



707, 727-787

STANDARD WIRING PRACTICES MANUAL

Chapter 20

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STANDARD WIRING PRACTICES MANUAL

Revision No. 41
Nov 01/2008

To: All holders of this Boeing Document D6-54446

Attached is the current revision to the 707, 727-787 Standard Wiring Practices Manual (SWPM).

This manual is available either as a printed manual, on microfilm, or digital products, or any combination of the three. This revision replaces all previous microfilm cartridges or digital products. All microfilm and digital products are reissued with all obsolete data deleted and all updated pages added.

For printed manuals, changes are indicated on the Effective Pages. The pages which are revised will be identified on the Effective Pages by an R (Revised), A (Added), O (Overflow, i.e. changes to the document structure and/or page layout), or D (Deleted). Each page in the Effective Pages is identified by Chapter-Section-Subject number, page number and page date. Pages replaced or deleted by this revision should be removed and destroyed.

All pages are included in this revision. Revision bars on the pages identify current revision changes.

NOTE: IF YOU RECEIVE PRINTED REVISIONS, PLEASE VERIFY THAT YOU HAVE RECEIVED AND FILED THE PREVIOUS REVISION. BOEING MUST BE NOTIFIED WITHIN 30 DAYS IF YOU HAVE NOT RECEIVED THE PREVIOUS REVISION. REQUESTS FOR REVISIONS OTHER THAN THE PREVIOUS REVISION WILL REQUIRE A COMPLETE MANUAL REPRINT SUBJECT TO REPRINT CHARGES SHOWN IN THE DATA AND SERVICES CATALOG.

It is Boeing's intent to maintain the wiring repair practices so that the necessary procedures are satisfactory for the operator to use. Please direct any comments, concerns, or suggestions to the Boeing Technical Publications focal.

Revision bars identify all technical changes, however, not all changes identified by revision bars are technical in nature. A description of the revised technical data is given in the HIGHLIGHTS section (next section).

TRANSMITTAL LETTER



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Location of Change

Description of Change

CHAPTER 20

20-10-15

The airworthiness limitations for FQIS wires and cables that have a shield are made more clear.

20-20-00

The procedure to bond a ground stud in Carbon Fiber Reinforced Plastic is added.

The procedure of electrical bonding to a carbon fiber reinforced plastic structure is added.

The procedure of electrical bonding through a clearance fit fastener is added.

The procedure of electrical bonding through a interference fit fastener is added.

20-20-00

Paragraph 1.E.

The general conditions for the preparation of a faying surface are made more clear.

20-20-00

Paragraph 1.G.

Airworthiness Limitations are added.

HIGHLIGHTS

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STANDARD WIRING PRACTICES MANUAL

INTRODUCTION

This manual contains the procedures and data that are necessary for the maintenance of the electrical wires and electrical termination on these Boeing Commercial Airplane models:

- 707
- 727
- 737
- 747
- 757
- 767
- 777
- 787

This manual also gives the data and procedures that are necessary for the maintenance of the wiring of these 777 model power plants:

- The Pratt & Whitney PW4000/777
- The Rolls-Royce RB 211 Trent 800.

NOTE: The wiring of the 777 model GE90 power plant is specified as line replaceable and, if unserviceable, must be returned to General Electric for repair.

Unless it is specified differently, the data and procedures in this manual are applicable for airplane wiring that has a Boeing part number. For the remaining wiring with a manufacturer part number, refer to the manufacturer or the applicable manual.

GENERAL INFORMATION



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Subject 20-64-12	ITT Cannon KO() Connector Assembly	Subject 20-40-00	21	Mar 30/1994
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DATA RELOCATION RECORD



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INTRODUCTION

The following is a list of the most used acronyms and abbreviations in Chapter 20.

Abbreviation	Term
Al	Aluminum
Al-Ch	Alumel-Chromel
APU	Auxiliary Power Unit
ARINC	Aeronautical Radio Incorporated
BMS	Boeing Material Standard
CAU	Circular Area Units
CMA	Circular Mil Area
Cn-Ch	Constantan-Chromel
CRES	Corrosion Resistant Steel
Cu	Copper
EMC	Electromagnetic Compatibility
ESDS	Electrostatic Discharge Sensitive
I.D.	Inside Diameter
LRU	Line Replaceable Unit
O.D.	Outside Diameter
QPL	Qualified Products List
WTC	Wire Type Code

DEFINITIONS



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STANDARD WIRING PRACTICES MANUAL

INTRODUCTION

This section gives the general instructions on how to find technical data in this manual.

1. CROSS REFERENCE INDEX

The Cross Reference Index is an alphanumeric list of the names, the part numbers, and the suppliers of the equipment in this manual. Each entry in the Cross Reference Index also gives the Chapter/Section/Subject where the assembly procedure or the maintenance data for the equipment can be found.

A usual entry in the Cross Reference Index can give this data about the equipment:

- The name, the part number, the supplier
- The part number, the supplier, the name
- The supplier, the part number, the name.

Other entries in the Cross Reference Index can give any of these:

- General maintenance data
- The name of an assembly or an installation procedure.

For example, to find the assembly procedure for a splice, look in the Cross Reference Index and find the word "Splice" that is followed by the part number for that splice. The assembly procedure can also be found by the part number first or by the supplier first.

2. CONTENTS OF A CHAPTER/SECTION/SUBJECT

Each Subject starts with a Table of Contents that gives:

- The major breakdown or subdivision
- The page number of the Subject where the major breakdown or subdivision starts.

The two types of Subjects in this manual are:

- The Subjects that give important maintenance data or conditions
- The Subjects that give the procedures for the assembly or the installation of equipment, or both.

For Subjects with the assembly or installation procedures give the part numbers and description of the equipment first, followed by the procedures.

3. IMPORTANT DATA TABLES

These are important data tables:

- Contact Crimp Tools in Subject 20-00-12
- Insulation Removal Tools in Subject 20-00-15
- Materials in Subject 20-00-11
- Wire Type Codes and Wire Part Numbers in Subject 20-00-13.

MANUAL USAGE

CHAPTER

20

**STANDARD WIRING
PRACTICES**



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O	45	Nov 01/2008	O	82	Nov 01/2008	O	7	Nov 01/2008
O	46	Nov 01/2008	O	83	Nov 01/2008	O	8	Nov 01/2008
O	47	Nov 01/2008	O	84	Nov 01/2008	O	9	Nov 01/2008
O	48	Nov 01/2008	O	85	Nov 01/2008	O	10	Nov 01/2008
O	49	Nov 01/2008	O	86	Nov 01/2008	O	11	Nov 01/2008
O	50	Nov 01/2008	O	87	Nov 01/2008		12	BLANK
O	51	Nov 01/2008	O	88	Nov 01/2008	20-00-15 CONTENTS		
O	52	Nov 01/2008	O	89	Nov 01/2008	O	1	Nov 01/2008
O	53	Nov 01/2008	O	90	Nov 01/2008		2	BLANK
O	54	Nov 01/2008	O	91	Nov 01/2008	20-00-15		
O	55	Nov 01/2008	O	92	Nov 01/2008	O	1	Nov 01/2008
O	56	Nov 01/2008	O	93	Nov 01/2008	O	2	Nov 01/2008
O	57	Nov 01/2008	O	94	Nov 01/2008	O	3	Nov 01/2008
O	58	Nov 01/2008	O	95	Nov 01/2008	O	4	Nov 01/2008
O	59	Nov 01/2008	O	96	Nov 01/2008	O	5	Nov 01/2008
O	60	Nov 01/2008	O	97	Nov 01/2008	O	6	Nov 01/2008

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O	7	Nov 01/2008	O	44	Nov 01/2008	O	5	Nov 01/2008
O	8	Nov 01/2008	O	45	Nov 01/2008	O	6	Nov 01/2008
O	9	Nov 01/2008	O	46	Nov 01/2008	O	7	Nov 01/2008
O	10	Nov 01/2008	O	47	Nov 01/2008	O	8	Nov 01/2008
O	11	Nov 01/2008	O	48	Nov 01/2008	20-02-20 CONTENTS		
O	12	Nov 01/2008	O	49	Nov 01/2008	O	1	Nov 01/2008
O	13	Nov 01/2008	O	50	Nov 01/2008		2	BLANK
O	14	Nov 01/2008	O	51	Nov 01/2008	20-02-20		
O	15	Nov 01/2008	O	52	Nov 01/2008	O	1	Nov 01/2008
O	16	Nov 01/2008	O	53	Nov 01/2008	O	2	Nov 01/2008
O	17	Nov 01/2008	O	54	Nov 01/2008	20-02-30 CONTENTS		
O	18	Nov 01/2008	O	55	Nov 01/2008	O	1	Nov 01/2008
O	19	Nov 01/2008	O	56	Nov 01/2008		2	BLANK
O	20	Nov 01/2008	O	57	Nov 01/2008	20-02-30		
O	21	Nov 01/2008	O	58	Nov 01/2008	O	1	Nov 01/2008
O	22	Nov 01/2008	O	59	Nov 01/2008	O	2	Nov 01/2008
O	23	Nov 01/2008	O	60	Nov 01/2008	20-10-04 CONTENTS		
O	24	Nov 01/2008	O	61	Nov 01/2008	O	1	Nov 01/2008
O	25	Nov 01/2008	O	62	Nov 01/2008		2	BLANK
O	26	Nov 01/2008	20-00-16 CONTENTS			20-10-04		
O	27	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	28	Nov 01/2008		2	BLANK	O	2	Nov 01/2008
O	29	Nov 01/2008	20-00-16			O	3	Nov 01/2008
O	30	Nov 01/2008	O	1	Nov 01/2008	O	4	Nov 01/2008
O	31	Nov 01/2008	O	2	Nov 01/2008	O	5	Nov 01/2008
O	32	Nov 01/2008	O	3	Nov 01/2008	O	6	Nov 01/2008
O	33	Nov 01/2008	O	4	Nov 01/2008	O	7	Nov 01/2008
O	34	Nov 01/2008	O	5	Nov 01/2008	O	8	Nov 01/2008
O	35	Nov 01/2008		6	BLANK	O	9	Nov 01/2008
O	36	Nov 01/2008	20-02-10 CONTENTS			O	10	Nov 01/2008
O	37	Nov 01/2008	O	1	Nov 01/2008	O	11	Nov 01/2008
O	38	Nov 01/2008		2	BLANK	O	12	Nov 01/2008
O	39	Nov 01/2008	20-02-10			O	13	Nov 01/2008
O	40	Nov 01/2008	O	1	Nov 01/2008	O	14	Nov 01/2008
O	41	Nov 01/2008	O	2	Nov 01/2008	O	15	Nov 01/2008
O	42	Nov 01/2008	O	3	Nov 01/2008	O	16	Nov 01/2008
O	43	Nov 01/2008	O	4	Nov 01/2008	O	17	Nov 01/2008

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O	18	Nov 01/2008	O	21	Nov 01/2008	O	58	Nov 01/2008
20-10-06 CONTENTS			O	22	Nov 01/2008	O	59	Nov 01/2008
O	1	Nov 01/2008	O	23	Nov 01/2008	O	60	Nov 01/2008
	2	BLANK	O	24	Nov 01/2008	O	61	Nov 01/2008
20-10-06			O	25	Nov 01/2008	O	62	Nov 01/2008
O	1	Nov 01/2008	O	26	Nov 01/2008	O	63	Nov 01/2008
O	2	Nov 01/2008	O	27	Nov 01/2008	O	64	Nov 01/2008
O	3	Nov 01/2008	O	28	Nov 01/2008	O	65	Nov 01/2008
O	4	Nov 01/2008	O	29	Nov 01/2008		66	BLANK
O	5	Nov 01/2008	O	30	Nov 01/2008	20-10-12 CONTENTS		
	6	BLANK	O	31	Nov 01/2008	O	1	Nov 01/2008
20-10-11 CONTENTS			O	32	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008	O	33	Nov 01/2008	20-10-12		
O	2	Nov 01/2008	O	34	Nov 01/2008	O	1	Nov 01/2008
O	3	Nov 01/2008	O	35	Nov 01/2008	O	2	Nov 01/2008
	4	BLANK	O	36	Nov 01/2008	O	3	Nov 01/2008
20-10-11			O	37	Nov 01/2008	O	4	Nov 01/2008
O	1	Nov 01/2008	O	38	Nov 01/2008	O	5	Nov 01/2008
O	2	Nov 01/2008	O	39	Nov 01/2008	O	6	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008	O	7	Nov 01/2008
O	4	Nov 01/2008	O	41	Nov 01/2008	O	8	Nov 01/2008
O	5	Nov 01/2008	O	42	Nov 01/2008	O	9	Nov 01/2008
O	6	Nov 01/2008	O	43	Nov 01/2008	O	10	Nov 01/2008
O	7	Nov 01/2008	O	44	Nov 01/2008	O	11	Nov 01/2008
O	8	Nov 01/2008	O	45	Nov 01/2008	O	12	Nov 01/2008
O	9	Nov 01/2008	O	46	Nov 01/2008	O	13	Nov 01/2008
O	10	Nov 01/2008	O	47	Nov 01/2008	O	14	Nov 01/2008
O	11	Nov 01/2008	O	48	Nov 01/2008	O	15	Nov 01/2008
O	12	Nov 01/2008	O	49	Nov 01/2008	O	16	Nov 01/2008
O	13	Nov 01/2008	O	50	Nov 01/2008	O	17	Nov 01/2008
O	14	Nov 01/2008	O	51	Nov 01/2008	O	18	Nov 01/2008
O	15	Nov 01/2008	O	52	Nov 01/2008	O	19	Nov 01/2008
O	16	Nov 01/2008	O	53	Nov 01/2008	O	20	Nov 01/2008
O	17	Nov 01/2008	O	54	Nov 01/2008	O	21	Nov 01/2008
O	18	Nov 01/2008	O	55	Nov 01/2008	O	22	Nov 01/2008
O	19	Nov 01/2008	O	56	Nov 01/2008	O	23	Nov 01/2008
O	20	Nov 01/2008	O	57	Nov 01/2008	O	24	Nov 01/2008

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O	26	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	27	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	28	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	29	Nov 01/2008	O	8	Nov 01/2008	O	45	Nov 01/2008
O	30	Nov 01/2008	O	9	Nov 01/2008	O	46	Nov 01/2008
O	31	Nov 01/2008	O	10	Nov 01/2008	O	47	Nov 01/2008
O	32	Nov 01/2008	O	11	Nov 01/2008	O	48	Nov 01/2008
O	33	Nov 01/2008	O	12	Nov 01/2008	O	49	Nov 01/2008
O	34	Nov 01/2008	O	13	Nov 01/2008	O	50	Nov 01/2008
O	35	Nov 01/2008	O	14	Nov 01/2008	O	51	Nov 01/2008
O	36	Nov 01/2008	O	15	Nov 01/2008	O	52	Nov 01/2008
O	37	Nov 01/2008	O	16	Nov 01/2008	O	53	Nov 01/2008
O	38	Nov 01/2008	O	17	Nov 01/2008	O	54	Nov 01/2008
O	39	Nov 01/2008	O	18	Nov 01/2008	O	55	Nov 01/2008
O	40	Nov 01/2008	O	19	Nov 01/2008	O	56	Nov 01/2008
O	41	Nov 01/2008	O	20	Nov 01/2008	O	57	Nov 01/2008
O	42	Nov 01/2008	O	21	Nov 01/2008	O	58	Nov 01/2008
O	43	Nov 01/2008	O	22	Nov 01/2008	O	59	Nov 01/2008
O	44	Nov 01/2008	O	23	Nov 01/2008	O	60	Nov 01/2008
O	45	Nov 01/2008	O	24	Nov 01/2008	O	61	Nov 01/2008
O	46	Nov 01/2008	O	25	Nov 01/2008	O	62	Nov 01/2008
O	47	Nov 01/2008	O	26	Nov 01/2008	O	63	Nov 01/2008
O	48	Nov 01/2008	O	27	Nov 01/2008	O	64	Nov 01/2008
O	49	Nov 01/2008	O	28	Nov 01/2008	O	65	Nov 01/2008
O	50	Nov 01/2008	O	29	Nov 01/2008	O	66	Nov 01/2008
O	51	Nov 01/2008	O	30	Nov 01/2008	O	67	Nov 01/2008
	52	BLANK	O	31	Nov 01/2008	O	68	Nov 01/2008
20-10-13 CONTENTS			O	32	Nov 01/2008	O	69	Nov 01/2008
O	1	Nov 01/2008	O	33	Nov 01/2008	O	70	Nov 01/2008
O	2	Nov 01/2008	O	34	Nov 01/2008	O	71	Nov 01/2008
O	3	Nov 01/2008	O	35	Nov 01/2008	O	72	Nov 01/2008
	4	BLANK	O	36	Nov 01/2008	O	73	Nov 01/2008
20-10-13			O	37	Nov 01/2008	O	74	Nov 01/2008
O	1	Nov 01/2008	O	38	Nov 01/2008	O	75	Nov 01/2008
O	2	Nov 01/2008	O	39	Nov 01/2008	O	76	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008	O	77	Nov 01/2008

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O	79	Nov 01/2008	O	116	Nov 01/2008	R	19	Nov 01/2008
O	80	Nov 01/2008	O	117	Nov 01/2008	R	20	Nov 01/2008
O	81	Nov 01/2008	O	118	Nov 01/2008	O	21	Nov 01/2008
O	82	Nov 01/2008	O	119	Nov 01/2008	O	22	Nov 01/2008
O	83	Nov 01/2008	O	120	Nov 01/2008	R	23	Nov 01/2008
O	84	Nov 01/2008	O	121	Nov 01/2008	O	24	Nov 01/2008
O	85	Nov 01/2008		122	BLANK	O	25	Nov 01/2008
O	86	Nov 01/2008	20-10-14 CONTENTS			R	26	Nov 01/2008
O	87	Nov 01/2008	O	1	Nov 01/2008	R	27	Nov 01/2008
O	88	Nov 01/2008		2	BLANK	R	28	Nov 01/2008
O	89	Nov 01/2008	20-10-14			O	29	Nov 01/2008
O	90	Nov 01/2008	O	1	Nov 01/2008	O	30	Nov 01/2008
O	91	Nov 01/2008	O	2	Nov 01/2008	O	31	Nov 01/2008
O	92	Nov 01/2008	20-10-15 CONTENTS			O	32	Nov 01/2008
O	93	Nov 01/2008	O	1	Nov 01/2008	O	33	Nov 01/2008
O	94	Nov 01/2008	O	2	Nov 01/2008	O	34	Nov 01/2008
O	95	Nov 01/2008	O	3	Nov 01/2008	O	35	Nov 01/2008
O	96	Nov 01/2008		4	BLANK	O	36	Nov 01/2008
O	97	Nov 01/2008	20-10-15			O	37	Nov 01/2008
O	98	Nov 01/2008	O	1	Nov 01/2008	O	38	Nov 01/2008
O	99	Nov 01/2008	O	2	Nov 01/2008	O	39	Nov 01/2008
O	100	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
O	101	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	102	Nov 01/2008	R	5	Nov 01/2008	O	42	Nov 01/2008
O	103	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	104	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	105	Nov 01/2008	R	8	Nov 01/2008	O	45	Nov 01/2008
O	106	Nov 01/2008	O	9	Nov 01/2008	O	46	Nov 01/2008
O	107	Nov 01/2008	O	10	Nov 01/2008	O	47	Nov 01/2008
O	108	Nov 01/2008	O	11	Nov 01/2008	O	48	Nov 01/2008
O	109	Nov 01/2008	O	12	Nov 01/2008	O	49	Nov 01/2008
O	110	Nov 01/2008	O	13	Nov 01/2008	O	50	Nov 01/2008
O	111	Nov 01/2008	O	14	Nov 01/2008	O	51	Nov 01/2008
O	112	Nov 01/2008	O	15	Nov 01/2008	O	52	Nov 01/2008
O	113	Nov 01/2008	O	16	Nov 01/2008	O	53	Nov 01/2008
O	114	Nov 01/2008	O	17	Nov 01/2008	O	54	Nov 01/2008

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O	55	Nov 01/2008	O	92	Nov 01/2008	O	1	Nov 01/2008
O	56	Nov 01/2008	O	93	Nov 01/2008		2	BLANK
O	57	Nov 01/2008	O	94	Nov 01/2008	20-10-16		
O	58	Nov 01/2008	O	95	Nov 01/2008	O	1	Nov 01/2008
O	59	Nov 01/2008	O	96	Nov 01/2008	O	2	Nov 01/2008
O	60	Nov 01/2008	O	97	Nov 01/2008	O	3	Nov 01/2008
O	61	Nov 01/2008	O	98	Nov 01/2008	O	4	Nov 01/2008
O	62	Nov 01/2008	O	99	Nov 01/2008	O	5	Nov 01/2008
O	63	Nov 01/2008	O	100	Nov 01/2008	O	6	Nov 01/2008
O	64	Nov 01/2008	O	101	Nov 01/2008	O	7	Nov 01/2008
O	65	Nov 01/2008	O	102	Nov 01/2008	O	8	Nov 01/2008
O	66	Nov 01/2008	O	103	Nov 01/2008	O	9	Nov 01/2008
O	67	Nov 01/2008	O	104	Nov 01/2008		10	BLANK
O	68	Nov 01/2008	O	105	Nov 01/2008	20-10-17 CONTENTS		
O	69	Nov 01/2008	O	106	Nov 01/2008	O	1	Nov 01/2008
O	70	Nov 01/2008	O	107	Nov 01/2008		2	BLANK
O	71	Nov 01/2008	O	108	Nov 01/2008	20-10-17		
O	72	Nov 01/2008	O	109	Nov 01/2008	O	1	Nov 01/2008
O	73	Nov 01/2008	O	110	Nov 01/2008	O	2	Nov 01/2008
O	74	Nov 01/2008	O	111	Nov 01/2008	O	3	Nov 01/2008
O	75	Nov 01/2008	O	112	Nov 01/2008		4	BLANK
O	76	Nov 01/2008	O	113	Nov 01/2008	20-10-18 CONTENTS		
O	77	Nov 01/2008	O	114	Nov 01/2008	O	1	Nov 01/2008
O	78	Nov 01/2008	O	115	Nov 01/2008		2	BLANK
O	79	Nov 01/2008	O	116	Nov 01/2008	20-10-18		
O	80	Nov 01/2008	O	117	Nov 01/2008	O	1	Nov 01/2008
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O	82	Nov 01/2008	O	119	Nov 01/2008	20-10-19 CONTENTS		
O	83	Nov 01/2008	O	120	Nov 01/2008	O	1	Nov 01/2008
O	84	Nov 01/2008	O	121	Nov 01/2008	O	2	Nov 01/2008
O	85	Nov 01/2008	O	122	Nov 01/2008	20-10-19		
O	86	Nov 01/2008	O	123	Nov 01/2008	O	1	Nov 01/2008
O	87	Nov 01/2008	O	124	Nov 01/2008	O	2	Nov 01/2008
O	88	Nov 01/2008	O	125	Nov 01/2008	O	3	Nov 01/2008
O	89	Nov 01/2008	O	126	Nov 01/2008	O	4	Nov 01/2008
O	90	Nov 01/2008	A	127	Nov 01/2008	O	5	Nov 01/2008
O	91	Nov 01/2008	A	128	Nov 01/2008	O	6	Nov 01/2008

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O	8	Nov 01/2008	O	23	Nov 01/2008	O	24	Nov 01/2008
O	9	Nov 01/2008	O	24	Nov 01/2008	O	25	Nov 01/2008
O	10	Nov 01/2008	O	25	Nov 01/2008	O	26	Nov 01/2008
O	11	Nov 01/2008		26	BLANK	O	27	Nov 01/2008
O	12	Nov 01/2008	20-10-21 CONTENTS			O	28	Nov 01/2008
O	13	Nov 01/2008	O	1	Nov 01/2008	O	29	Nov 01/2008
O	14	Nov 01/2008		2	BLANK	O	30	Nov 01/2008
O	15	Nov 01/2008	20-10-21			O	31	Nov 01/2008
O	16	Nov 01/2008	O	1	Nov 01/2008	O	32	Nov 01/2008
O	17	Nov 01/2008	O	2	Nov 01/2008	O	33	Nov 01/2008
	18	BLANK	20-10-22 CONTENTS			O	34	Nov 01/2008
20-10-20 CONTENTS			O	1	Nov 01/2008	O	35	Nov 01/2008
O	1	Nov 01/2008		2	BLANK	O	36	Nov 01/2008
	2	BLANK	20-10-22			O	37	Nov 01/2008
20-10-20			O	1	Nov 01/2008	O	38	Nov 01/2008
O	1	Nov 01/2008	O	2	Nov 01/2008	O	39	Nov 01/2008
O	2	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
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O	4	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
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O	13	Nov 01/2008	O	14	Nov 01/2008	O	51	Nov 01/2008
O	14	Nov 01/2008	O	15	Nov 01/2008	O	52	Nov 01/2008
O	15	Nov 01/2008	O	16	Nov 01/2008	O	53	Nov 01/2008
O	16	Nov 01/2008	O	17	Nov 01/2008	O	54	Nov 01/2008
O	17	Nov 01/2008	O	18	Nov 01/2008	O	55	Nov 01/2008
O	18	Nov 01/2008	O	19	Nov 01/2008	O	56	Nov 01/2008
O	19	Nov 01/2008	O	20	Nov 01/2008	O	57	Nov 01/2008
O	20	Nov 01/2008	O	21	Nov 01/2008	O	58	Nov 01/2008
O	21	Nov 01/2008	O	22	Nov 01/2008	O	59	Nov 01/2008

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O	60	Nov 01/2008	O	11	Nov 01/2008	O	48	Nov 01/2008
O	61	Nov 01/2008	O	12	Nov 01/2008	O	49	Nov 01/2008
O	62	Nov 01/2008	O	13	Nov 01/2008	O	50	Nov 01/2008
O	63	Nov 01/2008	O	14	Nov 01/2008	O	51	Nov 01/2008
O	64	Nov 01/2008	O	15	Nov 01/2008	O	52	Nov 01/2008
O	65	Nov 01/2008	O	16	Nov 01/2008	O	53	Nov 01/2008
O	66	Nov 01/2008	O	17	Nov 01/2008	O	54	Nov 01/2008
O	67	Nov 01/2008	O	18	Nov 01/2008	O	55	Nov 01/2008
O	68	Nov 01/2008	O	19	Nov 01/2008	O	56	Nov 01/2008
O	69	Nov 01/2008	O	20	Nov 01/2008	O	57	Nov 01/2008
O	70	Nov 01/2008	O	21	Nov 01/2008	O	58	Nov 01/2008
O	71	Nov 01/2008	O	22	Nov 01/2008	O	59	Nov 01/2008
	72	BLANK	O	23	Nov 01/2008	O	60	Nov 01/2008
20-10-91 CONTENTS			O	24	Nov 01/2008	O	61	Nov 01/2008
O	1	Nov 01/2008	O	25	Nov 01/2008	O	62	Nov 01/2008
	2	BLANK	O	26	Nov 01/2008	O	63	Nov 01/2008
20-10-91			O	27	Nov 01/2008	O	64	Nov 01/2008
O	1	Nov 01/2008	O	28	Nov 01/2008	O	65	Nov 01/2008
O	2	Nov 01/2008	O	29	Nov 01/2008	O	66	Nov 01/2008
O	3	Nov 01/2008	O	30	Nov 01/2008	O	67	Nov 01/2008
O	4	Nov 01/2008	O	31	Nov 01/2008	O	68	Nov 01/2008
O	5	Nov 01/2008	O	32	Nov 01/2008	O	69	Nov 01/2008
	6	BLANK	O	33	Nov 01/2008	O	70	Nov 01/2008
20-11-11 CONTENTS			O	34	Nov 01/2008	O	71	Nov 01/2008
O	1	Nov 01/2008	O	35	Nov 01/2008	O	72	Nov 01/2008
O	2	Nov 01/2008	O	36	Nov 01/2008	O	73	Nov 01/2008
20-11-11			O	37	Nov 01/2008		74	BLANK
O	1	Nov 01/2008	O	38	Nov 01/2008	20-12-11 CONTENTS		
O	2	Nov 01/2008	O	39	Nov 01/2008	O	1	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008	O	2	Nov 01/2008
O	4	Nov 01/2008	O	41	Nov 01/2008	20-12-11		
O	5	Nov 01/2008	O	42	Nov 01/2008	O	1	Nov 01/2008
O	6	Nov 01/2008	O	43	Nov 01/2008	O	2	Nov 01/2008
O	7	Nov 01/2008	O	44	Nov 01/2008	O	3	Nov 01/2008
O	8	Nov 01/2008	O	45	Nov 01/2008	O	4	Nov 01/2008
O	9	Nov 01/2008	O	46	Nov 01/2008	O	5	Nov 01/2008
O	10	Nov 01/2008	O	47	Nov 01/2008	O	6	Nov 01/2008

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20-12-11 (continued)			20-12-20			20-12-21 (continued)		
O	7	Nov 01/2008	O	1	Nov 01/2008		20	BLANK
O	8	Nov 01/2008	O	2	Nov 01/2008	20-14-11 CONTENTS		
O	9	Nov 01/2008	O	3	Nov 01/2008	O	1	Nov 01/2008
O	10	Nov 01/2008	O	4	Nov 01/2008	O	2	Nov 01/2008
O	11	Nov 01/2008	O	5	Nov 01/2008	20-14-11		
O	12	Nov 01/2008	O	6	Nov 01/2008	O	1	Nov 01/2008
O	13	Nov 01/2008	O	7	Nov 01/2008	O	2	Nov 01/2008
O	14	Nov 01/2008	O	8	Nov 01/2008	O	3	Nov 01/2008
O	15	Nov 01/2008	O	9	Nov 01/2008	O	4	Nov 01/2008
O	16	Nov 01/2008	O	10	Nov 01/2008	O	5	Nov 01/2008
O	17	Nov 01/2008	O	11	Nov 01/2008	O	6	Nov 01/2008
O	18	Nov 01/2008	O	12	Nov 01/2008	O	7	Nov 01/2008
O	19	Nov 01/2008	O	13	Nov 01/2008	O	8	Nov 01/2008
O	20	Nov 01/2008		14	BLANK	O	9	Nov 01/2008
O	21	Nov 01/2008	20-12-21 CONTENTS			O	10	Nov 01/2008
O	22	Nov 01/2008	O	1	Nov 01/2008	O	11	Nov 01/2008
O	23	Nov 01/2008		2	BLANK	O	12	Nov 01/2008
O	24	Nov 01/2008	20-12-21			O	13	Nov 01/2008
O	25	Nov 01/2008	O	1	Nov 01/2008	O	14	Nov 01/2008
O	26	Nov 01/2008	O	2	Nov 01/2008	O	15	Nov 01/2008
O	27	Nov 01/2008	O	3	Nov 01/2008	O	16	Nov 01/2008
O	28	Nov 01/2008	O	4	Nov 01/2008	O	17	Nov 01/2008
O	29	Nov 01/2008	O	5	Nov 01/2008	O	18	Nov 01/2008
O	30	Nov 01/2008	O	6	Nov 01/2008	O	19	Nov 01/2008
O	31	Nov 01/2008	O	7	Nov 01/2008	O	20	Nov 01/2008
O	32	Nov 01/2008	O	8	Nov 01/2008	O	21	Nov 01/2008
O	33	Nov 01/2008	O	9	Nov 01/2008	O	22	Nov 01/2008
O	34	Nov 01/2008	O	10	Nov 01/2008	O	23	Nov 01/2008
O	35	Nov 01/2008	O	11	Nov 01/2008	O	24	Nov 01/2008
O	36	Nov 01/2008	O	12	Nov 01/2008	O	25	Nov 01/2008
O	37	Nov 01/2008	O	13	Nov 01/2008	O	26	Nov 01/2008
O	38	Nov 01/2008	O	14	Nov 01/2008	O	27	Nov 01/2008
O	39	Nov 01/2008	O	15	Nov 01/2008	O	28	Nov 01/2008
	40	BLANK	O	16	Nov 01/2008	O	29	Nov 01/2008
20-12-20 CONTENTS			O	17	Nov 01/2008	O	30	Nov 01/2008
O	1	Nov 01/2008	O	18	Nov 01/2008	O	31	Nov 01/2008
	2	BLANK	O	19	Nov 01/2008	O	32	Nov 01/2008

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20-14-11 (continued)			20-14-12 (continued)			20-15-21		
O	33	Nov 01/2008	O	18	Nov 01/2008	O	1	Nov 01/2008
O	34	Nov 01/2008	20-14-51 CONTENTS			O	2	Nov 01/2008
O	35	Nov 01/2008	O	1	Nov 01/2008	O	3	Nov 01/2008
O	36	Nov 01/2008		2	BLANK	O	4	Nov 01/2008
O	37	Nov 01/2008	20-14-51			O	5	Nov 01/2008
O	38	Nov 01/2008	O	1	Nov 01/2008	O	6	Nov 01/2008
O	39	Nov 01/2008	O	2	Nov 01/2008	20-15-26 CONTENTS		
O	40	Nov 01/2008	O	3	Nov 01/2008	O	1	Nov 01/2008
O	41	Nov 01/2008		4	BLANK		2	BLANK
O	42	Nov 01/2008	20-14-52 CONTENTS			20-15-26		
O	43	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	44	Nov 01/2008		2	BLANK	O	2	Nov 01/2008
O	45	Nov 01/2008	20-14-52			O	3	Nov 01/2008
O	46	Nov 01/2008	O	1	Nov 01/2008	O	4	Nov 01/2008
O	47	Nov 01/2008	O	2	Nov 01/2008	20-15-31 CONTENTS		
O	48	BLANK	O	3	Nov 01/2008	O	1	Nov 01/2008
20-14-12 CONTENTS			O	4	Nov 01/2008		2	BLANK
O	1	Nov 01/2008	O	5	Nov 01/2008	20-15-31		
	2	BLANK	O	6	Nov 01/2008	O	1	Nov 01/2008
20-14-12			O	7	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008	O	8	Nov 01/2008	O	3	Nov 01/2008
O	2	Nov 01/2008	O	9	Nov 01/2008	O	4	Nov 01/2008
O	3	Nov 01/2008	O	10	Nov 01/2008	20-15-33 CONTENTS		
O	4	Nov 01/2008	O	11	Nov 01/2008	O	1	Nov 01/2008
O	5	Nov 01/2008	O	12	Nov 01/2008		2	BLANK
O	6	Nov 01/2008	20-15-04 CONTENTS			20-15-33		
O	7	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	8	Nov 01/2008		2	BLANK	O	2	Nov 01/2008
O	9	Nov 01/2008	20-15-04			O	3	Nov 01/2008
O	10	Nov 01/2008	O	1	Nov 01/2008	O	4	Nov 01/2008
O	11	Nov 01/2008	O	2	Nov 01/2008	O	5	Nov 01/2008
O	12	Nov 01/2008	O	3	Nov 01/2008		6	BLANK
O	13	Nov 01/2008	O	4	Nov 01/2008	20-15-35 CONTENTS		
O	14	Nov 01/2008	20-15-21 CONTENTS			O	1	Nov 01/2008
O	15	Nov 01/2008	O	1	Nov 01/2008		2	BLANK
O	16	Nov 01/2008		2	BLANK	20-15-35		
O	17	Nov 01/2008				O	1	Nov 01/2008

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20-15-35 (continued)			20-15-43 (continued)			20-15-48 CONTENTS		
O	2	Nov 01/2008	O	5	Nov 01/2008	O	1	Nov 01/2008
20-15-41 CONTENTS			O	6	Nov 01/2008		2	BLANK
O	1	Nov 01/2008	O	7	Nov 01/2008	20-15-48		
	2	BLANK	O	8	Nov 01/2008	O	1	Nov 01/2008
20-15-41			O	9	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008	O	10	Nov 01/2008	O	3	Nov 01/2008
O	2	Nov 01/2008	O	11	Nov 01/2008	O	4	Nov 01/2008
O	3	Nov 01/2008	O	12	Nov 01/2008	O	5	Nov 01/2008
O	4	Nov 01/2008	20-15-46 CONTENTS			O	6	Nov 01/2008
O	5	Nov 01/2008	O	1	Nov 01/2008	O	7	Nov 01/2008
O	6	Nov 01/2008		2	BLANK	O	8	Nov 01/2008
O	7	Nov 01/2008	20-15-46			O	9	Nov 01/2008
O	8	Nov 01/2008	O	1	Nov 01/2008	O	10	Nov 01/2008
20-15-42 CONTENTS			O	2	Nov 01/2008	O	11	Nov 01/2008
O	1	Nov 01/2008	O	3	Nov 01/2008	O	12	Nov 01/2008
	2	BLANK	O	4	Nov 01/2008	O	13	Nov 01/2008
20-15-42			O	5	Nov 01/2008	O	14	Nov 01/2008
O	1	Nov 01/2008	O	6	Nov 01/2008	O	15	Nov 01/2008
O	2	Nov 01/2008	O	7	Nov 01/2008		16	BLANK
O	3	Nov 01/2008	O	8	Nov 01/2008	20-15-49 CONTENTS		
O	4	Nov 01/2008	O	9	Nov 01/2008	O	1	Nov 01/2008
O	5	Nov 01/2008	O	10	Nov 01/2008		2	BLANK
O	6	Nov 01/2008	O	11	Nov 01/2008	20-15-49		
O	7	Nov 01/2008	O	12	Nov 01/2008	O	1	Nov 01/2008
O	8	Nov 01/2008	O	13	Nov 01/2008	O	2	Nov 01/2008
O	9	Nov 01/2008	O	14	Nov 01/2008	O	3	Nov 01/2008
O	10	Nov 01/2008	O	15	Nov 01/2008	O	4	Nov 01/2008
O	11	Nov 01/2008	O	16	Nov 01/2008	O	5	Nov 01/2008
	12	BLANK	O	17	Nov 01/2008	O	6	Nov 01/2008
20-15-43 CONTENTS			O	18	Nov 01/2008	O	7	Nov 01/2008
O	1	Nov 01/2008	O	19	Nov 01/2008	O	8	Nov 01/2008
	2	BLANK	O	20	Nov 01/2008	O	9	Nov 01/2008
20-15-43			O	21	Nov 01/2008	O	10	Nov 01/2008
O	1	Nov 01/2008	O	22	Nov 01/2008	O	11	Nov 01/2008
O	2	Nov 01/2008	O	23	Nov 01/2008	O	12	Nov 01/2008
O	3	Nov 01/2008	O	24	Nov 01/2008	20-20-00 CONTENTS		
O	4	Nov 01/2008				O	1	Nov 01/2008

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O	2	Nov 01/2008	R	34	Nov 01/2008	A	71	Nov 01/2008
A	3	Nov 01/2008	R	35	Nov 01/2008	A	72	Nov 01/2008
A	4	BLANK	R	36	Nov 01/2008	A	73	Nov 01/2008
20-20-00			R	37	Nov 01/2008	A	74	Nov 01/2008
R	1	Nov 01/2008	R	38	Nov 01/2008	A	75	Nov 01/2008
R	2	Nov 01/2008	R	39	Nov 01/2008	A	76	Nov 01/2008
R	3	Nov 01/2008	O	40	Nov 01/2008	A	77	Nov 01/2008
O	4	Nov 01/2008	O	41	Nov 01/2008	A	78	Nov 01/2008
R	5	Nov 01/2008	R	42	Nov 01/2008	A	79	Nov 01/2008
R	6	Nov 01/2008	R	43	Nov 01/2008	A	80	Nov 01/2008
R	7	Nov 01/2008	R	44	Nov 01/2008	A	81	Nov 01/2008
R	8	Nov 01/2008	R	45	Nov 01/2008	A	82	Nov 01/2008
O	9	Nov 01/2008	R	46	Nov 01/2008	A	83	Nov 01/2008
R	10	Nov 01/2008	R	47	Nov 01/2008	A	84	Nov 01/2008
R	11	Nov 01/2008	R	48	Nov 01/2008	A	85	Nov 01/2008
O	12	Nov 01/2008	R	49	Nov 01/2008	A	86	BLANK
O	13	Nov 01/2008	R	50	Nov 01/2008	20-20-10 CONTENTS		
O	14	Nov 01/2008	O	51	Nov 01/2008	O	1	Nov 01/2008
O	15	Nov 01/2008	R	52	Nov 01/2008		2	BLANK
R	16	Nov 01/2008	R	53	Nov 01/2008	20-20-10		
R	17	Nov 01/2008	R	54	Nov 01/2008	O	1	Nov 01/2008
O	18	Nov 01/2008	R	55	Nov 01/2008	O	2	Nov 01/2008
O	19	Nov 01/2008	R	56	Nov 01/2008	O	3	Nov 01/2008
O	20	Nov 01/2008	R	57	Nov 01/2008	O	4	Nov 01/2008
O	21	Nov 01/2008	R	58	Nov 01/2008	O	5	Nov 01/2008
O	22	Nov 01/2008	R	59	Nov 01/2008	O	6	Nov 01/2008
O	23	Nov 01/2008	R	60	Nov 01/2008	20-20-11 CONTENTS		
O	24	Nov 01/2008	R	61	Nov 01/2008	O	1	Nov 01/2008
R	25	Nov 01/2008	O	62	Nov 01/2008		2	BLANK
O	26	Nov 01/2008	R	63	Nov 01/2008	20-20-11		
R	27	Nov 01/2008	R	64	Nov 01/2008	O	1	Nov 01/2008
O	28	Nov 01/2008	R	65	Nov 01/2008	O	2	Nov 01/2008
R	29	Nov 01/2008	R	66	Nov 01/2008	O	3	Nov 01/2008
O	30	Nov 01/2008	R	67	Nov 01/2008	O	4	Nov 01/2008
O	31	Nov 01/2008	R	68	Nov 01/2008	O	5	Nov 01/2008
O	32	Nov 01/2008	R	69	Nov 01/2008	O	6	Nov 01/2008
R	33	Nov 01/2008	R	70	Nov 01/2008	O	7	Nov 01/2008

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20-20-11 (continued)			20-23-03 CONTENTS			20-23-17 (continued)		
	8	BLANK	O	1	Nov 01/2008	O	7	Nov 01/2008
20-20-12 CONTENTS				2	BLANK	O	8	Nov 01/2008
O	1	Nov 01/2008	20-23-03			O	9	Nov 01/2008
	2	BLANK	O	1	Nov 01/2008	O	10	Nov 01/2008
20-20-12			O	2	Nov 01/2008	O	11	Nov 01/2008
O	1	Nov 01/2008	20-23-15 CONTENTS			O	12	Nov 01/2008
O	2	Nov 01/2008	O	1	Nov 01/2008	O	13	Nov 01/2008
O	3	Nov 01/2008		2	BLANK	O	14	Nov 01/2008
O	4	Nov 01/2008	20-23-15			O	15	Nov 01/2008
O	5	Nov 01/2008	O	1	Nov 01/2008	O	16	Nov 01/2008
O	6	Nov 01/2008	O	2	Nov 01/2008	O	17	Nov 01/2008
O	7	Nov 01/2008	O	3	Nov 01/2008	O	18	Nov 01/2008
	8	BLANK	O	4	Nov 01/2008	O	19	Nov 01/2008
20-22-00 CONTENTS			O	5	Nov 01/2008	O	20	Nov 01/2008
O	1	Nov 01/2008	O	6	Nov 01/2008	O	21	Nov 01/2008
	2	BLANK	O	7	Nov 01/2008	O	22	Nov 01/2008
20-22-00			O	8	Nov 01/2008	O	23	Nov 01/2008
O	1	Nov 01/2008	O	9	Nov 01/2008	O	24	Nov 01/2008
	2	BLANK	O	10	Nov 01/2008	O	25	Nov 01/2008
20-23-00 CONTENTS			O	11	Nov 01/2008	O	26	Nov 01/2008
O	1	Nov 01/2008	O	12	Nov 01/2008	O	27	Nov 01/2008
	2	BLANK	20-23-16 CONTENTS			O	28	Nov 01/2008
20-23-00			O	1	Nov 01/2008	O	29	Nov 01/2008
O	1	Nov 01/2008		2	BLANK	O	30	Nov 01/2008
	2	BLANK	20-23-16			O	31	Nov 01/2008
20-23-01 CONTENTS			O	1	Nov 01/2008	O	32	Nov 01/2008
O	1	Nov 01/2008		2	BLANK	O	33	Nov 01/2008
	2	BLANK	20-23-17 CONTENTS			O	34	Nov 01/2008
20-23-01			O	1	Nov 01/2008	O	35	Nov 01/2008
O	1	Nov 01/2008		2	BLANK	O	36	Nov 01/2008
O	2	Nov 01/2008	20-23-17			O	37	Nov 01/2008
O	3	Nov 01/2008	O	1	Nov 01/2008	O	38	Nov 01/2008
O	4	Nov 01/2008	O	2	Nov 01/2008	O	39	Nov 01/2008
O	5	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
O	6	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	7	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	8	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008

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O	44	Nov 01/2008	O	3	Nov 01/2008	O	12	Nov 01/2008
O	45	Nov 01/2008	O	4	Nov 01/2008	O	13	Nov 01/2008
O	46	Nov 01/2008	O	5	Nov 01/2008	O	14	Nov 01/2008
O	47	Nov 01/2008	O	6	Nov 01/2008	O	15	Nov 01/2008
	48	BLANK	O	7	Nov 01/2008	O	16	Nov 01/2008
20-23-19 CONTENTS			O	8	Nov 01/2008	20-24-00 CONTENTS		
O	1	Nov 01/2008	O	9	Nov 01/2008	O	1	Nov 01/2008
	2	BLANK	O	10	Nov 01/2008		2	BLANK
20-23-19			O	11	Nov 01/2008	20-24-00		
O	1	Nov 01/2008	O	12	Nov 01/2008	O	1	Nov 01/2008
O	2	Nov 01/2008	O	13	Nov 01/2008	O	2	Nov 01/2008
20-23-30 CONTENTS			O	14	Nov 01/2008	O	3	Nov 01/2008
O	1	Nov 01/2008	O	15	Nov 01/2008	O	4	Nov 01/2008
	2	BLANK	O	16	Nov 01/2008	O	5	Nov 01/2008
20-23-30			O	17	Nov 01/2008	O	6	Nov 01/2008
O	1	Nov 01/2008	O	18	Nov 01/2008	O	7	Nov 01/2008
O	2	Nov 01/2008	O	19	Nov 01/2008	O	8	Nov 01/2008
O	3	Nov 01/2008	O	20	Nov 01/2008	20-24-01 CONTENTS		
O	4	Nov 01/2008	O	21	Nov 01/2008	O	1	Nov 01/2008
O	5	Nov 01/2008	O	22	Nov 01/2008		2	BLANK
O	6	Nov 01/2008	O	23	Nov 01/2008	20-24-01		
O	7	Nov 01/2008	O	24	Nov 01/2008	O	1	Nov 01/2008
O	8	Nov 01/2008	20-23-39 CONTENTS			O	2	Nov 01/2008
O	9	Nov 01/2008	O	1	Nov 01/2008	20-24-02 CONTENTS		
O	10	Nov 01/2008		2	BLANK	O	1	Nov 01/2008
20-23-32 CONTENTS			20-23-39				2	BLANK
O	1	Nov 01/2008	O	1	Nov 01/2008	20-24-02		
	2	BLANK	O	2	Nov 01/2008	O	1	Nov 01/2008
20-23-32			O	3	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008	O	4	Nov 01/2008	20-24-12 CONTENTS		
O	2	Nov 01/2008	O	5	Nov 01/2008	O	1	Nov 01/2008
20-23-37 CONTENTS			O	6	Nov 01/2008		2	BLANK
O	1	Nov 01/2008	O	7	Nov 01/2008	20-24-12		
	2	BLANK	O	8	Nov 01/2008	O	1	Nov 01/2008
20-23-37			O	9	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008	O	10	Nov 01/2008	O	3	Nov 01/2008
O	2	Nov 01/2008	O	11	Nov 01/2008	O	4	Nov 01/2008

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O	5	Nov 01/2008	O	12	Nov 01/2008	O	1	Nov 01/2008
O	6	Nov 01/2008	O	13	Nov 01/2008		2	BLANK
O	7	Nov 01/2008	O	14	Nov 01/2008	20-24-25		
O	8	Nov 01/2008	O	15	Nov 01/2008	O	1	Nov 01/2008
O	9	Nov 01/2008	O	16	Nov 01/2008	O	2	Nov 01/2008
O	10	Nov 01/2008	O	17	Nov 01/2008	O	3	Nov 01/2008
O	11	Nov 01/2008	O	18	Nov 01/2008	O	4	Nov 01/2008
O	12	Nov 01/2008	O	19	Nov 01/2008	20-24-26 CONTENTS		
O	13	Nov 01/2008		20	BLANK	O	1	Nov 01/2008
O	14	Nov 01/2008	20-24-21 CONTENTS				2	BLANK
O	15	Nov 01/2008	O	1	Nov 01/2008	20-24-26		
O	16	Nov 01/2008		2	BLANK	O	1	Nov 01/2008
20-24-14 CONTENTS			20-24-21			O	2	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	O	3	Nov 01/2008
	2	BLANK	O	2	Nov 01/2008	O	4	Nov 01/2008
20-24-14			O	3	Nov 01/2008	O	5	Nov 01/2008
O	1	Nov 01/2008	O	4	Nov 01/2008	O	6	Nov 01/2008
O	2	Nov 01/2008	O	5	Nov 01/2008	20-24-27 CONTENTS		
O	3	Nov 01/2008	O	6	Nov 01/2008	O	1	Nov 01/2008
O	4	Nov 01/2008	20-24-22 CONTENTS				2	BLANK
O	5	Nov 01/2008	O	1	Nov 01/2008	20-24-27		
	6	BLANK		2	BLANK	O	1	Nov 01/2008
20-24-20 CONTENTS			20-24-22			O	2	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	20-25-00 CONTENTS		
	2	BLANK	O	2	Nov 01/2008	O	1	Nov 01/2008
20-24-20			O	3	Nov 01/2008		2	BLANK
O	1	Nov 01/2008	O	4	Nov 01/2008	20-25-00		
O	2	Nov 01/2008	20-24-24 CONTENTS			O	1	Nov 01/2008
O	3	Nov 01/2008	O	1	Nov 01/2008	O	2	Nov 01/2008
O	4	Nov 01/2008		2	BLANK	O	3	Nov 01/2008
O	5	Nov 01/2008	20-24-24			O	4	Nov 01/2008
O	6	Nov 01/2008	O	1	Nov 01/2008	20-25-11 CONTENTS		
O	7	Nov 01/2008	O	2	Nov 01/2008	O	1	Nov 01/2008
O	8	Nov 01/2008	O	3	Nov 01/2008		2	BLANK
O	9	Nov 01/2008	O	4	Nov 01/2008	20-25-11		
O	10	Nov 01/2008	O	5	Nov 01/2008	O	1	Nov 01/2008
O	11	Nov 01/2008	O	6	Nov 01/2008	O	2	Nov 01/2008

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20-25-11 (continued)			20-25-12 (continued)			20-25-14 (continued)		
O	3	Nov 01/2008	O	20	Nov 01/2008	O	7	Nov 01/2008
O	4	Nov 01/2008	O	21	Nov 01/2008	O	8	Nov 01/2008
O	5	Nov 01/2008	O	22	Nov 01/2008	O	9	Nov 01/2008
O	6	Nov 01/2008	O	23	Nov 01/2008	O	10	Nov 01/2008
O	7	Nov 01/2008		24	BLANK	O	11	Nov 01/2008
O	8	Nov 01/2008	20-25-13 CONTENTS			O	12	Nov 01/2008
O	9	Nov 01/2008	O	1	Nov 01/2008	O	13	Nov 01/2008
O	10	Nov 01/2008		2	BLANK	O	14	Nov 01/2008
O	11	Nov 01/2008	20-25-13			O	15	Nov 01/2008
O	12	Nov 01/2008	O	1	Nov 01/2008	O	16	Nov 01/2008
O	13	Nov 01/2008	O	2	Nov 01/2008	O	17	Nov 01/2008
O	14	Nov 01/2008	O	3	Nov 01/2008	O	18	Nov 01/2008
O	15	Nov 01/2008	O	4	Nov 01/2008	O	19	Nov 01/2008
	16	BLANK	O	5	Nov 01/2008	O	20	Nov 01/2008
20-25-12 CONTENTS			O	6	Nov 01/2008	O	21	Nov 01/2008
O	1	Nov 01/2008	O	7	Nov 01/2008	O	22	Nov 01/2008
	2	BLANK	O	8	Nov 01/2008	O	23	Nov 01/2008
20-25-12			O	9	Nov 01/2008	O	24	Nov 01/2008
O	1	Nov 01/2008	O	10	Nov 01/2008	O	25	Nov 01/2008
O	2	Nov 01/2008	O	11	Nov 01/2008	O	26	Nov 01/2008
O	3	Nov 01/2008	O	12	Nov 01/2008	O	27	Nov 01/2008
O	4	Nov 01/2008	O	13	Nov 01/2008	O	28	Nov 01/2008
O	5	Nov 01/2008	O	14	Nov 01/2008	O	29	Nov 01/2008
O	6	Nov 01/2008	O	15	Nov 01/2008	O	30	Nov 01/2008
O	7	Nov 01/2008	O	16	Nov 01/2008	O	31	Nov 01/2008
O	8	Nov 01/2008	O	17	Nov 01/2008	O	32	Nov 01/2008
O	9	Nov 01/2008		18	BLANK	O	33	Nov 01/2008
O	10	Nov 01/2008	20-25-14 CONTENTS			O	34	Nov 01/2008
O	11	Nov 01/2008	O	1	Nov 01/2008	O	35	Nov 01/2008
O	12	Nov 01/2008	O	2	Nov 01/2008	O	36	Nov 01/2008
O	13	Nov 01/2008	20-25-14			O	37	Nov 01/2008
O	14	Nov 01/2008	O	1	Nov 01/2008	O	38	Nov 01/2008
O	15	Nov 01/2008	O	2	Nov 01/2008	O	39	Nov 01/2008
O	16	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
O	17	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	18	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	19	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008

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O	44	Nov 01/2008	O	1	Nov 01/2008	O	35	Nov 01/2008
O	45	Nov 01/2008		2	BLANK	O	36	Nov 01/2008
O	46	Nov 01/2008	20-30-11			O	37	Nov 01/2008
O	47	Nov 01/2008	O	1	Nov 01/2008	O	38	Nov 01/2008
O	48	Nov 01/2008	O	2	Nov 01/2008	O	39	Nov 01/2008
O	49	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
O	50	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	51	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	52	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	53	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	54	Nov 01/2008	O	8	Nov 01/2008	O	45	Nov 01/2008
O	55	Nov 01/2008	O	9	Nov 01/2008	O	46	Nov 01/2008
	56	BLANK	O	10	Nov 01/2008	O	47	Nov 01/2008
20-30-00 CONTENTS			O	11	Nov 01/2008	O	48	Nov 01/2008
O	1	Nov 01/2008	O	12	Nov 01/2008	O	49	Nov 01/2008
	2	BLANK	O	13	Nov 01/2008	O	50	Nov 01/2008
20-30-00			O	14	Nov 01/2008	O	51	Nov 01/2008
O	1	Nov 01/2008	O	15	Nov 01/2008	O	52	Nov 01/2008
O	2	Nov 01/2008	O	16	Nov 01/2008	O	53	Nov 01/2008
O	3	Nov 01/2008	O	17	Nov 01/2008	O	54	Nov 01/2008
O	4	Nov 01/2008	O	18	Nov 01/2008	O	55	Nov 01/2008
O	5	Nov 01/2008	O	19	Nov 01/2008	O	56	Nov 01/2008
O	6	Nov 01/2008	O	20	Nov 01/2008	O	57	Nov 01/2008
O	7	Nov 01/2008	O	21	Nov 01/2008	O	58	Nov 01/2008
O	8	Nov 01/2008	O	22	Nov 01/2008	O	59	Nov 01/2008
O	9	Nov 01/2008	O	23	Nov 01/2008	O	60	Nov 01/2008
O	10	Nov 01/2008	O	24	Nov 01/2008	O	61	Nov 01/2008
O	11	Nov 01/2008	O	25	Nov 01/2008	O	62	Nov 01/2008
O	12	Nov 01/2008	O	26	Nov 01/2008	O	63	Nov 01/2008
O	13	Nov 01/2008	O	27	Nov 01/2008	O	64	Nov 01/2008
O	14	Nov 01/2008	O	28	Nov 01/2008	O	65	Nov 01/2008
O	15	Nov 01/2008	O	29	Nov 01/2008	O	66	Nov 01/2008
O	16	Nov 01/2008	O	30	Nov 01/2008	O	67	Nov 01/2008
O	17	Nov 01/2008	O	31	Nov 01/2008	O	68	Nov 01/2008
O	18	Nov 01/2008	O	32	Nov 01/2008	O	69	Nov 01/2008
O	19	Nov 01/2008	O	33	Nov 01/2008	O	70	Nov 01/2008
	20	BLANK	O	34	Nov 01/2008	O	71	Nov 01/2008

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O	72	Nov 01/2008	O	109	Nov 01/2008	O	28	Nov 01/2008
O	73	Nov 01/2008	O	110	Nov 01/2008	O	29	Nov 01/2008
O	74	Nov 01/2008	O	111	Nov 01/2008	O	30	Nov 01/2008
O	75	Nov 01/2008		112	BLANK	O	31	Nov 01/2008
O	76	Nov 01/2008	20-30-12 CONTENTS			O	32	Nov 01/2008
O	77	Nov 01/2008	O	1	Nov 01/2008	O	33	Nov 01/2008
O	78	Nov 01/2008	O	2	Nov 01/2008	O	34	Nov 01/2008
O	79	Nov 01/2008	O	3	Nov 01/2008	O	35	Nov 01/2008
O	80	Nov 01/2008	O	4	Nov 01/2008	O	36	Nov 01/2008
O	81	Nov 01/2008	20-30-12			O	37	Nov 01/2008
O	82	Nov 01/2008	O	1	Nov 01/2008	O	38	Nov 01/2008
O	83	Nov 01/2008	O	2	Nov 01/2008	O	39	Nov 01/2008
O	84	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
O	85	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	86	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	87	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	88	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	89	Nov 01/2008	O	8	Nov 01/2008	O	45	Nov 01/2008
O	90	Nov 01/2008	O	9	Nov 01/2008	O	46	Nov 01/2008
O	91	Nov 01/2008	O	10	Nov 01/2008	O	47	Nov 01/2008
O	92	Nov 01/2008	O	11	Nov 01/2008	O	48	Nov 01/2008
O	93	Nov 01/2008	O	12	Nov 01/2008	O	49	Nov 01/2008
O	94	Nov 01/2008	O	13	Nov 01/2008	O	50	Nov 01/2008
O	95	Nov 01/2008	O	14	Nov 01/2008	O	51	Nov 01/2008
O	96	Nov 01/2008	O	15	Nov 01/2008	O	52	Nov 01/2008
O	97	Nov 01/2008	O	16	Nov 01/2008	O	53	Nov 01/2008
O	98	Nov 01/2008	O	17	Nov 01/2008	O	54	Nov 01/2008
O	99	Nov 01/2008	O	18	Nov 01/2008	O	55	Nov 01/2008
O	100	Nov 01/2008	O	19	Nov 01/2008	O	56	Nov 01/2008
O	101	Nov 01/2008	O	20	Nov 01/2008	O	57	Nov 01/2008
O	102	Nov 01/2008	O	21	Nov 01/2008	O	58	Nov 01/2008
O	103	Nov 01/2008	O	22	Nov 01/2008	O	59	Nov 01/2008
O	104	Nov 01/2008	O	23	Nov 01/2008	O	60	Nov 01/2008
O	105	Nov 01/2008	O	24	Nov 01/2008	O	61	Nov 01/2008
O	106	Nov 01/2008	O	25	Nov 01/2008	O	62	Nov 01/2008
O	107	Nov 01/2008	O	26	Nov 01/2008	O	63	Nov 01/2008
O	108	Nov 01/2008	O	27	Nov 01/2008	O	64	Nov 01/2008

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CH-SC-SU	Page	Date	CH-SC-SU	Page	Date	CH-SC-SU	Page	Date
20-30-12 (continued)			20-30-12 (continued)			20-30-12 (continued)		
O	65	Nov 01/2008	O	102	Nov 01/2008	O	139	Nov 01/2008
O	66	Nov 01/2008	O	103	Nov 01/2008	O	140	Nov 01/2008
O	67	Nov 01/2008	O	104	Nov 01/2008	O	141	Nov 01/2008
O	68	Nov 01/2008	O	105	Nov 01/2008	O	142	Nov 01/2008
O	69	Nov 01/2008	O	106	Nov 01/2008	O	143	Nov 01/2008
O	70	Nov 01/2008	O	107	Nov 01/2008	O	144	Nov 01/2008
O	71	Nov 01/2008	O	108	Nov 01/2008	O	145	Nov 01/2008
O	72	Nov 01/2008	O	109	Nov 01/2008	O	146	Nov 01/2008
O	73	Nov 01/2008	O	110	Nov 01/2008	O	147	Nov 01/2008
O	74	Nov 01/2008	O	111	Nov 01/2008	O	148	Nov 01/2008
O	75	Nov 01/2008	O	112	Nov 01/2008	O	149	Nov 01/2008
O	76	Nov 01/2008	O	113	Nov 01/2008	O	150	Nov 01/2008
O	77	Nov 01/2008	O	114	Nov 01/2008	O	151	Nov 01/2008
O	78	Nov 01/2008	O	115	Nov 01/2008	O	152	Nov 01/2008
O	79	Nov 01/2008	O	116	Nov 01/2008	O	153	Nov 01/2008
O	80	Nov 01/2008	O	117	Nov 01/2008	O	154	Nov 01/2008
O	81	Nov 01/2008	O	118	Nov 01/2008	O	155	Nov 01/2008
O	82	Nov 01/2008	O	119	Nov 01/2008	O	156	Nov 01/2008
O	83	Nov 01/2008	O	120	Nov 01/2008	O	157	Nov 01/2008
O	84	Nov 01/2008	O	121	Nov 01/2008	O	158	Nov 01/2008
O	85	Nov 01/2008	O	122	Nov 01/2008	O	159	Nov 01/2008
O	86	Nov 01/2008	O	123	Nov 01/2008	O	160	Nov 01/2008
O	87	Nov 01/2008	O	124	Nov 01/2008	O	161	Nov 01/2008
O	88	Nov 01/2008	O	125	Nov 01/2008	O	162	Nov 01/2008
O	89	Nov 01/2008	O	126	Nov 01/2008	O	163	Nov 01/2008
O	90	Nov 01/2008	O	127	Nov 01/2008	O	164	Nov 01/2008
O	91	Nov 01/2008	O	128	Nov 01/2008	O	165	Nov 01/2008
O	92	Nov 01/2008	O	129	Nov 01/2008	O	166	Nov 01/2008
O	93	Nov 01/2008	O	130	Nov 01/2008	O	167	Nov 01/2008
O	94	Nov 01/2008	O	131	Nov 01/2008	O	168	Nov 01/2008
O	95	Nov 01/2008	O	132	Nov 01/2008	O	169	Nov 01/2008
O	96	Nov 01/2008	O	133	Nov 01/2008	O	170	Nov 01/2008
O	97	Nov 01/2008	O	134	Nov 01/2008	O	171	Nov 01/2008
O	98	Nov 01/2008	O	135	Nov 01/2008	O	172	Nov 01/2008
O	99	Nov 01/2008	O	136	Nov 01/2008	O	173	Nov 01/2008
O	100	Nov 01/2008	O	137	Nov 01/2008	O	174	Nov 01/2008
O	101	Nov 01/2008	O	138	Nov 01/2008	O	175	Nov 01/2008

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20-30-12 (continued)			20-30-12 (continued)			20-30-12 (continued)		
O	176	Nov 01/2008	O	213	Nov 01/2008	O	250	Nov 01/2008
O	177	Nov 01/2008	O	214	Nov 01/2008	O	251	Nov 01/2008
O	178	Nov 01/2008	O	215	Nov 01/2008	O	252	Nov 01/2008
O	179	Nov 01/2008	O	216	Nov 01/2008	O	253	Nov 01/2008
O	180	Nov 01/2008	O	217	Nov 01/2008	O	254	Nov 01/2008
O	181	Nov 01/2008	O	218	Nov 01/2008	O	255	Nov 01/2008
O	182	Nov 01/2008	O	219	Nov 01/2008	O	256	Nov 01/2008
O	183	Nov 01/2008	O	220	Nov 01/2008	O	257	Nov 01/2008
O	184	Nov 01/2008	O	221	Nov 01/2008	O	258	Nov 01/2008
O	185	Nov 01/2008	O	222	Nov 01/2008	O	259	Nov 01/2008
O	186	Nov 01/2008	O	223	Nov 01/2008	O	260	Nov 01/2008
O	187	Nov 01/2008	O	224	Nov 01/2008	O	261	Nov 01/2008
O	188	Nov 01/2008	O	225	Nov 01/2008	O	262	Nov 01/2008
O	189	Nov 01/2008	O	226	Nov 01/2008	O	263	Nov 01/2008
O	190	Nov 01/2008	O	227	Nov 01/2008	O	264	Nov 01/2008
O	191	Nov 01/2008	O	228	Nov 01/2008	O	265	Nov 01/2008
O	192	Nov 01/2008	O	229	Nov 01/2008	O	266	Nov 01/2008
O	193	Nov 01/2008	O	230	Nov 01/2008	O	267	Nov 01/2008
O	194	Nov 01/2008	O	231	Nov 01/2008	O	268	Nov 01/2008
O	195	Nov 01/2008	O	232	Nov 01/2008	O	269	Nov 01/2008
O	196	Nov 01/2008	O	233	Nov 01/2008	O	270	Nov 01/2008
O	197	Nov 01/2008	O	234	Nov 01/2008	O	271	Nov 01/2008
O	198	Nov 01/2008	O	235	Nov 01/2008	O	272	Nov 01/2008
O	199	Nov 01/2008	O	236	Nov 01/2008	O	273	Nov 01/2008
O	200	Nov 01/2008	O	237	Nov 01/2008	O	274	Nov 01/2008
O	201	Nov 01/2008	O	238	Nov 01/2008	O	275	Nov 01/2008
O	202	Nov 01/2008	O	239	Nov 01/2008	O	276	Nov 01/2008
O	203	Nov 01/2008	O	240	Nov 01/2008	O	277	Nov 01/2008
O	204	Nov 01/2008	O	241	Nov 01/2008	O	278	Nov 01/2008
O	205	Nov 01/2008	O	242	Nov 01/2008	20-30-13 CONTENTS		
O	206	Nov 01/2008	O	243	Nov 01/2008	O	1	Nov 01/2008
O	207	Nov 01/2008	O	244	Nov 01/2008		2	BLANK
O	208	Nov 01/2008	O	245	Nov 01/2008	20-30-13		
O	209	Nov 01/2008	O	246	Nov 01/2008	O	1	Nov 01/2008
O	210	Nov 01/2008	O	247	Nov 01/2008	O	2	Nov 01/2008
O	211	Nov 01/2008	O	248	Nov 01/2008	O	3	Nov 01/2008
O	212	Nov 01/2008	O	249	Nov 01/2008	O	4	Nov 01/2008

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20-30-13 (continued)			20-30-14 (continued)			20-30-22		
O	5	Nov 01/2008	O	10	Nov 01/2008	O	1	Nov 01/2008
O	6	Nov 01/2008	O	11	Nov 01/2008	O	2	Nov 01/2008
O	7	Nov 01/2008		12	BLANK	O	3	Nov 01/2008
O	8	Nov 01/2008	20-30-15 CONTENTS			O	4	Nov 01/2008
O	9	Nov 01/2008	O	1	Nov 01/2008	O	5	Nov 01/2008
O	10	Nov 01/2008		2	BLANK	O	6	Nov 01/2008
O	11	Nov 01/2008	20-30-15			O	7	Nov 01/2008
O	12	Nov 01/2008	O	1	Nov 01/2008	O	8	Nov 01/2008
O	13	Nov 01/2008	O	2	Nov 01/2008	O	9	Nov 01/2008
O	14	Nov 01/2008	O	3	Nov 01/2008	O	10	Nov 01/2008
O	15	Nov 01/2008	O	4	Nov 01/2008	O	11	Nov 01/2008
O	16	Nov 01/2008	O	5	Nov 01/2008	O	12	Nov 01/2008
O	17	Nov 01/2008	O	6	Nov 01/2008	O	13	Nov 01/2008
O	18	Nov 01/2008	20-30-16 CONTENTS			O	14	Nov 01/2008
O	19	Nov 01/2008	O	1	Nov 01/2008	O	15	Nov 01/2008
O	20	Nov 01/2008		2	BLANK	O	16	Nov 01/2008
O	21	Nov 01/2008	20-30-16			O	17	Nov 01/2008
O	22	Nov 01/2008	O	1	Nov 01/2008	O	18	Nov 01/2008
O	23	Nov 01/2008	O	2	Nov 01/2008	O	19	Nov 01/2008
O	24	Nov 01/2008	O	3	Nov 01/2008	O	20	Nov 01/2008
O	25	Nov 01/2008	O	4	Nov 01/2008	O	21	Nov 01/2008
O	26	Nov 01/2008	O	5	Nov 01/2008	O	22	Nov 01/2008
O	27	Nov 01/2008	O	6	Nov 01/2008	20-35-11 CONTENTS		
	28	BLANK	O	7	Nov 01/2008	O	1	Nov 01/2008
20-30-14 CONTENTS			O	8	Nov 01/2008		2	BLANK
O	1	Nov 01/2008	20-30-17 CONTENTS			20-35-11		
	2	BLANK	O	1	Nov 01/2008	O	1	Nov 01/2008
20-30-14				2	BLANK	O	2	Nov 01/2008
O	1	Nov 01/2008	20-30-17			O	3	Nov 01/2008
O	2	Nov 01/2008	O	1	Nov 01/2008	O	4	Nov 01/2008
O	3	Nov 01/2008	O	2	Nov 01/2008	O	5	Nov 01/2008
O	4	Nov 01/2008	O	3	Nov 01/2008	O	6	Nov 01/2008
O	5	Nov 01/2008	O	4	Nov 01/2008	O	7	Nov 01/2008
O	6	Nov 01/2008	20-30-22 CONTENTS			O	8	Nov 01/2008
O	7	Nov 01/2008	O	1	Nov 01/2008	O	9	Nov 01/2008
O	8	Nov 01/2008		2	BLANK	O	10	Nov 01/2008
O	9	Nov 01/2008				O	11	Nov 01/2008

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20-35-11 (continued)			20-35-14 CONTENTS (continued)			20-35-22 (continued)		
O	12	Nov 01/2008		2	BLANK		4	BLANK
O	13	Nov 01/2008	20-35-14			20-35-23 CONTENTS		
O	14	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	15	Nov 01/2008		2	BLANK		2	BLANK
O	16	Nov 01/2008	20-35-17 CONTENTS			20-35-23		
O	17	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	18	Nov 01/2008		2	BLANK	O	2	Nov 01/2008
O	19	Nov 01/2008	20-35-17			O	3	Nov 01/2008
O	20	Nov 01/2008	O	1	Nov 01/2008		4	BLANK
O	21	Nov 01/2008	O	2	Nov 01/2008	20-35-24 CONTENTS		
	22	BLANK	20-35-18 CONTENTS			O	1	Nov 01/2008
20-35-12 CONTENTS			O	1	Nov 01/2008		2	BLANK
O	1	Nov 01/2008		2	BLANK	20-35-24		
	2	BLANK	20-35-18			O	1	Nov 01/2008
20-35-12			O	1	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008	O	2	Nov 01/2008	O	3	Nov 01/2008
	2	BLANK	20-35-19 CONTENTS				4	BLANK
20-35-13 CONTENTS			O	1	Nov 01/2008	20-35-25 CONTENTS		
O	1	Nov 01/2008		2	BLANK	O	1	Nov 01/2008
	2	BLANK	20-35-19				2	BLANK
20-35-13			O	1	Nov 01/2008	20-35-25		
O	1	Nov 01/2008	O	2	Nov 01/2008	O	1	Nov 01/2008
O	2	Nov 01/2008	20-35-20 CONTENTS				2	BLANK
O	3	Nov 01/2008	O	1	Nov 01/2008	20-35-26 CONTENTS		
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O	5	Nov 01/2008	20-35-20				2	BLANK
O	6	Nov 01/2008	O	1	Nov 01/2008	20-35-26		
O	7	Nov 01/2008	O	2	Nov 01/2008	O	1	Nov 01/2008
O	8	Nov 01/2008	O	3	Nov 01/2008	O	2	Nov 01/2008
O	9	Nov 01/2008	O	4	Nov 01/2008	20-35-27 CONTENTS		
O	10	Nov 01/2008	20-35-22 CONTENTS			O	1	Nov 01/2008
O	11	Nov 01/2008	O	1	Nov 01/2008		2	BLANK
O	12	Nov 01/2008		2	BLANK	20-35-27		
O	13	Nov 01/2008	20-35-22			O	1	Nov 01/2008
O	14	Nov 01/2008	O	1	Nov 01/2008	O	2	Nov 01/2008
20-35-14 CONTENTS			O	2	Nov 01/2008	20-40-00 CONTENTS		
O	1	Nov 01/2008	O	3	Nov 01/2008	O	1	Nov 01/2008

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	2	BLANK	O	6	Nov 01/2008	O	1	Nov 01/2008
20-40-00			O	7	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008		8	BLANK	O	3	Nov 01/2008
O	2	Nov 01/2008	20-40-16	CONTENTS		O	4	Nov 01/2008
O	3	Nov 01/2008	O	1	Nov 01/2008	O	5	Nov 01/2008
	4	BLANK		2	BLANK	O	6	Nov 01/2008
20-40-12	CONTENTS		20-40-16			O	7	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	O	8	Nov 01/2008
	2	BLANK	O	2	Nov 01/2008	O	9	Nov 01/2008
20-40-12			O	3	Nov 01/2008	O	10	Nov 01/2008
O	1	Nov 01/2008		4	BLANK	O	11	Nov 01/2008
O	2	Nov 01/2008	20-41-01	CONTENTS		O	12	Nov 01/2008
O	3	Nov 01/2008	O	1	Nov 01/2008	O	13	Nov 01/2008
O	4	Nov 01/2008		2	BLANK	O	14	Nov 01/2008
O	5	Nov 01/2008	20-41-01			O	15	Nov 01/2008
	6	BLANK	O	1	Nov 01/2008	O	16	Nov 01/2008
20-40-13	CONTENTS		O	2	Nov 01/2008	O	17	Nov 01/2008
O	1	Nov 01/2008	O	3	Nov 01/2008		18	BLANK
	2	BLANK	O	4	Nov 01/2008	20-51-05	CONTENTS	
20-40-13			O	5	Nov 01/2008	O	1	Nov 01/2008
O	1	Nov 01/2008	O	6	Nov 01/2008		2	BLANK
	2	BLANK	O	7	Nov 01/2008	20-51-05		
20-40-14	CONTENTS		O	8	Nov 01/2008	O	1	Nov 01/2008
O	1	Nov 01/2008	20-42-01	CONTENTS		O	2	Nov 01/2008
	2	BLANK	O	1	Nov 01/2008	20-51-11	CONTENTS	
20-40-14				2	BLANK	O	1	Nov 01/2008
O	1	Nov 01/2008	20-42-01				2	BLANK
	2	BLANK	O	1	Nov 01/2008	20-51-11		
20-40-15	CONTENTS		O	2	Nov 01/2008	O	1	Nov 01/2008
O	1	Nov 01/2008	O	3	Nov 01/2008	O	2	Nov 01/2008
	2	BLANK	O	4	Nov 01/2008	O	3	Nov 01/2008
20-40-15			O	5	Nov 01/2008	O	4	Nov 01/2008
O	1	Nov 01/2008		6	BLANK	O	5	Nov 01/2008
O	2	Nov 01/2008	20-51-00	CONTENTS		O	6	Nov 01/2008
O	3	Nov 01/2008	O	1	Nov 01/2008	O	7	Nov 01/2008
O	4	Nov 01/2008		2	BLANK	O	8	Nov 01/2008
O	5	Nov 01/2008				O	9	Nov 01/2008

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O	10	Nov 01/2008	O	47	Nov 01/2008	O	1	Nov 01/2008
O	11	Nov 01/2008	O	48	Nov 01/2008		2	BLANK
O	12	Nov 01/2008	O	49	Nov 01/2008	20-51-13		
O	13	Nov 01/2008	O	50	Nov 01/2008	O	1	Nov 01/2008
O	14	Nov 01/2008	O	51	Nov 01/2008	O	2	Nov 01/2008
O	15	Nov 01/2008	O	52	Nov 01/2008	O	3	Nov 01/2008
O	16	Nov 01/2008	O	53	Nov 01/2008	O	4	Nov 01/2008
O	17	Nov 01/2008	O	54	Nov 01/2008	O	5	Nov 01/2008
O	18	Nov 01/2008	O	55	Nov 01/2008	O	6	Nov 01/2008
O	19	Nov 01/2008	O	56	Nov 01/2008	O	7	Nov 01/2008
O	20	Nov 01/2008	O	57	Nov 01/2008	O	8	Nov 01/2008
O	21	Nov 01/2008	O	58	Nov 01/2008	O	9	Nov 01/2008
O	22	Nov 01/2008	O	59	Nov 01/2008	O	10	Nov 01/2008
O	23	Nov 01/2008	O	60	Nov 01/2008	O	11	Nov 01/2008
O	24	Nov 01/2008	O	61	Nov 01/2008	O	12	Nov 01/2008
O	25	Nov 01/2008	O	62	Nov 01/2008	O	13	Nov 01/2008
O	26	Nov 01/2008	O	63	Nov 01/2008		14	BLANK
O	27	Nov 01/2008	O	64	Nov 01/2008	20-51-15 CONTENTS		
O	28	Nov 01/2008	O	65	Nov 01/2008	O	1	Nov 01/2008
O	29	Nov 01/2008	O	66	Nov 01/2008		2	BLANK
O	30	Nov 01/2008	O	67	Nov 01/2008	20-51-15		
O	31	Nov 01/2008	O	68	Nov 01/2008	O	1	Nov 01/2008
O	32	Nov 01/2008	O	69	Nov 01/2008	O	2	Nov 01/2008
O	33	Nov 01/2008	O	70	Nov 01/2008	O	3	Nov 01/2008
O	34	Nov 01/2008	O	71	Nov 01/2008	O	4	Nov 01/2008
O	35	Nov 01/2008	O	72	Nov 01/2008	O	5	Nov 01/2008
O	36	Nov 01/2008	O	73	Nov 01/2008	O	6	Nov 01/2008
O	37	Nov 01/2008	O	74	Nov 01/2008	O	7	Nov 01/2008
O	38	Nov 01/2008	O	75	Nov 01/2008	O	8	Nov 01/2008
O	39	Nov 01/2008	O	76	Nov 01/2008	O	9	Nov 01/2008
O	40	Nov 01/2008	O	77	Nov 01/2008	O	10	Nov 01/2008
O	41	Nov 01/2008	O	78	Nov 01/2008	O	11	Nov 01/2008
O	42	Nov 01/2008	O	79	Nov 01/2008	O	12	Nov 01/2008
O	43	Nov 01/2008	O	80	Nov 01/2008	O	13	Nov 01/2008
O	44	Nov 01/2008	O	81	Nov 01/2008	O	14	Nov 01/2008
O	45	Nov 01/2008		82	BLANK	O	15	Nov 01/2008
O	46	Nov 01/2008				O	16	Nov 01/2008

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O	17	Nov 01/2008	O	54	Nov 01/2008	O	91	Nov 01/2008
O	18	Nov 01/2008	O	55	Nov 01/2008	O	92	Nov 01/2008
O	19	Nov 01/2008	O	56	Nov 01/2008	O	93	Nov 01/2008
O	20	Nov 01/2008	O	57	Nov 01/2008	O	94	Nov 01/2008
O	21	Nov 01/2008	O	58	Nov 01/2008	O	95	Nov 01/2008
O	22	Nov 01/2008	O	59	Nov 01/2008	O	96	Nov 01/2008
O	23	Nov 01/2008	O	60	Nov 01/2008	O	97	Nov 01/2008
O	24	Nov 01/2008	O	61	Nov 01/2008	O	98	Nov 01/2008
O	25	Nov 01/2008	O	62	Nov 01/2008	O	99	Nov 01/2008
O	26	Nov 01/2008	O	63	Nov 01/2008	O	100	Nov 01/2008
O	27	Nov 01/2008	O	64	Nov 01/2008	O	101	Nov 01/2008
O	28	Nov 01/2008	O	65	Nov 01/2008	O	102	Nov 01/2008
O	29	Nov 01/2008	O	66	Nov 01/2008	O	103	Nov 01/2008
O	30	Nov 01/2008	O	67	Nov 01/2008	O	104	Nov 01/2008
O	31	Nov 01/2008	O	68	Nov 01/2008	O	105	Nov 01/2008
O	32	Nov 01/2008	O	69	Nov 01/2008	O	106	Nov 01/2008
O	33	Nov 01/2008	O	70	Nov 01/2008	O	107	Nov 01/2008
O	34	Nov 01/2008	O	71	Nov 01/2008	O	108	Nov 01/2008
O	35	Nov 01/2008	O	72	Nov 01/2008	O	109	Nov 01/2008
O	36	Nov 01/2008	O	73	Nov 01/2008	O	110	Nov 01/2008
O	37	Nov 01/2008	O	74	Nov 01/2008	O	111	Nov 01/2008
O	38	Nov 01/2008	O	75	Nov 01/2008	O	112	Nov 01/2008
O	39	Nov 01/2008	O	76	Nov 01/2008	O	113	Nov 01/2008
O	40	Nov 01/2008	O	77	Nov 01/2008	O	114	Nov 01/2008
O	41	Nov 01/2008	O	78	Nov 01/2008	O	115	Nov 01/2008
O	42	Nov 01/2008	O	79	Nov 01/2008	O	116	Nov 01/2008
O	43	Nov 01/2008	O	80	Nov 01/2008	O	117	Nov 01/2008
O	44	Nov 01/2008	O	81	Nov 01/2008	O	118	Nov 01/2008
O	45	Nov 01/2008	O	82	Nov 01/2008	O	119	Nov 01/2008
O	46	Nov 01/2008	O	83	Nov 01/2008	O	120	Nov 01/2008
O	47	Nov 01/2008	O	84	Nov 01/2008	O	121	Nov 01/2008
O	48	Nov 01/2008	O	85	Nov 01/2008	O	122	Nov 01/2008
O	49	Nov 01/2008	O	86	Nov 01/2008	O	123	Nov 01/2008
O	50	Nov 01/2008	O	87	Nov 01/2008	O	124	Nov 01/2008
O	51	Nov 01/2008	O	88	Nov 01/2008	O	125	Nov 01/2008
O	52	Nov 01/2008	O	89	Nov 01/2008	O	126	Nov 01/2008
O	53	Nov 01/2008	O	90	Nov 01/2008	O	127	Nov 01/2008

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20-51-15 (continued)			20-51-17 CONTENTS (continued)			20-51-26 (continued)		
O	128	Nov 01/2008		2	BLANK	O	10	Nov 01/2008
O	129	Nov 01/2008	20-51-17			O	11	Nov 01/2008
O	130	Nov 01/2008	O	1	Nov 01/2008	O	12	Nov 01/2008
O	131	Nov 01/2008	O	2	Nov 01/2008	20-51-31 CONTENTS		
O	132	Nov 01/2008	O	3	Nov 01/2008	O	1	Nov 01/2008
O	133	Nov 01/2008	O	4	Nov 01/2008		2	BLANK
O	134	Nov 01/2008	O	5	Nov 01/2008	20-51-31		
O	135	Nov 01/2008	O	6	Nov 01/2008	O	1	Nov 01/2008
O	136	Nov 01/2008	O	7	Nov 01/2008	O	2	Nov 01/2008
O	137	Nov 01/2008	O	8	Nov 01/2008	O	3	Nov 01/2008
O	138	Nov 01/2008	20-51-20 CONTENTS			O	4	Nov 01/2008
O	139	Nov 01/2008	O	1	Nov 01/2008	O	5	Nov 01/2008
O	140	Nov 01/2008		2	BLANK		6	BLANK
O	141	Nov 01/2008	20-51-20			20-51-32 CONTENTS		
O	142	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	143	Nov 01/2008	O	2	Nov 01/2008		2	BLANK
O	144	Nov 01/2008	O	3	Nov 01/2008	20-51-32		
O	145	Nov 01/2008		4	BLANK	O	1	Nov 01/2008
O	146	Nov 01/2008	20-51-21 CONTENTS			O	2	Nov 01/2008
20-51-16 CONTENTS			O	1	Nov 01/2008	O	3	Nov 01/2008
O	1	Nov 01/2008		2	BLANK		4	BLANK
	2	BLANK	20-51-21			20-51-33 CONTENTS		
20-51-16			O	1	Nov 01/2008	O	1	Nov 01/2008
O	1	Nov 01/2008	O	2	Nov 01/2008		2	BLANK
O	2	Nov 01/2008	20-51-26 CONTENTS			20-51-33		
O	3	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	4	Nov 01/2008		2	BLANK	O	2	Nov 01/2008
O	5	Nov 01/2008	20-51-26			O	3	Nov 01/2008
O	6	Nov 01/2008	O	1	Nov 01/2008		4	BLANK
O	7	Nov 01/2008	O	2	Nov 01/2008	20-51-41 CONTENTS		
O	8	Nov 01/2008	O	3	Nov 01/2008	O	1	Nov 01/2008
O	9	Nov 01/2008	O	4	Nov 01/2008		2	BLANK
O	10	Nov 01/2008	O	5	Nov 01/2008	20-51-41		
O	11	Nov 01/2008	O	6	Nov 01/2008	O	1	Nov 01/2008
	12	BLANK	O	7	Nov 01/2008	O	2	Nov 01/2008
20-51-17 CONTENTS			O	8	Nov 01/2008	O	3	Nov 01/2008
O	1	Nov 01/2008	O	9	Nov 01/2008		4	BLANK

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CH-SC-SU	Page	Date	CH-SC-SU	Page	Date	CH-SC-SU	Page	Date
20-51-42 CONTENTS			20-53-05 (continued)			20-60-02 CONTENTS		
O	1	Nov 01/2008	O	11	Nov 01/2008	O	1	Nov 01/2008
	2	BLANK	O	12	Nov 01/2008		2	BLANK
20-51-42			O	13	Nov 01/2008	20-60-02		
O	1	Nov 01/2008	O	14	Nov 01/2008	O	1	Nov 01/2008
O	2	Nov 01/2008	O	15	Nov 01/2008		2	BLANK
O	3	Nov 01/2008	O	16	Nov 01/2008	20-60-03 CONTENTS		
O	4	Nov 01/2008	O	17	Nov 01/2008	O	1	Nov 01/2008
20-51-51 CONTENTS			O	18	Nov 01/2008		2	BLANK
O	1	Nov 01/2008	O	19	Nov 01/2008	20-60-03		
	2	BLANK	O	20	Nov 01/2008	O	1	Nov 01/2008
20-51-51			O	21	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008	O	22	Nov 01/2008	O	3	Nov 01/2008
O	2	Nov 01/2008	20-60-00 CONTENTS			O	4	Nov 01/2008
O	3	Nov 01/2008	O	1	Nov 01/2008	O	5	Nov 01/2008
O	4	Nov 01/2008		2	BLANK	O	6	Nov 01/2008
20-51-90 CONTENTS			20-60-00			O	7	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	O	8	Nov 01/2008
	2	BLANK	O	2	Nov 01/2008	O	9	Nov 01/2008
20-51-90			O	3	Nov 01/2008	O	10	Nov 01/2008
O	1	Nov 01/2008	O	4	Nov 01/2008	O	11	Nov 01/2008
O	2	Nov 01/2008	O	5	Nov 01/2008	O	12	Nov 01/2008
O	3	Nov 01/2008	O	6	Nov 01/2008	O	13	Nov 01/2008
	4	BLANK	O	7	Nov 01/2008	O	14	Nov 01/2008
20-53-05 CONTENTS			O	8	Nov 01/2008	20-60-06 CONTENTS		
O	1	Nov 01/2008	20-60-01 CONTENTS			O	1	Nov 01/2008
	2	BLANK	O	1	Nov 01/2008		2	BLANK
20-53-05				2	BLANK	20-60-06		
O	1	Nov 01/2008	20-60-01			O	1	Nov 01/2008
O	2	Nov 01/2008	O	1	Nov 01/2008	O	2	Nov 01/2008
O	3	Nov 01/2008	O	2	Nov 01/2008	O	3	Nov 01/2008
O	4	Nov 01/2008	O	3	Nov 01/2008	O	4	Nov 01/2008
O	5	Nov 01/2008	O	4	Nov 01/2008	O	5	Nov 01/2008
O	6	Nov 01/2008	O	5	Nov 01/2008	O	6	Nov 01/2008
O	7	Nov 01/2008	O	6	Nov 01/2008	O	7	Nov 01/2008
O	8	Nov 01/2008	O	7	Nov 01/2008	O	8	Nov 01/2008
O	9	Nov 01/2008	O	8	Nov 01/2008	O	9	Nov 01/2008
O	10	Nov 01/2008				O	10	Nov 01/2008

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20-60-06 (continued)			20-60-09			20-61-11 CONTENTS (continued)		
O	11	Nov 01/2008	O	1	Nov 01/2008	O	3	Nov 01/2008
O	12	Nov 01/2008	O	2	Nov 01/2008		4	BLANK
O	13	Nov 01/2008	O	3	Nov 01/2008	20-61-11		
O	14	Nov 01/2008	O	4	Nov 01/2008	O	1	Nov 01/2008
O	15	Nov 01/2008	O	5	Nov 01/2008	O	2	Nov 01/2008
O	16	Nov 01/2008	O	6	Nov 01/2008	O	3	Nov 01/2008
O	17	Nov 01/2008	O	7	Nov 01/2008	O	4	Nov 01/2008
O	18	Nov 01/2008	O	8	Nov 01/2008	O	5	Nov 01/2008
20-60-07 CONTENTS			O	9	Nov 01/2008	O	6	Nov 01/2008
O	1	Nov 01/2008	O	10	Nov 01/2008	O	7	Nov 01/2008
	2	BLANK	O	11	Nov 01/2008	O	8	Nov 01/2008
20-60-07			O	12	Nov 01/2008	O	9	Nov 01/2008
O	1	Nov 01/2008	O	13	Nov 01/2008	O	10	Nov 01/2008
O	2	Nov 01/2008	O	14	Nov 01/2008	O	11	Nov 01/2008
O	3	Nov 01/2008	O	15	Nov 01/2008	O	12	Nov 01/2008
O	4	Nov 01/2008	O	16	Nov 01/2008	O	13	Nov 01/2008
O	5	Nov 01/2008	O	17	Nov 01/2008	O	14	Nov 01/2008
O	6	Nov 01/2008	O	18	Nov 01/2008	O	15	Nov 01/2008
20-60-08 CONTENTS			O	19	Nov 01/2008	O	16	Nov 01/2008
O	1	Nov 01/2008	O	20	Nov 01/2008	O	17	Nov 01/2008
	2	BLANK	O	21	Nov 01/2008	O	18	Nov 01/2008
20-60-08			O	22	Nov 01/2008	O	19	Nov 01/2008
O	1	Nov 01/2008	20-61-00 CONTENTS			O	20	Nov 01/2008
O	2	Nov 01/2008	O	1	Nov 01/2008	O	21	Nov 01/2008
O	3	Nov 01/2008		2	BLANK	O	22	Nov 01/2008
O	4	Nov 01/2008	20-61-00			O	23	Nov 01/2008
O	5	Nov 01/2008	O	1	Nov 01/2008	O	24	Nov 01/2008
O	6	Nov 01/2008	O	2	Nov 01/2008	O	25	Nov 01/2008
O	7	Nov 01/2008	O	3	Nov 01/2008	O	26	Nov 01/2008
O	8	Nov 01/2008	O	4	Nov 01/2008	O	27	Nov 01/2008
O	9	Nov 01/2008	O	5	Nov 01/2008	O	28	Nov 01/2008
O	10	Nov 01/2008	O	6	Nov 01/2008	O	29	Nov 01/2008
O	11	Nov 01/2008	O	7	Nov 01/2008	O	30	Nov 01/2008
O	12	Nov 01/2008	O	8	Nov 01/2008	O	31	Nov 01/2008
20-60-09 CONTENTS			20-61-11 CONTENTS			O	32	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	O	33	Nov 01/2008
	2	BLANK	O	2	Nov 01/2008	O	34	Nov 01/2008

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O	35	Nov 01/2008	O	72	Nov 01/2008	O	109	Nov 01/2008
O	36	Nov 01/2008	O	73	Nov 01/2008	O	110	Nov 01/2008
O	37	Nov 01/2008	O	74	Nov 01/2008	O	111	Nov 01/2008
O	38	Nov 01/2008	O	75	Nov 01/2008	O	112	Nov 01/2008
O	39	Nov 01/2008	O	76	Nov 01/2008	O	113	Nov 01/2008
O	40	Nov 01/2008	O	77	Nov 01/2008	O	114	Nov 01/2008
O	41	Nov 01/2008	O	78	Nov 01/2008	O	115	Nov 01/2008
O	42	Nov 01/2008	O	79	Nov 01/2008	O	116	Nov 01/2008
O	43	Nov 01/2008	O	80	Nov 01/2008	O	117	Nov 01/2008
O	44	Nov 01/2008	O	81	Nov 01/2008	O	118	Nov 01/2008
O	45	Nov 01/2008	O	82	Nov 01/2008	O	119	Nov 01/2008
O	46	Nov 01/2008	O	83	Nov 01/2008	O	120	Nov 01/2008
O	47	Nov 01/2008	O	84	Nov 01/2008	O	121	Nov 01/2008
O	48	Nov 01/2008	O	85	Nov 01/2008	O	122	Nov 01/2008
O	49	Nov 01/2008	O	86	Nov 01/2008	O	123	Nov 01/2008
O	50	Nov 01/2008	O	87	Nov 01/2008	O	124	Nov 01/2008
O	51	Nov 01/2008	O	88	Nov 01/2008	O	125	Nov 01/2008
O	52	Nov 01/2008	O	89	Nov 01/2008	O	126	Nov 01/2008
O	53	Nov 01/2008	O	90	Nov 01/2008	O	127	Nov 01/2008
O	54	Nov 01/2008	O	91	Nov 01/2008	O	128	Nov 01/2008
O	55	Nov 01/2008	O	92	Nov 01/2008	O	129	Nov 01/2008
O	56	Nov 01/2008	O	93	Nov 01/2008	O	130	Nov 01/2008
O	57	Nov 01/2008	O	94	Nov 01/2008	O	131	Nov 01/2008
O	58	Nov 01/2008	O	95	Nov 01/2008	O	132	Nov 01/2008
O	59	Nov 01/2008	O	96	Nov 01/2008	O	133	Nov 01/2008
O	60	Nov 01/2008	O	97	Nov 01/2008	O	134	Nov 01/2008
O	61	Nov 01/2008	O	98	Nov 01/2008	O	135	Nov 01/2008
O	62	Nov 01/2008	O	99	Nov 01/2008	O	136	Nov 01/2008
O	63	Nov 01/2008	O	100	Nov 01/2008	O	137	Nov 01/2008
O	64	Nov 01/2008	O	101	Nov 01/2008	O	138	Nov 01/2008
O	65	Nov 01/2008	O	102	Nov 01/2008	O	139	Nov 01/2008
O	66	Nov 01/2008	O	103	Nov 01/2008	O	140	Nov 01/2008
O	67	Nov 01/2008	O	104	Nov 01/2008	O	141	Nov 01/2008
O	68	Nov 01/2008	O	105	Nov 01/2008	O	142	Nov 01/2008
O	69	Nov 01/2008	O	106	Nov 01/2008	O	143	Nov 01/2008
O	70	Nov 01/2008	O	107	Nov 01/2008	O	144	Nov 01/2008
O	71	Nov 01/2008	O	108	Nov 01/2008	O	145	Nov 01/2008

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20-61-11 (continued)			20-61-12 (continued)			20-61-16 (continued)		
O	146	Nov 01/2008	O	5	Nov 01/2008	O	6	Nov 01/2008
O	147	Nov 01/2008	O	6	Nov 01/2008	O	7	Nov 01/2008
O	148	Nov 01/2008	O	7	Nov 01/2008	O	8	Nov 01/2008
O	149	Nov 01/2008		8	BLANK	O	9	Nov 01/2008
O	150	Nov 01/2008	20-61-13 CONTENTS			O	10	Nov 01/2008
O	151	Nov 01/2008	O	1	Nov 01/2008	O	11	Nov 01/2008
O	152	Nov 01/2008		2	BLANK	O	12	Nov 01/2008
O	153	Nov 01/2008	20-61-13			O	13	Nov 01/2008
O	154	Nov 01/2008	O	1	Nov 01/2008	O	14	Nov 01/2008
O	155	Nov 01/2008	O	2	Nov 01/2008	O	15	Nov 01/2008
O	156	Nov 01/2008	O	3	Nov 01/2008	O	16	Nov 01/2008
O	157	Nov 01/2008	O	4	Nov 01/2008	O	17	Nov 01/2008
O	158	Nov 01/2008	O	5	Nov 01/2008	O	18	Nov 01/2008
O	159	Nov 01/2008	O	6	Nov 01/2008	O	19	Nov 01/2008
O	160	Nov 01/2008	O	7	Nov 01/2008	O	20	Nov 01/2008
O	161	Nov 01/2008	O	8	Nov 01/2008	20-61-17 CONTENTS		
O	162	Nov 01/2008	O	9	Nov 01/2008	O	1	Nov 01/2008
O	163	Nov 01/2008		10	BLANK		2	BLANK
O	164	Nov 01/2008	20-61-15 CONTENTS			20-61-17		
O	165	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	166	Nov 01/2008		2	BLANK	O	2	Nov 01/2008
O	167	Nov 01/2008	20-61-15			O	3	Nov 01/2008
O	168	Nov 01/2008	O	1	Nov 01/2008	O	4	Nov 01/2008
O	169	Nov 01/2008	O	2	Nov 01/2008	O	5	Nov 01/2008
O	170	Nov 01/2008	O	3	Nov 01/2008	O	6	Nov 01/2008
O	171	Nov 01/2008	O	4	Nov 01/2008	O	7	Nov 01/2008
O	172	Nov 01/2008	O	5	Nov 01/2008	O	8	Nov 01/2008
O	173	Nov 01/2008	O	6	Nov 01/2008	O	9	Nov 01/2008
O	174	Nov 01/2008	20-61-16 CONTENTS			O	10	Nov 01/2008
20-61-12 CONTENTS			O	1	Nov 01/2008	O	11	Nov 01/2008
O	1	Nov 01/2008		2	BLANK	O	12	Nov 01/2008
	2	BLANK	20-61-16			O	13	Nov 01/2008
20-61-12			O	1	Nov 01/2008	O	14	Nov 01/2008
O	1	Nov 01/2008	O	2	Nov 01/2008	O	15	Nov 01/2008
O	2	Nov 01/2008	O	3	Nov 01/2008		16	BLANK
O	3	Nov 01/2008	O	4	Nov 01/2008	20-61-18 CONTENTS		
O	4	Nov 01/2008	O	5	Nov 01/2008	O	1	Nov 01/2008

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20-61-18 CONTENTS (continued)			20-61-19 (continued)			20-61-19 (continued)		
	2	BLANK	O	18	Nov 01/2008	O	55	Nov 01/2008
20-61-18			O	19	Nov 01/2008	O	56	Nov 01/2008
O	1	Nov 01/2008	O	20	Nov 01/2008	O	57	Nov 01/2008
O	2	Nov 01/2008	O	21	Nov 01/2008	O	58	Nov 01/2008
O	3	Nov 01/2008	O	22	Nov 01/2008	O	59	Nov 01/2008
O	4	Nov 01/2008	O	23	Nov 01/2008	O	60	Nov 01/2008
O	5	Nov 01/2008	O	24	Nov 01/2008	O	61	Nov 01/2008
O	6	Nov 01/2008	O	25	Nov 01/2008	O	62	Nov 01/2008
O	7	Nov 01/2008	O	26	Nov 01/2008	O	63	Nov 01/2008
O	8	Nov 01/2008	O	27	Nov 01/2008	O	64	Nov 01/2008
O	9	Nov 01/2008	O	28	Nov 01/2008	O	65	Nov 01/2008
O	10	Nov 01/2008	O	29	Nov 01/2008	O	66	Nov 01/2008
O	11	Nov 01/2008	O	30	Nov 01/2008	O	67	Nov 01/2008
O	12	Nov 01/2008	O	31	Nov 01/2008	O	68	Nov 01/2008
O	13	Nov 01/2008	O	32	Nov 01/2008	O	69	Nov 01/2008
O	14	Nov 01/2008	O	33	Nov 01/2008		70	BLANK
20-61-19 CONTENTS			O	34	Nov 01/2008	20-61-20 CONTENTS		
O	1	Nov 01/2008	O	35	Nov 01/2008	O	1	Nov 01/2008
O	2	Nov 01/2008	O	36	Nov 01/2008		2	BLANK
20-61-19			O	37	Nov 01/2008	20-61-20		
O	1	Nov 01/2008	O	38	Nov 01/2008	O	1	Nov 01/2008
O	2	Nov 01/2008	O	39	Nov 01/2008	O	2	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008	O	3	Nov 01/2008
O	4	Nov 01/2008	O	41	Nov 01/2008	O	4	Nov 01/2008
O	5	Nov 01/2008	O	42	Nov 01/2008	O	5	Nov 01/2008
O	6	Nov 01/2008	O	43	Nov 01/2008	O	6	Nov 01/2008
O	7	Nov 01/2008	O	44	Nov 01/2008	O	7	Nov 01/2008
O	8	Nov 01/2008	O	45	Nov 01/2008	O	8	Nov 01/2008
O	9	Nov 01/2008	O	46	Nov 01/2008	O	9	Nov 01/2008
O	10	Nov 01/2008	O	47	Nov 01/2008		10	BLANK
O	11	Nov 01/2008	O	48	Nov 01/2008	20-61-23 CONTENTS		
O	12	Nov 01/2008	O	49	Nov 01/2008	O	1	Nov 01/2008
O	13	Nov 01/2008	O	50	Nov 01/2008		2	BLANK
O	14	Nov 01/2008	O	51	Nov 01/2008	20-61-23		
O	15	Nov 01/2008	O	52	Nov 01/2008	O	1	Nov 01/2008
O	16	Nov 01/2008	O	53	Nov 01/2008	O	2	Nov 01/2008
O	17	Nov 01/2008	O	54	Nov 01/2008	O	3	Nov 01/2008

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20-61-23 (continued)			20-61-28 (continued)			20-62-13 CONTENTS		
	4	BLANK	O	13	Nov 01/2008	O	1	Nov 01/2008
20-61-24 CONTENTS			O	14	Nov 01/2008	O	2	Nov 01/2008
O	1	Nov 01/2008	O	15	Nov 01/2008	20-62-13		
	2	BLANK		16	BLANK	O	1	Nov 01/2008
20-61-24			20-61-29 CONTENTS			O	2	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	O	3	Nov 01/2008
O	2	Nov 01/2008		2	BLANK	O	4	Nov 01/2008
O	3	Nov 01/2008	20-61-29			O	5	Nov 01/2008
O	4	Nov 01/2008	O	1	Nov 01/2008	O	6	Nov 01/2008
O	5	Nov 01/2008	O	2	Nov 01/2008	O	7	Nov 01/2008
	6	BLANK	O	3	Nov 01/2008	O	8	Nov 01/2008
20-61-26 CONTENTS			O	4	Nov 01/2008	O	9	Nov 01/2008
O	1	Nov 01/2008	O	5	Nov 01/2008	O	10	Nov 01/2008
	2	BLANK	O	6	Nov 01/2008	O	11	Nov 01/2008
20-61-26			O	7	Nov 01/2008	O	12	Nov 01/2008
O	1	Nov 01/2008	O	8	Nov 01/2008	O	13	Nov 01/2008
O	2	Nov 01/2008	O	9	Nov 01/2008	O	14	Nov 01/2008
O	3	Nov 01/2008		10	BLANK	O	15	Nov 01/2008
O	4	Nov 01/2008	20-62-12 CONTENTS			O	16	Nov 01/2008
O	5	Nov 01/2008	O	1	Nov 01/2008	O	17	Nov 01/2008
O	6	Nov 01/2008		2	BLANK	O	18	Nov 01/2008
20-61-28 CONTENTS			20-62-12			O	19	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	O	20	Nov 01/2008
	2	BLANK	O	2	Nov 01/2008	O	21	Nov 01/2008
20-61-28			O	3	Nov 01/2008	O	22	Nov 01/2008
O	1	Nov 01/2008	O	4	Nov 01/2008	O	23	Nov 01/2008
O	2	Nov 01/2008	O	5	Nov 01/2008	O	24	Nov 01/2008
O	3	Nov 01/2008	O	6	Nov 01/2008	O	25	Nov 01/2008
O	4	Nov 01/2008	O	7	Nov 01/2008	O	26	Nov 01/2008
O	5	Nov 01/2008	O	8	Nov 01/2008	O	27	Nov 01/2008
O	6	Nov 01/2008	O	9	Nov 01/2008	O	28	Nov 01/2008
O	7	Nov 01/2008	O	10	Nov 01/2008	20-62-14 CONTENTS		
O	8	Nov 01/2008	O	11	Nov 01/2008	O	1	Nov 01/2008
O	9	Nov 01/2008	O	12	Nov 01/2008	O	2	Nov 01/2008
O	10	Nov 01/2008	O	13	Nov 01/2008	20-62-14		
O	11	Nov 01/2008		14	BLANK	O	1	Nov 01/2008
O	12	Nov 01/2008				O	2	Nov 01/2008

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20-62-14 (continued)			20-62-14 (continued)			20-62-16 (continued)		
O	3	Nov 01/2008	O	40	Nov 01/2008	O	11	Nov 01/2008
O	4	Nov 01/2008	20-62-15 CONTENTS			O	12	Nov 01/2008
O	5	Nov 01/2008	O	1	Nov 01/2008	O	13	Nov 01/2008
O	6	Nov 01/2008		2	BLANK	O	14	Nov 01/2008
O	7	Nov 01/2008	20-62-15			O	15	Nov 01/2008
O	8	Nov 01/2008	O	1	Nov 01/2008	O	16	Nov 01/2008
O	9	Nov 01/2008	O	2	Nov 01/2008	O	17	Nov 01/2008
O	10	Nov 01/2008	O	3	Nov 01/2008	O	18	Nov 01/2008
O	11	Nov 01/2008	O	4	Nov 01/2008	O	19	Nov 01/2008
O	12	Nov 01/2008	O	5	Nov 01/2008	O	20	Nov 01/2008
O	13	Nov 01/2008	O	6	Nov 01/2008	O	21	Nov 01/2008
O	14	Nov 01/2008	O	7	Nov 01/2008	O	22	Nov 01/2008
O	15	Nov 01/2008	O	8	Nov 01/2008	20-62-17 CONTENTS		
O	16	Nov 01/2008	O	9	Nov 01/2008	O	1	Nov 01/2008
O	17	Nov 01/2008	O	10	Nov 01/2008		2	BLANK
O	18	Nov 01/2008	O	11	Nov 01/2008	20-62-17		
O	19	Nov 01/2008	O	12	Nov 01/2008	O	1	Nov 01/2008
O	20	Nov 01/2008	O	13	Nov 01/2008	O	2	Nov 01/2008
O	21	Nov 01/2008	O	14	Nov 01/2008	O	3	Nov 01/2008
O	22	Nov 01/2008	O	15	Nov 01/2008	O	4	Nov 01/2008
O	23	Nov 01/2008	O	16	Nov 01/2008	O	5	Nov 01/2008
O	24	Nov 01/2008	O	17	Nov 01/2008	O	6	Nov 01/2008
O	25	Nov 01/2008	O	18	Nov 01/2008	20-62-18 CONTENTS		
O	26	Nov 01/2008	20-62-16 CONTENTS			O	1	Nov 01/2008
O	27	Nov 01/2008	O	1	Nov 01/2008		2	BLANK
O	28	Nov 01/2008	O	2	Nov 01/2008	20-62-18		
O	29	Nov 01/2008	20-62-16			O	1	Nov 01/2008
O	30	Nov 01/2008	O	1	Nov 01/2008	O	2	Nov 01/2008
O	31	Nov 01/2008	O	2	Nov 01/2008	O	3	Nov 01/2008
O	32	Nov 01/2008	O	3	Nov 01/2008	O	4	Nov 01/2008
O	33	Nov 01/2008	O	4	Nov 01/2008	O	5	Nov 01/2008
O	34	Nov 01/2008	O	5	Nov 01/2008		6	BLANK
O	35	Nov 01/2008	O	6	Nov 01/2008	20-62-19 CONTENTS		
O	36	Nov 01/2008	O	7	Nov 01/2008	O	1	Nov 01/2008
O	37	Nov 01/2008	O	8	Nov 01/2008		2	BLANK
O	38	Nov 01/2008	O	9	Nov 01/2008	20-62-19		
O	39	Nov 01/2008	O	10	Nov 01/2008	O	1	Nov 01/2008

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20-62-19 (continued)			20-62-26 (continued)			20-63-13 (continued)		
O	2	Nov 01/2008	O	3	Nov 01/2008	O	14	Nov 01/2008
20-62-20 CONTENTS			O	4	Nov 01/2008	O	15	Nov 01/2008
O	1	Nov 01/2008	O	5	Nov 01/2008	O	16	Nov 01/2008
	2	BLANK		6	BLANK	O	17	Nov 01/2008
20-62-20			20-63-00 CONTENTS			O	18	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	O	19	Nov 01/2008
O	2	Nov 01/2008		2	BLANK	O	20	Nov 01/2008
20-62-21 CONTENTS			20-63-00			O	21	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	O	22	Nov 01/2008
	2	BLANK	O	2	Nov 01/2008	O	23	Nov 01/2008
20-62-21			20-63-01 CONTENTS			O	24	Nov 01/2008
O	1	Nov 01/2008	O	1	Nov 01/2008	20-63-14 CONTENTS		
O	2	Nov 01/2008		2	BLANK	O	1	Nov 01/2008
O	3	Nov 01/2008	20-63-01				2	BLANK
O	4	Nov 01/2008	O	1	Nov 01/2008	20-63-14		
20-62-22 CONTENTS			O	2	Nov 01/2008	O	1	Nov 01/2008
O	1	Nov 01/2008	O	3	Nov 01/2008	O	2	Nov 01/2008
	2	BLANK	O	4	Nov 01/2008	O	3	Nov 01/2008
20-62-22			O	5	Nov 01/2008	O	4	Nov 01/2008
O	1	Nov 01/2008		6	BLANK	O	5	Nov 01/2008
O	2	Nov 01/2008	20-63-13 CONTENTS			O	6	Nov 01/2008
O	3	Nov 01/2008	O	1	Nov 01/2008	O	7	Nov 01/2008
O	4	Nov 01/2008		2	BLANK	O	8	Nov 01/2008
O	5	Nov 01/2008	20-63-13			O	9	Nov 01/2008
O	6	Nov 01/2008	O	1	Nov 01/2008	O	10	Nov 01/2008
O	7	Nov 01/2008	O	2	Nov 01/2008	O	11	Nov 01/2008
O	8	Nov 01/2008	O	3	Nov 01/2008		12	BLANK
O	9	Nov 01/2008	O	4	Nov 01/2008	20-63-18 CONTENTS		
O	10	Nov 01/2008	O	5	Nov 01/2008	O	1	Nov 01/2008
O	11	Nov 01/2008	O	6	Nov 01/2008		2	BLANK
O	12	Nov 01/2008	O	7	Nov 01/2008	20-63-18		
20-62-26 CONTENTS			O	8	Nov 01/2008	O	1	Nov 01/2008
O	1	Nov 01/2008	O	9	Nov 01/2008	O	2	Nov 01/2008
	2	BLANK	O	10	Nov 01/2008	O	3	Nov 01/2008
20-62-26			O	11	Nov 01/2008	O	4	Nov 01/2008
O	1	Nov 01/2008	O	12	Nov 01/2008	O	5	Nov 01/2008
O	2	Nov 01/2008	O	13	Nov 01/2008	O	6	Nov 01/2008

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20-63-18 (continued)			20-63-19 (continued)			20-64-12 (continued)		
O	7	Nov 01/2008	O	30	Nov 01/2008	O	3	Nov 01/2008
O	8	Nov 01/2008	O	31	Nov 01/2008	O	4	Nov 01/2008
O	9	Nov 01/2008	O	32	Nov 01/2008	O	5	Nov 01/2008
	10	BLANK	O	33	Nov 01/2008	O	6	Nov 01/2008
20-63-19 CONTENTS			O	34	Nov 01/2008	O	7	Nov 01/2008
O	1	Nov 01/2008	O	35	Nov 01/2008	O	8	Nov 01/2008
	2	BLANK	O	36	Nov 01/2008	O	9	Nov 01/2008
20-63-19			O	37	Nov 01/2008	O	10	Nov 01/2008
O	1	Nov 01/2008	O	38	Nov 01/2008	20-64-13 CONTENTS		
O	2	Nov 01/2008	O	39	Nov 01/2008	O	1	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008		2	BLANK
O	4	Nov 01/2008	O	41	Nov 01/2008	20-64-13		
O	5	Nov 01/2008	O	42	Nov 01/2008	O	1	Nov 01/2008
O	6	Nov 01/2008	O	43	Nov 01/2008		2	BLANK
O	7	Nov 01/2008	O	44	Nov 01/2008	20-64-14 CONTENTS		
O	8	Nov 01/2008	O	45	Nov 01/2008	O	1	Nov 01/2008
O	9	Nov 01/2008	O	46	Nov 01/2008		2	BLANK
O	10	Nov 01/2008	O	47	Nov 01/2008	20-64-14		
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O	12	Nov 01/2008	O	49	Nov 01/2008	O	2	Nov 01/2008
O	13	Nov 01/2008	O	50	Nov 01/2008	O	3	Nov 01/2008
O	14	Nov 01/2008	O	51	Nov 01/2008	O	4	Nov 01/2008
O	15	Nov 01/2008	O	52	Nov 01/2008	O	5	Nov 01/2008
O	16	Nov 01/2008	20-64-11 CONTENTS			O	6	Nov 01/2008
O	17	Nov 01/2008	O	1	Nov 01/2008	O	7	Nov 01/2008
O	18	Nov 01/2008		2	BLANK	O	8	Nov 01/2008
O	19	Nov 01/2008	20-64-11			O	9	Nov 01/2008
O	20	Nov 01/2008	O	1	Nov 01/2008		10	BLANK
O	21	Nov 01/2008	O	2	Nov 01/2008	20-64-15 CONTENTS		
O	22	Nov 01/2008	O	3	Nov 01/2008	O	1	Nov 01/2008
O	23	Nov 01/2008		4	BLANK		2	BLANK
O	24	Nov 01/2008	20-64-12 CONTENTS			20-64-15		
O	25	Nov 01/2008	O	1	Nov 01/2008	O	1	Nov 01/2008
O	26	Nov 01/2008		2	BLANK	O	2	Nov 01/2008
O	27	Nov 01/2008	20-64-12			O	3	Nov 01/2008
O	28	Nov 01/2008	O	1	Nov 01/2008	O	4	Nov 01/2008
O	29	Nov 01/2008	O	2	Nov 01/2008	O	5	Nov 01/2008

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20-64-15 (continued)			20-64-18 (continued)			20-71-11 (continued)		
	6	BLANK	O	7	Nov 01/2008	O	32	Nov 01/2008
20-64-16 CONTENTS				8	BLANK	O	33	Nov 01/2008
O	1	Nov 01/2008	20-71-11 CONTENTS			O	34	Nov 01/2008
	2	BLANK	O	1	Nov 01/2008	O	35	Nov 01/2008
20-64-16			O	2	Nov 01/2008	O	36	Nov 01/2008
O	1	Nov 01/2008	20-71-11			O	37	Nov 01/2008
O	2	Nov 01/2008	O	1	Nov 01/2008	O	38	Nov 01/2008
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O	4	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
O	5	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	6	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	7	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	8	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	9	Nov 01/2008	O	8	Nov 01/2008	O	45	Nov 01/2008
O	10	Nov 01/2008	O	9	Nov 01/2008	O	46	Nov 01/2008
20-64-17 CONTENTS			O	10	Nov 01/2008	O	47	Nov 01/2008
O	1	Nov 01/2008	O	11	Nov 01/2008	O	48	Nov 01/2008
	2	BLANK	O	12	Nov 01/2008	O	49	Nov 01/2008
20-64-17			O	13	Nov 01/2008	O	50	Nov 01/2008
O	1	Nov 01/2008	O	14	Nov 01/2008	O	51	Nov 01/2008
O	2	Nov 01/2008	O	15	Nov 01/2008	O	52	Nov 01/2008
O	3	Nov 01/2008	O	16	Nov 01/2008	O	53	Nov 01/2008
O	4	Nov 01/2008	O	17	Nov 01/2008	O	54	Nov 01/2008
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O	6	Nov 01/2008	O	19	Nov 01/2008	O	56	Nov 01/2008
O	7	Nov 01/2008	O	20	Nov 01/2008	O	57	Nov 01/2008
O	8	Nov 01/2008	O	21	Nov 01/2008	O	58	Nov 01/2008
20-64-18 CONTENTS			O	22	Nov 01/2008	O	59	Nov 01/2008
O	1	Nov 01/2008	O	23	Nov 01/2008	O	60	Nov 01/2008
	2	BLANK	O	24	Nov 01/2008	O	61	Nov 01/2008
20-64-18			O	25	Nov 01/2008	O	62	Nov 01/2008
O	1	Nov 01/2008	O	26	Nov 01/2008	O	63	Nov 01/2008
O	2	Nov 01/2008	O	27	Nov 01/2008	O	64	Nov 01/2008
O	3	Nov 01/2008	O	28	Nov 01/2008	O	65	Nov 01/2008
O	4	Nov 01/2008	O	29	Nov 01/2008	O	66	Nov 01/2008
O	5	Nov 01/2008	O	30	Nov 01/2008	O	67	Nov 01/2008
O	6	Nov 01/2008	O	31	Nov 01/2008	O	68	Nov 01/2008

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20-71-11 (continued)			20-71-11 (continued)			20-71-12 CONTENTS (continued)		
O	69	Nov 01/2008	O	106	Nov 01/2008		2	BLANK
O	70	Nov 01/2008	O	107	Nov 01/2008	20-71-12		
O	71	Nov 01/2008	O	108	Nov 01/2008	O	1	Nov 01/2008
O	72	Nov 01/2008	O	109	Nov 01/2008	O	2	Nov 01/2008
O	73	Nov 01/2008	O	110	Nov 01/2008	O	3	Nov 01/2008
O	74	Nov 01/2008	O	111	Nov 01/2008	O	4	Nov 01/2008
O	75	Nov 01/2008	O	112	Nov 01/2008	O	5	Nov 01/2008
O	76	Nov 01/2008	O	113	Nov 01/2008	O	6	Nov 01/2008
O	77	Nov 01/2008	O	114	Nov 01/2008	O	7	Nov 01/2008
O	78	Nov 01/2008	O	115	Nov 01/2008	O	8	Nov 01/2008
O	79	Nov 01/2008	O	116	Nov 01/2008	O	9	Nov 01/2008
O	80	Nov 01/2008	O	117	Nov 01/2008	O	10	Nov 01/2008
O	81	Nov 01/2008	O	118	Nov 01/2008	O	11	Nov 01/2008
O	82	Nov 01/2008	O	119	Nov 01/2008	O	12	Nov 01/2008
O	83	Nov 01/2008	O	120	Nov 01/2008	O	13	Nov 01/2008
O	84	Nov 01/2008	O	121	Nov 01/2008	O	14	Nov 01/2008
O	85	Nov 01/2008	O	122	Nov 01/2008	O	15	Nov 01/2008
O	86	Nov 01/2008	O	123	Nov 01/2008	O	16	Nov 01/2008
O	87	Nov 01/2008	O	124	Nov 01/2008	O	17	Nov 01/2008
O	88	Nov 01/2008	O	125	Nov 01/2008	O	18	Nov 01/2008
O	89	Nov 01/2008	O	126	Nov 01/2008	O	19	Nov 01/2008
O	90	Nov 01/2008	O	127	Nov 01/2008	O	20	Nov 01/2008
O	91	Nov 01/2008	O	128	Nov 01/2008	O	21	Nov 01/2008
O	92	Nov 01/2008	O	129	Nov 01/2008	O	22	Nov 01/2008
O	93	Nov 01/2008	O	130	Nov 01/2008	O	23	Nov 01/2008
O	94	Nov 01/2008	O	131	Nov 01/2008	O	24	Nov 01/2008
O	95	Nov 01/2008	O	132	Nov 01/2008	20-71-13 CONTENTS		
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O	97	Nov 01/2008	O	134	Nov 01/2008		2	BLANK
O	98	Nov 01/2008	O	135	Nov 01/2008	20-71-13		
O	99	Nov 01/2008	O	136	Nov 01/2008	O	1	Nov 01/2008
O	100	Nov 01/2008	O	137	Nov 01/2008	O	2	Nov 01/2008
O	101	Nov 01/2008	O	138	Nov 01/2008	O	3	Nov 01/2008
O	102	Nov 01/2008	O	139	Nov 01/2008	O	4	Nov 01/2008
O	103	Nov 01/2008		140	BLANK	20-71-14 CONTENTS		
O	104	Nov 01/2008	20-71-12 CONTENTS			O	1	Nov 01/2008
O	105	Nov 01/2008	O	1	Nov 01/2008	O	2	Nov 01/2008

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O	3	Nov 01/2008	O	35	Nov 01/2008	O	72	Nov 01/2008
O	4	Nov 01/2008	O	36	Nov 01/2008	O	73	Nov 01/2008
20-71-14			O	37	Nov 01/2008	O	74	Nov 01/2008
O	1	Nov 01/2008	O	38	Nov 01/2008	O	75	Nov 01/2008
O	2	Nov 01/2008	O	39	Nov 01/2008	O	76	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008	O	77	Nov 01/2008
O	4	Nov 01/2008	O	41	Nov 01/2008	O	78	Nov 01/2008
O	5	Nov 01/2008	O	42	Nov 01/2008	O	79	Nov 01/2008
O	6	Nov 01/2008	O	43	Nov 01/2008	O	80	Nov 01/2008
O	7	Nov 01/2008	O	44	Nov 01/2008	O	81	Nov 01/2008
O	8	Nov 01/2008	O	45	Nov 01/2008	O	82	Nov 01/2008
O	9	Nov 01/2008	O	46	Nov 01/2008	O	83	Nov 01/2008
O	10	Nov 01/2008	O	47	Nov 01/2008	O	84	Nov 01/2008
O	11	Nov 01/2008	O	48	Nov 01/2008	O	85	Nov 01/2008
O	12	Nov 01/2008	O	49	Nov 01/2008	O	86	Nov 01/2008
O	13	Nov 01/2008	O	50	Nov 01/2008	O	87	Nov 01/2008
O	14	Nov 01/2008	O	51	Nov 01/2008	O	88	Nov 01/2008
O	15	Nov 01/2008	O	52	Nov 01/2008	O	89	Nov 01/2008
O	16	Nov 01/2008	O	53	Nov 01/2008	O	90	Nov 01/2008
O	17	Nov 01/2008	O	54	Nov 01/2008	O	91	Nov 01/2008
O	18	Nov 01/2008	O	55	Nov 01/2008	O	92	Nov 01/2008
O	19	Nov 01/2008	O	56	Nov 01/2008	O	93	Nov 01/2008
O	20	Nov 01/2008	O	57	Nov 01/2008	O	94	Nov 01/2008
O	21	Nov 01/2008	O	58	Nov 01/2008	O	95	Nov 01/2008
O	22	Nov 01/2008	O	59	Nov 01/2008	O	96	Nov 01/2008
O	23	Nov 01/2008	O	60	Nov 01/2008	O	97	Nov 01/2008
O	24	Nov 01/2008	O	61	Nov 01/2008	O	98	Nov 01/2008
O	25	Nov 01/2008	O	62	Nov 01/2008	O	99	Nov 01/2008
O	26	Nov 01/2008	O	63	Nov 01/2008	O	100	Nov 01/2008
O	27	Nov 01/2008	O	64	Nov 01/2008	O	101	Nov 01/2008
O	28	Nov 01/2008	O	65	Nov 01/2008	O	102	Nov 01/2008
O	29	Nov 01/2008	O	66	Nov 01/2008	O	103	Nov 01/2008
O	30	Nov 01/2008	O	67	Nov 01/2008	O	104	Nov 01/2008
O	31	Nov 01/2008	O	68	Nov 01/2008	O	105	Nov 01/2008
O	32	Nov 01/2008	O	69	Nov 01/2008	O	106	Nov 01/2008
O	33	Nov 01/2008	O	70	Nov 01/2008	O	107	Nov 01/2008
O	34	Nov 01/2008	O	71	Nov 01/2008	O	108	Nov 01/2008

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O	109	Nov 01/2008	O	146	Nov 01/2008	O	183	Nov 01/2008
O	110	Nov 01/2008	O	147	Nov 01/2008	O	184	Nov 01/2008
O	111	Nov 01/2008	O	148	Nov 01/2008	O	185	Nov 01/2008
O	112	Nov 01/2008	O	149	Nov 01/2008	O	186	Nov 01/2008
O	113	Nov 01/2008	O	150	Nov 01/2008	O	187	Nov 01/2008
O	114	Nov 01/2008	O	151	Nov 01/2008	O	188	Nov 01/2008
O	115	Nov 01/2008	O	152	Nov 01/2008	O	189	Nov 01/2008
O	116	Nov 01/2008	O	153	Nov 01/2008	O	190	Nov 01/2008
O	117	Nov 01/2008	O	154	Nov 01/2008	O	191	Nov 01/2008
O	118	Nov 01/2008	O	155	Nov 01/2008	O	192	Nov 01/2008
O	119	Nov 01/2008	O	156	Nov 01/2008	O	193	Nov 01/2008
O	120	Nov 01/2008	O	157	Nov 01/2008	O	194	Nov 01/2008
O	121	Nov 01/2008	O	158	Nov 01/2008	O	195	Nov 01/2008
O	122	Nov 01/2008	O	159	Nov 01/2008	O	196	Nov 01/2008
O	123	Nov 01/2008	O	160	Nov 01/2008	O	197	Nov 01/2008
O	124	Nov 01/2008	O	161	Nov 01/2008	O	198	Nov 01/2008
O	125	Nov 01/2008	O	162	Nov 01/2008	O	199	Nov 01/2008
O	126	Nov 01/2008	O	163	Nov 01/2008	O	200	Nov 01/2008
O	127	Nov 01/2008	O	164	Nov 01/2008	O	201	Nov 01/2008
O	128	Nov 01/2008	O	165	Nov 01/2008	O	202	Nov 01/2008
O	129	Nov 01/2008	O	166	Nov 01/2008	O	203	Nov 01/2008
O	130	Nov 01/2008	O	167	Nov 01/2008	O	204	Nov 01/2008
O	131	Nov 01/2008	O	168	Nov 01/2008	O	205	Nov 01/2008
O	132	Nov 01/2008	O	169	Nov 01/2008	O	206	Nov 01/2008
O	133	Nov 01/2008	O	170	Nov 01/2008	O	207	Nov 01/2008
O	134	Nov 01/2008	O	171	Nov 01/2008	O	208	Nov 01/2008
O	135	Nov 01/2008	O	172	Nov 01/2008	O	209	Nov 01/2008
O	136	Nov 01/2008	O	173	Nov 01/2008	O	210	Nov 01/2008
O	137	Nov 01/2008	O	174	Nov 01/2008	O	211	Nov 01/2008
O	138	Nov 01/2008	O	175	Nov 01/2008	O	212	Nov 01/2008
O	139	Nov 01/2008	O	176	Nov 01/2008	O	213	Nov 01/2008
O	140	Nov 01/2008	O	177	Nov 01/2008	O	214	Nov 01/2008
O	141	Nov 01/2008	O	178	Nov 01/2008	O	215	Nov 01/2008
O	142	Nov 01/2008	O	179	Nov 01/2008	O	216	Nov 01/2008
O	143	Nov 01/2008	O	180	Nov 01/2008	O	217	Nov 01/2008
O	144	Nov 01/2008	O	181	Nov 01/2008	O	218	Nov 01/2008
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O	220	Nov 01/2008	O	27	Nov 01/2008	O	14	Nov 01/2008
O	221	Nov 01/2008	O	28	Nov 01/2008	O	15	Nov 01/2008
O	222	Nov 01/2008	O	29	Nov 01/2008	O	16	Nov 01/2008
O	223	Nov 01/2008	O	30	Nov 01/2008	20-72-08 CONTENTS		
O	224	Nov 01/2008	O	31	Nov 01/2008	O	1	Nov 01/2008
O	225	Nov 01/2008	O	32	Nov 01/2008		2	BLANK
	226	BLANK	O	33	Nov 01/2008	20-72-08		
20-71-15 CONTENTS			O	34	Nov 01/2008	O	1	Nov 01/2008
O	1	Nov 01/2008	O	35	Nov 01/2008	O	2	Nov 01/2008
	2	BLANK	O	36	Nov 01/2008	O	3	Nov 01/2008
20-71-15			O	37	Nov 01/2008	O	4	Nov 01/2008
O	1	Nov 01/2008	O	38	Nov 01/2008	O	5	Nov 01/2008
O	2	Nov 01/2008	O	39	Nov 01/2008	O	6	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008	O	7	Nov 01/2008
O	4	Nov 01/2008	O	41	Nov 01/2008	O	8	Nov 01/2008
O	5	Nov 01/2008	O	42	Nov 01/2008	O	9	Nov 01/2008
O	6	Nov 01/2008	O	43	Nov 01/2008	O	10	Nov 01/2008
O	7	Nov 01/2008	O	44	Nov 01/2008	O	11	Nov 01/2008
O	8	Nov 01/2008	O	45	Nov 01/2008	O	12	Nov 01/2008
O	9	Nov 01/2008		46	BLANK	O	13	Nov 01/2008
O	10	Nov 01/2008	20-72-07 CONTENTS			O	14	Nov 01/2008
O	11	Nov 01/2008	O	1	Nov 01/2008	O	15	Nov 01/2008
O	12	Nov 01/2008		2	BLANK	O	16	Nov 01/2008
O	13	Nov 01/2008	20-72-07			O	17	Nov 01/2008
O	14	Nov 01/2008	O	1	Nov 01/2008	O	18	Nov 01/2008
O	15	Nov 01/2008	O	2	Nov 01/2008	O	19	Nov 01/2008
O	16	Nov 01/2008	O	3	Nov 01/2008	O	20	Nov 01/2008
O	17	Nov 01/2008	O	4	Nov 01/2008	O	21	Nov 01/2008
O	18	Nov 01/2008	O	5	Nov 01/2008	O	22	Nov 01/2008
O	19	Nov 01/2008	O	6	Nov 01/2008	O	23	Nov 01/2008
O	20	Nov 01/2008	O	7	Nov 01/2008	O	24	Nov 01/2008
O	21	Nov 01/2008	O	8	Nov 01/2008	O	25	Nov 01/2008
O	22	Nov 01/2008	O	9	Nov 01/2008	O	26	Nov 01/2008
O	23	Nov 01/2008	O	10	Nov 01/2008	O	27	Nov 01/2008
O	24	Nov 01/2008	O	11	Nov 01/2008	O	28	Nov 01/2008
O	25	Nov 01/2008	O	12	Nov 01/2008	O	29	Nov 01/2008
O	26	Nov 01/2008	O	13	Nov 01/2008	O	30	Nov 01/2008

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20-72-08 (continued)			20-72-10 (continued)			20-72-11 (continued)		
O	31	Nov 01/2008	O	32	Nov 01/2008	O	17	Nov 01/2008
	32	BLANK	O	33	Nov 01/2008	O	18	Nov 01/2008
20-72-10 CONTENTS			O	34	Nov 01/2008	20-72-12 CONTENTS		
O	1	Nov 01/2008	O	35	Nov 01/2008	O	1	Nov 01/2008
	2	BLANK	O	36	Nov 01/2008		2	BLANK
20-72-10			O	37	Nov 01/2008	20-72-12		
O	1	Nov 01/2008	O	38	Nov 01/2008	O	1	Nov 01/2008
O	2	Nov 01/2008	O	39	Nov 01/2008	O	2	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008	O	3	Nov 01/2008
O	4	Nov 01/2008	O	41	Nov 01/2008	O	4	Nov 01/2008
O	5	Nov 01/2008	O	42	Nov 01/2008	O	5	Nov 01/2008
O	6	Nov 01/2008	O	43	Nov 01/2008	O	6	Nov 01/2008
O	7	Nov 01/2008	O	44	Nov 01/2008	O	7	Nov 01/2008
O	8	Nov 01/2008	O	45	Nov 01/2008	O	8	Nov 01/2008
O	9	Nov 01/2008	O	46	Nov 01/2008	O	9	Nov 01/2008
O	10	Nov 01/2008	O	47	Nov 01/2008	O	10	Nov 01/2008
O	11	Nov 01/2008		48	BLANK	O	11	Nov 01/2008
O	12	Nov 01/2008	20-72-11 CONTENTS			O	12	Nov 01/2008
O	13	Nov 01/2008	O	1	Nov 01/2008	O	13	Nov 01/2008
O	14	Nov 01/2008		2	BLANK	O	14	Nov 01/2008
O	15	Nov 01/2008	20-72-11			O	15	Nov 01/2008
O	16	Nov 01/2008	O	1	Nov 01/2008	O	16	Nov 01/2008
O	17	Nov 01/2008	O	2	Nov 01/2008	O	17	Nov 01/2008
O	18	Nov 01/2008	O	3	Nov 01/2008	O	18	Nov 01/2008
O	19	Nov 01/2008	O	4	Nov 01/2008	O	19	Nov 01/2008
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O	25	Nov 01/2008	O	10	Nov 01/2008	O	25	Nov 01/2008
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O	29	Nov 01/2008	O	14	Nov 01/2008	O	29	Nov 01/2008
O	30	Nov 01/2008	O	15	Nov 01/2008	O	30	Nov 01/2008
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O	32	Nov 01/2008	O	1	Nov 01/2008	O	32	Nov 01/2008
O	33	Nov 01/2008	O	2	Nov 01/2008	O	33	Nov 01/2008
	34	BLANK	20-72-17 CONTENTS			O	34	Nov 01/2008
20-72-13 CONTENTS			O	1	Nov 01/2008	O	35	Nov 01/2008
O	1	Nov 01/2008		2	BLANK	O	36	Nov 01/2008
	2	BLANK	20-72-17			O	37	Nov 01/2008
20-72-13			O	1	Nov 01/2008	O	38	Nov 01/2008
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O	2	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
O	3	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	4	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	5	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	6	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	7	Nov 01/2008	O	8	Nov 01/2008	O	45	Nov 01/2008
O	8	Nov 01/2008	O	9	Nov 01/2008	O	46	Nov 01/2008
O	9	Nov 01/2008	O	10	Nov 01/2008	20-72-18 CONTENTS		
O	10	Nov 01/2008	O	11	Nov 01/2008	O	1	Nov 01/2008
O	11	Nov 01/2008	O	12	Nov 01/2008	O	2	Nov 01/2008
O	12	Nov 01/2008	O	13	Nov 01/2008	20-72-18		
O	13	Nov 01/2008	O	14	Nov 01/2008	O	1	Nov 01/2008
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O	23	Nov 01/2008	O	24	Nov 01/2008	O	11	Nov 01/2008
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O	26	Nov 01/2008	O	27	Nov 01/2008	O	14	Nov 01/2008
20-72-16 CONTENTS			O	28	Nov 01/2008	O	15	Nov 01/2008
O	1	Nov 01/2008	O	29	Nov 01/2008	O	16	Nov 01/2008
	2	BLANK	O	30	Nov 01/2008	O	17	Nov 01/2008
			O	31	Nov 01/2008	O	18	Nov 01/2008

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O	19	Nov 01/2008		8	BLANK	O	33	Nov 01/2008
O	20	Nov 01/2008	20-72-22 CONTENTS			O	34	Nov 01/2008
O	21	Nov 01/2008	O	1	Nov 01/2008	O	35	Nov 01/2008
O	22	Nov 01/2008		2	BLANK	O	36	Nov 01/2008
O	23	Nov 01/2008	20-72-22			O	37	Nov 01/2008
O	24	Nov 01/2008	O	1	Nov 01/2008	O	38	Nov 01/2008
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O	27	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	28	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	29	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	30	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	31	Nov 01/2008	O	8	Nov 01/2008	O	45	Nov 01/2008
	32	BLANK	O	9	Nov 01/2008	O	46	Nov 01/2008
20-72-19 CONTENTS			O	10	Nov 01/2008	20-72-23 CONTENTS		
O	1	Nov 01/2008	O	11	Nov 01/2008	O	1	Nov 01/2008
	2	BLANK	O	12	Nov 01/2008		2	BLANK
20-72-19			O	13	Nov 01/2008	20-72-23		
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O	6	Nov 01/2008	O	19	Nov 01/2008	O	6	Nov 01/2008
O	7	Nov 01/2008	O	20	Nov 01/2008	O	7	Nov 01/2008
	8	BLANK	O	21	Nov 01/2008	O	8	Nov 01/2008
20-72-21 CONTENTS			O	22	Nov 01/2008	O	9	Nov 01/2008
O	1	Nov 01/2008	O	23	Nov 01/2008	O	10	Nov 01/2008
	2	BLANK	O	24	Nov 01/2008	O	11	Nov 01/2008
20-72-21			O	25	Nov 01/2008	O	12	Nov 01/2008
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O	3	Nov 01/2008	O	28	Nov 01/2008	O	15	Nov 01/2008
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O	5	Nov 01/2008	O	30	Nov 01/2008	O	17	Nov 01/2008
O	6	Nov 01/2008	O	31	Nov 01/2008	O	18	Nov 01/2008
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O	20	Nov 01/2008	O	9	Nov 01/2008	O	1	Nov 01/2008
O	21	Nov 01/2008	O	10	Nov 01/2008		2	BLANK
O	22	Nov 01/2008	O	11	Nov 01/2008	20-72-26		
O	23	Nov 01/2008	O	12	Nov 01/2008	O	1	Nov 01/2008
O	24	Nov 01/2008	O	13	Nov 01/2008	O	2	Nov 01/2008
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O	27	Nov 01/2008	O	16	Nov 01/2008	O	5	Nov 01/2008
O	28	Nov 01/2008	O	17	Nov 01/2008	O	6	Nov 01/2008
O	29	Nov 01/2008	O	18	Nov 01/2008	O	7	Nov 01/2008
O	30	Nov 01/2008	O	19	Nov 01/2008	O	8	Nov 01/2008
O	31	Nov 01/2008	O	20	Nov 01/2008	O	9	Nov 01/2008
O	32	Nov 01/2008	O	21	Nov 01/2008	O	10	Nov 01/2008
O	33	Nov 01/2008	O	22	Nov 01/2008	O	11	Nov 01/2008
O	34	Nov 01/2008	20-72-25 CONTENTS			O	12	Nov 01/2008
O	35	Nov 01/2008	O	1	Nov 01/2008	O	13	Nov 01/2008
O	36	Nov 01/2008		2	BLANK	O	14	Nov 01/2008
O	37	Nov 01/2008	20-72-25			O	15	Nov 01/2008
O	38	Nov 01/2008	O	1	Nov 01/2008	O	16	Nov 01/2008
O	39	Nov 01/2008	O	2	Nov 01/2008	O	17	Nov 01/2008
O	40	Nov 01/2008	O	3	Nov 01/2008		18	BLANK
O	41	Nov 01/2008	O	4	Nov 01/2008	20-73-00 CONTENTS		
O	42	Nov 01/2008	O	5	Nov 01/2008	O	1	Nov 01/2008
O	43	Nov 01/2008	O	6	Nov 01/2008		2	BLANK
	44	BLANK	O	7	Nov 01/2008	20-73-00		
20-72-24 CONTENTS			O	8	Nov 01/2008	O	1	Nov 01/2008
O	1	Nov 01/2008	O	9	Nov 01/2008	O	2	Nov 01/2008
	2	BLANK	O	10	Nov 01/2008	O	3	Nov 01/2008
20-72-24			O	11	Nov 01/2008	O	4	Nov 01/2008
O	1	Nov 01/2008	O	12	Nov 01/2008	O	5	Nov 01/2008
O	2	Nov 01/2008	O	13	Nov 01/2008		6	BLANK
O	3	Nov 01/2008	O	14	Nov 01/2008	20-73-01 CONTENTS		
O	4	Nov 01/2008	O	15	Nov 01/2008	O	1	Nov 01/2008
O	5	Nov 01/2008	O	16	Nov 01/2008		2	BLANK
O	6	Nov 01/2008	O	17	Nov 01/2008	20-73-01		
O	7	Nov 01/2008		18	BLANK	O	1	Nov 01/2008
O	8	Nov 01/2008				O	2	Nov 01/2008

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O	4	Nov 01/2008	O	27	Nov 01/2008	O	64	Nov 01/2008
O	5	Nov 01/2008	O	28	Nov 01/2008	O	65	Nov 01/2008
O	6	Nov 01/2008	O	29	Nov 01/2008	O	66	Nov 01/2008
O	7	Nov 01/2008	O	30	Nov 01/2008	O	67	Nov 01/2008
O	8	Nov 01/2008	O	31	Nov 01/2008	O	68	Nov 01/2008
O	9	Nov 01/2008	O	32	Nov 01/2008	O	69	Nov 01/2008
	10	BLANK	O	33	Nov 01/2008	O	70	Nov 01/2008
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O	1	Nov 01/2008	O	35	Nov 01/2008	O	72	Nov 01/2008
O	2	Nov 01/2008	O	36	Nov 01/2008	O	73	Nov 01/2008
20-74-02			O	37	Nov 01/2008		74	BLANK
O	1	Nov 01/2008	O	38	Nov 01/2008	20-74-11 CONTENTS		
O	2	Nov 01/2008	O	39	Nov 01/2008	O	1	Nov 01/2008
O	3	Nov 01/2008	O	40	Nov 01/2008	O	2	Nov 01/2008
O	4	Nov 01/2008	O	41	Nov 01/2008	20-74-11		
O	5	Nov 01/2008	O	42	Nov 01/2008	O	1	Nov 01/2008
O	6	Nov 01/2008	O	43	Nov 01/2008	O	2	Nov 01/2008
O	7	Nov 01/2008	O	44	Nov 01/2008	O	3	Nov 01/2008
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O	9	Nov 01/2008	O	46	Nov 01/2008	O	5	Nov 01/2008
O	10	Nov 01/2008	O	47	Nov 01/2008	O	6	Nov 01/2008
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O	13	Nov 01/2008	O	50	Nov 01/2008	O	9	Nov 01/2008
O	14	Nov 01/2008	O	51	Nov 01/2008	O	10	Nov 01/2008
O	15	Nov 01/2008	O	52	Nov 01/2008	O	11	Nov 01/2008
O	16	Nov 01/2008	O	53	Nov 01/2008	O	12	Nov 01/2008
O	17	Nov 01/2008	O	54	Nov 01/2008	O	13	Nov 01/2008
O	18	Nov 01/2008	O	55	Nov 01/2008	O	14	Nov 01/2008
O	19	Nov 01/2008	O	56	Nov 01/2008	O	15	Nov 01/2008
O	20	Nov 01/2008	O	57	Nov 01/2008	O	16	Nov 01/2008
O	21	Nov 01/2008	O	58	Nov 01/2008	O	17	Nov 01/2008
O	22	Nov 01/2008	O	59	Nov 01/2008	O	18	Nov 01/2008
O	23	Nov 01/2008	O	60	Nov 01/2008	O	19	Nov 01/2008
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O	23	Nov 01/2008	O	2	Nov 01/2008	O	34	Nov 01/2008
O	24	Nov 01/2008	O	3	Nov 01/2008	O	35	Nov 01/2008
O	25	Nov 01/2008		4	BLANK	O	36	Nov 01/2008
O	26	Nov 01/2008	20-74-12			O	37	Nov 01/2008
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O	29	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
O	30	Nov 01/2008	O	4	Nov 01/2008	O	41	Nov 01/2008
O	31	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	32	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	33	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	34	Nov 01/2008	O	8	Nov 01/2008	O	45	Nov 01/2008
O	35	Nov 01/2008	O	9	Nov 01/2008	O	46	Nov 01/2008
O	36	Nov 01/2008	O	10	Nov 01/2008	20-74-13 CONTENTS		
O	37	Nov 01/2008	O	11	Nov 01/2008	O	1	Nov 01/2008
O	38	Nov 01/2008	O	12	Nov 01/2008	O	2	Nov 01/2008
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O	40	Nov 01/2008	O	14	Nov 01/2008		4	BLANK
O	41	Nov 01/2008	O	15	Nov 01/2008	20-74-13		
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O	47	Nov 01/2008	O	21	Nov 01/2008	O	6	Nov 01/2008
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O	52	Nov 01/2008	O	26	Nov 01/2008	O	11	Nov 01/2008
O	53	Nov 01/2008	O	27	Nov 01/2008	O	12	Nov 01/2008
O	54	Nov 01/2008	O	28	Nov 01/2008	O	13	Nov 01/2008
O	55	Nov 01/2008	O	29	Nov 01/2008	O	14	Nov 01/2008
O	56	Nov 01/2008	O	30	Nov 01/2008	O	15	Nov 01/2008
O	57	Nov 01/2008	O	31	Nov 01/2008	O	16	Nov 01/2008
O	58	BLANK	O	32	Nov 01/2008	O	17	Nov 01/2008

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O	22	Nov 01/2008	O	59	Nov 01/2008	O	14	Nov 01/2008
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O	24	Nov 01/2008	O	61	Nov 01/2008	O	16	Nov 01/2008
O	25	Nov 01/2008	O	62	Nov 01/2008	O	17	Nov 01/2008
O	26	Nov 01/2008	O	63	Nov 01/2008	O	18	Nov 01/2008
O	27	Nov 01/2008	O	64	Nov 01/2008	O	19	Nov 01/2008
O	28	Nov 01/2008	O	65	Nov 01/2008	O	20	Nov 01/2008
O	29	Nov 01/2008	O	66	Nov 01/2008	O	21	Nov 01/2008
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O	31	Nov 01/2008	O	68	Nov 01/2008	O	23	Nov 01/2008
O	32	Nov 01/2008	O	69	Nov 01/2008	O	24	Nov 01/2008
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O	34	Nov 01/2008	O	71	Nov 01/2008	O	26	Nov 01/2008
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O	41	Nov 01/2008		78	BLANK	O	33	Nov 01/2008
O	42	Nov 01/2008	20-74-14 CONTENTS			O	34	Nov 01/2008
O	43	Nov 01/2008	O	1	Nov 01/2008	O	35	Nov 01/2008
O	44	Nov 01/2008	O	2	Nov 01/2008	O	36	Nov 01/2008
O	45	Nov 01/2008	20-74-14			O	37	Nov 01/2008
O	46	Nov 01/2008	O	1	Nov 01/2008	O	38	Nov 01/2008
O	47	Nov 01/2008	O	2	Nov 01/2008	O	39	Nov 01/2008
O	48	Nov 01/2008	O	3	Nov 01/2008	O	40	Nov 01/2008
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O	50	Nov 01/2008	O	5	Nov 01/2008	O	42	Nov 01/2008
O	51	Nov 01/2008	O	6	Nov 01/2008	O	43	Nov 01/2008
O	52	Nov 01/2008	O	7	Nov 01/2008	O	44	Nov 01/2008
O	53	Nov 01/2008	O	8	Nov 01/2008	O	45	Nov 01/2008
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O	48	Nov 01/2008	O	31	Nov 01/2008	O	12	Nov 01/2008
O	49	Nov 01/2008	O	32	Nov 01/2008	O	13	Nov 01/2008
O	50	Nov 01/2008	O	33	Nov 01/2008	O	14	Nov 01/2008
20-74-16 CONTENTS			O	34	Nov 01/2008	O	15	Nov 01/2008
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20-74-16			O	37	Nov 01/2008		18	BLANK
O	1	Nov 01/2008	O	38	Nov 01/2008	20-81-13 CONTENTS		
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O	8	Nov 01/2008		2	BLANK		4	BLANK
O	9	Nov 01/2008	20-81-11			20-81-14 CONTENTS		
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O	15	Nov 01/2008	O	6	Nov 01/2008	O	3	Nov 01/2008
O	16	Nov 01/2008	20-81-12 CONTENTS			O	4	Nov 01/2008
O	17	Nov 01/2008	O	1	Nov 01/2008	20-81-16 CONTENTS		
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O	19	Nov 01/2008	20-81-12				2	BLANK
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O	23	Nov 01/2008	O	4	Nov 01/2008	O	3	Nov 01/2008
O	24	Nov 01/2008	O	5	Nov 01/2008	O	4	Nov 01/2008
O	25	Nov 01/2008	O	6	Nov 01/2008	O	5	Nov 01/2008
O	26	Nov 01/2008	O	7	Nov 01/2008	O	6	Nov 01/2008
O	27	Nov 01/2008	O	8	Nov 01/2008	O	7	Nov 01/2008
O	28	Nov 01/2008	O	9	Nov 01/2008	O	8	Nov 01/2008
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20-81-17 CONTENTS			O 2	Nov 01/2008		O 11	Nov 01/2008	
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2	BLANK		4	BLANK		20-83-00 CONTENTS		
20-81-17			20-82-11 CONTENTS			O 1	Nov 01/2008	
O 1	Nov 01/2008		O 1	Nov 01/2008		2	BLANK	
O 2	Nov 01/2008		2	BLANK		20-83-00		
O 3	Nov 01/2008		20-82-11			O 1	Nov 01/2008	
O 4	Nov 01/2008		O 1	Nov 01/2008		O 2	Nov 01/2008	
20-81-18 CONTENTS			O 2	Nov 01/2008		O 3	Nov 01/2008	
O 1	Nov 01/2008		O 3	Nov 01/2008		O 4	Nov 01/2008	
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20-81-18			O 5	Nov 01/2008		O 6	Nov 01/2008	
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O 2	Nov 01/2008		O 7	Nov 01/2008		O 8	Nov 01/2008	
O 3	Nov 01/2008		8	BLANK		O 9	Nov 01/2008	
O 4	Nov 01/2008		20-82-12 CONTENTS			O 10	Nov 01/2008	
20-81-19 CONTENTS			O 1	Nov 01/2008		O 11	Nov 01/2008	
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2	BLANK		20-82-12			20-83-01 CONTENTS		
20-81-19			O 1	Nov 01/2008		O 1	Nov 01/2008	
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O 2	Nov 01/2008		O 3	Nov 01/2008		20-83-01		
O 3	Nov 01/2008		O 4	Nov 01/2008		O 1	Nov 01/2008	
O 4	Nov 01/2008		20-82-13 CONTENTS			O 2	Nov 01/2008	
O 5	Nov 01/2008		O 1	Nov 01/2008		O 3	Nov 01/2008	
6	BLANK		2	BLANK		O 4	Nov 01/2008	
20-81-21 CONTENTS			20-82-13			O 5	Nov 01/2008	
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20-81-21			O 3	Nov 01/2008		O 8	Nov 01/2008	
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O 2	Nov 01/2008		O 5	Nov 01/2008		O 10	Nov 01/2008	
20-81-22 CONTENTS			O 6	Nov 01/2008		O 11	Nov 01/2008	
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2	BLANK		O 8	Nov 01/2008		O 13	Nov 01/2008	
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O	17	Nov 01/2008	O	3	Nov 01/2008	O	10	Nov 01/2008
O	18	Nov 01/2008	O	4	Nov 01/2008	O	11	Nov 01/2008
O	19	Nov 01/2008	O	5	Nov 01/2008	O	12	Nov 01/2008
O	20	Nov 01/2008	O	6	Nov 01/2008	20-84-17 CONTENTS		
O	21	Nov 01/2008	O	7	Nov 01/2008	O	1	Nov 01/2008
O	22	Nov 01/2008	O	8	Nov 01/2008		2	BLANK
20-83-02 CONTENTS			20-84-13 CONTENTS			20-84-17		
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	2	BLANK		2	BLANK		2	BLANK
20-83-02			20-84-13			20-85-11 CONTENTS		
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O	5	Nov 01/2008	O	5	Nov 01/2008		2	BLANK
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20-83-11 CONTENTS			O	7	Nov 01/2008	O	1	Nov 01/2008
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	2	BLANK	O	9	Nov 01/2008	20-85-12		
20-83-11			O	10	Nov 01/2008	O	1	Nov 01/2008
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O	5	Nov 01/2008	20-84-14 CONTENTS			O	6	Nov 01/2008
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20-84-00 CONTENTS				2	BLANK	O	8	Nov 01/2008
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20-84-00			O	2	Nov 01/2008	O	11	Nov 01/2008
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20-84-10 CONTENTS			O	5	Nov 01/2008	O	14	Nov 01/2008
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O	19	Nov 01/2008	O	18	Nov 01/2008	O	15	Nov 01/2008
O	20	Nov 01/2008	20-90-12 CONTENTS			O	16	Nov 01/2008
20-86-00 CONTENTS			O	1	Nov 01/2008	O	17	Nov 01/2008
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	2	BLANK	20-90-12			O	19	Nov 01/2008
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O	4	Nov 01/2008	20-90-14 CONTENTS			O	24	Nov 01/2008
20-87-00 CONTENTS			O	1	Nov 01/2008	O	25	Nov 01/2008
O	1	Nov 01/2008		2	BLANK		26	BLANK
	2	BLANK	20-90-14			20-90-16 CONTENTS		
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20-90-11 CONTENTS			O	4	Nov 01/2008	O	1	Nov 01/2008
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20-90-11			20-90-15 CONTENTS			O	4	Nov 01/2008
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O	2	Nov 01/2008		2	BLANK	O	6	Nov 01/2008
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O	10	Nov 01/2008	O	7	Nov 01/2008		14	BLANK
O	11	Nov 01/2008	O	8	Nov 01/2008	20-91-00 CONTENTS		
O	12	Nov 01/2008	O	9	Nov 01/2008	O	1	Nov 01/2008
O	13	Nov 01/2008	O	10	Nov 01/2008		2	BLANK
O	14	Nov 01/2008	O	11	Nov 01/2008	20-91-00		
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20-00-11	MATERIALS
20-00-12	CONTACT CRIMP TOOL CROSS REFERENCE
20-00-13	WIRE TYPE CODES
20-00-14	STANDARD WIRE TYPE REPLACEMENT
20-00-15	WIRE INSULATION REMOVAL
20-00-16	OUTER DIAMETER OF WIRE
20-02	FIRE PROTECTION ZONES AND ENVIRONMENTAL AREAS
20-02-10	AIRPLANE FLAMMABLE LEAKAGE ZONES
20-02-20	AIRPLANE TEMPERATURE AREAS
20-02-30	AIRPLANE VIBRATION AREAS
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SAFETY PRACTICES

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STANDARD WIRING PRACTICES MANUAL**SAFETY PRACTICES**

Working on any high voltage electrical/electronic system presents hazards such as:

- Electrical shock on contact with energized wiring
- Short circuits caused by metal tools dropped across electrical connections/conductors
- Explosions caused by electrical sparks in the presence of flammable vapors.

1. GENERAL

Assessment of existing conditions, good judgement and common sense must be exercised by airline personnel.

A. Before Maintenance Work Starts

To prevent injury to personnel and damage to equipment during maintenance operations on electrically operated equipment or while performing maintenance on any part of the electrical/electronic systems, use these safety practices:

- (1) Identify the system that maintenance work is to be done on.
- (2) Open circuit breakers and switches to make sure that power has been cut off from system components.
- (3) Put this Warning Tag on the circuit breakers:

WARNING: DO NOT CLOSE THIS CIRCUIT BREAKER. THIS CIRCUIT BREAKER MUST REMAIN OPEN UNTIL COMPLETION OF MAINTENANCE WORK.

- (4) To make sure that a circuit breaker will remain open, install a circuit breaker collar. Refer to Table 1.

Table 1
CIRCUIT BREAKER COLLARS

Part Number	Supplier
10164	Paramount Plastics
10237	Paramount Plastics
20266	Paramount Plastics
G57NB-5	Nylon Molding Corp./Union Plastics
S-4933959	Paco Plastics

- (5) Put this Warning Tag on the switches:

WARNING: DO NOT MOVE THIS SWITCH FROM THE OFF POSITION UNTIL MAINTENANCE WORK HAS BEEN COMPLETED.

B. After Maintenance Work Ends

- (1) Make sure that all switches and controls are in a position that prevents the accidental operation of any component.
- (2) Remove the warning tags and close the circuit breakers and switches that were opened before the work started.
- (3) Energize the system.
- (4) Perform the required operational checks.
- (5) When the checks have been satisfactorily completed, return the switches and controls to their normal shutdown positions.

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STANDARD WIRING PRACTICES MANUAL**SAFETY PRACTICES**

- (6) Before removing the external power connector at the external power panel, make sure that the external power source is switched off.

WARNING: BEFORE YOU REMOVE THE EXTERNAL POWER CONNECTOR, MAKE SURE THAT THE EXTERNAL POWER SOURCE IS SWITCHED OFF. FAILURE TO TURN OFF THE EXTERNAL POWER SOURCE CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

C. Circuit Breaker Reset

When a circuit breaker trips or opens, do not attempt to reset or close the breaker until the discrepancy or malfunction that caused the breaker to trip or open has been determined and corrected.

WARNING: DO NOT RESET A TRIPPED CIRCUIT BREAKER UNTIL YOU KNOW THE CAUSE OF THE TRIPPED CIRCUIT BREAKER AND YOU KNOW THAT THE CIRCUIT BREAKER CAN BE SAFELY RESET. DAMAGE TO THE AIRPLANE AND INJURY TO THE PERSON CAN OCCUR.

2. FUEL VAPOR LEVELS**A. Acceptable Fuel Vapor Level**

The vapor level considered safe for use of ignition-producing devices is essentially zero.

B. Fuel Vapor Measurement

Vapor level measurement may be accomplished with calibrated equipment such as Mine Safety Appliances Model 2 or Davis Model D-6 that give readings like:

- PERCENT LOWER EXPLOSIVE LIMIT
- PERCENT EXPLOSIVE.

Any fuel vapor level readable on these instruments is an indication of:

- A nearby liquid fuel or vapor source
- A local higher vapor concentrations
- Insufficient ventilation.

These instruments should be used to:

- Establish that initial vapor levels are sufficiently low
- Monitor the level during repairs.

3. IGNITION SOURCES

WARNING: UNDER NO CONDITIONS SHOULD ANY POTENTIAL IGNITION SOURCE BE USED IN THE VICINITY OF OPEN FUEL TANKS, FUEL VENTS OR SPILLED FUEL WHERE VAPOR CONCENTRATIONS ARE UNPREDICTABLE OR CANNOT BE CONTROLLED.

A. Fire Safety

If ignition-producing equipment is used anywhere on or near an airplane where smoking is not allowed, a member of the local fire fighting crew or a person responsible for airplane fire safety should stand by to observe the work and other nearby activities.

STANDARD WIRING PRACTICES MANUAL**SAFETY PRACTICES**

These safety practices are recommended:

- Work should never begin or continue on any fuel system component while ignition-producing equipment is present
- The number of maintenance and safety personnel involved should be kept to a minimum
- The amount of emergency or fire fighting equipment that should be at the work site must be determined by local fire fighting personnel, or other authorities, who are responsible for fire safety and are capable of judging the degree of risk associated with the work to be done.

4. HEAT GUNS, HOT AIR GUNS, SOLDERING GUNS, AND SOLDERING IRONS

This paragraph defines the minimum recommended safety practices to use when operating heat guns, hot air guns, soldering guns, or soldering irons on or near in-service airplanes.

A. General

It should be noted that these recommendations are written for use throughout the world and are general in nature.

Regulations established by local agencies and/or airline generated procedures may take precedence.

NOTE: Boeing can neither conceive nor document all potential sets of conditions which the airlines may encounter.

Airlines are responsible for the safe use of any of these heating devices.

B. Explosion Potential

Heat guns, hot air guns, soldering guns, and soldering irons are not considered to be explosion-proof.

The devices may contain:

- Elements that may operate at temperatures in excess of the fuel vapor flashpoint (450 degrees F)
- Electrical switches that can produce sparks capable of igniting fuel vapors.

C. Use in Fuel Tanks

A heat device must not be operated in a fuel tank that has not been purged of fuel and filled with an inert gas, such as nitrogen.

D. Use Near Fuel and Flammable Liquids

Heat guns, hot air guns, soldering guns, or soldering irons should not be used within 100 feet of:

- An airplane during refueling
- An airplane during defueling
- An airplane when fuel tanks are open
- Fuel vents
- Fuel spills
- Other flammable liquids.

E. Use in Smoking Areas

Heat guns, hot air guns, soldering guns, and soldering irons can be used when smoking is allowed on or near the airplane.

If it is necessary to use these devices where smoking is not allowed, it must be determined that unsafe quantities of fuel vapors are not present in the intended work area.

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STANDARD WIRING PRACTICES MANUAL

MATERIALS

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STANDARD WIRING PRACTICES MANUAL

MATERIALS

This subject gives the materials and the satisfactory alternatives that are recommended for maintenance work on all Boeing commercial airplanes.

1. GENERAL DATA

A. Material Suppliers

All materials are available from the manufacturer, the manufacturer's representative, or Boeing Spares Procurement.

B. Material Temperature Grades

The Temperature Grade of a material is identified by the maximum temperature of the material in continuous operation. Grade A is the lowest grade and Grade D is the highest grade. Refer to Table 1.

These conditions are applicable:

- When a procedure gives a Temperature Grade of a material, it is permitted to use only the materials of that Grade or a higher Grade
- When a procedure does not give the Temperature Grade of a material, the lowest Grade of the material that is available can be used.

**Table 1
MATERIAL TEMPERATURE GRADES**

Grade	Maximum Temperature		Superseded Type
	Degrees C	Degrees F	
A	100	212	Type I
B	135	275	Type II
C	180	356	Type III
D	260	500	Type IV

C. Material Classes

The Class of a material is identified by the material's resistance to BMS 3-11 fluid. Refer to Table 2.

These conditions are applicable:

- If the Class of the material is specified, then a material of the same Class must be used
- If the Class of the material is not specified, either Class can be used.

**Table 2
MATERIAL CLASSES**

Class	Description
1	Resistant to BMS 3-11 fluid
2	Not resistant to BMS 3-11 fluid

2. MATERIALS

A. Cements

NOTE: Cements are not put into general groups of Grade or Class.

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MATERIALS

**Table 3
CEMENTS**

Grade	Class	Part Number	Supplier	Description
-	-	Resbond 940	Cotronics	Ceramic Adhesive
		Sauereisen 1	Sauereisen Cement Co.	Strong inorganic adhesive
		Sauereisen 31	Sauereisen Cement Co.	Synthetic ceramic adhesive

B. Coating Materials

**Table 4
COATING MATERIALS**

Grade	Class	Part Number	Supplier	Description	
A	1	EC-776SR	3M Company	Insulation coating	
		683-3-2	Akso Coating of America, Inc.		
	2	PC18M	Hysol Division, Dexter Corp.	Polyurethane coating	
			No. 72-102		Rudd Paint and Varnish Co.
			Type No. 1A33		Humiseal Division, Chase Corp.
		Tartan	Rudd Paint and Varnish Co.	Acrylic coating	
			Krylon 1303		Krylon, Inc.
			Type No. 1B31		Humiseal Division, Chase Corp.
			Type 88		Nycote Laboratories
		Type 7-11	Nycote Laboratories	Nylon varnish	

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MATERIALS

C. Convoluted Teflon Tubing

**Table 5
CONVOLUTED TEFLON TUBING**

Grade	Class	Part Number	Supplier	Description
D	1	CFT-()-0-00	Icore	Tubing, Plastic, Flexible, Convoluted, PTFE, Standard Convolutions, Black
		ZCT-TS-()	Zeus	Tubing, Plastic, Flexible, Convoluted, PTFE, Standard Convolutions, Black
		C10000-()	Cooperative Industries	Tubing, Plastic, Flexible, Convoluted, PTFE, Standard Convolutions, Black
		AMS-T-81914/1-1()	QPL	Tubing, Plastic, Flexible, Convoluted, PTFE, Standard Convolutions, Black

D. Filler Rods

**Table 6
FILLER RODS**

Grade	Class	Part Number or Specification	Supplier	Description
A	2	BMS1-11 Type II Grade 60	Boeing	Rod, black synthetic rubber, extruded, nominal diameter 3/8 inch to 3/4 inch, 1/16 inch increments
C	1	BMS1-52	Boeing	Rod, synthetic rubber, high performance silicone, extruded; nominal diameter 1/16 inch to 3/16 inch, 1/16 inch increments
		K-1045N	Union Carbide	Rod, synthetic rubber, extruded; nominal diameter 1/16 inch to 3/16 inch, 1/16 inch increments
		K-1046N		
		L-P-410 Type 6/6	Cadillac Plastics	Rod, plastic, polyimide (nylon), rigid; natural color; specify size.
		L-P-410 Type 6/6	Professional Plastics	
		Silastic 52	Dow Corning	Rod, synthetic rubber, extruded; red, nominal diameter 1/16 inch to 3/16 inch, 1/16 inch increments
D	1	AMS 3656	Available source	Rod, PTFE (Teflon), natural color
		ASTM D 1710	Available source	

**Table 7
APPROVED SUPPLIERS OF BOEING STANDARD FILLER ROD MATERIAL**

Material	Supplier
BMS1-11 Type II Grade 60	Flexfab
	Flexco

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MATERIALS

Table 7 (continued)

Material	Supplier
BMS1-52	Kirkhill-TA
	Rubber Teck

E. Film Strips

Table 8

TEMPERATURE GRADE C CLASS 1 FILM STRIPS

Part Number	Supplier	Description
C1-1/2 Identastrip	General Plastics Corp.	Insulating strip, fiberglass, KEL-F, suspensoid treated; specify width as required

Table 9

TEMPERATURE GRADE D CLASS 1 FILM STRIPS

Part Number	Supplier	Description
E125-2	Fluorglas	Insulating film, PTFE (Teflon), natural type B electrical grade, 0.002 inch thick, 1.0 inch wide
	Saint-Gobain Performance Plastics	Insulating film, PTFE (Teflon), natural type B electrical grade, 0.002 inch thick, 1.0 inch wide
E125-3	Fluorglas	Insulating film, PTFE (Teflon), natural type B electrical grade, 0.003 inch thick, 1.0 inch wide
	Saint-Gobain Performance Plastics	Insulating film, PTFE (Teflon), natural type B electrical grade, 0.003 inch thick, 1.0 inch wide
GB-116T	Continental Diamond Fiber Co.	Insulating strip, non-pressure sensitive, glass cloth, PTFE (Teflon) impregnated; meets AMS 3652 requirements; 0.005 inch thick; width as required in 1/4 inch increments
GB-128T	Continental Diamond Fiber Co.	Insulating strip, non-pressure sensitive, glass cloth, PTFE (Teflon) impregnated; meets AMS 3652 requirements; 0.010 inch thick; width as required in 1/4 inch increments
GB116T	Continental Diamond Fiber Co.	Insulating strip (or film), PTFE (Teflon), unsupported, skived, virgin or reprocessed; natural or blue; 0.005, 0.010, 0.015, 0.020 inch thick; width as required in 1/4 inch increments
GB128T	Continental Diamond Fiber Co.	Insulating strip (or film), PTFE (Teflon), unsupported, skived, virgin or reprocessed; natural or blue; 0.005, 0.010, 0.015, 0.020 inch thick; width as required in 1/4 inch increments
P-412	Permacel	Insulating film, PTFE (Teflon), natural type B electrical grade, 0.003 inch thick, 1.0 inch wide

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MATERIALS

Table 9 (continued)

Part Number	Supplier	Description
R/M 827	Raybestos- Manhattan, Inc.	Insulating strip (or film), PTFE (Teflon), unsupported, skived, virgin or reprocessed; natural or blue; 0.005, 0.010, 0.015, 0.020 inch thick; width as required in 1/4 inch increments
S-16815	W. S. Shamban and Co.	Insulating strip (or film), PTFE (Teflon), unsupported, skived, virgin or reprocessed; natural or blue; 0.005, 0.010, 0.015, 0.020 inch thick; width as required in 1/4 inch increments
Scotch 3082	3M Company	Insulating film, PTFE (Teflon), natural type B electrical grade, 0.002 inch thick, 1.0 inch wide
Scotch 48	3M Company	Insulating film, TFE, 0.003 inch thick

**Table 10
OBSOLETE FILM STRIP PART NUMBERS**

Part Number	Supplier
E125-2	Fluorglas
E125-3	Fluorglas
Scotch 3082	3M

F. Inks

NOTE: Inks are not put into general groups of Grade or Class.

**Table 11
INKS**

Grade	Class	Part Number	Supplier	Description
-	-	No. 68 Fast Dry	Independent	Ink
-	-	No. 73X NW Opaque	Independent	Ink
-	-	No. 73X Opaque	Independent	Ink
-	-	683-3-2	Akzo	Paint, Clear
-	-	Clear Lacquer	Tartan	Paint, Clear
-	-	EC-776	3M	Paint, Clear
-	-	EC-776SR	3M	Paint, Clear
-	-	Ultra Fine Point	Sanford Sharpie	Permanent Ink Pen
-	-	SCA-UF	Pilot	Permanent Ink Pen
-	-	SCAN-UF-B	Pilot	Permanent Ink Pen

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G. Lubricants

NOTE: Lubricants are not put into general groups of Grade or Class.

**Table 12
LUBRICANTS**

Grade	Class	Part Number	Supplier	Description
-	-	-	Any Source	Cetyl Alcohol Paste; viscosity of 10 to 100 centistokes
-	-	-	Any Source	Isopropyl Alcohol

H. Potting Compounds

**Table 13
POTTING COMPOUNDS**

Grade	Class	Part Number	Supplier	Description
A	1	MIL-PRF-8516 Type II Class 2	QPL	Potting, flexible, electrical sealing, -65 degrees F to 225 degrees F
C	1	Silastic-738	Dow Corning	Potting, flexible, electrical sealing, -85 degrees F to 360 degrees F
		RTV-162	General Electric	Potting, flexible, electrical sealing, -75 degrees F to 480 degrees F
		DC-3145	Dow Corning	Potting, flexible, electrical sealing, 685 degrees F to 482 degrees F

I. Seal Plugs

**Table 14
SEAL PLUGS**

Grade	Class	Part Number	Supplier	Description
A	2	BACP20BA1	American United Seal, Stillman Seal Division	Plug, BMS 1-33 Grade 60 butyl rubber
			Kirkhill Rubber	
C	2	MS27488	Iconics	Seal Plug, FEP; specify material for Temperature Grade; for size and color, refer to Table 15
D	2	MS27488	Iconics	Seal Plug, PFA; specify material for Temperature Grade; for size and color, refer to Table 15

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**Table 15
SEAL PLUG SIZES**

Contact Cavity Size	Seal Plug	
	Part Number	Color
22	MS27488-22	Black
20	MS27488-20	Red
16	MS27488-16	Blue
12	MS27488-12	Yellow
8	MS27488-8	Red
4	MS27488-4	Blue
0	MS27488-0	Yellow

J. Seal Rods

**Table 16
SEAL RODS**

Grade	Class	Part Number or Specification	Supplier	Description
C	1	L-P-410 Type 6/6	Cadillac Plastics	Rod, plastic, polyimide (nylon), rigid; natural color; for applicable size, refer to Table 17
		L-P-410 Type 6/6	Professional Plastics	
D	1	AMS 3656	Available source	Rod, PTFE (Teflon), natural color; for applicable size, refer to Table 17
D	1	ASTM D 1710	Available source	Rod, PTFE (Teflon), natural color; for applicable size, refer to Table 17

**Table 17
SEAL ROD SIZES**

Contact Cavity Size	Diameter (inch)	
	Target	Tolerance
22	0.042	± 0.003
20	0.063	± 0.003
16	0.094	± 0.003
12	0.125	± 0.003
08	0.180	± 0.003

STANDARD WIRING PRACTICES MANUAL**MATERIALS****K. Shield Materials****Table 18
SHIELD MATERIALS**

Grade	Class	Standard or Specification	Supplier	Description
B	1	AA59569	Qualified Source	Braid, tubular, tin plated copper
		BAC3108	Boeing	Braid, tubular, tin plated copper
		QQB575	Qualified Source	Braid, tubular, tin plated copper
D	1	AA59569	Qualified Source	Braid, tubular, nickel plated copper
		BAC3106	Boeing	Braid, tubular, nickel plated copper

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Table 19
BOEING STANDARD SHIELD MATERIAL PART NUMBERS

Temperature Grade	I.D. (inch)	Part Number
B	0.031	BAC3108-1B
	0.063	BAC3108-1D
	0.078	BAC3108-1E
	0.109	BAC3108-1G
	0.125	BAC3108-1
	0.156	BAC3108-2B
	0.172	BAC3108-2C
	0.203	BAC3108-2F
	0.250	BAC3108-2
	0.281	BAC3108-3B
	0.313	BAC3108-3D
	0.375	BAC3108-3
	0.438	BAC3108-4D
	0.500	BAC3108-4
	0.563	BAC3108-5D
	0.656	BAC3108-5F
0.688	BAC3108-6D	
0.750	BAC3108-6	
0.781	BAC3108-7B	
0.813	BAC3108-7D	
0.875	BAC3108-7	
1.000	BAC3108-8	
1.125	BAC3108-9	
1.250	BAC3108-10	
1.375	BAC3108-11	
1.500	BAC3108-12	
1.625	BAC3108-13	
2.000	BAC3108-16	

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Table 19 (continued)

Temperature Grade	I.D. (inch)	Part Number
D	0.063	BAC3106-1
	0.109	BAC3106-3
	0.125	BAC3106-3A
	0.156	BAC3106-3B
	0.172	BAC3106-3C
	0.203	BAC3106-4
	0.250	BAC3106-5A
	0.375	BAC3106-6A
	0.438	BAC3106-7A
	0.500	BAC3106-8A
	0.563	BAC3106-9
	0.625	BAC3106-10
	0.750	BAC3106-10A
	0.781	BAC3106-11A
	0.875	BAC3106-12
	1.000	BAC3106-13
	1.125	BAC3106-14
	1.375	BAC3106-15
1.500	BAC3106-16	
1.875	BAC3106-16A	
2.000	BAC3106-17	
2.250	BAC3106-18	

Table 20

APPROVED SUPPLIERS OF BOEING STANDARD SHIELD MATERIALS

Shield Material	Supplier
BAC3106-()	Continental Cordage
	New England Electrical Wire
BAC3108-()	Alpha Wire
	Birnbach
	Continental Cordage
	New England Electrical Wire
	Standard Wire and Cable

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**Table 21
ALTERNATIVE SHIELD MATERIALS**

Boeing Standard	Alternative Shield Material
BAC3106-1	AA59569R36N0062
BAC3106-3	AA59569R36N0109
BAC3106-3A	AA59569R36N0125
BAC3106-3B	AA59569R36N0156
BAC3106-3C	AA59569R36N0171
BAC3106-4	AA59569R36N0203
BAC3106-5A	AA59569R36N0250
BAC3106-6A	AA59569R36N0375
BAC3106-7A	AA59569R30N0437
BAC3106-8A	AA59569R36N0500
BAC3106-9	-
BAC3106-10	-
BAC3106-10A	-
BAC3106-11A	AA59569R36N0781
BAC3106-12	AA59569R30N0875
BAC3106-13	AA59569R30N1000
BAC3106-14	AA59569R30N1125
BAC3106-15	AA59569R30N1375
BAC3106-16	AA59569R30N1500
BAC3106-16A	-
BAC3106-17	AA59569R30N2000
BAC3106-18	-
BAC3108-1B	AA59569R36T0031
	QQB575R36T031
BAC3108-1D	AA59569R36T0062
	QQB575R36T062
BAC3108-1E	AA59569R36T0078
	QQB575R36T078
BAC3108-1G	AA59569R36T0109
	QQB575R36T109
BAC3108-1	AA59569R36T0125
	QQB575R36T125

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Table 21 (continued)

Boeing Standard	Alternative Shield Material
BAC3108-2B	AA59569R36T0156
	QQB575R36T156
BAC3108-2C	AA59569R36T0171
	QQB575R36T171
BAC3108-2F	AA59569R36T0203
	QQB575R36T203
BAC3108-2	AA59569R36T0250
	QQB575R36T250
BAC3108-3B	AA59569R30T0281
	QQB575R30T281
BAC3108-3D	-
BAC3108-3	AA59569R36T0375
	QQB575R36T375
BAC3108-4D	AA59569R30T0437
	QQB575R30T437
BAC3108-4	AA59569R36T0500
	QQB575R36T500
BAC3108-5D	AA59569R30T0562
	QQB575R30T562
BAC3108-5F	AA59569R30T0656
	QQB575R30T656
BAC3108-6D	-
BAC3108-6	-
BAC3108-7B	AA59569R36T0781
	QQB575R36T781
BAC3108-7D	-
BAC3108-7	AA59569R30T0875
	QQB575R30T875
BAC3108-8	-
BAC3108-9	AA59569R30T1125
	QQB575R30T1125
BAC3108-10	-

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Table 21 (continued)

Boeing Standard	Alternative Shield Material
BAC3108-11	AA59569R30T1375
	QQB575R30T1375
BAC3108-12	AA59569R30T1500
BAC3108-13	-
BAC3108-16	AA59569R30T2000

Table 22
OBSOLETE SHIELD MATERIAL PART NUMBERS

Obsolete Shield Material	Replacement Shield Material
QQB575R36T0031	AA59569R36T0031
	BAC3108-1B
QQB575R36T0062	AA59569R36T0062
	BAC3108-1D
QQB575R36T0078	AA59569R36T0078
	BAC3108-1E
QQB575R36T0109	AA59569R36T0109
	BAC3108-1G
QQB575R36T0125	AA59569R36T0125
	BAC3108-1
QQB575R36T0156	AA59569R36T0156
	BAC3108-2B
QQB575R36T0171	AA59569R36T0171
	BAC3108-2C
QQB575R36T0203	AA59569R36T0203
	BAC3108-2F
QQB575R36T0250	AA59569R36T0250
	BAC3108-2
QQB575R30T0281	AA59569R30T0281
	BAC3108-3B
QQB575R36T0375	AA59569R36T0375
	BAC3108-3
QQB575R30T0437	AA59569R30T0437
	BAC3108-4D

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Table 22 (continued)

Obsolete Shield Material	Replacement Shield Material
QQB575R36T0500	AA59569R36T0500
	BAC3108-4
QQB575R30T0562	AA59569R30T0562
	BAC3108-5D
QQB575R30T0656	AA59569R30T0656
	BAC3108-5F
QQB575R36T0781	AA59569R36T0781
	BAC3108-7B
QQB575R30T0875	AA59569R30T0875
	BAC3108-7
QQB575R30T1000	AA59569R30T1000
	BAC3108-8
QQB575R30T1125	AA59569R30T1125
	BAC3108-9
QQB575R30T1375	AA59569R30T1375
	BAC3108-11

L. Sleeves

**Table 23
COLD SHRINKABLE SLEEVES**

Grade	Class	Part Number	Supplier	Description
D	1	8443-()	3M Company	Insulating sleeve, cold shrinkable, silicone rubber, graph, sizes as required
		8445-()	3M Company	Insulating sleeve, cold shrinkable, silicone rubber, graph, sizes as required
		8447-()	3M Company	Insulating sleeve, cold shrinkable, silicone rubber, graph, sizes as required

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Table 24
3M COMPANY COLD SHRINK SLEEVES

Sleeve	Wire Size (AWG)		Area of Protection			
	Minimum	Maximum	Diameter (inch)		Length (inch)	
			Minimum	Maximum	Minimum	Maximum
8443-2	6	2	0.27	0.56	1.15	1.56
8443-6.5	6	2	0.27	0.56	4.70	5.50
8445-2.5	2	1/0	0.35	0.72	1.20	1.88
8445-7.5	2	1/0	0.35	0.72	5.20	6.00
8447-3.2	1/0	3/0	0.48	0.95	1.90	2.52
8447-8	1/0	3/0	0.48	0.95	5.80	6.88

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**Table 25
HEAT SHRINKABLE SLEEVES**

Grade	Class	Part Number	Supplier	Description
A	2	Scotch 3028	3M	Insulating sleeve, heat shrinkable, stabilized vinyl, flexible, flame retardant, ASTM-D-876, AMS-DTL-25053; clear; standard I.D. sizes as required
B	1	AMS-DTL-23053/5 Class 1	Available source	Insulating sleeve, heat shrinkable, irradiated polyolefin, flame retardant
		AMS-DTL-23053/8	Available source	Insulating sleeve, heat shrinkable, polyvinylidene fluoride; clear; nominal I.D.: 3/64 inch to 1.5 inch
		CRN (Type 1)	Raychem	Insulating sleeve, heat shrinkable, irradiated polyolefin, semi-rigid, flame retardant, AMS-DTL-23053
		DR-25	Raychem	Insulating sleeve, heat shrinkable, thin wall, semi-rigid, fuel resistant
		ECC-VFP-876	Electronized Chemicals	Insulating sleeve, heat shrinkable; irradiated polyolefin, flexible, flame retardant per ASTM-D-876, AMS-DTL-23053; colors: red, yellow, blue; sizes: 1/16, 3/32, 1/8, 3/16, 1/4, 3/8, 1/2, 3/4, 1, 1-1/2, 2 inch
		MIL-LT	Raychem	Insulating sleeve, heat shrinkable, irradiated polyolefin, flame retardant, MIL-R-46846 Type V, AMS-DTL-23053/5
		PLF 100	Plastronic	Insulating sleeve, heat shrinkable, irradiated polyolefin, flame retardant, AMS-DTL-23053/5
		RW-175	Raychem	Insulating sleeve, heat shrinkable, polyvinylidene fluoride, AMS-DTL-23053/8; clear; nominal I.D.: 3/64 inch to 1.5 inch
		Versafit	Raychem	Insulating sleeve, heat shrinkable, irradiated polyolefin, flame retardant, AMS-DTL-23053/5
		2	DWP-125	Raychem
C	1	MWSF	Remtek	Insulating sleeve, heat shrinkable, irradiated polyolefin, meltable inner wall, flame retardant; black; I.D.: 3/16, 1/4, 3/8, 1/2, 3/4, 1, 1-1/4 inch

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Table 25 (continued)

Grade	Class	Part Number	Supplier	Description
D	1	AMS-DTL-23053/12 Class 2	Available source	Insulating sleeve, heat shrinkable, polytetrafluoroethylene (TFE, Teflon); natural color; sizes: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1 inch
		AMS-DTL-23053/12 Class 3	Available source	Insulating sleeve, heat shrinkable, polytetrafluoroethylene (TFE, Teflon), thin wall; natural color; sizes: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1 inch
		AMS-DTL-23053/12 Class 5	Available source	
		Insultite TFE Standard Wall	Electronized Chemicals	Insulating sleeve, heat shrinkable, polytetrafluoroethylene (TFE, Teflon), AMS-DTL-23053/12; natural color; sizes: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1 inch
		Penntube I Shrinkable	Pennsylvania Fluorocarbon	
		Penntube II	Pennsylvania Fluorocarbon	
		TFE 2 to 1	Zeus Industrial Products	
		TFE 2X Standard Wall	Chemplast	
			Zeus Industrial Products	
		TFE 2XTW Thin Wall	Zeus Industrial Products	
TFE 4X Thin Wall	Chemplast			
	Zeus Industrial Products			

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**Table 26
OBSOLETE HEAT SHRINKABLE SLEEVES**

Grade	Class	Part Number	Supplier	Description	
B	1	MIL-DTL-23053/5 Class 1	Available source	Insulating sleeve, heat shrinkable, irradiated polyolefin, flame retardant	
		MIL-DTL-23053/8	Available source	Insulating sleeve, heat shrinkable, polyvinylidene fluoride, AMS-DTL-23053/8; clear; nominal I.D.: 3/64 inch to 1.5 inch	
		MIL-I-23053/5 Class 1	Available source	Insulating sleeve, heat shrinkable, irradiated polyolefin, flame retardant	
		MIL-I-23053/8	Available source	Insulating sleeve, heat shrinkable, polyvinylidene fluoride, AMS-DTL-23053/8; clear; nominal I.D.: 3/64 inch to 1.5 inch	
		RT-850	Raychem		
		RT-876	Raychem	Insulating sleeve, heat shrinkable, irradiated polyolefin, flame retardant, MIL-R-46846 Type V	
	2	PD	Raychem	Insulating sleeve, heat shrinkable, irradiated polyolefin with meltable inner wall, flame retardant; black; I.D.: 3/16, 1/4, 3/8, 1/2, 3/4, 1, 1-1/4 inch	
		PD-70	Raychem		
	D	1	MIL-DTL-23053/12 Class 2	Available source	Insulating sleeve, heat shrinkable, polytetrafluoroethylene (TFE, Teflon); natural color; sizes: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1 inch
			MIL-DTL-23053/12 Class 3	Available source	Insulating sleeve, heat shrinkable, polytetrafluoroethylene (TFE, Teflon), thin wall; natural color; sizes: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1 inch
MIL-DTL-23053/12 Class 5			Available source		
MIL-I-23053/12 Class 2			Available source	Insulating sleeve, heat shrinkable, polytetrafluoroethylene (TFE, Teflon); natural color; sizes: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1 inch	
MIL-I-23053/12 Class 3			Available source	Insulating sleeve, heat shrinkable, polytetrafluoroethylene (TFE, Teflon), thin wall; natural color; sizes: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1 inch	
MIL-I-23053/12 Class 5			Available source		

**Table 27
RAYCHEM RT-876 HEAT SHRINKABLE SLEEVES**

Sleeve Size (inch)	Inside Diameter (inch)		Nominal Recovered Wall Thickness (inch)
	Minimum Expanded	Maximum Recovered	
3/64	0.046	0.023	0.016
1/16	0.063	0.031	0.017

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Table 27 (continued)

Sleeve Size (inch)	Inside Diameter (inch)		Nominal Recovered Wall Thickness (inch)
	Minimum Expanded	Maximum Recovered	
3/32	0.093	0.046	0.020
1/8	0.125	0.062	0.020
3/16	0.187	0.093	0.023
1/4	0.250	0.125	0.028
3/8	0.375	0.187	0.028
1/2	0.500	0.250	0.028
3/4	0.750	0.375	0.033
1	1.000	0.500	0.035
1-1/2	1.500	0.750	0.040
2	2.000	1.000	0.045
3	3.000	1.500	0.050
4	4.000	2.000	0.055

Table 28

ALTERNATIVE HEAT SHRINKABLE SLEEVE PART NUMBERS

Specified Part Number	Alternative Part Number
AMS-DTL-23053/5 Class 1	MIL-DTL-23053/5 Class 1
	MIL-I-23053/5 Class 1
	MIL-LT
	PLF 100
	RT-876
	Versafit
AMS-DTL-23053/8	MIL-DTL-23053/8
	MIL-I-23053/8
	RT-850
	RW-175
AMS-DTL-23053/12 Class 2	MIL-DTL-23053/12 Class 2
	MIL-I-23053/12 Class 2
	TFE 2X Standard Wall
AMS-DTL-23053/12 Class 3	MIL-DTL-23053/12 Class 3
	MIL-I-23053/12 Class 3
	TFE 2XTW Thin Wall

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Table 28 (continued)

Specified Part Number	Alternative Part Number
AMS-DTL-23053/12 Class 5	MIL-DTL-23053/12 Class 5
	MIL-I-23053/12 Class 5
	TFE 4X Thin Wall
DWP-125	PD
	PD-70
MIL-DTL-23053/5 Class 1	AMS-DTL-23053/5 Class 1
	MIL-I-23053/5 Class 1
	MIL-LT
	PLF 100
	RT-876
	Versafit
MIL-DTL-23053/8	AMS-DTL-23053/8
	MIL-I-23053/8
	RT-850
	RW-175
MIL-DTL-23053/12 Class 2	AMS-DTL-23053/12 Class 2
	MIL-I-23053/12 Class 2
	TFE 2X Standard Wall
MIL-DTL-23053/12 Class 3	AMS-DTL-23053/12 Class 3
	MIL-I-23053/12 Class 3
	TFE 2XTW Thin Wall
MIL-DTL-23053/12 Class 5	AMS-DTL-23053/12 Class 5
	MIL-I-23053/12 Class 5
	TFE 4X Thin Wall
MIL-I-23053/5 Class 1	AMS-DTL-23053/5 Class 1
	MIL-DTL-23053/5 Class 1
	MIL-LT
	PLF 100
	RT-876
	Versafit

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Table 28 (continued)

Specified Part Number	Alternative Part Number
MIL-I-23053/8	AMS-DTL-23053/8
	MIL-DTL-23053/8
	RT-850
	RW-175
MIL-I-23053/12 Class 2	AMS-DTL-23053/12 Class 2
	MIL-DTL-23053/12 Class 2
	TFE 2X Standard Wall
MIL-I-23053/12 Class 3	AMS-DTL-23053/12 Class 3
	MIL-DTL-23053/12 Class 3
	TFE 2XTW Thin Wall
MIL-I-23053/12 Class 5	AMS-DTL-23053/12 Class 5
	MIL-DTL-23053/12 Class 5
	TFE 4X Thin Wall
MIL-LT	AMS-DTL-23053/5 Class 1
	MIL-DTL-23053/5 Class 1
	MIL-I-23053/5 Class 1
	PLF 100
	RT-876
	Versafit
PD	DWP-125
PD-70	DWP-125
Penntube I Shrinkable	TFE 2X Standard Wall
Penntube II	TFE 2X Standard Wall
PLF 100	AMS-DTL-23053/5 Class 1
	MIL-DTL-23053/5 Class 1
	MIL-I-23053/5 Class 1
	MIL-LT
	RT-876
	Versafit
RT-850	AMS-DTL-23053/8
	MIL-DTL-23053/8
	MIL-I-23053/8
	RW-175

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Table 28 (continued)

Specified Part Number	Alternative Part Number
RT-876	AMS-DTL-23053/5 Class 1
	MIL-DTL-23053/5 Class 1
	MIL-I-23053/5 Class 1
	MIL-LT
	PLF 100
	Versafit
RW-175	AMS-DTL-23053/8
	MIL-DTL-23053/8
	MIL-I-23053/8
	RT-850
TFE 2X Standard Wall	AMS-DTL-23053/12 Class 2
	MIL-DTL-23053/12 Class 2
	MIL-I-23053/12 Class 2
	Penntube I Shrinkable
	Penntube II
	TFE 4X Thin Wall
TFE 2XTW Thin Wall	AMS-DTL-23053/12 Class 3
	MIL-DTL-23053/12 Class 3
	MIL-I-23053/12 Class 3
	TFE 2 to 1
TFE 4X Thin Wall	AMS-DTL-23053/12 Class 5
	MIL-DTL-23053/12 Class 5
	MIL-I-23053/12 Class 5
Versafit	AMS-DTL-23053/5 Class 1
	MIL-DTL-23053/5 Class 1
	MIL-I-23053/5 Class 1
	MIL-LT
	PLF 100
	RT-876

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**Table 29
PROTECTIVE SLEEVES**

Grade	Class	Part Number	Supplier	Description
A	1	Expando KN (Frayless)	Bentley-Harris Manufacturing Co.	Protective sleeve, expandable, braided, Kynar; color as required; nominal I.D.: sizes 1/4, 1/2, 3/4, 1-1/4, 1-3/4 inch
		Expando PT (Frayless)	Bentley-Harris Manufacturing Co.	Protective sleeve, expandable, braided, polyester; color as required; nominal I.D.: sizes 1/4, 1/2, 3/4, 1-1/4, 1-3/4 inch
B	1	Expando HR (Frayless)	Bentley-Harris Manufacturing Co.	Protective sleeve, expandable, braided, halar (E-CTFE); color as required; nominal I.D.: sizes 1/4, 1/2, 3/4, 1-1/4, 1-3/4 inch
	2	Varglas HO	Varflex Corp.	Protective sleeve, fiberglass, acrylic varnish, non-fray; color: green and grey, nominal I.D.: sizes 18 (.042), 16 (.053), 14 (0.072), 12 (0.089), 10 (0.112), 9 (0.124), 6 (0.178) and 1/8, 1/4, 3/8, 1/2, 3/4, 1 inch
		Varglas HP	Varflex Corp.	
D	1	Ben-Har 1151-FRB	Bentley-Harris Manufacturing Co.	Protective sleeve, fiberglass, silicone rubber covered, fungus resistant, treated per MIL-I-18057; 200 degrees C, 8000 Volt minimum average dielectric strength; sizes AWG 24 through 1/0, and I.D. 3/8, 7/16, 1/2, 5/8 inch
		ES-4400	Varflex	Protective sleeve, fiberglass, silicone rubber covered, 200 degrees C, MIL-I-3190/8; sizes AWG 24 through 1 inch I.D.
		Gencote 125C	General Plastics Corp.	Protective sleeve, fiberglass (KEL-F) suspensoid-treated; nominal I.D.: sizes 1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 1, 1-1/4 inch
		Gencote 145C	General Plastics Corp.	
		TFE Perforated	Zeus Industrial Products, Inc.	Protective sleeve, AMS 3655, polytetrafluoroethylene (TFE, Teflon); perforated as shown in BAC5157 to drain moisture; color: natural, nominal I.D.: sizes 5 (0.186), 4 (0.208), 3 (0.234), 1 (0.294), and 3/8 (0.387), 7/16 (0.451), 1/2 (0.515), 5/8 (0.643), 3/4 (0.772), 1 (0.030) inch

M. Solders

NOTE: Solders are not put into the general group of Class.

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**Table 30
SOLDERS**

Grade	Class	Alloy	Description	Supplier
C	-	Sn60Pb40	Tin/lead Solder	Almit
				Alpha Metals
				Kester
		Sn63Pb37	Tin/lead solder	Almit
				Alpha Metals
				Kester

**Table 31
HIGH TEMPERATURE SOLDERS**

Grade	Class	Description	Alloy	Supplier
D	-	High temperature silver/lead solder	Ag06Pb94	Alpha Metals
				Kester

**Table 32
SOLDER ALLOY NAMES**

Alloy	Specification	Short Name
Ag06Pb94	QQ-S-571	Ag5.5
Sn60Pb40	J-STD-006	Sn60
Sn60Pb40	QQ-S-571	Sn60
Sn63Pb37	J-STD-006	Sn63
Sn63Pb37	QQ-S-571	Sn63

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**Table 33
FLUX CORED SOLDERS**

Grade	Class	Description	Part Number	Supplier
C	-	Flux cored tin/lead solder, RMA flux	Sn60WRMAP2	Almit
				Alpha Metals
				Kester
			Sn60WRMAP3	Almit
				Alpha Metals
				Kester
			Sn63WRMAP2	Almit
				Alpha Metals
				Kester
			Sn63WRMAP3	Almit
				Alpha Metals
				Kester
D	-	High temperature flux cored silver/lead solder, RMA flux	Ag5.5WRMAP2	Alpha Metals
				Kester
			Ag5.5WRMAP3	Alpha Metals
				Kester

N. Solder Fluxes

**Table 34
LIQUID SOLDER FLUX**

Flux Designator	Specification	Former Name	Supplier
ROL0	J-STD-004	Rosin, mildly activated (RMA)	Almit
			Kester
ROL1	J-STD-004	Rosin, mildly activated (RMA)	Almit
			Kester

O. Solvents

NOTE: Solvents are not put into general groups of Grade or Class.

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**Table 35
SOLVENTS**

Grade	Class	Part Number or Specification	Supplier	Description
-	-	O-A-51	Any Source	Acetone
		O-E-760	Any Source	Alcohol, ethyl, denatured
		TT-I-735 Grade A	Any Source	Alcohol, Isopropyl
		TT-I-735 Grade B	Any Source	
		TT-N-95, Type I	Any Source	Aliphatic naphtha
		TT-N-95, Type II	Any Source	
		Freon BF	DuPont	Cleaning solvent
		Freon TF	DuPont	
		Genesolv C	Allied Chemical	
		Genesolv D	Allied Chemical	
		BMS 3-2	Boeing	Cleaning solvent, general purpose
		P-D-680 Type 1	Any Source	De-greasing solvent
		Cellosolve Acetate	Union Carbide	Ethoxy Ethyl Acetate, 99 percent polyurethane Grade
		-	Any Source	N-Heptane, CP Grade, flammable
		TT-T-266	Any Source	Thinner, lacquer
TT-T-548	Any Source	Toluene (toluol)		

**Table 36
OBSOLETE SOLVENTS**

Obsolete Solvent	Replacement Solvent
BMS 3-2 Type I	TT-N-95 Type I
BMS 3-2 Type II	TT-N-95 Type II

P. Tapes

**Table 37
CLOTH TAPES**

Grade	Class	Part Number	Supplier	Description
B	2	P-263	Permacel	Nomex, pressure sensitive acrylic adhesive, flame retardant; nominal overall thickness 0.016 inch, 1/2 inch wide
		Scotch 79	3M Company	Glass cloth, pressure sensitive thermosetting acrylic adhesive; 0.007 inch thick, 1/2 inch wide

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Table 37 (continued)

Grade	Class	Part Number	Supplier	Description
C	2	P-212HD	Permacel	Glass cloth, silicone adhesive, flame retardant; 0.010 inch thick, 1/2, 3/4, 1 inch widths
D	2	Mystik 7000, Fluorglas Brand	Saint-Gobain Performance Plastics	Glass cloth, pressure sensitive adhesive per MIL-I-19166; white; 0.101 inch thick, 1/2 inch wide

Table 38

OBSOLETE CLOTH TAPE PART NUMBERS

Part Number	Supplier
P-263	Permacel

Table 39

ALTERNATIVE CLOTH TAPE PART NUMBERS

Specified Part Number	Alternative Part Number
P-263	P-212HD

Table 40

POLYIMIDE TAPES

Grade	Class	Part Number	Supplier	Description
C	2	2342-1, Fluorglas Brand	Saint-Gobain Performance Plastics	Polyimide, acrylic adhesive; 0.002 inch and 0.003 inch thick, 1/2 inch wide
		K-102	Saint-Gobain Performance Plastics	Polyimide, acrylic adhesive; 0.0025 inch thick, 1/2 inch wide
		Mystik 7367, Fluorglas Brand	Saint-Gobain Performance Plastics	Polyimide, acrylic adhesive; 0.002 inch and 0.003 inch thick, 1/2 inch wide
		Scotch 1205	3M Company	Polyimide, acrylic adhesive; 0.002 inch and 0.003 inch thick, 1/2 inch wide
D	2	2345-2, Fluorglas Brand	Saint-Gobain Performance Plastics	Polyimide, silicone adhesive; 0.002 inch and 0.003 inch thick, 1/2 inch wide

Table 41

OBSOLETE POLYIMIDE TAPE PART NUMBERS

Part Number	Supplier
2342-1, Fluorglas Brand	Saint Gobain Performance Plastics

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**Table 42
ALTERNATIVE POLYIMIDE TAPE PART NUMBERS**

Specified Tape	Alternative Tape
2342-1	K-102

**Table 43
POLYESTER TAPES**

Grade	Class	Part Number	Supplier	Description
A	2	M765	Conneticut Hard Rubber	Polyester, pressure sensitive natural rubber adhesive; 0.0025 inch thick
		M765	Furon	
		M765	Saint-Gobain Performance Plastics	

**Table 44
OBSOLETE POLYESTER TAPE PART NUMBERS**

Part Number	Supplier
M765	Conneticut Hard Rubber
M765	Furon

**Table 45
RUBBER AND CORK COMPOSITION TAPES**

Grade	Class	Part Number	Supplier	Description
A	2	DK-153	Armstrong Cork Co.	Pressure sensitive, rubber and cork composition per MIL-T-6841; 1/32 or 1/16 inch thick, 1/2 inch wide

**Table 46
SILICONE TAPES**

Grade	Class	Part Number	Supplier	Description
C	1	E8450-1	Kirkhill Rubber Co.	Fluorosilicone / silicone blend, self-extinguishing, given by Boeing SCD 10-62034-1; for connector backshell
		E8902-2	Kirkhill Rubber Co.	Fluorosilicone / silicone blend, self-extinguishing, given by Boeing SCD 10-62034-2; for connector backshell
D	2	912-10X12	Arlon, Silicone Technologies Division	Self-bonding silicone rubber, high temperature; 0.012 inch thick, 1 inch wide
		Scotch 70	3M Company	Self-bonding silicone rubber, high temperature; 0.012 inch thick, 1 inch wide
		Temp-R-Tape SGV, CHR Brand	Saint-Gobain Performance Plastics	Insulating, thermal curing silicone rubber coated fiberglass, pressure sensitive, 0.010 inch thick, 1/2 inch wide

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**Table 47
TFE TAPES**

Grade	Class	Part Number	Supplier	Description
B	1	2242-2, Fluorglas Brand	Saint-Gobain Performance Plastics	TFE fluorocarbon film; pressure sensitive acrylic adhesive; 0.0035 inch thick, 1/2 inch wide
		Scotch 63	3M Company	TFE fluorocarbon film; pressure sensitive acrylic adhesive; 0.0035 inch thick, 1/2 inch wide
C	2	Mystik 7505, Fluorglas Brand	Saint-Gobain Performance Plastics	PTFE, pressure sensitive thermosetting adhesive per MIL-T-23594; 0.0065 inch thick, 1/2 inch wide
		Scotch 61	3M Company	PTFE, pressure sensitive thermosetting silicone adhesive per MIL-T-23594; 0.0065 inch thick, 1/2 inch wide
		SG23-03	Saint-Gobain Performance Plastics	PTFE, glass supported, pressure sensitive acrylic adhesive; 0.005 inch thick 1/2 inch wide
D	2	2045-5, Fluorglas Brand	Saint-Gobain Performance Plastics	PTFE, skived, pressure sensitive thermosetting silicone adhesive per MIL-T-23594; 0.0065 inch thick, 1/2 inch wide
		2245-5, Fluorglas Brand	Saint-Gobain Performance Plastics	PTFE, pressure sensitive thermosetting silicone adhesive per MIL-T-23594; 0.0065 inch thick, 1/2 inch wide
		P-421	Permacel	PTFE, skived, pressure sensitive thermosetting adhesive per MIL-T-23594; 0.0065 inch thick, 1/2 inch wide
		P-440	Permacel	PTFE, glass supported, pressure sensitive silicone adhesive; 0.005 inch thick, 1/2 inch wide
		SG15-06	Saint-Gobain Performance Plastics	PTFE, glass supported; pressure sensitive silicone adhesive; 0.008 inch thick, 1/2 inch wide
		SG16-05	Saint-Gobain Performance Plastics	PTFE, glass supported; pressure sensitive silicone adhesive; 0.0075 inch thick, 1/2 inch wide
		SG26-03	Saint-Gobain Performance Plastics	PTFE, glass supported; pressure sensitive silicone adhesive; 0.005 inch thick, 1/2 inch wide

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**Table 48
OBSOLETE TFE TAPES**

Grade	Class	Part Number	Supplier	Description
C	2	2812-3, Fluorglas	Saint-Gobain Performance Plastics	PTFE, glass supported, pressure sensitive acrylic adhesive; 0.005 inch thick, 1/2 inch wide
D	2	2815-3, Fluorglas Brand	Saint-Gobain Performance Plastics	PTFE, glass supported; pressure sensitive silicone adhesive; 0.0045 inch thick, 1/2 inch wide
		2815-6	Saint-Gobain Performance Plastics	PTFE, glass supported; pressure sensitive silicone adhesive; 0.0075 inch thick, 1/2 inch wide
		CHR-A-2005, CHR Brand	Saint-Gobain Performance Plastics	PTFE, glass supported; pressure sensitive silicone adhesive; 0.005 inch thick, 1/2 inch wide
		CHR-A-2008, CHR Brand	Saint-Gobain Performance Plastics	PTFE, glass supported; pressure sensitive silicone adhesive; 0.008 inch thick, 1/2 inch wide

**Table 49
ALTERNATIVE TFE TAPE PART NUMBERS**

Specified Part Number	Alternative Part Number
CHR-A-2005	SG26-03
CHR-A-2008	SG15-06
2812-3, Fluorglas Brand	SG23-03
2815-3, Fluorglas Brand	SG26-03
2815-6, Fluorglas Brand	SG16-05

**Table 50
MASKING TAPES**

Part Number	Supplier	Description
P-70	Permacel	High Temperature Masking Tape
P-781	Permacel	High Temperature Masking Tape
Scotch 2693	3M	High Temperature Masking Tape

Q. Thread Locking Compounds

NOTE: Thread locking compounds are not put into general groups of Grade or Class.

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**Table 51
THREAD LOCKING COMPOUNDS**

Grade	Class	Part Number	Supplier	Description
-	-	Threadlocker 242	Loctite Corp.	Medium strength, general purpose adhesive to seal threads
		Precote 30	Nylok Fastener Corp.	

R. Tubes

NOTE: Use tube materials only when they are specified.

**Table 52
TUBES**

Grade	Class	Part Number	Supplier	Description
D	1	Penntube I (Non-shrinkable)	Pennsylvania Fluorocarbon Co.	Insulating tube, PTFE (Teflon) resin; non-rigid as specified in MIL-I-22129; AWG 1/0 through 3/0; refer to Table 53 for additional sizes
		Temprene Teflon Tubing	Hitemp Wires, Inc.	Protective tube; non-rigid, constructed of spirally welded extruded PTFE (Teflon) tape, per AMS 3653 red; minimum breakdown strength 5000 volts rms; 0.010 inch \pm 0.002 inch wall thickness, AWG 8, 4, 2, 1/0, and I.D. 3/8, 1/2 inch

**Table 53
ADDITIONAL PENNTUBE I SIZES**

Nominal Inner Diameter (inch)	Wall Thickness	
	Target (inch)	Tolerance (inch)
3/8	0.025	\pm 0.006
7/16		
1/2		
9/16		
5/8	0.035	\pm 0.008
3/4		
7/8		
1		

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S. Wipers

**Table 54
WIPERS**

Material or Tool	Description	Part Number or Specification	Supplier
Cloth, Cleaning	Cotton, non-woven	CCC-C-46	Any Source
Wiper	Cotton, low lint	Specified by supplier	Any Source
	Cotton, non-woven Grade 142951	BMS15-5 Class A	BBA Nonwovens Walpole
	Cotton, cheesecloth No. 10, 20, 40	BMS15-5 Class A	American Fiber & Finishing
	Cotton, cheesecloth No. 9017	BMS15-5 Class A	DeRoyal Textiles
	Cotton, gauze sponge No. 582556	BMS15-5 Class A	American Fiber & Finishing
	Cotton, gauze sponge No. 9405	BMS15-5 Class A	DeRoyal Textiles
	Cotton, HAN SIN SANG SA Fabric Code No. 3030	BMS15-5 Class A	HO CHANG Medical Company
	Cotton, Hermitex No. 300, 400	BMS15-5 Class A	DeRoyal Textiles
	Cotton, Rymplecloth No. 201, 300, 301	BMS15-5 Class A	American Fiber & Finishing
	Cotton, Weston cloth No. 8000	BMS15-5 Class A	Nippon Weston Company

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CONTACT CRIMP TOOL CROSS REFERENCE

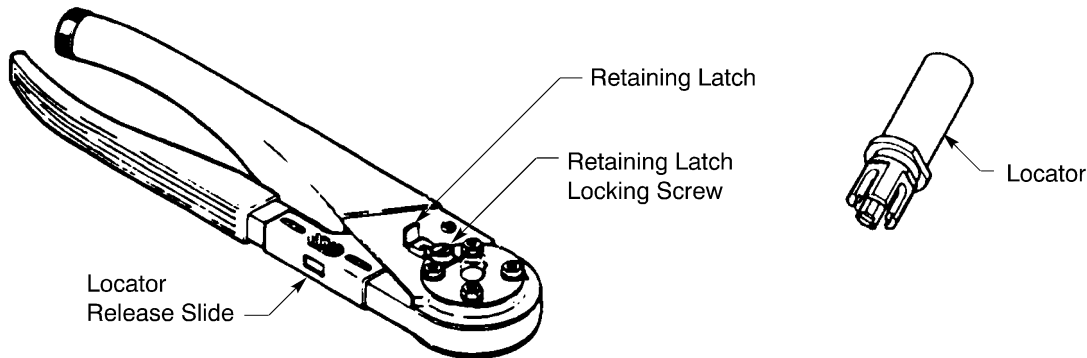
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STANDARD WIRING PRACTICES MANUAL**CONTACT CRIMP TOOL CROSS REFERENCE****1. THE BOEING ST2220-() CRIMP TOOL****A. General Description**

The Boeing ST2220-() crimp tool is based on the MS3191-A crimp tool and has these features:

- The handle uses replaceable contact locators
- The locators are also identified with an ST2220-() part number
- The tool must be operated through a full cycle
- Crimp depth is controlled by the locator.

**ST2220-() CRIMP TOOL HANDLE AND LOCATOR****Figure 1****B. Locator Installation**

- (1) Close the handles fully to trip the ratchet, then release the pressure so the handles open fully. Refer to Figure 1.
- (2) Loosen the retaining latch locking screw.
- (3) Pull the latch to the open position.
- (4) Pull the locator release slide.
- (5) Remove the existing locator in the tool head.
- (6) Insert the new locator.

Make sure that the flat on the flange of the locator mates with the flat in the handle. The flange of the locator must be flush with the handle.

- (7) Push the latch to the close position and tighten the locking screw.
The tool is ready to crimp, no adjustment is required.

STANDARD WIRING PRACTICES MANUAL

CONTACT CRIMP TOOL CROSS REFERENCE

2. THE M22520/1-01 CRIMP TOOL

A. General Description

The M22520/1-01 crimp tool has these features:

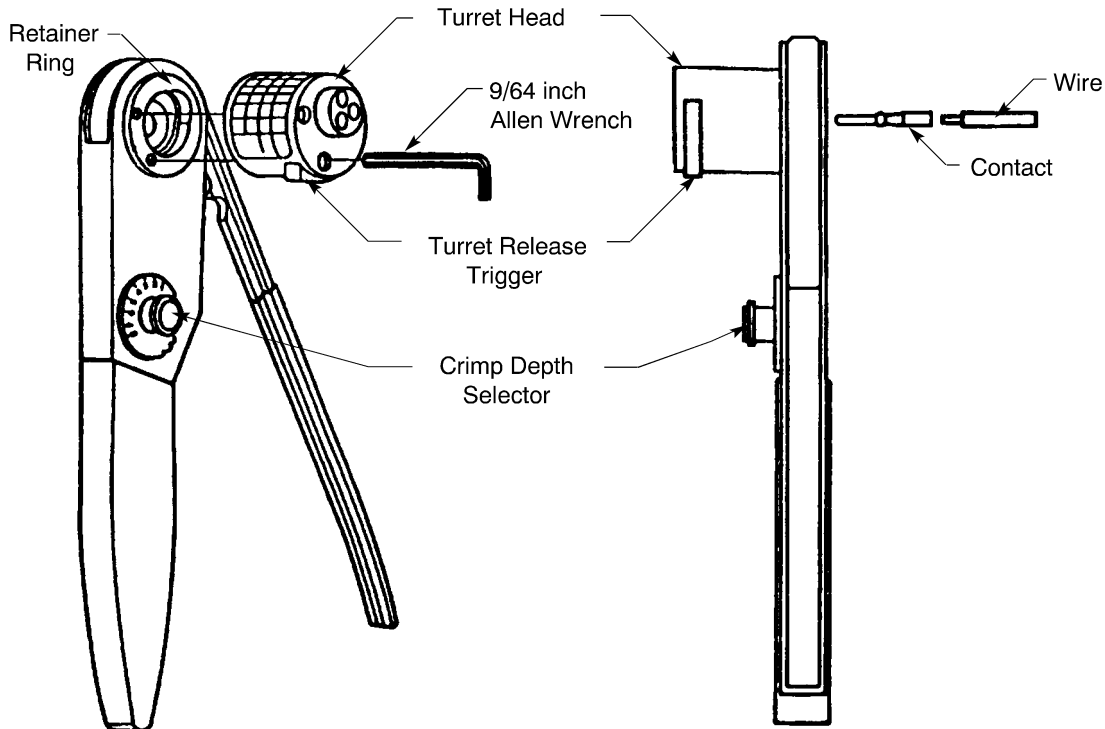
- The handle uses replaceable turret heads or locators
- The turret heads are identified with an M22520/1-() part number
- The turret head can be rotated to crimp different contacts or contact sizes without removing the head
- The tool must be operated through a full cycle
- Crimp depth is controlled by a selector on the tool.

B. Turret Head Assembly Removal

- (1) Loosen the socket head screws until the threads are disengaged from the retainer ring.
All heads (single position or turret) are attached by means of two socket head screws. Refer to Figure 2.
- (2) Remove the turret head with a straight lifting motion.

C. Turret Head Assembly Installation

- (1) With the tool in the open position, press the trigger which releases the turret to the indexing position.
Refer to Figure 2.



M22520/1-01 CRIMP TOOL HANDLE AND TURRET LOCATOR
Figure 2

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CONTACT CRIMP TOOL CROSS REFERENCE

- (2) Position the turret head assembly onto the retainer ring and line up the screws with the tapped holes.
- (3) After the turret head is seated against the retainer ring, tighten the socket head screws with a 9/64 inch allen wrench.

The turret should index easily without binding.

3. THE M22520/2-01 CRIMP TOOL

A. General Description

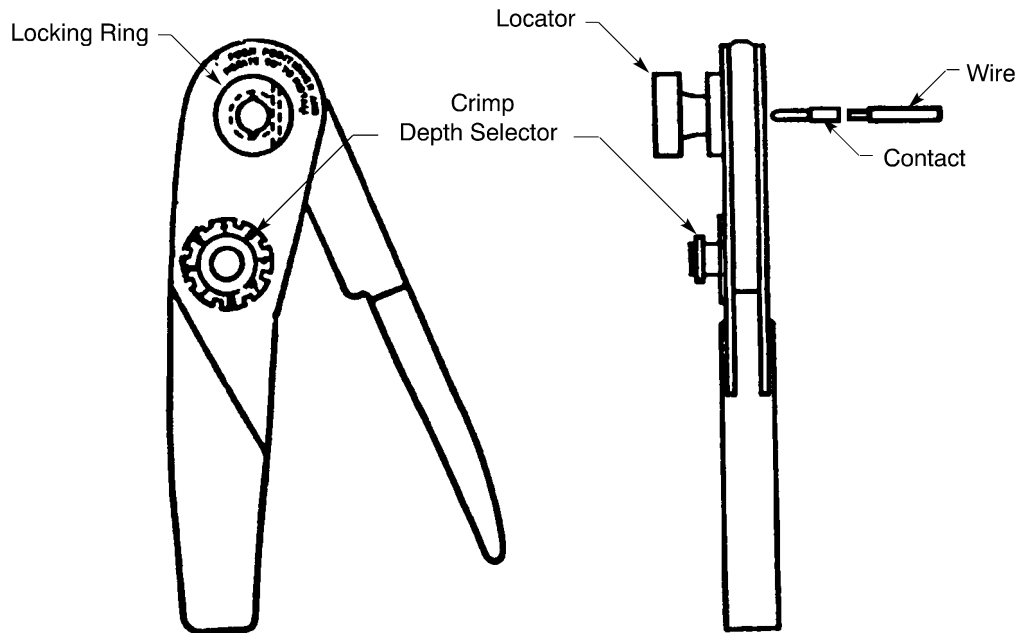
The M22520/2-01 basic crimp tool is designed with eight die closures that are changeable by a selector knob for AWG 20 through AWG 32 with positive ratchet action. The crimp tool has these features:

- The tool accommodates a wide variety of contacts
- The interchangeable locators are easily removed (rotate 90 degrees and pull out)
- Each locator positions the contact longitudinally and transversely in relation to the indentors
- Both the locator and crimp depth selector may be safety wire locked to provide the operator with a tool that cannot be adjusted and to assure crimp depth and location.

B. Locator Removal

- (1) With the tool in the open position, remove the spring clip lock wire.

Refer to Figure 3.



M22520/2-01 CRIMP TOOL HANDLE AND LOCATOR
Figure 3

- (2) Push and rotate the locator 90 degrees.



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C. Locator Installation

- (1) Select the correct locator for the cable size and the contact to be crimped.
- (2) Insert the locator into the lock plate.
- (3) Push and rotate the locator 90 degrees.
- (4) Replace the spring clip lock wire.
- (5) Select the correct selector number on the crimp depth selector:
 - (a) Raise and rotate the crimp depth selector knob until the desired selector number is in line with "SEL. NO".
 - (b) Release the selector knob.

Make sure that the crimp depth selector knob drops against the tool handle.

4. EQUIVALENT CONTACT CRIMP TOOLS

A. M22520/1-01 Equivalent Crimp Tools

Table 1 gives the crimp tools and locators that are equivalent to the M22520/1-01 handle and M22520/1-02 head for the contacts in the specified Subject.

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CONTACT CRIMP TOOL CROSS REFERENCE

**Table 1
M22520/1-01 EQUIVALENT CRIMP TOOLS**

Subject	Contact Size		Special	Equivalent Crimp Tool	
	Engaging End	Crimp Barrel		Basic Unit	Locator
Subject 20-61-11	20	20	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-1
				M22520/2-01	M22520/2-02
		18	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-1
				M22520/2-01	M22520/2-02
	16	-	M22520/1-01	M22520/1-02	
			ST2220-1-Y	ST2220-1-45	
			M22520/2-01	M22520/2-02	
	16	16	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-2
				MS3191-1	MS3191-16
	12	12	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-3
				MS3191-1	MS3191-12
			Alumel	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-31
			Chromel	M22520/1-01	M22520/1-02
		ST2220-1-Y		ST2220-1-31	
		10	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-3
MS3191-1	MS3191-12				

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CONTACT CRIMP TOOL CROSS REFERENCE

Table 1 (continued)

Subject	Contact Size		Special	Equivalent Crimp Tool	
	Engaging End	Crimp Barrel		Basic Unit	Locator
Subject 20-61-13	16S	16S	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-2
				MS3191-1	MS3191-16A
	16	16	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-2
				MS3191-1	MS3191-16A
	12	12	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-3
				MS3191-1	MS3191-12A
Subject 20-61-19	16	16	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-2
				MS3191-1	MS3191-16A
	12	12	-	M22520/1-01	M22520/1-02
				ST2220-1-Y	ST2220-1-3
				MS3191-1	MS3191-12A

B. M22520/2-01 Equivalent Crimp Tools

Table 2 gives the ST2220-() crimp tool and locator that can be used as the alternative for the M22520/2-01 handle and locator for the contacts in the specified Subject.

**Table 2
M22520/2-01 EQUIVALENT CRIMP TOOLS**

Subject	Contact Size	Equivalent Crimp Tool	
		Basic Unit	Locator
Subject 20-61-12	20	M22520/2-01	K149
		ST2220-1-Y	ST2220-1-12
Subject 20-71-11	22	M22520/2-01	M22520/2-23
		ST2220-1-Y	ST2220-1-60

C. ST2220-1-Y Equivalent Crimp Tools

Table 3 gives the M22520/() crimp tool and locator that can be as the alternative for the ST2220-1-Y handle and the locator for the contacts in the specified Subject.

STANDARD WIRING PRACTICES MANUAL

CONTACT CRIMP TOOL CROSS REFERENCE

**Table 3
ST2220-1-Y CRIMP TOOL EQUIVALENTS**

Subject	Contact Size		Special	Equivalent Crimp Tool		
	Engaging End	Crimp Barrel		Basic Unit	Locator	
Subject 20-61-11	20	20	-	ST2220-1-Y	ST2220-1-1	
				M22520/1-01	M22520/1-02	
				M22520/2-01	M22520/2-02	
		18	-	ST2220-1-Y	ST2220-1-1	
				M22520/1-01	M22520/1-02	
				M22520/2-01	M22520/2-02	
		16	-	ST2220-1-Y	ST2220-1-45	
				M22520/1-01	M22520/1-02	
				M22520/2-01	M22520/2-02	
	16	16	-	ST2220-1-Y	ST2220-1-2	
				M22520/1-01	M22520/1-02	
				MS3191-1	MS3191-16	
	12	12	-	ST2220-1-Y	ST2220-1-3	
				M22520/1-01	M22520/1-02	
				MS3191-1	MS3191-12	
			Alumel	ST2220-1-Y	ST2220-1-31	
				M22520/1-01	M22520/1-02	
			Chromel	ST2220-1-Y	ST2220-1-31	
		M22520/1-01		M22520/1-02		
		10	-	ST2220-1-Y	ST2220-1-3	
				M22520/1-01	M22520/1-02	
	MS3191-1			MS3191-12		
	Subject 20-61-12	20	20	-	ST2220-1-Y	ST2220-1-12
					M22520/2-01	K149

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CONTACT CRIMP TOOL CROSS REFERENCE

Table 3 (continued)

Subject	Contact Size		Special	Equivalent Crimp Tool	
	Engaging End	Crimp Barrel		Basic Unit	Locator
Subject 20-61-13	16S	16S	-	ST2220-1-Y	ST2220-1-2
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-16A
	16	16	-	ST2220-1-Y	ST2220-1-2
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-16A
	12	12	-	ST2220-1-Y	ST2220-1-3
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-12A
Subject 20-61-15	20	20	-	ST2220-1-Y	ST2220-1-4
				MS3191-1	11096-1
Subject 20-61-16	20	20	-	ST2220-1-Y	ST2220-1-1
				MS3191-1	MS3191-20
	16	16	-	ST2220-1-Y	ST2220-1-2
				MS3191-1	MS3191-16
Subject 20-61-19	16	16	-	ST2220-1-Y	ST2220-1-2
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-16A
	12	12	-	ST2220-1-Y	ST2220-1-3
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-12A
Subject 20-61-26	20	20	-	ST2220-1-Y	ST2220-1-1
				MS3191-1	3360-2
	16	16	-	ST2220-1-Y	ST2220-1-2
				MS3191-1	2520-3



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CONTACT CRIMP TOOL CROSS REFERENCE

Table 3 (continued)

Subject	Contact Size		Special	Equivalent Crimp Tool	
	Engaging End	Crimp Barrel		Basic Unit	Locator
Subject 20-63-14	16S	16S	-	ST2220-1-Y	ST2220-1-2
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-16A
	16	16	-	ST2220-1-Y	ST2220-1-2
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-16A
	12	12	-	ST2220-1-Y	ST2220-1-3
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-12A
Subject 20-71-11	22	22	-	ST2220-1-Y	ST2220-1-60
				M22520/2-01	M22520/2-23
	20	20	-	ST2220-1-Y	ST2220-1-1
				ST2220-1-Y	ST2220-1-1
				M22520/1-01	M22520/1-02
				M22520/1-01	M22520/1-02
				M22520/2-01	M22520/2-02
				MS3191-1	MS3191-20
	16	16	-	ST2220-1-Y	ST2220-1-2
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-16
	12	12	-	ST2220-1-Y	ST2220-1-3
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-12

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CONTACT CRIMP TOOL CROSS REFERENCE

Table 3 (continued)

Subject	Contact Size		Special	Equivalent Crimp Tool	
	Engaging End	Crimp Barrel		Basic Unit	Locator
Subject 20-71-12	Sub 20	Sub 20	-	ST2220-1-Y	ST2220-1-48
				M22520/1-01	M22520/1-02
				MS3191-1	ST2220-1-48
	20	20	-	ST2220-1-Y	ST2220-1-1
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-20A
	16	16	-	ST2220-1-Y	ST2220-1-2
				M22520/1-01	M22520/1-02
				MS3191-1	MS3191-16A

D. M22520/() Equivalent Supplier Crimp Tools

Table 4 gives the supplier part numbers for M22520/() crimp tools.

**Table 4
SUPPLIER PART NUMBERS OF THE M22520/() CRIMP TOOLS**

M22520/() Crimp Tool			Equivalent Crimp Tool	
Component	Part Number	Supplier	Part Number	Supplier
Basic Unit	M22520/1-01	QPL	55-000	Daniels
			615708	Astro
			AF8	Daniels
	M22520/2-01	QPL	615717	Astro
			85-220	Balmar
			AFM8	Daniels
			MH 780	Daniels
			MS3198-1	QPL
			TC1652	Airborn
			WA22	Daniels

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CONTACT CRIMP TOOL CROSS REFERENCE

Table 4 (continued)

M22520(/) Crimp Tool			Equivalent Crimp Tool	
Component	Part Number	Supplier	Part Number	Supplier
Locator	M22520/2-06	QPL	22-106	Balmar
			615722	Astro
			A41	Daniels
			K41	Daniels
			MS3198-6P	QPL
			TP1653	Airborn
	M22520/2-07	QPL	22-107	Balmar
			615723	Astro
			A40	Daniels
			K40	Daniels
			MS3198-7P	QPL
	M22520/2-09	QPL	22-109	Balmar
			615725	Astro
			A42	Daniels
			K42P	Daniels
MS3198-8P			QPL	
Head	M22520/1-04	QPL	55-104	Daniels
			615711	Astro
			TH163	Daniels

5. APPROVED TOOL SUPPLIERS

A. Crimp Tools

Table 5
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
11096-1	Buchanan
22-106	Balmar
22-107	Balmar
22-109	Balmar
2520-3	Astro
3360-2	Astro
55-000	Daniels

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CONTACT CRIMP TOOL CROSS REFERENCE

Table 5 (continued)

Crimp Tool	Supplier
55-104	Daniels
615708	Astro
615711	Astro
615717	Astro
615722	Astro
615723	Astro
615725	Astro
85-220	Balmar
A40	Daniels
A41	Daniels
A42	Daniels
AF8	Daniels
AFM8	Daniels
K149	Daniels
K40	Daniels
K41	Daniels
K42P	Daniels
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
M22520/2-23	QPL
MH 780	Daniels
MS3191-1	QPL
MS3191-12	QPL
MS3191-12A	QPL
MS3191-16	QPL
MS3191-16A	QPL
MS3191-20	QPL
MS3191-20A	QPL
MS3198-1	QPL
MS3198-6P	QPL
MS3198-7P	QPL

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CONTACT CRIMP TOOL CROSS REFERENCE

Table 5 (continued)

Crimp Tool	Supplier
MS3198-8P	QPL
ST2220-1-1	Boeing
ST2220-1-12	Boeing
ST2220-1-2	Boeing
ST2220-1-3	Boeing
ST2220-1-31	Boeing
ST2220-1-4	Boeing
ST2220-1-45	Boeing
ST2220-1-48	Boeing
ST2220-1-60	Boeing
ST2220-1-Y	Boeing
TC1652	Airborn
TH163	Daniels
TP1653	Airborn
WA22	Daniels

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STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

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STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

This subject gives Wire Type Codes and Wire Specifications or Wire Part Numbers for the 727, 737, 747, 757, 767, and 777 model airplanes.

1. GENERAL DATA

A. Applicable Conditions for Wire Type Code Data

These conditions are applicable for the Wire Type Code data and the Wire Part Number data in Table 1 and Table 2:

- The primary purpose is to identify the Wire Part Number for the Wire Type Code that is specified in the Wire List of the Wiring Diagram Manual that is applicable for the airplane model
- The secondary purpose is to give a minimum description of the type of wire and its configuration
- An airplane model number for a Wire Type Code does not give approval to use that wire for electronic assembly wiring
- An airplane model number for a Wire Type Code does not give approval to use that wire for changes to airplane wiring that occur after the production of the airplane.

B. Wire Data

For the conditions that are applicable for Wire Type Code and Wire Part Number data, refer to Paragraph 1.A.

The primary data that is given in:

- Table 1 is the Wire Type Code (WTC) that is specified in the Wiring Diagram Manual (WDM)
- Table 2 is the Wire Specification or the Wire Part Number for the Wire Type Code (WTC) that is specified in the Wiring Diagram Manual (WDM)
- Table 3 is the alternative Wire Specification or Wire Part Number for the specified Wire Specification or the Wire Part Number and its alternative.

C. Wire Specification or Wire Part Number from the WTC

For the part number structure of Boeing Standard Wire Specifications, refer to Paragraph 4.A.

- (1) Find the WTC in Table 1.
- (2) Look in the Model WDM columns for the model or the models that are applicable for the WTC.
- (3) Find the Wire Specification or Wire Part Number for that WTC.
- (4) If that wire is not available, find an Alternative Wire in Table 3. Refer to Paragraph 3.B.

D. Wire Data from the Wire Specification or the Wire Part Number

This Paragraph gives the procedure to find the wire data if the Wire Type Code (WTC) is not known. The wire data is also specified in Table 1 by the Wire Type Code (WTC).

For the part number structure of Boeing Standard Wire Specifications, refer to Paragraph 4.A.

- (1) Find the Wire Specification or the Wire Part Number in Table 2.
- (2) Look in the Model WDM columns for the model or the models that are applicable for the Wire Specification or Wire Part Number.
- (3) Find the Wire Data for that Wire Specification or Wire Part Number.
- (4) If that wire is not available, find an Alternative Wire in Table 3. Refer to Paragraph 3.B.

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STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

2. WIRE TYPE CODES AND WIRE PART NUMBERS

A. Wire Type Codes

**Table 1
WIRE TYPE CODES**

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
01	2	3	-	-	-	-	BMS 13-8 Type I Class A	01	High Temperature
02	2	3	-	-	-	-	BMS 13-8 Type II Class A	01	Shielded, High Temperature
03	2	3	-	5	-	-	1-70436-1, TWA, MIL-W-16878D	26	-
04	2	3	-	5	-	-	1-70436-2, TWA, MIL-W-16878D	26	Shielded
05	2	3	-	5	-	-	T8/A	01	Coax
06	-	3	-	5	-	-	21-606, Aljak	01	Coax
07	2	3	-	5	-	-	21-607, Aljak	01	Coax
08	2	3	-	-	-	-	RG-8A, MIL-C-17	01	Coax
09	2	3	-	-	-	-	5021E1331, Raychem	01	Coax
0A	-	-	-	-	-	7	BMS 13-48 Type 15 Class 1	01	Shielded
0B	-	-	-	-	-	7	BMS 13-48 Type 15 Class 2	02	Shielded
0C	-	-	-	-	6	7	BMS 13-48 Type 15 Class 3	03	Shielded
0D	-	-	-	-	-	7	BMS 13-48 Type 15 Class 4	04	Shielded
0E	-	-	4	-	6	7	BMS 13-65 Type 0E, S280W503-1	01	Coax
0F	-	3	4	5	6	7	BMS 13-65 Type 0F, S280W503-2	01	Coax
0G	-	3	4	5	6	7	BMS 13-65 Type 0G, S280W503-3	01	Coax
0H	-	3	4	5	6	7	BMS 13-65 Type 0H, S280W503-4	01	Coax
0J	-	3	4	5	6	7	BMS 13-65 Type 0J, S280W503-5	01	Coax
0K	-	3	4	5	6	7	BMS 13-65 Type 0K, S280W503-6	01	Light Weight Coax
0L	-	-	-	-	6	7	BMS 13-60 Type 22 Class 3	03	Al
0M	-	-	4	-	6	7	930-OFSXE, Thermax	3	50 Ohm, Triax
0N	-	-	4	-	6	7	S280W502-1	02	100 ohm, Round Conductor Shield, Adjacent Flat Conductor Shield
0Q	-	3	4	-	6	7	S280W502-3	04	100 ohm, Shielded Pair of Shielded Component Wires

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
0R	-	-	-	-	-	7	S280W502-4	04	100 ohm, Round Conductor Shield, Adjacent Flat Conductor Shield
0S	-	-	-	-	-	7	S280W502-5	04	100 ohm, Round Conductor Shield, Adjacent Flat Conductor Shield
0T	-	3	4	5	6	7	S280W502-6	02	100 ohm, Shielded
0U	-	3	4	-	-	7	24443/9C062X-4, Tensolite	04	100 ohm, Shielded
0V	-	-	-	-	6	-	24473/9P231X-4(LD), Tensolite	2	100 Ohm, Shielded Pair of Shielded Component Wires
0Z	-	-	4	-	6	7	20461/9C059X-4, Tensolite	04	100 ohm, Shielded
10	2	3	-	-	-	-	5012F1339 (10-008), Raychem	01	Coax
11	2	3	-	5	-	-	RG-11A, MIL-C-17D	01	Coax
12	2	3	-	-	-	-	5012F1339, Raychem	01	Coax
13	2	-	-	-	-	-	153049, MIL-W-16878/3 Type D	01	-
14	2	3	-	-	-	-	MIL-W-7139B, MIL-W-7078	02	Shielded, High Temperature
15	2	3	-	-	-	-	MIL-W-7139B, MIL-W-7078	01	Shielded, High Temperature
16	2	3	-	-	-	-	10-02716, MIL-C-13273	02	Retractile
17	-	3	-	5	-	-	RG-223, MIL-C-17	01	Coax
18	2	3	-	5	-	-	18S6JX, Lewis	01	Shielded, High Temperature
19	-	-	4	-	-	-	RG-180B, MIL-C-17	01	Coax
1A	2	3	-	-	-	-	BMS 13-13 Type I Class 1	01	-
1B	2	3	-	-	-	-	BMS 13-13 Type I Class 2	02	-
1C	2	3	-	-	-	-	BMS 13-13 Type I Class 3	03	-
1D	2	3	-	-	-	-	BMS 13-13 Type I Class 4	04	-
1E	2	3	4	5	6	-	BMS 13-16 Type I Class 1	01	-
1F	2	3	-	5	-	-	BMS 13-16 Type I Class 2	02	-
1G	2	3	-	5	-	-	BMS 13-16 Type I Class 3	03	-
1H	2	3	-	-	-	-	BMS 13-16 Type I Class 4	04	-
1J	2	3	-	-	-	-	BMS 13-11 Type I Class 1	01	-



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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
1K	2	3	-	-	-	-	BMS 13-11 Type I Class 2	02	-
1L	2	3	-	-	-	-	BMS 13-11 Type I Class 3	03	-
1M	2	3	-	-	-	-	BMS 13-11 Type I Class 4	04	-
1N	2	3	-	-	-	-	BMS 13-13 Type I Class 1	01	-
1P	2	3	-	-	-	-	BMS 13-13 Type I Class 2	02	-
1Q	2	3	-	-	-	-	BMS 13-13 Type I Class 3	03	-
1R	2	3	-	-	-	-	BMS 13-10 Type I Class 1	01	-
1S	2	3	-	-	-	-	BMS 13-10 Type I Class 2	02	-
1T	2	3	-	-	-	-	BMS 13-10 Type I Class 3	03	-
1U	2	3	-	-	-	-	BMS 13-10 Type I Class 4	04	-
1V	-	3	-	-	-	-	BMS 13-13 Type I Class 5	05	-
1W	2	3	-	-	-	-	BMS 13-13 Type I Class 8	08	-
1X	2	3	-	-	-	-	BMS 13-5 Type I Class A	01	-
1Y	2	3	-	-	-	-	BMS 13-5 Type I Class B	02	-
1Z	2	3	-	-	-	-	BMS 13-5 Type I Class C	03	-
20	2	3	-	-	-	-	20S6JX, Lewis	01	Shielded, High Temperature
21	2	3	-	5	-	-	BMS 13-29 Type I Class 1	01	-
22	2	3	-	-	-	-	SS-1222-70, Spectrastrap Cable	12	-
23	2	3	-	5	-	-	BMS 13-29 Type IV Class 4	04	-
24	2	3	-	-	-	-	BMS 13-11 Type V Class 2	02	Shielded
25	2	3	-	-	-	-	12-025C, Raychem	01	Coax
26	2	3	-	-	-	-	7526D1312, Raychem	01	Coax
27	2	3	-	-	-	-	12-125, Raychem	01	Coax
28	-	3	-	-	-	-	N-9004, ITT	02	-
29	-	3	-	-	-	-	45-28-13, ITT	02	-
2A	2	3	-	5	-	-	BMS 13-51 Type VIII Class 1	01	-
2B	2	3	-	5	-	-	BMS 13-51 Type VIII Class 2	02	-
2C	2	3	-	5	-	-	BMS 13-51 Type VIII Class 3	03	-
2D	2	3	-	5	-	-	BMS 13-51 Type VIII Class 4	04	-
2E	2	3	-	5	-	-	BMS 13-51 Type IX Class 1	01	Shielded
2F	2	3	-	5	-	-	BMS 13-51 Type IX Class 2	02	Shielded

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
2G	2	3	-	5	-	-	BMS 13-51 Type IX Class 3	03	Shielded
2H	2	3	-	5	-	-	BMS 13-51 Type IX Class 4	04	Shielded
2J	2	3	-	-	-	-	BMS 13-51 Type XI Class 1	01	-
2K	2	-	-	-	-	-	BMS 13-51 Type XI Class 2	02	-
2L	2	3	-	5	-	-	BMS 13-51 Type XI Class 3	03	-
2M	2	3	-	-	-	-	BMS 13-51 Type XI Class 4	04	-
2N	2	-	-	-	-	-	BMS 13-51 Type XII Class 1	01	Shielded
2P	2	-	-	-	-	-	BMS 13-51 Type XII Class 2	02	Shielded
2Q	2	-	-	-	-	-	BMS 13-51 Type XII Class 3	03	Shielded
2R	2	3	-	5	-	-	BMS 13-51 Type XII Class 4	04	Shielded
2S	-	3	-	-	-	-	BMS 13-51 Type X Class 4	04	-
2T	2	3	-	-	-	-	BMS 13-51 Type XII Class 5	05	Shielded
2U	2	-	-	-	-	-	BMS 13-51 Type X Class 6	06	-
2V	2	3	-	5	-	-	BMS 13-51 Type VIII Class 1	01	Red
2W	2	3	-	5	-	-	BMS 13-51 Type VIII Class 1	01	Yellow
2X	-	-	-	-	-	7	S280T007-3	08	Retractable Cable
2Y	-	3	-	5	-	-	RG-223, MIL-C-17	01	Coax
2Z	-	-	-	5	6	-	55A6160()-2/6-9-9, Raychem	02	Two Shields
30	-	3	-	-	-	-	N-9002, ITT	04	-
31	2	3	-	-	-	-	10-60233-1	05	-
32	-	3	-	-	-	-	10-60233-2	03	-
33	2	3	-	-	-	-	10-60233-3	03	-
34	2	3	-	-	-	-	10-60233-4	03	-
35	2	3	-	-	-	-	10-60233-5	12	-
36	2	3	-	-	-	-	10-60233-6	19	-
37	2	3	-	-	-	-	BMS 13-8 Type III Class A	01	Shielded, High Temperature
38	2	-	-	-	-	-	BMS 13-8 Type III Class B	02	Shielded, High Temperature
39	2	3	-	-	-	-	BMS 13-8 Type I Class A	01	Shielded
3A	2	3	-	-	-	-	BMS 13-11 Type V Class 1	01	Shielded
3B	2	3	-	-	-	-	BMS 13-11 Type V Class 2	02	Shielded
3B	-	-	4	-	6	7	BMS 13-48 Type 12 Class 2	02	Yellow, Shielded

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
3C	2	3	-	-	-	-	BMS 13-11 Type V Class 3	03	Shielded
3D	2	3	-	-	-	-	BMS 13-11 Type V Class 4	04	Shielded
3E	2	3	-	-	-	-	BMS 13-11 Type V Class 1	01	Shielded
3F	2	3	-	-	-	-	BMS 13-11 Type V Class 2	02	Shielded
3G	2	3	-	-	-	-	BMS 13-11 Type V Class 3	03	Shielded
3H	2	3	-	-	-	-	BMS 13-11 Type V Class 4	04	Shielded
3J	2	3	-	-	-	-	BMS 13-11 Type V Class 1	01	Shielded, White
3K	2	3	-	-	-	-	BMS 13-11 Type V Class 2	02	Shielded
3L	2	3	-	-	-	-	BMS 13-11 Type V Class 3	03	Shielded
3M	2	3	-	-	-	-	BMS 13-11 Type V Class 4	04	Shielded
3N	2	3	-	-	-	-	BMS 13-13 Type III Class 1	01	Shielded
3P	2	3	-	-	-	-	BMS 13-13 Type III Class 2	02	Shielded
3Q	2	3	-	-	-	-	BMS 13-13 Type III Class 3	03	Shielded
3R	2	3	-	-	-	-	BMS 13-10 Type III Class 1	01	Shielded
3S	2	3	-	-	-	-	BMS 13-10 Type III Class 2	02	Shielded
3T	2	3	-	-	-	-	BMS 13-10 Type III Class 3	03	Shielded
3U	2	3	-	-	-	-	BMS 13-10 Type III Class 4	04	Shielded
3V	2	3	-	-	-	-	BMS 13-10 Type III Class 7	07	Shielded
3W	2	3	-	-	-	-	BMS 13-10 Type III Class 14	14	Shielded
3X	2	3	-	-	-	-	BMS 13-5 Type III Class A	01	Shielded
3Y	2	3	-	-	-	-	BMS 13-5 Type III Class B	02	Shielded
3Z	2	3	-	-	-	-	BMS 13-5 Type III Class C	03	Shielded
40	2	3	-	-	-	-	10-60816-26	06	-
41	2	3	-	-	-	-	10-60816-25	16	-
42	2	3	-	-	-	-	42-133, Raychem	01	Coax
42	-	-	4	-	6	-	55A1211-10-9-9, Raychem	01	Shielded
43	2	3	4	5	6	7	BMS 13-35 Type I Class 1	01	Al
44	2	3	-	-	-	-	LWAC-144, Lewis	10	Al-Ch, Thermocouple, High Temperature
45	2	3	-	-	-	-	BMS 13-30 Type I Class 1	01	-
46	2	3	-	-	-	-	BMS 13-30 Type I Class 2	02	-
47	2	3	-	-	-	-	BMS 13-30 Type I Class 3	03	-

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STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
48	2	3	-	-	-	-	BMS 13-30 Type I Class 4	04	-
49	2	3	-	-	-	-	WW500, Warren, MIL-W-7139B	01	Shielded, High Temperature
4A	2	3	-	-	-	-	BMS 13-13 Type I Class 4	04	-
4A	-	-	4	-	-	-	BMS 13-51 Type XIV Class 6	06	-
4B	2	3	-	-	-	-	201-0046, Amphenol	07	-
4B	-	-	4	-	-	-	BMS 13-51 Type XIV Class 7	07	-
4C	2	3	-	-	-	-	10-60816-27	26	-
4C	-	-	4	-	6	-	BMS 13-51 Type XV Class 1	01	Red, Shielded
4D	2	3	-	-	-	-	BMS 13-13 Type IV Class 4	04	-
4D	-	-	4	-	6	-	BMS 13-51 Type VIII Class 1	01	-
4E	2	3	-	-	-	-	7484444-1SN-22, Douglas	01	Shielded
4E	-	-	4	-	-	-	M27500-20ML2T23, MIL-W-81044/12-20, MIL-C-27500	02	Shielded
4F	2	3	-	-	-	-	BS-G192, Uniefglass	01	High Temperature
4F	-	-	4	-	-	-	M27500-22ML2T23, MIL-W-81044/12-22, MIL-C-27500	02	Shielded
4G	2	3	-	-	-	-	BS-G177, Uninyvin	01	-
4G	-	-	4	-	-	-	M27500-20ML4T04, MIL-W-81044/12-20, MIL-C-27500	04	Shielded
4H	-	3	-	5	-	-	55A6160-()-2/6-9-9, Raychem	02	Adjacent Round Conductor Shields
4H	-	-	4	-	-	-	D6-7619-5/915, V96906	10	-
4I	-	-	4	-	-	-	M27500-20ML4T23, MIL-W-81044/12-20, MIL-C-27500	04	Shielded
4J	-	-	-	5	-	-	55A6087-20-9, Raychem	01	Adjacent Round Conductor Shields
4K	-	-	-	5	-	-	55A6088-()-9, Raychem	15	Shielded
4K	-	-	-	-	6	-	BMS 13-51 Type XV Class 1	01	-
4L	-	-	4	-	-	-	24723/70102KK-5, Tensolite	05	Shielded
4L	2	3	-	5	-	-	55A6090-()-9, Raychem	05	Shielded
4M	-	-	4	-	-	-	20722/70172KLX-10, Tensolite	10	Shielded
4Q	-	-	-	-	-	7	BMS 13-48 Type 12 Class 3	03	Yellow, Shielded
4R	-	-	4	-	-	-	55A1821-10-2/6-9, Raychem	02	-
4S	-	-	4	-	-	-	12817, Teledyne	01	Shielded

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
4T	-	-	4	-	-	-	HB06681/70258T-1, Tensolite	01	Shielded
4U	-	-	4	-	-	-	KWN1108, Gore	02	Wire Wrap, Shielded
50	2	3	-	-	-	-	RSS-5-191, MIL-W-7139B	01	High Temperature
51	2	3	-	-	-	-	BMS 13-18 Type IV Class 4	04	High Temperature
52	2	3	-	5	-	-	852-4236774, Pirelli	02	Cu-Cn, Thermocouple
53	2	3	-	-	-	-	8220D0011 (62-22QB), Raychem	02	Shielded
54	2	3	-	-	-	-	7120D0011 (62-320), Raychem	03	Shielded
55	2	3	-	-	-	-	BMS 13-18 Type I Class 4	04	High Temperature
56	2	3	-	-	-	-	P694694	02	Multi-Conductor
57	2	3	-	-	-	-	10-60875-1	02	Shielded
58	2	3	-	-	-	-	RG-58C, MIL-C-17D	01	Coax
59	2	3	4	5	-	-	RG-59B, MIL-C-17	01	Coax
5A	-	-	-	-	6	7	BMS 13-48 Type 16 Class 1	01	-
5A	2	-	-	5	-	-	BMS 13-51 Type XXVI Class 1	01	-
5B	-	-	-	-	6	-	BMS 13-48 Type 16 Class 1	01	White/Red
5B	-	-	4	-	-	-	BMS 13-51 Type XVIII Class 1	01	Red, Shielded
5B	2	-	-	5	-	-	BMS 13-51 Type XXVI Class 2	02	-
5C	-	-	-	-	6	-	BMS 13-48 Type 16 Class 1	01	Yellow
5C	2	-	-	5	-	-	BMS 13-51 Type XXVI Class 3	03	-
5D	-	-	-	-	6	7	BMS 13-48 Type 16 Class 2	02	-
5D	2	-	-	5	-	-	BMS 13-51 Type XXVI Class 4	04	-
5E	-	-	-	-	6	7	BMS 13-48 Type 16 Class 3	03	-
5E	2	-	-	5	-	-	BMS 13-51 Type XXVII Class 1	01	Shielded
5F	-	-	-	-	6	-	BMS 13-48 Type 16 Class 4	04	-
5F	2	-	-	5	-	-	BMS 13-51 Type XXVII Class 2	02	Shielded
5G	-	-	4	-	6	-	BMS 13-51 Type XVIII Class 1	01	Shielded
5G	2	3	-	5	-	-	BMS 13-51 Type XXVII Class 3	03	Shielded
5H	-	-	4	-	6	-	BMS 13-51 Type XVIII Class 2	02	Shielded
5H	2	-	-	5	-	-	BMS 13-51 Type XXVII Class 4	04	Shielded
5J	-	-	4	-	6	-	BMS 13-51 Type XVIII Class 3	03	Shielded
5J	2	3	-	5	-	-	BMS 13-51 Type XXIX Class 1	01	-
5K	-	-	4	-	6	-	BMS 13-51 Type XVIII Class 4	04	Shielded

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
5K	2	3	-	5	-	-	BMS 13-51 Type XXIX Class 2	02	-
5L	-	-	4	-	6	-	BMS 13-51 Type XIV Class 1	01	Red
5L	2	3	-	5	-	-	BMS 13-51 Type XXIX Class 3	03	-
5M	-	-	4	-	6	-	BMS 13-51 Type XIV Class 1	01	Green
5M	2	3	-	5	-	-	BMS 13-51 Type XXIX Class 4	04	-
5N	-	-	4	-	6	-	BMS 13-51 Type XIV Class 1	01	Yellow
5N	2	3	-	5	-	-	BMS 13-51 Type XXX Class 1	01	Shielded
5P	-	-	4	-	6	-	BMS 13-51 Type XV Class 1	01	Yellow, Shielded
5P	2	3	-	5	-	-	BMS 13-51 Type XXX Class 2	02	Shielded
5Q	2	3	-	5	-	-	BMS 13-51 Type XXX Class 3	03	Shielded
5R	-	-	-	5	-	-	BMS 13-51 Type XXX Class 4	04	Shielded
5S	-	-	4	-	6	-	BMS 13-48 Type 8 Class 1	01	Green
5S	-	-	-	5	-	-	BMS 13-51 Type XXX Class 1	01	Red, Shielded
5T	-	-	-	5	-	-	20721/20087Q-2, Tensolite	02	Shielded
5U	-	-	-	5	-	-	BMS 13-51 Type XXX Class 3	03	Red, Shielded
5V	2	-	-	5	-	-	BMS 13-51 Type XXVI Class 1	01	Red
5W	-	-	-	-	6	-	5026A1314-9, Raychem	01	Coax
5W	-	-	-	5	-	-	BMS 13-51 Type XXVI Class 1	01	Yellow
5X	-	-	-	5	-	-	24721/30130Q-2, Tensolite	02	Shielded
5X	-	-	4	-	6	-	5024A1314, Raychem	01	Coax
5Y	2	-	-	-	-	-	BMS 13-51 Type VI Class 2	02	Shielded
5Y	-	-	-	-	6	-	S280T004-1	38	Shielded, Audio Selector Cable
5Z	2	3	-	5	-	-	BMS 13-51 Type VII Class 2	02	-
60	2	-	-	-	-	-	421-166, Amphenol	03	Triax
61	2	3	4	-	-	-	7524D5011, Raychem	03	Triax
62	2	3	4	-	-	-	RG-62B, MIL-C-17	01	Coax
63	2	3	-	-	-	-	RG-63B, MIL-C-17D	01	Coax
64	2	3	-	-	-	-	BA6416A, ITT Surprenant	03	Triax
65	2	3	4	5	6	-	BA6903A, ITT Surprenant	01	Coax
66	2	3	4	5	6	7	BA5903A, ITT Surprenant	01	Coax
67	-	-	4	-	-	-	BA14349, ITT Surprenant	01	Coax

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
67	2	3	-	-	-	-	BMS 13-18 Type III Class 3	03	Shielded, High Temperature
68	2	3	-	-	-	-	BMS 13-18 Type III Class 2	02	Shielded, High Temperature
69	2	3	-	-	-	-	BMS 13-18 Type III Class 1	01	Shielded, High Temperature
6A	2	3	4	5	6	-	BMS 13-51 Type XIV Class 1	01	-
6B	2	3	4	5	6	-	BMS 13-51 Type XIV Class 2	02	-
6C	2	3	4	5	6	-	BMS 13-51 Type XIV Class 3	03	-
6D	2	3	4	5	6	-	BMS 13-51 Type XIV Class 4	04	-
6E	2	3	4	5	6	-	BMS 13-51 Type XV Class 1	01	Shielded
6F	2	3	4	5	6	-	BMS 13-51 Type XV Class 2	02	Shielded
6G	2	3	4	5	6	-	BMS 13-51 Type XV Class 3	03	Shielded
6H	2	3	4	5	6	-	BMS 13-51 Type XV Class 4	04	Shielded
6J	2	3	4	5	6	-	BMS 13-51 Type XVII Class 1	01	-
6K	2	3	4	5	6	-	BMS 13-51 Type XVII Class 2	02	-
6L	2	3	4	5	6	-	BMS 13-51 Type XVII Class 3	03	-
6M	2	3	4	5	6	-	BMS 13-51 Type XVII Class 4	04	-
6N	2	3	-	5	-	-	BMS 13-51 Type XVIII Class 1	01	Shielded
6P	-	-	4	-	6	-	BMS 13-51 Type XI Class 1	01	-
6P	2	3	-	5	-	-	BMS 13-51 Type XVIII Class 2	02	Shielded
6Q	-	-	-	-	6	-	BMS 13-51 Type XI Class 2	02	-
6Q	2	3	-	5	-	-	BMS 13-51 Type XVIII Class 3	03	Shielded
6R	-	-	-	-	6	-	BMS 13-51 Type XI Class 3	03	-
6R	2	3	-	5	-	-	BMS 13-51 Type XVIII Class 4	04	Shielded
6S	-	-	4	-	-	-	55A0831-08-92/96/94, Raychem	03	-
6S	-	-	-	-	6	-	BMS 13-51 Type XI Class 4	04	-
6S	-	3	-	-	-	-	BMS 13-51 Type XVIII Class 5	05	Shielded
6T	-	-	-	-	6	-	BMS 13-51 Type XII Class 1	01	-
6T	-	3	-	-	-	-	BMS 13-51 Type XVI Class 4	04	-
6U	-	-	-	-	6	-	BMS 13-51 Type XII Class 2	02	Shielded
6U	2	3	-	-	-	-	BMS 13-51 Type XVI Class 6	06	-
6V	-	-	-	-	6	-	BMS 13-51 Type XII Class 3	03	Shielded

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
6V	2	3	-	5	-	-	BMS 13-51 Type XIV Class 1	01	Red
6W	-	-	-	-	6	-	BMS 13-51 Type XII Class 4	04	Shielded
6W	2	3	-	5	-	-	BMS 13-51 Type XIV Class 1	01	Yellow
6X	-	-	-	-	6	-	BMS 13-51 Type XVII Class 1	01	Red
6Y	-	-	4	-	6	-	22722/60586KK-6, Tensolite	06	Shielded
6Z	-	3	-	-	-	-	10-60816-65	02	-
70	2	3	-	-	-	-	BMS 13-18 Type I Class 1	01	High Temperature
71	2	3	-	-	-	-	RG-71B, MIL-C-17E	01	Coax
72	2	3	-	5	-	-	RG-114A, MIL-C-17D	01	Coax
73	2	3	4	-	6	-	RG-214, MIL-C-17	01	Coax
74	2	-	-	-	-	-	MIL-W-5274A Type 3 Class A	01	-
74	-	-	4	-	6	7	RG-316, MIL-C-17	01	Coax
75	2	3	-	5	-	-	12-175, Raychem	01	Coax
75	-	-	4	-	-	-	RG-400, MIL-C-17	01	Coax
76	2	3	-	5	-	-	21-768, Raychem	02	Shielded
76	-	-	4	-	-	-	M17/134-0001, MIL-C-17	01	Triax, Shielded
77	2	3	-	-	-	-	BMS 13-18 Type I Class 2	02	High Temperature
77	-	-	4	-	-	-	RG-303, MIL-C-17	01	Coax
78	2	3	4	5	6	-	RG-142B, MIL-C-17E	01	Coax
79	2	3	4	-	-	-	MI-5224, Times Wire Company	01	Coax
7A	-	3	4	5	6	-	BMS 13-31 Type V Class 1	01	High Temperature
7B	-	-	4	-	6	-	BMS 13-31 Type V Class 1	01	Red, High Temperature
7C	-	-	4	-	6	-	BMS 13-31 Type V Class 2	02	High Temperature
7D	-	-	4	-	6	-	BMS 13-31 Type V Class 3	03	High Temperature
7E	-	-	4	-	6	-	BMS 13-31 Type V Class 4	04	High Temperature
7F	-	-	4	-	6	-	BMS 13-31 Type VII Class 1	01	Shielded, High Temperature
7G	-	-	4	-	6	-	BMS 13-31 Type VII Class 2	02	Shielded, High Temperature
7H	-	-	4	-	6	-	BMS 13-31 Type VII Class 3	03	Shielded, High Temperature
7J	-	-	4	-	6	7	BMS 13-48 Type 24 Class 4	04	Shielded

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
7K	-	3	-	5	6	-	976-295, Thermax	02	70 ohm, Nickel Plated Shield
7L	-	-	-	-	6	-	S280T001-2	05	PSUD To PSUD Cable
7M	-	-	-	-	6	-	S280T006-1	10	Spoiler Actuating Cable
7N	-	-	-	5	6	-	S280T006-2	07	Spoiler Actuating Cable, Shielded
7P	-	3	4	5	6	7	986-495, Thermax	02	75 ohm
7Q	-	3	4	5	6	7	LDF4RN-50A, Andrew	01	Coax
7R	-	-	-	-	6	-	BMS 13-48 Type 19 Class 4	04	-
7S	-	-	-	-	6	-	BMS 13-51 Type XXVI Class 1	01	-
7T	-	-	-	-	6	-	BMS 13-51 Type XXVI Class 1	01	Red
7U	-	-	-	-	6	-	BMS 13-51 Type XXVI Class 1	01	Green
7V	-	-	-	-	6	-	BMS 13-51 Type XXVI Class 2	02	-
7W	-	-	-	-	6	-	BMS 13-51 Type XXVI Class 3	03	-
7X	-	-	-	-	6	-	BMS 13-51 Type XXVI Class 4	04	-
7Y	-	-	-	-	6	-	BMS 13-51 Type XXVII Class 1	01	Shielded
7Z	-	-	-	-	6	-	S280T001-1	06	Electrical P.E.S. Cable
80	2	3	-	5	-	-	853-4221073, Pirelli	02	Cu-Cn, Thermocouple
81	2	3	-	5	-	-	853-4125928, Specialty Cable	02	Cu-Cn, Thermocouple
82	-	-	-	-	6	-	64-500, Prodelin	01	Coax, 50 ohm
82	2	3	-	5	-	-	BA3482, ITT Surprenant	02	Twinax
83	2	3	-	-	-	-	RG-213, MIL-C-17D	01	Coax
84	2	3	-	5	-	-	T214, Times Wire Company	01	Coax
85	2	3	-	5	-	-	LWAC-99JX, Lewis	02	Al-Ch, Thermocouple, High Temperature
86	2	3	4	-	-	-	BMS 13-28 Type I Class 1	01	High Temperature
86	-	-	4	-	-	-	BMS 13-28 Type I Class 1	01	High Temperature
87	2	3	4	-	-	-	BMS 13-28 Type I Class 2	02	High Temperature
88	-	-	4	-	-	-	BMS 13-28 Type I Class 3	03	High Temperature
88	2	3	-	5	-	-	BMS 13-28 Type I Class 4	04	High Temperature
89	2	3	4	-	-	-	BMS 13-28 Type III Class 1	01	Shielded, High Temperature
8A	2	3	-	5	-	-	BMS 13-51 Type IX Class 2	02	Blue, Shielded



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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
8A	-	-	-	-	6	-	BMS 13-51 Type XXVII Class 2	02	Shielded
8B	2	3	-	5	-	-	BMS 13-51 Type IX Class 3	03	Blue, Shielded
8B	-	-	-	-	6	-	BMS 13-51 Type XXVII Class 3	03	Shielded
8C	-	-	4	-	6	7	BMS 13-48 Type 24 Class 1	01	Shielded
8C	2	3	-	5	-	-	BMS 13-51 Type IX Class 4	04	Blue, Shielded
8D	-	-	4	-	6	7	BMS 13-48 Type 24 Class 1	01	White/Red, Shielded
8D	2	3	-	5	-	-	BMS 13-51 Type XXX Class 1	01	Blue, Shielded
8E	-	-	4	-	6	7	BMS 13-48 Type 24 Class 3	03	Shielded
8E	2	3	-	5	-	-	BMS 13-51 Type XXX Class 2	02	Blue, Shielded
8F	2	3	-	5	-	-	BMS 13-51 Type XXX Class 3	03	Blue, Shielded
8G	2	3	-	5	-	-	BMS 13-51 Type XXX Class 4	04	Blue, Shielded
8H	-	-	-	-	-	7	BMS 13-48 Type 22 Class 4	04	-
8H	2	3	-	5	-	-	BMS 13-51 Type XV Class 2	02	Yellow, Shielded
8J	-	-	-	-	6	7	BMS 13-48 Type 22 Class 2	02	-
8J	2	3	-	5	-	-	BMS 13-51 Type XV Class 1	01	Blue, Shielded
8K	-	-	4	-	6	7	BMS 13-48 Type 24 Class 2	02	Shielded
8K	2	3	-	5	-	-	BMS 13-51 Type XV Class 2	02	Blue, Shielded
8L	-	-	-	-	6	-	0024A0014, Raychem	02	Shielded, 100 ohm
8L	2	3	-	5	-	-	BMS 13-51 Type XV Class 3	03	Blue, Shielded
8M	2	3	-	5	-	-	BMS 13-51 Type XV Class 4	04	Blue, Shielded
8M	-	-	-	-	6	-	BMS 13-51 Type XXVII Class 4	04	Shielded
8N	-	-	-	-	6	-	44A7434-22-9/5, Raychem	02	Al-Ch, Thermocouple
8P	-	-	4	-	6	7	44A7620-22-9/5-9, Raychem	02	Shielded, Al-Ch, Thermocouple
8P	2	3	-	5	-	-	BMS 13-51 Type XVIII Class 2	02	Blue, Shielded
8Q	2	3	-	5	-	-	BMS 13-16 Type I Class 1	01	Blue
8Q	-	-	4	-	6	7	BMS 13-48 Type 12 Class 1	01	Yellow, Shielded
8R	2	3	-	5	-	-	BMS 13-16 Type III Class 1	01	Blue, Shielded
8R	-	-	4	-	6	7	BMS 13-48 Type 22 Class 1	01	-
8S	-	3	-	5	-	-	BMS 13-16 Type III Class 2	02	Blue, Shielded
8S	-	-	4	-	6	7	BMS 13-48 Type 22 Class 1	01	White/Red
8T	-	-	-	-	6	-	BMS 13-51 Type XXVI Class 1	01	Yellow

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
8U	-	3	-	5	6	-	S280T007-1	06	Retractable Cable
8V	-	-	4	-	6	-	5021K1011, Raychem	01	Coax
8W	-	-	4	-	6	-	5012H3012, Raychem	01	Coax
8X	-	-	-	-	6	-	55A6087-20, Raychem	01	Coax, Round Conductor Shields, Not Adjacent
8Y	-	-	4	-	6	-	55A6090-20, Raychem	05	Shielded
8Z	-	-	-	-	6	-	55A6088-20, Raychem	15	Shielded
90	2	3	4	-	-	-	BMS 13-28 Type III Class 2	02	Shielded, High Temperature
91	2	3	4	-	-	-	BMS 13-28 Type III Class 3	03	Shielded, High Temperature
92	2	3	-	-	-	-	RSS-5-191, MIL-W-7139	01	Coax, High Temperature
93	-	-	4	-	6	-	10-60875-4	01	Fuel Quantity, Shielded
93	2	3	-	-	-	-	421-176, Amphenol	01	Coax
94	2	3	-	5	-	-	5020G3442, Raychem	01	Coax
95	2	3	-	-	-	-	BMS 13-30 Type III Class 1	01	Shielded
96	2	3	-	-	-	-	BMS 13-30 Type III Class 2	02	Shielded
97	2	3	-	-	-	-	BMS 13-30 Type III Class 3	03	Shielded
98	-	-	-	-	6	-	10-60875-8	01	Fuel Quantity, Shielded
98	2	3	-	-	-	-	BMS 13-30 Type III Class 4	04	-
99	2	3	-	-	-	-	852-4991972, Specialty Cable	02	Al-Ch, Thermocouple
9A	-	-	-	-	6	-	51-04751, Champlain	36	Shielded
9A	-	3	-	-	-	-	M22759/16-()-9, MIL-W-22759	01	-
9B	-	-	4	-	-	-	BMS 13-55 Type 1 Class 1	01	Fire Resistant
9B	-	3	-	-	-	-	M27500-()TG2U00, MIL-W-22759/16, MIL-W-27500	02	-
9C	-	-	-	-	6	-	55A6160-20, Raychem	02	Round Conductor Shields, Not Adjacent
9C	-	3	-	-	-	-	M27500-()TG3U00, MIL-W-22759/16, MIL-W-27500	03	-
9D	-	-	4	-	6	-	61-02651, Champlain	02	High Temperature, Round Conductor Shields, Not Adjacent
9D	-	3	-	-	-	-	M27500-()TG4U00, MIL-W-22759/16, MIL-W-27500	04	-

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7(7) Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
9E	-	-	4	-	6	-	BMS 13-31 Type VII Class 4	04	Shielded, High Temperature
9E	-	3	-	-	-	-	M27500-()SB1T14, MIL-W-22759/32, MIL-C-27500	01	Shielded, Replaced M27500-()TG1T14 for AWG 22 - AWG 12
9E	-	3	-	-	-	-	M27500-()TG1T14, MIL-C-27500	01	Shielded, Replaced by M27500-()SB1T14 or M27500-24ST1T14
9E	-	3	-	-	-	-	M27500-24ST1T14, MIL-W-22759/46, MIL-C-27500	01	Shielded, Replaced M27500-24TG1T14
9F	-	-	4	-	6	-	30-04680, Champlain	09	Shielded
9F	-	3	-	-	-	-	M27500-()SB2T14, MIL-W-22759/32, MIL-C-27500	02	Shielded, Replaced M27500-()TG2T14 for AWG 22 - AWG 12
9F	-	3	-	-	-	7	M27500-()TG2T14, MIL-C-27500	02	Shielded, Replaced by M27500-()SB2T14 or M27500-24ST2T14
9F	-	3	-	-	-	-	M27500-24ST2T14, MIL-W-22759/46, MIL-C-27500	02	Shielded, Replaced M27500-24TG2T14
9G	-	-	-	-	6	-	831-4245379, Pirelli	02	Shielded, 100 ohm Balanced Line
9G	-	3	-	-	-	-	M27500-()SB3T14, MIL-W-22759/32, MIL-C-27500	03	Shielded, Replaced M27500-()TG3T14 for AWG 22 - AWG 12
9G	-	3	-	-	-	-	M27500-()TG3T14, MIL-C-27500	03	Shielded, Replaced by M27500-()SB3T14 or M27500-24ST3T14
9G	-	3	-	-	-	-	M27500-24ST3T14, MIL-W-22759/46, MIL-C-27500	03	Shielded, Replaced M27500-24TG3T14
9H	-	-	4	-	6	-	831-4245270, Pirelli	02	Shielded, 100 ohm Balanced Line
9H	-	3	-	-	-	-	M27500-()SB4T14, MIL-W-22759/32, MIL-C-27500	04	Shielded, Replaced M27500-()TG4T14 for AWG 22 - AWG 12
9H	-	3	-	-	-	-	M27500-()TG4T14, MIL-C-27500	04	Shielded, Replaced by M27500-()SB4T14 or M27500-24ST4T14
9H	-	3	-	-	-	-	M27500-24ST4T14, MIL-W-22759/46, MIL-C-27500	04	Shielded, Replaced M27500-()TG4T14
9J	-	-	4	-	-	-	55A6645-20, Raychem	02	Round Conductor Shields, Not Adjacent



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STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7(7) Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
9K	-	-	4	-	6	-	61-02783, Champlain	03	High Temperature, Round Conductor Shields, Not Adjacent, Nickel Plated
9L	-	3	4	-	6	7	BMS 13-55 Type 4 Class 1	01	Nickel Plated Shield, Fire Resistant
9M	-	-	4	-	6	-	24-00033, Champlain	01	Red, Fire Resistant
9N	-	-	4	-	6	-	24-00034, Champlain	01	Red, Fire Resistant
9P	-	3	4	5	6	7	BMS 13-55 Type 2 Class 1	01	Fire Resistant
9Q	-	-	-	-	-	7	BMS 13-55 Type 4 Class 2	02	Nickel Plated Shield, Fire Resistant
9R	-	-	4	-	-	-	7724D3664, Raychem	02	Shielded
9S	-	-	4	-	-	-	3518D0611, Raychem	02	Shielded
9T	-	-	-	5	-	7	BMS 13-55 Type 4 Class 3	03	Nickel Plated Shield, Fire Resistant
9U	-	-	4	-	6	-	BMS 13-67 Type 2 Class 1	01	Nickel Plated Shield, Fire Resistant
9V	-	-	4	5	-	-	BMS 13-55 Type 1 Class 1	01	Fire Resistant
9W	2	3	-	5	-	-	BMS 13-51 Type XIV Class 1	01	White/Black
9X	-	-	4	-	6	-	85842, Filotex	01	Red, Fire Resistant
9X	2	3	-	5	-	-	BMS 13-51 Type XIV Class 1	01	White/Green
9Y	-	-	4	-	6	-	81993, Filotex	01	Fire Resistant
9Y	-	3	-	5	-	-	BMS 13-51 Type XIV Class 1	01	White/Violet
9Z	2	3	-	5	-	-	BMS 13-51 Type XIV Class 1	01	White/Orange, Shielded, High Temperature
A#	-	-	4	-	6	7	BE Aerospace Specified Wire	-	-
A6	-	3	-	-	-	-	10-60816-64	08	-
A8	-	-	-	-	6	7	557-392, Thermax	03	High Temperature
A9	-	-	-	-	-	7	08766/01147KE-3, Tensolite	03	-
AA	2	3	-	-	-	-	10-60816-1	01	Shielded, High Temperature
AB	2	3	-	-	-	-	10-60816-2	02	-
AC	2	-	-	-	-	-	10-60816-3	07	-
AD	2	3	-	-	-	-	10-60816-4	02	-
AE	2	3	-	-	-	-	10-60816-5	01	High Temperature

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
AF	2	3	-	-	-	-	10-60816-6	01	High Temperature
AG	2	3	-	-	-	-	10-60816-7	08	-
AH	2	3	-	-	-	-	10-60816-8	07	-
AI	2	3	-	-	-	-	10-60816-12	14	-
AJ	2	3	-	-	-	-	10-60918-1	08	Shielded
AK	2	3	-	-	-	-	10-60918-2	03	Shielded
AL	2	3	-	5	-	-	10-60816-9	05	Shielded
AM	2	3	-	-	-	-	10-60816-10	05	Shielded
AN	2	3	-	-	-	-	10-60816-11	02	Shielded
AO	2	3	-	5	-	-	10-60816-13	01	High Temperature
AP	2	3	-	-	-	-	10-60816-14	05	-
AQ	2	3	-	-	-	-	10-60816-15	03	-
AR	2	3	-	-	-	-	10-61299-1	04	-
AS	2	3	-	-	-	-	10-60816-17	01	High Temperature
AT	2	3	-	-	-	-	10-60816-19	05	-
AU	-	3	-	-	-	-	10-60816-20	03	-
AV	2	3	-	-	-	-	10-60816-21	03	-
AW	2	3	-	-	-	-	10-60816-22	03	-
AX	2	3	-	-	-	-	BMS 13-31 Type IV Class 4	04	High Temperature
AY	2	3	-	5	-	-	10-60816-23	01	High Temperature
AZ	2	3	-	-	-	-	BMS 13-11 Type I Class 1	01	-
B#	-	-	4	-	6	7	BE Aerospace Specified Wire	-	-
B6	-	3	-	-	-	-	BMS 13-58 Type V Class 1	01	High Temperature
B7	-	-	4	-	-	7	BMS 13-58 Type V Class 2	02	High Temperature
B8	-	-	-	-	-	7	BMS 13-58 Type V Class 3	03	High Temperature
B9	-	3	-	-	-	-	BMS 13-58 Type VII Class 1	01	Nickel Plated Shield, High Temperature
BA	2	3	-	-	-	-	BMS 13-30 Type I Class 1	01	-
BB	2	3	-	-	-	-	BMS 13-30 Type I Class 2	02	-
BC	2	3	-	-	-	-	BMS 13-30 Type I Class 3	03	-
BD	2	3	-	-	-	-	BMS 13-30 Type I Class 4	04	-
BE	-	-	-	-	-	7	BMS 13-58 Type VII Class 2	02	Nickel Plated Shield, High Temperature

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STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
BF	-	3	-	5	-	-	10-61299-6	04	Shielded
BG	-	-	4	-	6	-	BMS 13-31 Type I Class 1	01	High Temperature
BG	2	3	-	-	-	-	BMS 13-42C Type VIII Class 1	01	-
BH	-	-	4	-	6	-	BMS 13-31 Type I Class 2	02	High Temperature
BH	2	3	-	-	-	-	BMS 13-42C Type VIII Class 2	02	-
BI	-	-	4	-	-	-	BMS 13-31 Type I Class 4	04	High Temperature
BJ	2	3	-	-	-	-	BMS 13-42C Type VIII Class 3	03	-
BJ	-	-	4	-	6	7	BMS 13-58 Type I Class 1	01	High Temperature
BK	2	3	-	-	-	-	BMS 13-42C Type VIII Class 4	04	-
BL	2	3	-	5	-	-	BMS 13-28 Type IV Class 4	04	High Temperature
BM	-	3	-	-	-	-	BMS 13-10 Type IV Class 6	06	-
BN	-	3	-	-	-	-	BMS 13-10 Type IV Class 4	04	-
BO	2	3	-	-	-	-	10-60816-24	03	-
BP	2	3	-	-	-	-	10-61299-2	04	Shielded
BQ	2	3	-	-	-	-	10-60918-3	03	Shielded
BR	-	-	4	5	6	-	5021K1011, Raychem	01	Coax
BS	-	3	4	5	6	-	5012H3012, Raychem	01	Coax
BT	2	3	-	-	-	-	10-61299-4	04	-
BU	-	3	-	5	-	-	10-61299-5	04	Shielded
BV	-	-	4	5	6	-	977-295, Thermax	01	100 ohm
BW	-	3	-	5	6	-	831-4245379, Specialty Cable	01	100 ohm
BX	-	-	-	5	6	-	5026A1314-9, Raychem	01	Coax
BY	-	3	-	-	-	-	10-61299-7	05	-
BZ	-	-	-	-	-	7	BMS 13-58 Type VII Class 3	03	Nickel Plated Shield, High Temperature
C#	-	-	4	-	6	7	BE Aerospace Specified Wire	-	-
C0	-	-	-	-	-	7	BMS 13-58 Type VII Class 4	04	Nickel Plated Shield, High Temperature
C1	-	3	-	-	-	-	TLS-200-1SJ-20NA, Tensolite	01	Shielded, Low Impedance
C2	-	3	-	-	-	-	TLS-200-1DSJ-20NA, Tensolite	01	Shielded, High Impedance
C3	-	3	-	-	-	-	TLS-200-2SJ-20NA, Tensolite	02	Silver Shield

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
C4	-	3	-	-	-	-	TLS-200-4SJ-20NA, Tensolite	04	Silver Shield
C5	-	-	-	-	-	7	BMS 13-58 Type VII Class 1	01	Red, Nickel Plated Shield, High Temperature
C6	-	-	-	-	6	-	BMS 13-55 Type 1 Class 1	01	White, Fire Resistant
C7	-	-	-	-	6	-	BMS 13-55 Type 1 Class 2	02	High Temperature
C8	-	-	-	-	6	-	BMS 13-55 Type 3 Class 1	01	White, Nickel Plated Shield, High Temperature
C9	-	3	-	-	6	-	BMS 13-55 Type 3 Class 2	02	White, Nickel Plated Shield, High Temperature
CA	2	3	-	-	-	-	BMS 13-30 Type III Class 1	01	Shielded
CB	2	3	-	-	-	-	BMS 13-30 Type III Class 2	02	Shielded
CC	2	3	-	-	-	-	BMS 13-30 Type III Class 3	03	Shielded
CD	2	3	-	-	-	-	BMS 13-30 Type III Class 4	04	Shielded
CE	-	-	-	-	-	7	BMS 13-58 Type V Class 1	01	Red, High Temperature
CF	-	3	-	-	-	-	BMS 13-58 Type V Class 4	04	High Temperature
CG	2	3	-	-	-	-	BMS 13-42C Type XII Class 1	01	Shielded
CH	-	-	4	-	-	-	BMS 13-31 Type III Class 2	02	Shielded, High Temperature
CH	2	3	-	-	-	-	BMS 13-42C Type XII Class 2	02	Shielded
CJ	-	-	4	-	-	-	BMS 13-31 Type III Class 3	03	Shielded, High Temperature
CJ	2	3	-	-	-	-	BMS 13-42C Type XII Class 3	03	Shielded
CK	-	-	4	-	-	-	61-02384, Champlain	02	Shielded, High Temperature
CK	2	3	-	-	-	-	BMS 13-42C Type XII Class 4	04	Shielded
CL	-	-	4	-	-	-	M27500-20RE2N12, MIL-W-22759/12-20, MIL-C-27500	02	Shielded, High Temperature
CM	-	-	4	-	6	-	61-02786, Champlain	01	Shielded, High Temperature
CN	2	3	-	5	-	-	BMS 13-16 Type III Class 1	01	Shielded
CP	2	3	-	5	-	-	BMS 13-16 Type III Class 2	02	Shielded
CQ	-	3	4	5	6	7	BMS 13-58 Type I Class 1	01	High Temperature
CR	2	3	-	-	-	-	BMS 13-16 Type III Class 3	03	Shielded

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
CS	2	3	-	-	-	-	BMS 13-16 Type III Class 4	04	Shielded
CT	2	3	-	-	-	-	10-60816-16	26	Shielded
CU	2	3	4	5	-	-	BMS 13-31 Type IV Class 3	03	High Temperature
CV	2	3	-	-	-	-	MT-LN205/A, Vibro-Meter	02	Shielded, High Temperature
CW	-	3	-	5	-	-	691-295, Thermax	01	Coax
CW	-	-	4	-	6	-	72016, Thermax	02	Two Shields, High Temperature
CX	-	-	4	-	-	-	RG-196, MIL-C-17	01	Coax
CY	-	3	-	-	-	-	RG-122, MIL-C-17D	01	Coax
CZ	-	3	-	-	-	-	RG-225, MIL-C-17D	01	Coax
D#	-	-	4	-	-	-	18480/9K105X-4(LD), Tensolite	04	105 ohm, Adjacent Round Conductor Shields
D0	-	-	-	-	-	7	55PC6000-20, Raychem	02	Round Conductor Shields, Not Adjacent
D1	-	-	-	-	-	7	55PC6001-20, Raychem	03	Round Conductor Shields, Not Adjacent
D2	-	-	-	-	6	7	550-292, Thermax	02	High Temperature, Round Conductor Shields, Not Adjacent
D3	-	-	-	-	6	7	551-292, Thermax	03	High Temperature, Round Conductor Shields, Not Adjacent
D4	-	-	-	-	-	7	552-292, Thermax	02	High Temperature, Round Conductor Shields, Not Adjacent
D5	-	-	-	-	-	7	55PC6024-20, Raychem	4	Round Conductor Shields, Not Adjacent
D6	-	-	-	5	-	7	55PC6021-20, Raychem	02	Adjacent Round Conductor Shields
D7	-	-	-	5	-	7	55PC6022-20, Raychem	03	Adjacent Round Conductor Shields
D8	-	-	-	-	-	7	55PC6023-20, Raychem	04	Adjacent Round Conductor Shields
D9	-	-	-	-	-	7	JW647-99, Judd	2	HI-FLEX, Adjacent Round Conductor Shields
DA	-	3	-	-	-	-	RG-108A, MIL-C-17	01	Twinax

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WIRE TYPE CODES

Table 1 (continued)

WTC	7(7) Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
DB	-	3	-	-	-	-	14401, ITT	02	Shielded
DC	-	3	-	5	-	-	BMS 13-48 Type 1 Class 1	01	-
DD	-	3	-	-	-	-	BMS 13-48 Type 1 Class 2	02	-
DE	2	3	-	-	-	-	BMS 13-48 Type 1 Class 3	03	-
DF	-	3	-	-	-	-	BMS 13-48 Type 1 Class 4	04	-
DG	-	3	-	-	-	-	BMS 13-48 Type 3 Class 1	01	Shielded
DH	-	3	-	-	-	-	BMS 13-48 Type 3 Class 2	02	Shielded
DJ	2	3	-	-	-	-	BMS 13-48 Type 3 Class 3	03	Shielded
DK	-	3	-	-	-	-	BMS 13-48 Type 3 Class 4	04	Shielded
DL	-	3	-	-	-	-	BMS 13-48 Type 4 Class 2	02	-
DM	-	3	-	-	-	-	BMS 13-48 Type 4 Class 3	03	-
DN	-	3	-	-	-	-	BMS 13-48 Type 4 Class 4	04	-
DP	2	3	-	-	-	-	RG-195A, MIL-C-17D	01	Coax
DQ	2	3	-	-	-	-	RG-210, MIL-C-17D	01	Coax
DR	2	3	-	-	-	-	BMS 13-16 Type III Class 7	07	Shielded
DS	2	3	-	-	-	-	BMS 13-16 Type III Class 14	14	Shielded
DT	-	3	-	5	-	-	CTC-0039-20-9/5-9, Raychem	02	Al-Ch, Thermocouple
DU	-	3	4	5	6	7	CTC-0039(-)-9/5-9, Raychem	02	Al-Ch, Thermocouple
DV	-	3	-	-	-	-	157167, Prestolite	01	High Voltage
DW	2	3	-	-	-	-	853-4221172, Pirelli	02	Al-Ch, Thermocouple
DX	-	3	-	5	-	-	44A7434, Raychem	02	Al-Ch, Thermocouple
DY	2	3	-	-	-	-	7484444-2-22, Douglas	02	Shielded, High Temperature
DZ	2	3	-	-	-	-	7616964B24, Douglas	01	-
E#	-	-	4	-	6	-	BE Aerospace Specified Wire	-	-
E0	-	-	4	-	-	-	BMS 13-55 Type 3 Class 2	02	Nickel Plated Shield, Fire Resistant
E1	-	-	4	-	-	-	BMS 13-55 Type 3 Class 3	03	Nickel Plated Shield, Fire Resistant
E2	-	-	-	5	-	-	BMS 13-16 Type III Class 2	02	Shielded
E3	-	-	4	-	-	7	5026N5611, Raychem	03	50 ohm Triax, Shielded
E4	-	3	-	-	-	-	BMS 13-60 Type 20 Class 1	01	Nickel Plated Shield, High Temperature

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WIRE TYPE CODES

Table 1 (continued)

WTC	7(7) Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
E5	-	3	-	-	-	-	BMS 13-60 Type 20 Class 2	02	Nickel Plated Shield, High Temperature
E6	-	3	-	-	-	-	BMS 13-60 Type 20 Class 3	03	Nickel Plated Shield, High Temperature
EA	2	3	-	5	-	-	BMS 13-31 Type I Class 1	01	High Temperature
EB	2	3	-	5	-	-	BMS 13-31 Type I Class 2	02	High Temperature
EC	2	3	4	5	6	-	BMS 13-31 Type I Class 3	03	High Temperature
ED	2	3	-	5	-	-	BMS 13-31 Type I Class 4	04	High Temperature
EE	2	3	4	5	6	-	BMS 13-31 Type III Class 1	01	Shielded, High Temperature
EF	2	3	-	5	-	-	BMS 13-31 Type III Class 2	02	Shielded, High Temperature
EG	2	3	-	5	-	-	BMS 13-31 Type III Class 3	03	Shielded, High Temperature
EH	2	3	-	5	-	-	BMS 13-31 Type III Class 4	04	Shielded, High Temperature
EJ	2	3	-	5	-	-	BMS 13-51 Type I Class 1	01	High Temperature
EK	2	3	-	-	-	-	BMS 13-51 Type I Class 2	02	High Temperature
EL	2	3	-	-	-	-	BMS 13-51 Type I Class 3	03	High Temperature
EM	2	3	-	-	-	-	BMS 13-51 Type I Class 4	04	High Temperature
EN	2	3	-	-	-	-	BMS 13-51 Type III Class 1	01	Shielded, High Temperature
EP	2	3	-	-	-	-	BMS 13-51 Type III Class 2	02	Shielded, High Temperature
EQ	2	3	-	-	-	-	BMS 13-51 Type III Class 3	03	Shielded, High Temperature
ER	2	3	-	-	-	-	BMS 13-51 Type III Class 4	04	Shielded, High Temperature
ES	2	3	-	-	-	-	MIL-W-16878, Sundstrand 704-0785	02	High Temperature
ET	2	3	-	-	-	-	MIL-W-16878, Sundstrand 704-0785	02	Shielded, High Temperature
EU	2	3	-	-	-	-	MIL-W-16878, Sundstrand 704-0785	01	High Temperature
EV	2	3	-	-	-	-	MIL-W-16878, Sundstrand 704-0785	01	Shielded, High Temperature
EW	2	3	-	5	-	-	BMS 13-29 Type III Class 2	02	Shielded, High Temperature

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
EX	2	3	-	5	-	-	BMS 13-31 Type IV Class 8	08	High Temperature
EY	-	-	-	5	-	-	BMS 13-29 Type I Class 2	02	High Temperature
EZ	-	3	-	5	-	-	0024A0014, Raychem	01	100 ohm Balanced Line
F#	-	3	-	-	-	-	BMS 13-60 Type 12 Class 3	03	-
F1	-	-	4	-	-	-	VSC-A1-10-17	-	Fiber Optic Cable
F2	-	-	-	5	-	-	001-BC-100/140/160PM, Northern Lights	-	Fiber Optic
F3	-	-	-	5	-	-	001-BC-HT-100/140/160PM, Northern Lights	-	Fiber Optic
F4	-	3	4	-	6	7	BACC69A-AA-()	-	Fiber Optic Cable Assembly
FA	-	-	-	-	6	-	284T1015-1	20	Flat Cable Assembly
FA	2	3	-	5	-	-	BMS 13-31 Type V Class 1	01	High Temperature
FB	-	-	-	-	6	-	284T1015-2	20	Flat Cable Assembly
FB	2	3	-	5	-	-	BMS 13-31 Type V Class 2	02	High Temperature
FC	2	3	-	5	-	-	BMS 13-31 Type V Class 3	03	High Temperature
FD	-	3	-	5	-	-	BMS 13-31 Type V Class 4	04	High Temperature
FE	2	3	-	5	-	-	BMS 13-31 Type VII Class 1	01	Shielded, High Temperature
FF	2	3	-	5	-	-	BMS 13-31 Type VII Class 2	02	Shielded, High Temperature
FG	2	3	-	5	-	-	BMS 13-31 Type VII Class 3	03	Shielded, High Temperature
FH	2	3	-	5	-	-	BMS 13-31 Type VII Class 4	04	Shielded, High Temperature
FJ	-	-	4	-	-	-	BMS 13-31 Type VII Class 1	01	Red, Shielded, High Temperature
FK	-	-	-	5	-	-	BMS 13-31 Type IV Class 2	02	High Temperature
FL	-	-	4	5	6	-	61-02651, Champlain	02	High Temperature, Round Conductor Shields, Not Adjacent
FM	-	3	-	-	-	-	BMS 13-48 Type 16 Class 1	01	-
FN	-	3	-	5	-	-	BMS 13-48 Type 12 Class 2	02	-
FP	-	3	-	-	-	-	BMS 13-48 Type 12 Class 3	03	Shielded
FR	-	3	-	5	-	-	BMS 13-48 Type 12 Class 1	01	Shielded
FS	-	3	4	5	6	7	BMS 13-72 Type 3 Class 4	4	Databus

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
FT	-	3	4	5	6	7	BMS 13-72 Type 4 Class 4	4	Databus
FV	2	3	-	5	-	-	BMS 13-31 Type V Class 1	01	Red, High Temperature
FW	-	-	-	5	-	-	BMS 13-31 Type V Class 1	01	Yellow, High Temperature
FX	2	3	-	5	-	-	BMS 13-31 Type VIII Class 8	08	High Temperature
G1	-	3	-	5	-	-	BMS 13-60 Type 15 Class 1	01	Shielded, Do Not Solder AWG 24
G2	-	3	-	5	-	-	BMS 13-60 Type 15 Class 2	02	Shielded, Do Not Solder AWG 24
G3	-	3	-	5	-	-	BMS 13-60 Type 15 Class 3	03	Shielded, Do Not Solder AWG 24
G4	-	3	-	5	-	-	BMS 13-60 Type 15 Class 4	04	Shielded, Do Not Solder AWG 24
G5	-	3	-	-	-	-	BMS 13-60 Type 44 Class 1	01	-
G6	-	3	-	-	-	-	BMS 13-60 Type 45 Class 1	01	-
G7	-	-	-	5	-	-	BMS 13-60 Type 2 Class 1	01	Yellow, Shielded
GA	-	3	-	5	-	-	BMS 13-60 Type 1 Class 1	01	-
GB	-	3	-	5	-	-	BMS 13-60 Type 1 Class 2	02	-
GC	-	3	-	5	-	-	BMS 13-60 Type 1 Class 3	03	-
GD	-	3	-	5	-	-	BMS 13-60 Type 1 Class 4	04	-
GE	-	3	-	5	-	-	BMS 13-60 Type 2 Class 1	01	Shielded
GF	-	3	-	5	-	-	BMS 13-60 Type 2 Class 2	02	Shielded
GG	-	3	-	5	-	-	BMS 13-60 Type 2 Class 3	03	Shielded
GH	-	-	-	5	-	-	BMS 13-60 Type 2 Class 4	04	Shielded
GJ	-	3	-	5	-	-	BMS 13-60 Type 3 Class 6	06	-
GJ	-	3	-	5	-	-	BMS 13-60 Type 3 Class 6	6	-
GK	-	3	-	5	-	-	BMS 13-60 Type 4 Class 1	01	High Temperature, Do Not Solder AWG 24
GL	-	3	-	5	-	-	BMS 13-60 Type 4 Class 2	02	Do Not Solder AWG 24
GM	-	3	-	5	-	-	BMS 13-60 Type 4 Class 3	03	Do Not Solder AWG 24
GN	-	3	-	5	-	-	BMS 13-60 Type 4 Class 4	04	Do Not Solder AWG 24
GP	-	-	-	5	-	7	BMS 13-60 Type 5 Class 1	01	Shielded, Do Not Solder AWG 24
GQ	-	3	-	5	-	7	BMS 13-60 Type 5 Class 2	02	Shielded, Do Not Solder AWG 24

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
GR	-	3	-	5	-	7	BMS 13-60 Type 5 Class 3	03	Shielded, Do Not Solder AWG 24
GS	-	-	-	5	-	7	BMS 13-60 Type 5 Class 4	04	Shielded, Do Not Solder AWG 24
GT	-	3	-	5	-	-	BMS 13-60 Type 13 Class 1	01	Shielded
GU	-	3	-	5	-	-	BMS 13-60 Type 13 Class 2	02	Shielded
GV	-	3	-	5	-	-	BMS 13-60 Type 13 Class 3	03	Shielded
GW	-	3	-	5	-	-	BMS 13-60 Type 13 Class 4	04	Shielded
GY	-	3	-	5	-	-	BMS 13-60 Type 13 Class 1	01	White/Black
H0	-	3	-	-	-	-	BMS 13-60 Type 2 Class 1	01	Red, Shielded
H1	-	-	-	5	-	-	BMS 13-60 Type 13 Class 1	01	Blue, Shielded
H2	-	-	-	5	-	-	BMS 13-60 Type 13 Class 2	02	Blue, Shielded
H3	-	-	-	5	-	-	BMS 13-60 Type 13 Class 3	03	Blue, Shielded
H4	-	-	-	5	-	-	BMS 13-60 Type 13 Class 4	04	Blue, Shielded
H5	-	-	-	5	-	-	BMS 13-60 Type 13 Class 2	02	Yellow, Shielded
H6	-	-	-	5	-	-	BMS 13-60 Type 15 Class 1	01	Blue, Shielded, Do Not Solder AWG 24
H7	-	-	-	5	-	-	BMS 13-60 Type 15 Class 2	02	Blue, Shielded, Do Not Solder AWG 24
H8	-	3	-	-	-	-	BMS 13-60 Type 13 Class 1	01	Red, Shielded
H9	-	3	4	-	-	7	BMS 13-60 Type 11 Class 1	01	White/Red, Nickel Plated Shield, High Temperature
HA	-	3	4	5	6	7	BMS 13-60 Type 7 Class 1	01	High Temperature, Do Not Solder AWG 24
HB	-	3	4	5	6	-	BMS 13-60 Type 7 Class 2	02	High Temperature, Do Not Solder AWG 24
HC	-	3	4	5	6	-	BMS 13-60 Type 7 Class 3	03	High Temperature, Do Not Solder AWG 24
HD	-	3	4	5	-	-	BMS 13-60 Type 7 Class 4	04	High Temperature, Do Not Solder AWG 24
HE	-	3	4	5	6	7	BMS 13-60 Type 8 Class 1	01	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24
HF	-	3	4	5	6	7	BMS 13-60 Type 8 Class 2	02	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
HG	-	3	4	5	-	-	BMS 13-60 Type 8 Class 3	03	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24
HH	-	3	4	-	6	-	BMS 13-60 Type 9 Class 3	03	High Temperature, Do Not Solder AWG 24
HJ	-	3	-	-	-	-	BMS 13-60 Type 9 Class 8	08	High Temperature, Do Not Solder AWG 24
HK	-	3	-	5	-	-	BMS 13-60 Type 8 Class 4	04	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24
HL	-	3	4	5	6	7	BMS 13-60 Type 10 Class 1	01	High Temperature, Do Not Solder AWG 24
HM	-	3	4	5	6	7	BMS 13-60 Type 10 Class 2	02	High Temperature, Do Not Solder AWG 24
HN	-	3	4	5	6	7	BMS 13-60 Type 10 Class 3	03	High Temperature, Do Not Solder AWG 24
HP	-	3	4	5	6	7	BMS 13-60 Type 11 Class 1	01	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24
HQ	-	3	4	5	6	7	BMS 13-60 Type 11 Class 2	02	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24
HR	-	3	4	5	6	7	BMS 13-60 Type 11 Class 3	03	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24
HS	-	3	4	5	6	7	BMS 13-60 Type 11 Class 4	04	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24
HT	-	-	4	5	6	7	BMS 13-60 Type 10 Class 4	04	High Temperature, Do Not Solder AWG 24
HU	-	3	-	-	-	-	BMS 13-60 Type 12 Class 8	08	High Temperature, Do Not Solder AWG 24
HV	-	-	-	5	-	-	BMS 13-60 Type 24 Class 7	07	Shielded
HW	-	3	-	-	-	-	BMS 13-60 Type 25 Class 1	01	High Temperature, Adjacent Round Conductor Shields
HX	-	3	-	5	-	-	BMS 13-60 Type 25 Class 2	02	High Temperature, Adjacent Round Conductor Shields
HY	-	3	-	-	-	-	BMS 13-60 Type 25 Class 3	03	High Temperature, Adjacent Round Conductor Shields

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
HZ	-	3	-	-	-	-	BMS 13-60 Type 25 Class 4	04	Two Shields, High Temperature
JA	-	-	4	-	-	-	RG-400, MIL-C-17	01	Coax
JB	-	3	4	5	6	7	RG-393, MIL-C-17	01	Coax
JJ	-	3	-	-	-	-	D3-7619-5/935, M81044/12-22	5	Shielded
JT	-	-	4	-	6	-	RG-179B, MIL-C-17	01	Coax
JU	-	3	-	-	-	-	RG-178B, MIL-C-17D	01	Coax
JZ	-	-	4	-	6	-	204-15578-1	01	Coax
K1	2	3	-	5	-	-	4/0591/31886PT-1	01	High Temperature, AWG 4/0
KB	-	3	-	-	-	-	M25038/1-12-2, MIL-W-25038	01	Red, Fire Resistant
KH	-	3	-	-	-	-	M5846-1E2/(), MIL-W-5486	02	Shielded, Thermocouple
LE	-	-	4	-	-	-	M27500-()ML1T08, MIL-W-81044/12, MIL-C-27500	01	-
LH	-	-	4	-	-	-	M27500-()ML2T08, MIL-W-81044/12, MIL-C-27500	02	-
LL	-	-	4	-	-	-	M27500-()ML3T08, MIL-W-81044/12, MIL-C-27500	03	-
M1	-	3	-	5	6	-	BMS 13-60 Type 27 Class 1	01	High Temperature, Round Conductor Shields, Not Adjacent
M2	-	3	-	-	-	-	BMS 13-60 Type 27 Class 2	02	High Temperature, Round Conductor Shields, Not Adjacent
M3	-	3	-	-	-	-	BMS 13-60 Type 27 Class 3	03	High Temperature, Round Conductor Shields, Not Adjacent
M4	-	3	-	-	-	-	BMS 13-60 Type 26 Class 1	01	Two Flat Conductor Shields
M5	-	3	-	5	-	-	BMS 13-60 Type 26 Class 2	02	Flat Conductor Shields, Not Adjacent
M6	-	3	-	-	-	-	BMS 13-60 Type 26 Class 3	03	Flat Conductor Shields, Not Adjacent
MA	2	3	-	-	-	-	PMA-11, Lewis	11	Al-Ch, Thermocouple
MB	2	3	-	5	-	-	10-60816-31	01	High Temperature
MC	-	3	-	-	-	-	10-60816-32	01	High Temperature
MD	-	3	-	-	-	-	10-60816-30	01	Shielded

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
ME	-	3	-	-	-	-	10-60816-33	01	Shielded, High Temperature
MF	-	3	-	-	-	-	10-60816-34	01	High Temperature
MG	-	3	-	-	-	-	10-60816-38	02	-
MH	-	3	-	-	-	-	10-60816-39	08	-
MJ	-	3	-	-	-	-	10-60816-40	07	-
MK	-	3	-	-	-	-	10-60816-43	02	Shielded
ML	-	3	-	-	-	-	10-60816-45	03	-
MM	-	3	-	-	-	-	10-60816-46	26	Shielded
MN	-	3	-	-	-	-	10-60816-47	05	-
MP	-	3	-	-	-	-	10-60816-49	03	-
MQ	-	3	-	-	-	-	10-60816-50	03	-
MR	-	3	-	-	-	-	10-60816-52	06	-
MS	-	3	-	-	-	-	10-60816-53	26	-
MT	-	3	-	-	-	-	10-60816-55	03	-
MU	-	3	-	-	-	-	10-60233-9	03	-
MV	-	3	-	-	-	-	10-60233-10	03	-
MW	-	3	-	-	-	-	10-60816-36	02	-
MX	2	3	-	-	-	-	10-60816-56	01	High Temperature
MZ	-	3	-	-	-	-	10-60816-58	03	-
N0	-	3	-	-	-	-	BMS 13-60 Type 33 Class 2	02	Yellow, Flat Conductor Shield
N1	-	3	-	5	-	-	BMS 13-60 Type 33 Class 1	01	Flat Conductor Shield
N2	-	3	-	5	-	-	BMS 13-60 Type 33 Class 2	02	Flat Conductor Shield
N3	-	3	-	5	-	-	BMS 13-60 Type 33 Class 3	03	Flat Conductor Shield
N4	-	3	-	5	-	-	BMS 13-60 Type 33 Class 4	04	Flat Conductor Shield
N5	-	3	-	5	-	-	BMS 13-60 Type 34 Class 1	01	Flat Conductor Shield
N6	-	3	-	5	-	-	BMS 13-60 Type 34 Class 2	02	Flat Conductor Shield
N7	-	3	-	5	-	-	BMS 13-60 Type 34 Class 3	03	Flat Conductor Shield
N8	-	3	-	5	-	-	BMS 13-60 Type 34 Class 4	04	Flat Conductor Shield
N9	-	3	-	-	-	-	BMS 13-60 Type 33 Class 1	01	White/Red, Flat Conductor Shield
NJ	-	3	-	-	-	-	RG-316, MIL-C-17	1	Coax

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
P0	-	-	-	-	-	7	BMS 13-48 Type 26 Class 2	02	Yellow, Shielded
P1	-	-	-	-	-	7	BMS 13-48 Type 26 Class 3	03	Yellow, Shielded
P2	-	-	-	-	-	7	BMS 13-48 Type 25 Class 2	02	Yellow, Shielded
P3	-	-	-	-	-	7	BMS 13-48 Type 25 Class 3	03	Yellow, Shielded
P4	-	-	4	-	6	-	BMS 13-48 Type 3 Class 2	02	Yellow, Shielded
P5	-	-	4	-	6	-	BMS 13-48 Type 3 Class 1	01	Yellow, Shielded
P6	-	-	4	-	6	-	BMS 13-48 Type 6 Class 5	05	Shielded
P7	-	-	-	-	6	-	S280T004-1	38	Audio Selector Cable
PA	-	3	4	-	6	7	BMS 13-48 Type 10 Class 1	01	-
PB	-	3	4	-	6	7	BMS 13-48 Type 10 Class 2	02	-
PC	-	3	4	5	6	7	BMS 13-48 Type 10 Class 3	03	-
PD	-	3	4	-	6	7	BMS 13-48 Type 10 Class 4	04	-
PE	-	-	4	-	6	-	BMS 13-48 Type 10 Class 5	05	-
PF	-	-	4	-	6	-	BMS 13-48 Type 10 Class 6	06	-
PG	-	-	4	-	6	-	BMS 13-48 Type 10 Class 7	07	-
PH	-	3	4	-	6	7	BMS 13-48 Type 10 Class 1	01	White/Red
PJ	-	-	4	-	6	7	BMS 13-48 Type 10 Class 1	01	Yellow
PK	-	3	4	-	6	7	BMS 13-48 Type 11 Class 1	01	-
PL	-	3	4	-	6	7	BMS 13-48 Type 11 Class 2	02	-
PM	-	3	4	-	6	7	BMS 13-48 Type 11 Class 3	03	-
PN	-	3	4	-	6	7	BMS 13-48 Type 11 Class 4	04	-
PP	-	-	4	-	6	7	BMS 13-48 Type 11 Class 1	01	White/Red
PQ	-	-	4	-	6	7	BMS 13-48 Type 3 Class 1	01	Shielded
PR	-	-	4	-	6	-	BMS 13-48 Type 3 Class 2	02	Shielded
PS	-	-	4	5	6	7	BMS 13-48 Type 3 Class 3	03	Shielded
PT	-	-	4	-	6	-	BMS 13-48 Type 3 Class 4	04	Shielded
PU	-	-	4	-	6	-	BMS 13-48 Type 3 Class 1	01	White/Red, Shielded
PV	-	-	4	-	6	-	BMS 13-48 Type 6 Class 1	01	Shielded
PW	-	-	4	-	6	-	BMS 13-48 Type 6 Class 2	02	Shielded
PX	-	-	4	-	6	-	BMS 13-48 Type 6 Class 3	03	Shielded
PY	-	-	4	-	6	-	BMS 13-48 Type 6 Class 4	04	Shielded
PZ	-	-	4	-	6	-	BMS 13-48 Type 6 Class 2	02	Red, Shielded

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
Q0	-	-	4	-	6	7	Airline Specified Wire	10	Refer to WDM Introduction and WDM 91-00-06
Q1	-	-	4	-	6	7	Airline Specified Wire	01	Refer to WDM Introduction and WDM 91-00-06
Q2	-	-	4	-	6	7	Airline Specified Wire	02	Refer to WDM Introduction and WDM 91-00-06
Q3	-	-	4	-	6	7	Airline Specified Wire	03	Refer to WDM Introduction and WDM 91-00-06
Q4	-	-	4	-	6	7	Airline Specified Wire	04	Refer to WDM Introduction and WDM 91-00-06
Q5	-	-	4	-	6	7	Airline Specified Wire	05	Refer to WDM Introduction and WDM 91-00-06
Q6	-	-	4	-	6	7	Airline Specified Wire	06	Refer to WDM Introduction and WDM 91-00-06
Q7	-	-	4	-	6	7	Airline Specified Wire	07	Refer to WDM Introduction and WDM 91-00-06
Q8	-	-	4	-	6	7	Airline Specified Wire	08	Refer to WDM Introduction and WDM 91-00-06
Q9	-	-	4	-	6	7	Airline Specified Wire	09	Refer to WDM Introduction and WDM 91-00-06
QA	-	3	-	5	-	-	BMS 13-60 Type 1 Class 1	01	White/Red
QB	-	3	-	5	-	-	BMS 13-60 Type 1 Class 1	01	Yellow
QC	-	3	-	-	-	-	BMS 13-60 Type 1 Class 1	01	White/Black
QD	-	3	-	-	-	-	BMS 13-60 Type 1 Class 1	01	White/Orange
QE	-	3	-	-	-	-	BMS 13-60 Type 1 Class 1	01	White/Violet
QF	-	3	-	-	-	-	BMS 13-60 Type 1 Class 1	01	White/Green
QG	-	-	-	5	-	-	BMS 13-60 Type 19 Class 1	01	High Temperature
QH	-	-	-	-	-	7	1/0TLA/02101E-6, Tensolite	6	Aluminum
QJ	-	-	-	5	-	-	BMS 13-60 Type 2 Class 2	02	Blue, Shielded
QK	-	-	-	5	-	-	BMS 13-60 Type 2 Class 3	03	Blue, Shielded

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
QL	-	-	-	5	-	-	BMS 13-60 Type 2 Class 4	04	Blue, Shielded
QN	-	-	-	5	-	-	BMS 13-60 Type 4 Class 1	01	Blue, Do Not Solder AWG 24
QS	-	-	-	5	-	-	BMS 13-60 Type 5 Class 1	01	Blue, Shielded, Do Not Solder AWG 24
QT	-	3	-	5	-	-	BMS 13-60 Type 5 Class 1	01	White/Red, Shielded, Do Not Solder AWG 24
QU	-	-	-	5	-	-	BMS 13-60 Type 5 Class 2	02	Blue, Shielded, Do Not Solder AWG 24
QV	-	-	-	5	-	-	BMS 13-60 Type 5 Class 3	03	Blue, Shielded, Do Not Solder AWG 24
QW	-	-	-	5	-	-	BMS 13-60 Type 5 Class 3	03	White/Red, Shielded, Do Not Solder AWG 24
QX	-	-	-	5	-	-	BMS 13-60 Type 5 Class 4	04	Blue, Shielded, Do Not Solder AWG 24
QY	-	3	4	5	6	7	BMS 13-60 Type 22 Class 1	01	Aluminum
QZ	-	3	4	5	6	7	BMS 13-60 Type 10 Class 1	01	White/Red, High Temperature, Do Not Solder AWG 24
R0	-	-	-	-	-	7	BMS 13-48 Type 25 Class 1	01	Shielded
R1	-	-	-	-	-	7	BMS 13-48 Type 25 Class 2	02	Shielded
R2	-	-	-	-	-	7	BMS 13-48 Type 25 Class 3	03	Shielded
R3	-	-	4	-	-	7	BMS 13-48 Type 25 Class 4	04	Shielded
R4	-	-	-	-	-	7	BMS 13-48 Type 26 Class 1	01	Shielded
R5	-	-	-	-	-	7	BMS 13-48 Type 26 Class 2	02	Shielded
R6	-	-	-	-	-	7	BMS 13-48 Type 26 Class 3	03	Shielded
R7	-	-	-	-	-	7	BMS 13-48 Type 26 Class 4	04	Shielded
R8	-	3	-	-	-	7	BMS 13-48 Type 26 Class 5	05	Shielded
R9	-	-	-	-	-	7	BMS 13-48 Type 25 Class 1	01	Yellow, Shielded
RA	-	-	4	-	-	-	BMS 13-46 Type 3 Class 1	01	Red, Wire Wrap
RB	-	-	-	-	-	7	BMS 13-48 Type 25 Class 4	04	Yellow, Shielded
RC	-	-	-	-	-	7	BMS 13-48 Type 22 Class 3	03	-
RD	-	-	4	-	-	-	BMS 13-46 Type 3 Class 1	01	Wire Wrap
RE	-	-	4	-	-	-	BMS 13-46 Type 3 Class 2	02	Wire Wrap
RF	-	-	4	-	-	-	BMS 13-46 Type 3 Class 3	03	Wire Wrap

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
RG	-	-	4	-	-	-	BMS 13-46 Type 3 Class 4	04	Wire Wrap
RH	-	-	-	-	-	7	BMS 13-48 Type 25 Class 1	01	White/Red, Shielded
RJ	-	3	4	5	6	7	65B47866-2	02	Red, Nickel Plated Shield, High Temperature, Low Noise Cable
RK	-	3	-	-	-	-	FBTLS-260-1NJ-()NA, Tensolite	01	Shielded, High Temperature, BMS 13-60 Type 11 With Bondable Jacket
RL	-	3	-	-	-	-	FBTLS-260-2NJ-()NA, Tensolite	02	Shielded, High Temperature, BMS 13-60 Type 11 With Bondable Jacket
RM	-	3	-	-	-	-	FBTLS-260-3NJ-()NA, Tensolite	03	Shielded, High Temperature, BMS 13-60 Type 11 With Bondable Jacket
RN	-	3	-	-	-	-	FBTLS-260-()NA, Tensolite	01	High Temperature, BMS 13-60 Type 10 With Bondable Jacket
RQ	-	3	4	5	6	-	65B47866-5, Thermax	02	Low Noise, Red, High Temperature, Nickel Plated Round Conductor Shields, Not Adjacent
RS	-	-	4	-	-	-	BMS 13-46 Type 4 Class 1	01	Shielded, Wire Wrap
RT	-	-	4	-	-	-	BMS 13-46 Type 4 Class 2	02	Shielded, Wire Wrap
RW	-	-	4	-	-	-	BMS 13-46 Type 4 Class 3	03	Shielded, Wire Wrap
RX	-	-	4	-	-	-	BMS 13-46 Type 4 Class 4	04	Shielded, Wire Wrap
RZ	-	-	4	-	-	-	1008-2SJ, Thermax	02	100 ohm, Shielded, Wire Wrap
S1	2	3	-	5	-	-	BMS 13-52 Type V	-	Polyester Expando Sleeve
S2	2	3	-	5	-	-	RT-876, Raychem	-	Thermofit Sleeve; for alternatives, refer to Subject 20-00-11
S3	2	3	-	5	-	-	BMS 13-52 Type IV	-	Teflon Expando Sleeve
S4	2	3	-	5	-	-	MIL-I-23053/12	-	Heat Shrinkable Teflon Sleeve; for alternatives, refer to Subject 20-00-11

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
S5	2	3	-	5	-	-	Varglas Type HO, Varflex	-	Fiberglass Sleeve, Green
S6	-	-	-	5	-	-	Varglas Type HP, Varflex	-	Fiberglass Sleeve, Tan
S7	-	-	-	5	-	-	204-44, Bentley-Harris	-	Viton Sleeve
S8	-	3	-	5	-	-	TFE 2X Perforated, Chemplast	-	Perforated Teflon Sleeve
SA	-	-	4	-	6	7	CFT-16-0-00	-	Sleeve, Convoluted Teflon
SB	-	-	4	-	-	7	Penntube I, Pennsylvania Fluorocarbon	-	Teflon Sleeve
SC	-	-	4	-	6	7	ECC-VFP-876, Electronized Chemicals	-	Heat Shrinkable Polyolefin Sleeve
SE	-	-	4	-	6	7	Ben-Har Expando Grade PT, Bentley-Harris	-	Polyester Expando Sleeve
SF	-	3	4	5	6	7	BMS 13-52 Type IV	-	Teflon Expando Sleeve
SG	-	-	4	-	6	7	Gencote #125C, General Plastics	-	Fiberglass Sleeve
SJ	-	3	4	5	6	7	TFE 2X, Chemplast	-	Sleeve, Standard
SK	-	-	4	-	6	7	Ben-Har 1151 FRB, Bentley-Harris	-	Fiberglass Sleeve
SL	-	-	4	-	6	7	Varglas Type HO or HP, Varflex	-	Fiberglass Sleeve, Green Or Tan
SM	-	-	-	-	-	7	TFE #3, Zeus Industrial Products	-	Perforated Teflon Sleeve, Thinwall
SP	-	3	4	5	6	7	TFE 4X, Chemplast	-	Heat Shrinkable Teflon Sleeve, Standard
SQ	-	-	4	-	6	7	TFE 2XTW, Chemplast	-	Heat Shrinkable Teflon Sleeve, Thinwall
SR	-	-	-	-	-	7	120-S001-20, Glenair	-	5/8 Convolex Tube
SX	-	-	4	-	6	7	Varglas Type HO or HP, Varflex	-	Fiberglass Sleeve, Silver Or Gray
SY	-	-	4	-	6	7	Varglas, Varflex	-	Fiberglass Sleeve, Full Length
SZ	-	-	4	-	6	7	TFE 2X, Chemplast	-	Heat Shrinkable Teflon Sleeve
T0	-	-	-	-	-	7	EPD 52236A, Raychem	06	Power Seat Cable
T1	-	-	-	-	-	7	C42016260902, Judd	01	Shielded, 77 pf/ft
T2	-	-	-	-	-	7	C42016310902, Judd	01	Shielded, 91 pf/ft
T3	-	3	4	5	6	7	24473/9C175X-2(LD), Tensolite	02	Shielded, 120 ohm
T4	-	-	-	-	-	7	BMS 13-35 Type I Class 3	03	Aluminum

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
T5	-	-	-	-	-	7	S280W501-11	13	Nickel Plated Shield, Fly-By-Wire, Flaperon
T6	-	-	-	-	-	7	S280W501-12	19	Nickel Plated Shield, Fly-By-Wire, Elevator
T7	-	-	-	-	-	7	S280W501-13	13	Nickel Plated Shield, Fly-By-Wire, Aileron
T8	-	-	-	-	-	7	S280W501-14	07	Nickel Plated Shield, Fly-By-Wire, Spoiler
T9	-	-	-	-	-	7	S280W501-15	17	Nickel Plated Shield, Fly-By-Wire, Rudder
TA	-	-	-	5	6	7	CTC-0062-()-9/5-9, Raychem	02	Shielded, Al-Ch
TB	-	-	-	-	-	7	1/0766/9D032E-6, Tensolite	06	Special BMS 13-35
TC	-	-	-	-	6	-	852-4206876, Specialty Cable	02	Cn-Ch, Shielded, Thermocouple
TD	-	-	4	-	6	-	852-4206975, Specialty Cable	02	Cn-Ch, Shielded, Thermocouple
TE	-	-	4	5	6	-	852-4985321, Specialty Cable	02	Al-Ch, Shielded, High Temperature, Thermocouple
TF	-	-	-	-	6	7	55A6203-(), Raychem	02	Cn-Ch, Shielded, Thermocouple
TG	-	-	-	-	-	7	621-1292, Thermax	03	BMS13-58T1C3G8, High Temperature
TH	-	-	4	-	6	7	RG-108A, MIL-C-17	01	Twinax
TJ	-	3	-	5	-	-	BMS 13-55 Type 5 Class 1	01	Fire Resistant
TK	-	-	-	5	-	-	10-60816-61	01	Shielded, High Temperature, Fuel Quantity
TL	-	-	-	-	6	-	767-2217, Thermax	17	Pink, 2 Shields, Fuel Quantity
TM	-	-	-	-	6	-	767-227, Thermax	07	Pink, 2 Shields, Fuel Quantity
TN	-	-	-	-	6	-	767-226, Thermax	06	Pink, 2 Shields, Fuel Quantity
TP	-	-	-	-	6	-	767-222, Thermax	02	Pink, 3 Shields, Fuel Quantity
TQ	-	-	4	-	6	-	767-221, Thermax	17	Pink, 2 Shields, Fuel Quantity

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
TR	-	-	-	-	6	-	767-207, Thermax	07	Pink, 2 Shields, Fuel Quantity
TS	-	-	-	-	6	-	767-208, Thermax	7	FQIS Cable
TT	-	-	-	-	6	-	767-202, Thermax	02	Pink, 3 Shields, Fuel Quantity
TU	-	3	4	-	-	-	747-201, Thermax	02	Pink, 1 Shield, Fuel Quantity
TV	-	3	4	-	-	-	747-203, Thermax	07	Pink, 4 Shields, Fuel Quantity
TX	-	-	4	-	6	-	RG-178B, MIL-C-17	01	Coax
U4	-	3	4	-	6	7	BMS 13-48 Type 12 Class 4	04	Shielded
UA	2	3	-	-	-	-	BMS 13-42B Type VIII Class 1	01	-
UA	-	-	4	-	6	7	BMS 13-48 Type 8 Class 1	01	-
UB	2	3	-	-	-	-	BMS 13-42B Type VIII Class 2	02	-
UB	-	-	4	-	6	7	BMS 13-48 Type 8 Class 2	02	-
UC	2	-	-	-	-	-	BMS 13-42B Type VIII Class 3	03	-
UC	-	3	-	-	-	-	BMS 13-42B Type VIII Class 3	03	Not applicable after Line Number 1440
UC	-	3	-	-	-	-	BMS 13-48 Type 8 Class 3	03	Not applicable before Line Number 1441
UC	-	-	4	-	6	7	BMS 13-48 Type 8 Class 3	03	-
UD	2	3	-	-	-	-	BMS 13-42C Type VIII Class 1	01	-
UD	-	-	4	-	6	7	BMS 13-48 Type 8 Class 4	04	-
UE	2	3	-	-	-	-	BMS 13-42C Type VIII Class 2	02	-
UE	-	-	4	-	-	-	BMS 13-48 Type 8 Class 6	06	-
UF	2	3	-	-	-	-	BMS 13-42C Type VIII Class 3	03	-
UF	-	-	4	-	-	-	BMS 13-48 Type 1 Class 1	01	-
UG	2	3	-	-	-	-	BMS 13-42C Type VIII Class 4	04	-
UG	-	-	4	-	-	-	BMS 13-48 Type 1 Class 2	02	-
UH	-	-	4	-	-	-	BMS 13-48 Type 1 Class 3	03	-
UI	-	-	4	-	-	-	BMS 13-48 Type 13 Class 2	02	White/Red, Shielded
UJ	-	-	4	-	-	-	10-60875-1	02	Shielded, Fuel Quantity
UJ	2	3	-	-	-	-	BMS 13-13 Type I Class 1	01	-
UK	-	-	4	-	6	-	10-60875-2	03	Shielded, Fuel Quantity

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
UK	2	3	-	-	-	-	BMS 13-13 Type I Class 2	02	-
UL	-	-	4	-	-	-	10-60875-3	01	Fuel Quantity
UL	-	3	-	-	-	-	BMS 13-13 Type I Class 3	03	-
UM	2	3	-	5	-	-	BMS 13-13 Type I Class 4	04	-
UM	-	-	4	-	-	-	BMS 13-29 Type I Class 1	01	High Voltage
UN	2	3	-	5	-	-	BMS 13-48 Type 8 Class 1	01	-
UN	-	-	4	-	-	-	BMS 13-48 Type 8 Class 7	07	-
UP	-	-	4	-	-	-	10-60875-5	03	Shielded, Fuel Quantity
UP	2	3	-	-	-	-	BMS 13-11 Type V Class 1	01	Shielded
UQ	2	3	-	-	-	-	BMS 13-11 Type V Class 2	02	Shielded
UR	2	3	-	-	-	-	BMS 13-11 Type V Class 3	03	Shielded
US	2	3	-	-	-	-	BMS 13-11 Type V Class 4	04	Shielded
US	-	-	4	-	-	-	BMS 13-48 Type 8 Class 1	01	-
UT	2	3	-	5	-	-	10-60816-4	02	-
UT	-	-	4	-	-	-	10-60875-9	03	Shielded, Fuel Quantity
UU	2	3	-	-	-	-	10-60816-7	08	-
UV	2	3	-	-	-	-	10-60816-8	07	-
UW	2	3	-	5	-	-	10-60816-11	02	Shielded
UW	-	-	4	-	-	-	BMS 13-48 Type 8 Class 5	05	-
UX	2	3	-	-	-	-	10-60816-26	06	-
UY	-	3	4	5	6	7	55A8081-18-9, Raychem	02	Al-Ch, Thermocouple
UZ	-	3	4	5	6	-	852-4991980, Specialty Cable	02	Al-Ch, Thermocouple
V1	2	3	-	-	-	-	853-4310074, Specialty Cable	02	Cu-Cn, Thermocouple
V2	-	3	4	5	6	7	975-295, Thermax	09	Shielded
V3	-	3	-	-	-	-	24-00034, Champlain	01	High Temperature
V4	-	3	-	5	-	-	24-00115, Champlain	01	Red, High Temperature
V5	-	-	-	5	-	-	BMS 13-55 Type 4 Class 2	02	Shielded, Fire Resistant
V6	-	3	-	-	-	-	P606671, Axon	01	High Temperature
V7	2	3	-	5	-	-	BMS 13-48 Type 12 Class 2	02	Yellow, Shielded
V9	-	3	-	5	-	-	10-61299-8	06	Shielded
VA	-	-	4	-	6	-	BMS 13-48 Type 9 Class 1	01	-

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
VA	-	-	-	5	-	-	S280T004-1	38	Shielded, Audio Selector Cable
VB	-	-	4	-	6	-	BMS 13-48 Type 9 Class 2	02	-
VB	-	-	-	5	-	-	S280T006-2	07	Shielded, Spoiler Cable
VC	-	3	-	5	-	-	65B47866-2	02	Red, Shielded, High Temperature, Low Noise Cable
VC	-	-	4	-	6	-	BMS 13-48 Type 9 Class 3	03	-
VD	-	3	-	5	-	-	24-00034, Champlain	01	Red, High Temperature
VD	-	-	4	-	6	-	BMS 13-48 Type 9 Class 4	04	-
VE	-	3	-	5	-	-	S280T007-1	06	Retractable Cable
VE	-	-	-	-	6	7	Supplier Equipment Shield Ground Wire	06	-
VF	2	-	-	-	-	-	BMS 13-42B Type XII Class 1	01	Shielded
VF	-	3	-	-	-	-	BMS 13-42B Type XII Class 1	01	Shielded; not applicable after Line Number 1440
VF	-	3	-	-	-	-	BMS 13-48 Type 12 Class 1	01	Shielded; not applicable before Line Number 1441
VF	-	-	4	-	6	7	BMS 13-48 Type 12 Class 1	01	Shielded
VG	2	-	-	-	-	-	BMS 13-42B Type XII Class 2	02	Shielded
VG	-	3	-	-	-	-	BMS 13-42B Type XII Class 2	02	Shielded; not applicable after Line Number 1440
VG	-	3	-	-	-	-	BMS 13-48 Type 12 Class 2	02	Shielded; not applicable before Line Number 1441
VG	-	-	4	-	6	7	BMS 13-48 Type 12 Class 2	02	Shielded
VH	2	-	-	-	-	-	BMS 13-42C Type XII Class 1	01	Shielded
VH	-	3	-	-	-	-	BMS 13-42C Type XII Class 1	01	Shielded; not applicable after 737 Classic Line Number 1440
VH	-	3	-	-	-	-	BMS 13-48 Type 12 Class 3	03	Shielded; not applicable before 737 Classic Line Number 1441
VH	-	-	4	-	6	7	BMS 13-48 Type 12 Class 3	03	Shielded
VI	-	-	4	-	6	-	BMS 13-48 Type 12 Class 4	04	Shielded
VJ	-	-	4	-	-	-	44A1811-12-9-9, Raychem	02	-

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
VJ	2	3	-	-	-	-	BMS 13-42C Type XII Class 2	02	Shielded
VJ	-	-	-	-	6	-	BMS 13-48 Type 9 Class 1	01	White/Red, Shielded
VK	-	-	4	-	-	-	44A7418, Raychem	06	PSU
VK	2	3	-	-	-	-	BMS 13-42C Type XII Class 3	03	Shielded
VK	-	-	-	-	6	-	BMS 13-48 Type 9 Class 1	01	Black
VL	-	-	4	-	-	-	44A7428, Raychem	05	PSU
VL	2	3	-	-	-	-	BMS 13-42C Type XII Class 4	04	Shielded
VM	-	-	4	-	-	-	44A7429, Raychem	07	PSU
VM	2	3	-	5	-	-	51-04569, Champlain	02	Shielded, High Temperature
VN	-	3	-	5	-	-	51-04570, Champlain	02	Shielded
VN	-	-	4	-	-	-	M27500-20RC2N06, MIL-W-22759/11-20, MIL-C-27500	02	Shielded, High Temperature
VP	-	-	4	-	6	7	55A8081-18, Raychem	02	Al-Ch, Thermocouple
VP	-	3	-	-	-	-	60B40033-8	19	-
VQ	-	3	-	-	-	-	63831, Filotex	01	Shielded, High Temperature
VQ	-	-	4	-	-	-	NEC 28W, National Electric	02	Shielded
VR	-	-	4	-	-	-	NEC 21044BC, National Electric	06	-
VR	-	3	-	-	-	-	Type 2100-1(-), Filotex	01	High Temperature
VS	2	3	-	5	-	-	BMS 13-55 Type 1 Class 1	01	Ni-Cu, High Temperature
VS	-	-	4	-	-	-	NEC 28616BC, National Electric	08	Coax
VT	2	3	-	5	-	-	BMS 13-55 Type 2 Class 1	01	HSCA, High Temperature
VT	-	-	4	-	-	-	NEC 210712BC, National Electric	09	Coax
VU	-	3	-	5	-	-	853-4218376, Specialty Cable	02	Al-Ch, Thermocouple
VU	-	-	4	-	-	-	NEC 1616MF, National Electric	16	-
VV	2	3	-	-	-	-	30-04373, Champlain	02	Cu-Cn, Thermocouple
VV	-	-	4	-	-	-	NEC 2416MF, National Electric	24	-
VW	-	3	-	5	-	-	24-00033, Champlain	01	Red, High Temperature
VW	-	-	4	-	-	-	NEC 3616MF, National Electric	36	-
VX	-	3	-	5	-	-	784-2ZXE, Thermax	02	Shielded, Low Noise
VX	-	-	4	-	-	-	NEC 282616BC, National Electric	28	-

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
VY	-	-	4	-	-	-	55A0821-10-92/96, Raychem	02	-
VY	2	3	-	5	-	-	63546, Filotex	02	Shielded, High Temperature
VZ	-	-	4	-	-	-	55A6210-18, Raychem	03	-
VZ	2	3	-	5	-	-	BMS 13-55 Type 4 Class 3	03	Shielded, High Temperature
W0	-	-	-	-	-	7	S280T007-2	06	Retractable Cable
W2	-	3	-	-	-	-	BMS 13-58 Type I Class 1	01	High Temperature
W3	2	3	-	5	-	-	BMS 13-58 Type I Class 1	01	High Temperature
W4	-	-	4	5	6	-	10-60875-4	01	Shielded
W5	-	3	-	5	-	-	26353/90074ZX-2, Tensolite	02	Shielded
W6	-	3	-	5	-	-	12621, Teledyne	02	Blue, Shielded
W7	-	3	-	-	-	-	P606672, Axon	01	High Temperature
W8	-	-	-	5	-	-	DM-F-2MFG, Matsushita Cable	05	Shielded
W9	-	3	-	5	-	-	10-60816-62	02	Shielded
WA	2	3	-	5	-	-	72016, Thermax	02	Low Noise Cable, High Temperature, Round Conductor Shields, Not Adjacent
WA	-	-	4	-	-	-	FSJ4-50, Andrew	01	Heliac
WB	-	-	-	5	-	-	72017, Thermax	02	Shielded, High Temperature, Low Noise Cable
WB	-	-	4	-	-	-	RG-195A, MIL-C-17	01	Coax
WC	-	-	-	5	-	-	10-60816-61	01	Shielded, Fuel Quantity
WC	-	3	4	-	6	7	10599, Raychem	02	Shielded, Data Bus, 70 ohm
WD	2	-	-	-	-	-	BMS 13-48 Type 8 Class 1	01	Yellow
WD	-	-	4	-	-	-	SF-226, Times Wire Company	01	Coax, FEP 226
WE	-	-	4	-	6	7	65B47866-2	02	Red, Shielded, High Temperature, Low Noise
WE	2	-	-	-	-	-	BMS 13-48 Type 8 Class 3	03	-
WF	-	-	4	-	6	-	BMS 13-48 Type 13 Class 1	01	Shielded
WF	2	-	-	-	-	-	BMS 13-48 Type 8 Class 4	04	-
WG	-	-	4	-	6	-	BMS 13-48 Type 13 Class 2	02	Shielded

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
WG	2	-	-	-	-	-	BMS 13-48 Type 8 Class 2	02	-
WH	2	-	-	-	-	-	BMS 13-48 Type 12 Class 3	03	Shielded
WH	-	-	4	-	6	-	BMS 13-48 Type 13 Class 3	03	Shielded
WI	-	-	4	-	6	-	BMS 13-48 Type 13 Class 4	04	Shielded
WJ	-	-	4	-	-	-	6917M39, ENDEVCO	02	Coax, Shielded, High Temperature
WJ	2	-	-	-	-	-	BMS 13-48 Type 16 Class 3	03	Shielded
WK	-	-	4	-	-	-	BMS 13-28 Type IV Class 3	03	High Temperature
WK	2	3	-	5	-	-	BMS 13-48 Type 22 Class 1	01	-
WL	2	3	-	5	-	-	BMS 13-48 Type 24 Class 2	02	Shielded
WL	-	-	4	-	-	-	EPD5386, Raychem	01	-
WM	2	3	-	5	-	-	BMS 13-48 Type 24 Class 3	03	Shielded
WM	-	-	4	-	-	-	VE 556, Vermillion Enterprises	02	Shielded
WN	-	-	4	-	-	-	VE 3042, Vermillion Enterprises	02	Coax, Shielded
WP	-	-	4	-	-	-	VE 3043, Vermillion Enterprises	03	Shielded
WQ	-	-	4	-	-	-	BB 30271, Consolidated Products	04	Coax
WR	-	-	4	-	-	-	BB 30272, Consolidated Products	08	Shielded
WS	-	-	4	-	-	-	BL 782, Times Wire Company	02	Shielded
WT	-	-	4	-	-	-	44A7314-24, Raychem	17	Shielded
WU	-	-	4	-	6	-	MIL-W-22759/2	01	High Temperature
WV	-	-	4	-	-	-	6917M19A, ENDEVCO	02	Shielded, High Temperature
WW	-	-	4	-	-	-	65B43584	26	Coax, Shielded, Power System
WX	-	-	4	-	6	-	65B47866-1	02	Red, Nickel Plated Shield, High Temperature, Low Noise
WY	-	-	4	-	-	-	BMS 13-40 Type I Class 1	01	Aluminum
WZ	-	-	4	-	-	-	BL 982, Times Wire Company	02	Shielded
X1	-	3	-	-	6	-	BMS 13-48 Type 27 Class 1	01	Flat Conductor Shield
X2	-	3	-	-	6	-	BMS 13-48 Type 27 Class 2	02	Flat Conductor Shield
X3	-	3	-	-	6	-	BMS 13-48 Type 27 Class 3	03	Flat Conductor Shield
X4	-	3	-	-	6	-	BMS 13-48 Type 27 Class 4	04	Flat Conductor Shield

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
X5	-	3	-	-	6	-	BMS 13-48 Type 27 Class 1	01	White/Red, Flat Conductor Shield
X6	-	-	-	-	6	-	BMS 13-48 Type 27 Class 1	01	Yellow, Flat Conductor Shield
XA	-	3	4	5	6	-	RG-174, MIL-C-17	01	Coax
XB	-	-	4	-	-	-	5026A1318, Raychem	01	Coax
XC	-	-	4	-	-	-	RG-213, MIL-C-17	01	Coax
XD	-	-	4	-	-	-	5026D1018, Raychem	01	Coax
XE	-	-	4	-	6	-	RG-223, MIL-C-17	01	Coax
XF	-	-	4	-	6	-	RG-115A, MIL-C-17	01	Coax
XG	-	-	4	-	6	7	BMS 13-48 Type 8 Class 1	01	White/Red
XH	-	-	4	-	-	-	RG-332, MIL-C-23806/2	01	Coax
XI	-	-	4	-	6	-	204-15578-1, FEP 226	01	Coax
XJ	-	-	4	-	-	-	204-3998-0000, Microdot	03	Triax
XK	-	-	4	-	-	-	275-3962-0000, Microdot	01	Coax
XL	-	-	4	-	-	-	H22-4000, Rockbestos	01	Red, Fire Resistant
XM	-	-	4	-	-	-	BMS 13-8 Type I Class A	01	Red, Fire Resistant
XN	-	3	4	-	-	-	60B40033-8	19	Control Column
XP	-	-	4	-	6	7	BMS 13-48 Type 8 Class 1	01	Yellow
XQ	-	-	4	-	6	7	BMS 13-48 Type 12 Class 1	01	White/Red, Shielded
XR	-	-	4	-	-	-	RG-385, MIL-C-22931	01	Coax
XS	-	-	4	-	6	7	RG-393, MIL-C-17	01	Coax
XT	-	-	4	-	-	-	RG-231, MIL-C-23806/1	01	Coax
XU	-	3	4	5	6	-	44A7434-20, Raychem	02	Al-Ch, Thermocouple
XV	-	-	4	-	6	-	852-4991980, Specialty Cable	02	Al-Ch, High Temperature, Thermocouple
XW	-	-	4	-	-	-	44A7451-20, Raychem	02	Cu-Cn, Thermocouple
XX	-	-	4	-	6	-	44A7620-20-9/5-9, Raychem	02	Al-Ch, Shielded, Thermocouple
XY	-	-	4	-	6	-	852-4985339, Specialty Cable	03	Al-Ch, Shielded, High Temperature, Thermocouple
XZ	-	-	4	-	6	-	RG-142B, MIL-C-17	01	Coax
Y1	-	3	-	-	6	-	BMS 13-48 Type 28 Class 1	01	Flat Conductor Shield



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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
Y2	-	3	-	-	6	-	BMS 13-48 Type 28 Class 2	02	Flat Conductor Shield
Y3	-	3	-	-	6	-	BMS 13-48 Type 28 Class 3	03	Flat Conductor Shield
Y4	-	3	-	-	6	-	BMS 13-48 Type 28 Class 4	04	Flat Conductor Shield
Y5	-	-	-	-	6	-	BMS 13-48 Type 28 Class 5	05	Flat Conductor Shield
Y6	-	3	-	-	-	7	BMS 13-48 Type 32 Class 2	02	Shielded
Y7	-	3	-	-	-	7	BMS 13-48 Type 32 Class 3	03	Shielded
Y8	-	3	-	-	-	-	BMS 13-48 Type 32 Class 4	04	Shielded
YA	-	-	4	-	-	-	BMS 13-48 Type 8 Class 1	01	-
YB	-	-	4	-	-	-	BMS 13-48 Type 8 Class 2	02	-
YC	-	-	4	-	-	-	BMS 13-48 Type 8 Class 3	03	-
YD	-	-	4	-	-	-	44A9051, Raychem	05	-
YE	-	-	4	-	-	-	44A9052, Raychem	07	-
YF	-	-	4	-	6	-	BMS 13-48 Type 12 Class 1	01	Red, Shielded
YG	-	-	4	-	-	-	BMS 13-48 Type 12 Class 2	02	Shielded
YH	-	-	4	-	-	-	BMS 13-48 Type 12 Class 3	03	Shielded
YJ	-	-	4	-	-	-	BMS 13-48 Type 12 Class 1	01	Shielded
YK	-	-	4	-	-	-	44A7435-20-9, Raychem	01	Ch, Thermocouple
YL	-	-	4	-	-	-	251-106104-1, Galileo	01	Ch, Thermocouple
YM	-	-	4	-	-	-	BMS 13-48 Type 8 Class 1	01	Red
YP	-	-	4	-	-	-	BMS 13-48 Type 14 Class 2	02	-
YQ	-	-	4	-	-	-	BMS 13-48 Type 8 Class 2	02	-
YR	-	-	4	-	-	-	BMS 13-48 Type 8 Class 3	03	-
YS	-	-	4	-	-	-	BMS 13-48 Type 9 Class 1	01	-
YT	-	-	4	-	-	-	BMS 13-48 Type 9 Class 2	02	-
YU	-	-	4	-	-	-	BMS 13-48 Type 9 Class 3	03	-
YV	-	-	4	-	-	-	BMS 13-48 Type 9 Class 4	04	-
YW	-	-	4	-	-	-	BMS 13-48 Type 14 Class 3	03	-
YY	-	-	4	-	-	-	EPD 2376, Raychem	02	Al-Ch, Thermocouple
Z1	-	3	-	5	-	-	MS25226-2-()	-	Busbar
Z2	-	-	4	-	-	-	ZTZ-0875-SHN-15B, Zippertubing Company	-	Shield
Z3	-	-	4	-	-	-	ZTZ-0550-SHN-15B, Zippertubing Company	-	Shield

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WIRE TYPE CODES

Table 1 (continued)

WTC	7()7 Model WDM						Wire Specification or Part Number	Conductors	Notes
	2	3	4	5	6	7			
Z5	-	-	4	-	-	-	ZTZ-1000-SHN-15B, Zippertubing Company	-	Shield
Z7	-	-	4	-	-	-	ZTZ-1125-SHN-15B, Zippertubing Company	-	Shield
Z8	-	-	4	-	-	-	ZTZ-0625-SHN-15B, Zippertubing Company	-	Shield
Z9	-	-	-	5	-	-	BAC3108-()	-	Shield Braid
ZA	-	3	-	5	-	7	BACJ40K5A5A-()	-	Insulated Jumper
ZB	-	3	4	5	6	7	BACB29B7S()	-	Insulated Bus Assembly
ZC	-	-	-	5	-	-	CH10-0324-(), 287N5001-()	-	Insulated Jumper
ZC	-	-	4	-	-	-	M5086/2, MIL-W-5086	03	Triax
ZD	-	3	-	-	-	7	BACB29B15S	-	Insulated Bus
ZF	-	-	4	-	-	-	284U1228-1	01	Busbar
ZG	-	-	4	-	-	-	284U1250-16	01	Busbar
ZH	-	-	4	-	-	-	284U2175-1	01	Busbar
ZJ	-	3	4	-	-	-	MS25226-6-()	01	Busbar
ZK	-	3	4	-	-	-	MS25226-4-()	01	Busbar

B. Wire Specifications and Wire Part Numbers

**Table 2
WIRE PART NUMBERS**

Wire Specification or Part Number	Notes	WTC	Conductors	7()7 Model WDM					
				2	3	4	5	6	7
001-BC-100/140/160PM, Northern Lights	Fiber Optic	F2	-	-	-	-	5	-	-
001-BC-HT-100/140/160PM, Northern Lights	Fiber Optic	F3	-	-	-	-	5	-	-
0024A0014, Raychem	Shielded, 100 ohm	8L	02	-	-	-	-	6	-
0024A0014, Raychem	100 ohm Balanced Line	EZ	01	-	3	-	5	-	-
08766/01147KE-3, Tensolite	-	A9	03	-	-	-	-	-	7
1-70436-1, TWA, MIL-W-16878D	-	03	26	2	3	-	5	-	-
1-70436-2, TWA, MIL-W-16878D	Shielded	04	26	2	3	-	5	-	-
1/0766/9D032E-6, Tensolite	Special BMS 13-35	TB	06	-	-	-	-	-	7

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7 Model WDM					
				2	3	4	5	6	7
1/OTLA/02101E-6, Tensolite	Aluminum	QH	6	-	-	-	-	-	7
10-02716, MIL-C-13273	Retractable	16	02	2	3	-	-	-	-
10-60233-1	-	31	05	2	3	-	-	-	-
10-60233-10	-	MV	03	-	3	-	-	-	-
10-60233-2	-	32	03	-	3	-	-	-	-
10-60233-3	-	33	03	2	3	-	-	-	-
10-60233-4	-	34	03	2	3	-	-	-	-
10-60233-5	-	35	12	2	3	-	-	-	-
10-60233-6	-	36	19	2	3	-	-	-	-
10-60233-9	-	MU	03	-	3	-	-	-	-
10-60816-1	Shielded, High Temperature	AA	01	2	3	-	-	-	-
10-60816-10	Shielded	AM	05	2	3	-	-	-	-
10-60816-11	Shielded	AN	02	2	3	-	-	-	-
10-60816-11	Shielded	UW	02	2	3	-	5	-	-
10-60816-12	-	AI	14	2	3	-	-	-	-
10-60816-13	High Temperature	AO	01	2	3	-	5	-	-
10-60816-14	-	AP	05	2	3	-	-	-	-
10-60816-15	-	AQ	03	2	3	-	-	-	-
10-60816-16	Shielded	CT	26	2	3	-	-	-	-
10-60816-17	High Temperature	AS	01	2	3	-	-	-	-
10-60816-19	-	AT	05	2	3	-	-	-	-
10-60816-2	-	AB	02	2	3	-	-	-	-
10-60816-20	-	AU	03	-	3	-	-	-	-
10-60816-21	-	AV	03	2	3	-	-	-	-
10-60816-22	-	AW	03	2	3	-	-	-	-
10-60816-23	High Temperature	AY	01	2	3	-	5	-	-
10-60816-24	-	BO	03	2	3	-	-	-	-
10-60816-25	-	41	16	2	3	-	-	-	-
10-60816-26	-	40	06	2	3	-	-	-	-
10-60816-26	-	UX	06	2	3	-	-	-	-
10-60816-27	-	4C	26	2	3	-	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
10-60816-3	-	AC	07	2	-	-	-	-	-
10-60816-30	Shielded	MD	01	-	3	-	-	-	-
10-60816-31	High Temperature	MB	01	2	3	-	5	-	-
10-60816-32	High Temperature	MC	01	-	3	-	-	-	-
10-60816-33	Shielded, High Temperature	ME	01	-	3	-	-	-	-
10-60816-34	High Temperature	MF	01	-	3	-	-	-	-
10-60816-36	-	MW	02	-	3	-	-	-	-
10-60816-38	-	MG	02	-	3	-	-	-	-
10-60816-39	-	MH	08	-	3	-	-	-	-
10-60816-4	-	AD	02	2	3	-	-	-	-
10-60816-4	-	UT	02	2	3	-	5	-	-
10-60816-40	-	MJ	07	-	3	-	-	-	-
10-60816-43	Shielded	MK	02	-	3	-	-	-	-
10-60816-45	-	ML	03	-	3	-	-	-	-
10-60816-46	Shielded	MM	26	-	3	-	-	-	-
10-60816-47	-	MN	05	-	3	-	-	-	-
10-60816-49	-	MP	03	-	3	-	-	-	-
10-60816-5	High Temperature	AE	01	2	3	-	-	-	-
10-60816-50	-	MQ	03	-	3	-	-	-	-
10-60816-52	-	MR	06	-	3	-	-	-	-
10-60816-53	-	MS	26	-	3	-	-	-	-
10-60816-55	-	MT	03	-	3	-	-	-	-
10-60816-56	High Temperature	MX	01	2	3	-	-	-	-
10-60816-58	-	MZ	03	-	3	-	-	-	-
10-60816-6	High Temperature	AF	01	2	3	-	-	-	-
10-60816-61	Shielded, High Temperature, Fuel Quantity	TK	01	-	-	-	5	-	-
10-60816-61	Shielded, Fuel Quantity	WC	01	-	-	-	5	-	-
10-60816-62	Shielded	W9	02	-	3	-	5	-	-
10-60816-64	-	A6	08	-	3	-	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
10-60816-65	-	6Z	02	-	3	-	-	-	-
10-60816-7	-	AG	08	2	3	-	-	-	-
10-60816-7	-	UU	08	2	3	-	-	-	-
10-60816-8	-	AH	07	2	3	-	-	-	-
10-60816-8	-	UV	07	2	3	-	-	-	-
10-60816-9	Shielded	AL	05	2	3	-	5	-	-
10-60875-1	Shielded	57	02	2	3	-	-	-	-
10-60875-1	Shielded, Fuel Quantity	UJ	02	-	-	4	-	-	-
10-60875-2	Shielded, Fuel Quantity	UK	03	-	-	4	-	6	-
10-60875-3	Fuel Quantity	UL	01	-	-	4	-	-	-
10-60875-4	Fuel Quantity, Shielded	93	01	-	-	4	-	6	-
10-60875-4	Shielded	W4	01	-	-	4	5	6	-
10-60875-5	Shielded, Fuel Quantity	UP	03	-	-	4	-	-	-
10-60875-8	Fuel Quantity, Shielded	98	01	-	-	-	-	6	-
10-60875-9	Shielded, Fuel Quantity	UT	03	-	-	4	-	-	-
10-60918-1	Shielded	AJ	08	2	3	-	-	-	-
10-60918-2	Shielded	AK	03	2	3	-	-	-	-
10-60918-3	Shielded	BQ	03	2	3	-	-	-	-
10-61299-1	-	AR	04	2	3	-	-	-	-
10-61299-2	Shielded	BP	04	2	3	-	-	-	-
10-61299-4	-	BT	04	2	3	-	-	-	-
10-61299-5	Shielded	BU	04	-	3	-	5	-	-
10-61299-6	Shielded	BF	04	-	3	-	5	-	-
10-61299-7	-	BY	05	-	3	-	-	-	-
10-61299-8	Shielded	V9	06	-	3	-	5	-	-
1008-2SJ, Thermax	100 ohm, Shielded, Wire Wrap	RZ	02	-	-	4	-	-	-
10599, Raychem	Shielded, Data Bus, 70 ohm	WC	02	-	3	4	-	6	7

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
12-025C, Raychem	Coax	25	01	2	3	-	-	-	-
12-125, Raychem	Coax	27	01	2	3	-	-	-	-
12-175, Raychem	Coax	75	01	2	3	-	5	-	-
120-S001-20, Glenair	5/8 Convolex Tube	SR	-	-	-	-	-	-	7
12621, Teledyne	Blue, Shielded	W6	02	-	3	-	5	-	-
12817, Teledyne	Shielded	4S	01	-	-	4	-	-	-
14401, ITT	Shielded	DB	02	-	3	-	-	-	-
153049, MIL-W-16878/3 Type D	-	13	01	2	-	-	-	-	-
157167, Prestolite	High Voltage	DV	01	-	3	-	-	-	-
18480/9K105X-4(LD), Tensolite	105 ohm, Adjacent Round Conductor Shields	D#	04	-	-	4	-	-	-
18S6JX, Lewis	Shielded, High Temperature	18	01	2	3	-	5	-	-
201-0046, Amphenol	-	4B	07	2	3	-	-	-	-
204-15578-1	Coax	JZ	01	-	-	4	-	6	-
204-15578-1, FEP 226	Coax	XI	01	-	-	4	-	6	-
204-3998-0000, Microdot	Triax	XJ	03	-	-	4	-	-	-
204-44, Bentley-Harris	Viton Sleeve	S7	-	-	-	-	5	-	-
20461/9C059X-4, Tensolite	100 ohm, Shielded	OZ	04	-	-	4	-	6	7
20721/20087Q-2, Tensolite	Shielded	5T	02	-	-	-	5	-	-
20722/70172KLX-10, Tensolite	Shielded	4M	10	-	-	4	-	-	-
20S6JX, Lewis	Shielded, High Temperature	20	01	2	3	-	-	-	-
21-606, Aljak	Coax	06	01	-	3	-	5	-	-
21-607, Aljak	Coax	07	01	2	3	-	5	-	-
21-768, Raychem	Shielded	76	02	2	3	-	5	-	-
22722/60586KK-6, Tensolite	Shielded	6Y	06	-	-	4	-	6	-
24-00033, Champlain	Red, Fire Resistant	9M	01	-	-	4	-	6	-
24-00033, Champlain	Red, High Temperature	VW	01	-	3	-	5	-	-
24-00034, Champlain	Red, Fire Resistant	9N	01	-	-	4	-	6	-
24-00034, Champlain	High Temperature	V3	01	-	3	-	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
24-00034, Champlain	Red, High Temperature	VD	01	-	3	-	5	-	-
24-00115, Champlain	Red, High Temperature	V4	01	-	3	-	5	-	-
24443/9C062X-4, Tensolite	100 ohm, Shielded	0U	04	-	3	4	-	-	7
24473/9C175X-2(LD), Tensolite	Shielded, 120 ohm	T3	02	-	3	4	5	6	7
24473/9P231X-4(LD), Tensolite	100 Ohm, Shielded Pair of Shielded Component Wires	0V	2	-	-	-	-	6	-
24721/30130Q-2, Tensolite	Shielded	5X	02	-	-	-	5	-	-
24723/70102KK-5, Tensolite	Shielded	4L	05	-	-	4	-	-	-
251-106104-1, Galileo	Ch, Thermocouple	YL	01	-	-	4	-	-	-
26353/90074ZX-2, Tensolite	Shielded	W5	02	-	3	-	5	-	-
275-3962-0000, Microdot	Coax	XK	01	-	-	4	-	-	-
284T1015-1	Flat Cable Assembly	FA	20	-	-	-	-	6	-
284T1015-2	Flat Cable Assembly	FB	20	-	-	-	-	6	-
284U1228-1	Busbar	ZF	01	-	-	4	-	-	-
284U1250-16	Busbar	ZG	01	-	-	4	-	-	-
284U2175-1	Busbar	ZH	01	-	-	4	-	-	-
30-04373, Champlain	Cu-Cn, Thermocouple	VV	02	2	3	-	-	-	-
30-04680, Champlain	Shielded	9F	09	-	-	4	-	6	-
3518D0611, Raychem	Shielded	9S	02	-	-	4	-	-	-
4/0591/31886PT-1	High Temperature, AWG 4/0	K1	01	2	3	-	5	-	-
42-133, Raychem	Coax	42	01	2	3	-	-	-	-
421-166, Amphenol	Triax	60	03	2	-	-	-	-	-
421-176, Amphenol	Coax	93	01	2	3	-	-	-	-
44A1811-12-9-9, Raychem	-	VJ	02	-	-	4	-	-	-
44A7314-24, Raychem	Shielded	WT	17	-	-	4	-	-	-
44A7418, Raychem	PSU	VK	06	-	-	4	-	-	-
44A7428, Raychem	PSU	VL	05	-	-	4	-	-	-
44A7429, Raychem	PSU	VM	07	-	-	4	-	-	-
44A7434, Raychem	Al-Ch, Thermocouple	DX	02	-	3	-	5	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
44A7434-20, Raychem	Al-Ch, Thermocouple	XU	02	-	3	4	5	6	-
44A7434-22-9/5, Raychem	Al-Ch, Thermocouple	8N	02	-	-	-	-	6	-
44A7435-20-9, Raychem	Ch, Thermocouple	YK	01	-	-	4	-	-	-
44A7451-20, Raychem	Cu-Cn, Thermocouple	XW	02	-	-	4	-	-	-
44A7620-20-9/5-9, Raychem	Al-Ch, Shielded, Thermocouple	XX	02	-	-	4	-	6	-
44A7620-22-9/5-9, Raychem	Shielded, Al-Ch, Thermocouple	8P	02	-	-	4	-	6	7
44A9051, Raychem	-	YD	05	-	-	4	-	-	-
44A9052, Raychem	-	YE	07	-	-	4	-	-	-
45-28-13, ITT	-	29	02	-	3	-	-	-	-
5012F1339 (10-008), Raychem	Coax	10	01	2	3	-	-	-	-
5012F1339, Raychem	Coax	12	01	2	3	-	-	-	-
5012H3012, Raychem	Coax	8W	01	-	-	4	-	6	-
5012H3012, Raychem	Coax	BS	01	-	3	4	5	6	-
5020G3442, Raychem	Coax	94	01	2	3	-	5	-	-
5021E1331, Raychem	Coax	09	01	2	3	-	-	-	-
5021K1011, Raychem	Coax	8V	01	-	-	4	-	6	-
5021K1011, Raychem	Coax	BR	01	-	-	4	5	6	-
5024A1314, Raychem	Coax	5X	01	-	-	4	-	6	-
5026A1314-9, Raychem	Coax	5W	01	-	-	-	-	6	-
5026A1314-9, Raychem	Coax	BX	01	-	-	-	5	6	-
5026A1318, Raychem	Coax	XB	01	-	-	4	-	-	-
5026D1018, Raychem	Coax	XD	01	-	-	4	-	-	-
5026N5611, Raychem	50 ohm Triax, Shielded	E3	03	-	-	4	-	-	7
51-04569, Champlain	Shielded, High Temperature	VM	02	2	3	-	5	-	-
51-04570, Champlain	Shielded	VN	02	-	3	-	5	-	-
51-04751, Champlain	Shielded	9A	36	-	-	-	-	6	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
550-292, Thermax	High Temperature, Round Conductor Shields, Not Adjacent	D2	02	-	-	-	-	6	7
551-292, Thermax	High Temperature, Round Conductor Shields, Not Adjacent	D3	03	-	-	-	-	6	7
552-292, Thermax	High Temperature, Round Conductor Shields, Not Adjacent	D4	02	-	-	-	-	-	7
557-392, Thermax	High Temperature	A8	03	-	-	-	-	6	7
55A0821-10-92/96, Raychem	-	VY	02	-	-	4	-	-	-
55A0831-08-92/96/94, Raychem	-	6S	03	-	-	4	-	-	-
55A1211-10-9-9, Raychem	Shielded	42	01	-	-	4	-	6	-
55A1821-10-2/6-9, Raychem	-	4R	02	-	-	4	-	-	-
55A6087-20, Raychem	Coax, Round Conductor Shields, Not Adjacent	8X	01	-	-	-	-	6	-
55A6087-20-9, Raychem	Adjacent Round Conductor Shields	4J	01	-	-	-	5	-	-
55A6088-()-9, Raychem	Shielded	4K	15	-	-	-	5	-	-
55A6088-20, Raychem	Shielded	8Z	15	-	-	-	-	6	-
55A6090-()-9, Raychem	Shielded	4L	05	2	3	-	5	-	-
55A6090-20, Raychem	Shielded	8Y	05	-	-	4	-	6	-
55A6160-()-2/6-9-9, Raychem	Two Shields	2Z	02	-	-	-	5	6	-
55A6160-()-2/6-9-9, Raychem	Adjacent Round Conductor Shields	4H	02	-	3	-	5	-	-
55A6160-20, Raychem	Round Conductor Shields, Not Adjacent	9C	02	-	-	-	-	6	-
55A6203-(), Raychem	Cn-Ch, Shielded, Thermocouple	TF	02	-	-	-	-	6	7
55A6210-18, Raychem	-	VZ	03	-	-	4	-	-	-
55A6645-20, Raychem	Round Conductor Shields, Not Adjacent	9J	02	-	-	4	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
55A8081-18, Raychem	Al-Ch, Thermocouple	VP	02	-	-	4	-	6	7
55A8081-18-9, Raychem	Al-Ch, Thermocouple	UY	02	-	3	4	5	6	7
55PC6000-20, Raychem	Round Conductor Shields, Not Adjacent	D0	02	-	-	-	-	-	7
55PC6001-20, Raychem	Round Conductor Shields, Not Adjacent	D1	03	-	-	-	-	-	7
55PC6021-20, Raychem	Adjacent Round Conductor Shields	D6	02	-	-	-	5	-	7
55PC6022-20, Raychem	Adjacent Round Conductor Shields	D7	03	-	-	-	5	-	7
55PC6023-20, Raychem	Adjacent Round Conductor Shields	D8	04	-	-	-	-	-	7
55PC6024-20, Raychem	Round Conductor Shields, Not Adjacent	D5	4	-	-	-	-	-	7
60B40033-8	-	VP	19	-	3	-	-	-	-
60B40033-8	Control Column	XN	19	-	3	4	-	-	-
61-02384, Champlain	Shielded, High Temperature	CK	02	-	-	4	-	-	-
61-02651, Champlain	High Temperature, Round Conductor Shields, Not Adjacent	9D	02	-	-	4	-	6	-
61-02651, Champlain	High Temperature, Round Conductor Shields, Not Adjacent	FL	02	-	-	4	5	6	-
61-02783, Champlain	High Temperature, Round Conductor Shields, Not Adjacent, Nickel Plated	9K	03	-	-	4	-	6	-
61-02786, Champlain	Shielded, High Temperature	CM	01	-	-	4	-	6	-
621-1292, Thermax	BMS13-58T1C3G8, High Temperature	TG	03	-	-	-	-	-	7
63546, Filotex	Shielded, High Temperature	VY	02	2	3	-	5	-	-

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM						
				2	3	4	5	6	7	
63831, Filotex	Shielded, High Temperature	VQ	01	-	3	-	-	-	-	
64-500, Prodelin	Coax, 50 ohm	82	01	-	-	-	-	6	-	
65B43584	Coax, Shielded, Power System	WW	26	-	-	4	-	-	-	
65B47866-1	Red, Nickel Plated Shield, High Temperature, Low Noise	WX	02	-	-	4	-	6	-	
65B47866-2	Red, Nickel Plated Shield, High Temperature, Low Noise Cable	RJ	02	-	3	4	5	6	7	
65B47866-2	Red, Shielded, High Temperature, Low Noise Cable	VC	02	-	3	-	5	-	-	
65B47866-2	Red, Shielded, High Temperature, Low Noise	WE	02	-	-	4	-	6	7	
65B47866-5, Thermax	Low Noise, Red, High Temperature, Nickel Plated Round Conductor Shields, Not Adjacent	RQ	02	-	3	4	5	6	-	
691-295, Thermax	Coax	CW	01	-	3	-	5	-	-	
6917M19A, ENDEVCO	Shielded, High Temperature	WV	02	-	-	4	-	-	-	
6917M39, ENDEVCO	Coax, Shielded, High Temperature	WJ	02	-	-	4	-	-	-	
7120D0011 (62-320), Raychem	Shielded	54	03	2	3	-	-	-	-	
72016, Thermax	Two Shields, High Temperature	CW	02	-	-	4	-	6	-	
72016, Thermax	Low Noise Cable, High Temperature, Round Conductor Shields, Not Adjacent	WA	02	2	3	-	5	-	-	
72017, Thermax	Shielded, High Temperature, Low Noise Cable	WB	02	-	-	-	5	-	-	
747-201, Thermax	Pink, 1 Shield, Fuel Quantity	TU	02	-	3	4	-	-	-	

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
747-203, Thermax	Pink, 4 Shields, Fuel Quantity	TV	07	-	3	4	-	-	-
7484444-1SN-22, Douglas	Shielded	4E	01	2	3	-	-	-	-
7484444-2-22, Douglas	Shielded, High Temperature	DY	02	2	3	-	-	-	-
7524D5011, Raychem	Triax	61	03	2	3	4	-	-	-
7526D1312, Raychem	Coax	26	01	2	3	-	-	-	-
7616964B24, Douglas	-	DZ	01	2	3	-	-	-	-
767-202, Thermax	Pink, 3 Shields, Fuel Quantity	TT	02	-	-	-	-	6	-
767-207, Thermax	Pink, 2 Shields, Fuel Quantity	TR	07	-	-	-	-	6	-
767-208, Thermax	FQIS Cable	TS	7	-	-	-	-	6	-
767-221, Thermax	Pink, 2 Shields, Fuel Quantity	TQ	17	-	-	4	-	6	-
767-2217, Thermax	Pink, 2 Shields, Fuel Quantity	TL	17	-	-	-	-	6	-
767-222, Thermax	Pink, 3 Shields, Fuel Quantity	TP	02	-	-	-	-	6	-
767-226, Thermax	Pink, 2 Shields, Fuel Quantity	TN	06	-	-	-	-	6	-
767-227, Thermax	Pink, 2 Shields, Fuel Quantity	TM	07	-	-	-	-	6	-
7724D3664, Raychem	Shielded	9R	02	-	-	4	-	-	-
784-2ZXE, Thermax	Shielded, Low Noise	VX	02	-	3	-	5	-	-
81993, Filotex	Fire Resistant	9Y	01	-	-	4	-	6	-
8220D0011 (62-22QB), Raychem	Shielded	53	02	2	3	-	-	-	-
831-4245270, Pirelli	Shielded, 100 ohm Balanced Line	9H	02	-	-	4	-	6	-
831-4245379, Pirelli	Shielded, 100 ohm Balanced Line	9G	02	-	-	-	-	6	-
831-4245379, Specialty Cable	100 ohm	BW	01	-	3	-	5	6	-
852-4206876, Specialty Cable	Cn-Ch, Shielded, Thermocouple	TC	02	-	-	-	-	6	-
852-4206975, Specialty Cable	Cn-Ch, Shielded, Thermocouple	TD	02	-	-	4	-	6	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
852-4236774, Pirelli	Cu-Cn, Thermocouple	52	02	2	3	-	5	-	-
852-4985321, Specialty Cable	Al-Ch, Shielded, High Temperature, Thermocouple	TE	02	-	-	4	5	6	-
852-4985339, Specialty Cable	Al-Ch, Shielded, High Temperature, Thermocouple	XY	03	-	-	4	-	6	-
852-4991972, Specialty Cable	Al-Ch, Thermocouple	99	02	2	3	-	-	-	-
852-4991980, Specialty Cable	Al-Ch, Thermocouple	UZ	02	-	3	4	5	6	-
852-4991980, Specialty Cable	Al-Ch, High Temperature, Thermocouple	XV	02	-	-	4	-	6	-
853-4125928, Specialty Cable	Cu-Cn, Thermocouple	81	02	2	3	-	5	-	-
853-4218376, Specialty Cable	Al-Ch, Thermocouple	VU	02	-	3	-	5	-	-
853-4221073, Pirelli	Cu-Cn, Thermocouple	80	02	2	3	-	5	-	-
853-4221172, Pirelli	Al-Ch, Thermocouple	DW	02	2	3	-	-	-	-
853-4310074, Specialty Cable	Cu-Cn, Thermocouple	V1	02	2	3	-	-	-	-
85842, Filotex	Red, Fire Resistant	9X	01	-	-	4	-	6	-
930-OFSXE, Thermax	50 Ohm, Triax	0M	3	-	-	4	-	6	7
975-295, Thermax	Shielded	V2	09	-	3	4	5	6	7
976-295, Thermax	70 ohm, Nickel Plated Shield	7K	02	-	3	-	5	6	-
977-295, Thermax	100 ohm	BV	01	-	-	4	5	6	-
986-495, Thermax	75 ohm	7P	02	-	3	4	5	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q0	10	-	-	4	-	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q1	01	-	-	4	-	6	7

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q2	02	-	-	4	-	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q3	03	-	-	4	-	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q4	04	-	-	4	-	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q5	05	-	-	4	-	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q6	06	-	-	4	-	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q7	07	-	-	4	-	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q8	08	-	-	4	-	6	7
Airline Specified Wire	Refer to WDM Introduction and WDM 91-00-06	Q9	09	-	-	4	-	6	7
BA14349, ITT Surprenant	Coax	67	01	-	-	4	-	-	-
BA3482, ITT Surprenant	Twinax	82	02	2	3	-	5	-	-
BA5903A, ITT Surprenant	Coax	66	01	2	3	4	5	6	7
BA6416A, ITT Surprenant	Triax	64	03	2	3	-	-	-	-
BA6903A, ITT Surprenant	Coax	65	01	2	3	4	5	6	-
BAC3108-()	Shield Braid	Z9	-	-	-	-	5	-	-
BACB29B15S	Insulated Bus	ZD	-	-	3	-	-	-	7
BACB29B7S()	Insulated Bus Assembly	ZB	-	-	3	4	5	6	7
BACC69A-AA-()	Fiber Optic Cable Assembly	F4	-	-	3	4	-	6	7
BACJ40K5A5A-()	Insulated Jumper	ZA	-	-	3	-	5	-	7
BB 30271, Consolidated Products	Coax	WQ	04	-	-	4	-	-	-
BB 30272, Consolidated Products	Shielded	WR	08	-	-	4	-	-	-
BE Aerospace Specified Wire	-	A#	-	-	-	4	-	6	7

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BE Aerospace Specified Wire	-	B#	-	-	-	4	-	6	7
BE Aerospace Specified Wire	-	C#	-	-	-	4	-	6	7
BE Aerospace Specified Wire	-	E#	-	-	-	4	-	6	-
BL 782, Times Wire Company	Shielded	WS	02	-	-	4	-	-	-
BL 982, Times Wire Company	Shielded	WZ	02	-	-	4	-	-	-
BMS 13-10 Type I Class 1	-	1R	01	2	3	-	-	-	-
BMS 13-10 Type I Class 2	-	1S	02	2	3	-	-	-	-
BMS 13-10 Type I Class 3	-	1T	03	2	3	-	-	-	-
BMS 13-10 Type I Class 4	-	1U	04	2	3	-	-	-	-
BMS 13-10 Type III Class 1	Shielded	3R	01	2	3	-	-	-	-
BMS 13-10 Type III Class 14	Shielded	3W	14	2	3	-	-	-	-
BMS 13-10 Type III Class 2	Shielded	3S	02	2	3	-	-	-	-
BMS 13-10 Type III Class 3	Shielded	3T	03	2	3	-	-	-	-
BMS 13-10 Type III Class 4	Shielded	3U	04	2	3	-	-	-	-
BMS 13-10 Type III Class 7	Shielded	3V	07	2	3	-	-	-	-
BMS 13-10 Type IV Class 4	-	BN	04	-	3	-	-	-	-
BMS 13-10 Type IV Class 6	-	BM	06	-	3	-	-	-	-
BMS 13-11 Type I Class 1	-	1J	01	2	3	-	-	-	-
BMS 13-11 Type I Class 1	-	AZ	01	2	3	-	-	-	-
BMS 13-11 Type I Class 2	-	1K	02	2	3	-	-	-	-
BMS 13-11 Type I Class 3	-	1L	03	2	3	-	-	-	-
BMS 13-11 Type I Class 4	-	1M	04	2	3	-	-	-	-
BMS 13-11 Type V Class 1	Shielded	3A	01	2	3	-	-	-	-
BMS 13-11 Type V Class 1	Shielded	3E	01	2	3	-	-	-	-
BMS 13-11 Type V Class 1	Shielded, White	3J	01	2	3	-	-	-	-
BMS 13-11 Type V Class 1	Shielded	UP	01	2	3	-	-	-	-
BMS 13-11 Type V Class 2	Shielded	24	02	2	3	-	-	-	-
BMS 13-11 Type V Class 2	Shielded	3B	02	2	3	-	-	-	-
BMS 13-11 Type V Class 2	Shielded	3F	02	2	3	-	-	-	-
BMS 13-11 Type V Class 2	Shielded	3K	02	2	3	-	-	-	-
BMS 13-11 Type V Class 2	Shielded	UQ	02	2	3	-	-	-	-
BMS 13-11 Type V Class 3	Shielded	3C	03	2	3	-	-	-	-

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-11 Type V Class 3	Shielded	3G	03	2	3	-	-	-	-
BMS 13-11 Type V Class 3	Shielded	3L	03	2	3	-	-	-	-
BMS 13-11 Type V Class 3	Shielded	UR	03	2	3	-	-	-	-
BMS 13-11 Type V Class 4	Shielded	3D	04	2	3	-	-	-	-
BMS 13-11 Type V Class 4	Shielded	3H	04	2	3	-	-	-	-
BMS 13-11 Type V Class 4	Shielded	3M	04	2	3	-	-	-	-
BMS 13-11 Type V Class 4	Shielded	US	04	2	3	-	-	-	-
BMS 13-13 Type I Class 1	-	1A	01	2	3	-	-	-	-
BMS 13-13 Type I Class 1	-	1N	01	2	3	-	-	-	-
BMS 13-13 Type I Class 1	-	UJ	01	2	3	-	-	-	-
BMS 13-13 Type I Class 2	-	1B	02	2	3	-	-	-	-
BMS 13-13 Type I Class 2	-	1P	02	2	3	-	-	-	-
BMS 13-13 Type I Class 2	-	UK	02	2	3	-	-	-	-
BMS 13-13 Type I Class 3	-	1C	03	2	3	-	-	-	-
BMS 13-13 Type I Class 3	-	1Q	03	2	3	-	-	-	-
BMS 13-13 Type I Class 3	-	UL	03	-	3	-	-	-	-
BMS 13-13 Type I Class 4	-	1D	04	2	3	-	-	-	-
BMS 13-13 Type I Class 4	-	4A	04	2	3	-	-	-	-
BMS 13-13 Type I Class 4	-	UM	04	2	3	-	5	-	-
BMS 13-13 Type I Class 5	-	1V	05	-	3	-	-	-	-
BMS 13-13 Type I Class 8	-	1W	08	2	3	-	-	-	-
BMS 13-13 Type III Class 1	Shielded	3N	01	2	3	-	-	-	-
BMS 13-13 Type III Class 2	Shielded	3P	02	2	3	-	-	-	-
BMS 13-13 Type III Class 3	Shielded	3Q	03	2	3	-	-	-	-
BMS 13-13 Type IV Class 4	-	4D	04	2	3	-	-	-	-
BMS 13-16 Type I Class 1	-	1E	01	2	3	4	5	6	-
BMS 13-16 Type I Class 1	Blue	8Q	01	2	3	-	5	-	-
BMS 13-16 Type I Class 2	-	1F	02	2	3	-	5	-	-
BMS 13-16 Type I Class 3	-	1G	03	2	3	-	5	-	-
BMS 13-16 Type I Class 4	-	1H	04	2	3	-	-	-	-
BMS 13-16 Type III Class 1	Blue, Shielded	8R	01	2	3	-	5	-	-
BMS 13-16 Type III Class 1	Shielded	CN	01	2	3	-	5	-	-

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-16 Type III Class 14	Shielded	DS	14	2	3	-	-	-	-
BMS 13-16 Type III Class 2	Blue, Shielded	8S	02	-	3	-	5	-	-
BMS 13-16 Type III Class 2	Shielded	CP	02	2	3	-	5	-	-
BMS 13-16 Type III Class 2	Shielded	E2	02	-	-	-	5	-	-
BMS 13-16 Type III Class 3	Shielded	CR	03	2	3	-	-	-	-
BMS 13-16 Type III Class 4	Shielded	CS	04	2	3	-	-	-	-
BMS 13-16 Type III Class 7	Shielded	DR	07	2	3	-	-	-	-
BMS 13-18 Type I Class 1	High Temperature	70	01	2	3	-	-	-	-
BMS 13-18 Type I Class 2	High Temperature	77	02	2	3	-	-	-	-
BMS 13-18 Type I Class 4	High Temperature	55	04	2	3	-	-	-	-
BMS 13-18 Type III Class 1	Shielded, High Temperature	69	01	2	3	-	-	-	-
BMS 13-18 Type III Class 2	Shielded, High Temperature	68	02	2	3	-	-	-	-
BMS 13-18 Type III Class 3	Shielded, High Temperature	67	03	2	3	-	-	-	-
BMS 13-18 Type IV Class 4	High Temperature	51	04	2	3	-	-	-	-
BMS 13-28 Type I Class 1	High Temperature	86	01	2	3	4	-	-	-
BMS 13-28 Type I Class 1	High Temperature	86	01	-	-	4	-	-	-
BMS 13-28 Type I Class 2	High Temperature	87	02	2	3	4	-	-	-
BMS 13-28 Type I Class 3	High Temperature	88	03	-	-	4	-	-	-
BMS 13-28 Type I Class 4	High Temperature	88	04	2	3	-	5	-	-
BMS 13-28 Type III Class 1	Shielded, High Temperature	89	01	2	3	4	-	-	-
BMS 13-28 Type III Class 2	Shielded, High Temperature	90	02	2	3	4	-	-	-
BMS 13-28 Type III Class 3	Shielded, High Temperature	91	03	2	3	4	-	-	-
BMS 13-28 Type IV Class 3	High Temperature	WK	03	-	-	4	-	-	-
BMS 13-28 Type IV Class 4	High Temperature	BL	04	2	3	-	5	-	-
BMS 13-29 Type I Class 1	-	21	01	2	3	-	5	-	-
BMS 13-29 Type I Class 1	High Voltage	UM	01	-	-	4	-	-	-
BMS 13-29 Type I Class 2	High Temperature	EY	02	-	-	-	5	-	-
BMS 13-29 Type III Class 2	Shielded, High Temperature	EW	02	2	3	-	5	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7 Model WDM					
				2	3	4	5	6	7
BMS 13-29 Type IV Class 4	-	23	04	2	3	-	5	-	-
BMS 13-30 Type I Class 1	-	45	01	2	3	-	-	-	-
BMS 13-30 Type I Class 1	-	BA	01	2	3	-	-	-	-
BMS 13-30 Type I Class 2	-	46	02	2	3	-	-	-	-
BMS 13-30 Type I Class 2	-	BB	02	2	3	-	-	-	-
BMS 13-30 Type I Class 3	-	47	03	2	3	-	-	-	-
BMS 13-30 Type I Class 3	-	BC	03	2	3	-	-	-	-
BMS 13-30 Type I Class 4	-	48	04	2	3	-	-	-	-
BMS 13-30 Type I Class 4	-	BD	04	2	3	-	-	-	-
BMS 13-30 Type III Class 1	Shielded	95	01	2	3	-	-	-	-
BMS 13-30 Type III Class 1	Shielded	CA	01	2	3	-	-	-	-
BMS 13-30 Type III Class 2	Shielded	96	02	2	3	-	-	-	-
BMS 13-30 Type III Class 2	Shielded	CB	02	2	3	-	-	-	-
BMS 13-30 Type III Class 3	Shielded	97	03	2	3	-	-	-	-
BMS 13-30 Type III Class 3	Shielded	CC	03	2	3	-	-	-	-
BMS 13-30 Type III Class 4	-	98	04	2	3	-	-	-	-
BMS 13-30 Type III Class 4	Shielded	CD	04	2	3	-	-	-	-
BMS 13-31 Type I Class 1	High Temperature	BG	01	-	-	4	-	6	-
BMS 13-31 Type I Class 1	High Temperature	EA	01	2	3	-	5	-	-
BMS 13-31 Type I Class 2	High Temperature	BH	02	-	-	4	-	6	-
BMS 13-31 Type I Class 2	High Temperature	EB	02	2	3	-	5	-	-
BMS 13-31 Type I Class 3	High Temperature	EC	03	2	3	4	5	6	-
BMS 13-31 Type I Class 4	High Temperature	BI	04	-	-	4	-	-	-
BMS 13-31 Type I Class 4	High Temperature	ED	04	2	3	-	5	-	-
BMS 13-31 Type III Class 1	Shielded, High Temperature	EE	01	2	3	4	5	6	-
BMS 13-31 Type III Class 2	Shielded, High Temperature	CH	02	-	-	4	-	-	-
BMS 13-31 Type III Class 2	Shielded, High Temperature	EF	02	2	3	-	5	-	-
BMS 13-31 Type III Class 3	Shielded, High Temperature	CJ	03	-	-	4	-	-	-
BMS 13-31 Type III Class 3	Shielded, High Temperature	EG	03	2	3	-	5	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-31 Type III Class 4	Shielded, High Temperature	EH	04	2	3	-	5	-	-
BMS 13-31 Type IV Class 2	High Temperature	FK	02	-	-	-	5	-	-
BMS 13-31 Type IV Class 3	High Temperature	CU	03	2	3	4	5	-	-
BMS 13-31 Type IV Class 4	High Temperature	AX	04	2	3	-	-	-	-
BMS 13-31 Type IV Class 8	High Temperature	EX	08	2	3	-	5	-	-
BMS 13-31 Type V Class 1	High Temperature	7A	01	-	3	4	5	6	-
BMS 13-31 Type V Class 1	Red, High Temperature	7B	01	-	-	4	-	6	-
BMS 13-31 Type V Class 1	High Temperature	FA	01	2	3	-	5	-	-
BMS 13-31 Type V Class 1	Red, High Temperature	FV	01	2	3	-	5	-	-
BMS 13-31 Type V Class 1	Yellow, High Temperature	FW	01	-	-	-	5	-	-
BMS 13-31 Type V Class 2	High Temperature	7C	02	-	-	4	-	6	-
BMS 13-31 Type V Class 2	High Temperature	FB	02	2	3	-	5	-	-
BMS 13-31 Type V Class 3	High Temperature	7D	03	-	-	4	-	6	-
BMS 13-31 Type V Class 3	High Temperature	FC	03	2	3	-	5	-	-
BMS 13-31 Type V Class 4	High Temperature	7E	04	-	-	4	-	6	-
BMS 13-31 Type V Class 4	High Temperature	FD	04	-	3	-	5	-	-
BMS 13-31 Type VII Class 1	Shielded, High Temperature	7F	01	-	-	4	-	6	-
BMS 13-31 Type VII Class 1	Shielded, High Temperature	FE	01	2	3	-	5	-	-
BMS 13-31 Type VII Class 1	Red, Shielded, High Temperature	FJ	01	-	-	4	-	-	-
BMS 13-31 Type VII Class 2	Shielded, High Temperature	7G	02	-	-	4	-	6	-
BMS 13-31 Type VII Class 2	Shielded, High Temperature	FF	02	2	3	-	5	-	-
BMS 13-31 Type VII Class 3	Shielded, High Temperature	7H	03	-	-	4	-	6	-
BMS 13-31 Type VII Class 3	Shielded, High Temperature	FG	03	2	3	-	5	-	-
BMS 13-31 Type VII Class 4	Shielded, High Temperature	9E	04	-	-	4	-	6	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-31 Type VII Class 4	Shielded, High Temperature	FH	04	2	3	-	5	-	-
BMS 13-31 Type VIII Class 8	High Temperature	FX	08	2	3	-	5	-	-
BMS 13-35 Type I Class 1	Al	43	01	2	3	4	5	6	7
BMS 13-35 Type I Class 3	Aluminum	T4	03	-	-	-	-	-	7
BMS 13-40 Type I Class 1	Aluminum	WY	01	-	-	4	-	-	-
BMS 13-42B Type VIII Class 1	-	UA	01	2	3	-	-	-	-
BMS 13-42B Type VIII Class 2	-	UB	02	2	3	-	-	-	-
BMS 13-42B Type VIII Class 3	-	UC	03	2	-	-	-	-	-
BMS 13-42B Type VIII Class 3	Not applicable after Line Number 1440	UC	03	-	3	-	-	-	-
BMS 13-42B Type XII Class 1	Shielded	VF	01	2	-	-	-	-	-
BMS 13-42B Type XII Class 1	Shielded; not applicable after Line Number 1440	VF	01	-	3	-	-	-	-
BMS 13-42B Type XII Class 2	Shielded	VG	02	2	-	-	-	-	-
BMS 13-42B Type XII Class 2	Shielded; not applicable after Line Number 1440	VG	02	-	3	-	-	-	-
BMS 13-42C Type VIII Class 1	-	BG	01	2	3	-	-	-	-
BMS 13-42C Type VIII Class 1	-	UD	01	2	3	-	-	-	-
BMS 13-42C Type VIII Class 2	-	BH	02	2	3	-	-	-	-
BMS 13-42C Type VIII Class 2	-	UE	02	2	3	-	-	-	-
BMS 13-42C Type VIII Class 3	-	BJ	03	2	3	-	-	-	-
BMS 13-42C Type VIII Class 3	-	UF	03	2	3	-	-	-	-
BMS 13-42C Type VIII Class 4	-	BK	04	2	3	-	-	-	-
BMS 13-42C Type VIII Class 4	-	UG	04	2	3	-	-	-	-
BMS 13-42C Type XII Class 1	Shielded	CG	01	2	3	-	-	-	-
BMS 13-42C Type XII Class 1	Shielded	VH	01	2	-	-	-	-	-
BMS 13-42C Type XII Class 1	Shielded; not applicable after Line Number 1440	VH	01	-	3	-	-	-	-
BMS 13-42C Type XII Class 2	Shielded	CH	02	2	3	-	-	-	-
BMS 13-42C Type XII Class 2	Shielded	VJ	02	2	3	-	-	-	-
BMS 13-42C Type XII Class 3	Shielded	CJ	03	2	3	-	-	-	-

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-42C Type XII Class 3	Shielded	VK	03	2	3	-	-	-	-
BMS 13-42C Type XII Class 4	Shielded	CK	04	2	3	-	-	-	-
BMS 13-42C Type XII Class 4	Shielded	VL	04	2	3	-	-	-	-
BMS 13-46 Type 3 Class 1	Red, Wire Wrap	RA	01	-	-	4	-	-	-
BMS 13-46 Type 3 Class 1	Wire Wrap	RD	01	-	-	4	-	-	-
BMS 13-46 Type 3 Class 2	Wire Wrap	RE	02	-	-	4	-	-	-
BMS 13-46 Type 3 Class 3	Wire Wrap	RF	03	-	-	4	-	-	-
BMS 13-46 Type 3 Class 4	Wire Wrap	RG	04	-	-	4	-	-	-
BMS 13-46 Type 4 Class 1	Shielded, Wire Wrap	RS	01	-	-	4	-	-	-
BMS 13-46 Type 4 Class 2	Shielded, Wire Wrap	RT	02	-	-	4	-	-	-
BMS 13-46 Type 4 Class 3	Shielded, Wire Wrap	RW	03	-	-	4	-	-	-
BMS 13-46 Type 4 Class 4	Shielded, Wire Wrap	RX	04	-	-	4	-	-	-
BMS 13-48 Type 1 Class 1	-	DC	01	-	3	-	5	-	-
BMS 13-48 Type 1 Class 1	-	UF	01	-	-	4	-	-	-
BMS 13-48 Type 1 Class 2	-	DD	02	-	3	-	-	-	-
BMS 13-48 Type 1 Class 2	-	UG	02	-	-	4	-	-	-
BMS 13-48 Type 1 Class 3	-	DE	03	2	3	-	-	-	-
BMS 13-48 Type 1 Class 3	-	UH	03	-	-	4	-	-	-
BMS 13-48 Type 1 Class 4	-	DF	04	-	3	-	-	-	-
BMS 13-48 Type 10 Class 1	-	PA	01	-	3	4	-	6	7
BMS 13-48 Type 10 Class 1	White/Red	PH	01	-	3	4	-	6	7
BMS 13-48 Type 10 Class 1	Yellow	PJ	01	-	-	4	-	6	7
BMS 13-48 Type 10 Class 2	-	PB	02	-	3	4	-	6	7
BMS 13-48 Type 10 Class 3	-	PC	03	-	3	4	5	6	7
BMS 13-48 Type 10 Class 4	-	PD	04	-	3	4	-	6	7
BMS 13-48 Type 10 Class 5	-	PE	05	-	-	4	-	6	-
BMS 13-48 Type 10 Class 6	-	PF	06	-	-	4	-	6	-
BMS 13-48 Type 10 Class 7	-	PG	07	-	-	4	-	6	-
BMS 13-48 Type 11 Class 1	-	PK	01	-	3	4	-	6	7
BMS 13-48 Type 11 Class 1	White/Red	PP	01	-	-	4	-	6	7
BMS 13-48 Type 11 Class 2	-	PL	02	-	3	4	-	6	7
BMS 13-48 Type 11 Class 3	-	PM	03	-	3	4	-	6	7

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-48 Type 11 Class 4	-	PN	04	-	3	4	-	6	7
BMS 13-48 Type 12 Class 1	Yellow, Shielded	8Q	01	-	-	4	-	6	7
BMS 13-48 Type 12 Class 1	Shielded	FR	01	-	3	-	5	-	-
BMS 13-48 Type 12 Class 1	Shielded; not applicable before Line Number 1441	VF	01	-	3	-	-	-	-
BMS 13-48 Type 12 Class 1	Shielded	VF	01	-	-	4	-	6	7
BMS 13-48 Type 12 Class 1	White/Red, Shielded	XQ	01	-	-	4	-	6	7
BMS 13-48 Type 12 Class 1	Red, Shielded	YF	01	-	-	4	-	6	-
BMS 13-48 Type 12 Class 1	Shielded	YJ	01	-	-	4	-	-	-
BMS 13-48 Type 12 Class 2	Yellow, Shielded	3B	02	-	-	4	-	6	7
BMS 13-48 Type 12 Class 2	-	FN	02	-	3	-	5	-	-
BMS 13-48 Type 12 Class 2	Yellow, Shielded	V7	02	2	3	-	5	-	-
BMS 13-48 Type 12 Class 2	Shielded; not applicable before Line Number 1441	VG	02	-	3	-	-	-	-
BMS 13-48 Type 12 Class 2	Shielded	VG	02	-	-	4	-	6	7
BMS 13-48 Type 12 Class 2	Shielded	YG	02	-	-	4	-	-	-
BMS 13-48 Type 12 Class 3	Yellow, Shielded	4Q	03	-	-	-	-	-	7
BMS 13-48 Type 12 Class 3	Shielded	FP	03	-	3	-	-	-	-
BMS 13-48 Type 12 Class 3	Shielded; not applicable before Line Number 1441	VH	03	-	3	-	-	-	-
BMS 13-48 Type 12 Class 3	Shielded	VH	03	-	-	4	-	6	7
BMS 13-48 Type 12 Class 3	Shielded	WH	03	2	-	-	-	-	-
BMS 13-48 Type 12 Class 3	Shielded	YH	03	-	-	4	-	-	-
BMS 13-48 Type 12 Class 4	Shielded	U4	04	-	3	4	-	6	7
BMS 13-48 Type 12 Class 4	Shielded	VI	04	-	-	4	-	6	-
BMS 13-48 Type 13 Class 1	Shielded	WF	01	-	-	4	-	6	-
BMS 13-48 Type 13 Class 2	White/Red, Shielded	UI	02	-	-	4	-	-	-
BMS 13-48 Type 13 Class 2	Shielded	WG	02	-	-	4	-	6	-
BMS 13-48 Type 13 Class 3	Shielded	WH	03	-	-	4	-	6	-
BMS 13-48 Type 13 Class 4	Shielded	WI	04	-	-	4	-	6	-
BMS 13-48 Type 14 Class 2	-	YP	02	-	-	4	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-48 Type 14 Class 3	-	YW	03	-	-	4	-	-	-
BMS 13-48 Type 15 Class 1	Shielded	0A	01	-	-	-	-	-	7
BMS 13-48 Type 15 Class 2	Shielded	0B	02	-	-	-	-	-	7
BMS 13-48 Type 15 Class 3	Shielded	0C	03	-	-	-	-	6	7
BMS 13-48 Type 15 Class 4	Shielded	0D	04	-	-	-	-	-	7
BMS 13-48 Type 16 Class 1	-	5A	01	-	-	-	-	6	7
BMS 13-48 Type 16 Class 1	White/Red	5B	01	-	-	-	-	6	-
BMS 13-48 Type 16 Class 1	Yellow	5C	01	-	-	-	-	6	-
BMS 13-48 Type 16 Class 1	-	FM	01	-	3	-	-	-	-
BMS 13-48 Type 16 Class 2	-	5D	02	-	-	-	-	6	7
BMS 13-48 Type 16 Class 3	-	5E	03	-	-	-	-	6	7
BMS 13-48 Type 16 Class 3	Shielded	WJ	03	2	-	-	-	-	-
BMS 13-48 Type 16 Class 4	-	5F	04	-	-	-	-	6	-
BMS 13-48 Type 19 Class 4	-	7R	04	-	-	-	-	6	-
BMS 13-48 Type 22 Class 1	-	8R	01	-	-	4	-	6	7
BMS 13-48 Type 22 Class 1	White/Red	8S	01	-	-	4	-	6	7
BMS 13-48 Type 22 Class 1	-	WK	01	2	3	-	5	-	-
BMS 13-48 Type 22 Class 2	-	8J	02	-	-	-	-	6	7
BMS 13-48 Type 22 Class 3	-	RC	03	-	-	-	-	-	7
BMS 13-48 Type 22 Class 4	-	8H	04	-	-	-	-	-	7
BMS 13-48 Type 24 Class 1	Shielded	8C	01	-	-	4	-	6	7
BMS 13-48 Type 24 Class 1	White/Red, Shielded	8D	01	-	-	4	-	6	7
BMS 13-48 Type 24 Class 2	Shielded	8K	02	-	-	4	-	6	7
BMS 13-48 Type 24 Class 2	Shielded	WL	02	2	3	-	5	-	-
BMS 13-48 Type 24 Class 3	Shielded	8E	03	-	-	4	-	6	7
BMS 13-48 Type 24 Class 3	Shielded	WM	03	2	3	-	5	-	-
BMS 13-48 Type 24 Class 4	Shielded	7J	04	-	-	4	-	6	7
BMS 13-48 Type 25 Class 1	Shielded	R0	01	-	-	-	-	-	7
BMS 13-48 Type 25 Class 1	Yellow, Shielded	R9	01	-	-	-	-	-	7
BMS 13-48 Type 25 Class 1	White/Red, Shielded	RH	01	-	-	-	-	-	7
BMS 13-48 Type 25 Class 2	Yellow, Shielded	P2	02	-	-	-	-	-	7
BMS 13-48 Type 25 Class 2	Shielded	R1	02	-	-	-	-	-	7

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-48 Type 25 Class 3	Yellow, Shielded	P3	03	-	-	-	-	-	7
BMS 13-48 Type 25 Class 3	Shielded	R2	03	-	-	-	-	-	7
BMS 13-48 Type 25 Class 4	Shielded	R3	04	-	-	4	-	-	7
BMS 13-48 Type 25 Class 4	Yellow, Shielded	RB	04	-	-	-	-	-	7
BMS 13-48 Type 26 Class 1	Shielded	R4	01	-	-	-	-	-	7
BMS 13-48 Type 26 Class 2	Yellow, Shielded	P0	02	-	-	-	-	-	7
BMS 13-48 Type 26 Class 2	Shielded	R5	02	-	-	-	-	-	7
BMS 13-48 Type 26 Class 3	Yellow, Shielded	P1	03	-	-	-	-	-	7
BMS 13-48 Type 26 Class 3	Shielded	R6	03	-	-	-	-	-	7
BMS 13-48 Type 26 Class 4	Shielded	R7	04	-	-	-	-	-	7
BMS 13-48 Type 26 Class 5	Shielded	R8	05	-	3	-	-	-	7
BMS 13-48 Type 27 Class 1	Flat Conductor Shield	X1	01	-	3	-	-	6	-
BMS 13-48 Type 27 Class 2	Flat Conductor Shield	X2	02	-	3	-	-	6	-
BMS 13-48 Type 27 Class 3	Flat Conductor Shield	X3	03	-	3	-	-	6	-
BMS 13-48 Type 27 Class 4	Flat Conductor Shield	X4	04	-	3	-	-	6	-
BMS 13-48 Type 27 Class 5	White/Red, Flat Conductor Shield	X5	05	-	3	-	-	6	-
BMS 13-48 Type 27 Class 6	Yellow, Flat Conductor Shield	X6	06	-	-	-	-	6	-
BMS 13-48 Type 28 Class 1	Flat Conductor Shield	Y1	01	-	3	-	-	6	-
BMS 13-48 Type 28 Class 2	Flat Conductor Shield	Y2	02	-	3	-	-	6	-
BMS 13-48 Type 28 Class 3	Flat Conductor Shield	Y3	03	-	3	-	-	6	-
BMS 13-48 Type 28 Class 4	Flat Conductor Shield	Y4	04	-	3	-	-	6	-
BMS 13-48 Type 28 Class 5	Flat Conductor Shield	Y5	05	-	-	-	-	6	-
BMS 13-48 Type 3 Class 1	Shielded	DG	01	-	3	-	-	-	-
BMS 13-48 Type 3 Class 1	Yellow, Shielded	P5	01	-	-	4	-	6	-
BMS 13-48 Type 3 Class 1	Shielded	PQ	01	-	-	4	-	6	7

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-48 Type 3 Class 1	White/Red, Shielded	PU	01	-	-	4	-	6	-
BMS 13-48 Type 3 Class 2	Shielded	DH	02	-	3	-	-	-	-
BMS 13-48 Type 3 Class 2	Yellow, Shielded	P4	02	-	-	4	-	6	-
BMS 13-48 Type 3 Class 2	Shielded	PR	02	-	-	4	-	6	-
BMS 13-48 Type 3 Class 3	Shielded	DJ	03	2	3	-	-	-	-
BMS 13-48 Type 3 Class 3	Shielded	PS	03	-	-	4	5	6	7
BMS 13-48 Type 3 Class 4	Shielded	DK	04	-	3	-	-	-	-
BMS 13-48 Type 3 Class 4	Shielded	PT	04	-	-	4	-	6	-
BMS 13-48 Type 32 Class 2	Shielded	Y6	3	-	3	-	-	-	7
BMS 13-48 Type 32 Class 3	Shielded	Y7	4	-	3	-	-	-	7
BMS 13-48 Type 32 Class 4	Shielded	Y8	5	-	3	-	-	-	-
BMS 13-48 Type 4 Class 2	-	DL	02	-	3	-	-	-	-
BMS 13-48 Type 4 Class 3	-	DM	03	-	3	-	-	-	-
BMS 13-48 Type 4 Class 4	-	DN	04	-	3	-	-	-	-
BMS 13-48 Type 6 Class 1	Shielded	PV	01	-	-	4	-	6	-
BMS 13-48 Type 6 Class 2	Shielded	PW	02	-	-	4	-	6	-
BMS 13-48 Type 6 Class 2	Red, Shielded	PZ	02	-	-	4	-	6	-
BMS 13-48 Type 6 Class 3	Shielded	PX	03	-	-	4	-	6	-
BMS 13-48 Type 6 Class 4	Shielded	PY	04	-	-	4	-	6	-
BMS 13-48 Type 6 Class 5	Shielded	P6	05	-	-	4	-	6	-
BMS 13-48 Type 8 Class 1	Green	5S	01	-	-	4	-	6	-
BMS 13-48 Type 8 Class 1	-	UA	01	-	-	4	-	6	7
BMS 13-48 Type 8 Class 1	-	UN	01	2	3	-	5	-	-
BMS 13-48 Type 8 Class 1	-	US	01	-	-	4	-	-	-
BMS 13-48 Type 8 Class 1	Yellow	WD	01	2	-	-	-	-	-
BMS 13-48 Type 8 Class 1	White/Red	XG	01	-	-	4	-	6	7
BMS 13-48 Type 8 Class 1	Yellow	XP	01	-	-	4	-	6	7
BMS 13-48 Type 8 Class 1	-	YA	01	-	-	4	-	-	-
BMS 13-48 Type 8 Class 1	Red	YM	01	-	-	4	-	-	-
BMS 13-48 Type 8 Class 2	-	UB	02	-	-	4	-	6	7
BMS 13-48 Type 8 Class 2	-	WG	02	2	-	-	-	-	-
BMS 13-48 Type 8 Class 2	-	YB	02	-	-	4	-	-	-

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-48 Type 8 Class 2	-	YQ	02	-	-	4	-	-	-
BMS 13-48 Type 8 Class 3	Not applicable before Line Number 1441	UC	03	-	3	-	-	-	-
BMS 13-48 Type 8 Class 3	-	UC	03	-	-	4	-	6	7
BMS 13-48 Type 8 Class 3	-	WE	03	2	-	-	-	-	-
BMS 13-48 Type 8 Class 3	-	YC	03	-	-	4	-	-	-
BMS 13-48 Type 8 Class 3	-	YR	03	-	-	4	-	-	-
BMS 13-48 Type 8 Class 4	-	UD	04	-	-	4	-	6	7
BMS 13-48 Type 8 Class 4	-	WF	04	2	-	-	-	-	-
BMS 13-48 Type 8 Class 5	-	UW	05	-	-	4	-	-	-
BMS 13-48 Type 8 Class 6	-	UE	06	-	-	4	-	-	-
BMS 13-48 Type 8 Class 7	-	UN	07	-	-	4	-	-	-
BMS 13-48 Type 9 Class 1	-	VA	01	-	-	4	-	6	-
BMS 13-48 Type 9 Class 1	White/Red, Shielded	VJ	01	-	-	-	-	6	-
BMS 13-48 Type 9 Class 1	Black	VK	01	-	-	-	-	6	-
BMS 13-48 Type 9 Class 1	-	YS	01	-	-	4	-	-	-
BMS 13-48 Type 9 Class 2	-	VB	02	-	-	4	-	6	-
BMS 13-48 Type 9 Class 2	-	YT	02	-	-	4	-	-	-
BMS 13-48 Type 9 Class 3	-	VC	03	-	-	4	-	6	-
BMS 13-48 Type 9 Class 3	-	YU	03	-	-	4	-	-	-
BMS 13-48 Type 9 Class 4	-	VD	04	-	-	4	-	6	-
BMS 13-48 Type 9 Class 4	-	YV	04	-	-	4	-	-	-
BMS 13-5 Type I Class A	-	1X	01	2	3	-	-	-	-
BMS 13-5 Type I Class B	-	1Y	02	2	3	-	-	-	-
BMS 13-5 Type I Class C	-	1Z	03	2	3	-	-	-	-
BMS 13-5 Type III Class A	Shielded	3X	01	2	3	-	-	-	-
BMS 13-5 Type III Class B	Shielded	3Y	02	2	3	-	-	-	-
BMS 13-5 Type III Class C	Shielded	3Z	03	2	3	-	-	-	-
BMS 13-51 Type I Class 1	High Temperature	EJ	01	2	3	-	5	-	-
BMS 13-51 Type I Class 2	High Temperature	EK	02	2	3	-	-	-	-
BMS 13-51 Type I Class 3	High Temperature	EL	03	2	3	-	-	-	-
BMS 13-51 Type I Class 4	High Temperature	EM	04	2	3	-	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-51 Type III Class 1	Shielded, High Temperature	EN	01	2	3	-	-	-	-
BMS 13-51 Type III Class 2	Shielded, High Temperature	EP	02	2	3	-	-	-	-
BMS 13-51 Type III Class 3	Shielded, High Temperature	EQ	03	2	3	-	-	-	-
BMS 13-51 Type III Class 4	Shielded, High Temperature	ER	04	2	3	-	-	-	-
BMS 13-51 Type IX Class 1	Shielded	2E	01	2	3	-	5	-	-
BMS 13-51 Type IX Class 2	Shielded	2F	02	2	3	-	5	-	-
BMS 13-51 Type IX Class 2	Blue, Shielded	8A	02	2	3	-	5	-	-
BMS 13-51 Type IX Class 3	Shielded	2G	03	2	3	-	5	-	-
BMS 13-51 Type IX Class 3	Blue, Shielded	8B	03	2	3	-	5	-	-
BMS 13-51 Type IX Class 4	Shielded	2H	04	2	3	-	5	-	-
BMS 13-51 Type IX Class 4	Blue, Shielded	8C	04	2	3	-	5	-	-
BMS 13-51 Type VI Class 2	Shielded	5Y	02	2	-	-	-	-	-
BMS 13-51 Type VII Class 2	-	5Z	02	2	3	-	5	-	-
BMS 13-51 Type VIII Class 1	-	2A	01	2	3	-	5	-	-
BMS 13-51 Type VIII Class 1	Red	2V	01	2	3	-	5	-	-
BMS 13-51 Type VIII Class 1	Yellow	2W	01	2	3	-	5	-	-
BMS 13-51 Type VIII Class 1	-	4D	01	-	-	4	-	6	-
BMS 13-51 Type VIII Class 2	-	2B	02	2	3	-	5	-	-
BMS 13-51 Type VIII Class 3	-	2C	03	2	3	-	5	-	-
BMS 13-51 Type VIII Class 4	-	2D	04	2	3	-	5	-	-
BMS 13-51 Type X Class 4	-	2S	04	-	3	-	-	-	-
BMS 13-51 Type X Class 6	-	2U	06	2	-	-	-	-	-
BMS 13-51 Type XI Class 1	-	2J	01	2	3	-	-	-	-
BMS 13-51 Type XI Class 1	-	6P	01	-	-	4	-	6	-
BMS 13-51 Type XI Class 2	-	2K	02	2	-	-	-	-	-
BMS 13-51 Type XI Class 2	-	6Q	02	-	-	-	-	6	-
BMS 13-51 Type XI Class 3	-	2L	03	2	3	-	5	-	-
BMS 13-51 Type XI Class 3	-	6R	03	-	-	-	-	6	-
BMS 13-51 Type XI Class 4	-	2M	04	2	3	-	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM						
				2	3	4	5	6	7	
BMS 13-51 Type XI Class 4	-	6S	04	-	-	-	-	6	-	
BMS 13-51 Type XII Class 1	Shielded	2N	01	2	-	-	-	-	-	
BMS 13-51 Type XII Class 1	-	6T	01	-	-	-	-	6	-	
BMS 13-51 Type XII Class 2	Shielded	2P	02	2	-	-	-	-	-	
BMS 13-51 Type XII Class 2	Shielded	6U	02	-	-	-	-	6	-	
BMS 13-51 Type XII Class 3	Shielded	2Q	03	2	-	-	-	-	-	
BMS 13-51 Type XII Class 3	Shielded	6V	03	-	-	-	-	6	-	
BMS 13-51 Type XII Class 4	Shielded	2R	04	2	3	-	5	-	-	
BMS 13-51 Type XII Class 4	Shielded	6W	04	-	-	-	-	6	-	
BMS 13-51 Type XII Class 5	Shielded	2T	05	2	3	-	-	-	-	
BMS 13-51 Type XIV Class 1	Red	5L	01	-	-	4	-	6	-	
BMS 13-51 Type XIV Class 1	Green	5M	01	-	-	4	-	6	-	
BMS 13-51 Type XIV Class 1	Yellow	5N	01	-	-	4	-	6	-	
BMS 13-51 Type XIV Class 1	-	6A	01	2	3	4	5	6	-	
BMS 13-51 Type XIV Class 1	Red	6V	01	2	3	-	5	-	-	
BMS 13-51 Type XIV Class 1	Yellow	6W	01	2	3	-	5	-	-	
BMS 13-51 Type XIV Class 1	White/Black	9W	01	2	3	-	5	-	-	
BMS 13-51 Type XIV Class 1	White/Green	9X	01	2	3	-	5	-	-	
BMS 13-51 Type XIV Class 1	White/Violet	9Y	01	-	3	-	5	-	-	
BMS 13-51 Type XIV Class 1	White/Orange, Shielded, High Temperature	9Z	01	2	3	-	5	-	-	
BMS 13-51 Type XIV Class 2	-	6B	02	2	3	4	5	6	-	
BMS 13-51 Type XIV Class 3	-	6C	03	2	3	4	5	6	-	
BMS 13-51 Type XIV Class 4	-	6D	04	2	3	4	5	6	-	
BMS 13-51 Type XIV Class 6	-	4A	06	-	-	4	-	-	-	
BMS 13-51 Type XIV Class 7	-	4B	07	-	-	4	-	-	-	
BMS 13-51 Type XV Class 1	Red, Shielded	4C	01	-	-	4	-	6	-	
BMS 13-51 Type XV Class 1	-	4K	01	-	-	-	-	6	-	
BMS 13-51 Type XV Class 1	Yellow, Shielded	5P	01	-	-	4	-	6	-	
BMS 13-51 Type XV Class 1	Shielded	6E	01	2	3	4	5	6	-	
BMS 13-51 Type XV Class 1	Blue, Shielded	8J	01	2	3	-	5	-	-	
BMS 13-51 Type XV Class 2	Shielded	6F	02	2	3	4	5	6	-	

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-51 Type XV Class 2	Yellow, Shielded	8H	02	2	3	-	5	-	-
BMS 13-51 Type XV Class 2	Blue, Shielded	8K	02	2	3	-	5	-	-
BMS 13-51 Type XV Class 3	Shielded	6G	03	2	3	4	5	6	-
BMS 13-51 Type XV Class 3	Blue, Shielded	8L	03	2	3	-	5	-	-
BMS 13-51 Type XV Class 4	Shielded	6H	04	2	3	4	5	6	-
BMS 13-51 Type XV Class 4	Blue, Shielded	8M	04	2	3	-	5	-	-
BMS 13-51 Type XVI Class 4	-	6T	04	-	3	-	-	-	-
BMS 13-51 Type XVI Class 6	-	6U	06	2	3	-	-	-	-
BMS 13-51 Type XVII Class 1	-	6J	01	2	3	4	5	6	-
BMS 13-51 Type XVII Class 1	Red	6X	01	-	-	-	-	6	-
BMS 13-51 Type XVII Class 2	-	6K	02	2	3	4	5	6	-
BMS 13-51 Type XVII Class 3	-	6L	03	2	3	4	5	6	-
BMS 13-51 Type XVII Class 4	-	6M	04	2	3	4	5	6	-
BMS 13-51 Type XVIII Class 1	Red, Shielded	5B	01	-	-	4	-	-	-
BMS 13-51 Type XVIII Class 1	Shielded	5G	01	-	-	4	-	6	-
BMS 13-51 Type XVIII Class 1	Shielded	6N	01	2	3	-	5	-	-
BMS 13-51 Type XVIII Class 2	Shielded	5H	02	-	-	4	-	6	-
BMS 13-51 Type XVIII Class 2	Shielded	6P	02	2	3	-	5	-	-
BMS 13-51 Type XVIII Class 2	Blue, Shielded	8P	02	2	3	-	5	-	-
BMS 13-51 Type XVIII Class 3	Shielded	5J	03	-	-	4	-	6	-
BMS 13-51 Type XVIII Class 3	Shielded	6Q	03	2	3	-	5	-	-
BMS 13-51 Type XVIII Class 4	Shielded	5K	04	-	-	4	-	6	-
BMS 13-51 Type XVIII Class 4	Shielded	6R	04	2	3	-	5	-	-
BMS 13-51 Type XVIII Class 5	Shielded	6S	05	-	3	-	-	-	-
BMS 13-51 Type XXIX Class 1	-	5J	01	2	3	-	5	-	-
BMS 13-51 Type XXIX Class 2	-	5K	02	2	3	-	5	-	-
BMS 13-51 Type XXIX Class 3	-	5L	03	2	3	-	5	-	-
BMS 13-51 Type XXIX Class 4	-	5M	04	2	3	-	5	-	-
BMS 13-51 Type XXVI Class 1	-	5A	01	2	-	-	5	-	-
BMS 13-51 Type XXVI Class 1	Red	5V	01	2	-	-	5	-	-
BMS 13-51 Type XXVI Class 1	Yellow	5W	01	-	-	-	5	-	-
BMS 13-51 Type XXVI Class 1	-	7S	01	-	-	-	-	6	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-51 Type XXVI Class 1	Red	7T	01	-	-	-	-	6	-
BMS 13-51 Type XXVI Class 1	Green	7U	01	-	-	-	-	6	-
BMS 13-51 Type XXVI Class 1	Yellow	8T	01	-	-	-	-	6	-
BMS 13-51 Type XXVI Class 2	-	5B	02	2	-	-	5	-	-
BMS 13-51 Type XXVI Class 2	-	7V	02	-	-	-	-	6	-
BMS 13-51 Type XXVI Class 3	-	5C	03	2	-	-	5	-	-
BMS 13-51 Type XXVI Class 3	-	7W	03	-	-	-	-	6	-
BMS 13-51 Type XXVI Class 4	-	5D	04	2	-	-	5	-	-
BMS 13-51 Type XXVI Class 4	-	7X	04	-	-	-	-	6	-
BMS 13-51 Type XXVII Class 1	Shielded	5E	01	2	-	-	5	-	-
BMS 13-51 Type XXVII Class 1	Shielded	7Y	01	-	-	-	-	6	-
BMS 13-51 Type XXVII Class 2	Shielded	5F	02	2	-	-	5	-	-
BMS 13-51 Type XXVII Class 2	Shielded	8A	02	-	-	-	-	6	-
BMS 13-51 Type XXVII Class 3	Shielded	5G	03	2	3	-	5	-	-
BMS 13-51 Type XXVII Class 3	Shielded	8B	03	-	-	-	-	6	-
BMS 13-51 Type XXVII Class 4	Shielded	5H	04	2	-	-	5	-	-
BMS 13-51 Type XXVII Class 4	Shielded	8M	04	-	-	-	-	6	-
BMS 13-51 Type XXX Class 1	Shielded	5N	01	2	3	-	5	-	-
BMS 13-51 Type XXX Class 1	Red, Shielded	5S	01	-	-	-	5	-	-
BMS 13-51 Type XXX Class 1	Blue, Shielded	8D	01	2	3	-	5	-	-
BMS 13-51 Type XXX Class 2	Shielded	5P	02	2	3	-	5	-	-
BMS 13-51 Type XXX Class 2	Blue, Shielded	8E	02	2	3	-	5	-	-
BMS 13-51 Type XXX Class 3	Shielded	5Q	03	2	3	-	5	-	-
BMS 13-51 Type XXX Class 3	Red, Shielded	5U	03	-	-	-	5	-	-
BMS 13-51 Type XXX Class 3	Blue, Shielded	8F	03	2	3	-	5	-	-
BMS 13-51 Type XXX Class 4	Shielded	5R	04	-	-	-	5	-	-
BMS 13-51 Type XXX Class 4	Blue, Shielded	8G	04	2	3	-	5	-	-
BMS 13-52 Type IV	Teflon Expando Sleeve	S3	-	2	3	-	5	-	-
BMS 13-52 Type IV	Teflon Expando Sleeve	SF	-	-	3	4	5	6	7
BMS 13-52 Type V	Polyester Expando Sleeve	S1	-	2	3	-	5	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(07 Model WDM)					
				2	3	4	5	6	7
BMS 13-55 Type 1 Class 1	Fire Resistant	9B	01	-	-	4	-	-	-
BMS 13-55 Type 1 Class 1	Fire Resistant	9V	01	-	-	4	5	-	-
BMS 13-55 Type 1 Class 1	White, Fire Resistant	C6	01	-	-	-	-	6	-
BMS 13-55 Type 1 Class 1	Ni-Cu, High Temperature	VS	01	2	3	-	5	-	-
BMS 13-55 Type 1 Class 2	High Temperature	C7	02	-	-	-	-	6	-
BMS 13-55 Type 2 Class 1	Fire Resistant	9P	01	-	3	4	5	6	7
BMS 13-55 Type 2 Class 1	HSCA, High Temperature	VT	01	2	3	-	5	-	-
BMS 13-55 Type 3 Class 1	White, Nickel Plated Shield, High Temperature	C8	01	-	-	-	-	6	-
BMS 13-55 Type 3 Class 2	White, Nickel Plated Shield, High Temperature	C9	02	-	3	-	-	6	-
BMS 13-55 Type 3 Class 2	Nickel Plated Shield, Fire Resistant	E0	02	-	-	4	-	-	-
BMS 13-55 Type 3 Class 3	Nickel Plated Shield, Fire Resistant	E1	03	-	-	4	-	-	-
BMS 13-55 Type 4 Class 1	Nickel Plated Shield, Fire Resistant	9L	01	-	3	4	-	6	7
BMS 13-55 Type 4 Class 2	Nickel Plated Shield, Fire Resistant	9Q	02	-	-	-	-	-	7
BMS 13-55 Type 4 Class 2	Shielded, Fire Resistant	V5	02	-	-	-	5	-	-
BMS 13-55 Type 4 Class 3	Nickel Plated Shield, Fire Resistant	9T	03	-	-	-	5	-	7
BMS 13-55 Type 4 Class 3	Shielded, High Temperature	VZ	03	2	3	-	5	-	-
BMS 13-55 Type 5 Class 1	Fire Resistant	TJ	01	-	3	-	5	-	-
BMS 13-58 Type I Class 1	High Temperature	BJ	01	-	-	4	-	6	7
BMS 13-58 Type I Class 1	High Temperature	CQ	01	-	3	4	5	6	7
BMS 13-58 Type I Class 1	High Temperature	W2	01	-	3	-	-	-	-
BMS 13-58 Type I Class 1	High Temperature	W3	01	2	3	-	5	-	-
BMS 13-58 Type V Class 1	High Temperature	B6	01	-	3	-	-	-	-
BMS 13-58 Type V Class 1	Red, High Temperature	CE	01	-	-	-	-	-	7

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-58 Type V Class 2	High Temperature	B7	02	-	-	4	-	-	7
BMS 13-58 Type V Class 3	High Temperature	B8	03	-	-	-	-	-	7
BMS 13-58 Type V Class 4	High Temperature	CF	04	-	3	-	-	-	-
BMS 13-58 Type VII Class 1	Nickel Plated Shield, High Temperature	B9	01	-	3	-	-	-	-
BMS 13-58 Type VII Class 1	Red, Nickel Plated Shield, High Temperature	C5	01	-	-	-	-	-	7
BMS 13-58 Type VII Class 2	Nickel Plated Shield, High Temperature	BE	02	-	-	-	-	-	7
BMS 13-58 Type VII Class 3	Nickel Plated Shield, High Temperature	BZ	03	-	-	-	-	-	7
BMS 13-58 Type VII Class 4	Nickel Plated Shield, High Temperature	C0	04	-	-	-	-	-	7
BMS 13-60 Type 1 Class 1	-	GA	01	-	3	-	5	-	-
BMS 13-60 Type 1 Class 1	White/Red	QA	01	-	3	-	5	-	-
BMS 13-60 Type 1 Class 1	Yellow	QB	01	-	3	-	5	-	-
BMS 13-60 Type 1 Class 1	White/Black	QC	01	-	3	-	-	-	-
BMS 13-60 Type 1 Class 1	White/Orange	QD	01	-	3	-	-	-	-
BMS 13-60 Type 1 Class 1	White/Violet	QE	01	-	3	-	-	-	-
BMS 13-60 Type 1 Class 1	White/Green	QF	01	-	3	-	-	-	-
BMS 13-60 Type 1 Class 2	-	GB	02	-	3	-	5	-	-
BMS 13-60 Type 1 Class 3	-	GC	03	-	3	-	5	-	-
BMS 13-60 Type 1 Class 4	-	GD	04	-	3	-	5	-	-
BMS 13-60 Type 10 Class 1	High Temperature, Do Not Solder AWG 24	HL	01	-	3	4	5	6	7
BMS 13-60 Type 10 Class 1	White/Red, High Temperature, Do Not Solder AWG 24	QZ	01	-	3	4	5	6	7
BMS 13-60 Type 10 Class 2	High Temperature, Do Not Solder AWG 24	HM	02	-	3	4	5	6	7
BMS 13-60 Type 10 Class 3	High Temperature, Do Not Solder AWG 24	HN	03	-	3	4	5	6	7

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-60 Type 10 Class 4	High Temperature, Do Not Solder AWG 24	HT	04	-	-	4	5	6	7
BMS 13-60 Type 11 Class 1	White/Red, Nickel Plated Shield, High Temperature	H9	01	-	3	4	-	-	7
BMS 13-60 Type 11 Class 1	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24	HP	01	-	3	4	5	6	7
BMS 13-60 Type 11 Class 2	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24	HQ	02	-	3	4	5	6	7
BMS 13-60 Type 11 Class 3	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24	HR	03	-	3	4	5	6	7
BMS 13-60 Type 11 Class 4	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24	HS	04	-	3	4	5	6	7
BMS 13-60 Type 12 Class 3	-	F#	03	-	3	-	-	-	-
BMS 13-60 Type 12 Class 8	High Temperature, Do Not Solder AWG 24	HU	08	-	3	-	-	-	-
BMS 13-60 Type 13 Class 1	Shielded	GT	01	-	3	-	5	-	-
BMS 13-60 Type 13 Class 1	White/Black	GY	01	-	3	-	5	-	-
BMS 13-60 Type 13 Class 1	Blue, Shielded	H1	01	-	-	-	5	-	-
BMS 13-60 Type 13 Class 1	Red, Shielded	H8	01	-	3	-	-	-	-
BMS 13-60 Type 13 Class 2	Shielded	GU	02	-	3	-	5	-	-
BMS 13-60 Type 13 Class 2	Blue, Shielded	H2	02	-	-	-	5	-	-
BMS 13-60 Type 13 Class 2	Yellow, Shielded	H5	02	-	-	-	5	-	-
BMS 13-60 Type 13 Class 3	Shielded	GV	03	-	3	-	5	-	-
BMS 13-60 Type 13 Class 3	Blue, Shielded	H3	03	-	-	-	5	-	-
BMS 13-60 Type 13 Class 4	Shielded	GW	04	-	3	-	5	-	-
BMS 13-60 Type 13 Class 4	Blue, Shielded	H4	04	-	-	-	5	-	-
BMS 13-60 Type 15 Class 1	Shielded, Do Not Solder AWG 24	G1	01	-	3	-	5	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-60 Type 15 Class 1	Blue, Shielded, Do Not Solder AWG 24	H6	01	-	-	-	5	-	-
BMS 13-60 Type 15 Class 2	Shielded, Do Not Solder AWG 24	G2	02	-	3	-	5	-	-
BMS 13-60 Type 15 Class 2	Blue, Shielded, Do Not Solder AWG 24	H7	02	-	-	-	5	-	-
BMS 13-60 Type 15 Class 3	Shielded, Do Not Solder AWG 24	G3	03	-	3	-	5	-	-
BMS 13-60 Type 15 Class 4	Shielded, Do Not Solder AWG 24	G4	04	-	3	-	5	-	-
BMS 13-60 Type 19 Class 1	High Temperature	QG	01	-	-	-	5	-	-
BMS 13-60 Type 2 Class 1	Yellow, Shielded	G7	01	-	-	-	5	-	-
BMS 13-60 Type 2 Class 1	Shielded	GE	01	-	3	-	5	-	-
BMS 13-60 Type 2 Class 1	Red, Shielded	H0	01	-	3	-	-	-	-
BMS 13-60 Type 2 Class 2	Shielded	GF	02	-	3	-	5	-	-
BMS 13-60 Type 2 Class 2	Blue, Shielded	QJ	02	-	-	-	5	-	-
BMS 13-60 Type 2 Class 3	Shielded	GG	03	-	3	-	5	-	-
BMS 13-60 Type 2 Class 3	Blue, Shielded	QK	03	-	-	-	5	-	-
BMS 13-60 Type 2 Class 4	Shielded	GH	04	-	-	-	5	-	-
BMS 13-60 Type 2 Class 4	Blue, Shielded	QL	04	-	-	-	5	-	-
BMS 13-60 Type 20 Class 1	Nickel Plated Shield, High Temperature	E4	01	-	3	-	-	-	-
BMS 13-60 Type 20 Class 2	Nickel Plated Shield, High Temperature	E5	02	-	3	-	-	-	-
BMS 13-60 Type 20 Class 3	Nickel Plated Shield, High Temperature	E6	03	-	3	-	-	-	-
BMS 13-60 Type 22 Class 1	Aluminum	QY	01	-	3	4	5	6	7
BMS 13-60 Type 22 Class 3	Al	OL	03	-	-	-	-	6	7
BMS 13-60 Type 24 Class 7	Shielded	HV	07	-	-	-	5	-	-
BMS 13-60 Type 25 Class 1	High Temperature, Adjacent Round Conductor Shields	HW	01	-	3	-	-	-	-
BMS 13-60 Type 25 Class 2	High Temperature, Adjacent Round Conductor Shields	HX	02	-	3	-	5	-	-

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM						
				2	3	4	5	6	7	
BMS 13-60 Type 25 Class 3	High Temperature, Adjacent Round Conductor Shields	HY	03	-	3	-	-	-	-	
BMS 13-60 Type 25 Class 4	Two Shields, High Temperature	HZ	04	-	3	-	-	-	-	
BMS 13-60 Type 26 Class 1	Two Flat Conductor Shields	M4	01	-	3	-	-	-	-	
BMS 13-60 Type 26 Class 2	Flat Conductor Shields, Not Adjacent	M5	02	-	3	-	5	-	-	
BMS 13-60 Type 26 Class 3	Flat Conductor Shields, Not Adjacent	M6	03	-	3	-	-	-	-	
BMS 13-60 Type 27 Class 1	High Temperature, Round Conductor Shields, Not Adjacent	M1	01	-	3	-	5	6	-	
BMS 13-60 Type 27 Class 2	High Temperature, Round Conductor Shields, Not Adjacent	M2	02	-	3	-	-	-	-	
BMS 13-60 Type 27 Class 3	High Temperature, Round Conductor Shields, Not Adjacent	M3	03	-	3	-	-	-	-	
BMS 13-60 Type 3 Class 6	-	GJ	6	-	3	-	5	-	-	
BMS 13-60 Type 3 Class 6	-	GJ	06	-	3	-	5	-	-	
BMS 13-60 Type 33 Class 1	Flat Conductor Shield	N1	01	-	3	-	5	-	-	
BMS 13-60 Type 33 Class 1	White/Red, Flat Conductor Shield	N9	01	-	3	-	-	-	-	
BMS 13-60 Type 33 Class 2	Yellow, Flat Conductor Shield	N0	02	-	3	-	-	-	-	
BMS 13-60 Type 33 Class 2	Flat Conductor Shield	N2	02	-	3	-	5	-	-	
BMS 13-60 Type 33 Class 3	Flat Conductor Shield	N3	03	-	3	-	5	-	-	
BMS 13-60 Type 33 Class 4	Flat Conductor Shield	N4	04	-	3	-	5	-	-	
BMS 13-60 Type 34 Class 1	Flat Conductor Shield	N5	01	-	3	-	5	-	-	

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
BMS 13-60 Type 34 Class 2	Flat Conductor Shield	N6	02	-	3	-	5	-	-
BMS 13-60 Type 34 Class 3	Flat Conductor Shield	N7	03	-	3	-	5	-	-
BMS 13-60 Type 34 Class 4	Flat Conductor Shield	N8	04	-	3	-	5	-	-
BMS 13-60 Type 4 Class 1	High Temperature, Do Not Solder AWG 24	GK	01	-	3	-	5	-	-
BMS 13-60 Type 4 Class 1	Blue, Do Not Solder AWG 24	QN	01	-	-	-	5	-	-
BMS 13-60 Type 4 Class 2	Do Not Solder AWG 24	GL	02	-	3	-	5	-	-
BMS 13-60 Type 4 Class 3	Do Not Solder AWG 24	GM	03	-	3	-	5	-	-
BMS 13-60 Type 4 Class 4	Do Not Solder AWG 24	GN	04	-	3	-	5	-	-
BMS 13-60 Type 44 Class 1	-	G5	01	-	3	-	-	-	-
BMS 13-60 Type 45 Class 1	-	G6	01	-	3	-	-	-	-
BMS 13-60 Type 5 Class 1	Shielded, Do Not Solder AWG 24	GP	01	-	-	-	5	-	7
BMS 13-60 Type 5 Class 1	Blue, Shielded, Do Not Solder AWG 24	QS	01	-	-	-	5	-	-
BMS 13-60 Type 5 Class 1	White/Red, Shielded, Do Not Solder AWG 24	QT	01	-	3	-	5	-	-
BMS 13-60 Type 5 Class 2	Shielded, Do Not Solder AWG 24	GQ	02	-	3	-	5	-	7
BMS 13-60 Type 5 Class 2	Blue, Shielded, Do Not Solder AWG 24	QU	02	-	-	-	5	-	-
BMS 13-60 Type 5 Class 3	Shielded, Do Not Solder AWG 24	GR	03	-	3	-	5	-	7
BMS 13-60 Type 5 Class 3	Blue, Shielded, Do Not Solder AWG 24	QV	03	-	-	-	5	-	-
BMS 13-60 Type 5 Class 3	White/Red, Shielded, Do Not Solder AWG 24	QW	03	-	-	-	5	-	-
BMS 13-60 Type 5 Class 4	Shielded, Do Not Solder AWG 24	GS	04	-	-	-	5	-	7

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7 Model WDM					
				2	3	4	5	6	7
BMS 13-60 Type 5 Class 4	Blue, Shielded, Do Not Solder AWG 24	QX	04	-	-	-	5	-	-
BMS 13-60 Type 7 Class 1	High Temperature, Do Not Solder AWG 24	HA	01	-	3	4	5	6	7
BMS 13-60 Type 7 Class 2	High Temperature, Do Not Solder AWG 24	HB	02	-	3	4	5	6	-
BMS 13-60 Type 7 Class 3	High Temperature, Do Not Solder AWG 24	HC	03	-	3	4	5	6	-
BMS 13-60 Type 7 Class 4	High Temperature, Do Not Solder AWG 24	HD	04	-	3	4	5	-	-
BMS 13-60 Type 8 Class 1	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24	HE	01	-	3	4	5	6	7
BMS 13-60 Type 8 Class 2	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24	HF	02	-	3	4	5	6	7
BMS 13-60 Type 8 Class 3	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24	HG	03	-	3	4	5	-	-
BMS 13-60 Type 8 Class 4	Nickel Plated Shield, High Temperature, Do Not Solder AWG 24	HK	04	-	3	-	5	-	-
BMS 13-60 Type 9 Class 3	High Temperature, Do Not Solder AWG 24	HH	03	-	3	4	-	6	-
BMS 13-60 Type 9 Class 8	High Temperature, Do Not Solder AWG 24	HJ	08	-	3	-	-	-	-
BMS 13-65 Type 0E, S280W503-1	Coax	0E	01	-	-	4	-	6	7
BMS 13-65 Type 0F, S280W503-2	Coax	0F	01	-	3	4	5	6	7
BMS 13-65 Type 0G, S280W503-3	Coax	0G	01	-	3	4	5	6	7
BMS 13-65 Type 0H, S280W503-4	Coax	0H	01	-	3	4	5	6	7
BMS 13-65 Type 0J, S280W503-5	Coax	0J	01	-	3	4	5	6	7
BMS 13-65 Type 0K, S280W503-6	Light Weight Coax	0K	01	-	3	4	5	6	7

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM						
				2	3	4	5	6	7	
BMS 13-67 Type 2 Class 1	Nickel Plated Shield, Fire Resistant	9U	01	-	-	4	-	6	-	
BMS 13-72 Type 3 Class 4	Databus	FS	4	-	3	4	5	6	7	
BMS 13-72 Type 4 Class 4	Databus	FT	4	-	3	4	5	6	7	
BMS 13-8 Type I Class A	High Temperature	01	01	2	3	-	-	-	-	
BMS 13-8 Type I Class A	Shielded	39	01	2	3	-	-	-	-	
BMS 13-8 Type I Class A	Red, Fire Resistant	XM	01	-	-	4	-	-	-	
BMS 13-8 Type II Class A	Shielded, High Temperature	02	01	2	3	-	-	-	-	
BMS 13-8 Type III Class A	Shielded, High Temperature	37	01	2	3	-	-	-	-	
BMS 13-8 Type III Class B	Shielded, High Temperature	38	02	2	-	-	-	-	-	
BS-G177, Uninyvin	-	4G	01	2	3	-	-	-	-	
BS-G192, Uniefglass	High Temperature	4F	01	2	3	-	-	-	-	
Ben-Har 1151 FRB, Bentley-Harris	Fiberglass Sleeve	SK	-	-	-	4	-	6	7	
Ben-Har Expando Grade PT, Bentley-Harris	Polyester Expando Sleeve	SE	-	-	-	4	-	6	7	
C42016260902, Judd	Shielded, 77 pf/ft	T1	01	-	-	-	-	-	7	
C42016310902, Judd	Shielded, 91 pf/ft	T2	01	-	-	-	-	-	7	
CFT-16-0-00	Sleeve, Convolutd Teflon	SA	-	-	-	4	-	6	7	
CH10-0324-(), 287N5001-()	Insulated Jumper	ZC	-	-	-	-	5	-	-	
CTC-0039-()-9/5-9, Raychem	Al-Ch, Thermocouple	DU	02	-	3	4	5	6	7	
CTC-0039-20-9/5-9, Raychem	Al-Ch, Thermocouple	DT	02	-	3	-	5	-	-	
CTC-0062-()-9/5-9, Raychem	Shielded, Al-Ch	TA	02	-	-	-	5	6	7	
D3-7619-5/935, M81044/12-22	Shielded	JJ	5	-	3	-	-	-	-	
D6-7619-5/915, V96906	-	4H	10	-	-	4	-	-	-	
DM-F-2MFG, Matsushita Cable	Shielded	W8	05	-	-	-	5	-	-	
ECC-VFP-876, Electronized Chemicals	Heat Shrinkable Polyolefin Sleeve	SC	-	-	-	4	-	6	7	
EPD 2376, Raychem	Al-Ch, Thermocouple	YY	02	-	-	4	-	-	-	

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
EPD 52236A, Raychem	Power Seat Cable	T0	06	-	-	-	-	-	7
EPD5386, Raychem	-	WL	01	-	-	4	-	-	-
FBTLS-260-()NA, Tensolite	High Temperature, BMS 13-60 Type 10 With Bondable Jacket	RN	01	-	3	-	-	-	-
FBTLS-260-1NJ-()NA, Tensolite	Shielded, High Temperature, BMS 13-60 Type 11 With Bondable Jacket	RK	01	-	3	-	-	-	-
FBTLS-260-2NJ-()NA, Tensolite	Shielded, High Temperature, BMS 13-60 Type 11 With Bondable Jacket	RL	02	-	3	-	-	-	-
FBTLS-260-3NJ-()NA, Tensolite	Shielded, High Temperature, BMS 13-60 Type 11 With Bondable Jacket	RM	03	-	3	-	-	-	-
FSJ4-50, Andrew	Heliax	WA	01	-	-	4	-	-	-
Gencote #125C, General Plastics	Fiberglass Sleeve	SG	-	-	-	4	-	6	7
H22-4000, Rockbestos	Red, Fire Resistant	XL	01	-	-	4	-	-	-
HB06681/70258T-1, Tensolite	Shielded	4T	01	-	-	4	-	-	-
JW647-99, Judd	HI-FLEX, Adjacent Round Conductor Shields	D9	2	-	-	-	-	-	7
KWN1108, Gore	Wire Wrap, Shielded	4U	02	-	-	4	-	-	-
LDF4RN-50A, Andrew	Coax	7Q	01	-	3	4	5	6	7
LWAC-144, Lewis	Al-Ch, Thermocouple, High Temperature	44	10	2	3	-	-	-	-
LWAC-99JX, Lewis	Al-Ch, Thermocouple, High Temperature	85	02	2	3	-	5	-	-
M17/134-0001, MIL-C-17	Triax, Shielded	76	01	-	-	4	-	-	-
M22759/16-()-9, MIL-W-22759	-	9A	01	-	3	-	-	-	-
M25038/1-12-2, MIL-W-25038	Red, Fire Resistant	KB	01	-	3	-	-	-	-
M27500-()ML1T08, MIL-W-81044/12, MIL-C-27500	-	LE	01	-	-	4	-	-	-
M27500-()ML2T08, MIL-W-81044/12, MIL-C-27500	-	LH	02	-	-	4	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
M27500-()ML3T08, MIL-W-81044/12, MIL-C-27500	-	LL	03	-	-	4	-	-	-
M27500-()SB1T14, MIL-W-22759/32, MIL-C-27500	Shielded, Replaced M27500-()TG1T14 for AWG 22 - AWG 12	9E	01	-	3	-	-	-	-
M27500-()SB2T14, MIL-W-22759/32, MIL-C-27500	Shielded, Replaced M27500-()TG2T14 for AWG 22 - AWG 12	9F	02	-	3	-	-	-	-
M27500-()SB3T14, MIL-W-22759/32, MIL-C-27500	Shielded, Replaced M27500-()TG3T14 for AWG 22 - AWG 12	9G	03	-	3	-	-	-	-
M27500-()SB4T14, MIL-W-22759/32, MIL-C-27500	Shielded, Replaced M27500-()TG4T14 for AWG 22 - AWG 12	9H	04	-	3	-	-	-	-
M27500-()TG1T14, MIL-C-27500	Shielded, Replaced by M27500-()SB1T14 or M27500-24ST1T14	9E	01	-	3	-	-	-	-
M27500-()TG2T14, MIL-C-27500	Shielded, Replaced by M27500-()SB2T14 or M27500-24ST2T14	9F	02	-	3	-	-	-	7
M27500-()TG2U00, MIL-W-22759/16, MIL-W-27500	-	9B	02	-	3	-	-	-	-
M27500-()TG3T14, MIL-C-27500	Shielded, Replaced by M27500-()SB3T14 or M27500-24ST3T14	9G	03	-	3	-	-	-	-
M27500-()TG3U00, MIL-W-22759/16, MIL-W-27500	-	9C	03	-	3	-	-	-	-
M27500-()TG4T14, MIL-C-27500	Shielded, Replaced by M27500-()SB4T14 or M27500-24ST4T14	9H	04	-	3	-	-	-	-
M27500-()TG4U00, MIL-W-22759/16, MIL-W-27500	-	9D	04	-	3	-	-	-	-
M27500-20ML2T23, MIL-W-81044/12-20, MIL-C-27500	Shielded	4E	02	-	-	4	-	-	-
M27500-20ML4T04, MIL-W-81044/12-20, MIL-C-27500	Shielded	4G	04	-	-	4	-	-	-
M27500-20ML4T23, MIL-W-81044/12-20, MIL-C-27500	Shielded	4I	04	-	-	4	-	-	-
M27500-20RC2N06, MIL-W-22759/11-20, MIL-C-27500	Shielded, High Temperature	VN	02	-	-	4	-	-	-
M27500-20RE2N12, MIL-W-22759/12-20, MIL-C-27500	Shielded, High Temperature	CL	02	-	-	4	-	-	-

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WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM						
				2	3	4	5	6	7	
M27500-22ML2T23, MIL-W-81044/12-22, MIL-C-27500	Shielded	4F	02	-	-	4	-	-	-	
M27500-24ST1T14, MIL-W-22759/46, MIL-C-27500	Shielded, Replaced M27500-24TG1T14	9E	01	-	3	-	-	-	-	
M27500-24ST2T14, MIL-W-22759/46, MIL-C-27500	Shielded, Replaced M27500-24TG2T14	9F	02	-	3	-	-	-	-	
M27500-24ST3T14, MIL-W-22759/46, MIL-C-27500	Shielded, Replaced M27500-24TG3T14	9G	03	-	3	-	-	-	-	
M27500-24ST4T14, MIL-W-22759/46, MIL-C-27500	Shielded, Replaced M27500-()TG4T14	9H	04	-	3	-	-	-	-	
M5086/2, MIL-W-5086	Triax	ZC	03	-	-	4	-	-	-	
M5846-1E2/(), MIL-W-5486	Shielded, Thermocouple	KH	02	-	3	-	-	-	-	
MI-5224, Times Wire Company	Coax	79	01	2	3	4	-	-	-	
MIL-I-23053/12	Heat Shrinkable Teflon Sleeve; for alternatives, refer to Subject 20-00-11	S4	-	2	3	-	5	-	-	
MIL-W-16878, Sundstrand 704-0785	High Temperature	ES	02	2	3	-	-	-	-	
MIL-W-16878, Sundstrand 704-0785	Shielded, High Temperature	ET	02	2	3	-	-	-	-	
MIL-W-16878, Sundstrand 704-0785	High Temperature	EU	01	2	3	-	-	-	-	
MIL-W-16878, Sundstrand 704-0785	Shielded, High Temperature	EV	01	2	3	-	-	-	-	
MIL-W-22759/2	High Temperature	WU	01	-	-	4	-	6	-	
MIL-W-5274A Type 3 Class A	-	74	01	2	-	-	-	-	-	
MIL-W-7139B, MIL-W-7078	Shielded, High Temperature	14	02	2	3	-	-	-	-	
MIL-W-7139B, MIL-W-7078	Shielded, High Temperature	15	01	2	3	-	-	-	-	
MS25226-2-()	Busbar	Z1	-	-	3	-	5	-	-	
MS25226-4-()	Busbar	ZK	01	-	3	4	-	-	-	
MS25226-6-()	Busbar	ZJ	01	-	3	4	-	-	-	
MT-LN205/A, Vibro-Meter	Shielded, High Temperature	CV	02	2	3	-	-	-	-	
N-9002, ITT	-	30	04	-	3	-	-	-	-	

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
N-9004, ITT	-	28	02	-	3	-	-	-	-
NEC 1616MF, National Electric	-	VU	16	-	-	4	-	-	-
NEC 21044BC, National Electric	-	VR	06	-	-	4	-	-	-
NEC 210712BC, National Electric	Coax	VT	09	-	-	4	-	-	-
NEC 2416MF, National Electric	-	VV	24	-	-	4	-	-	-
NEC 282616BC, National Electric	-	VX	28	-	-	4	-	-	-
NEC 28616BC, National Electric	Coax	VS	08	-	-	4	-	-	-
NEC 28W, National Electric	Shielded	VQ	02	-	-	4	-	-	-
NEC 3616MF, National Electric	-	VW	36	-	-	4	-	-	-
P606671, Axon	High Temperature	V6	01	-	3	-	-	-	-
P606672, Axon	High Temperature	W7	01	-	3	-	-	-	-
P694694	Multi-Conductor	56	02	2	3	-	-	-	-
PMA-11, Lewis	Al-Ch, Thermocouple	MA	11	2	3	-	-	-	-
Penntube I, Pennsylvania Fluorocarbon	Teflon Sleeve	SB	-	-	-	4	-	-	7
RG-108A, MIL-C-17	Twinax	DA	01	-	3	-	-	-	-
RG-108A, MIL-C-17	Twinax	TH	01	-	-	4	-	6	7
RG-114A, MIL-C-17D	Coax	72	01	2	3	-	5	-	-
RG-115A, MIL-C-17	Coax	XF	01	-	-	4	-	6	-
RG-11A, MIL-C-17D	Coax	11	01	2	3	-	5	-	-
RG-122, MIL-C-17D	Coax	CY	01	-	3	-	-	-	-
RG-142B, MIL-C-17	Coax	XZ	01	-	-	4	-	6	-
RG-142B, MIL-C-17E	Coax	78	01	2	3	4	5	6	-
RG-174, MIL-C-17	Coax	XA	01	-	3	4	5	6	-
RG-178B, MIL-C-17	Coax	TX	01	-	-	4	-	6	-
RG-178B, MIL-C-17D	Coax	JU	01	-	3	-	-	-	-
RG-179B, MIL-C-17	Coax	JT	01	-	-	4	-	6	-
RG-180B, MIL-C-17	Coax	19	01	-	-	4	-	-	-
RG-195A, MIL-C-17	Coax	WB	01	-	-	4	-	-	-
RG-195A, MIL-C-17D	Coax	DP	01	2	3	-	-	-	-
RG-196, MIL-C-17	Coax	CX	01	-	-	4	-	-	-
RG-210, MIL-C-17D	Coax	DQ	01	2	3	-	-	-	-

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Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
RG-213, MIL-C-17	Coax	XC	01	-	-	4	-	-	-
RG-213, MIL-C-17D	Coax	83	01	2	3	-	-	-	-
RG-214, MIL-C-17	Coax	73	01	2	3	4	-	6	-
RG-223, MIL-C-17	Coax	17	01	-	3	-	5	-	-
RG-223, MIL-C-17	Coax	2Y	01	-	3	-	5	-	-
RG-223, MIL-C-17	Coax	XE	01	-	-	4	-	6	-
RG-225, MIL-C-17D	Coax	CZ	01	-	3	-	-	-	-
RG-231, MIL-C-23806/1	Coax	XT	01	-	-	4	-	-	-
RG-303, MIL-C-17	Coax	77	01	-	-	4	-	-	-
RG-316, MIL-C-17	Coax	74	01	-	-	4	-	6	7
RG-316, MIL-C-17	Coax	NJ	1	-	3	-	-	-	-
RG-332, MIL-C-23806/2	Coax	XH	01	-	-	4	-	-	-
RG-385, MIL-C-22931	Coax	XR	01	-	-	4	-	-	-
RG-393, MIL-C-17	Coax	JB	01	-	3	4	5	6	7
RG-393, MIL-C-17	Coax	XS	01	-	-	4	-	6	7
RG-400, MIL-C-17	Coax	75	01	-	-	4	-	-	-
RG-400, MIL-C-17	Coax	JA	01	-	-	4	-	-	-
RG-58C, MIL-C-17D	Coax	58	01	2	3	-	-	-	-
RG-59B, MIL-C-17	Coax	59	01	2	3	4	5	-	-
RG-62B, MIL-C-17	Coax	62	01	2	3	4	-	-	-
RG-63B, MIL-C-17D	Coax	63	01	2	3	-	-	-	-
RG-71B, MIL-C-17E	Coax	71	01	2	3	-	-	-	-
RG-8A, MIL-C-17	Coax	08	01	2	3	-	-	-	-
RSS-5-191, MIL-W-7139	Coax, High Temperature	92	01	2	3	-	-	-	-
RSS-5-191, MIL-W-7139B	High Temperature	50	01	2	3	-	-	-	-
RT-876, Raychem	Thermofit Sleeve; for alternatives, refer to Subject 20-00-11	S2	-	2	3	-	5	-	-
S280T001-1	Electrical P.E.S. Cable	7Z	06	-	-	-	-	6	-
S280T001-2	PSUD To PSUD Cable	7L	05	-	-	-	-	6	-

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
S280T004-1	Shielded, Audio Selector Cable	5Y	38	-	-	-	-	6	-
S280T004-1	Audio Selector Cable	P7	38	-	-	-	-	6	-
S280T004-1	Shielded, Audio Selector Cable	VA	38	-	-	-	5	-	-
S280T006-1	Spoiler Actuating Cable	7M	10	-	-	-	-	6	-
S280T006-2	Spoiler Actuating Cable, Shielded	7N	07	-	-	-	5	6	-
S280T006-2	Shielded, Spoiler Cable	VB	07	-	-	-	5	-	-
S280T007-1	Retractable Cable	8U	06	-	3	-	5	6	-
S280T007-1	Retractable Cable	VE	06	-	3	-	5	-	-
S280T007-2	Retractable Cable	W0	06	-	-	-	-	-	7
S280T007-3	Retractable Cable	2X	08	-	-	-	-	-	7
S280W501-11	Nickel Plated Shield, Fly-By-Wire, Flaperon	T5	13	-	-	-	-	-	7
S280W501-12	Nickel Plated Shield, Fly-By-Wire, Elevator	T6	19	-	-	-	-	-	7
S280W501-13	Nickel Plated Shield, Fly-By-Wire, Aileron	T7	13	-	-	-	-	-	7
S280W501-14	Nickel Plated Shield, Fly-By-Wire, Spoiler	T8	07	-	-	-	-	-	7
S280W501-15	Nickel Plated Shield, Fly-By-Wire, Rudder	T9	17	-	-	-	-	-	7
S280W502-1	100 ohm, Round Conductor Shield, Adjacent Flat Conductor Shield	0N	02	-	-	4	-	6	7
S280W502-3	100 ohm, Shielded Pair of Shielded Component Wires	0Q	04	-	3	4	-	6	7
S280W502-4	100 ohm, Round Conductor Shield, Adjacent Flat Conductor Shield	0R	04	-	-	-	-	-	7

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
S280W502-5	100 ohm, Round Conductor Shield, Adjacent Flat Conductor Shield	0S	04	-	-	-	-	-	7
S280W502-6	100 ohm, Shielded	0T	02	-	3	4	5	6	7
SF-226, Times Wire Company	Coax, FEP 226	WD	01	-	-	4	-	-	-
SS-1222-70, Spectrastrap Cable	-	22	12	2	3	-	-	-	-
Supplier Equipment Shield Ground Wire	-	VE	06	-	-	-	-	6	7
T214, Times Wire Company	Coax	84	01	2	3	-	5	-	-
T8/A	Coax	05	01	2	3	-	5	-	-
TFE #3, Zeus Industrial Products	Perforated Teflon Sleeve, Thinwall	SM	-	-	-	-	-	-	7
TFE 2X Perforated, Chemplast	Perforated Teflon Sleeve	S8	-	-	3	-	5	-	-
TFE 2X, Chemplast	Sleeve, Standard	SJ	-	-	3	4	5	6	7
TFE 2X, Chemplast	Heat Shrinkable Teflon Sleeve	SZ	-	-	-	4	-	6	7
TFE 2XTW, Chemplast	Heat Shrinkable Teflon Sleeve, Thinwall	SQ	-	-	-	4	-	6	7
TFE 4X, Chemplast	Heat Shrinkable Teflon Sleeve, Standard	SP	-	-	3	4	5	6	7
TLS-200-1DSJ-20NA, Tensolite	Shielded, High Impedance	C2	01	-	3	-	-	-	-
TLS-200-1SJ-20NA, Tensolite	Shielded, Low Impedance	C1	01	-	3	-	-	-	-
TLS-200-2SJ-20NA, Tensolite	Silver Shield	C3	02	-	3	-	-	-	-
TLS-200-4SJ-20NA, Tensolite	Silver Shield	C4	04	-	3	-	-	-	-
Type 2100-1(-), Filotex	High Temperature	VR	01	-	3	-	-	-	-
VE 3042, Vermillion Enterprises	Coax, Shielded	WN	02	-	-	4	-	-	-
VE 3043, Vermillion Enterprises	Shielded	WP	03	-	-	4	-	-	-
VE 556, Vermillion Enterprises	Shielded	WM	02	-	-	4	-	-	-
VSC-A1-10-17	Fiber Optic Cable	F1	-	-	-	4	-	-	-
Varglas Type HO or HP, Varflex	Fiberglass Sleeve, Green Or Tan	SL	-	-	-	4	-	6	7

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 2 (continued)

Wire Specification or Part Number	Notes	WTC	Conductors	7(7) Model WDM					
				2	3	4	5	6	7
Varglas Type HO or HP, Varflex	Fiberglass Sleeve, Silver Or Gray	SX	-	-	-	4	-	6	7
Varglas Type HO, Varflex	Fiberglass Sleeve, Green	S5	-	2	3	-	5	-	-
Varglas Type HP, Varflex	Fiberglass Sleeve, Tan	S6	-	-	-	-	5	-	-
Varglas, Varflex	Fiberglass Sleeve, Full Length	SY	-	-	-	4	-	6	7
WW500, Warren, MIL-W-7139B	Shielded, High Temperature	49	01	2	3	-	-	-	-
ZTZ-0550-SHN-15B, Zippertubing Company	Shield	Z3	-	-	-	4	-	-	-
ZTZ-0625-SHN-15B, Zippertubing Company	Shield	Z8	-	-	-	4	-	-	-
ZTZ-0875-SHN-15B, Zippertubing Company	Shield	Z2	-	-	-	4	-	-	-
ZTZ-1000-SHN-15B, Zippertubing Company	Shield	Z5	-	-	-	4	-	-	-
ZTZ-1125-SHN-15B, Zippertubing Company	Shield	Z7	-	-	-	4	-	-	-

3. ALTERNATIVE WIRES

A. Applicable Conditions for Alternative Wire Data

These conditions are applicable for the Alternative Wire Data in Table 3:

- An Alternative Wire is satisfactory when it is not possible to find or get the wire that is specified in the wire list of the Wiring Diagram Manual (WDM) that is applicable for the airplane model
- The replacement of a Specified Wire by a wire that is not given in Table 3 as an Alternative Wire is not recommended
- Each Alternative Wire is applicable for all models.

NOTE: Boeing Service Engineering can supply more data to answer questions about the Alternative Wires.

These conditions are applicable when a Specified Wire is replaced with an Alternative Wire:

- The Alternative Wire must have the same number of conductors
- The Alternative Wire must have the same size of conductor
- The Alternative Wire must have the same color of the insulation or the outer jacket, if a special color is specified.

B. Alternative Wire for a Specified Wire

For the conditions that are applicable for Alternative Wires, refer to Paragraph 3.A.

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

CAUTION: THE REPLACEMENT OF A SPECIFIED WIRE BY A WIRE THAT IS NOT GIVEN IN TABLE 3 AS AN ALTERNATIVE WIRE IS NOT RECOMMENDED.

- (1) If it is necessary, find the Wire Specification or the Wire Part Number from the WTC. Refer to Paragraph 1.C.
- (2) Find the Specified Wire in Table 3.
- (3) Find an Alternative Wire for the Specified Wire.

Make sure that the special conditions for the Alternative Wire and the conditions of the system or circuit are obeyed.

C. Alternative Wires

For the conditions that are applicable for Alternative Wires, refer to Paragraph 3.A.

NOTE: The Specified Wire that is given in Table 3 is the Wire Specification or the Wire Part Number for the WTC that is specified in the wire list of the WDM.

CAUTION: THE REPLACEMENT OF A SPECIFIED WIRE BY A WIRE THAT IS NOT GIVEN IN TABLE 3 AS AN ALTERNATIVE WIRE IS NOT RECOMMENDED.

NOTE: Boeing Service Engineering can supply more data to answer questions about the Alternative Wires.

**Table 3
ALTERNATIVE WIRES**

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
0024A0014, Raychem	831-4245270, Pirelli	Ships Bundles Only
08766/01147KE-3, Tensolite	BMS 13-60 Type 22 Class 3	-
1/0766/9D032E-6, Tensolite	1/0TLA/02101E-6, Tensolite	-
1/0766/9D032E-6, Tensolite	30-05899, Champlain	-
1/0TLA/02101E-6, Tensolite	1/0766/9D032E-6, Tensolite	-
10-60233-1	10-60233-7	-
10-60233-3	10-60233-9	-
10-60233-4	10-60233-10	-
10-60816-1	BMS 13-55 Type 4	-
10-60816-11	10-60816-43	-
10-60816-13	BMS 13-55 Type 2	-
10-60816-13	BMS 13-60 Type 10	-
10-60816-15	10-60816-45	-
10-60816-16	10-60816-46	-
10-60816-17	BMS 13-55 Type 5	-
10-60816-19	10-60816-47	-

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
10-60816-2	10-60816-36	-
10-60816-21	10-60816-49	-
10-60816-22	10-60816-50	-
10-60816-23	BMS 13-55 Type 2	-
10-60816-26	10-60816-52	-
10-60816-27	10-60816-53	-
10-60816-31	BMS 13-60 Type 10	-
10-60816-4	10-60816-38	-
10-60816-56	BMS 13-60 Type 10	-
10-60816-62	DM-F-2MF, Matsushita	-
10-60816-7	10-60816-39	-
10-60816-8	10-60816-40	-
10-60875-3	M16878/5BGE2	-
10-61299-1	10-61299-4	-
10-61299-2	10-61299-5	-
10-61299-6	10-61299-5	-
10-61299-6	20531/9E039LL-4(TL), Tensolite	-
1010-010, Specialty Cable	853-4125928, Specialty Cable	-
1010-020, Specialty Cable	852-4985321, Specialty Cable	-
1010-020, Thermax	852-4985321, Speciality	-
1010-030, Specialty Cable	852-4106803, Specialty Cable	-
1010-040, Specialty Cable	852-4000303, Specialty Cable	-
1010-040, Specialty Cable	852-4985339, Specialty Cable	-
1010-040, Specialty Cable	852-4991980, Specialty Cable	-
1018CRAL, Thermax	852-4104717, Specialty Cable	-
10363, Raychem	7524D5011-(), Raychem	-
12621, Teledyne	BWC-890014-2-18, Barcel	-
12621/1 Type XXX Class 2	BMS 13-51 Type XXX Class 2	-
12628 Type XXX Class 1	BMS 13-51 Type XXX Class 1	-
13054 Type XXX Class 3	BMS 13-51 Type XXX Class 3	-
170291, Thermax	BMS 13-58 Type V	-
18480/9K105X-4(LD), Tensolite	18480/9M140X-4(LD), Tensolite	-

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
18480/9M140X-4(LD), Tensolite	18480/9K140X-4(LD), Tensolite	-
18734/41225KA-1, Tensolite	BMS 13-51 Type XXIX Class 1	-
202-3836-000, Microdot	784-2ZXE, Thermax	-
204-15578-1	707-1195, Thermax	-
204-17468-1, Twinax	51-04570, Champlain	-
24-00033, Champlain	BMS 13-55 Type 2 Class 1	AWG 18
24-00033, Champlain	BMS 13-55 Type 5 Class 1	AWG 18
24-00034, Champlain	24-00523, Champlain	-
24-00034, Champlain	BMS 13-55 Type 2 Class 1	AWG 16
24-00034, Champlain	BMS 13-55 Type 5 Class 1	AWG 16
24-00115, Champlain	BMS 13-55 Type 5 Class 1	AWG 16
24-00523, Champlain	24-00034, Champlain	-
252-94102, Al-Ch, Galite	852-4991980, Al-Ch, Specialty	-
254-100338, Cu-Cn, Revere	852-4236774, Cu-Cn, Pirelli	-
262-62737, Al-Ch, Revere	852-4991972, Al-Ch, Specialty	-
30-04373, Cu-Cn, Champlain	853-4221073, Cu-Cn, Pirelli	-
30-04373, Cu-Cn, Champlain	853-4310074, Cu-Cn, Pirelli	-
30-04680, Champlain	975-295, Thermax	-
30-04749, Champlain	975-295, Thermax	-
30-05899, Champlain	1/0766/9D032E-6, Tensolite	-
30-05899, Champlain	1/0TLA/02101E-6, Tensolite	-
411-63221, Cu-Cn, Revere	853-4125928, Cu-Cn, Pirelli	-
412-67587, Cu-Cn, Revere	853-4221073, Cu-Cn, Pirelli	-
421-166, Amphenol	7524D5011-(), Raychem	-
421-176, Amphenol	RG-142, MIL-C-17	-
44A7620-(), Al-Ch, Raychem	CTC-0039-()-9/5-9, Al-Ch, Raychem	-
5012F1339(), Raychem	RG-213, MIL-C-17	-
5012G3332, Raychem	BA-6903A, ITT Surprenant	-
5012H3012, Raychem	BA20048, ITT Surprenant	-
5020G3442, Raychem	AA-1500, Times Wire Company	-
5020G3442, Raychem	BA-14349, ITT Surprenant	-

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
5020G3442, Raychem	BA14349, ITT Surprenant	-
5020G3442, Raychem	MI-5406, Times Wire Company	-
5021D1331, Raychem	BA-5903A, ITT Surprenant	-
5021E1331(), Raychem	BA5903A, ITT Surprenant	-
5021K1011, Raychem	BA20049, ITT Surprenant	-
5026A1314-9, Raychem	5026D1018, Raychem	-
5026D1018, Raychem	5026A1314-9, Raychem	-
51-04569, Champlain	976-295, Thermax	-
51-04570, Champlain	204-17468-1, Twinax	-
51-04570, Champlain	986-495, Thermax	-
51-04763, Champlain	831-4245379, Pirelli	-
51-04859, Champlain	977-295, Thermax	-
550-292, Thermax	61-02651, Champlain	-
551-292, Thermax	61-02783, Champlain	-
557-392, Thermax	BMS 13-60 Type 7 Class 3	AWG 10
55A1211-10-9-9, Raychem	BMS 13-48 Type 12 Class 1	AWG 10
55A1211-10-9-9, Raychem	C4201358, Judd	-
55A8707, Raychem	55PC8707, Raychem	-
55PC8707, Raychem	55A8707, Raychem	-
61-02651, Champlain	550-292, Thermax	-
61-02783, Champlain	551-292, Thermax	-
621-1292, Thermax	BMS 13-58 Type 1 Class 1	-
621-1292, Thermax	BMS 13-58 Type 1 Class 3	-
63546, Filotex	BMS 13-55 Type 4 Class 2	-
63546, Filotex	BMS 13-8 Type III Class A	-
63832, Filotex	BMS 13-55 Type 4	-
65B47866-5	SS72016, Thermax	-
689-295, Thermax	831-4245270, Speciality	-
691-295, Thermax	AA6343, Times Wire Company	-
707-1195, Thermax	204-15578-1	-
7120D0011(), Raychem	BA6848, ITT Surprenant	-
744-597, Thermax	831-4245379, Specialty Cable	-

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
7524D5011-(), Raychem	10363, Raychem	-
7524D5011-(), Raychem	421-166, Amphenol	-
7524D5011-(), Raychem	BA6416A, ITT Surprenant	-
784-2ZXE, Thermax	202-3836-0000, Microdot	-
784-2ZXE, Thermax	202-386-0000, Microdot	-
81993, Filotex	BMS 13-55 Type 2 Class 1	AWG 18
8220D0011(), Raychem	BA6580, ITT Surprenant	-
831-4245270, Raychem	0024A0014, Speciality	-
831-4245270, Speciality	0024A0014, Raychem	-
831-4245270, Speciality	689-295, Thermax	-
831-4245270, Specialty	977-295, Thermax	-
831-4245379, Pirelli	51-04763, Champlain	-
831-4245379, Speciality	744-597, Thermax	-
852-4000303, Al-Ch, Pirelli	852-4991980, Al-Ch, Specialty	-
852-4000303, Specialty Cable	1010-030, Specialty Cable	-
852-4104717, Al-Ch, Pirelli	852-4991972, Al-Ch, Specialty	-
852-4106803, Specialty Cable	1010-040, Specialty Cable	-
852-4207072, Al-Ch, Pirelli	852-4985321, Al-Ch, Specialty	-
852-4236774, Cu-Cn, Pirelli	254-100338, Cu-Cn, Revere	-
852-4236774, Cu-Cn, Pirelli	LWC-160, Cu-Cn, Lewis	-
852-4985321, Al-Ch, Specialty	852-4207072, Al-Ch, Pirelli	-
852-4985321, Speciality	1010-020, Thermax	-
852-4985339, Specialty Cable	1010-030, Specialty Cable	-
852-4991972, Al-Ch, Specialty	262-62737, Al-Ch, Revere	-
852-4991972, Al-Ch, Specialty	852-4104717, Al-Ch, Pirelli	-
852-4991972, Al-Ch, Specialty	LWAC-99, Al-Ch, Lewis	-
852-4991972, Al-Ch, Specialty	WC-62737, Al-Ch, Revere	-
852-4991980, Al-Ch, Specialty	252-94102, Al-Ch, Galite	-
852-4991980, Al-Ch, Specialty	852-4000303, Al-Ch, Pirelli	-
852-4991980, Specialty Cable	1010-040, Specialty Cable	-
853-4125928, Cu-Cn, Pirelli	411-63221, Cu-Cn, Revere	-
853-4125928, Cu-Cn, Pirelli	WW-63221, Cu-Cn, Revere	-

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
853-4125928, Specialty Cable	1010-010, Specialty Cable	-
853-4218376, Al-Ch, Pirelli	WC101767, Al-Ch, Pirelli	-
853-4221073, Cu-Cn, Pirelli	30-04373, Cu-Cn, Champlain	-
853-4221073, Cu-Cn, Pirelli	412-67587, Cu-Cn, Revere	-
853-4221073, Cu-Cn, Pirelli	853-4310074, Cu-Cn, Pirelli	-
853-4221073, Cu-Cn, Pirelli	WW67587, Cu-Cn, Revere	-
853-4221172, Al-Ch, Pirelli	WC-101763, Al-Ch, Revere	-
853-4310074, Cu-Cn, Pirelli	30-04373, Cu-Cn, Champlain	-
853-4310074, Cu-Cn, Pirelli	853-4221073, Cu-Cn, Pirelli	-
85842, Filotex	BMS 13-55 Type 2 Class 1	AWG 16
975-295, Thermax	30-04680, Champlain	-
975-295, Thermax	30-04749, Champlain	-
976-295, Thermax	51-04569, Champlain	-
977-295, Thermax	51-04859, Champlain	-
977-295, Thermax	831-4245270, Specialty	-
986-495, Thermax	51-04570, Champlain	-
986-495, Thermax	BL 782, Times Wire Company	-
AA-1500, Times Wire Company	5020G3442, Raychem	-
AA6343, Times Wire Company	691-295, Thermax	-
BA-14349, ITT Surprenant	5020G3442, Raychem	-
BA-5903A, ITT Surprenant	5021D1331, Raychem	-
BA-6903A, ITT Surprenant	5012G3332, Raychem	-
BA14349, ITT Surprenant	5020G3442, Raychem	-
BA20048, ITT Surprenant	5012H3012, Raychem	-
BA20049, ITT Surprenant	5021K1011, Raychem	-
BA5903A, ITT Surprenant	5021E1331(), Raychem	-
BA6416A, ITT Surprenant	7524D5011-(), Raychem	-
BA6580, ITT Surprenant	8220D0011(), Raychem	-
BA6848, ITT Surprenant	7120D0011(), Raychem	-
BL 782, Times Wire Company	986-495, Thermax	-
BMS 13-10 Type I	BMS 13-48 Type 10	-

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
BMS 13-10 Type I	BMS 13-60 Type 1	-
BMS 13-10 Type III	BMS 13-48 Type 12	-
BMS 13-10 Type III	BMS 13-60 Type 2	-
BMS 13-10 Type IV	BMS 13-48 Type 12	-
BMS 13-10 Type IV	BMS 13-60 Type 2	-
BMS 13-11 Type I	BMS 13-48 Type 10	-
BMS 13-11 Type I	BMS 13-60 Type 1	-
BMS 13-11 Type II	BMS 13-48 Type 10	-
BMS 13-11 Type II	BMS 13-60 Type 1	-
BMS 13-11 Type V	BMS 13-48 Type 12	-
BMS 13-11 Type V	BMS 13-60 Type 2	-
BMS 13-13 Type I	BMS 13-48 Type 10	-
BMS 13-13 Type I	BMS 13-60 Type 1	-
BMS 13-13 Type III	BMS 13-48 Type 12	-
BMS 13-13 Type III	BMS 13-60 Type 2	-
BMS 13-13 Type IV	BMS 13-60 Type 3	-
BMS 13-16 Type I	BMS 13-60 Type 1	-
BMS 13-16 Type I Class 1	BMS 13-48 Type 11 Class 1	AWG 24
BMS 13-16 Type I Class 1	BMS 13-60 Type 4 Class 1	AWG 24
BMS 13-16 Type III	BMS 13-48 Type 12	-
BMS 13-16 Type III	BMS 13-60 Type 2	-
BMS 13-18 Type I	BMS 13-60 Type 7	-
BMS 13-18 Type III	BMS 13-60 Type 8	-
BMS 13-18 Type IV	BMS 13-60 Type 9	-
BMS 13-28	BMS 13-31	Same Type, Class, AWG, and Color, AWG 22 through AWG 8
BMS 13-28	BMS 13-58	Same Type, Class, AWG, and Color
BMS 13-29 Type I	BMS 13-60 Type 7	-
BMS 13-30 Type I	BMS 13-48 Type 11	-
BMS 13-30 Type I	BMS 13-60 Type 4	-
BMS 13-30 Type III	BMS 13-48 Type 13	-
BMS 13-30 Type III	BMS 13-48 Type 32	Do Not Solder Alternative Wire

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
BMS 13-30 Type III	BMS 13-60 Type 5	-
BMS 13-31	BMS 13-58	Same Type, Class, AWG, and Color
BMS 13-31 Type I	BMS 13-60 Type 7	-
BMS 13-31 Type III	BMS 13-60 Type 8	-
BMS 13-31 Type IV	BMS 13-60 Type 9	-
BMS 13-31 Type V	BMS 13-60 Type 10	-
BMS 13-31 Type VII	BMS 13-60 Type 11	-
BMS 13-31 Type VIII	BMS 13-60 Type 12	-
BMS 13-35 Type 1	BMS 13-60 Type 22	AWG 8 Through AWG 4/0
BMS 13-38 Type I	BMS 13-48 Type 10	-
BMS 13-38 Type I	BMS 13-48 Type 8	-
BMS 13-38 Type I	BMS 13-60 Type 1	-
BMS 13-38 Type V	BMS 13-48 Type 11	-
BMS 13-38 Type V	BMS 13-48 Type 9	-
BMS 13-38 Type V	BMS 13-60 Type 4	-
BMS 13-39 Type I	BMS 13-48 Type 10	-
BMS 13-39 Type I	BMS 13-60 Type 1	-
BMS 13-39 Type III	BMS 13-48 Type 12	-
BMS 13-39 Type III	BMS 13-60 Type 2	-
BMS 13-39 Type V	BMS 13-48 Type 11	-
BMS 13-39 Type V	BMS 13-60 Type 4	-
BMS 13-39 Type VI	BMS 13-48 Type 13	-
BMS 13-39 Type VI	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-39 Type VI	BMS 13-48 Type 8	-
BMS 13-39 Type VI	BMS 13-60 Type 5	-
BMS 13-40 Type I	BMS 13-35 Type I	-
BMS 13-42 Type I	BMS 13-48 Type 10	-
BMS 13-42 Type I	BMS 13-48 Type 8	-
BMS 13-42 Type I	BMS 13-60 Type 1	-
BMS 13-42 Type IX	BMS 13-48 Type 9	-
BMS 13-42 Type VIII	BMS 13-48 Type 10	-
BMS 13-42 Type VIII	BMS 13-48 Type 8	-

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
BMS 13-42 Type XII	BMS 13-48 Type 12	-
BMS 13-42 Type XII	BMS 13-60 Type 2	-
BMS 13-42 Type XIII	BMS 13-48 Type 13	-
BMS 13-42 Type XIII	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-42 Type XIII	BMS 13-60 Type 5	-
BMS 13-48 Type 1	BMS 13-48 Type 10	-
BMS 13-48 Type 1	BMS 13-48 Type 8	-
BMS 13-48 Type 1	BMS 13-60 Type 1	-
BMS 13-48 Type 10	BMS 13-48 Type 8	-
BMS 13-48 Type 10	BMS 13-60 Type 1	-
BMS 13-48 Type 11	BMS 13-48 Type 9	-
BMS 13-48 Type 11	BMS 13-60 Type 4	-
BMS 13-48 Type 12	BMS 13-48 Type 15	-
BMS 13-48 Type 12	BMS 13-60 Type 13	-
BMS 13-48 Type 12	BMS 13-60 Type 2	-
BMS 13-48 Type 12 Class 1	55A1211-10-9-9, Raychem	AWG 10
BMS 13-48 Type 13	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-48 Type 13	BMS 13-60 Type 5	-
BMS 13-48 Type 14	BMS 13-48 Type 16	-
BMS 13-48 Type 14	BMS 13-60 Type 7	Do Not Solder Alternative Wire
BMS 13-48 Type 16	BMS 13-48 Type 22	-
BMS 13-48 Type 22	BMS 13-60 Type 10	Do Not Solder Alternative Wire
BMS 13-48 Type 24	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-48 Type 24	BMS 13-60 Type 5	-
BMS 13-48 Type 25	BMS 13-48 Type 12	-
BMS 13-48 Type 25	BMS 13-48 Type 3	-
BMS 13-48 Type 25	BMS 13-60 Type 13	-
BMS 13-48 Type 25	BMS 13-60 Type 2	-
BMS 13-48 Type 25	BMS 13-60 Type 33	-
BMS 13-48 Type 26	BMS 13-48 Type 13	-
BMS 13-48 Type 26	BMS 13-48 Type 28	-
BMS 13-48 Type 26	BMS 13-48 Type 32	Do Not Solder Alternative Wire

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STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
BMS 13-48 Type 26	BMS 13-48 Type 6	-
BMS 13-48 Type 26	BMS 13-60 Type 15	-
BMS 13-48 Type 26	BMS 13-60 Type 34	-
BMS 13-48 Type 26	BMS 13-60 Type 5	-
BMS 13-48 Type 27	BMS 13-48 Type 12	-
BMS 13-48 Type 27	BMS 13-60 Type 2	-
BMS 13-48 Type 27	BMS 13-60 Type 33	-
BMS 13-48 Type 28	BMS 13-48 Type 13	-
BMS 13-48 Type 28	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-48 Type 28	BMS 13-60 Type 34	-
BMS 13-48 Type 28	BMS 13-60 Type 5	-
BMS 13-48 Type 3	BMS 13-48 Type 12	Same Class and Color, AWG 22 Only
BMS 13-48 Type 3	BMS 13-60 Type 13	-
BMS 13-48 Type 3	BMS 13-60 Type 2	-
BMS 13-48 Type 32	BMS 13-60 Type 15	-
BMS 13-48 Type 32	BMS 13-60 Type 5	-
BMS 13-48 Type 6	BMS 13-48 Type 13	-
BMS 13-48 Type 6	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-48 Type 6	BMS 13-60 Type 15	-
BMS 13-48 Type 6	BMS 13-60 Type 5	-
BMS 13-48 Type 8	BMS 13-48 Type 10	-
BMS 13-48 Type 8	BMS 13-60 Type 1	-
BMS 13-48 Type 9	BMS 13-48 Type 11	-
BMS 13-48 Type 9	BMS 13-48 Type 11	-
BMS 13-48 Type 9	BMS 13-60 Type 4	-
BMS 13-49 Type VIII	BMS 13-48 Type 8	-
BMS 13-51 Type I	BMS 13-48 Type 10	-
BMS 13-51 Type I	BMS 13-60 Type 1	-
BMS 13-51 Type III	BMS 13-48 Type 12	-
BMS 13-51 Type III	BMS 13-60 Type 2	-
BMS 13-51 Type IX	BMS 13-48 Type 12	-
BMS 13-51 Type IX	BMS 13-60 Type 2	-

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
BMS 13-51 Type VI	BMS 13-48 Type 13	-
BMS 13-51 Type VI	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-51 Type VI	BMS 13-60 Type 5	-
BMS 13-51 Type VIII	BMS 13-48 Type 10	-
BMS 13-51 Type VIII	BMS 13-48 Type 8	-
BMS 13-51 Type VIII	BMS 13-60 Type 1	-
BMS 13-51 Type X	BMS 13-60 Type 3	-
BMS 13-51 Type XI	BMS 13-48 Type 11	-
BMS 13-51 Type XI	BMS 13-48 Type 9	-
BMS 13-51 Type XI	BMS 13-60 Type 4	Do Not Solder Alternative Wire
BMS 13-51 Type XII	BMS 13-48 Type 13	-
BMS 13-51 Type XII	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-51 Type XII	BMS 13-48 Type 6	-
BMS 13-51 Type XII	BMS 13-60 Type 5	Do Not Solder Alternative Wire
BMS 13-51 Type XIV	BMS 13-48 Type 10	-
BMS 13-51 Type XIV	BMS 13-48 Type 8	-
BMS 13-51 Type XIV	BMS 13-60 Type 1	-
BMS 13-51 Type XV	BMS 13-48 Type 12	-
BMS 13-51 Type XV	BMS 13-48 Type 3	-
BMS 13-51 Type XV	BMS 13-60 Type 13	-
BMS 13-51 Type XV	BMS 13-60 Type 2	-
BMS 13-51 Type XVI	BMS 13-60 Type 3	-
BMS 13-51 Type XVII	BMS 13-48 Type 11	-
BMS 13-51 Type XVII	BMS 13-48 Type 9	-
BMS 13-51 Type XVII	BMS 13-60 Type 4	Do Not Solder Alternative Wire
BMS 13-51 Type XVIII	BMS 13-48 Type 13	-
BMS 13-51 Type XVIII	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-51 Type XVIII	BMS 13-48 Type 6	-
BMS 13-51 Type XVIII	BMS 13-60 Type 15	Do Not Solder Alternative Wire
BMS 13-51 Type XVIII	BMS 13-60 Type 5	Do Not Solder Alternative Wire
BMS 13-51 Type XXIX	BMS 13-48 Type 11	-
BMS 13-51 Type XXIX	BMS 13-60 Type 4	-

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STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
BMS 13-51 Type XXVI	BMS 13-48 Type 10	-
BMS 13-51 Type XXVI	BMS 13-48 Type 8	-
BMS 13-51 Type XXVI	BMS 13-60 Type 1	-
BMS 13-51 Type XXVII	BMS 13-48 Type 12	-
BMS 13-51 Type XXVII	BMS 13-60 Type 2	-
BMS 13-51 Type XXX	BMS 13-48 Type 13	-
BMS 13-51 Type XXX	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-51 Type XXX	BMS 13-48 Type 6	-
BMS 13-51 Type XXX	BMS 13-60 Type 5	-
BMS 13-55 Type 1	BMS 13-55 Type 2	-
BMS 13-55 Type 2	BMS 13-55 Type 5	-
BMS 13-55 Type 2 Class 1	81993, Filotex	AWG 18
BMS 13-55 Type 2 Class 1	85842, Filotex	AWG 16
BMS 13-55 Type 4	63832, Filotex	-
BMS 13-55 Type 4 Class 2	63546, Filotex	-
BMS 13-55 Type 5	BMS 13-55 Type 2	-
BMS 13-58 Type I	BMS 13-58 Type 5	-
BMS 13-58 Type I	BMS 13-60 Type 7	747/767/777 Only
BMS 13-58 Type I Class 3	621-1292, Thermax	AWG 8
BMS 13-58 Type III	BMS 13-60 Type 8	747/767/777 Only
BMS 13-58 Type V	170291, Thermax	-
BMS 13-58 Type V	BMS 13-60 Type 10	747/767/777 Only
BMS 13-58 Type VII	BMS 13-60 Type 11	747/767/777 Only
BMS 13-60 Type 1	BMS 13-48 Type 10	-
BMS 13-60 Type 1	BMS 13-48 Type 8	-
BMS 13-60 Type 1	BMS 13-60 Type 7	Do Not Solder Alternative Wire
BMS 13-60 Type 1 Class 1	55PC6121-18-900, Raychem	AWG 18, White/Black
BMS 13-60 Type 1 Class 1	55PC6121-20-900, Raychem	AWG 20, White/Black
BMS 13-60 Type 1 Class 1	55PC6121-22-900, Raychem	AWG 22, White/Black
BMS 13-60 Type 10	BMS 13-58 Type V	-
BMS 13-60 Type 11	BMS 13-58 Type VII	-
BMS 13-60 Type 12	BMS 13-31 Type 8	-



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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
BMS 13-60 Type 12	BMS 13-58 Type VIII	-
BMS 13-60 Type 13	BMS 13-48 Type 12	-
BMS 13-60 Type 13	BMS 13-48 Type 3	-
BMS 13-60 Type 13	BMS 13-60 Type 2	-
BMS 13-60 Type 15	BMS 13-48 Type 13	-
BMS 13-60 Type 15	BMS 13-48 Type 32	-
BMS 13-60 Type 15	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-60 Type 15	BMS 13-48 Type 6	-
BMS 13-60 Type 15	BMS 13-60 Type 5	-
BMS 13-60 Type 2	BMS 13-48 Type 12	-
BMS 13-60 Type 2	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-60 Type 2	BMS 13-60 Type 5	-
BMS 13-60 Type 22	TLA-150-(), Tensolite	-
BMS 13-60 Type 22 Class 1	BMS 13-35 Type 1 Class 1	AWG 4
BMS 13-60 Type 22 Class 3	08766/01147KE-3, Tensolite	AWG 8
BMS 13-60 Type 22 Class 3	BMS 13-35 Type 1 Class 3	AWG 6
BMS 13-60 Type 33	BMS 13-48 Type 12	-
BMS 13-60 Type 33	BMS 13-48 Type 25	-
BMS 13-60 Type 33	BMS 13-48 Type 27	-
BMS 13-60 Type 33	BMS 13-60 Type 2	-
BMS 13-60 Type 34	BMS 13-48 Type 13	-
BMS 13-60 Type 34	BMS 13-48 Type 26	-
BMS 13-60 Type 34	BMS 13-48 Type 28	-
BMS 13-60 Type 34	BMS 13-48 Type 32	Do Not Solder Alternative Wire
BMS 13-60 Type 34	BMS 13-60 Type 5	-
BMS 13-60 Type 4	BMS 13-48 Type 11	-
BMS 13-60 Type 4	BMS 13-48 Type 9	-
BMS 13-60 Type 4	BMS 13-60 Type 10	-
BMS 13-60 Type 44	BMS 13-58 Type 1	-
BMS 13-60 Type 45	BMS 13-58 Type 5	-
BMS 13-60 Type 5	BMS 13-48 Type 13	Do Not Solder Alternative Wire
BMS 13-60 Type 5	BMS 13-48 Type 24	Do Not Solder Alternative Wire

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
BMS 13-60 Type 5	BMS 13-48 Type 32	-
BMS 13-60 Type 5	BMS 13-60 Type 11	Do Not Solder Alternative Wire
BMS 13-60 Type 7	BMS 13-58 Type I	-
BMS 13-60 Type 7 Class 3	557-392, Thermax	AWG 10
BMS 13-60 Type 8	BMS 13-58 Type III	-
BMS 13-60 Type 8	BMS 13-60 Type 11	-
BMS 13-60 Type 9	BMS 13-31 Type 4	-
BMS 13-60 Type 9	BMS 13-58 Type IV	-
BMS 13-60 Type 9	BMS 13-60 Type 12	-
BMS 13-65 Type 0E	S280W503-1	-
BMS 13-65 Type 0F	S280W503-2	-
BMS 13-65 Type 0G	S280W503-3	-
BMS 13-65 Type 0H	S280W503-4	-
BMS 13-65 Type 0J	S280W503-5	-
BMS 13-65 Type 0K	S280W503-6	-
BMS 13-8 Type I Class A	BMS 13-55 Type 2 Class 1	-
BMS 13-8 Type II Class A	BMS 13-8 Type III Class A	-
BMS 13-8 Type III Class A	63546, Filotex	-
BMS 13-8 Type III Class A	BMS 13-8 Type II Class A	-
BWC-880079-2-(), Barcel	BMS 13-51 Type XXIX Class 2	-
BWC-890014-2-18, Barcel	12621, Teledyne	-
C4201358, Judd	55A1211-10-9-9, Raychem	-
CTC-0039-()-9/5-9, Al-Ch, Raychem	44A7620-()-9/5-9, Al-Ch, Raychem	-
H22-4000, Rockbestos	BMS 13-55 Type 1 Class 1	AWG 18
H22-4000, Rockbestos	BMS 13-55 Type 2 Class 1	AWG 18
JW1177/9-()	M1177/9-()	Magnet Wire
JW1177/9-()	NYLAC-(), Anaconda	Magnet Wire
JW1177/9-()	NYLEZE-(), Phelps Dodge	Magnet Wire
LWAC-99, Al-Ch, Lewis	852-4991972, Al-Ch, Specialty	-
LWC-160, Cu-Cn, Lewis	852-4236774, Cu-Cn, Pirelli	-
M1177/9-()	JW1177/9-()	Magnet Wire

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WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
MI-5406, Times Wire Company	5020G3442, Raychem	-
MIL-C-17/174-00001	RG-393, MIL-C-17	-
MIL-W-22759/2-()1-9	BMS 13-60 Type 7 Class 1	-
MIL-W-7139, MIL-W-7078	BMS 13-60 Type 8	-
NYLAC-(), Anaconda	JW1177/9-()	Magnet Wire
NYLEZE-(), Phelps Dodge	JW1177/9-()	Magnet Wire
P606671, Axon	RSS-5-148B-16, Rockbestos	-
P606672, Axon	RSS-5-148B-18, Rockbestos	-
RG-142, MIL-C-17	421-176, Amphenol	-
RG-188, MIL-C-17	RG-316, MIL-C-17	-
RG-195, MIL-C-17	RG-180, MIL-C-17	-
RG-213, MIL-C-17	5012F1339(), Raychem	-
RG-214, MIL-C-17	BA6903A, ITT Surprenant	-
RG-316, MIL-C-17	RG-188, MIL-C-17	-
RG-393, MIL-C-17	MIL-C-17/174-00001	-
RG-58, MIL-C-17	BA5903A, ITT Surprenant	-
RG-8, MIL-C-17	5012F1339(), Raychem	-
RSS-5-148B-16, Rockbestos	P606671, Axon	-
RSS-5-148B-18, Rockbestos	P606672, Axon	-
RSS-5-191, MIL-W-7139	BMS 13-60 Type 8	-
S280T001-1	S280T001-3	-
S280T006-2, Spoiler Cable	BMS 13-60 Type 24	Do Not Solder Alternative Wire
S280W503-1	BMS 13-65 Type 0E	-
S280W503-2	BMS 13-65 Type 0F	-
S280W503-3	BMS 13-65 Type 0G	-
S280W503-4	BMS 13-65 Type 0H	-
S280W503-5	BMS 13-65 Type 0J	-
S280W503-6	BMS 13-65 Type 0K	-
SS72016, Thermax	65B47866-5	-
TLA-150-(), Tensolite	BMS 13-60 Type 22	-
TU20-100-24B, Raychem	BMS 13-56 Type 3 Class 20	-
Type 2100-1-(), Filotex	BMS 13-58 Type I	-

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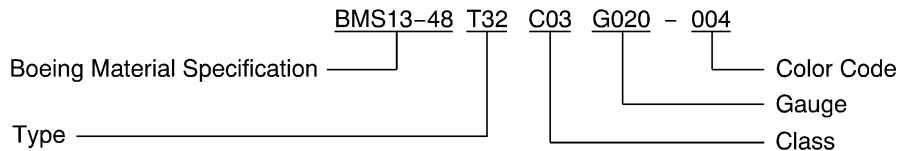
WIRE TYPE CODES

Table 3 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Special Conditions
WARREN WW500, MIL-W-7139	BMS 13-60 Type 8	-
WC-101763, Al-Ch, Revere	853-4221172, Al-Ch, Pirelli	-
WC-62737, Al-Ch, Revere	852-4991972, Al-Ch, Specialty	-
WC101767, Al-Ch, Pirelli	853-4218376, Al-Ch, Pirelli	-
WW-63221, Cu-Cn, Revere	853-4125928, Cu-Cn, Pirelli	-
WW67587, Cu-Cn, Revere	853-4221073, Cu-Cn, Pirelli	-

4. BOEING STANDARD WIRE PART NUMBERS

A. Boeing Standard Wire Part Number Data



BOEING STANDARD WIRE PART NUMBER STRUCTURE
Figure 1

STANDARD WIRING PRACTICES MANUAL

WIRE TYPE CODES

**Table 4
COLOR CODES FOR BOEING STANDARD WIRES**

Boeing Standard Wire	Color Code	Color		
		Insulation or Jacket	First Stripe	Second Stripe
BMS13-48	000	Black	-	-
	001	Brown	-	-
	002	Red	-	-
	003	Orange	-	-
	004	Yellow	-	-
	005	Green	-	-
	006	Blue	-	-
	007	Violet	-	-
	008	Gray	-	-
	009	White	-	-
	00P	Pink	-	-
	063	Blue	Orange	-
	090	White	Black	-
	091	White	Brown	-
	092	White	Red	-
	093	White	Orange	-
	094	White	Yellow	-
	095	White	Green	-
	096	White	Blue	-
	097	White	Violet	-
	098	White	Gray	-
	09P	White	Pink	-
	921	White	Red	Brown
	924	White	Red	Yellow
	925	White	Red	Green
	926	White	Red	Blue
	927	White	Red	Violet

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WIRE TYPE CODES

Table 4 (continued)

Boeing Standard Wire	Color Code	Color		
		Insulation or Jacket	First Stripe	Second Stripe
BMS13-55	000	Black	-	-
	001	Brown	-	-
	002	Red	-	-
	003	Orange	-	-
	004	Yellow	-	-
	005	Green	-	-
	006	Blue	-	-
	007	Violet	-	-
	008	Gray	-	-
	009	White	-	-
BMS13-58	A	Light Gray	-	-
	B	Blue	-	-
	E	Orange	-	-
	G	Green	-	-
	K	Black	-	-
	N	Brown	-	-
	R	Red	-	-
	V	Purple	-	-
	W	White	-	-
	Y	Yellow	-	-

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WIRE TYPE CODES

Table 4 (continued)

Boeing Standard Wire	Color Code	Color		
		Insulation or Jacket	First Stripe	Second Stripe
BMS13-60	000	Black	-	-
	001	Brown	-	-
	002	Red	-	-
	003	Orange	-	-
	004	Yellow	-	-
	005	Green	-	-
	006	Blue	-	-
	007	Violet	-	-
	008	Gray	-	-
	009	White	-	-
	00P	Pink	-	-
	063	Blue	Orange	-
	090	White	Black	-
	091	White	Brown	-
	092	White	Red	-
	093	White	Orange	-
	094	White	Yellow	-
	095	White	Green	-
	096	White	Blue	-
	097	White	Violet	-
	098	White	Gray	-
	09P	White	Pink	-
	921	White	Red	Brown
	924	White	Red	Yellow
	925	White	Red	Green
	926	White	Red	Blue
927	White	Red	Violet	

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WIRE TYPE CODES

Table 4 (continued)

Boeing Standard Wire	Color Code	Color		
		Insulation or Jacket	First Stripe	Second Stripe
BMS13-67	000	Black	-	-
	001	Brown	-	-
	003	Orange	-	-
	004	Yellow	-	-
	005	Green	-	-
	006	Blue	-	-
	007	Violet	-	-
	008	Gray	-	-
	009	White	-	-

Table 5

STANDARD COLORS FOR BOEING STANDARD WIRES

Boeing Standard Wire	Wire Size (AWG)	Standard Wire Color
BMS13-48	24	White
	22	Pastel Green
	20-4/0	White
BMS13-55	22-10	Light Gray
BMS13-58	24-4/0	Light Gray
BMS13-60	24	White
	22	Pastel Green
	20-4/0	White
BMS13-67	22-10	Red

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STANDARD WIRING PRACTICES MANUAL

STANDARD WIRE TYPE REPLACEMENT

<u>Paragraph</u>		<u>Page</u>
1.	<u>ALTERNATIVE WIRES AND CABLES</u>	1
	A. Applicable Conditions for Wire Replacement	1
	B. BMS 13-48 Wire Types	1
	C. BMS 13-60 Wire Types	2
2.	<u>REPLACEMENT OF STANDARD WIRE TYPES</u>	3
	A. General Purpose Wire Types	3
	B. High Temperature Wire Types	10

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STANDARD WIRING PRACTICES MANUAL

STANDARD WIRE TYPE REPLACEMENT

This Subject gives:

- The general purpose BMS 13-48 and BMS 13-60 wire types that are equivalent
- The other general purpose wire types that can be replaced by BMS 13-48 and BMS 13-60 wire types
- The high temperature wire types that can be replaced by BMS 13-58 wire types.

1. ALTERNATIVE WIRES AND CABLES

A. Applicable Conditions for Wire Replacement

The Alternative Wire Data that is given in this Subject is also included in the Alternative Wire Data of Subject 20-00-13.

These conditions are applicable for the Alternative Wire Data and in Table 3, Table 4, Table 5, Table 6, and Table 7:

- An Alternative Wire is satisfactory when it is not possible to find or get the wire that is specified in the wire list of the Wiring Diagram Manual (WDM) that is applicable for the airplane model
- The replacement of a Specified Wire by a wire that is not given as an Alternative Wire is not recommended
- Each Alternative Wire is applicable for all models.

NOTE: Boeing Service Engineering can supply more data to answer questions about the Alternative Wires.

These conditions are also applicable when a Specified Wire is replaced with an Alternative Wire:

- The Alternative Wire must have the same number of conductors
- The Alternative Wire must have the same size of conductor
- The Alternative Wire must have the same color of the insulation or the outer jacket if a special color is specified.

For the replacement of standard wire types:

- Table 1 gives the equivalent BMS 13-60 wire types for the applicable BMS 13-48 wire types
- Table 2 gives the equivalent BMS 13-48 wire types for the applicable BMS 13-60 wire types
- Table 3, Table 4, and Table 5 give the other general purpose wire types that can be replaced by the applicable BMS 13-48 and BMS 13-60 wire types
- Table 6 and Table 7 give the high temperature wire types that can be replaced by the applicable BMS 13-58 wire types.

B. BMS 13-48 Wire Types

**Table 1
BMS 13-60 WIRE TYPES THAT HAVE EQUIVALENT BMS 13-48 WIRE TYPES**

BMS 13-48 Wire		Equivalent BMS 13-60 Wire	
Type	Description	Type	Description
Type 3	Insulation - 6 mil, Conductor - tin coated copper, Shield, Jacket	Type 13	Insulation - 6 mil, Conductor - tin coated copper, Shield, Jacket
Type 6	Insulation - 6 mil, Conductor - silver coated high strength copper alloy, Shield, Jacket	Type 15	Insulation - 6 mil, AWG 24 to AWG 16 conductors - nickel coated high strength copper alloy, AWG 14 to AWG 10 conductors - nickel coated copper, Shield, Jacket

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STANDARD WIRE TYPE REPLACEMENT

Table 1 (continued)

BMS 13-48 Wire		Equivalent BMS 13-60 Wire	
Type	Description	Type	Description
Type 10	Insulation - 8 mil, Conductor - tin coated copper	Type 1	Insulation - 8 mil, Conductor - tin coated copper
Type 11	Insulation - 8 mil, Conductor - silver coated high strength copper alloy	Type 4	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy
Type 12	Insulation - 8 mil, Conductor - tin coated copper, Shield, Jacket	Type 2	Insulation - 8 mil, Conductor - tin coated copper, Shield, Jacket
Type 13	Insulation - 8 mil, Conductor - silver coated high strength copper alloy, Shield, Jacket	Type 5	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy, Shield, Jacket
Type 27	Insulation - 8 mil, Conductor - tin coated copper, Flat Conductor Shield, Jacket	Type 33	Insulation - 8 mil, Conductor - tin coated copper, Flat Conductor Shield, Jacket
Type 28	Insulation - 8 mil, Conductor - silver coated high strength copper alloy, Flat Conductor Shield, Jacket	Type 34	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy, Flat Conductor Shield, Jacket
Type 32	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy, Shield, Jacket	Type 5	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy, Shield, Jacket

C. BMS 13-60 Wire Types

Table 2
BMS 13-48 WIRE TYPES THAT HAVE EQUIVALENT BMS 13-60 WIRE TYPES

BMS 13-60 Wire		Equivalent BMS 13-48 Wire	
Type	Description	Type	Description
Type 1	Insulation - 8 mil, Conductor - tin coated copper	Type 10	Insulation - 8 mil, Conductor - tin coated copper
Type 2	Insulation - 8 mil, Conductor - tin coated copper, Shield, Jacket	Type 12	Insulation - 8 mil, Conductor - tin coated copper, Shield, Jacket
Type 4	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy	Type 11	Insulation - 8 mil, Conductor - silver coated high strength copper alloy
Type 5	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy, Shield, Jacket	Type 13	Insulation - 8 mil, Conductor - silver coated high strength copper alloy, Shield, Jacket
		Type 32	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy, Shield, Jacket
Type 13	Insulation - 6 mil, Conductor - tin coated copper, Shield, Jacket	Type 3	Insulation - 6 mil, Conductor - tin coated copper, Shield, Jacket

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STANDARD WIRE TYPE REPLACEMENT

Table 2 (continued)

BMS 13-60 Wire		Equivalent BMS 13-48 Wire	
Type	Description	Type	Description
Type 15	Insulation - 6 mil, AWG 24 to AWG 16 conductors - nickel coated high strength copper alloy, AWG 14 to AWG 10 conductors - nickel coated copper, Shield, Jacket	Type 6	Insulation - 6 mil, Conductor - silver coated high strength copper alloy, Shield, Jacket
Type 33	Insulation - 8 mil, Conductor - tin coated copper, Flat Conductor Shield, Jacket	Type 27	Insulation - 8 mil, Conductor - tin coated copper, Flat Conductor Shield, Jacket
Type 34	Insulation - 8 mil, Conductor - nickel coated high strength copper alloy, Flat Conductor Shield, Jacket	Type 28	Insulation - 8 mil, Conductor - silver coated high strength copper alloy, Flat Conductor Shield, Jacket

2. REPLACEMENT OF STANDARD WIRE TYPES

A. General Purpose Wire Types

CAUTION: THE REPLACEMENT OF A SPECIFIED WIRE BY A WIRE THAT IS NOT GIVEN IN TABLE 3 AS AN ALTERNATIVE WIRE IS NOT RECOMMENDED.

Table 3

ALTERNATIVE BMS 13-48 AND BMS 13-60 WIRE TYPES FOR SPECIFIED STANDARD WIRE TYPES

Specified Wire Type	Alternative Wire Type	
	BMS 13-48	BMS 13-60
BMS 13-10 Type I	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-10 Type III	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-10 Type IV	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-11 Type I	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-11 Type II	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-11 Type V	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-13 Type I	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-13 Type III	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-16 Type I	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-16 Type III	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-30 Type I	BMS 13-48 Type 11	BMS 13-60 Type 4
BMS 13-30 Type III	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-30 Type III	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-39 Type I	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-39 Type III	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-39 Type VI	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-42 Type I	BMS 13-48 Type 10	BMS 13-60 Type 1

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STANDARD WIRE TYPE REPLACEMENT

Table 3 (continued)

Specified Wire Type	Alternative Wire Type	
	BMS 13-48	BMS 13-60
BMS 13-42 Type XII	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-42 Type XIII	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-42 Type XIII	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-48 Type 1	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-48 Type 13	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-48 Type 3	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-48 Type 6	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-48 Type 8	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-48 Type 9	BMS 13-48 Type 11	BMS 13-60 Type 4
BMS 13-48 Type 24	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-48 Type 25	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-48 Type 26	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-48 Type 26	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-48 Type 27	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-48 Type 28	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-48 Type 28	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-48 Type 6	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-51 Type I	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-51 Type III	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-51 Type VI	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-51 Type VI	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-51 Type VIII	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-51 Type IX	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-51 Type XI	BMS 13-48 Type 11	BMS 13-60 Type 4
BMS 13-51 Type XII	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-51 Type XII	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-51 Type XIV	BMS 13-48 Type 10	BMS 13-60 Type 1
BMS 13-51 Type XV	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-51 Type XVII	BMS 13-48 Type 11	BMS 13-60 Type 4
BMS 13-51 Type XVIII	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-51 Type XVIII	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-51 Type XXVI	BMS 13-48 Type 10	BMS 13-60 Type 1

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STANDARD WIRE TYPE REPLACEMENT

Table 3 (continued)

Specified Wire Type	Alternative Wire Type	
	BMS 13-48	BMS 13-60
BMS 13-51 Type XXVII	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-51 Type XXIX	BMS 13-48 Type 11	BMS 13-60 Type 4
BMS 13-51 Type XXX	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-51 Type XXX	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-60 Type 13	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-60 Type 15	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-60 Type 15	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-60 Type 2	BMS 13-48 Type 32	BMS 13-60 Type 5
BMS 13-60 Type 33	BMS 13-48 Type 12	BMS 13-60 Type 2
BMS 13-60 Type 34	BMS 13-48 Type 13	BMS 13-60 Type 5
BMS 13-60 Type 34	BMS 13-48 Type 32	BMS 13-60 Type 5

CAUTION: THE REPLACEMENT OF A SPECIFIED WIRE BY A WIRE THAT IS NOT GIVEN IN TABLE 4 AS AN ALTERNATIVE WIRE IS NOT RECOMMENDED.

Table 4

SPECIFIED STANDARD WIRE TYPES THAT CAN BE REPLACED BY BMS 13-48 WIRE TYPES

Alternative Wire Type		Specified Wire Type
BMS 13-48	Equivalent BMS 13-60	
BMS 13-48 Type 10	BMS 13-60 Type 1	BMS 13-10 Type I
		BMS 13-11 Type I
		BMS 13-11 Type II
		BMS 13-13 Type I
		BMS 13-16 Type I
		BMS 13-39 Type I
		BMS 13-42 Type I
		BMS 13-48 Type 1
		BMS 13-48 Type 8
		BMS 13-51 Type I
		BMS 13-51 Type VIII
		BMS 13-51 Type XIV
		BMS 13-51 Type XXVI

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Table 4 (continued)

Alternative Wire Type		Specified Wire Type
BMS 13-48	Equivalent BMS 13-60	
BMS 13-48 Type 11	BMS 13-60 Type 4	BMS 13-30 Type I
		BMS 13-48 Type 9
		BMS 13-51 Type XI
		BMS 13-51 Type XVII
		BMS 13-51 Type XXIX
BMS 13-48 Type 12	BMS 13-60 Type 2	BMS 13-10 Type III
		BMS 13-10 Type IV
		BMS 13-11 Type V
		BMS 13-13 Type III
		BMS 13-16 Type III
		BMS 13-39 Type III
		BMS 13-42 Type XII
		BMS 13-48 Type 25
		BMS 13-48 Type 27
		BMS 13-48 Type 3
		BMS 13-51 Type III
		BMS 13-51 Type IX
		BMS 13-51 Type XV
		BMS 13-51 Type XXVII
		BMS 13-60 Type 13
BMS 13-60 Type 33		
BMS 13-48 Type 13	BMS 13-60 Type 5	BMS 13-30 Type III
		BMS 13-42 Type XIII
		BMS 13-48 Type 26
		BMS 13-48 Type 28
		BMS 13-48 Type 6
		BMS 13-51 Type VI
		BMS 13-51 Type XII
		BMS 13-51 Type XVIII
		BMS 13-51 Type XXX
		BMS 13-60 Type 15
BMS 13-60 Type 34		

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STANDARD WIRE TYPE REPLACEMENT
Table 4 (continued)

Alternative Wire Type		Specified Wire Type
BMS 13-48	Equivalent BMS 13-60	
BMS 13-48 Type 32	BMS 13-60 Type 5	BMS 13-30 Type III
		BMS 13-39 Type VI
		BMS 13-42 Type XIII
		BMS 13-48 Type 13
		BMS 13-48 Type 24
		BMS 13-48 Type 26
		BMS 13-48 Type 28
		BMS 13-48 Type 6
		BMS 13-51 Type VI
		BMS 13-51 Type XII
		BMS 13-51 Type XVIII
		BMS 13-51 Type XXX
		BMS 13-60 Type 15
		BMS 13-60 Type 2
BMS 13-60 Type 34		

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STANDARD WIRE TYPE REPLACEMENT

CAUTION: THE REPLACEMENT OF A SPECIFIED WIRE BY A WIRE THAT IS NOT GIVEN IN TABLE 5 AS AN ALTERNATIVE WIRE IS NOT RECOMMENDED.

Table 5
SPECIFIED STANDARD WIRE TYPES THAT CAN BE REPLACED BY BMS 13-60 WIRE TYPES

Alternative Wire Type		Specified Wire Type
BMS 13-60	Equivalent BMS 13-48	
BMS 13-60 Type 1	BMS 13-48 Type 10	BMS 13-10 Type I
		BMS 13-11 Type I
		BMS 13-11 Type II
		BMS 13-13 Type I
		BMS 13-16 Type I
		BMS 13-39 Type I
		BMS 13-42 Type I
		BMS 13-48 Type 1
		BMS 13-48 Type 8
		BMS 13-51 Type I
		BMS 13-51 Type VIII
		BMS 13-51 Type XIV
		BMS 13-51 Type XXVI
BMS 13-60 Type 2	BMS 13-48 Type 12	BMS 13-10 Type III
		BMS 13-10 Type IV
		BMS 13-11 Type V
		BMS 13-13 Type III
		BMS 13-16 Type III
		BMS 13-39 Type III
		BMS 13-42 Type XII
		BMS 13-48 Type 25
		BMS 13-48 Type 27
		BMS 13-48 Type 3
		BMS 13-51 Type III
		BMS 13-51 Type IX
		BMS 13-51 Type XV
		BMS 13-51 Type XXVII
BMS 13-60 Type 13		
BMS 13-60 Type 33		

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Table 5 (continued)

Alternative Wire Type		Specified Wire Type
BMS 13-60	Equivalent BMS 13-48	
BMS 13-60 Type 4	BMS 13-48 Type 11	BMS 13-30 Type I
		BMS 13-48 Type 9
		BMS 13-51 Type XI
		BMS 13-51 Type XVII
		BMS 13-51 Type XXIX
BMS 13-60 Type 5	BMS 13-48 Type 13	BMS 13-30 Type III
		BMS 13-42 Type XIII
		BMS 13-48 Type 26
		BMS 13-48 Type 28
		BMS 13-48 Type 6
		BMS 13-51 Type VI
		BMS 13-51 Type XII
		BMS 13-51 Type XVIII
		BMS 13-51 Type XXX
		BMS 13-60 Type 15
		BMS 13-60 Type 34
	BMS 13-48 Type 32	BMS 13-30 Type III
		BMS 13-39 Type VI
		BMS 13-42 Type XIII
		BMS 13-48 Type 13
		BMS 13-48 Type 24
		BMS 13-48 Type 26
		BMS 13-48 Type 28
		BMS 13-48 Type 6
		BMS 13-51 Type VI
		BMS 13-51 Type XII
		BMS 13-51 Type XVIII
		BMS 13-51 Type XXX
		BMS 13-60 Type 15
BMS 13-60 Type 2		
BMS 13-60 Type 34		

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STANDARD WIRE TYPE REPLACEMENT

B. High Temperature Wire Types

CAUTION: THE REPLACEMENT OF A SPECIFIED WIRE BY A WIRE THAT IS NOT GIVEN IN TABLE 6 AS AN ALTERNATIVE WIRE IS NOT RECOMMENDED.

Table 6

ALTERNATIVE BMS 13-58 WIRE TYPES FOR SPECIFIED HIGH TEMPERATURE WIRE TYPES

Specified Wire Type	Alternative BMS 13-58 Wire Type
BMS 13-28 Type I	BMS 13-58 Type I
BMS 13-28 Type III	BMS 13-58 Type III
BMS 13-28 Type IV	BMS 13-58 Type IV
BMS 13-28 Type V	BMS 13-58 Type V
BMS 13-28 Type VII	BMS 13-58 Type VII
BMS 13-28 Type VIII	BMS 13-58 Type VIII
BMS 13-31 Type I	BMS 13-58 Type I
BMS 13-31 Type III	BMS 13-58 Type III
BMS 13-31 Type IV	BMS 13-58 Type IV
BMS 13-31 Type V	BMS 13-58 Type V
BMS 13-31 Type VII	BMS 13-58 Type VII
BMS 13-31 Type VIII	BMS 13-58 Type VIII
BMS 13-60 Type 7	BMS 13-58 Type I
BMS 13-60 Type 8	BMS 13-58 Type III
BMS 13-60 Type 9	BMS 13-58 Type IV
BMS 13-60 Type 10	BMS 13-58 Type V
BMS 13-60 Type 11	BMS 13-58 Type VII
BMS 13-60 Type 12	BMS 13-58 Type VIII

CAUTION: THE REPLACEMENT OF A SPECIFIED WIRE BY A WIRE THAT IS NOT GIVEN IN TABLE 7 AS AN ALTERNATIVE WIRE IS NOT RECOMMENDED.

Table 7

SPECIFIED HIGH TEMPERATURE WIRE TYPES THAT CAN BE REPLACED BY BMS 13-58 WIRE TYPES

Alternative BMS 13-58 Wire Type	Specified Wire Type
BMS 13-58 Type I	BMS 13-28 Type I
	BMS 13-31 Type I
	BMS 13-60 Type 7
BMS 13-58 Type III	BMS 13-28 Type III
	BMS 13-31 Type III
	BMS 13-60 Type 8



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STANDARD WIRE TYPE REPLACEMENT

Table 7 (continued)

Alternative BMS 13-58 Wire Type	Specified Wire Type
BMS 13-58 Type IV	BMS 13-28 Type IV
	BMS 13-31 Type IV
	BMS 13-60 Type 9
BMS 13-58 Type V	BMS 13-28 Type V
	BMS 13-31 Type V
	BMS 13-60 Type 10
BMS 13-58 Type VII	BMS 13-28 Type VII
	BMS 13-31 Type VII
	BMS 13-60 Type 11
BMS 13-58 Type VIII	BMS 13-28 Type VIII
	BMS 13-31 Type VIII
	BMS 13-60 Type 12

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WIRE INSULATION REMOVAL

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	A. Necessary Conditions for the Removal of the Outer Jacket from the End of a Cable	1
	B. Necessary Conditions for the Removal of the Insulation from the End of a Wire	2
2.	<u>CABLE JACKET AND WIRE INSULATION REMOVAL</u>	2
	A. Selection of a Removal Tool	2
	B. Cable Jacket Removal	3
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WIRE INSULATION REMOVAL

This subject:

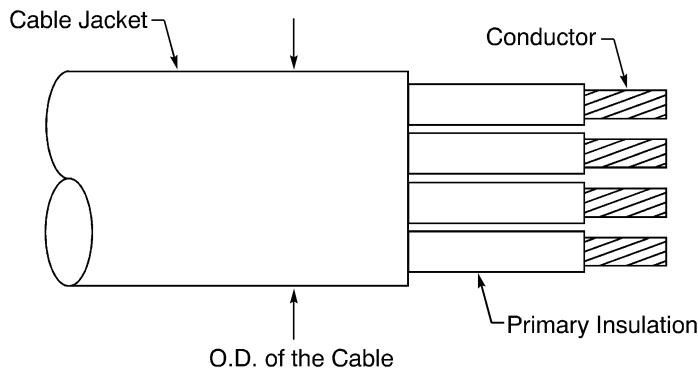
- Gives the conditions and the procedure for the removal of the necessary length of outer jacket from the end of a cable
- Gives the conditions and the procedure for the removal of the necessary length of insulation from the end of a wire
- Gives the outer jacket removal tools for cables that have an O.D. that is less than or equal to 0.3 inch
- Gives the insulation removal tools for AWG 10 through AWG 26 wire
- Does not give the cable preparation data for coax and triax cables.

1. GENERAL DATA

A. Necessary Conditions for the Removal of the Outer Jacket from the End of a Cable

These conditions are applicable after the outer jacket has been removed from the end of a cable that does not have a shield:

- The primary insulation of the wire does not have a hole or a crack
- The cable has no deformation near the end of the outer jacket
- The remaining jacket does not have a hole or a crack.



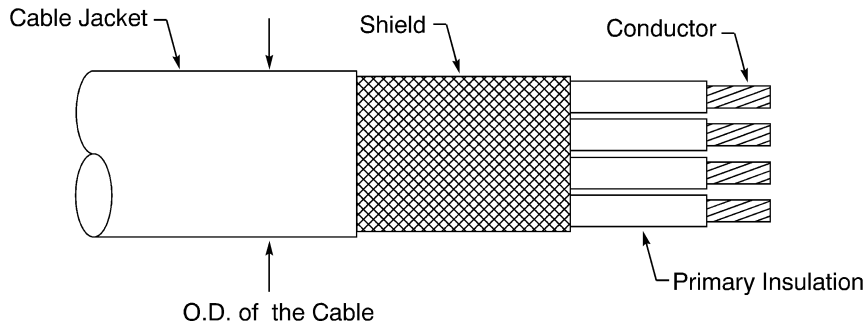
CONFIGURATION OF A CABLE WITHOUT A SHIELD CABLE
Figure 1

These conditions are applicable after the outer jacket has been removed from the end of a cable that has a shield:

- No strands of the shield are broken or missing
- The base metal of the strands of the shield cannot be seen
- The strands of shield are together
- The cable has no deformation near the end of the outer jacket
- The remaining jacket does not have a hole or a crack.

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WIRE INSULATION REMOVAL

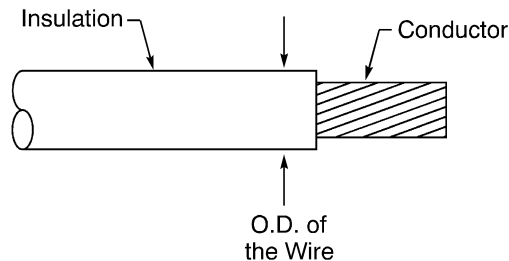


CONFIGURATION OF A CABLE WITH A SHIELD
Figure 2

B. Necessary Conditions for the Removal of the Insulation from the End of a Wire

These conditions are applicable after the insulation has been removed from the end of a wire:

- No strand of the conductor is broken or missing
- The base metal of a strand of the conductor cannot be seen
- The strands of the conductor are in the initial, twisted configuration
- The wire has no deformation near the end of the insulation
- The remaining insulation does not have a hole or a crack.



CONFIGURATION OF A WIRE
Figure 3

2. CABLE JACKET AND WIRE INSULATION REMOVAL

A. Selection of a Removal Tool

- (1) For the selection of a cable jacket removal tool:
 - (a) Find the Wire Type Code (WTC) of the cable. Refer to the Wiring Diagram Manual.
 - (b) Find the wire specification or the wire part number of the cable. Refer to Subject 20-00-13.
 - (c) Make a selection of a cable jacket removal tool. Refer to:
 - Table 1 for a WTC with one wire specification or part number
 - Table 2 for a WTC with more than one wire specification or part number.
- (2) For the selection of an insulation removal tool:
 - (a) Find the Wire Type Code (WTC) of the cable. Refer to the Wiring Diagram Manual.
 - (b) Find the wire specification or the wire part number of the cable. Refer to Subject 20-00-13.

STANDARD WIRING PRACTICES MANUAL

WIRE INSULATION REMOVAL

- (c) Make a selection of an insulation removal tool. Refer to:
 - Table 3 for a WTC with one wire specification or part number
 - Table 4 for a WTC with more than one wire specification or part number.

B. Cable Jacket Removal

This paragraph gives the procedure to remove a length of the outer jacket from a cable that has an O.D. that is less than or equal to 0.3 inch.

NOTE: It is recommended that a test of the cable jacket removal tool is done with a sample of the cable, before the operation is done on a cable that is installed or must be installed in the airplane.

- (1) Put the end of the cable in the V-notch that is nearest the pivot and below the blade.
Make sure that the blade is on the side of the cable jacket removal tool that is opposite to the hand that holds the cable.
- (2) Move the tool around the cable approximately three times.
- (3) Remove the cable from the tool.
- (4) Bend the cable on the line where the cable is cut to break the outer jacket loose.
- (5) If the length of jacket is long, cut the jacket longitudinally with the front blade of the tool.
- (6) Remove the length of jacket.
- (7) Examine the cable for damage. Refer to Paragraph 1.A.

C. Wire Insulation Removal

NOTE: It is recommended that a test of the insulation removal tool is done with a sample of the wire, before the operation is done on a wire that is installed or must be installed in the airplane.

- (1) Put the wire in the correct hole in the insulation removal tool.
- (2) Close the handles of the tool until the tool makes a click.
Make sure the handles stay closed.
- (3) Remove the wire from the tool.
- (4) Release the handles of the tool.
- (5) Examine the wire for damage. Refer to Paragraph 1.B.

3. CABLE JACKET AND WIRE INSULATION REMOVAL TOOLS

A. Cable Jacket Removal Tools

Table 1 and Table 2 give the tools that are recommended for the removal of a length of the outer jacket from the end of a cable.

NOTE: Other tools are acceptable if the result of the removal operation agrees with the necessary conditions that are specified in Paragraph 1.A.

**Table 1
RECOMMENDED CABLE JACKET REMOVAL TOOLS**

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
0A	-	-	45-402	K-6493

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WIRE INSULATION REMOVAL

Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
0B	-	-	45-402	K-6493
0C	-	-	45-402	K-6493
0D	-	-	45-402	K-6493
0N	-	-	45-403	K-6497
0Q	-	-	45-404	K-6500
0R	-	-	45-403	K-6495
0S	-	-	45-403	K-6497
0T	-	-	45-403	K-6499
0U	-	-	45-403	K-6495
0Z	-	-	45-403	K-6497
16	-	-	45-403	K-6497
24	-	-	45-401	K-6492
2E	-	-	45-401	K-6492
2F	-	-	45-401	K-6492
2G	-	-	45-401	K-6492
2H	-	-	45-401	K-6492
2N	-	-	45-401	K-6492
2P	-	-	45-401	K-6492
2Q	-	-	45-401	K-6492
2S	-	-	45-401	K-6492
2T	-	-	45-401	K-6492
2U	-	-	45-401	K-6492
2Z	-	-	45-402	K-6493
3A	-	-	45-401	K-6492
3U	-	-	45-404	K-6503
4I	-	-	45-402	K-6493
4J	-	-	45-402	K-6493
4Q	-	-	45-402	K-6493
5Q	-	-	45-401	K-6492
5R	-	-	45-401	K-6492
5T	-	-	45-403	K-6497

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WIRE INSULATION REMOVAL

Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
5U	-	-	45-401	K-6492
5X	-	-	45-403	K-6497
6E	-	-	45-401	K-6492
6F	-	-	45-401	K-6492
6G	-	-	45-401	K-6492
6H	-	-	45-401	K-6492
6N	-	-	45-401	K-6492
6Y	-	-	45-401	K-6492
6Z	-	-	45-403	K-6500
74	-	-	45-401	K-6492
7F	-	-	45-403	K-6498
7G	-	-	45-403	K-6502
7H	-	-	45-404	K-6503
7J	-	-	45-402	K-6493
7K	-	-	45-403	K-6498
7L	-	-	45-402	K-6493
7M	-	-	45-402	K-6493
7N	-	-	45-404	K-6494
7P	-	-	45-403	K-6495
7Y	-	-	45-401	K-6492
7Z	-	-	45-402	K-6493
8F	-	-	45-401	K-6492
8G	-	-	45-401	K-6492
8Y	-	-	45-404	K-6494
90	-	-	45-403	K-6502
91	-	-	45-403	K-6502
9J	-	-	45-402	K-6493
9K	-	-	45-404	K-6502
9L	-	-	45-402	K-6493
9M	-	-	45-403	K-6497
9N	-	-	45-403	K-6497

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Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
9P	-	-	45-402	K-6493
9Q	-	-	45-404	K-6493
9R	-	-	45-403	K-6494
9T	-	-	45-404	K-6493
9V	-	-	45-402	K-6493
AB	-	-	45-401	K-6492
AC	-	-	45-401	K-6492
AD	-	-	45-401	K-6492
AE	-	-	45-403	K-6494
AF	-	-	45-403	K-6494
AG	-	-	45-404	K-6492
AH	-	-	45-404	K-6492
AI	-	-	45-404	K-6492
AL	-	-	45-401	K-6492
AM	-	-	45-402	K-6493
AN	-	-	45-402	K-6493
AP	-	-	45-401	K-6492
AW	-	-	45-401	K-6492
AX	-	-	45-404	K-6503
B9	-	-	45-401	K-6492
BE	-	-	45-403	K-6498
BL	22	16	45-404	K-6502
BM	-	-	45-403	K-6498
BN	-	-	45-403	K-6498
BV	-	-	45-403	K-6497
BW	-	-	45-402	K-6493
BZ	-	-	45-404	K-6498
C0	-	-	45-404	K-6498
C1	-	-	45-400	K-6494
C2	-	-	45-403	K-6494
C3	-	-	45-403	K-6494

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WIRE INSULATION REMOVAL

Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
C4	-	-	45-403	K-6494
C5	-	-	45-403	K-6498
C8	-	-	45-402	K-6493
C9	-	-	45-404	K-6493
CB	-	-	45-401	K-6492
CL	-	-	45-401	K-6492
CN	-	-	45-403	K-6497
CP	-	-	45-403	K-6497
CR	-	-	45-403	K-6497
CS	-	-	45-403	K-6497
CU	24	20	45-403	K-6501
	18	14	45-404	K-6502
CV	-	-	45-402	K-6493
D#	-	-	45-404	K-6498
D0	-	-	45-402	K-6493
D1	-	-	45-402	K-6493
D2	-	-	45-404	K-6497
D3	-	-	45-404	K-6497
D4	-	-	45-404	K-6497
D6	-	-	45-402	K-6493
D7	-	-	45-402	K-6493
D8	-	-	45-402	K-6493
DG	-	-	45-402	K-6493
DH	-	-	45-402	K-6493
DK	-	-	45-403	K-6494
DM	-	-	45-403	K-6495
DN	-	-	45-403	K-6495
DR	-	-	45-403	K-6497
DS	28	16	45-404	K-6497
DT	-	-	45-403	K-6497
DU	-	-	45-403	K-6497

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WIRE INSULATION REMOVAL

Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
E0	-	-	45-402	K-6493
E1	-	-	45-402	K-6493
E2	28	14	45-403	K-6497
	12	12	45-404	K-6497
E4	-	-	45-402	K-6493
E5	24	14	45-402	K-6493
	12	10	45-404	K-6494
E6	24	14	45-402	K-6493
	12	10	45-404	K-6494
EE	24	18	45-403	K-6498
	16	12	45-403	K-6500
EF	24	20	45-403	K-6502
	18	16	45-404	K-6503
EG	24	22	45-403	K-6502
	20	16	45-404	K-6503
EH	24	24	45-403	K-6402
	22	18	45-404	K-6403
EP	26	14	45-401	K-6492
	12	10	45-404	K-6492
EZ	-	-	45-403	K-6497
F#	24	16	45-403	K-6496
	14	10	45-404	K-6496
FE	-	-	45-403	K-6499
FF	-	-	45-404	K-6502
FG	-	-	45-404	K-6502
FH	-	-	45-404	K-6502
FJ	-	-	45-403	K-6499
FL	-	-	45-404	K-6502
FN	24	14	45-402	K-6493
	12	10	45-404	K-6494

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Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
FP	24	14	45-402	K-6493
	12	10	45-404	K-6494
FR	24	14	45-401	K-6492
	12	10	45-402	K-6493
G1	-	-	45-402	K-6493
G2	24	14	45-402	K-6493
	12	10	45-404	K-6494
G3	24	14	45-402	K-6493
	12	10	45-404	K-6494
G4	24	16	45-402	K-6493
	14	10	45-404	K-6494
G7	-	-	45-402	K-6493
GE	-	-	45-402	K-6493
GF	24	14	45-402	K-6493
	12	10	45-404	K-6494
GG	24	14	45-402	K-6493
	12	10	45-404	K-6494
GH	26	16	45-402	K-6493
	14	10	45-404	K-6494
GP	-	-	45-402	K-6493
GQ	24	14	45-402	K-6493
	12	10	45-404	K-6494
GR	24	14	45-402	K-6493
	12	10	45-404	K-6494
GS	24	16	45-402	K-6493
	14	10	45-404	K-6494
GT	-	-	45-402	K-6493
GU	24	14	45-402	K-6493
	12	10	45-404	K-6494
GV	24	14	45-402	K-6493
	12	10	45-404	K-6494

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Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
GW	24	16	45-402	K-6493
	14	10	45-404	K-6494
H1	-	-	45-402	K-6493
H2	24	14	45-402	K-6493
	12	10	45-404	K-6494
H3	24	14	45-402	K-6493
	12	10	45-404	K-6494
H4	24	16	45-402	K-6493
	14	10	45-404	K-6494
H5	24	16	45-402	K-6493
	14	10	45-404	K-6494
H6	-	-	45-402	K-6493
H7	24	14	45-402	K-6493
	12	10	45-404	K-6494
H8	-	-	45-402	K-6493
H9	-	-	45-403	K-6496
HE	-	-	45-403	K-6496
HF	24	16	45-403	K-6496
	14	10	45-404	K-6496
HG	24	16	45-403	K-6496
	14	12	45-404	K-6496
HH	24	16	45-403	K-6496
	14	12	45-404	K-6496
HJ	-	-	45-404	K-6496
HK	24	18	45-403	K-6496
	16	14	45-404	K-6496
HP	-	-	45-403	K-6496
HQ	24	16	45-403	K-6496
	14	10	45-404	K-6496
HR	24	16	45-403	K-6496
	14	12	45-404	K-6496

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Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
HS	24	18	45-403	K-6496
	16	14	45-404	K-6496
HU	-	-	45-404	K-6496
HV	-	-	45-404	K-6503
HW	-	-	45-402	K-6493
HX	-	-	45-402	K-6493
HY	-	-	45-402	K-6493
LE	-	-	45-401	K-6492
LH	-	-	45-401	K-6492
LL	-	-	45-402	K-6493
M1	-	-	45-402	K-6493
M2	-	-	45-402	K-6493
M3	-	-	45-402	K-6493
M5	-	-	45-402	K-6493
M6	-	-	45-402	K-6493
MD	-	-	45-401	K-6492
ME	-	-	45-403	K-6496
MK	-	-	45-403	K-6500
ML	-	-	45-403	K-6500
MN	-	-	45-403	K-6500
MP	-	-	45-403	K-6500
MQ	-	-	45-403	K-6500
MR	-	-	45-403	K-6500
MT	-	-	45-403	K-6500
MU	-	-	45-403	K-6500
MV	-	-	45-403	K-6500
MW	-	-	45-403	K-6500
MZ	-	-	45-403	K-6496
N1	-	-	45-402	K-6493
N2	26	12	45-402	K-6493
	10	10	45-404	K-6493

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WIRE INSULATION REMOVAL

Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
N3	26	14	45-402	K-6493
	12	10	45-404	K-6493
N4	26	14	45-402	K-6493
	12	10	45-404	K-6493
N5	-	-	45-402	K-6493
N6	26	12	45-402	K-6493
	10	10	45-404	K-6493
N7	26	14	45-402	K-6493
	12	10	45-404	K-6493
N9	-	-	45-402	K-6493
P1	-	-	45-402	K-6493
P2	-	-	45-402	K-6493
P3	-	-	45-402	K-6493
P4	-	-	45-402	K-6493
P5	-	-	45-402	K-6493
P6	-	-	45-402	K-6493
PQ	-	-	45-402	K-6493
PR	24	14	45-402	K-6493
	12	10	45-404	K-6494
PS	24	14	45-402	K-6493
	12	12	45-404	K-6494
PT	24	16	45-402	K-6493
	14	12	45-404	K-6494
PU	-	-	45-402	K-6493
PV	-	-	45-402	K-6493
PW	-	-	45-402	K-6493
PX	-	-	45-402	K-6493
PY	-	-	45-402	K-6493
QJ	24	14	45-402	K-6493
	12	10	45-404	K-6493

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Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
QK	24	14	45-402	K-6493
	12	10	45-404	K-6493
QL	24	16	45-402	K-6493
	14	12	45-404	K-6493
QS	-	-	45-402	K-6493
QT	-	-	45-402	K-6493
QU	24	14	45-402	K-6493
	12	10	45-404	K-6494
QV	24	14	45-402	K-6493
	12	10	45-404	K-6494
QW	24	14	45-402	K-6493
	12	10	45-404	K-6494
QX	24	14	45-402	K-6493
	12	12	45-404	K-6494
R0	-	-	45-401	K-6492
R1	-	-	45-401	K-6492
R2	-	-	45-401	K-6492
R3	-	-	45-401	K-6492
R4	-	-	45-401	K-6492
R5	-	-	45-401	K-6492
R6	-	-	45-401	K-6492
R7	-	-	45-401	K-6492
R8	-	-	45-401	K-6492
R9	-	-	45-401	K-6492
RB	-	-	45-401	K-6492
RH	-	-	45-401	K-6492
RJ	-	-	45-403	K-6496
RK	-	-	45-403	K-6496
RL	24	16	45-403	K-6496
	14	12	45-404	K-6496

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WIRE INSULATION REMOVAL

Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
RM	24	16	45-403	K-6496
	14	12	45-404	K-6496
RQ	-	-	45-404	K-6496
T1	-	-	45-402	K-6493
T2	-	-	45-402	K-6493
T3	-	-	45-403	K-6496
TA	-	-	45-403	K-6497
TD	-	-	45-404	K-6497
TE	-	-	45-404	K-6497
TF	-	-	45-402	K-6493
TK	-	-	45-404	K-6503
TP	-	-	45-404	K-6503
TQ	-	-	45-403	K-6497
TT	-	-	45-404	K-6503
TU	-	-	45-403	K-6497
U4	24	16	45-402	K-6493
	14	14	45-404	K-6494
UI	-	-	45-402	K-6493
V2	-	-	45-403	K-6794
V3	-	-	45-403	K-6497
V4	-	-	45-403	K-6497
V9	-	-	45-403	K-6494
VI	24	16	45-402	K-6493
	14	14	45-404	K-6494
W4	-	-	45-403	K-6498
W5	-	-	45-403	K-6500
WA	-	-	45-404	K-6495
WB	-	-	45-404	K-6495
WI	-	-	45-402	K-6493
WN	-	-	45-404	K-6495
WP	-	-	45-404	K-6495

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Table 1 (continued)

WTC	Wire Size (AWG)		Basic Unit	Replacement Blade
	Minimum	Maximum		
WT	-	-	45-404	K-6494
WV	-	-	45-403	K-6495
WX	-	-	45-403	K-6496
X1	-	-	45-402	K-6493
X2	-	-	45-402	K-6493
X3	-	-	45-402	K-6493
X4	-	-	45-403	K-6494
X5	-	-	45-402	K-6493
X6	-	-	45-402	K-6493
XQ	-	-	45-402	K-6493
XV	-	-	45-403	K-6496
XX	-	-	45-403	K-6494
XY	-	-	45-404	K-6497
Y1	-	-	45-401	K-6492
Y2	-	-	45-402	K-6493
Y3	-	-	45-402	K-6493
Y4	-	-	45-402	K-6493
Y5	-	-	45-402	K-6493
YF	-	-	45-401	K-6492
YG	24	14	45-402	K-6493
	12	10	45-404	K-6494
YH	24	14	45-402	K-6493
	12	10	45-404	K-6494
YP	-	-	45-402	K-6493
YW	24	14	45-402	K-6493
	12	12	45-404	K-6494

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Table 2
RECOMMENDED CABLE JACKET REMOVAL TOOLS FOR WIRE TYPE CODES RELATED TO MORE THAN ONE WIRE SPECIFICATION

WTC	Wire Specification or Part Number	Jacket Removal Tool	
		Basic Unit	Replacement Blade
3B	BMS 13-48 Type 12	45-402	K-6493
	BMS 13-11 Type 5	45-401	K-6492
42	55A1211, Raychem	45-402	K-6493
4B	201-0046, Amphenol	45-404	K-6495
4C	BMS 13-51 Type 15	45-401	K-6492
4D	BMS 13-13 Type 4	45-401	K-6492
4E	7484444-1SN-22, Douglas	45-401	K-6492
4H	Raychem 55A6160	45-402	K-6493
4K	BMS 13-51 Type 15	45-401	K-6492
4L	55A6090, Raychem	45-404	K-6494
	24723/70102KK-5, Tensolite	45-401	K-6492
5B	BMS 13-48 Type 18	45-402	K-6493
5E	BMS 13-51 Type 27	45-401	K-6492
5F	BMS 13-51 Type 27	45-401	K-6492
5G	BMS 13-51 Type 18	45-401	K-6492
	BMS 13-51 Type 27	45-401	K-6492
5H	BMS 13-51 Type 18	45-401	K-6492
	BMS 13-51 Type 27	45-401	K-6492
5J	BMS 13-51 Type 18	45-401	K-6492
5K	BMS 13-51 Type 18	45-401	K-6492
5N	BMS 13-51 Type 30	45-401	K-6492
5P	BMS 13-51 Type 15	45-401	K-6492
	BMS 13-51 Type 30	45-401	K-6492
5S	BMS 13-51 Type 30	45-401	K-6492
5Y	S280T004	45-404	K-6493
	BMS 13-51 Type 6	45-401	K-6492
67	BMS 13-18 Type 3	45-403	K-6496
6P	BMS 13-51 Type 18	45-401	K-6492
6Q	BMS 13-51 Type 18	45-401	K-6492
6R	BMS 13-51 Type 18	45-401	K-6492

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Table 2 (continued)

WTC	Wire Specification or Part Number	Jacket Removal Tool	
		Basic Unit	Replacement Blade
6S	BMS 13-51 Type 18	45-401	K-6492
6T	BMS 13-51 Type 16	45-401	K-6492
	BMS 13-51 Type 12	45-401	K-6492
6U	BMS 13-51 Type 16	45-401	K-6492
	BMS 13-51 Type 12	45-401	K-6492
6V	BMS 13-51 Type 12	45-401	K-6492
6W	BMS 13-51 Type 12	45-401	K-6492
8A	BMS 13-51 Type 9	45-401	K-6492
	BMS 13-51 Type 27	45-401	K-6492
8B	BMS 13-51 Type 9	45-401	K-6492
	BMS 13-51 Type 27	45-401	K-6492
8C	BMS 13-48 Type 24	45-402	K-6493
	BMS 13-51 Type 9	45-401	K-6492
8D	BMS 13-48 Type 24	45-402	K-6493
	BMS 13-51 Type 30	45-401	K-6492
8E	BMS 13-48 Type 24	45-402	K-6493
	BMS 13-51 Type 30	45-401	K-6492
8H	BMS 13-51 Type 15	45-401	K-6492
8J	BMS 13-51 Type 15	45-401	K-6492
8K	BMS 13-48 Type 24	45-402	K-6493
	BMS 13-51 Type 15	45-401	K-6492
8L	0024A0014, Raychem	45-403	K-6497
	BMS 13-51 Type 15	45-401	K-6492
8M	BMS 13-51 Type 15	45-401	K-6492
	BMS 13-51 Type 27	45-401	K-6492
8P	44A7620, Raychem	45-403	K-6497
	BMS 13-51 Type 18	45-401	K-6492
8Q	BMS 13-48 Type 12	45-402	K-6493
8R	BMS 13-16 Type 3	45-403	K-6497
8S	BMS 13-16 Type 3	45-403	K-6497
93	10-60875-4	45-403	K-6497

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Table 2 (continued)

WTC	Wire Specification or Part Number	Jacket Removal Tool	
		Basic Unit	Replacement Blade
98	10-60875-8	45-403	K-6497
	BMS 13-30 Type 3	45-401	K-6492
9C	55A6160, Raychem	45-402	K-6493
9D	61-02651, Champlain	45-404	K-6502
9E	BMS 13-31 Type 7	45-404	K-6503
	M27500-*SB1T14	45-403	K-6497
9F	30-04680, Champlain	45-403	K-6500
	M27500-*TG2T14	45-403	K-6497
9G	831-4245379, Pirelli	45-402	K-6493
	M27500-*TG3T14	45-403	K-6494
9H	831-4245270, Pirelli	45-402	K-6493
	M27500-*TG4T14	45-403	K-6495
9X	85842, Filotex	45-402	K-6493
9Y	81993, Filotex	45-402	K-6493
CH	BMS 13-31 Type 3	45-404	K-6503
	BMS 13-42 Type 12	45-401	K-6492
CJ	BMS 13-31 Type 3	45-404	K-6503
	BMS 13-42 Type 12	45-403	K-6492
CW	65B47866-5	45-404	K-6495
UP	BMS 13-11 Type 5	45-401	K-6492
US	BMS 13-11 Type 5	45-401	K-6492
VA	S280T004-1	45-404	K-6493
VB	S280T006-2	45-404	K-6493
VC	65B47866-2	45-403	K-6496
VD	24-00034, Champlain	45-403	K-6497
VF	BMS 13-48 Type 12	45-402	K-6493
	BMS 13-42 Type 12	45-401	K-6492
VG	BMS 13-48 Type 12	45-402	K-6493
	BMS 13-42 Type 12	45-401	K-6492
VH	BMS 13-48 Type 12	45-402	K-6493
	BMS 13-42 Type 12	45-401	K-6492
VJ	BMS 13-42 Type 12	45-401	K-6492

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Table 2 (continued)

WTC	Wire Specification or Part Number	Jacket Removal Tool	
		Basic Unit	Replacement Blade
VK	BMS 13-42 Type 12	45-401	K-6492
VL	BMS 13-42 Type 12	45-401	K-6492
VM	51-04569, Champlain	45-403	K-6495
VN	51-04570, Champlain	45-403	K-6491
	M27500-20RC2N06	45-403	K-6497
VW	24-00033, Champlain	45-403	K-6497
	24-00517, Champlain	45-403	K-6497
VX	784-2ZXE, Thermax	45-403	K-6495
VY	63546, Filotex	45-404	45-2108-1
VZ	BMS 13-55 Type 4	45-404	K-6493
W2	10605, Raychem	45-403	K-6494
WC	10599, Raychem	45-403	K-6494
WE	65B47866-2	45-403	K-6496
WF	BMS 13-48 Type 13	45-402	K-6493
WG	BMS 13-48 Type 13	45-402	K-6493
WH	BMS 13-48 Type 13	45-402	K-6493
WJ	6917M39, Endevco	45-403	K-6495
WK	BMS 13-28 Type 4	45-403	K-6497
WL	BMS 13-28 Type 24	45-402	K-6493
WM	BMS 13-28 T24	45-402	K-6493
	VE 556, Vermillion	45-402	K-6493
ZC	M5086/2	45-401	K-6492

B. Wire Insulation Removal Tools

Table 3 and Table 4 give the tools that are recommended for the removal of a length of the insulation from the end of a wire.

NOTE: Other tools are acceptable if the result of the removal operation agrees with the necessary conditions that are specified in Paragraph 1.B.

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CAUTION: DO NOT USE THE TOOLS IN TABLE 3 AND TABLE 4 TO REMOVE THE OUTER JACKET FROM A CABLE OR A SHIELDED WIRE. DAMAGE TO THE SHIELD OR THE WIRES IN THE CABLE CAN OCCUR.

**Table 3
RECOMMENDED INSULATION REMOVAL TOOLS**

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
0A	24	16	ST2222-26
	14	12	ST2222-27
0B	24	16	ST2222-26
	14	12	ST2222-27
0C	24	16	ST2222-26
	14	12	ST2222-27
0D	24	16	ST2222-26
	14	12	ST2222-27
0N	24	24	ST2222-42
0Q	22	22	ST2222-42
0R	24	24	ST2222-46
0S	22	22	ST2222-21
0T	24	16	ST2222-42
0U	24	16	ST2222-42
0Z	20	20	ST2222-21
16	20	18	ST2222-38
1A	22	16	ST2222-42
	14	10	ST2222-39
1B	22	16	ST2222-42
	14	10	ST2222-39
1C	22	16	ST2222-42
	14	10	ST2222-39
1E	26	16	ST2222-29
	14	12	ST2222-27
1F	26	16	ST2222-29
	14	12	ST2222-27
1G	26	16	ST2222-29
	14	12	ST2222-27



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Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
1H	26	16	ST2222-29
	14	12	ST2222-27
1P	22	16	ST2222-42
	14	10	ST2222-39
1R	26	16	ST2222-29
	14	12	ST2222-43
1Z	22	16	ST2222-38
21	22	16	ST2222-42
	14	12	ST2222-39
24	26	16	ST2222-26
	14	12	ST2222-27
28	18	18	ST2222-38
2A	26	16	ST2222-29
	14	10	ST2222-30
2B	26	16	ST2222-29
	14	12	ST2222-30
2C	26	16	ST2222-29
	14	12	ST2222-30
2D	26	16	ST2222-29
	14	12	ST2222-30
2E	26	16	ST2222-29
	14	10	ST2222-30
2F	26	16	ST2222-29
	14	10	ST2222-30
2G	26	16	ST2222-29
	14	10	ST2222-30
2H	26	16	ST2222-29
	14	10	ST2222-30
2J	26	20	ST2222-29
2K	26	20	ST2222-29
2L	26	20	ST2222-29

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
2M	26	20	ST2222-29
2N	26	20	ST2222-29
2P	26	20	ST2222-29
2Q	26	20	ST2222-29
2S	26	16	ST2222-29
	14	10	ST2222-30
2T	26	20	ST2222-29
2U	26	16	ST2222-29
	14	10	ST2222-30
2V	24	16	ST2222-29
	14	10	ST2222-30
2W	24	16	ST2222-29
	14	10	ST2222-30
2X	22	20	ST2222-26
2Z	24	16	ST2222-40
30	16	16	ST2222-38
31	12	12	ST2222-39
	16	16	ST2222-21
32	12	12	ST2222-39
3A	26	16	ST2222-26
	14	12	ST2222-27
3U	26	16	ST2222-46
	14	12	ST2222-43
42	10	10	ST2222-44
4I	20	20	ST2222-28
4J	24	16	ST2222-38
4Q	24	16	ST2222-29
	14	10	ST2222-30
4R	10	10	ST2222-27
5Q	26	20	ST2222-29
5R	26	20	ST2222-29

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
5T	24	16	ST2222-40
5U	26	20	ST2222-29
6A	26	16	ST2222-33
	14	10	ST2222-32
6B	26	16	ST2222-33
	14	10	ST2222-32
6C	26	16	ST2222-33
	14	10	ST2222-32
6D	26	16	ST2222-33
	14	10	ST2222-32
6E	26	16	ST2222-33
	14	10	ST2222-32
6F	26	16	ST2222-33
	14	10	ST2222-32
6G	26	16	ST2222-33
	14	10	ST2222-32
6H	26	16	ST2222-33
	14	10	ST2222-32
6J	26	20	ST2222-33
6K	26	20	ST2222-33
6L	26	20	ST2222-33
6M	26	20	ST2222-33
6N	26	20	ST2222-33
6X	26	20	ST2222-33
6Y	22	22	ST2222-33
6Z	26	26	ST2222-42
70	20	16	ST2222-38
7A	20	16	ST2222-47
7B	24	16	ST2222-47
7C	24	16	ST2222-47
7D	24	16	ST2222-47

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
7E	24	16	ST2222-47
7F	20	16	ST2222-47
7G	20	16	ST2222-47
7H	20	16	ST2222-47
7J	24	16	ST2222-26
7K	24	24	ST2222-29
7L	22	16	ST2222-45
7M	18	18	ST2222-42
7N	20	20	ST2222-28
7P	24	24	ST2222-26
7R	20	20	ST2222-42
7S	26	16	ST2222-29
	14	10	ST2222-30
7T	26	16	ST2222-29
	14	10	ST2222-30
7U	26	16	ST2222-29
	14	10	ST2222-30
7V	26	16	ST2222-29
	14	10	ST2222-30
7W	26	16	ST2222-29
	14	10	ST2222-30
7X	26	16	ST2222-29
	14	10	ST2222-30
7Y	26	16	ST2222-29
	14	10	ST2222-30
7Z	22	20	ST2222-45
80	15	13	ST2222-41
81	18	16	ST2222-38
8F	26	20	ST2222-29
8G	26	20	ST2222-29
8N	22	20	ST2222-26

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
8T	26	16	ST2222-29
	14	10	ST2222-30
8U	22	20	ST2222-29
8Y	20	20	ST2222-42
8Z	20	20	ST2222-21
99	13	13	ST2222-43
9J	20	20	ST2222-21
9K	20	20	ST2222-42
9L	22	16	ST2222-38
9M	18	18	ST2222-26
9N	16	16	ST2222-26
9P	22	16	ST2222-38
9Q	22	16	ST2222-38
9R	24	24	ST2222-46
9T	22	16	ST2222-38
9U	24	16	ST2222-38
9V	22	16	ST2222-38
9W	26	16	ST2222-33
	14	10	ST2222-32
9Z	26	16	ST2222-33
	14	10	ST2222-32
A6	24	16	ST2222-45
A8	10	10	ST2222-39
AB	20	20	ST2222-42
AC	20	16	ST2222-42
AD	18	18	ST2222-42
AF	20	20	ST2222-38
AG	20	18	ST2222-42
AH	20	20	ST2222-42
AI	20	20	ST2222-46
AJ	20	16	ST2222-28

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
AK	20	16	ST2222-28
AL	20	18	ST2222-21
AM	16	16	ST2222-47
	12	12	ST2222-48
AN	16	16	ST2222-47
AO	22	22	ST2222-38
AP	20	16	ST2222-42
AR	24	20	ST2222-42
AW	20	18	ST2222-42
AX	24	16	ST2222-47
	14	10	ST2222-48
AY	20	20	ST2222-47
AZ	26	16	ST2222-26
	14	12	ST2222-27
B6	24	16	ST2222-38
B7	24	16	ST2222-38
B8	24	16	ST2222-38
B9	24	16	ST2222-38
BA	26	20	ST2222-42
BB	26	20	ST2222-42
BC	26	20	ST2222-42
BD	26	20	ST2222-42
BE	20	16	ST2222-38
BF	24	20	ST2222-40
BI	24	16	ST2222-47
	14	10	ST2222-48
BK	24	16	ST2222-26
	14	12	ST2222-27
BM	26	16	ST2222-29
	14	12	ST2222-43

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
BN	26	16	ST2222-29
	14	12	ST2222-43
BO	18	18	ST2222-42
BP	24	20	ST2222-26
BQ	20	20	ST2222-28
	14	14	ST2222-43
BU	24	20	ST2222-26
BV	24	16	ST2222-38
BW	24	16	ST2222-38
BY	20	20	ST2222-26
BZ	20	16	ST2222-38
C0	24	16	ST2222-38
C1	24	16	ST2222-42
C2	24	16	ST2222-42
C3	24	16	ST2222-42
C4	24	16	ST2222-42
C5	24	16	ST2222-38
C6	22	16	ST2222-38
C7	22	16	ST2222-38
C8	22	16	ST2222-38
C9	22	16	ST2222-38
CB	26	20	ST2222-21
CE	24	16	ST2222-38
CF	24	16	ST2222-38
CL	20	20	ST2222-46
CN	26	16	ST2222-29
	14	12	ST2222-27
CP	26	16	ST2222-29
	14	12	ST2222-27
CQ	24	16	ST2222-38
	14	10	ST2222-39

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
CR	26	16	ST2222-29
	14	12	ST2222-27
CS	26	16	ST2222-29
	14	12	ST2222-27
CT	22	22	ST2222-26
CU	24	16	ST2222-47
	14	10	ST2222-48
CV	22	22	ST2222-26
D#	18	18	ST2222-38
D0	20	20	ST2222-29
D1	20	20	ST2222-29
D2	20	20	ST2222-42
D3	20	20	ST2222-42
D4	18	18	ST2222-38
D6	20	20	ST2222-42
D7	20	20	ST2222-42
D8	20	20	ST2222-42
DC	24	16	ST2222-50
	14	10	ST2222-30
DD	24	16	ST2222-50
	14	10	ST2222-30
DF	24	16	ST2222-50
	14	10	ST2222-30
DG	24	16	ST2222-50
	14	10	ST2222-30
DH	24	16	ST2222-50
	14	10	ST2222-30
DK	24	16	ST2222-50
	14	10	ST2222-30
DM	24	16	ST2222-50
	14	10	ST2222-30

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Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
DN	24	16	ST2222-50
	14	10	ST2222-30
DR	26	16	ST2222-29
	14	12	ST2222-27
DS	26	16	ST2222-29
	14	12	ST2222-27
DT	20	20	ST2222-26
DU	22	18	ST2222-26
DW	20	20	ST2222-42
DX	20	20	ST2222-26
DZ	24	24	ST2222-42
E0	22	16	ST2222-38
	14	14	ST2222-34
E1	22	16	ST2222-38
	14	14	ST2222-34
E2	26	16	ST2222-29
	14	12	ST2222-27
E4	24	16	ST2222-40
	14	10	ST2222-41
E5	24	16	ST2222-40
	14	10	ST2222-41
E6	24	16	ST2222-40
	14	10	ST2222-41
EA	24	16	ST2222-47
	14	10	ST2222-48
EB	24	16	ST2222-47
	14	10	ST2222-48
EC	24	16	ST2222-47
	14	10	ST2222-48
ED	24	16	ST2222-47
	14	10	ST2222-48

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
EE	24	16	ST2222-47
	14	10	ST2222-48
EF	24	16	ST2222-47
	14	10	ST2222-48
EG	24	16	ST2222-47
	14	10	ST2222-48
EH	24	16	ST2222-47
	14	10	ST2222-48
EJ	24	16	ST2222-26
	14	10	ST2222-27
EK	24	16	ST2222-26
	14	10	ST2222-27
EP	24	16	ST2222-26
	14	10	ST2222-27
ES	26	16	ST2222-29
EX	24	18	ST2222-47
EZ	24	24	ST2222-26
F#	24	16	ST2222-42
	14	10	ST2222-43
FC	20	16	ST2222-42
FD	20	16	ST2222-42
FE	20	16	ST2222-42
FF	20	16	ST2222-42
FG	20	16	ST2222-42
FH	20	16	ST2222-42
FJ	20	16	ST2222-42
FL	20	20	ST2222-42
FM	24	16	ST2222-26
	14	10	ST2222-27
FN	24	16	ST2222-29
	14	10	ST2222-30

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Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
FP	24	16	ST2222-29
	14	10	ST2222-30
FR	24	16	ST2222-29
	14	10	ST2222-30
FV	24	16	ST2222-26
FX	24	18	ST2222-47
G1	24	16	ST2222-45
	14	10	ST2222-44
G2	24	16	ST2222-45
	14	10	ST2222-44
G3	24	16	ST2222-45
	14	10	ST2222-44
G4	24	16	ST2222-45
	14	10	ST2222-44
G5	24	16	ST2222-46
G6	24	16	ST2222-46
G7	24	16	ST2222-40
	14	10	ST2222-41
GA	24	16	ST2222-40
	14	10	ST2222-41
GB	24	16	ST2222-40
	14	10	ST2222-41
GC	24	16	ST2222-40
	14	10	ST2222-41
GD	24	16	ST2222-40
	14	10	ST2222-41
GE	24	16	ST2222-40
	14	10	ST2222-41
GF	24	16	ST2222-40
	14	10	ST2222-41

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
GG	24	16	ST2222-40
	14	10	ST2222-41
GH	24	16	ST2222-40
	14	10	ST2222-41
GK	24	16	ST2222-40
	14	10	ST2222-41
GL	24	16	ST2222-40
	14	10	ST2222-41
GM	24	16	ST2222-40
	14	10	ST2222-41
GN	24	16	ST2222-40
	14	10	ST2222-41
GP	24	16	ST2222-40
	14	10	ST2222-41
GQ	24	16	ST2222-40
	14	10	ST2222-41
GR	24	16	ST2222-40
	14	10	ST2222-41
GS	24	16	ST2222-40
	14	10	ST2222-41
GT	24	16	ST2222-45
	14	10	ST2222-44
GU	24	16	ST2222-45
	14	10	ST2222-44
GV	24	16	ST2222-45
	14	10	ST2222-44
GW	24	16	ST2222-45
	14	10	ST2222-44
H1	24	16	ST2222-45
	14	10	ST2222-44

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
H2	24	16	ST2222-45
	14	10	ST2222-44
H3	24	16	ST2222-45
	14	10	ST2222-44
H4	24	16	ST2222-45
	14	10	ST2222-44
H5	24	16	ST2222-45
	14	10	ST2222-44
H6	24	16	ST2222-45
	14	10	ST2222-44
H7	24	16	ST2222-45
	14	10	ST2222-44
H8	24	16	ST2222-45
	14	10	ST2222-44
H9	24	16	ST2222-42
	14	10	ST2222-43
HA	24	16	ST2222-42
	14	10	ST2222-43
HB	24	16	ST2222-42
	14	10	ST2222-43
HC	24	16	ST2222-42
	14	10	ST2222-43
HD	24	16	ST2222-42
	14	10	ST2222-43
HE	24	16	ST2222-42
	14	10	ST2222-43
HF	24	16	ST2222-42
	14	10	ST2222-43
HG	24	16	ST2222-42
	14	10	ST2222-43

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
HH	24	16	ST2222-42
	14	10	ST2222-43
HJ	24	18	ST2222-42
HK	24	16	ST2222-42
	14	10	ST2222-43
HL	24	16	ST2222-42
	14	10	ST2222-43
HM	24	16	ST2222-42
	14	10	ST2222-43
HN	24	16	ST2222-42
	14	10	ST2222-43
HP	24	16	ST2222-42
	14	10	ST2222-43
HQ	24	16	ST2222-42
	14	10	ST2222-43
HR	24	16	ST2222-42
	14	10	ST2222-43
HS	24	16	ST2222-42
	14	10	ST2222-43
HT	24	16	ST2222-42
	14	10	ST2222-43
HU	24	18	ST2222-42
HV	20	20	ST2222-40
HW	22	16	ST2222-40
HX	22	16	ST2222-40
HY	22	16	ST2222-40
LE	26	16	ST2222-28
	14	12	ST2222-30
LH	26	16	ST2222-28
	14	12	ST2222-30

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
LL	26	16	ST2222-28
	14	12	ST2222-30
M1	22	16	ST2222-40
M2	22	16	ST2222-40
M3	22	16	ST2222-40
M5	24	16	ST2222-40
M6	24	16	ST2222-40
MB	22	22	ST2222-47
MC	12	12	ST2222-48
MD	18	18	ST2222-21
MG	18	18	ST2222-29
MH	20	18	ST2222-29
MJ	20	20	ST2222-29
MK	16	16	ST2222-29
ML	16	16	ST2222-29
MM	22	22	ST2222-29
MN	18	16	ST2222-29
MP	22	22	ST2222-29
MQ	20	18	ST2222-29
MR	20	16	ST2222-29
	12	12	ST2222-30
MS	24	24	ST2222-29
MT	12	12	ST2222-30
MU	20	16	ST2222-29
MV	20	20	ST2222-29
MW	20	20	ST2222-29
MX	20	20	ST2222-47
MZ	14	14	ST2222-41
N1	24	16	ST2222-40
N2	24	16	ST2222-40
N3	24	16	ST2222-40

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
N4	24	16	ST2222-40
N5	24	16	ST2222-40
N6	24	16	ST2222-40
N7	24	16	ST2222-40
N9	24	16	ST2222-40
P1	24	16	ST2222-26
P2	24	16	ST2222-26
P3	24	16	ST2222-26
P4	24	16	ST2222-50
	14	10	ST2222-30
P5	24	16	ST2222-50
	14	10	ST2222-30
P6	24	16	ST2222-50
P7	24	20	ST2222-50
PA	24	16	ST2222-29
	14	10	ST2222-30
PB	24	16	ST2222-29
	14	12	ST2222-30
PC	24	16	ST2222-29
	14	12	ST2222-30
PD	24	16	ST2222-29
	14	12	ST2222-30
PF	24	16	ST2222-29
	14	12	ST2222-30
PG	22	20	ST2222-29
PH	24	16	ST2222-29
	14	10	ST2222-30
PJ	24	16	ST2222-29
	14	10	ST2222-30
PK	24	16	ST2222-29
PL	24	16	ST2222-29

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
PM	24	16	ST2222-29
PN	24	16	ST2222-29
PP	24	16	ST2222-29
PQ	24	16	ST2222-50
	14	10	ST2222-30
PR	24	16	ST2222-50
	14	10	ST2222-30
PS	24	16	ST2222-50
	14	12	ST2222-30
PT	24	16	ST2222-50
	14	12	ST2222-30
PU	24	16	ST2222-50
	14	10	ST2222-30
PV	24	16	ST2222-50
PW	24	16	ST2222-50
PX	24	16	ST2222-50
PY	24	16	ST2222-50
QA	24	16	ST2222-40
	14	10	ST2222-41
QB	24	16	ST2222-40
	14	10	ST2222-41
QC	24	16	ST2222-40
	14	10	ST2222-41
QD	24	16	ST2222-40
	14	10	ST2222-41
QE	24	16	ST2222-40
	14	10	ST2222-41
QF	24	16	ST2222-40
	14	10	ST2222-41
QJ	24	16	ST2222-40
	14	10	ST2222-41

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
QK	24	16	ST2222-40
	14	10	ST2222-41
QL	24	16	ST2222-40
	14	10	ST2222-41
QN	24	16	ST2222-40
	14	10	ST2222-41
QS	24	16	ST2222-40
	14	10	ST2222-41
QT	24	16	ST2222-40
	14	10	ST2222-41
QU	24	16	ST2222-40
	14	10	ST2222-41
QV	24	16	ST2222-40
	14	10	ST2222-41
QW	24	16	ST2222-40
	14	10	ST2222-41
QX	24	16	ST2222-40
	14	10	ST2222-41
QZ	24	16	ST2222-42
	14	10	ST2222-43
R0	24	16	ST2222-50
	14	12	ST2222-30
R1	24	16	ST2222-50
R2	24	16	ST2222-50
R3	24	16	ST2222-50
R4	24	16	ST2222-50
R5	24	16	ST2222-50
R6	24	16	ST2222-50
R7	24	16	ST2222-50
R8	24	16	ST2222-50
R9	24	16	ST2222-50

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
RB	24	16	ST2222-50
RC	24	16	ST2222-42
RD	26	18	ST2222-49
RE	26	18	ST2222-49
RF	26	18	ST2222-49
RG	26	18	ST2222-49
RH	24	16	ST2222-50
RJ	20	20	ST2222-26
RK	24	16	ST2222-42
	14	10	ST2222-43
RL	24	16	ST2222-42
	14	10	ST2222-43
RM	24	16	ST2222-42
	14	10	ST2222-43
RN	24	16	ST2222-42
	14	10	ST2222-43
RQ	20	20	ST2222-26
RS	26	18	ST2222-49
RT	26	18	ST2222-49
RW	26	18	ST2222-49
RX	26	18	ST2222-49
T0	16	16	ST2222-26
T1	20	20	ST2222-26
T2	18	18	ST2222-46
T3	24	16	ST2222-42
T5	22	20	ST2222-29
T6	22	20	ST2222-29
T7	22	20	ST2222-29
T8	22	22	ST2222-29
T9	22	20	ST2222-29
TA	24	16	ST2222-26

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
TD	20	20	ST2222-42
TF	26	16	ST2222-46
TJ	26	16	ST2222-38
TK	24	16	ST2222-38
TL	22	22	ST2222-42
TM	22	22	ST2222-42
TN	22	22	ST2222-42
TP	22	22	ST2222-42
TQ	22	22	ST2222-42
TR	22	20	ST2222-42
TT	20	20	ST2222-42
TU	20	20	ST2222-42
TV	20	20	ST2222-42
U4	24	16	ST2222-29
	14	10	ST2222-30
UH	24	16	ST2222-26
	14	10	ST2222-27
UI	24	16	ST2222-29
UY	24	16	ST2222-42
UZ	18	18	ST2222-38
V1	14	10	ST2222-41
V2	24	16	ST2222-38
V3	16	16	ST2222-26
V4	16	16	ST2222-26
V5	22	16	ST2222-38
V6	16	16	ST2222-38
V9	24	20	ST2222-29
VI	24	16	ST2222-29
W4	20	20	ST2222-21
W5	26	26	ST2222-26
W7	24	16	ST2222-38

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
W9	24	24	ST2222-45
WA	20	20	ST2222-26
WN	22	22	ST2222-29
WP	22	22	ST2222-26
WS	20	20	ST2222-42
WT	24	24	ST2222-29
WU	22	16	ST2222-38
WV	20	20	ST2222-26
WX	18	18	ST2222-26
WZ	22	22	ST2222-42
X1	24	16	ST2222-29
	14	12	ST2222-30
X2	24	16	ST2222-29
X3	24	16	ST2222-29
X4	24	16	ST2222-29
X5	24	16	ST2222-29
	14	12	ST2222-30
X6	24	16	ST2222-29
	14	12	ST2222-30
XG	24	16	ST2222-26
XL	18	18	ST2222-21
XN	24	16	ST2222-40
XP	24	16	ST2222-26
XQ	24	16	ST2222-29
	14	10	ST2222-30
XU	22	20	ST2222-42
XV	18	18	ST2222-42
XW	20	20	ST2222-21
XX	20	20	ST2222-26
XY	18	18	ST2222-42
Y1	24	16	ST2222-29

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WIRE INSULATION REMOVAL

Table 3 (continued)

WTC	Wire Size (AWG)		Insulation Removal Tool
	Minimum	Maximum	
Y2	24	16	ST2222-29
Y3	24	16	ST2222-29
Y4	24	16	ST2222-29
Y5	24	16	ST2222-29
YA	24	16	ST2222-26
	14	10	ST2222-27
YB	24	16	ST2222-26
	14	10	ST2222-27
YC	24	16	ST2222-26
	14	10	ST2222-27
YD	16	16	ST2222-26
	22	22	ST2222-29
YE	16	16	ST2222-26
	22	22	ST2222-29
YF	24	16	ST2222-29
	14	10	ST2222-30
YG	24	16	ST2222-29
	14	10	ST2222-30
YH	24	16	ST2222-29
	14	10	ST2222-30
YK	20	20	ST2222-26
YM	24	16	ST2222-42
	14	10	ST2222-43
YP	24	16	ST2222-29
	14	12	ST2222-30
YQ	24	16	ST2222-42
	14	10	ST2222-43
YT	24	16	ST2222-26
YU	24	16	ST2222-26
YW	24	16	ST2222-29
	14	12	ST2222-30

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WIRE INSULATION REMOVAL

Table 4

RECOMMENDED INSULATION REMOVAL TOOLS FOR WIRE TYPE CODES RELATED TO MORE THAN ONE WIRE SPECIFICATION

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
3B	BMS 13-48 Type 12	24	16	ST2222-29
		14	10	ST2222-30
	BMS 13-11 Type 5	26	16	ST2222-26
		14	12	ST2222-27
4A	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
	BMS 13-13 Type 1	22	16	ST2222-42
		14	10	ST2222-39
4B	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
	201-0046, Amphenol	16	16	ST2222-22
4C	BMS 13-51 Type 15	26	16	ST2222-33
		14	10	ST2222-32
	10-60816-27	24	24	ST2222-26
4D	BMS 13-51 Type 8	26	16	ST2222-29
		14	10	ST2222-30
	BMS 13-13 Type 4	22	16	ST2222-42
		14	10	ST2222-39
4E	M81044/12-20	20	20	ST2222-28
	7484444-1SN-22, Douglas	22	22	ST2222-42
4F	M81044/12-22	22	22	ST2222-28
4G	M81044/12-20	20	20	ST2222-28
4H	55A6160, Raychem	24	16	ST2222-40
4K	55A6088, Raychem	20	20	ST2222-21
	BMS 13-51 Type 15	26	16	ST2222-33
		14	10	ST2222-32
4L	55A6090, Raychem	20	20	ST2222-42
	24723/70102KK-5, Tensolite	24	24	ST2222-50

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
5A	BMS 13-48 Type 16	24	16	ST2222-42
		14	10	ST2222-43
	BMS 13-51 Type 26	26	16	ST2222-29
		14	10	ST2222-30
5B	BMS 13-48 Type 16	24	16	ST2222-42
		14	10	ST2222-43
	BMS 13-51 Type 26	26	16	ST2222-29
		14	10	ST2222-30
	BMS 13-51 Type 18	26	20	ST2222-33
5C	BMS 13-48 Type 16	24	16	ST2222-42
		14	10	ST2222-43
	BMS 13-51 Type 26	26	16	ST2222-29
		14	10	ST2222-30
5D	BMS 13-48 Type 16	24	16	ST2222-42
		14	10	ST2222-43
	BMS 13-51 Type 26	26	16	ST2222-29
		14	10	ST2222-30
5E	BMS 13-48 Type 16	24	16	ST2222-42
		14	10	ST2222-43
	BMS 13-51 Type 27	26	16	ST2222-29
		14	10	ST2222-30
5F	BMS 13-48 Type 16	24	16	ST2222-42
		14	10	ST2222-43
	BMS 13-51 Type 27	26	16	ST2222-29
		14	10	ST2222-30
5G	BMS 13-51 Type 18	26	20	ST2222-33
	BMS 13-51 Type 27	26	16	ST2222-29
		14	10	ST2222-30
5H	BMS 13-51 Type 18	26	20	ST2222-33
	BMS 13-51 Type 27	26	16	ST2222-29
		14	10	ST2222-30

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
5J	BMS 13-51 Type 29	26	20	ST2222-29
	BMS 13-51 Type 18	26	20	ST2222-33
5K	BMS 13-51 Type 29	26	20	ST2222-29
	BMS 13-51 Type 18	26	20	ST2222-33
5L	BMS 13-51 Type 29	26	20	ST2222-29
	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
5M	BMS 13-51 Type 29	26	20	ST2222-29
	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
5N	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
	BMS 13-51 Type 30	26	20	ST2222-29
5P	BMS 13-51 Type 15	26	16	ST2222-33
		14	10	ST2222-32
	BMS 13-51 Type 30	26	20	ST2222-29
5S	BMS 13-51 Type 30	26	20	ST2222-29
	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
5W	BMS 13-51 Type 26	26	16	ST2222-29
		14	10	ST2222-30
5X	24721/30130Q-2, Tensolite	24	24	ST2222-40
5Y	BMS 13-51 Type 6	26	22	ST2222-29
	S280T004-1	24	20	ST2222-33
67	BMS 13-18 Type 3	20	16	ST2222-38
6P	BMS 13-51 Type 18	26	20	ST2222-33
	BMS 13-51 Type 11	26	20	ST2222-29
6Q	BMS 13-51 Type 18	26	20	ST2222-33
	BMS 13-51 Type 11	26	20	ST2222-29
6R	BMS 13-51 Type 18	26	20	ST2222-33
	BMS 13-51 Type 11	26	20	ST2222-29

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
6S	BMS 13-51 Type 18	26	20	ST2222-33
	BMS 13-51 Type 11	26	20	ST2222-29
6T	BMS 13-51 Type 16	26	16	ST2222-33
		14	10	ST2222-32
	BMS 13-51 Type 12	26	16	ST2222-29
		14	10	ST2222-30
6U	BMS 13-51 Type 16	26	16	ST2222-33
		14	10	ST2222-32
	BMS 13-51 Type 12	26	16	ST2222-29
		14	10	ST2222-30
6V	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
	BMS 13-51 Type 12	26	16	ST2222-29
		14	10	ST2222-30
6W	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
	BMS 13-51 Type 12	26	16	ST2222-29
		14	10	ST2222-30
74	MIL-W-5274A Type 3	26	16	ST2222-38
8A	BMS 13-51 Type 9	26	16	ST2222-29
		14	10	ST2222-30
	BMS 13-51 Type 27	26	16	ST2222-29
		14	10	ST2222-30
8B	BMS 13-51 Type 9	26	16	ST2222-29
		14	10	ST2222-30
	BMS 13-51 Type 27	26	16	ST2222-29
		14	10	ST2222-30
8C	BMS 13-48 Type 24	24	16	ST2222-26
	BMS 13-51 Type 9	26	16	ST2222-29
		14	10	ST2222-30

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
8D	BMS 13-48 Type 24	24	16	ST2222-26
	BMS 13-51 Type 30	26	20	ST2222-29
8E	BMS 13-48 Type 24	24	16	ST2222-26
	BMS 13-51 Type 30	26	20	ST2222-29
8H	BMS 13-48 Type 22	24	16	ST2222-42
	BMS 13-51 Type 15	26	16	ST2222-33
		14	10	ST2222-32
8J	BMS 13-48 Type 22	24	16	ST2222-42
	BMS 13-51 Type 15	26	16	ST2222-33
		14	10	ST2222-32
8K	BMS 13-48 Type 24	24	16	ST2222-26
	BMS 13-51 Type 15	26	16	ST2222-33
8L	0024A0014, Raychem	24	24	ST2222-26
	BMS 13-51 Type 15	26	16	ST2222-33
		14	10	ST2222-32
8K	BMS 13-51 Type 15	14	10	ST2222-32
8M	BMS 13-51 Type 27	26	16	ST2222-29
		14	10	ST2222-30
	BMS 13-51 Type 15	26	16	ST2222-33
		14	10	ST2222-32
8P	44A7620, Raychem	22	22	ST2222-26
	BMS 13-51 Type 28	26	16	ST2222-29
		14	10	ST2222-30
8Q	BMS 13-48 Type 12	24	16	ST2222-29
		14	10	ST2222-30
	BMS 13-16 Type 1	26	16	ST2222-26
		14	12	ST2222-27
8R	BMS 13-48 Type 22	24	16	ST2222-42
	BMS 13-16 Type 3	26	16	ST2222-26
		14	12	ST2222-27

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
8S	BMS 13-48 Type 22	24	16	ST2222-42
	BMS 13-16 Type 3	26	16	ST2222-26
		14	12	ST2222-27
93	10-60875-4	20	20	ST2222-21
98	10-60875-8	20	20	ST2222-21
	BMS 13-30 Type 3	26	20	ST2222-21
9A	M22759/16-*9	24	16	ST2222-26
		14	10	ST2222-27
	51-04751, Champlain	24	22	ST2222-29
9B	BMS 13-55 T1	22	16	ST2222-38
	M27500-*TG2U00	26	16	ST2222-50
		14	10	ST2222-30
9C	55A6160, Raychem	24	16	ST2222-40
	M27500-*TG3U00	26	16	ST2222-50
		14	10	ST2222-30
9D	61-02651, Champlain	20	20	ST2222-42
	M27500-*TG4U00	26	16	ST2222-50
		14	10	ST2222-30
9E	BMS 13-31 Type 7	20	16	ST2222-47
	M27500-*SB1T14	22	20	ST2222-49
9F	Champlain 30-04680	24	24	ST2222-42
	M27500-*TG2T14	26	16	ST2222-50
		14	10	ST2222-30
9G	831-4245379, Pirelli	26	26	ST2222-38
	M27500-*TG3T14	22	22	ST2222-50
9H	831-4245270, Pirelli	24	24	ST2222-38
	M27500-*TG4T14	22	22	ST2222-50
9X	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
	85842, Filotex	22	16	ST2222-38

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
9Y	BMS 13-51 Type 14	26	16	ST2222-33
		14	10	ST2222-32
	81993, Filotex	22	16	ST2222-38
BG	BMS 13-31 Type 1	24	16	ST2222-47
		14	10	ST2222-48
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
BH	BMS 13-31 Type 1	24	16	ST2222-47
		14	10	ST2222-48
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
BJ	BMS 13-58 Type 1	24	16	ST2222-38
		14	10	ST2222-39
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
CH	BMS 13-31 Type 3	24	16	ST2222-47
		14	10	ST2222-48
	BMS 13-42 Type 12	24	16	ST2222-29
		14	12	ST2222-30
CJ	BMS 13-31 Type 3	24	16	ST2222-47
		14	10	ST2222-48
	BMS 13-42 Type 12	24	16	ST2222-29
		14	12	ST2222-30
CW	65B47866-5	20	20	ST2222-26
FA	284T1015-1	24	16	ST2222-26
	BMS 13-31 Type 5	20	16	ST2222-42
FB	284T1015-1	24	16	ST2222-26
	BMS 13-31 Type 5	20	16	ST2222-42

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
UA	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
UB	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
UC	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
UD	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
UE	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
UF	BMS 13-48 Type 1	24	16	ST2222-50
		14	10	ST2222-30
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
UG	BMS 13-48 Type 1	24	16	ST2222-50
		14	10	ST2222-30
	BMS 13-42 Type 8	24	16	ST2222-26
		14	10	ST2222-27
UJ	10-60875-1	20	20	ST2222-42
	BMS 13-13 Type 1	22	16	ST2222-42
		14	10	ST2222-48

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
UK	10-60875-2	20	20	ST2222-42
	BMS 13-13 Type 1	22	16	ST2222-42
		14	10	ST2222-48
UM	BMS 13-29 Type 1	22	16	ST2222-38
		14	12	ST2222-39
	BMS 13-13 Type 1	22	16	ST2222-42
		14	10	ST2222-48
UN	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
UP	10-60875-5	20	20	ST2222-42
	BMS 13-11 Type 5	26	16	ST2222-26
		14	12	ST2222-27
US	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
	BMS 13-11 Type 5	26	16	ST2222-26
		14	12	ST2222-27
UT	10-60875-9	20	20	ST2222-42
	10-60816-4	18	18	ST2222-42
UW	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
	10-60816-11	16	16	ST2222-47
VA	S280T004-1	24	16	ST2222-50
	BMS 13-48 Type 9	24	16	ST2222-26
		14	10	ST2222-27
VB	BMS 13-48 Type 9	24	16	ST2222-26
		14	10	ST2222-27
	S280T006-2	20	20	ST2222-26
VC	65B47866-2	20	20	ST2222-26
	BMS 13-48 Type 9	24	16	ST2222-26
		14	10	ST2222-27

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WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
VD	BMS 13-48 Type 9	24	16	ST2222-26
		14	10	ST2222-27
	24-00034, Champlain	16	16	ST2222-26
VE	S280T007-1	22	20	ST2222-29
VF	BMS 13-48 Type 12	24	16	ST2222-29
		14	10	ST2222-30
	BMS 13-42 Type 12	24	16	ST2222-29
		14	12	ST2222-30
VG	BMS 13-48 Type 12	24	16	ST2222-29
		14	10	ST2222-30
	BMS 13-42 Type 12	24	16	ST2222-29
		14	12	ST2222-30
VH	BMS 13-48 Type 12	24	16	ST2222-29
		14	10	ST2222-30
	BMS 13-42 Type 12	24	16	ST2222-29
		14	12	ST2222-30
VJ	BMS 13-48 Type 9	24	16	ST2222-26
		14	10	ST2222-27
	BMS 13-42 Type 12	24	16	ST2222-29
		14	12	ST2222-30
VK	BMS 13-48 Type 9	24	16	ST2222-26
		14	10	ST2222-27
	BMS 13-42 Type 12	24	16	ST2222-29
		14	12	ST2222-30
VL	BMS 13-42 Type 12	24	16	ST2222-29
		14	12	ST2222-30
	44A7428, Raychem	24	16	ST2222-28
VM	51-04569, Champlain	24	16	ST2222-26
	44A7429, Raychem	24	16	ST2222-28
VN	51-04570, Champlain	24	16	ST2222-42
	M27500-20RC2N06	20	20	ST2222-28

STANDARD WIRING PRACTICES MANUAL

WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
VP	55A8081, Raychem	18	18	ST2222-46
	60B40033-8	20	20	ST2222-28
VQ	63831, Filotex	18	18	ST2222-38
VS	BMS 13-55 Type 1	22	16	ST2222-38
VT	BMS 13-55 Type 2	22	16	ST2222-38
VU	853-4218376, Pirelli	24	16	ST2222-26
VW	24-00033, Champlain	18	18	ST2222-26
	24-00517, Champlain	18	18	ST2222-26
VX	784-2ZXE, Thermax	24	16	ST2222-40
VY	55A0821, Raychem	18	18	ST2222-38
	63546, Filotex	18	18	ST2222-38
VZ	55A6210, Raychem	24	16	ST2222-38
	BMS 13-55 Type 4	22	16	ST2222-38
W2	BMS 13-58 Type 1	24	16	ST2222-38
		14	10	ST2222-39
	10605, Raychem	22	22	ST2222-21
W3	BMS 13-58 Type 1	24	16	ST2222-38
		14	10	ST2222-39
WC	10599, Raychem	22	22	ST2222-26
	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
WD	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
WE	65B47866-2	20	20	ST2222-26
	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
WF	BMS 13-48 Type 13	24	16	ST2222-29
	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27

STANDARD WIRING PRACTICES MANUAL

WIRE INSULATION REMOVAL

Table 4 (continued)

WTC	Part Number or Wire Specification	Wire Size (AWG)		Insulation Removal Tool
		Minimum	Maximum	
WG	BMS 13-48 Type 13	24	16	ST2222-29
	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
WH	BMS 13-48 Type 13	24	16	ST2222-29
	BMS 13-48 Type 8	24	16	ST2222-26
		14	10	ST2222-27
WJ	6917M39, Endevco	24	16	ST2222-26
	BMS 13-48 Type 16	24	16	ST2222-21
		14	10	ST2222-27
WK	BMS 13-48 Type 22	24	16	ST2222-21
	BMS 13-28 Type 4	22	16	ST2222-38
WL	BMS 13-48 Type 24	24	16	ST2222-28
WM	BMS 13-48 Type 24	24	16	ST2222-28
ZC	M5086/2	22	16	ST2222-21
		14	10	45-1159

C. Insulation Removal Tool Supplier Part Numbers

**Table 5
SUPPLIER PART NUMBERS**

Boeing Standard	Supplier Part Number
ST2222-21	45-1302
ST2222-22	45-1212
ST2222-23	45-173
ST2222-26	45-1610
ST2222-27	45-1611
ST2222-28	45-1987
ST2222-29	45-1654
ST2222-30	45-1608
ST2222-32	45-1609
ST2222-33	45-1633
ST2222-40	45-2543

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STANDARD WIRING PRACTICES MANUAL

WIRE INSULATION REMOVAL

Table 5 (continued)

Boeing Standard	Supplier Part Number
ST2222-41	45-2541
ST2222-42	45-2564
ST2222-43	45-2565
ST2222-44	45-2542
ST2222-45	45-2686
ST2222-47	45-1500
ST2222-48	45-1501
ST2222-49	45-1980
ST2222-50	45-1551

**Table 6
INSULATION REMOVAL TOOL COMPONENTS**

Insulation Removal Tool	Component		
	Basic Unit	Blade	Grip Pads
45-1212	L-5617	45-1212-1	LB-198
		W3B-300-75	W3G-300-75
45-1302	L-5617	45-1302-1	LB-198
		W3B-300-69	W3G-300-69
45-1500	L-5617	45-1500-1	LB-198
		W3B-300-65	W3G-300-65
45-1501	L-5616	45-1501-1	LB-197
		W3B-300-77	W3G-300-77
45-1551	L-5617	45-1551-1	LB-198
		W3B-300-78	W3G-300-78
45-1608	L-5616	45-1608-1	LB-197
		W3B-300-42	W3G-300-42
45-1609	L-5616	45-1609-1	LB-197
		W3B-300-44	W3G-300-44
45-1610	L-5617	45-1610-1	LB-198
		W3B-300-45	W3G-300-45
45-1611	L-5616	45-1611-1	LB-197
		W3B-300-45B	W3G-300-45B

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STANDARD WIRING PRACTICES MANUAL

WIRE INSULATION REMOVAL

Table 6 (continued)

Insulation Removal Tool	Component		
	Basic Unit	Blade	Grip Pads
45-1633	L-5617	45-1633-1	LB-198
		W3B-300-43	W3G-300-43
45-1654	L-5617	45-1654-1	LB-198
		W3B-300-52	W3G-300-52
45-173	L-5616	L-5562	LB-197
		W3B-300-36	W3G-300-36
45-1980	L-5617	45-1980-1	LB-198
		W3B-300-58	W3G-300-58
45-1987	L-5617	45-1987-1	LB-198
		W3B-300-30	W3G-300-30
45-2541	L-5616	45-2541-1	LB-197
		W3B-300-59	W3G-300-59
45-2542	L-5616	45-2542-1	LB-197
		W3B-300-60	W3G-300-60
45-2543	L-5617	45-2543-1	LB-198
		W3BGP-300-50	W3GGP-300-50
45-2564	L-5617	45-2564-1	LB-198
		W3B-300-47	W3G-300-47
45-2565	L-5616	45-2565-1	LB-197
		W3B-300-53	W3G-300-53
45-2686	L-5617	45-2686-1	LB-198
		W3B-300-48	W3G-300-48
ST2222-21	L-5617	45-1302-1	LB-198
		W3B-300-69	W3G-300-69
ST2222-22	L-5617	45-1212-1	LB-198
		W3B-300-75	W3G-300-75
ST2222-23	L-5616	L-5562	LB-197
		W3B-300-36	W3G-300-36
ST2222-26	L-5617	45-1610-1	LB-198
		W3B-300-45	W3G-300-45
ST2222-27	L-5616	45-1611-1	LB-197
		W3B-300-45B	W3G-300-45B

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WIRE INSULATION REMOVAL

Table 6 (continued)

Insulation Removal Tool	Component		
	Basic Unit	Blade	Grip Pads
ST2222-28	L-5617	45-1987-1	LB-198
		W3B-300-30	W3G-300-30
ST2222-29	L-5617	45-1654-1	LB-198
		W3B-300-52	W3G-300-52
ST2222-30	L-5616	45-1608-1	LB-197
		W3B-300-42	W3G-300-42
ST2222-32	L-5616	45-1609-1	LB-197
		W3B-300-44	W3G-300-44
ST2222-33	L-5617	45-1633-1	LB-198
		W3B-300-43	W3G-300-43
ST2222-38	L-5617	-	LB-198
		W3BC-2222-38	W3G-2222-38
ST2222-39	L-5616	-	LB-197
		W3BC-2222-39	W3G-2222-39
ST2222-40	L-5617	45-2543-1	LB-198
		W3BGP-300-50	W3GGP-300-50
ST2222-41	L-5616	45-2541-1	LB-197
		W3B-300-59	W3G-300-59
ST2222-42	L-5617	45-2564-1	LB-198
		W3B-300-47	W3G-300-47
ST2222-43	L-5616	45-2565-1	LB-197
		W3B-300-53	W3G-300-53
ST2222-44	L-5616	45-2542-1	LB-197
		W3B-300-60	W3G-300-60
ST2222-45	L-5617	45-2686-1	LB-198
		W3B-300-48	W3G-300-48
ST2222-46	L-5617	-	LB-198
		W3B-300-64	W3G-300-64
ST2222-47	L-5617	45-1500-1	LB-198
		W3B-300-65	W3G-300-65
ST2222-48	L-5616	45-1501-1	LB-197
		W3B-300-77	W3G-300-77

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STANDARD WIRING PRACTICES MANUAL

WIRE INSULATION REMOVAL

Table 6 (continued)

Insulation Removal Tool	Component		
	Basic Unit	Blade	Grip Pads
ST2222-49	L-5617	45-1980-1	LB-198
		W3B-300-58	W3G-300-58
ST2222-50	L-5617	45-1551-1	LB-198
		W3B-300-78	W3G-300-78

4. TOOL SUPPLIERS

A. Insulation Removal Tools

Table 7
INSULATION REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
45-1159	Ideal Industries
45-1159-1	Ideal Industries
45-1212	Ideal Industries
45-1212-1	Ideal Industries
45-1302	Ideal Industries
45-1302-1	Ideal Industries
45-1500	Ideal Industries
45-1500-1	Ideal Industries
45-1501	Ideal Industries
45-1501-1	Ideal Industries
45-1551	Ideal Industries
45-1551-1	Ideal Industries
45-1608	Ideal Industries
45-1608-1	Ideal Industries
45-1609	Ideal Industries
45-1609-1	Ideal Industries
45-1610	Ideal Industries
45-1610-1	Ideal Industries
45-1611	Ideal Industries
45-1611-1	Ideal Industries
45-1633	Ideal Industries
45-1633-1	Ideal Industries

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WIRE INSULATION REMOVAL

Table 7 (continued)

Removal Tool	Supplier
45-1654	Ideal Industries
45-1654-1	Ideal Industries
45-173	Ideal Industries
45-1980	Ideal Industries
45-1980-1	Ideal Industries
45-1987	Ideal Industries
45-1987-1	Ideal Industries
45-2108-1	Ideal Industries
45-2541	Ideal Industries
45-2541-1	Ideal Industries
45-2542	Ideal Industries
45-2542-1	Ideal Industries
45-2543	Ideal Industries
45-2543-1	Ideal Industries
45-2564	Ideal Industries
45-2564-1	Ideal Industries
45-2565	Ideal Industries
45-2565-1	Ideal Industries
45-2612-1	Ideal Industries
45-2686	Ideal Industries
45-2686-1	Ideal Industries
45-400	Ideal Industries
45-401	Ideal Industries
45-402	Ideal Industries
45-403	Ideal Industries
45-404	Ideal Industries
K-6402	Ideal Industries
K-6403	Ideal Industries
K-6491	Ideal Industries
K-6492	Ideal Industries
K-6493	Ideal Industries
K-6494	Ideal Industries
K-6495	Ideal Industries

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WIRE INSULATION REMOVAL

Table 7 (continued)

Removal Tool	Supplier
K-6496	Ideal Industries
K-6497	Ideal Industries
K-6498	Ideal Industries
K-6499	Ideal Industries
K-6500	Ideal Industries
K-6501	Ideal Industries
K-6502	Ideal Industries
K-6503	Ideal Industries
K-6794	Ideal Industries
L-5562	Ideal Industries
L-5616	Ideal Industries
L-5617	Ideal Industries
LB-197	Ideal Industries
LB-198	Ideal Industries
ST2222-21	Boeing
ST2222-22	Boeing
ST2222-26	Boeing
ST2222-27	Boeing
ST2222-28	Boeing
ST2222-29	Boeing
ST2222-30	Boeing
ST2222-32	Boeing
ST2222-33	Boeing
ST2222-34	Boeing
ST2222-38	Boeing
ST2222-39	Boeing
ST2222-40	Boeing
ST2222-41	Boeing
ST2222-42	Boeing
ST2222-43	Boeing
ST2222-44	Boeing
ST2222-45	Boeing
ST2222-46	Boeing

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STANDARD WIRING PRACTICES MANUAL**WIRE INSULATION REMOVAL**

Table 7 (continued)

Removal Tool	Supplier
ST2222-47	Boeing
ST2222-48	Boeing
ST2222-49	Boeing
ST2222-50	Boeing
W3B-300-30	Western Industrial
W3B-300-36	Western Industrial
W3B-300-42	Western Industrial
W3B-300-43	Western Industrial
W3B-300-44	Western Industrial
W3B-300-45	Western Industrial
W3B-300-45B	Western Industrial
W3B-300-47	Western Industrial
W3B-300-48	Western Industrial
W3B-300-52	Western Industrial
W3B-300-53	Western Industrial
W3B-300-58	Western Industrial
W3B-300-59	Western Industrial
W3B-300-60	Western Industrial
W3B-300-64	Western Industrial
W3B-300-65	Western Industrial
W3B-300-69	Western Industrial
W3B-300-75	Western Industrial
W3B-300-77	Western Industrial
W3B-300-78	Western Industrial
W3BC-2222-38	Western Industrial
W3BC-2222-39	Western Industrial
W3BGP-300-50	Western Industrial
W3G-2222-38	Western Industrial
W3G-2222-39	Western Industrial
W3G-300-30	Western Industrial
W3G-300-36	Western Industrial
W3G-300-42	Western Industrial
W3G-300-43	Western Industrial

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STANDARD WIRING PRACTICES MANUAL

WIRE INSULATION REMOVAL

Table 7 (continued)

Removal Tool	Supplier
W3G-300-44	Western Industrial
W3G-300-45	Western Industrial
W3G-300-45B	Western Industrial
W3G-300-47	Western Industrial
W3G-300-48	Western Industrial
W3G-300-52	Western Industrial
W3G-300-53	Western Industrial
W3G-300-58	Western Industrial
W3G-300-59	Western Industrial
W3G-300-60	Western Industrial
W3G-300-64	Western Industrial
W3G-300-65	Western Industrial
W3G-300-69	Western Industrial
W3G-300-75	Western Industrial
W3G-300-77	Western Industrial
W3G-300-78	Western Industrial
W3GGP-300-50	Western Industrial

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STANDARD WIRING PRACTICES MANUAL

OUTER DIAMETER OF WIRE

<u>Paragraph</u>	<u>Page</u>
1. <u>OUTER DIAMETER OF WIRE</u>	1
A. O.D. of a Wire	1
B. O.D. of Specified Wires	2

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STANDARD WIRING PRACTICES MANUAL**OUTER DIAMETER OF WIRE**

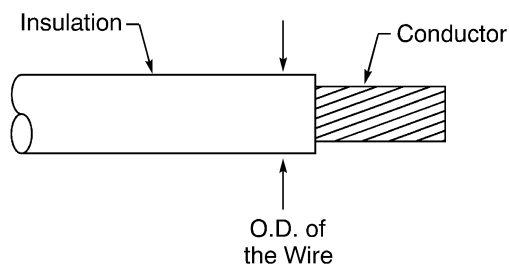
This Subject gives the range of the outer diameters of specified Boeing and Military standard wires.

1. OUTER DIAMETER OF WIRE**A. O.D. of a Wire**

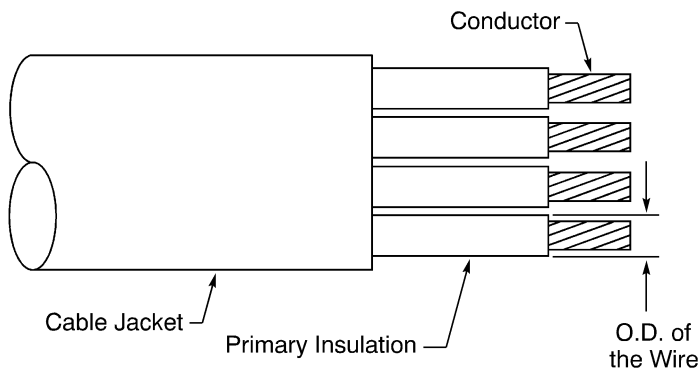
The O.D. of a wire is the distance from the outside edge of the insulation through the center of the conductor to the opposite, outside edge of the insulation.

Refer to:

- Figure 1 for the O.D. of one wire
- Figure 2 for the O.D. of a wire in a cable
- Figure 3 for the O.D. of one wire that has a shield and a jacket
- Figure 4 for the O.D. of a wire in a cable that has a shield and a jacket.



O.D. OF A WIRE
Figure 1

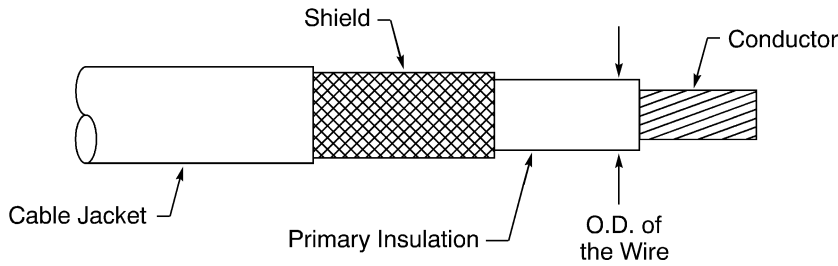


O.D. OF A WIRE IN A CABLE
Figure 2

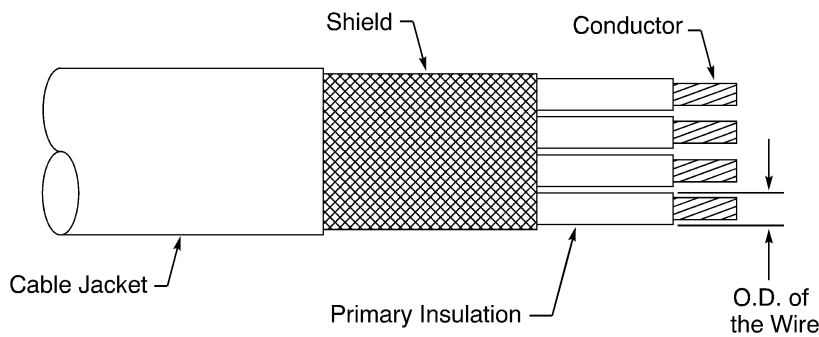
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STANDARD WIRING PRACTICES MANUAL

OUTER DIAMETER OF WIRE



O.D. OF A WIRE IN A SHIELDED CABLE
Figure 3



O.D. OF A WIRE IN A SHIELDED CABLE
Figure 4

B. O.D. of Specified Wires

Table 1
WIRE O.D.

Wire or Cable Specification	Wire Size Range (AWG)	Wire O.D. Range (inch)
BMS13-31	22 - 20	0.060 to 0.088
	18 - 14	0.088 to 0.130
BMS13-48 Type 1	24 - 20	Less than 0.06
BMS13-48 Type 2	24 - 20	Less than 0.06
BMS13-48 Type 3	24 - 20	Less than 0.06
BMS13-48 Type 4	24 - 20	Less than 0.06
BMS13-48 Type 5	24 - 20	Less than 0.06
BMS13-48 Type 6	24 - 20	Less than 0.06
BMS13-48 Type 7	24 - 20	Less than 0.06
BMS13-48 Type 8	24 - 20	Less than 0.06
BMS13-48 Type 9	24 - 20	Less than 0.06
BMS13-48 Type 10	24 - 20	Less than 0.06

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STANDARD WIRING PRACTICES MANUAL

OUTER DIAMETER OF WIRE

Table 1 (continued)

Wire or Cable Specification	Wire Size Range (AWG)	Wire O.D. Range (inch)
BMS13-48 Type 11	24 - 20	Less than 0.06
BMS13-48 Type 12	24 - 20	Less than 0.06
BMS13-48 Type 13	24 - 20	Less than 0.06
BMS13-48 Type 14	24 - 20	Less than 0.06
BMS13-48 Type 15	24 - 20	Less than 0.06
BMS13-48 Type 16	24	Less than 0.06
	22 - 18	0.060 to 0.088
	16 - 14	0.088 to 0.130
BMS13-48 Type 17	24	Less than 0.06
	22 - 18	0.060 to 0.088
	16 - 14	0.088 to 0.130
BMS13-48 Type 18	24	Less than 0.06
	22 - 18	0.060 to 0.088
	16 - 14	0.088 to 0.130
BMS13-48 Type 19	24	Less than 0.06
	22 - 18	0.060 to 0.088
	16	0.088 to 0.130
BMS13-48 Type 20	24	Less than 0.06
	22 - 20	0.060 to 0.088
BMS13-48 Type 21	24	Less than 0.06
	22 - 20	0.060 to 0.088
BMS13-48 Type 22	24	Less than 0.06
	22 - 18	0.060 to 0.088
	16	0.088 to 0.130
BMS13-48 Type 23	24 - 20	Less than 0.06
BMS13-48 Type 24	24 - 20	Less than 0.06
BMS13-48 Type 25	24 - 20	Less than 0.06
BMS13-48 Type 26	24 - 20	Less than 0.06
BMS13-48 Type 27	24 - 20	Less than 0.06
BMS13-48 Type 28	24 - 20	Less than 0.06
BMS13-51 Type I	24 - 20	Less than 0.06
BMS13-51 Type III	24 - 20	Less than 0.06

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STANDARD WIRING PRACTICES MANUAL

OUTER DIAMETER OF WIRE

Table 1 (continued)

Wire or Cable Specification	Wire Size Range (AWG)	Wire O.D. Range (inch)
BMS13-51 Type VIII	24 - 20	Less than 0.06
BMS13-51 Type IV	24 - 20	Less than 0.06
BMS13-51 Type IX	24 - 20	Less than 0.06
BMS13-51 Type X	24 - 20	Less than 0.06
BMS13-51 Type XI	24 - 20	Less than 0.06
BMS13-51 Type XII	24 - 20	Less than 0.06
BMS13-51 Type XIII	24 - 20	Less than 0.06
BMS13-51 Type XIV	24 - 20	Less than 0.06
BMS13-51 Type XV	24 - 20	Less than 0.06
BMS13-51 Type XVI	24 - 20	Less than 0.06
BMS13-51 Type XVII	24 - 20	Less than 0.06
BMS13-51 Type XVIII	24 - 20	Less than 0.06
BMS13-51 Type XIX	24 - 20	Less than 0.06
BMS13-51 Type XX	24 - 20	Less than 0.06
BMS13-51 Type XXI	24 - 20	Less than 0.06
BMS13-51 Type XXII	24 - 20	Less than 0.06
BMS13-51 Type XXIII	24 - 20	Less than 0.06
BMS13-51 Type XXIV	24 - 20	Less than 0.06
BMS13-51 Type XXV	24 - 20	Less than 0.06
BMS13-51 Type XXVI	24 - 20	Less than 0.06
BMS13-51 Type XXVII	24 - 20	Less than 0.06
BMS13-51 Type XXVIII	24 - 20	Less than 0.06
BMS13-51 Type XXIX	24 - 20	Less than 0.06
BMS13-51 Type XXX	24 - 20	Less than 0.06
BMS13-51 Type XXXI	24 - 20	Less than 0.06
BMS13-51 Type XXXII	24 - 20	Less than 0.06
BMS13-51 Type XXXIII	24 - 20	Less than 0.06
BMS13-51 Type XXXIV	24 - 20	Less than 0.06
BMS13-51 Type XXXV	24 - 20	Less than 0.06
BMS13-51 Type XXXVI	24 - 20	Less than 0.06
BMS13-51 Type XXXVII	24 - 20	Less than 0.06
BMS13-51 Type XXXVIII	24 - 20	Less than 0.06

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OUTER DIAMETER OF WIRE

Table 1 (continued)

Wire or Cable Specification	Wire Size Range (AWG)	Wire O.D. Range (inch)
BMS13-51 Type XXXIX	24 - 20	Less than 0.06
BMS13-51 Type XL	24 - 20	Less than 0.06
BMS13-51 Type XLI	24 - 20	Less than 0.06
BMS13-51 Type XLII	24 - 20	Less than 0.06
BMS13-51 Type XLIII	24 - 20	Less than 0.06
BMS13-55	22 - 20	0.060 to 0.088
	18 - 14	0.088 to 0.130
BMS13-58	24 - 20	0.060 to 0.088
	18 - 14	0.088 to 0.130
BMS13-60 Type 1	24 - 20	Less than 0.06
BMS13-60 Type 2	24 - 20	Less than 0.06
BMS13-60 Type 3	24 - 20	Less than 0.06
BMS13-60 Type 4	24 - 20	Less than 0.06
BMS13-60 Type 5	24 - 20	Less than 0.06
BMS13-60 Type 6	24 - 20	Less than 0.06
BMS13-60 Type 7	22 - 18	0.060 to 0.088
	16 - 14	0.088 to 0.130
BMS13-60 Type 8	22 - 18	0.060 to 0.088
	16 - 14	0.088 to 0.130
BMS13-60 Type 9	22 - 18	0.060 to 0.088
	16 - 14	0.088 to 0.130
BMS13-60 Type 10	22 - 18	0.060 to 0.088
	16	0.088 to 0.130
BMS13-60 Type 11	22 - 18	0.060 to 0.088
	16	0.088 to 0.130
BMS13-60 Type 12	22 - 18	0.060 to 0.088
	16	0.088 to 0.130
MIL-W-22759/3	22 - 20	0.060 to 0.088
	18 - 14	0.088 to 0.130
MIL-W-22759/32	22 - 20	Less than 0.06
MIL-W-22759/46	24	Less than 0.06

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STANDARD WIRING PRACTICES MANUAL

AIRPLANE FLAMMABLE LEAKAGE ZONES

<u>Paragraph</u>	<u>Page</u>
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A. Definition of a Flammable Leakage Zone	1
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C. Fire Safety Precautions	1
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A. 707 Model Flammable Leakage Zones	2
B. 727 Model Flammable Leakage Zones	3
C. 737 Model Flammable Leakage Zones	4
D. 747 Model Flammable Leakage Zones	5
E. 757 Model Flammable Leakage Zones	6
F. 767 Model Flammable Leakage Zones	7
G. 777 Model Flammable Leakage Zones	8

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AIRPLANE FLAMMABLE LEAKAGE ZONES

1. GENERAL DATA

A. Definition of a Flammable Leakage Zone

A flammable leakage zone is an area where leakage of flammable fluids or flammable vapors can occur as a result of:

- One failure
- Leakage during normal operation.

B. General Conditions

Refer to Subject 20-30-00 for the applicable conditions for protection of electrical connections in a flammable leakage zone.

C. Fire Safety Precautions

Refer to Subject 20-00-10 for the fire safety precautions in that apply to the electrical power of the circuits in a flammable leakage zone.

These conditions are applicable in an area where there are flammable vapors:

- All flames, smoking, sparks, and other sources of ignition must not occur
- Tools and test equipment that can make a spark must not be used
- A megohmmeter must not be used
- All electrical equipment, such as lights, motors, wiring, etc., must meet the necessary electrical and fire codes
- The accumulation of vapors must be prevented by sufficient ventilation.

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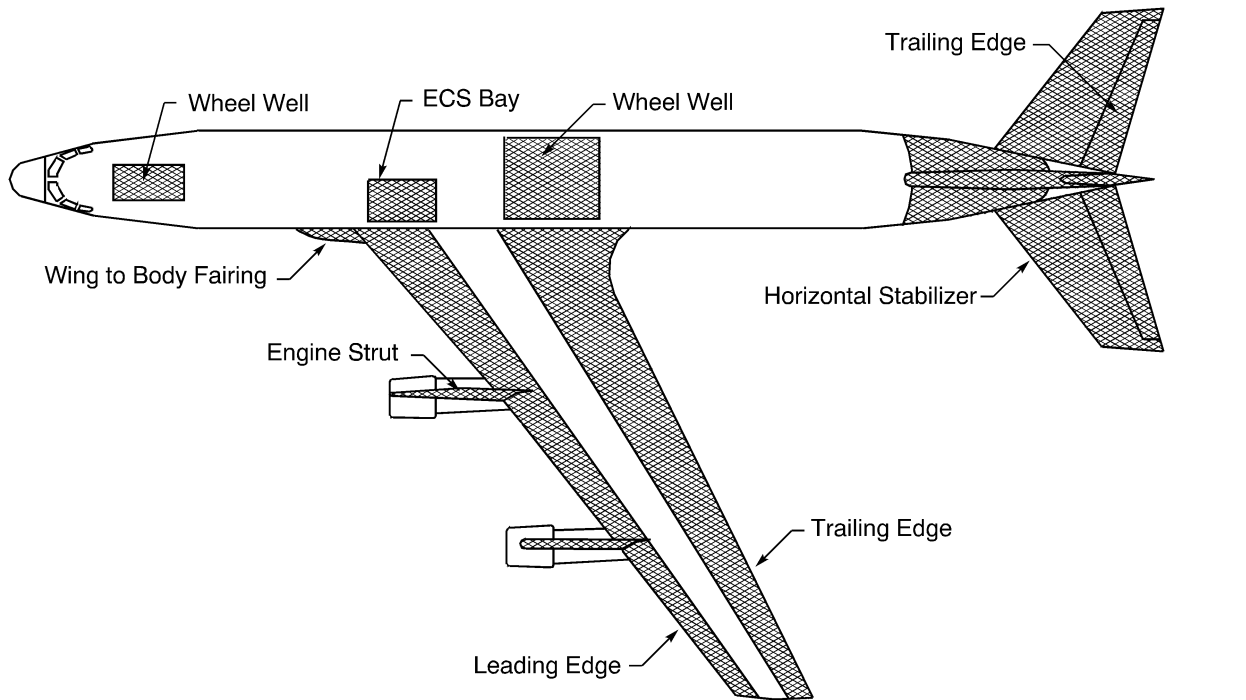
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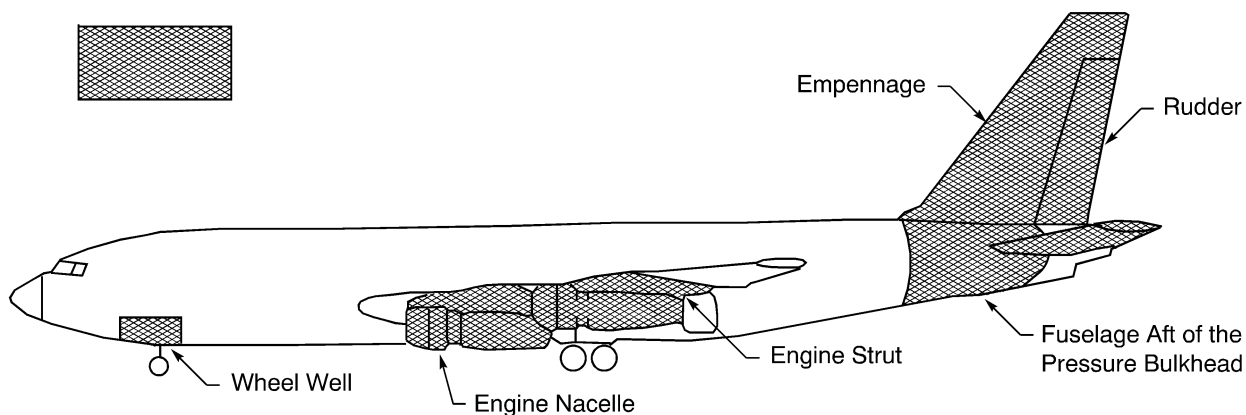
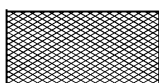
AIRPLANE FLAMMABLE LEAKAGE ZONES

2. LOCATION OF THE FLAMMABLE LEAKAGE ZONES

A. 707 Model Flammable Leakage Zones



Flammable Leakage Zone



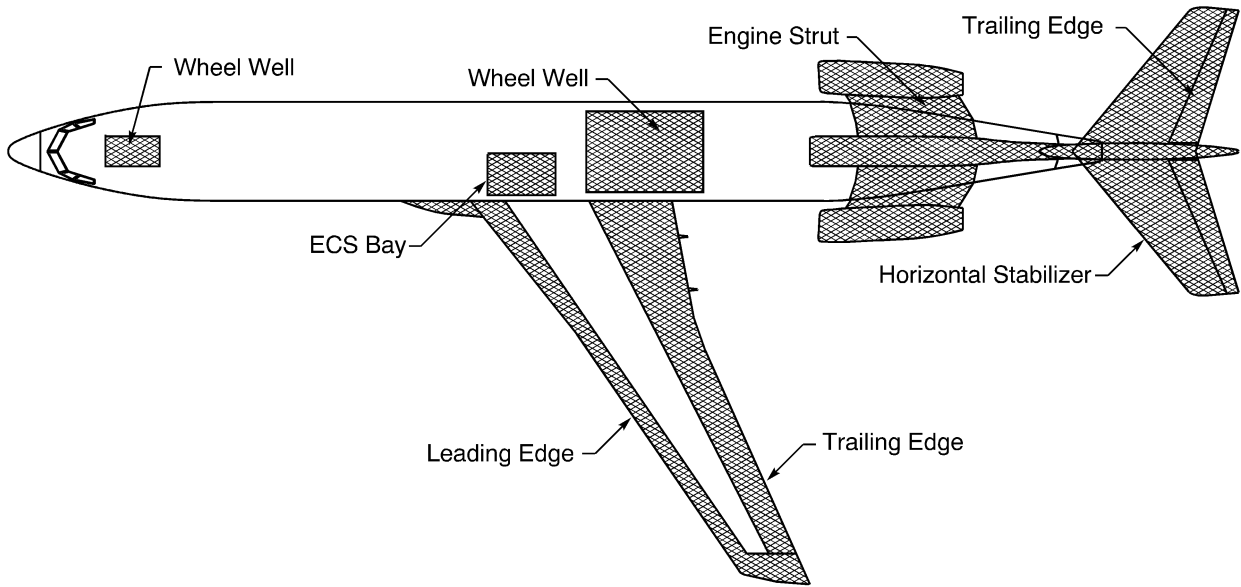
FLAMMABLE LEAKAGE ZONES
Figure 1

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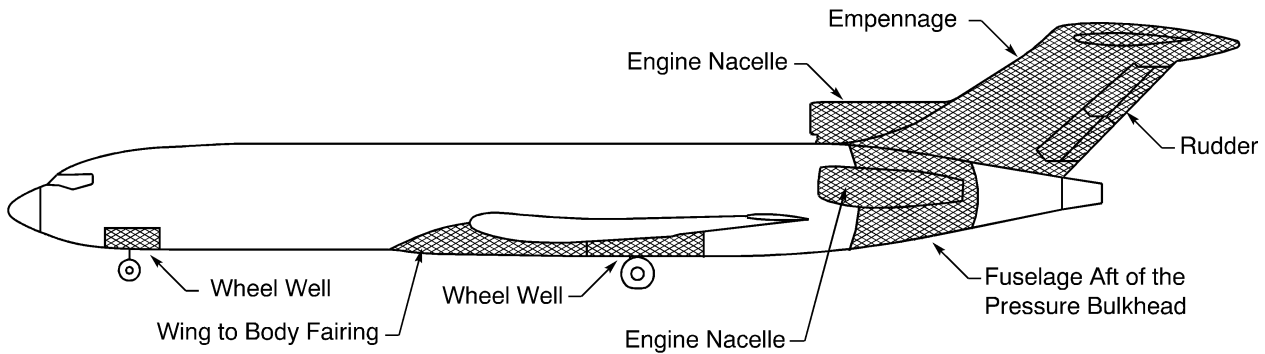
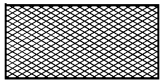
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AIRPLANE FLAMMABLE LEAKAGE ZONES

B. 727 Model Flammable Leakage Zones



Flammable Leakage Zone



FLAMMABLE LEAKAGE ZONES

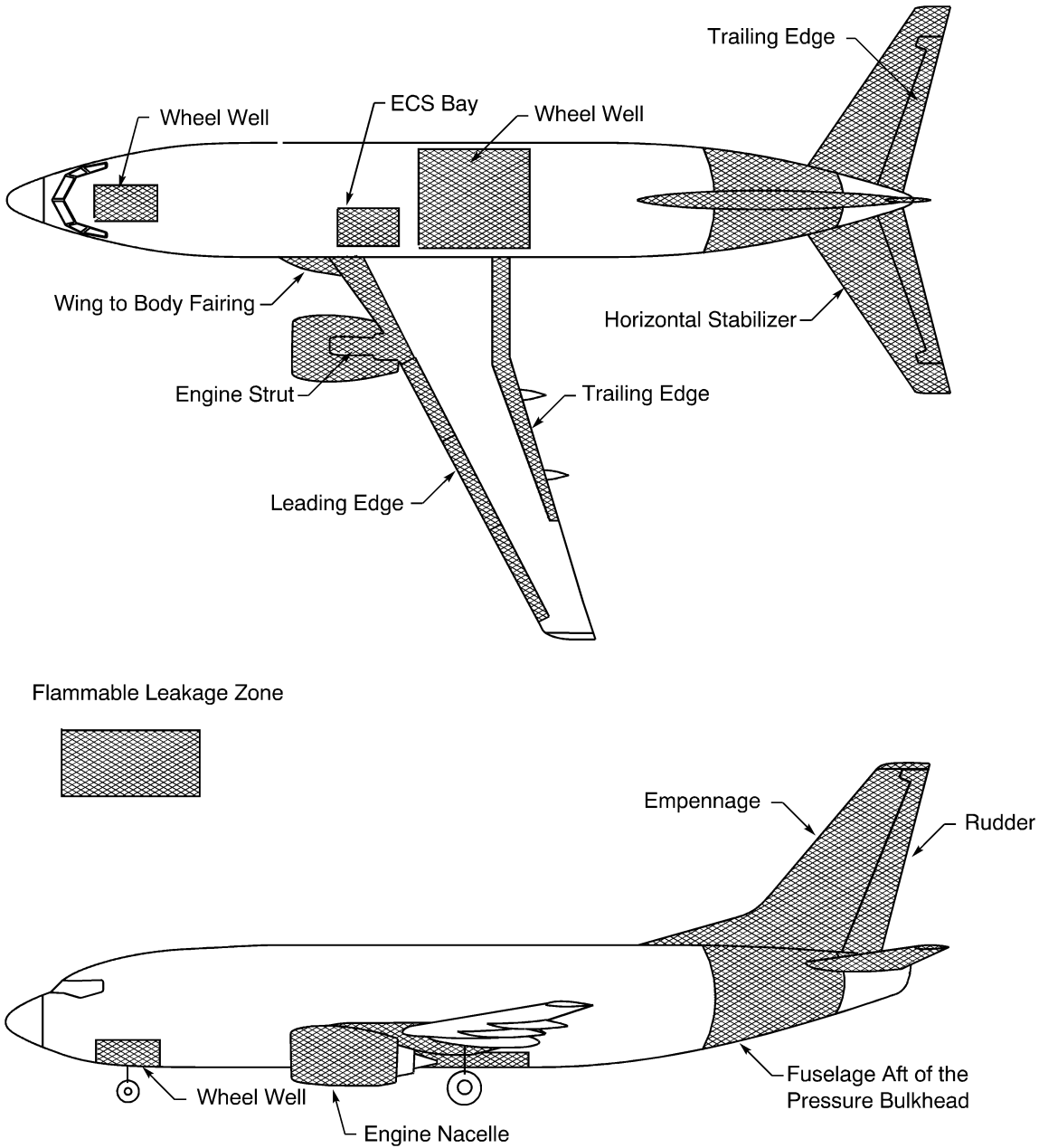
Figure 2

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C. 737 Model Flammable Leakage Zones

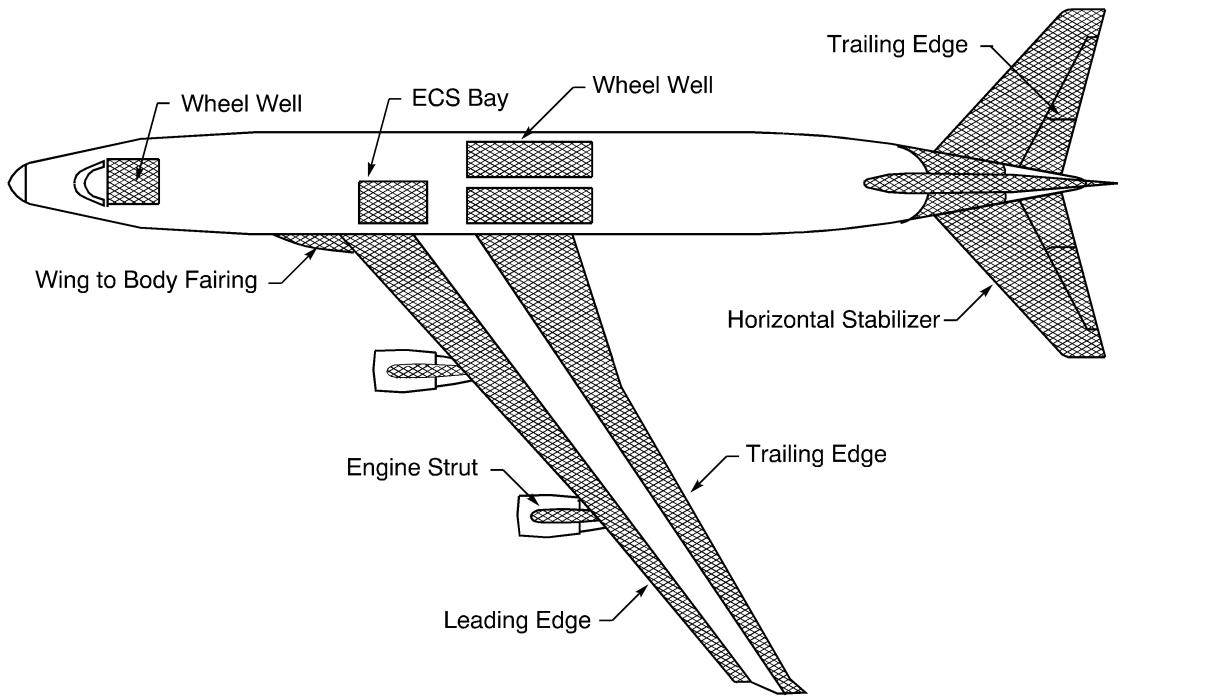


FLAMMABLE LEAKAGE ZONES
Figure 3

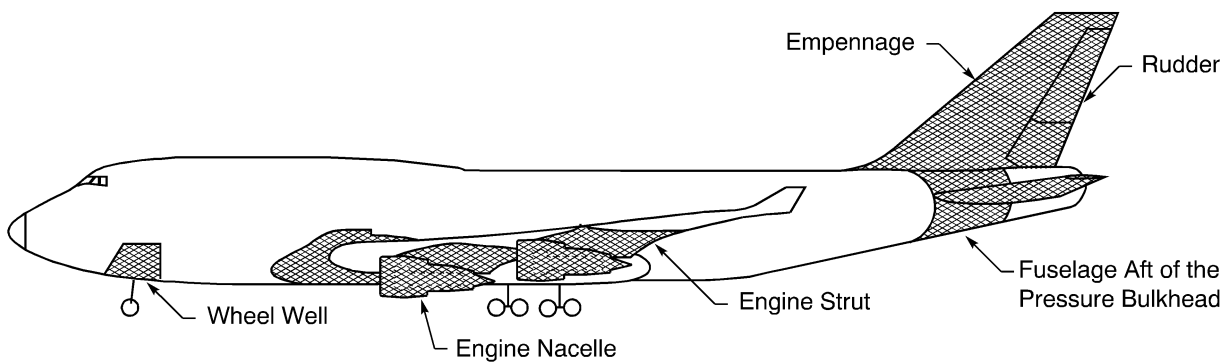
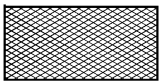
STANDARD WIRING PRACTICES MANUAL

AIRPLANE FLAMMABLE LEAKAGE ZONES

D. 747 Model Flammable Leakage Zones



Flammable Leakage Zone



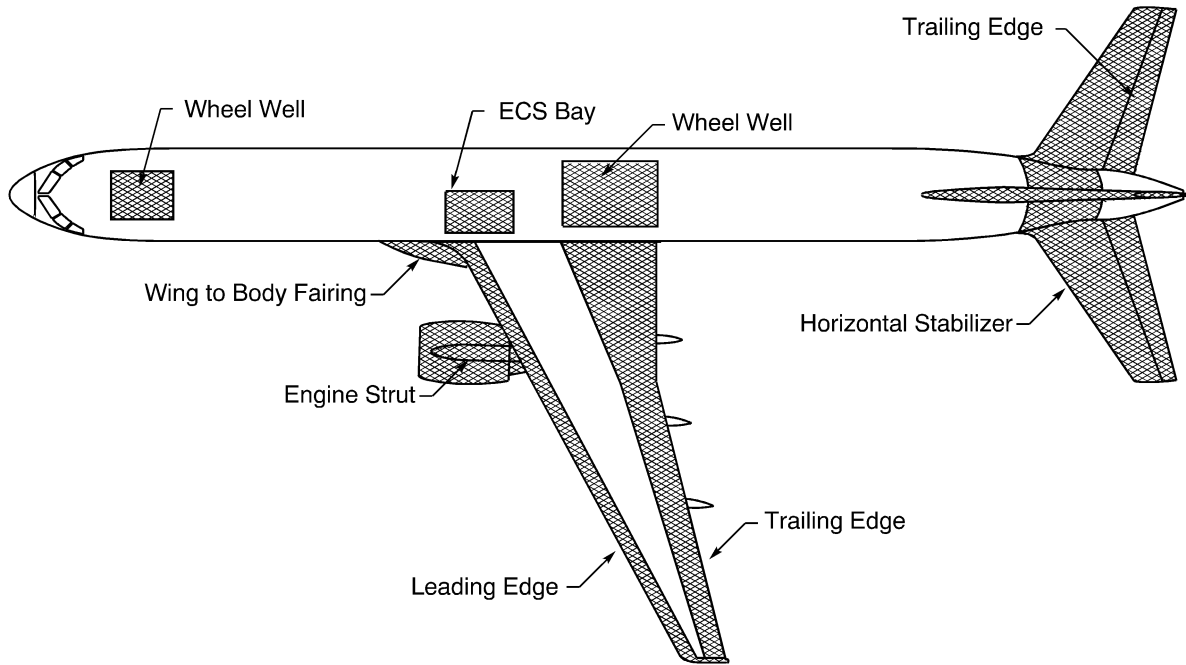
FLAMMABLE LEAKAGE ZONES

Figure 4

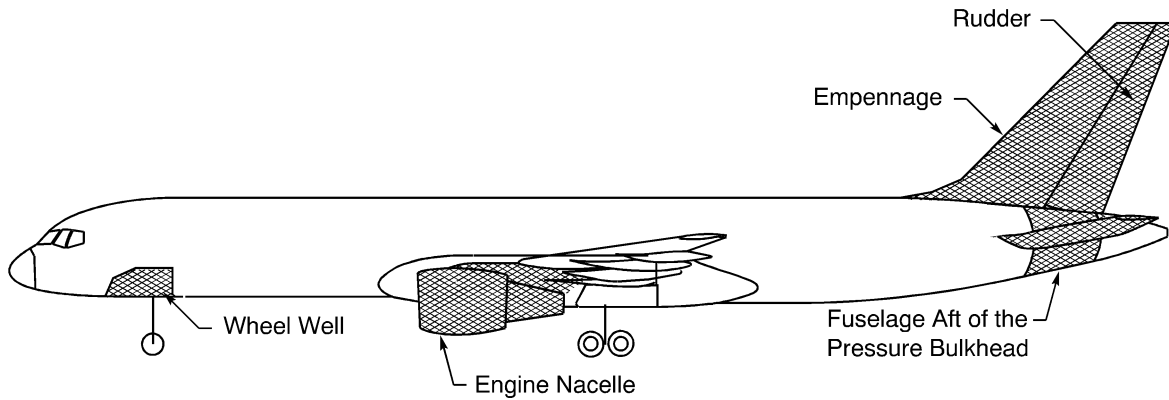
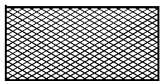
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AIRPLANE FLAMMABLE LEAKAGE ZONES

E. 757 Model Flammable Leakage Zones



Flammable Leakage Zone



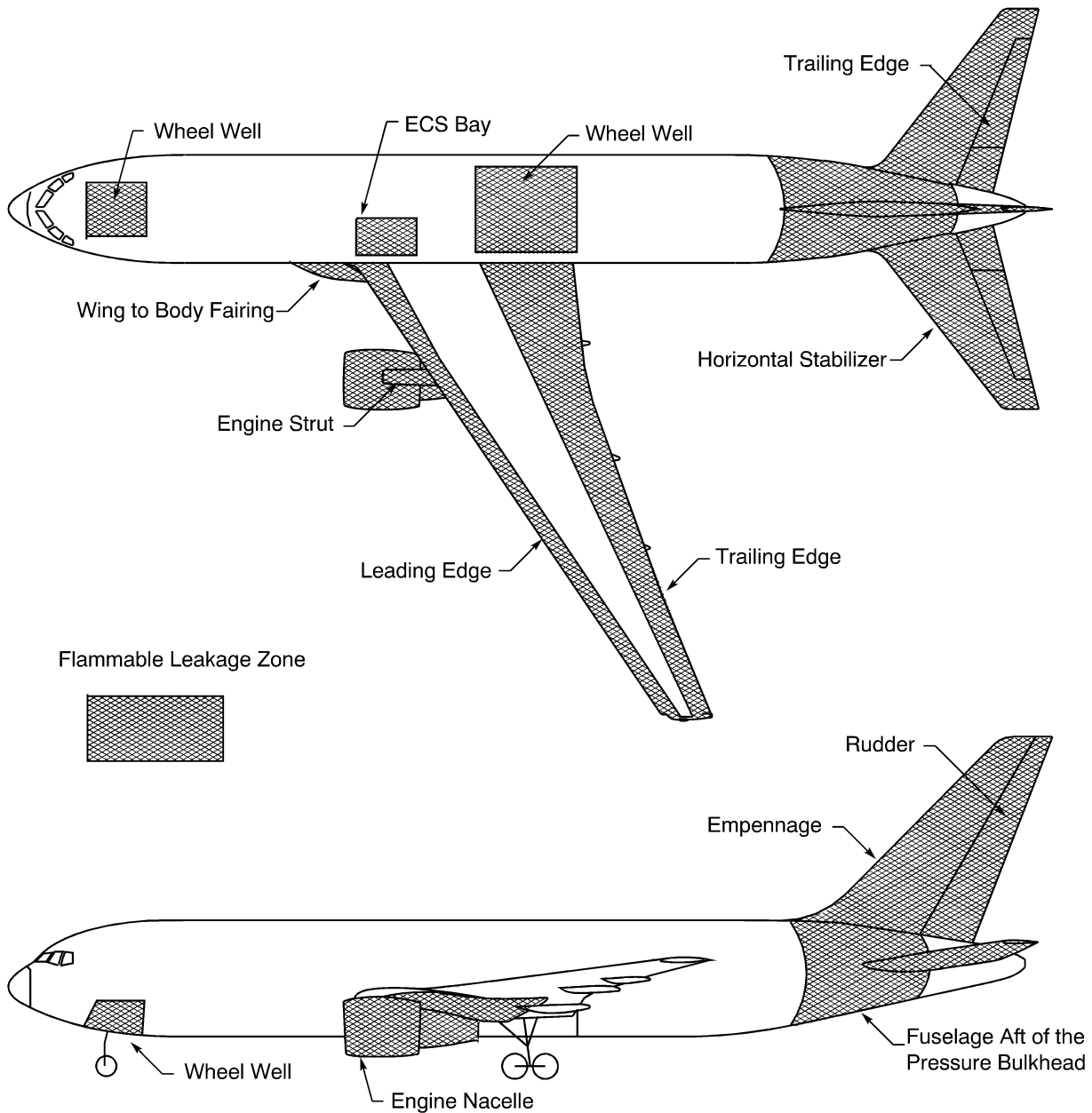
FLAMMABLE LEAKAGE ZONES
Figure 5

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AIRPLANE FLAMMABLE LEAKAGE ZONES

F. 767 Model Flammable Leakage Zones

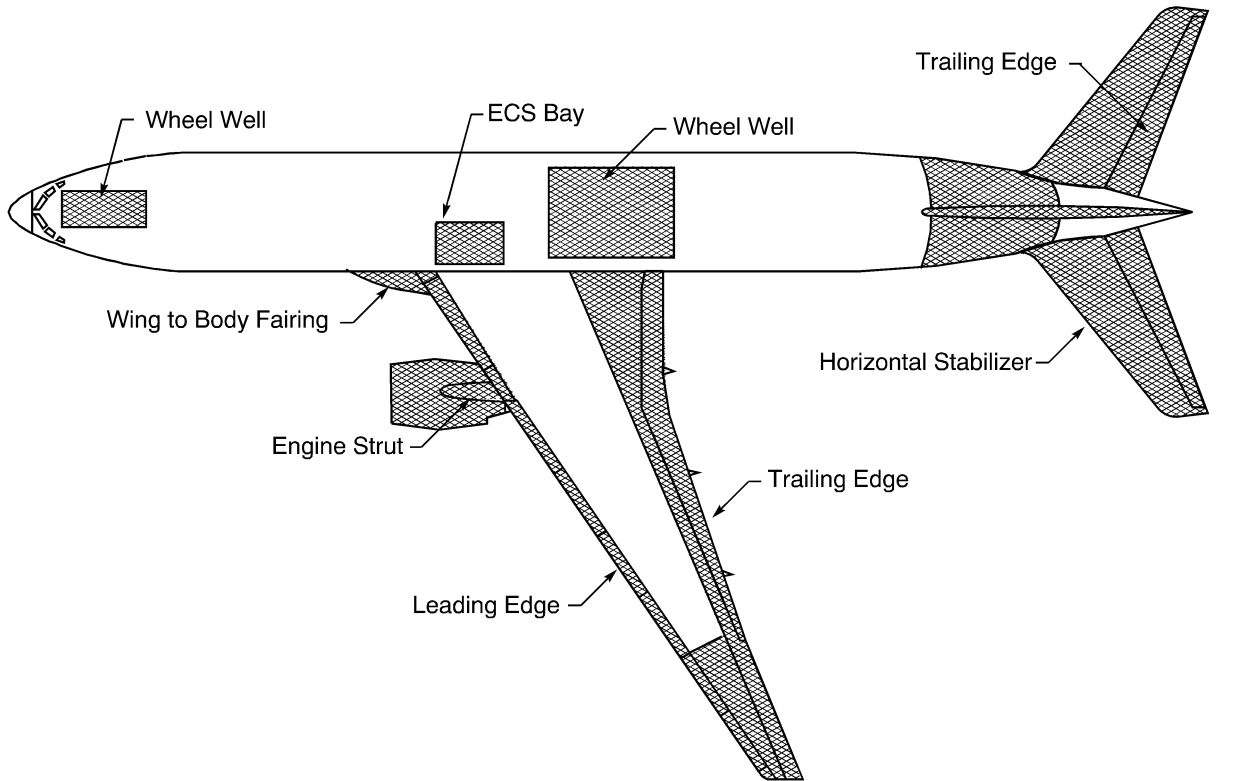


FLAMMABLE LEAKAGE ZONES
Figure 6

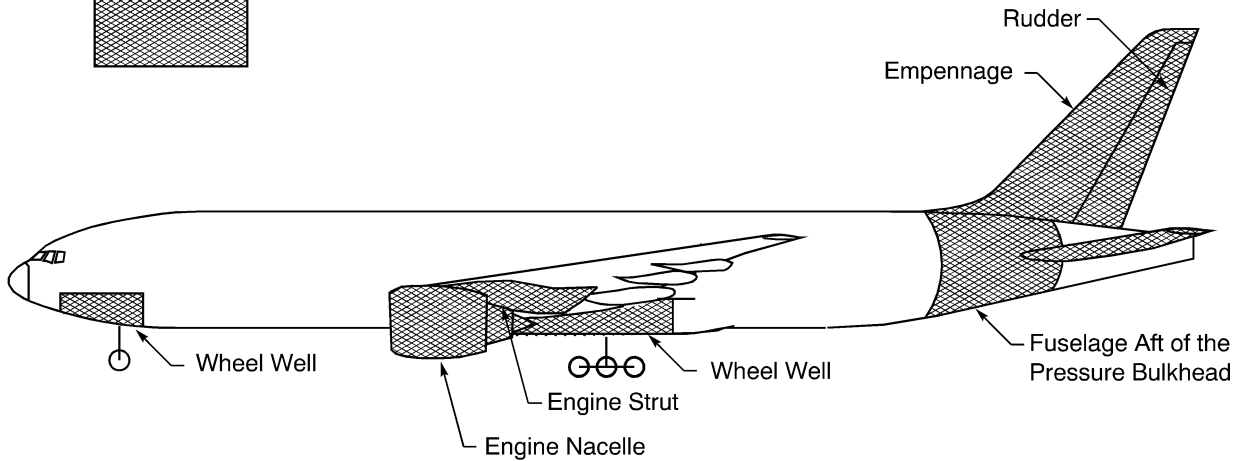
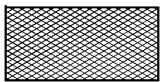
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AIRPLANE FLAMMABLE LEAKAGE ZONES

G. 777 Model Flammable Leakage Zones



Flammable Leakage Zone



FLAMMABLE LEAKAGE ZONES

Figure 7



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AIRPLANE TEMPERATURE AREAS

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1. <u>GENERAL DATA</u>	1
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2. <u>LOCATION OF HIGH TEMPERATURE AREAS</u>	2
A. Usual Location of High Temperature Areas	2

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STANDARD WIRING PRACTICES MANUAL

AIRPLANE TEMPERATURE AREAS

1. GENERAL DATA

A. General Conditions

The materials used for repair of a wire harness in a high temperature area must have Temperature Grade D.

Refer to:

- The applicable repair subject for the selection of materials
- Subject 20-10-13 for the general conditions for the repair of wire and cable.

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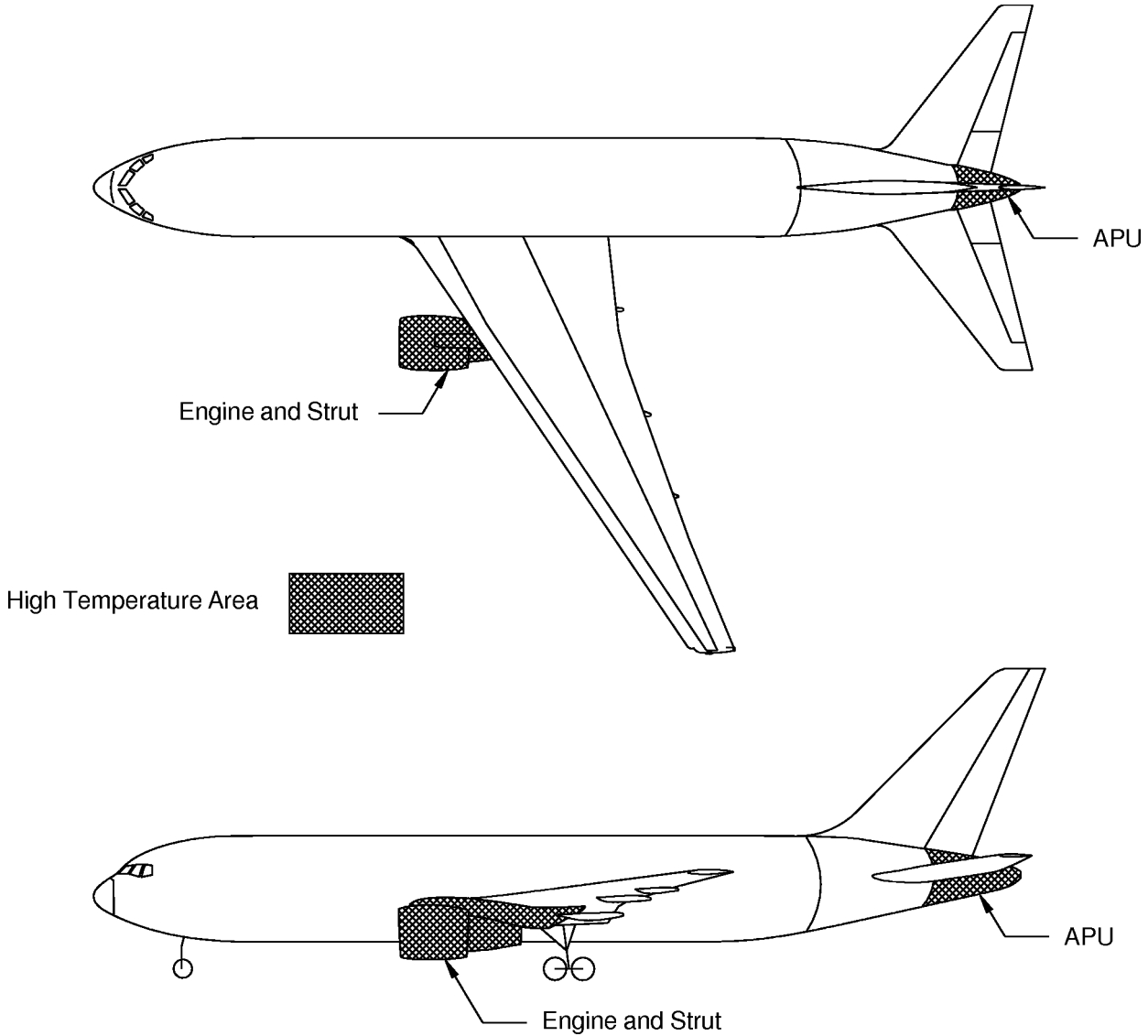
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AIRPLANE TEMPERATURE AREAS

2. LOCATION OF HIGH TEMPERATURE AREAS

A. Usual Location of High Temperature Areas



USUAL LOCATIONS OF HIGH TEMPERATURE AREAS FOR ALL MODELS
Figure 1



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STANDARD WIRING PRACTICES MANUAL

AIRPLANE VIBRATION AREAS

<u>Paragraph</u>	<u>Page</u>
1. <u>GENERAL DATA</u>	1
A. General Conditions	1
2. <u>LOCATION OF THE VIBRATION AREAS</u>	1
A. Usual Locations of the Vibration Areas	1

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STANDARD WIRING PRACTICES MANUAL**AIRPLANE VIBRATION AREAS****1. GENERAL DATA****A. General Conditions**

For the applicable conditions for the assembly and installation of wire harnesses in a high vibration area, refer to Subject 20-10-11.

2. LOCATION OF THE VIBRATION AREAS**A. Usual Locations of the Vibration Areas**

Table 1
VIBRATION LEVEL AND VIBRATION AREA TYPE

Vibration Level	Type
1	Not a high vibration area
2	A high vibration area
3	A high vibration area

The usual locations for vibration areas with Vibration Level 1 are:

- The cabin
- The EE bay
- The cargo area.

The usual locations for vibration areas with Vibration Level 2 are:

- The ECS bay
- The empennage
- The fuel tanks
- The horizontal stabilizer
- The leading edge of the wing
- The radome
- The rudder
- The struts
- The trailing edge of the wing
- The wheel wells
- The wing to body fairing.

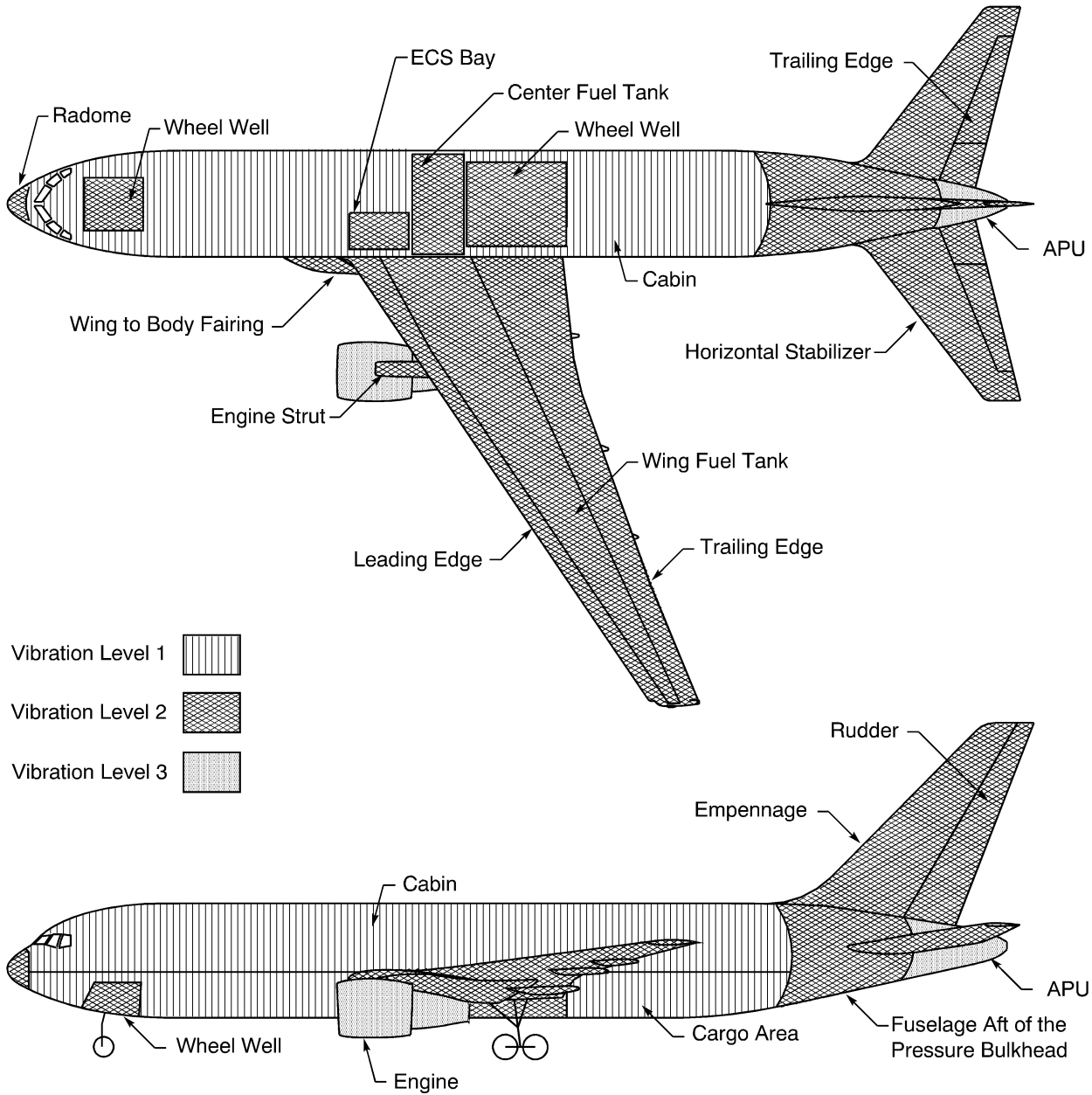
The usual locations for vibration areas with Vibration Level 3 are:

- The engine core
- The engine nacelle
- The APU compartment.

Refer to Figure 1.

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AIRPLANE VIBRATION AREAS



USUAL LOCATIONS OF THE VIBRATION AREAS FOR ALL MODELS

Figure 1



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STANDARD WIRING PRACTICES MANUAL

CLEANING OF WIRE HARNESSSES

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B. Necessary Conditions for Personnel Safety	1
C. General Conditions for Cleaning a Wire Harness	2
D. General Conditions for Cleaning with a Solvent	2
E. General Conditions for Cleaning with an Aqueous Cleaner	3
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A. Selection of an Applicable Cleaning Procedure	4
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STANDARD WIRING PRACTICES MANUAL

CLEANING OF WIRE HARNESSSES

This Subject gives the procedures to the remove the contamination from these wire harness components:

- A wire
- A cable
- A wire harness support
- The external surface of a connector
- A connector backshell
- A strain relief clamp.

1. GENERAL DATA

A. Necessary Conditions for Fire Safety

Refer to Subject 20-00-10 for more safety conditions.

These conditions are applicable for a solvent or a flammable aqueous cleaner:

- The conditions for fire safety specified by the manufacturer must be obeyed
- The necessary local conditions for fire safety must be obeyed
- The airplane must be electrostatically grounded; refer to the Aircraft Maintenance Manual
- The material must be kept in an approved closed container
- Only the quantity of material that is necessary to clean the wire harness or wire harness components must be kept near the airplane
- A wiper or a cloth that is made from a synthetic material is not permitted.

WARNING: CAREFULLY READ THE INSTRUCTIONS AND CAUTIONS FROM THE MANUFACTURER OF THE MATERIAL FOR MORE SAFETY CONDITIONS. IF ALL OF THE SPECIFIED CONDITIONS ARE NOT OBEYED, INJURY TO PERSONNEL CAN OCCUR.

CAUTION: CAREFULLY READ THE INSTRUCTIONS AND CAUTIONS FROM THE MANUFACTURER OF THE MATERIAL FOR MORE SAFETY CONDITIONS. IF ALL OF THE SPECIFIED CONDITIONS ARE NOT OBEYED, DAMAGE TO EQUIPMENT CAN OCCUR.

B. Necessary Conditions for Personnel Safety

These conditions are applicable for a cleaning material:

- The conditions for personnel safety specified by the manufacturer must be obeyed
- The necessary local conditions for personnel safety must be obeyed
- A cleaner must not touch the skin or the eyes
- The vapors from a cleaner must not be breathed.

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STANDARD WIRING PRACTICES MANUAL**CLEANING OF WIRE HARNESSSES**

WARNING: CAREFULLY READ THE INSTRUCTIONS AND CAUTIONS FROM THE MANUFACTURER OF THE MATERIAL FOR MORE SAFETY CONDITIONS. IF ALL OF THE SPECIFIED CONDITIONS ARE NOT OBEYED, INJURY TO PERSONNEL CAN OCCUR.

These equipment are recommended for protection:

- An apron
- Boots
- Coveralls
- Rubber gloves
- Chemical goggles
- An approved eye protection.

To make sure that fumes are not breathed, one of these conditions must occur:

- The area has a good airflow
- The personnel have sufficient respiratory protection.

C. General Conditions for Cleaning a Wire Harness

These conditions are applicable:

- Equipment or a component that is sensitive to contamination, solvents, or water and that is near the area that must be cleaned, must have satisfactory protection
- All disconnected connectors in the area must have protection
- A solvent, a cleaner, contamination, or water must not go into a connector
- A paint, a plastic, a polymeric material, or an adhesive must be fully cured before it can be cleaned.

CAUTION: FLUID OR CONTAMINATION IN A CONNECTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

D. General Conditions for Cleaning with a Solvent

These conditions are applicable:

- The mixture of the solvent and the contamination must be a safe mixture
- Different solvents must not be mixed
- A solvent must not be mixed with an aqueous cleaner
- The solvent must be a permitted cleaner for the materials in a wire harness
- The local environmental laws must be obeyed
- The solvent must be applied only with the procedure that is permitted or specified.

WARNING: IT CAN BE DANGEROUS TO MIX SOME TYPES OF SOLVENTS WITH SOME TYPES OF CONTAMINATION. MAKE SURE THAT THE MIXTURE OF THE SOLVENT AND THE CONTAMINATION IS PERMITTED. INJURY TO PERSONNEL CAN OCCUR.

CAUTION: A SOLVENT THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A WIRE HARNESS MUST NOT BE APPLIED TO THE WIRE HARNESS. DAMAGE TO THE WIRE HARNESS CAN OCCUR.

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STANDARD WIRING PRACTICES MANUAL**CLEANING OF WIRE HARNESSSES****E. General Conditions for Cleaning with an Aqueous Cleaner**

These conditions are applicable:

- The mixture of the aqueous cleaner and the contamination must be a safe mixture
- The maximum permitted pH of a cleaner is 9.0
- Different cleaners must not be mixed
- An aqueous cleaner must not be mixed with a solvent
- The cleaner must be a permitted cleaner for the materials in a wire harness
- The area that must be cleaned must sufficiently drain large volumes of liquid
- The sensitive components in the area must have satisfactory protection; refer to the Aircraft Maintenance Manual
- The local environmental laws must be obeyed
- The cleaner must be applied only with the procedure that is permitted or specified.

WARNING: IT CAN BE DANGEROUS TO MIX SOME TYPES OF AQUEOUS CLEANERS WITH SOME TYPES OF CONTAMINATION. MAKE SURE THAT THE MIXTURE OF THE CLEANER AND THE CONTAMINATION IS PERMITTED. INJURY TO PERSONNEL CAN OCCUR.

CAUTION: AN AQUEOUS CLEANER THAT HAS A PH MORE THAN 9.0 MUST NOT BE APPLIED TO THE WIRE HARNESS. DAMAGE TO THE WIRE HARNESS AND OTHER EQUIPMENT CAN OCCUR.

CAUTION: AN AQUEOUS CLEANER THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A WIRE HARNESS MUST NOT BE APPLIED TO THE WIRE HARNESS. DAMAGE TO THE WIRE HARNESS CAN OCCUR.

CAUTION: A HIGH VOLUME OF AQUEOUS CLEANER MUST NOT BE APPLIED TO AN AREA UNLESS THE LIQUID CAN DRAIN SUFFICIENTLY. IF THE LIQUID DOES NOT DRAIN SUFFICIENTLY, DAMAGE TO THE EQUIPMENT OR A STRUCTURE CAN OCCUR.

F. Necessary Materials and Tools

Table 1
RECOMMENDED SOLVENTS

Solvent	Specification	Supplier
Alcohol, Isopropyl	TT-I-735 Grade A	Any Source
	TT-I-735 Grade B	Any Source
Alcohol, Denatured, Ethyl	O-E-760	Any Source
Naphtha, Aliphatic	TT-N-95, Type II	Any Source

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STANDARD WIRING PRACTICES MANUAL

CLEANING OF WIRE HARNESSSES

**Table 2
NECESSARY TOOLS**

Material or Tool	Description	Part Number or Specification	Supplier
Brush	1. The bristles are soft and not abrasive; 2. The bristle retainer is not metal; 3. The cleaners do not cause damage to the brush materials	Specified by supplier	Any Source
Cloth, Cleaning	Cotton, non-woven	CCC-C-46	Any Source
Compressed Gas	Air, Clean and dry	Specified by supplier	Any Source
	Nitrogen, Clean and dry	Specified by supplier	Any Source
Swabs	Cotton, lint free	Specified by supplier	Any Source
Vacuum	The brush has soft bristles	Specified by supplier	Any Source
Wiper	Cotton, low lint	Specified by supplier	Any Source
	Cotton, non-woven Grade 142951	BMS15-5 Class A	BBA Nonwovens Walpole
	Cotton, cheesecloth No. 10, 20, 40	BMS15-5 Class A	American Fiber & Finishing
	Cotton, cheesecloth No. 9017	BMS15-5 Class A	DeRoyal Textiles
	Cotton, gauze sponge No. 582556	BMS15-5 Class A	American Fiber & Finishing
	Cotton, gauze sponge No. 9405	BMS15-5 Class A	DeRoyal Textiles
	Cotton, HAN SIN SANG SA Fabric Code No. 3030	BMS15-5 Class A	HO CHANG Medical Company
	Cotton, Hermitex No. 300, 400	BMS15-5 Class A	DeRoyal Textiles
	Cotton, Rymplecloth No. 201, 300, 301	BMS15-5 Class A	American Fiber & Finishing
	Cotton, Weston cloth No. 8000	BMS15-5 Class A	Nippon Weston Company

2. SELECTION OF A CLEANING PROCEDURE

A. Selection of an Applicable Cleaning Procedure

NOTE: Connectors can be environmentally sealed or unsealed. Each type has a different cleaning procedure. Environmentally sealed connectors are identified in Subject 20-60-08.

STANDARD WIRING PRACTICES MANUAL

CLEANING OF WIRE HARNESSSES

**Table 3
SELECTION OF A CLEANING PROCEDURE FOR THE PRESSURIZED AREA**

Contamination				Cleaning Procedure
Location	Form	State	Example	
A wire, a cable, or a wire harness support clamp	Fluid, petroleum based or a hydraulic fluid	Wet or dry	BMS3-11, chemical, chemical cleaner, corrosion inhibiting compound, fuel, hydraulic fluid, oil, paint	Paragraph 3.A.
	Fluid, not petroleum based	Wet or dry	Chemical, chemical cleaner, de-icing fluid, food products, lavatory waste water, urine, salt water, soft drink, solvent	Paragraph 3.D.
	Solid, not petroleum based	Dry	Dirt, fecal matter, food, soot	Paragraph 3.C.
	Solid, not petroleum based	Loose particles, abrasive	Dirt, foreign object, metal particle, corrosion particle that falls from a part, sand	Paragraph 3.C.
	Solid, not petroleum based	Loose particles, not abrasive	Dust, lint, food, foreign object	Paragraph 4.A.
	Semi-solid	Wet or dry	Adhesive, grease, mud, sealant	Paragraph 3.A.
	Mixture of fluid and solid, petroleum based or hydraulic fluid	Wet or dry	Oil and dirt	Paragraph 3.A.
	Mixture of fluid and solid, not petroleum based	Wet or dry	Lavatory waste water and dirt	Paragraph 3.D.
The external surface of an unsealed connector, a backshell, a strain relief clamp	Fluid; solid; mixture of a fluid and a solid; semi-solid	Wet or dry	All types	Paragraph 4.C.
The external surface of an environmentally sealed connector, a backshell, a strain relief clamp	Fluid; solid; mixture of a fluid and a solid; semi-solid	Wet or dry	All types	Paragraph 4.B.
The internal surface of a connector	Fluid; solid; mixture of a fluid and a solid; semi-solid	Wet or dry	All types	Subject 20-60-01

STANDARD WIRING PRACTICES MANUAL

CLEANING OF WIRE HARNESSSES

**Table 4
SELECTION OF A CLEANING PROCEDURE FOR THE UNPRESSURIZED AREA**

Contamination				Cleaning Procedure
Location	Form	State	Example	
A wire, a cable, or a wire harness support clamp	Fluid, petroleum based or a hydraulic fluid	Wet or dry	BMS3-11, chemical, chemical cleaner, corrosion inhibiting compound, fuel, hydraulic fluid, oil, paint	Paragraph 3.A. Paragraph 3.B.
	Fluid, not petroleum based	Wet or dry	Chemical, chemical cleaner, de-icing fluid, food products, lavatory waste water, urine, salt water, soft drink, solvent	Paragraph 3.D.
	Solid, not petroleum based	Dry	Dirt, fecal matter, food, soot	Paragraph 3.C.
	Solid, not petroleum based	Loose particles, abrasive	Dirt, foreign object, metal particle, corrosion particle that falls from a part, sand	Paragraph 3.C.
	Solid, not petroleum based	Loose particles, not abrasive	Dust, lint, food, foreign object	Paragraph 4.A.
	Semi-solid	Wet or dry	Adhesive, grease, mud, sealant	Paragraph 3.A.
	Mixture of fluid and solid, petroleum based or hydraulic fluid	Wet or dry	Oil and dirt	Paragraph 3.A.
	Mixture of fluid and solid, not petroleum based	Wet or dry	Lavatory waste water and dirt	Paragraph 3.D.
The external surface of an environmentally sealed connector, a backshell, a strain relief clamp	Fluid; solid; mixture of a fluid and a solid; semi-solid	Wet or dry	All types	Paragraph 4.B.
The internal surface of a connector	Fluid; solid; mixture of a fluid and a solid; semi-solid	Wet or dry	All types	Subject 20-60-01

STANDARD WIRING PRACTICES MANUAL**CLEANING OF WIRE HARNESSSES****3. CLEANING OF A WIRE HARNESS THAT HAS CONTAMINATION ON THE INTERNAL SURFACES****A. Removal of Heavy Contamination with a Solvent**

Heavy contamination can be:

- A petroleum based material
- A hydraulic fluid
- A wet or dried mixture of a fluid and a solid
- A wet or dried semi-solid.

Refer to Paragraph 2.A. for the conditions that are applicable for this procedure.

- (1) Identify the electrical system that must be cleaned.
- (2) Open all circuit breakers and all switches for the wire harness and the equipment in the area that must be cleaned. Refer to Subject 20-00-10.

Make sure that the applicable wire harness or wire harnesses are de-energized.

- (3) Electrostatically ground the airplane. Refer to the Aircraft Maintenance Manual.
- (4) Install the necessary protection for all equipment and all components that are sensitive to contamination and solvents.

Make sure that all disconnected connectors in the area have sufficient protection.

- (5) Make a selection of:
 - An aliphatic naphtha from Table 1
 - An isopropyl alcohol from Table 1
 - A wiper or a cloth from Table 2.

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE HARNESS.

CAUTION: A SOLVENT THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A WIRE HARNESS MUST NOT BE APPLIED. DAMAGE TO THE WIRE HARNESS CAN OCCUR.

- (6) Disassemble a short length of the wire harness:
 - (a) Remove the necessary wire harness supports to get access to the contamination.
Make sure that the wire harness has sufficient support after the supports are removed.
 - (b) Remove the wire harness ties along the free length.
 - (c) Move the wires apart.

CAUTION: A WIRE OR A CABLE MUST NOT BE MOVED MORE THAN IT IS NECESSARY TO CLEAN IT. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (7) Remove the contamination.

Refer to Paragraph 4. for the procedure to remove the contamination from:

- A backshell
- The external surface of the connector
- An area of a wire that is less than 6 inches from the end of a connector.

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STANDARD WIRING PRACTICES MANUAL**CLEANING OF WIRE HARNESSSES**

CAUTION: MAKE SURE TO PREVENT THE MOVEMENT OF THE CONTAMINATION TO A DIFFERENT WIRE HARNESS COMPONENT. DAMAGE TO THE COMPONENT CAN OCCUR.

CAUTION: A WIRE MARK OR AN IDENTIFICATION TAPE MUST NOT BE CLEANED WITH TOO MUCH FORCE. DAMAGE TO THE WIRE IDENTIFICATION CAN OCCUR.

CAUTION: SURFACES WITH PROTECTIVE FINISHES MUST BE CLEANED CAREFULLY. REMOVAL OF THE PROTECTIVE FINISH CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE EQUIPMENT OR THE STRUCTURE.

(a) Put the sufficient quantity of aliphatic naphtha on the wiper to make it moist.

CAUTION: THE WIPER MUST NOT HAVE TOO MUCH ALIPHATIC NAPHTHA. THE NAPHTHA CAN GET INTO A WIRE HARNESS COMPONENT AND DAMAGE TO THE COMPONENT CAN OCCUR.

(b) Carefully remove the contamination from each component with the wiper.

NOTE: A moist brush can help loosen the particles.

CAUTION: ALIPHATIC NAPHTHA MUST NOT BE APPLIED ON CONTROL CABLES, ACRYLIC SURFACES, DECALS, OR FINISHES THAT ARE NOT MADE FROM CLASS 1 MATERIALS. DAMAGE TO THE COMPONENT CAN OCCUR.

CAUTION: ALIPHATIC NAPHTHA MUST NOT BE APPLIED ON A SURFACE THAT HAS A CORROSION INHIBITING COMPOUND UNLESS THE CORROSION INHIBITING COMPOUND MUST BE REMOVED AND THEN APPLIED AGAIN.

CAUTION: ALIPHATIC NAPHTHA MUST NOT STAY ON A WIRE HARNESS COMPONENT. REMAINING NAPHTHA CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE HARNESS COMPONENT.

(c) Dry the cleaned area with a new wiper.

NOTE: As an alternative, compressed gas at 30 PSI can be applied to remove the remaining naphtha. Refer to Table 2.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN A DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

(d) Do Step (a) through Step (c) again until all of the contamination is removed.

(e) Put the sufficient quantity of isopropyl alcohol on the wiper to make it moist.

(f) Carefully clean the areas where the naphtha was applied.

(g) Dry the cleaned area with a new wiper.

NOTE: As an alternative, compressed gas at 30 PSI can be applied to remove the remaining naphtha. Refer to Table 2.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN A DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

(8) Examine the wire harness components and supports.

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Make sure that the components and supports are clean and fully dry.

- (9) Assemble the wire harness to make it the same as the initial configuration.
- (10) Install the wire harness supports.
- (11) Do Step (6) through Step (10) again until all of the contamination on the wire harness is removed.

B. Removal of Heavy Contamination with an Aqueous Cleaner

This procedure is recommended for the unpressurized areas where a high volume of liquid can drain sufficiently. Refer to Paragraph 2.A.

CAUTION: A HIGH VOLUME OF AQUEOUS CLEANER MUST NOT BE APPLIED TO AN AREA UNLESS THE LIQUID CAN DRAIN SUFFICIENTLY. IF THE LIQUID DOES NOT DRAIN SUFFICIENTLY, DAMAGE TO THE EQUIPMENT OR A STRUCTURE CAN OCCUR.

Heavy contamination can be:

- A petroleum based material
- A hydraulic fluid
- A wet or dried mixture of a fluid and a solid
- A wet or dried semi-solid.

- (1) Identify the electrical system that must be cleaned.
- (2) Open all circuit breakers and all switches for the wire harness and the equipment in the area that must be cleaned. Refer to Subject 20-00-10.

Make sure that the applicable wire harness or wire harnesses are de-energized.

- (3) Electrostatically ground the airplane. Refer to the Aircraft Maintenance Manual.
- (4) Install the necessary protection for all equipment and the components that are sensitive to contamination and cleaners. Refer to the Aircraft Maintenance Manual.

Make sure that all of the disconnected connectors in the area have sufficient protection.

CAUTION: COVERS, BLACK POLYETHYLENE SHEET, AND VINYL ADHESIVE TAPE MUST BE INSTALLED TO KEEP LIQUIDS OUT OF AREAS THAT CONTAIN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GO INTO THESE AREAS CAN CAUSE CORROSION, CAN FREEZE DURING AIRPLANE FLIGHT, OR CAN REMOVE NECESSARY LUBRICANTS.

- (5) Make a selection of:
 - An approved aqueous cleaner
 - A brush from Table 2
 - A wiper or a lint free cloth from Table 2.

WARNING: SOME CLEANERS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF A FLAMMABLE CLEANER NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE HARNESS.

CAUTION: A CLEANER THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A WIRE HARNESS MUST NOT BE APPLIED. DAMAGE TO THE WIRE HARNESS CAN OCCUR.

- (6) Disassemble a short length of the wire harness:
 - (a) Remove the necessary wire harness supports to get access to the contamination.

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Make sure that the wire harness has sufficient support after the supports are removed.

- (b) Remove the wire harness ties along the free length.
- (c) Move the wires apart.

CAUTION: A WIRE OR A CABLE MUST NOT BE MOVED MORE THAN IT IS NECESSARY TO CLEAN IT. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (7) Make a mixture of the cleaner and water. Refer to the instructions of the manufacturer of the cleaner.
- (8) Measure the pH level of the mixture.
Make sure the pH level is 9.0 or less.

CAUTION: AN AQUEOUS CLEANER MIXTURE WITH A PH THAT IS MORE THAN 9.0 MUST NOT BE APPLIED. DAMAGE FROM CORROSION CAN OCCUR.

- (9) Remove the contamination.

Refer to Paragraph 4. for the procedure to remove the contamination from:

- A backshell
- The external surface of the connector
- An area of a wire that is less than 6 inches from the end of a connector.

CAUTION: MAKE SURE TO PREVENT THE MOVEMENT OF THE CONTAMINATION TO A DIFFERENT WIRE HARNESS COMPONENT. DAMAGE TO THE COMPONENT CAN OCCUR.

CAUTION: A WIRE MARK OR AN IDENTIFICATION TAPE MUST NOT BE CLEANED WITH TOO MUCH FORCE. DAMAGE TO THE WIRE IDENTIFICATION CAN OCCUR.

CAUTION: SURFACES WITH PROTECTIVE FINISHES MUST BE CLEANED CAREFULLY. REMOVAL OF THE PROTECTIVE FINISH CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE EQUIPMENT OR THE STRUCTURE.

- (a) Apply the mixture with one of these tools:
 - A hose
 - A wiper
 - A brush.

CAUTION: THE FLOW OF CLEANING MIXTURE MUST NOT BE APPLIED LESS THAN 6 INCHES FROM A CONNECTOR. THE MIXTURE CAN GO INTO THE CONNECTOR AND DAMAGE TO THE CONNECTOR CAN OCCUR.

CAUTION: WATER PRESSURE OF 80 PSI OR LESS MUST BE APPLIED. HIGHER PRESSURE WATER CAN MOVE MOISTURE INTO THE COMPOSITE PARTS OR ELECTRICAL COMPONENTS THAT DO NOT HAVE SUFFICIENT PROTECTION AND CAUSE DAMAGE.

- (b) Let the cleaner stay on wire harness components for approximately ten minutes.
Make sure that the cleaner does not dry on the surface of a component.
- (c) If the contamination is not removed with the flow of the mixture, loosen the contamination with a brush or a wiper.

NOTE: To prevent scratches on the surfaces, the brush can be soaked in the cleaner.

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- (d) Flush the areas with clean warm water that is 160 degrees F or less.
Make sure that all of the mixture is removed.

CAUTION: THE SURFACES MUST BE SUFFICIENTLY FLUSHED TO REMOVE ALL OF THE MIXTURE. IF ALL OF THE MIXTURE IS NOT REMOVED, DAMAGE FROM CORROSION CAN OCCUR.

- (e) Let the wire harness dry.

NOTE: As an alternative, compressed gas at 30 PSI can be applied or the harness can be dried with wipers. Refer to Table 2.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN A DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

- (10) Make an inspection of the wire harness for remaining contamination.
- (11) If all of the contamination is not removed with the mixture, remove the contamination with solvent. Refer to Paragraph 3.A.
- (12) Examine the wire harness components and supports.
Make sure that the components and supports are clean and fully dry.
- (13) Assemble the wire harness to make it the same as the initial configuration.
- (14) Install the wire harness supports.
- (15) Do Step (6) through Step (14) again until all of the contamination on the wire harness is removed.

C. Removal of Solid Contamination

Contamination from solids can be:

- An abrasive particle
- A small foreign object
- A particle with a sharp edge.

- (1) Identify the electrical system that must be cleaned.
- (2) Open all circuit breakers and all switches for the wire harness and the equipment in the area that must be cleaned. Refer to Subject 20-00-10.

Make sure that the applicable wire harness or wire harnesses are de-energized.

- (3) Electrostatically ground the airplane. Refer to the Aircraft Maintenance Manual.
- (4) Install the necessary protection for all equipment and all components that are sensitive to contamination.

Make sure that all of the disconnected connectors in the area have sufficient protection.

- (5) Make a selection of these tools from Table 2:

- A brush
- A vacuum
- A wiper or a cloth.

- (6) Remove the loose particles on the external surface of the wire harness.
- (7) Disassemble a short length of the wire harness.

- (a) Remove the necessary wire harness supports to get access to the contamination.

Make sure that the wire harness has sufficient support after the supports are removed.

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- (b) Remove the wire harness ties along the free length.
- (c) Move the wires apart.

CAUTION: A WIRE OR A CABLE MUST NOT BE MOVED MORE THAN IT IS NECESSARY TO CLEAN IT. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (8) Remove the remaining contamination.

CAUTION: MAKE SURE TO PREVENT THE MOVEMENT OF THE CONTAMINATION TO A DIFFERENT WIRE HARNESS COMPONENT. DAMAGE TO THE COMPONENT CAN OCCUR.

- (a) Put the sufficient quantity of water on the wiper to make it moist.
- (b) Carefully remove the contamination from each component with the wiper.

NOTE: A moist brush can help loosen the particles.

- (c) Dry the cleaned area with a new wiper.

NOTE: As an alternative, compressed gas at 30 PSI can be applied or the harness can be dried with wipers. Refer to Table 2.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN A DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

- (9) Examine the wire harness components and supports.
Make sure that the components and supports are clean and fully dry.
- (10) Assemble the wire harness to make it the same as the initial configuration.
- (11) Install the wire harness supports.
- (12) Do Step (7) through Step (11) again until all contamination on the wire harness is removed.

D. Removal of Light Fluid Contamination

A light fluid is a fluid that is not petroleum based or a hydraulic fluid. The contamination can be a wet or dried mixture of the fluid and a solid.

- (1) Identify the electrical system that must be cleaned.
- (2) Open all circuit breakers and all switches for the wire harness and the equipment in the area that must be cleaned. Refer to Subject 20-00-10.

Make sure that the applicable wire harness or wire harnesses are de-energized.

- (3) Electrostatically ground the airplane. Refer to the Aircraft Maintenance Manual.
- (4) Install the necessary protection for all equipment and all components that are sensitive to contamination.

Make sure that all of the disconnected connectors in the area have sufficient protection.

- (5) Make a selection of a wiper or a lint free cloth from Table 2.
- (6) Disassemble a short length of the wire harness.

- (a) Remove the necessary wire harness supports to get access to the contamination.

Make sure that the wire harness has sufficient support after the supports are removed.

- (b) Remove the wire harness ties along the free length.

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- (c) Move the wires apart.

CAUTION: A WIRE OR A CABLE MUST NOT BE MOVED MORE THAN IT IS NECESSARY TO CLEAN IT. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (7) Remove the contamination.

Refer to Paragraph 4. for the procedure to remove contamination from:

- A backshell
- The external surface of the connector
- An area of a wire that is less than 6 inches from the end of a connector.

CAUTION: MAKE SURE TO PREVENT THE MOVEMENT OF THE CONTAMINATION TO A DIFFERENT WIRE HARNESS COMPONENT. DAMAGE TO THE COMPONENT CAN OCCUR.

CAUTION: A WIRE MARK OR AN IDENTIFICATION TAPE MUST NOT BE CLEANED WITH TOO MUCH FORCE. DAMAGE TO THE WIRE IDENTIFICATION CAN OCCUR.

CAUTION: SURFACES WITH PROTECTIVE FINISHES MUST BE CLEANED CAREFULLY. REMOVAL OF THE PROTECTIVE FINISH CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE EQUIPMENT OR THE STRUCTURE.

- (a) Put the sufficient quantity of water on the wiper to make it moist.
(b) Carefully remove the contamination from each component with the wiper.

NOTE: A moist brush can help loosen the particles.

- (8) If the contamination is not removed with the water:

- (a) Make a selection of an isopropyl alcohol from Table 1

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE HARNESS.

- (b) Put the sufficient quantity of the alcohol on a new wiper to make it moist.
(c) Carefully remove the contamination from each component with the wiper.

NOTE: A moist brush can help loosen the particles.

- (9) If the contamination is not removed with the water followed by the alcohol:

- (a) Make a selection of an aliphatic naphtha from Table 1.

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE HARNESS.

- (b) Put the sufficient quantity of aliphatic naphtha on a new wiper to make it moist.

CAUTION: THE WIPER MUST NOT HAVE TOO MUCH ALIPHATIC NAPHTHA. THE NAPHTHA CAN GET INTO A WIRE HARNESS COMPONENT AND DAMAGE TO THE COMPONENT CAN OCCUR.

- (c) Carefully remove the contamination from each component with the wiper.

NOTE: A moist brush can help loosen the particles.

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CAUTION: ALIPHATIC NAPHTHA MUST NOT BE APPLIED ON CONTROL CABLES, ACRYLIC SURFACES, DECALS, OR FINISHES THAT ARE NOT MADE FROM CLASS 1 MATERIALS. DAMAGE TO THE COMPONENT CAN OCCUR.

CAUTION: ALIPHATIC NAPHTHA MUST NOT BE APPLIED ON A SURFACE THAT HAS A CORROSION INHIBITING COMPOUND UNLESS THE CORROSION INHIBITING COMPOUND MUST BE REMOVED AND THEN APPLIED AGAIN.

CAUTION: ALIPHATIC NAPHTHA MUST NOT STAY ON A WIRE HARNESS COMPONENT. REMAINING NAPHTHA CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE HARNESS COMPONENT.

(d) Dry the cleaned area with a new wiper.

NOTE: As an alternative, compressed gas at 30 PSI can be applied to remove the remaining water or solvent. Refer to Table 2.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN A DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

(e) Put the sufficient quantity of isopropyl alcohol on a wiper to make it moist.

(f) Carefully clean the areas where the naphtha was applied.

(10) Dry the cleaned area with a new wiper.

NOTE: As an alternative, compressed gas at 30 PSI can be applied to remove the remaining water or solvent. Refer to Table 2.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN A DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

(11) Examine the wire harness components and supports.

Make sure that the components and supports are clean and fully dry.

(12) Assemble the wire harness to make it the same as the initial configuration.

(13) Install the wire harness supports.

(14) Do Step (7) through Step (13) again until all of the contamination on the wire harness is removed.

4. CLEANING OF A WIRE HARNESS THAT HAS CONTAMINATION ON THE EXTERNAL SURFACE**A. Removal of Light Particle Contamination**

Contamination from light particles is made of loose particles that are not too abrasive.

(1) Identify the electrical system that must be cleaned.

(2) Open all circuit breakers and all switches for the wire harness and the equipment in the area that must be cleaned. Refer to Subject 20-00-10.

Make sure that the applicable wire harness or wire harnesses are de-energized.

(3) Install the necessary protection for all equipment and all components that are sensitive to contamination.

Make sure that all disconnected connectors in the area have sufficient protection.

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- (4) Make a selection of these tools from Table 2:
- A brush
 - A vacuum
 - A wiper or a lint free cloth.
- (5) If it is necessary to get access to the contamination, remove the wire harness supports from a short length of the wire harness.
- Make sure that the wire harness has sufficient support after the supports are removed.
- CAUTION:** A WIRE OR A CABLE MUST NOT BE MOVED MORE THAN IT IS NECESSARY TO CLEAN IT. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.
- (6) Remove the loose particles on the external surface of the wire harness.
- CAUTION:** MAKE SURE TO PREVENT THE MOVEMENT OF THE CONTAMINATION TO A DIFFERENT WIRE HARNESS COMPONENT. DAMAGE TO THE COMPONENT CAN OCCUR.
- (7) Examine the wire harness components and supports.
- Make sure that the components and supports are clean.
- (8) If the wire harness supports are removed, install them again.

B. Removal of Contamination on or near Environmentally Sealed Connectors

This paragraph gives the procedure to remove all types of contamination from:

- The external surface of an environmentally sealed connector
- A connector grommet
- A backshell
- A strain relief clamp
- An area of wire that is less than 6 inches from the end of an environmentally sealed connector.

NOTE: Connectors can be environmentally sealed or unsealed. Each type has a different cleaning procedure. Environmentally sealed connectors are identified in Subject 20-60-08.

CAUTION: IF THE CONTAMINATION GOES INTO A CONNECTOR, THE INTERNAL SURFACES MUST BE CLEANED. REFER TO SUBJECT 20-60-01.

- (1) Identify the electrical system that must be cleaned.
- (2) Open all circuit breakers and all switches for the wire harness and the equipment in the area that must be cleaned. Refer to Subject 20-00-10.
- Make sure that the applicable wire harness or wire harnesses are de-energized.
- (3) Electrostatically ground the aircraft. Refer to the Aircraft Maintenance Manual.
- (4) Install the necessary protection for all equipment and all components that are sensitive to contamination and solvents.

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Make sure that:

- If a connector must be cleaned, it is connected
- All disconnected connectors in the area have sufficient protection.

(5) Make a selection of:

- An isopropyl alcohol from Table 1
- A brush from Table 2
- A swab from Table 2
- A wiper or a lint free cloth from Table 2.

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE HARNESS.

(6) If it is necessary to get access to the contamination:

- (a) Remove all wire harness ties from the wire harness near the rear end of the connector.
- (b) Remove the backshell or the strain relief clamp.
- (c) Move the wires apart.

CAUTION: A WIRE OR A CABLE MUST NOT BE MOVED MORE THAN IT IS NECESSARY TO CLEAN IT. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

(7) Remove the contamination.

Make sure that:

- The contamination does not go into an empty contact cavity
- The grommet holes are not opened by the movement of the wires.

CAUTION: CONTAMINATION IN AN EMPTY CONTACT CAVITY OR ON A WIRE IN THE GROMMET HOLE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (a) If a contact cavity is empty, seal the contact cavity. Refer to Subject 20-60-08.
- (b) Carefully apply the isopropyl alcohol until the contamination is loosened.
- (c) Flush the area with the sufficient quantity of alcohol to remove the contamination.
- (d) Examine the grommet and the wires for remaining contamination.
- (e) If the contamination is not removed, do Step (b) through Step (d) again.
- (f) Dry the components with a new wiper or a new swab.
- (g) Let the connector dry for one hour.

NOTE: As an alternative, compressed gas at 30 PSI can be applied to remove the remaining solvent. Refer to Table 2.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN A DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

(8) Examine the connector assembly components and wires.

Make sure that the components are clean and fully dry.

(9) If the connector components or wire harness ties are disassembled, assemble them again.

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STANDARD WIRING PRACTICES MANUAL**CLEANING OF WIRE HARNESSSES****C. Removal of Contamination on or near Unsealed Connectors**

This paragraph gives the procedure to remove all types of contamination from:

- The external surface of an unsealed connector
- A connector grommet
- A backshell
- A strain relief clamp
- An area of wire that is less than 6 inches from the end of an unsealed connector.

NOTE: The environmentally sealed connectors are identified in Subject 20-60-08. If a connector is not specified in Subject 20-60-08, the connector is unsealed.

CAUTION: IF THE CONTAMINATION GOES INTO A CONNECTOR, THE INTERNAL SURFACES MUST BE CLEANED. REFER TO SUBJECT 20-60-01.

- (1) Identify the electrical system that must be cleaned.
- (2) Open all circuit breakers and all switches for the wire harness and the equipment in the area that must be cleaned. Refer to Subject 20-00-10.

Make sure that the applicable wire harness or wire harnesses are de-energized.

- (3) Electrostatically ground the aircraft. Refer to the Aircraft Maintenance Manual.
- (4) Install the necessary protection for all equipment and all components that are sensitive to contamination and solvents.

Make sure that all disconnected connectors in the area have sufficient protection.

- (5) Make a selection of:
 - An isopropyl alcohol from Table 1
 - A swab from Table 2
 - A wiper or a lint free cloth from Table 2.

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE HARNESS.

- (6) If it is necessary to get access to the contamination:
 - (a) Remove all wire harness ties from the wire harness near the rear end of the connector.
 - (b) Remove the backshell or the strain relief clamp.
 - (c) Move the wires apart.

CAUTION: A WIRE OR A CABLE MUST NOT BE MOVED MORE THAN IT IS NECESSARY TO CLEAN IT. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (7) Remove the contamination.

Make sure that the contamination does not go into an empty contact cavity.

CAUTION: CONTAMINATION IN AN EMPTY CONTACT CAVITY CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (a) Carefully apply the isopropyl alcohol until the contamination is loosened.
- (b) Remove the contamination and the remaining isopropyl alcohol with a new wiper or a new swab.

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- (c) Examine the components for remaining contamination.
- (d) If the contamination is not removed, do Step (a) through Step (c) again.
- (e) Let the connector dry for one hour.

NOTE: As an alternative, compressed gas at 30 PSI can be applied to remove the remaining solvent. Refer to Table 2.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN A DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

- (8) Examine the connector assembly components and wires.
Make sure that the components are clean and fully dry.
- (9) If the connector components or wire harness ties are disassembled, assemble them again.

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INSPECTION OF WIRING

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STANDARD WIRING PRACTICES MANUAL**INSPECTION OF WIRING****1. GENERAL DATA****A. Applicable Conditions**

These conditions are applicable:

- The components, materials, and installation equipment must be sufficiently clean for visual inspection; refer to Subject 20-10-04 for the procedure to clean a wire harness
- Before a wire harness is examined, it must be de-energized
- When damage of a wiring component is seen, the cause of the damage must be removed and the component must be repaired
- When a condition that can cause damage of a wiring component is seen, the condition must be removed.

WARNING: THE WIRING MUST BE DE-ENERGIZED BEFORE AN INSPECTION. IF THE WIRING IS NOT DE-ENERGIZED, INJURY TO PERSONNEL CAN OCCUR.

CAUTION: THE WIRING MUST BE DE-ENERGIZED BEFORE AN INSPECTION. IF THE WIRING IS NOT DE-ENERGIZED, DAMAGE TO EQUIPMENT OR THE AIRPLANE CAN OCCUR.

2. CIRCULAR CONNECTORS**A. Special Conditions**

Some connectors must have special protection from corrosion. Refer to Subject 20-60-03.

B. Visual Inspection - Corrosion

- (1) If it is necessary to remove dirt or other contamination to examine the external surfaces for corrosion, clean the connector. Refer to Subject 20-10-04.

CAUTION: MAKE SURE TO REMOVE ONLY THE CONTAMINATION THAT PREVENTS THE INSPECTION FOR CORROSION. THE CORROSION MATERIAL MUST NOT BE REMOVED AT THIS TIME.

- (2) Examine the external surface of the connector for:
 - Corrosion material
 - Damage to the plated finish
 - Damage to the base metal
 - Damage to the threads or coupling mechanism.
- (3) Find the damage conditions and the repair conditions of the external surface of the connector. Refer to Table 1.
- (4) If the connector has a backshell, then disconnect the backshell. Refer to the applicable connector subject.

NOTE: Corrosion can make the operation of the backshell threads or coupling mechanism difficult or impossible.

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- (5) Examine the internal and the external surfaces of the backshell for:
 - Corrosion material
 - Damage to the plated finish
 - Damage to the base metal
 - Damage to the threads.
- (6) Find the damage condition and the repair condition of the coupling mechanism. Refer to Table 3.
- (7) Find the damage conditions and the repair conditions of the internal and external surfaces of the backshell. Refer to Table 3.
- (8) Disconnect the plug and the receptacle. Refer to the applicable subject for the connector and the AMM.

NOTE: Corrosion can make the operation of the connector coupling mechanism impossible.
- (9) Find the damage condition and the repair condition of the connector coupling mechanism. Refer to Table 1.
- (10) Examine the internal surface of the connector receptacle for:
 - Corrosion materials
 - Damage to the plated finish
 - Damage to the base metal.
- (11) Examine the connector contacts in the receptacle for:
 - Base metal that can be seen
 - Blue-green deposits
 - Black stains or red stains
 - Pits in the base metal.
- (12) Examine the internal surface of the connector plug for:
 - Corrosion materials
 - Damage to the plated finish
 - Damage to the base metal.
- (13) Examine the connector contacts in the plug for:
 - Base metal that can be seen
 - Blue-green deposits
 - Black stains or red stains
 - Pits in the base metal.
- (14) Examine the internal surfaces of the connector for moisture.
- (15) Find the damage condition and the repair condition for the internal surfaces of the connector. Refer to Table 2.

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C. Damage Conditions and Repair Conditions - Corrosion

Table 1

CORROSION DAMAGE AND REPAIR CONDITIONS - CONNECTOR EXTERNAL SURFACES

Type of Damage	Damage Condition	Repair Condition	Reference
Layer of corrosion material	A heavy layer of white corrosion materials in most areas	Replacement of the connector	The applicable subject for the connector
	A medium layer of white corrosion materials in some areas	Replacement of the connector recommended	The applicable subject for the connector
	A light layer of white corrosion materials in some areas	Examine at regular intervals	Paragraph 2.B.
Damage to the plated finish	The color of the finish is completely gone in the areas with corrosion	Replacement of the connector	The applicable subject for the connector
	The color of the finish is faded in some areas	Replacement of the connector recommended	The applicable subject for the connector
Damage to the base metal	Many pits or holes in the connector shell	Replacement of the connector	The applicable subject for the connector
	Some pits in the connector shell	Replacement of the connector recommended	The applicable subject for the connector
Damage to the coupling mechanism	The coupling mechanism is impossible to operate because of the corrosion	Replacement of the connector	The applicable subject for the connector
	The coupling mechanism does not operate easily because of the corrosion	Replacement of the connector recommended	The applicable subject for the connector
	The coupling mechanism operates easily	Examine at regular intervals	Paragraph 2.B.
Damage to the threads	The threads are impossible to engage or disengage because of the corrosion	Replacement of the connector	The applicable subject for the connector
	The threads do not engage or disengage easily because of the corrosion	Replacement of the connector recommended	The applicable subject for the connector
	The threads engage and disengage easily	Examine at regular intervals	Paragraph 2.B.

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**Table 2
CORROSION DAMAGE AND REPAIR CONDITIONS - CONNECTOR INTERNAL SURFACES**

Type of Damage	Damage Condition	Repair Condition	Reference
Damage to the connector shell	Corrosion materials on the surface of the shell	Replacement of the connector	The applicable subject for the connector
	Damage to the plated finish	Replacement of the connector	The applicable subject for the connector
	Pits in the base metal	Replacement of the connector	The applicable subject for the connector
Damage to a contact	The plating is completely gone in some areas	Replacement of the contact	The applicable subject for the connector
	Pits in the base metal	Replacement of the contact	The applicable subject for the connector
	Blue-green contamination	Replacement of the contact	The applicable subject for the connector
	Black stains or red stains	Replacement of the contact	The applicable subject for the connector
Contamination from moisture	Moisture in the connector	Clean the internal surfaces with isopropyl alcohol	Subject 20-60-01
		Examine at regular intervals	Paragraph 2.B.

**Table 3
CORROSION DAMAGE AND REPAIR CONDITIONS - CONNECTOR BACKSHELLS**

Type of Damage	Damage Condition	Repair Condition	Reference
Damage to the backshell	A heavy layer of white corrosion materials in most areas	Replacement of the backshell	Subject 20-60-09
	A medium layer of white corrosion materials	Replacement of the backshell recommended	Subject 20-60-09
	A light layer of white corrosion materials in some areas	Examine at regular intervals	Paragraph 2.B.
Damage to the plated finish	The color of the finish is completely gone in the areas with corrosion	Replacement of the backshell	Subject 20-60-09
	The color of the finish is faded in some areas	Replacement of the backshell recommended	Subject 20-60-09

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INSPECTION OF WIRING

Table 3 (continued)

Type of Damage	Damage Condition	Repair Condition	Reference
Damage to the base metal	Many pits or holes in the connector shell	Replacement of the backshell	Subject 20-60-09
	Some pits in the connector shell	Replacement of the backshell recommended	Subject 20-60-09
Damage to the coupling mechanism	The coupling mechanism is impossible to operate because of the corrosion	Replacement of the backshell	Subject 20-60-09
	The coupling mechanism cannot operate easily because of the corrosion	Replacement of the backshell recommended	Subject 20-60-09
	The threads or the coupling mechanism operate easily	Examine at regular intervals	Paragraph 2.B.
Damage to the threads	The threads are impossible to engage or disengage because of the corrosion	Replacement of the backshell	Subject 20-60-09
	The threads cannot engage or disengage easily because of the corrosion	Replacement of the backshell recommended	Subject 20-60-09
	The threads engage and disengage easily	Examine at regular intervals	Paragraph 2.B.



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STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****1. GENERAL DATA****A. High Vibration Areas**

Refer to Subject 20-02-30 for the locations of the high vibration areas by their specified Vibration Level.

2. CAUSES OF DAMAGE**A. Damage by Vibration from a Mechanical Source**

Damage to a wire harness can occur by vibration from these sources:

- An engine
- A flap drive motor
- A fuel pump
- A gear mechanism
- Turbulence from the wind.

B. Damage from Environmental Conditions

Damage to a wire harness can occur from:

- Heat
- Cold
- Fuel
- Dirt
- Moisture
- Hydraulic fluid.

C. Damage from an Incorrect Installation

Damage to a wire harness can occur from:

- A clamp that is loose
- A clamp that is the incorrect size
- A wire harness branch that is made incorrectly
- The incorrect quantity of wire harness ties or installed plastic tie straps
- Wire harness tension that is too loose or too tight.

3. APPLICABLE CONDITIONS FOR WIRE HARNESS ASSEMBLY**A. General Conditions**

This paragraph gives the general conditions that are applicable:

- During the assembly of a wire harness
- When a wire harness is moved from one location to a different location
- While a wire harness is kept in storage.

For the assembly of a wire harness, these conditions are applicable:

- Strain must not be put on the terminations of the wires or the cables
- A bend that is less than the minimum bend radius must not occur; refer to Paragraph 3.B.

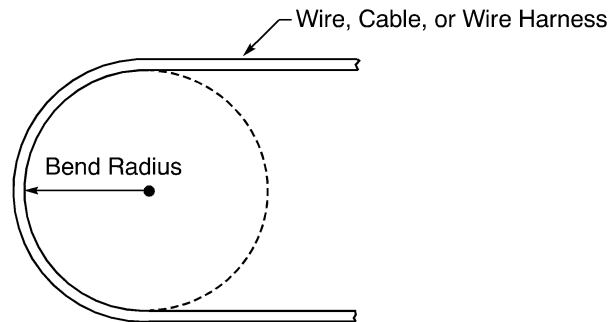
For the general conditions that are applicable for a wire harness that has a BACC69A fiber optic cable assembly, refer to Paragraph 3.G.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****B. Bend Radius**

This paragraph gives the values of the minimum bend radius for a wire, a cable, a coax cable, and a wire harness. For the minimum bend radius of the fiber optic cable of the BACC69A fiber optic cable assembly, refer to Paragraph 3.G.

The minimum bend radius of:

- A wire or cable is ten times the O.D. of the wire or the cable
- A coax cable is the larger value of 1.5 inches or six times the O.D. of the cable
- A wire harness is the same as the minimum bend radius of the wire or cable that has the largest diameter
- A wire harness with an overall shield is the larger value of 1.5 inches or six times the outer diameter of the harness
- A harness that contains two or more wire harnesses is the larger value of 1.5 inches or six times the outer diameter of the harness.



BEND RADIUS OF A WIRE, A CABLE, OR A WIRE HARNESS

Figure 1

C. Wire Harness Ties

These general conditions are applicable:

- If it is possible, all wires must be parallel before a wire harness tie is assembled on the wire harness
- A wire harness tie must be made from colored tie material when the identification of the wire harness separation is necessary; refer to Subject 20-10-19
- If it is necessary to replace a plastic tie strap wire harness tie on a wire harness in the unpressurized area, only a lacing tape wire harness tie is permitted; refer to Paragraph 4.C.

These conditions are applicable for the location of a wire harness tie on the wire harness:

- If it is possible, a wire harness tie must not be assembled where wires go across each other
- A wire harness tie must not be assembled on a repair of a wire or a cable unless it is assembled on top of the metal conductor splice of a splice assembly
- A wire harness tie must be assembled on a splice assembly that has more than one AWG 16 or smaller wire if the splice assembly does not have the support of a protection sleeve or insulation sleeve that is installed on the wire harness
- A wire harness tie can be assembled on a shield ground wire assembly.

NOTE: Wire harness ties are not necessary between the external surface of the wire harness and an insulation sleeve or a protection sleeve that is installed on the harness.

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STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****D. Wire Harness Ties in a High Vibration Area**

The conditions in this paragraph apply only to the outer wire harness ties on the harness.

For the locations of the high vibration areas, refer to Subject 20-02-30.

These conditions are applicable for the wire harness in a high vibration area, Vibration Level 3 and those parts of the wire harnesses that go from the wing seal rib into the strut or the sailboat areas:

- For a wire harness that goes through the leading edge gap, but does not go into the strut, the conditions for all other high vibration areas are applicable
- Lacing tape wire harness ties must be assembled at intervals of a maximum of 2 inches
- The necessary number of lacing tape wire harness ties must be assembled on the wire harness to make sure that the wires harness does not bend between the wire harness ties; refer to Figure 2
- The necessary number of lacing tape wire harness ties must be assembled on the wire harness to make sure that the outer diameter of the wire harness does not become larger between the wire harness ties; refer to Figure 2

For a high vibration area, Vibration Level 2, these conditions are applicable:

- For the 737 model only, the lacing tape wire harness ties on a power feeder wire harness on the leading edge of the wing must be assembled at intervals of a maximum of 2 inches
- Lacing tape wire harness ties must be assembled at intervals between 6 inches and 8 inches
- The necessary number of lacing tape wire harness ties must be assembled on the wire harness to make sure that the wires harness does not bend between the wire harness ties; refer to Figure 2
- The necessary number of lacing tape wire harness ties must be assembled on the wire harness to make sure that the outer diameter of the wire harness does not become larger between the wire harness ties; refer to Figure 2



Not Acceptable



Acceptable

INTERVALS FOR WIRE HARNESS TIES**Figure 2****E. Plastic Tie Strap Wire Harness Ties**

For the conditions that are applicable for a plastic tie strap wire harness ties on a wire harness with coax cable, refer to Paragraph 3.F.

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WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

Plastic tie strap wire harness ties are not permitted:

- In a fuel tank
- In the unpressurized area
- In a high vibration area; refer to Subject 20-02-30
- On a wire harness that has a Temperature Grade C or Temperature Grade D
- Where a broken tie strap can let the wire harness move against an abrasive surface
- Where a broken tie strap can let the wire harness cause an interference with mechanical linkage.

Plastic tie strap wire harness ties are a satisfactory alternative to lacing tape wire harness ties when these conditions occur:

- The wire harness is installed in the pressurized area of the airplane
- The wire harness has a Temperature Grade A or Temperature Grade B.

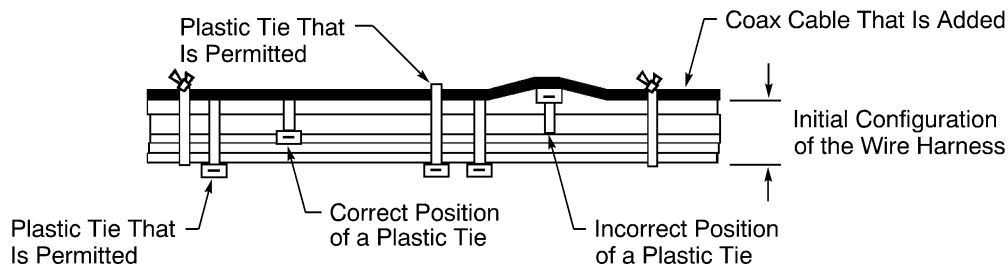
NOTE: Boeing Service Engineering can supply more data about the temperature grade of a wire harness.

NOTE: In the production of some airplanes, plastic tie strap wire harness ties have been installed on wire harnesses in the unpressurized area and in high vibration areas. These installations are satisfactory. If it is necessary to replace a plastic tie strap wire harness tie on one of these wire harnesses, only a lacing tape wire harness tie is permitted.

F. Wire Harnesses with Coax Cable

These conditions are applicable:

- The head of a plastic tie strap must be not be against a coax cable
- When a coax cable or a wire harness that a contains a coax cable is added to a wire harness that has a plastic tie strap, it is not necessary to remove the plastic tie strap.



PERMITTED CONFIGURATIONS OF PLASTIC TIE STRAPS WITH COAX CABLES THAT ARE ADDED

Figure 3

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

G. Wire Harnesses with a BACC69A Fiber Optic Cable Assembly

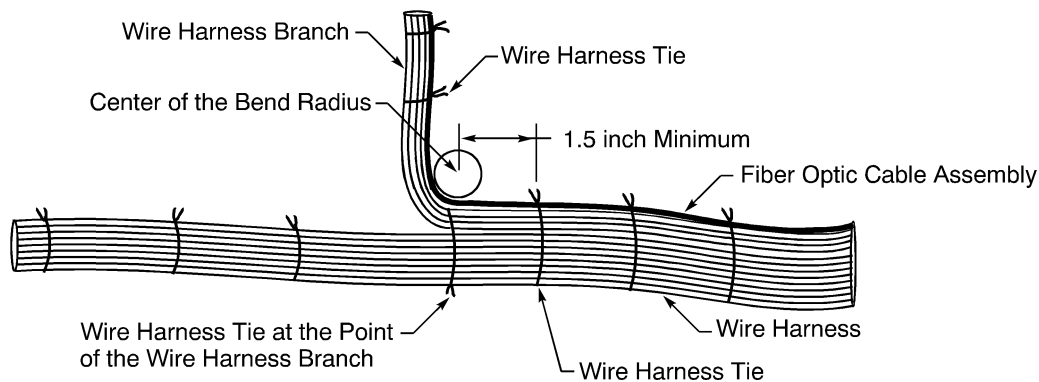
CAUTION: A HEAT GUN OR A HOT AIR GUN MUST NOT BE USED NEAR THE CABLE ASSEMBLY. IF TOO MUCH HEAT IS APPLIED TO THE CABLE, DAMAGE TO THE CABLE CAN OCCUR.

For the configuration of the fiber optic cable in a wire harness:

- The cable must not have a bend radius that is less than 0.75 inch
- The cable must not make a loop unless the cable is held in its position with a wire harness tie
- The wire harness tie at the point of a wire harness branch must not go on the fiber optic cable; refer to Figure 4
- A wire harness tie must be a minimum of 1.5 inches from the center of the bend radius of a wire harness branch where it makes a curve from the wire harness; refer to Figure 4.

CAUTION: IF THE BEND RADIUS IS LESS THAN 0.75 INCH, THE BEND CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

CAUTION: AS THE BEND RADIUS OF THE CABLE BECOMES MUCH LESS THAN 0.75 INCH, THE RISK OF DAMAGE TO THE CABLE INCREASES.



LOCATION OF THE WIRE HARNESS TIES AT A BRANCH
Figure 4

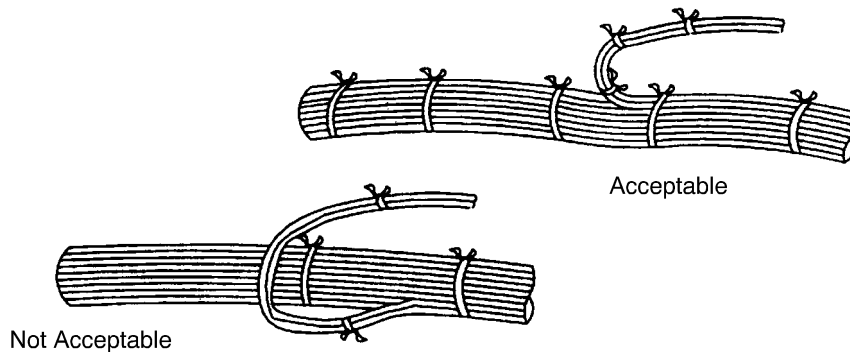
A deformation of the jacket of the cable from an assembled wire harness tie or plastic tie strap is permitted, if each of these conditions occur:

- The deformation does not go through the surface of the jacket
- The diameter of the cable at the maximum depth of the deformation is more than 85 percent of the diameter of the cable.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****H. Wire Harness Branches**

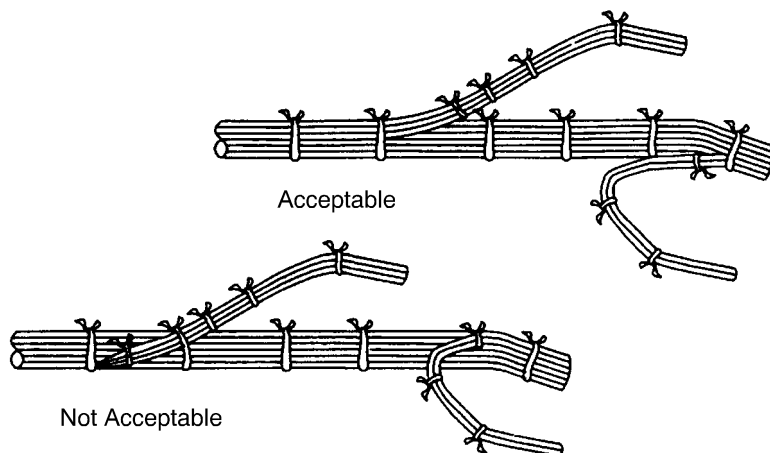
These conditions are applicable:

- If it is possible, a wire harness branch must make a smooth curve from the harness in the same plane as the centerline of the wire harness; refer to Figure 5
- If it is possible, all wires must be parallel and adjacent to each other and the wire harness before the wire harness branch is made
- If it is possible, a wire harness tie must be assembled or a plastic tie strap installed a maximum of 1 inch in front of the wire harness branch
- If it is possible, a wire harness tie must be assembled or a plastic tie strap installed a maximum of 1 inch behind the wire harness branch
- If it is possible, the wire harness branch must not go across other wires when it makes a curve from the wire harness; refer to Figure 6
- When a wire harness has a small number of wires that go to the branch point from opposite directions, a wire harness tie must be assembled or a plastic tie strap installed on the wire harness and the wires at the point of the branch; refer to Figure 7
- If the wire harness branch must go across the wire harness, the wire harness must have protection; refer to Figure 8 and Figure 9.

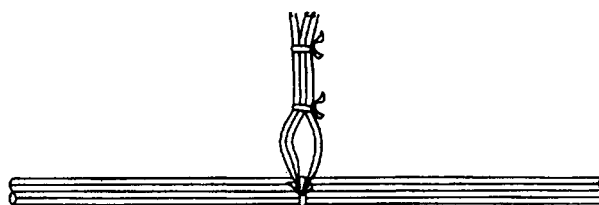
**ONE BRANCH ON A WIRE HARNESS****Figure 5**

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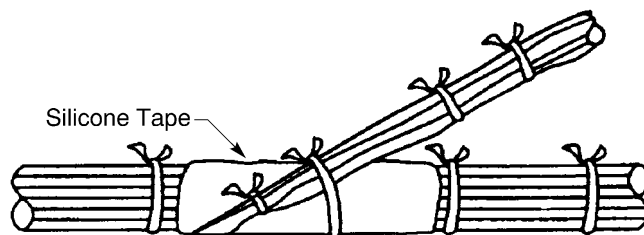
WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



MORE THAN ONE BRANCH ON A WIRE HARNESS
Figure 6



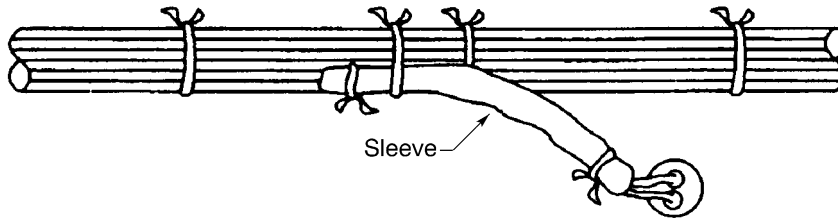
A BRANCH WITH WIRES THAT COME FROM OPPOSITE DIRECTIONS
Figure 7



WIRE HARNESS PROTECTION WITH TAPE
Figure 8

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



WIRE HARNESS PROTECTION WITH A SLEEVE
Figure 9

I. Wire Harnesses in Conduits or Tubes

These conditions are applicable for a wire harness assembled in a conduit or a tube:

- The wires must be parallel
- The wire harness must not have a wire harness tie
- The wire harness must not have a plastic tie strap.

For the procedures to repair a flexible conduit on the landing gear, refer to Subject 20-10-91.

4. ASSEMBLY OF WIRE HARNESS TIES

A. Wire Harness Tie Materials

Table 1
WIRE HARNESS TIE LACING TAPES

Temperature Grade	Class	Specification	Description
A	1	MIL-T-43435 Type II Finish C	Polyester, flat braid; 0.085 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick
B	1	BMS13-54 Type I Finish C	Polyester, flat braid, self-extinguishing finish; 0.085 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick
D	1	BMS13-54 Type II Finish C	Teflon coated fiberglass; flat braid; 0.100 inch \pm 0.010 inch wide, 0.016 inch \pm 0.003 inch thick
		BMS13-54 Type II Finish D/C	Teflon coated fiberglass; flat braid; 0.100 inch \pm 0.010 inch wide, 0.016 inch \pm 0.003 inch thick
		BMS13-54 Type III Finish C	Nomex, flat braid; 0.075 inch \pm 0.010 inch wide, 0.012 inch \pm 0.003 inch thick
			Nomex, flat braid; 0.110 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick
		MIL-T-43435 Type IV Finish D	Teflon coated fiberglass; flat braid; 0.110 inch \pm 0.010 inch wide, 0.016 inch \pm 0.003 inch thick
MIL-T-43435 Type V Finish C	Nomex, flat braid; 0.110 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick		

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**Table 2
ALTERNATIVE WIRE HARNESS TIE LACING TAPES**

Temperature Grade	Class	Description	Specified Lacing Tape			Alternative Lacing Tape	
			Specification	Type	Finish	Specification	Finish
A	1	Polyester, flat braid; 0.085 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick	MIL-T-43435	II	C	A-A-52081	C
D	1	Teflon coated fiberglass; flat braid; 0.110 inch \pm 0.010 inch wide, 0.016 inch \pm 0.003 inch thick	MIL-T-43435	IV	D	A-A-52083	D
D	1	Nomex, flat braid; 0.110 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick	MIL-T-43435	V	C	A-A-52084	C

**Table 3
APPROVED SUPPLIERS OF BOEING STANDARD LACING TAPES**

Boeing Specification	Approved Supplier
BMS13-54 Type I	Gudebrod
	Western Filament
BMS13-54 Type II	Western Filament
BMS13-54 Type III	Gudebrod
	Western Filament

**Table 4
WIRE HARNESS TIE PLASTIC TIE STRAPS**

Maximum Wire Harness Diameter (inch)	Tie Strap	
	Part Number	Supplier
0.75	ATTIE9	Tyton
	BACS38K4	Boeing
0.82	BACS38K8	Boeing
	BACS38K9	Boeing

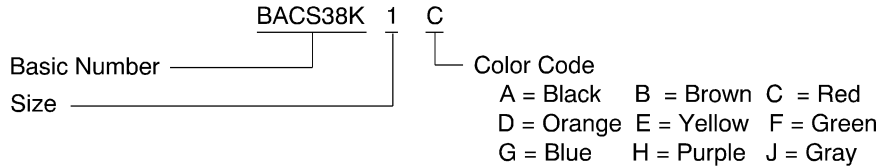
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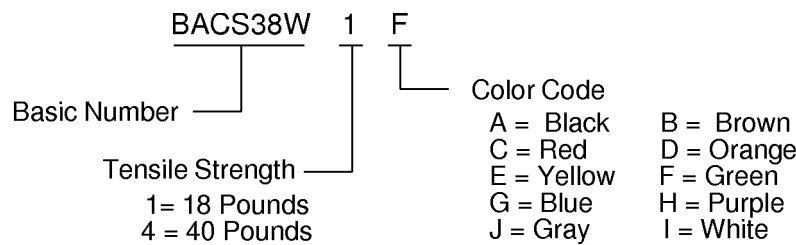
Table 4 (continued)

Maximum Wire Harness Diameter (inch)	Tie Strap	
	Part Number	Supplier
1.25	BACS38K5	Boeing
	PLT1.5M	Panduit
	SST1.5I-()	Panduit
1.75	BACS38K1	Boeing
	SST2S-()	Panduit
2.00	BACS38K10	Boeing
	SST2I-()	Panduit
3.00	BACS38K7	Boeing
4.00	BACS38K2	Boeing
	BACS38K3	Boeing
8.00	BACS38K6	Boeing
2.0	BACS38W1	Boeing
3.0	BACS38W4	Boeing



BACS38K TIE STRAP PART NUMBER STRUCTURE

Figure 10



BACS38W TIE STRAP PART NUMBER STRUCTURE

Figure 11

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

Table 5
APPROVED SUPPLIERS OF BOEING STANDARD PLASTIC TIE STRAPS

Plastic Tie Strap	Supplier
BACS38K	Panduit
	Tyton
BACS38W	Panduit

B. Selection of a Wire Harness Tie Configuration

For the conditions that are applicable for:

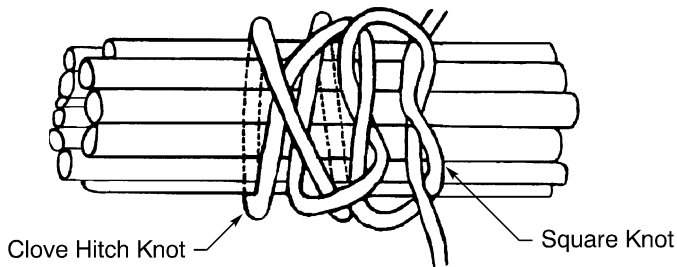
- The assembly of a wire harness tie, refer to Paragraph 3.C.
- A wire harness tie in a high vibration area, refer to Paragraph 3.D.
- A plastic tie strap wire harness tie, refer to Paragraph 3.C.

Table 6
WIRE HARNESS TIE ASSEMBLY CONFIGURATIONS

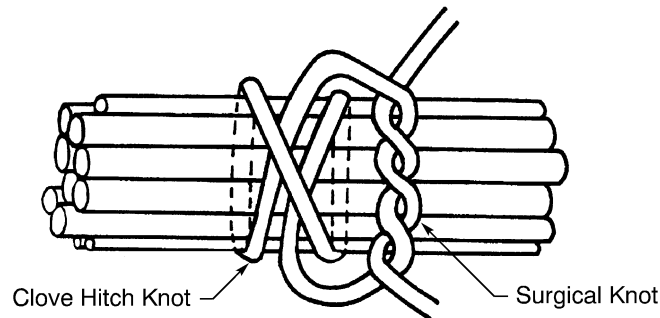
Maximum Temperature Grade	Applicable Area	Tie Assembly	
		Configuration	Reference
A	No High Vibration	Plastic Tie Strap	Paragraph 4.E.
		Lacing Tape	Paragraph 4.C.
B	High Vibration	Lacing Tape	Paragraph 4.D.
	No High Vibration	Lacing Tape	Paragraph 4.C.
D	High Vibration	Lacing Tape	Paragraph 4.D.
	No High Vibration	Lacing Tape	Paragraph 4.C.

C. Assembly of a Lacing Tape Wire Harness Tie

For the conditions that are applicable for this procedure, refer to Paragraph 4.B.



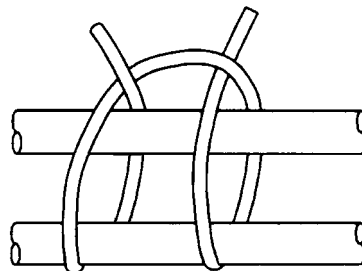
SQUARE KNOT OF A WIRE HARNESS TIE
Figure 12

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****SURGICAL KNOT OF A WIRE HARNESS TIE****Figure 13**

- (1) Make a selection of a lacing tape from Table 1.
Make sure that the temperature grade of the lacing tape is applicable for the location on the airplane.
- (2) Make a clove hitch knot on the wire harness. Refer to Figure 14.
Make sure that:
 - All of the wires are parallel
 - The knot is tight.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

**CLOVE HITCH KNOT****Figure 14**

- (3) Make one of these knots on top of the clove hitch:
 - A square knot; refer to Figure 12
 - A surgical knot; refer to Figure 13.
- (4) Cut the free ends of the lacing tape.

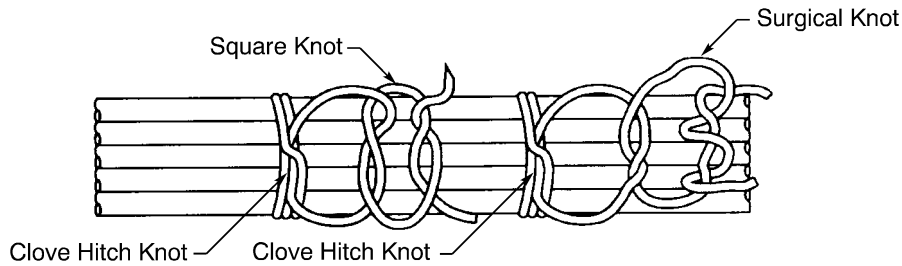
D. Assembly of a Lacing Tape Wire Harness Tie - High Vibration Area

For the conditions that are applicable for this procedure, refer to Paragraph 4.B.

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WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



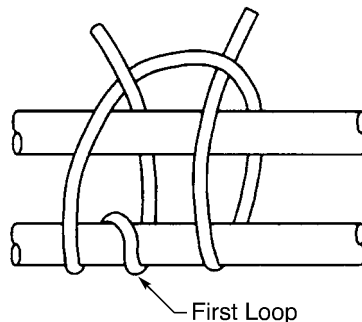
SQUARE AND SURGICAL KNOTS OF A WIRE HARNESS TIE

Figure 15

- (1) Make a selection of a lacing tape from Table 1.
Make sure that the temperature grade of the lacing tape is applicable for the location on the airplane.
- (2) Make a special clove hitch knot on the wire harness. Refer to Figure 16.
Make sure that:
 - A loop is made around a minimum of one of the wires of the harness
 - All of the wires are parallel
 - The knot is tight.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.



SPECIAL CLOVE HITCH KNOT

Figure 16

- (3) Make one of these knots on top of the clove hitch:
 - A square knot; refer to Figure 15
 - A surgical knot; refer to Figure 15.
- (4) Cut the free ends of the lacing tape.

E. Assembly of a Plastic Tie Strap Wire Harness Tie

For the conditions that are applicable for this procedure, refer to Paragraph 4.B.



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**Table 7
PLASTIC TIE STRAP TOOLS**

Plastic Tie Strap	Tool			
	Part Number	Supplier	Recommended Tool Tension Setting	
			Dial	Fine Adjust
ATTIE9	AT101	Tyton	-	-
BACS38K1	GS2B	Panduit	-	-
	WT193	Thomas & Betts	-	-
BACS38K10	GS2B	Panduit	-	-
	WT193	Thomas & Betts	-	-
BACS38K2	GS2B	Panduit	-	-
	WT193	Thomas & Betts	-	-
BACS38K3	GS4H	Panduit	-	-
BACS38K4	GS2B	Panduit	-	-
	WT193	Thomas & Betts	-	-
BACS38K5	GS2B	Panduit	-	-
	WT193	Thomas & Betts	-	-
BACS38K6	GS4H	Panduit	-	-
BACS38K7	GS2B	Panduit	-	-
	WT193	Thomas & Betts	-	-
BACS38K8	PSA-1M	Panduit	-	-
BACS38K9	PAT-1M2	Panduit	-	-
BACS38W1	GTS	Panduit	INT	4
	MS90387-1	A qualified source	INT	4
BACS38W4	GTS	Panduit	INT	5
	MS90387-1	A qualified source	INT	5
PLT1.5M	GS2B	Panduit	-	-
	GS2BL	Panduit	-	-
SST1.5I-()	GS2B	Panduit	-	-
	GS2BL	Panduit	-	-
SST2I-()	GS2B	Panduit	-	-
	GS2BL	Panduit	-	-
SST2S-()	GS2B	Panduit	-	-
	GS2BL	Panduit	-	-

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- (1) Make a selection of a plastic tie strap from Table 4.
- (2) Make a selection of a tie strap tool from Table 7.

NOTE: A pair of long nose pliers is a satisfactory alternative to a tie strap tool when the clearance is not sufficient for the tie strap tool.

- (3) Put the tie strap on the wire harness.
Make sure that all of the wires are parallel to each other.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

- (4) If the head of a plastic tie strap is against an adjacent coax cable, turn the head of the plastic tie strap away from the coax cable.

CAUTION: THE HEAD OF A PLASTIC TIE STRAP MUST NOT TOUCH A COAX CABLE. DAMAGE TO THE CABLE CAN OCCUR.

- (5) Tighten the tie strap sufficiently.

CAUTION: DO NOT TIGHTEN THE TIE STRAP MORE THAN THE NECESSARY AMOUNT TO HOLD THE HARNESS TOGETHER. IF THE TIE STRAP IS TOO TIGHT, DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR.

- (6) Cut the unwanted length from the end of the tie strap at the head.

Make sure that the end of the tie strap:

- Is a maximum of 0.01 inch from the head of the strap
- Does not have sharp edges.

5. APPLICABLE CONDITIONS - INSTALLATION OF A WIRE HARNESS**A. General Conditions**

This paragraph gives the general conditions that are applicable:

- While a wire harness is kept in storage
- When a wire harness is moved from one location to a different location
- During the installation of a wire harness
- After a wire harness is installed.

For the installation of a wire harness, these conditions are applicable:

- Strain must not be put on the terminations of the wires or the cables
- A bend that is less than the minimum bend radius must not occur; refer to Paragraph 3.B.

For the general conditions that are applicable for a wire harness that has a BACC69A fiber optic cable assembly, refer to Paragraph 6.A.

For the general conditions that are applicable for Critical Design Configuration Control Limitation (CDCCL) wiring, refer to Paragraph 5.B.

B. Airworthiness Limitations

These types of wiring configurations are specified as Critical Design Configuration Control Limitations (CDCCL):

- Fuel System Wiring
- Wiring that is installed adjacent to the fuel tank.

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WARNING: IT IS MANDATORY THAT THE SPECIFIED MAINTENANCE PROCEDURES BE OBEYED FULLY.

To find more data about CDCCL wiring, refer to Table 8 for the document that is applicable for the airplane model.

**Table 8
BOEING DOCUMENTS FOR AIRWORTHINESS LIMITATIONS**

Boeing Document	Airplane Model
D6-7552-AWL	707
D6-8766-AWL	727
D6-38278-CMR	737-100,-200,-200C,-300,-500
D6-13747-CMR	747-100,-200,-300,-SP
Maintenance Planning Document, Section 9	737-600,-700,-800 and later 737 models
	747-400 and later 747 models
	757
	767
	777

C. Wire Harness Clearance

This paragraph gives the minimum clearance between a wire harness and:

- An airplane structure
- A piece of equipment
- Other components.

Refer to Table 9.

If it is possible, the clearance between the wire harness and a flammable material line must be the maximum possible distance.

**Table 9
MINIMUM CLEARANCE**

Airplane Component	Minimum Clearance (inch)	Special Instructions
Side of Bleed Air Duct	1	None
Top of Bleed Air Duct	2	None
Control Cable	2	If positive separation is made sure by mechanical support, the minimum clearance can be decreased.
Fuel Line	2	If positive separation is made sure by mechanical support, the minimum clearance can be decreased. Refer to Figure 17.
Heat Equipment	0.2	Fiberglass conduit must have the minimum clearance specified.
Hydraulic Fluid Line	0.5	If positive separation is made sure by mechanical support, the minimum clearance can be decreased. Refer to Figure 17.

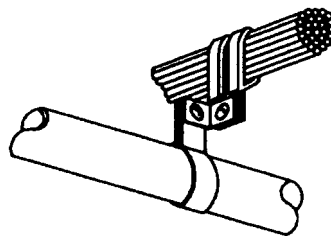
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Table 9 (continued)

Airplane Component	Minimum Clearance (inch)	Special Instructions
Oxygen Line	2	If positive separation is made sure by mechanical support, the minimum clearance can be decreased. Refer to Figure 17.
Pitot Static Line	0.5	If positive separation is made sure by mechanical support, the minimum clearance can be decreased. Refer to Figure 17.
Sharp Edge of Structure and Equipment	0.13	As an alternative to the minimum clearance, use a continuous Teflon or Expando sleeve for protection.
Smooth Metal or Plastic with 0.13 inch minimum radius	0.0	In pressurized areas only, the length of the wire harnesses between clamps can touch smooth flat surfaces and smooth 0.13 inch minimum radius.
Water Line	0.5	If positive separation is made sure by mechanical support, the minimum clearance can be decreased. Refer to Figure 17.



POSITIVE SEPARATION
Figure 17

D. Support of a Wire Harness

These conditions are applicable:

- Many wire harnesses can be put in the same raceway or in one clamp if the separation conditions are satisfactory; refer to Subject 20-10-19
- All channel separation conditions must be obeyed; refer to Subject 20-10-19
- A wire harness must be perpendicular to the longitudinal axis of the clamp
- More than one wire harness must not be attached with a wire harness tie unless support for a small wire harness is necessary
- An unshielded AWG 22 or smaller wire must be attached to the structure with a clamp at intervals of 6 inches or less
- Three or more AWG 22 or smaller wire wires can be put into a harness
- A 66-3539-() insulated retainer ring must not be installed where an electrical wire harness has a routing through an insulation blanket.

Refer to Subject 20-10-12 for:

- The general conditions for the selection of a clamp
- The conditions that are applicable for the replacement of a clamp
- The conditions that are applicable for the installation of a clamp.

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STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****E. Control of Wire Harness Slack**

These conditions are applicable:

- A wire harness must have sufficient slack, but not too much
- A wire harness must have slack that is equal along the length of the harness; refer to Figure 18
- A wire harness must have sufficient slack in the first 6 feet from the connector or other terminations
- If a wire harness has too much slack between the wire harness supports, more wire harness supports must be installed.

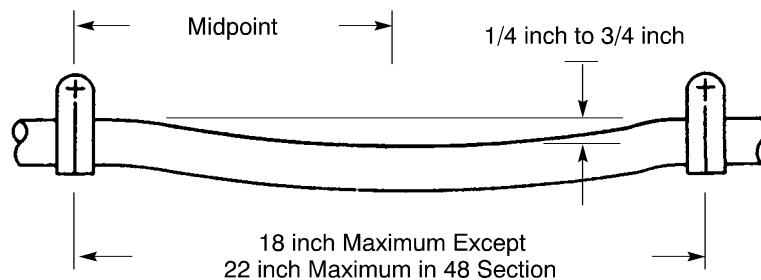
NOTE: In production, the design of a wire harness usually includes 1 inch to 1-1/2 inches of slack to make sure that a wire can be terminated a minimum of two times in service.

CAUTION: THE CONTROL OF SLACK IN A WIRE HARNESS IS VERY IMPORTANT IN A HIGH VIBRATION AREA BECAUSE:

- A WIRE CAN BE BROKEN IF THE SLACK IS NOT SUFFICIENT
- A WIRE CAN BE BROKEN IF THE WIRE HARNESS HAS TOO MUCH SLACK
- A WIRE CAN HAVE DAMAGE FROM ABRASION IF THE WIRE HARNESS HAS TOO MUCH SLACK.

A wire harness has sufficient slack when:

- Connectors can be connected and disconnected easily
- Strain is not put on a wire, a cable, or a wire harness
- Strain is not put on the termination of a wires or a cable
- Strain does not pull a connector grommet out of its shape
- Hinge joints can move freely
- Equipment can be removed easily
- The expansion of the airframe does not put strain on the wire, the cable, or the wire harness.



SLACK BETWEEN WIRE HARNESS CLAMPS

Figure 18

F. Drip Loops

A drip loop is assembled on a wire harness to make sure that water does not go down the wires of the harness and in the connector. Refer to Figure 19.

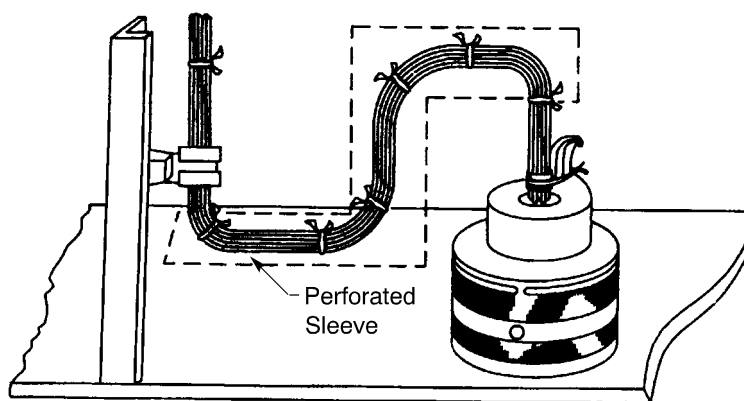
STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION**

These conditions are applicable:

- A drip loop must be assembled correctly to decrease the movement of the loop
- A drip loop must not rub an adjacent structure or equipment
- If the drip loop can rub against an adjacent structure or equipment, the wire harness must have protection
- A drip loop must not be assembled to control wire slack; refer to Paragraph 5.E. for the general conditions to control slack.

A satisfactory sleeve or tape for wire harness protection is:

- A Ben-Har 1151-FRB sleeve
- A perforated Teflon sleeve or an equivalent sleeve
- Scotch 70 tape or an equivalent tape.



DRIP LOOP
Figure 19

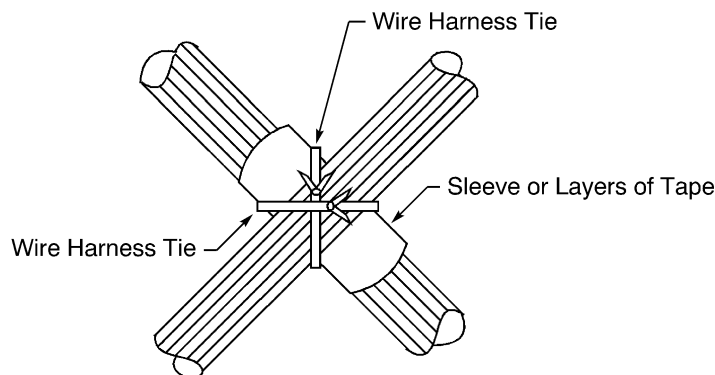
STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****G. Wire Harnesses that Touch at an Intersection**

These conditions are applicable:

- Usually, if two wire harnesses touch at an intersection, they must have positive separation with clamps and spacers to prevent damage from abrasion
- Wire harnesses that touch at an intersection in the unpressurized area must have positive separation
- When positive separation is not possible in the pressurized area, wire harness ties must be assembled at the intersection of the harnesses
- If two wire harnesses touch, the necessary conditions for circuit separation must be obeyed. Refer to Subject 20-10-19.

For two wire harnesses that are attached at an intersection, these conditions are applicable:

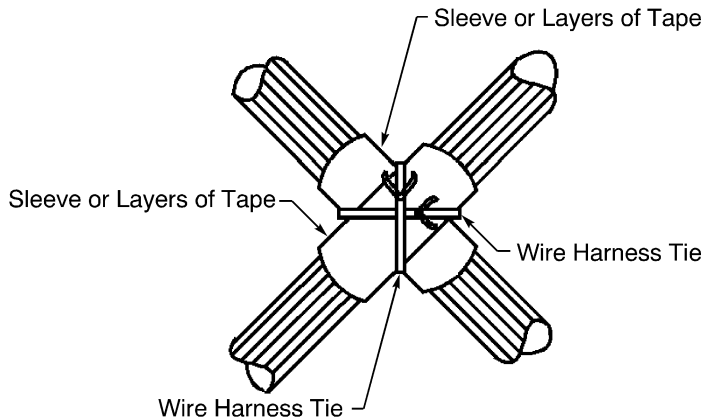
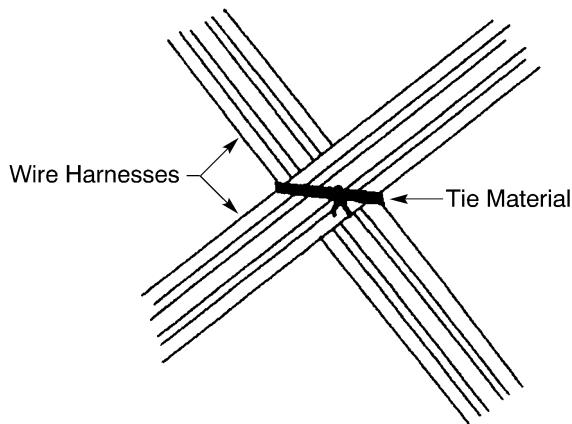
- The wire harnesses must have two wire harness ties at the intersection of the wire harnesses; refer to Figure 20
- The wire harness ties must prevent the movement of the harnesses
- The harnesses must be in a position that is 90 degrees from each other; refer to Figure 20
- One of the harnesses must have a protective sleeve or layer of tape at the intersection; refer to Figure 20
- If plastic tie straps are installed, each wire harness must have a protective sleeve or layer of tape at the intersection; refer to Figure 21
- If one harness has a fiberglass sleeve, the other harness must also have a protective sleeve or layer of tape
- For harnesses that touch in a panel or on a shelf, only one wire harness tie is necessary; refer to Figure 22.



PROTECTION FROM ABRASION DAMAGE FOR HARNESSES THAT TOUCH
Figure 20

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STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****PROTECTION FOR WIRE HARNESSES ATTACHED WITH PLASTIC TIE STRAPS****Figure 21****TWO WIRE HARNESSES THAT TOUCH IN A PANEL OR ON A SHELF****Figure 22****H. Protection from Abrasion in a High Vibration Area**

Protection is necessary for:

- A wire harness that is near the aircraft structure; refer to Figure 23
- A wire harness that is near a maintenance traffic area
- An uninsulated ground lug unless it is a flag terminal lug.

Satisfactory protection can be:

- A fiberglass protective sleeve for a wire harness
- A perforated Teflon sleeve or an equivalent sleeve for a wire harness
- A TFE heat shrinkable sleeve for an uninsulated ground lug.

Refer to Subject 20-00-11 for the specified sleeves.

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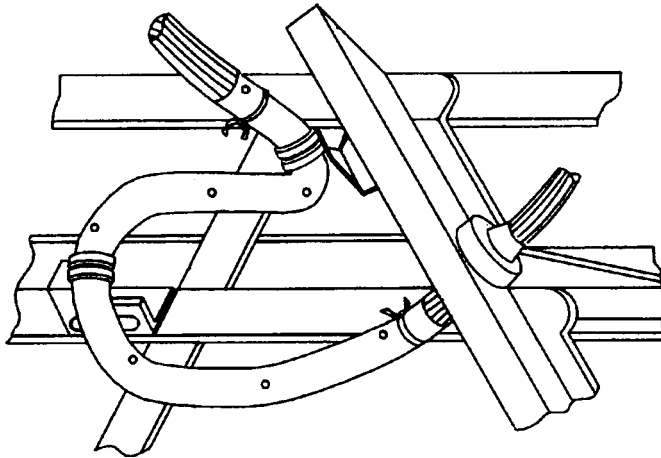
STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****PROTECTION FROM ABRASION FOR A WIRE HARNESS NEAR THE STRUCTURE**

Figure 23

6. APPLICABLE CONDITIONS - INSTALLATION OF A WIRE HARNESS THAT HAS A BACC69A FIBER OPTIC CABLE ASSEMBLY**A. General Conditions**

For the configuration of the fiber optic cable in the wire harness, the cable:

- Must not have a bend radius that is less than 0.75 inch
- Must not make a loop unless the cable is held in its position with a wire harness tie
- Must have a drip loop at the rear of the connector
- Must not have strain where the cable is attached to the backshell or the connector
- Can have a BACS38W2 or a BACS38W3 plastic tie strap wire harness support.

CAUTION: IF THE BEND RADIUS IS LESS THAN 0.75 INCH, THE BEND CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

CAUTION: AS THE BEND RADIUS OF THE CABLE BECOMES MUCH LESS THAN 0.75 INCH, THE RISK OF DAMAGE TO THE CABLE INCREASES.

7. APPLICABLE CONDITIONS - INSTALLATION OF A POWER FEEDER WIRE HARNESS**A. General Conditions**

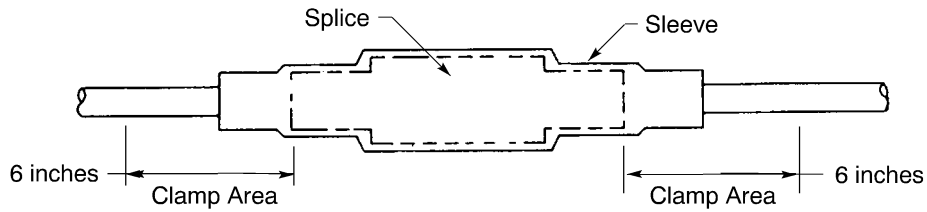
A power feeder wire harness must have clamps installed at a maximum interval of:

- 6 inches from the end of a splice in the unpressurized area; refer to Figure 24
- 18 inches in the pressurized area.

For the configuration of splices on adjacent wires of an aluminum power feeder wire harness, refer to Subject 20-30-13.

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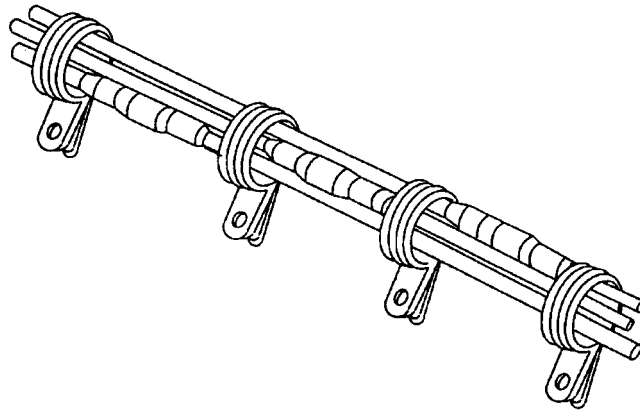


POSITION OF THE CLAMPS NEAR THE SPLICE

Figure 24

B. Splices at Intervals

Splices at intervals must be held with a clamp between each splice. Refer to Figure 25.



POSITION OF THE CLAMP FOR POWER FEEDER SPLICES AT INTERVALS

Figure 25

C. Splices That Have 100 Percent Overlap

Adjacent wires with splices that have 100 percent overlap must:

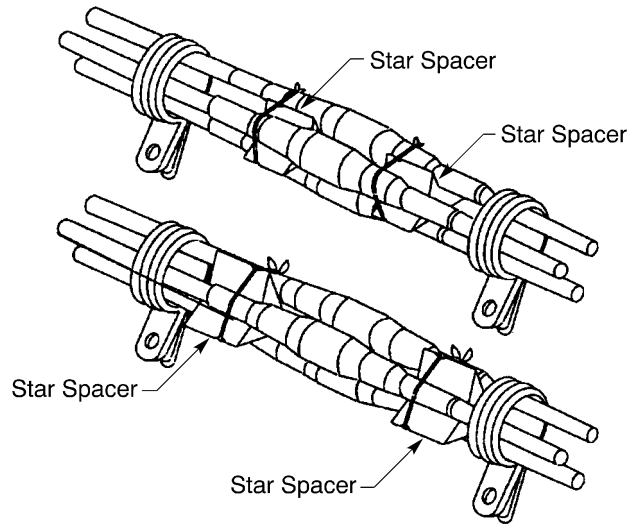
- Be held together with clamps and wire harness ties
- Have positive separation between the splices.

These conditions are applicable:

- The minimum distance for positive separation between each splice is 0.1 inch
- Positive separation is done with spacers; refer to Figure 26 and Table 10
- The temperature grade and the class of the spacers is equal to or higher than the grade and the class of the wire harness.

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POSITIVE SEPARATION OF ADJACENT SPLICES THAT HAVE 100 PERCENT OVERLAP
Figure 26

Table 10
SPACER PART NUMBERS

Material	Temperature Grade	Class	Part Number	Supplier
Spacer	C	1	63-9273	Plexus
Spacer, Star	C	1	BACS18AX()	Boeing

8. WIRE HARNESS SUPPORTS

A. General Conditions

Clamps must hold the wire harness tightly to prevent the movement of the wire harness in the clamp during vibration while in service.

B. Necessary Conditions for Clamp Replacement

Refer to Subject 20-10-12.

C. Necessary Conditions for Clamp Installation

Refer to Subject 20-10-12.

D. Selection of a Clamp Size

Refer to Subject 20-10-12.

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9. SPLIT SLEEVE INSTALLATION

A. Necessary Materials

**Table 11
NECESSARY MATERIALS**

Material	Part Number	Supplier
Nylon Varnish	Nycote 88	Nycote Laboratories
Sleeve	AMS-DTL-23053/12 Class 2	Available source
	AMS-DTL-23053/12 Class 5	Available source
	TFE 2X Standard Wall	Chemplast
	TFE 2X Standard Wall	Zeus Industrial Products
	TFE 2XTW Thin Wall	Zeus Industrial Products
	TFE 4X	Chemplast
	TFE 4X	Zeus Industrial Products
	TFE Perforated	Zeus Industrial Products

B. Installation of a Split Sleeve For Protection of a Wire Harness

- (1) Make a selection of a sleeve from Table 11.

NOTE: The sleeve must have the sufficient diameter to make a 0.5 inch minimum overlap on the wire harness.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (2) Cut the sleeve longitudinally in a straight line.
- (3) Put the sleeve around the wire harness.

If the diameter of the wire harness is larger than 0.32 inch, make sure one edge of the sleeve makes a 0.5 inch minimum overlap with the other edge of the sleeve.

If the diameter of the wire harness is 0.32 inch or smaller, make sure that the longitudinal edges of the sleeve make an overlap of not less than 50 percent of the circumference of the wire harness.

- (4) Assemble a wire harness tie at the center of the sleeve. Refer to Paragraph 4.

Make sure that the overlap of the sleeve stays in its position. Refer to Step (3).

- (5) Assemble wire harness ties at 2.00 inches \pm 0.25 inch intervals from the center wire harness tie to each end of the sleeve. Refer to Paragraph 4.

Make sure that:

- The last wire harness tie on each end of the sleeve is a maximum of 0.5 inch from the end of the sleeve
- The overlap of the sleeve stays in its position. Refer to Step (3).

C. Installation of a Split Sleeve For Wire or Cable Separation

For the conditions that are applicable for wire and cable separation, refer to Subject 20-10-19.

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(1) Make a selection of a sleeve:

NOTE: The sleeve must have the sufficient diameter to make a 0.5 inch minimum overlap on the wire harness.

- (a) If the sleeve is specified, use the specified sleeve.
- (b) If the sleeve is not specified, refer to Subject 20-10-19 for the applicable conditions for the selection of a sleeve.

(2) Cut the sleeve longitudinally in a straight line.

(3) If the sleeve is made of fiberglass:

- (a) Make a selection of a nylon varnish from Table 11.
- (b) Apply the nylon varnish to the ends of the sleeve that have been cut.

(4) Put the sleeve around the wire harness.

If the diameter of the wire harness is larger than 0.32 inch, make sure one edge of the sleeve makes a 0.5 inch minimum overlap with the other edge of the sleeve.

If the diameter of the wire harness is 0.32 inch or smaller, make sure that the longitudinal edges of the sleeve make an overlap of not less than 50 percent of the circumference of the wire harness.

(5) Assemble a wire harness tie at the center of the sleeve. Refer to Paragraph 4.

Make sure that the overlap of the sleeve stays in its position. Refer to Step (4).

(6) Assemble wire harness ties at 4 inch intervals from the center wire harness tie to each end of the sleeve. Refer to Paragraph 4.

Make sure that:

- The last wire harness tie on each end of the sleeve is a maximum of 0.5 inch from the end of the sleeve
- The overlap of the sleeve stays in its position. Refer to Step (4).

10. CHANGE OF WIRING

A. Selection of a Configuration of a New Wire Installation

For the conditions that are applicable for the data in this paragraph, refer to Paragraph 5.B.

A new wire:

- Must have the correct wire identification
- Must have EMI protection if it is necessary
- Can be installed on top of a wire harness tie, a plastic ties strap, a tape, or an identification marker that is installed on a wire harness
- Must be installed in the same clamps as the those of the main wire harness.

Table 12

SELECTION OF A CONFIGURATION OF A NEW WIRE INSTALLATION

Applicable Conditions	Configuration	Installation Procedure
The main wire harness does not have an overall shield.	The new wire is installed on top of the main wire harness.	Paragraph 10.C.
The main wire harness has an overall shield and EMI protection for the new wire is not necessary.	The new wire is installed on top of the overall shield of the main wire harness.	Paragraph 10.D.

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Table 12 (continued)

Applicable Conditions	Configuration	Installation Procedure
The main wire harness has an overall shield and the new wire must have EMI protection.	The new wire is installed between the external surface of the wire harness and the overall shield.	Paragraph 10.E.
	An overall shield is installed on the new wire and the new wire is installed on top of the overall shield of the main wire harness.	Paragraph 10.F.

B. Identification of a New Wire

NOTE: A new wire can be identified by one of these types of a wire identification:

- A direct mark
 - An indirect mark.
- (1) If the new wire has an old identification that is a direct mark, install a sleeve or a tape with the new identification:
 - On each end of the harness
 - On all branches that are longer than two feet.

Refer to Table 13

- (2) If the wire has an old identification that is an indirect mark, replace the identification sleeve or tape with a sleeve or tape that has the new identification.

Refer to Table 13

- (3) If the new wire does not have an old identification mark, put the full identification on the wire. Refer to Table 13

The full identification includes:

- The wire harness number
- The wire number
- The color code
- The wire size.

C. Installation of a New Wire on Top of a Wire Harness without an Overall Shield

For the conditions that are applicable for the data in this paragraph, refer to Paragraph 10.A.

- (1) Put the correct identification on the new wire. Refer to Paragraph 10.B.
- (2) Remove the necessary clamps along the main wire harness where the wire must be installed.
- (3) Install the wire on the external surface of the main harness.

Refer to Paragraph 3. for the general conditions that are applicable for wire harness assembly.

NOTE: The wire can be installed on top of a wire harness tie, a plastic tie strap, a tape, or a marker that is installed on the wire harness.

- (4) If the harness is installed in the airplane, assemble wire harness ties or install plastic tie straps at approximately one foot intervals between the clamps. Paragraph 4.

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- (5) If the harness is not installed in the airplane, assemble wire harness ties or install plastic tie straps at the same intervals as the intervals of the wire harness ties on the harness. Paragraph 4.
- (6) Put the wire in the same clamps as those of the main harness.
- (7) Install the clamps in their initial configuration. Refer to Subject 20-10-12.

D. Installation of a New Wire on Top of a Wire Harness with an Overall Shield

For the conditions that are applicable for the data in this paragraph, refer to Paragraph 10.A.

- (1) Put the correct identification on the new wire. Refer to Paragraph 10.B.
- (2) Remove the necessary clamps along the main wire harness where the wire must be installed.
- (3) Install the wire on top of the overall shield.

Refer to Paragraph 3. for the general conditions that are applicable for wire harness assembly.

NOTE: The wire can be installed on top of a wire harness tie, a plastic tie strap, a tape, or a marker that is installed on the wire harness.

- (4) Install a wire harness tie or a plastic strap on the new wire and the main harness at four inch intervals. Refer to Paragraph 4.
- (5) Put the wire in the same clamps as those of the main harness.
- (6) Install the clamps in their initial configuration. Refer to Subject 20-10-12.

E. Installation of a New Wire between the Overall Shield and the Wire Harness

For the conditions that are applicable for the data in this paragraph, refer to Paragraph 10.A.

- (1) Put the correct identification on the new wire. Refer to Paragraph 10.B.
- (2) Remove the necessary clamps along the main wire harness where the wire must be installed.
- (3) If it is necessary, remove the overall shield from the wire harness.
- (4) Install the wire between the external surface of the harness and the shield.

Refer to Paragraph 3. for the general conditions that are applicable for wire harness assembly.

NOTE: The wire can be installed on top of a wire harness tie, a plastic tie strap, a tape, or a marker that is installed on the wire harness.

- (5) If the harness is installed in the airplane, assemble wire harness ties or install plastic tie straps at approximately one foot intervals between the clamps. Refer to Paragraph 4.
- (6) If the harness is not installed in the airplane, assemble wire harness ties or install plastic tie straps at the same interval as the interval of the wire harness ties on the harness. Refer to Paragraph 4.
- (7) Put the overall shield of the harness in its initial configuration.
- (8) Install the clamps in their initial configuration. Refer to Subject 20-10-12.

F. Installation of a New Wire and an Overall Shield on Top of a Wire Harness with an Overall Shield

For the conditions that are applicable for the data in this paragraph, refer to Paragraph 10.A.

- (1) Put the correct identification on the new wire. Refer to Paragraph 10.B.
- (2) Remove the necessary clamps along the main wire harness where the wire must be installed.
- (3) Remove the wire harness ties along the harness where the wire is to be added.

NOTE: Do not remove the wire harness ties from the area of the harness near the shield ground wire of the overall shield.

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- (4) Install an overall shield on the wire. Refer to Subject 20-25-11.
- (5) Install the wire on top of the overall shield of the main harness.

Refer to:

- Paragraph 3. for the general conditions that are applicable for wire harness assembly
- Subject 20-25-11 for the modification of a wire harness with an overall shield.

NOTE: The wire can be installed on top of a wire harness tie, a plastic tie strap, a tape, or a marker that is installed on the wire harness.

- (6) Put the wire in the same clamps as those of the main harness.
- (7) Install the clamps in their initial configuration. Refer to Subject 20-10-12.

G. Removal of a Wire or Wire Harness from Operation

CAUTION: FLUID OR CONTAMINATION ON THE FREE END OF A WIRE, A CABLE, OR A WIRE HARNESS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE, THE CABLE, OR THE CONNECTOR.

CAUTION: UNWANTED MOVEMENT OF THE FREE END OF A WIRE, A CABLE, OR A WIRE HARNESS CAN CAUSE DAMAGE TO ADJACENT WIRES OR EQUIPMENT.

If the removal, or the removal of the function of a wire, a cable, or a wire harness from the airplane is specified and the removal of the wire, cable or wire harness can cause damage to adjacent wires or equipment, these precautions are recommended:

- Removal of all the termination points on the wire, cable, or wire harness.
- Installation of the necessary insulation on the end of the wire, the cable, or the wire harness; refer to Paragraph 12.
- The stow of the free end of the wire, the cable, or the wire harness; refer to Paragraph 13.

11. REPAIR OR REPLACEMENT OF WIRE HARNESS IDENTIFICATION

This paragraph gives:

- The general conditions for wire identification marks
- The procedures to make an indirect mark for wire identification.

A. General Data

These types of marks can make wire identification:

- A direct mark which is a mark that is printed directly on the wire insulation
- An indirect mark which is a mark that is printed on a sleeve, a tape, or a boot that is installed on the wire, the cable, or the wire harness.

A direct mark can be used to identify:

- A wire
- A cable that is not a coax cable or a BMS13-71 fiber optic cable.

An indirect mark can be used to identify:

- A wire
- A cable
- A coax cable
- A fiber optic cable
- A wire harness.

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CAUTION: A DIRECT MARK MUST NOT BE PUT ON A COAX CABLE. DAMAGE TO THE CABLE CAN OCCUR AND CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

CAUTION: A DIRECT MARK MUST NOT BE PUT ON A BMS13-71 FIBER OPTIC CABLE. DAMAGE TO THE CABLE CAN OCCUR AND CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

CAUTION: A DIRECT MARK MUST NOT CAUSE DAMAGE TO THE WIRE OR CABLE INSULATION. DAMAGE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE OR CABLE.

B. General Conditions for Wire Identification Marks

A wire identification mark:

- Must be in upper case letters and Arabic numerals
- Must be easily read at a distance of 15 inches with ambient room light
- Must have a minimum contrast measurement of 55 percent
- Is not necessary on a wire that is less than 6 inches long.

These conditions are applicable for indirect marks:

- The maximum interval for the mark is 72 inches \pm 1 inch
- The mark must be installed approximately 4 inches from the end of a wire, a cable, or a wire harness
- The mark must be installed approximately 4 inches from the end of a wire harness branch, if the branch is longer than 6 feet.

C. Wire Identification Materials

**Table 13
SLEEVES FOR WIRE IDENTIFICATION**

Temperature Grade	Class	Specification or Part Number	Description	Supplier
B	1	AMS-DTL-23053/5	Insulation Sleeve, Electrical, Heat Shrinkable, Polyolefin, Flexible, Crosslinked	Available source
		AMS-DTL-23053/6	Insulation Sleeve, Electrical, Heat Shrinkable, Polyolefin, Semi-Rigid, Crosslinked	Available source
		AMS-DTL-23053/8	Insulation Sleeve, Electrical, Heat Shrinkable, Polyvinylidene Fluoride, Semi-Rigid, Crosslinked; applicable for ground support equipment only	Available source
		AMS-DTL-23053/18	Insulation Sleeve, Electrical, Heat Shrinkable, Modified Fluoropolymer, Crosslinked	Available source
	2	AMS-DTL-23053/14	Insulation Sleeve, Electrical, Heat Shrinkable, Ethylenetetrafluoroethylene Fluoropolymer, Semi-Rigid	Available source
C	2	MIL-I-3190/6	Insulation Sleeve, Electrical, Flexible	Available source

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Table 13 (continued)

Temperature Grade	Class	Specification or Part Number	Description	Supplier
D	1	BMS13-69	Identification Sleeve, Heat Shrinkable	Boeing
		AMS-DTL-23053/12	Insulation Sleeve, Electrical, Heat Shrinkable, Polytetrafluoroethylene	Available source

Table 14

APPROVED SUPPLIERS OF BOEING HEAT SHRINKABLE IDENTIFICATION SLEEVES

Boeing Standard	Supplier
BMS13-69	Critchley
	Raychem

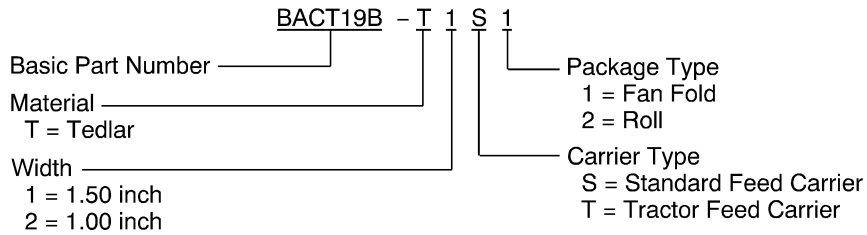
Table 15

TAPES FOR WIRE IDENTIFICATION

Temperature Grade	Class	Specification or Part Number	Description	Supplier
B	1	MIL-M-87958	Marker Blanks, Pressure Sensitive Adhesive, Wire or Cable Marker and Identification Label	QPL
		TMS-WM	Wrap around tape	Raychem
	2	BACT19B-T	Wire identification tape, Tedlar; pressure sensitive adhesive	Critchley
		BACT19B-T	Wire identification tape, Tedlar; pressure sensitive adhesive	W.H. Brady
		BACT19C-T	Wire identification tape, Tedlar; pressure sensitive adhesive	Critchley
		BACT19C-T	Wire identification tape, Tedlar; pressure sensitive adhesive	W.H. Brady
		BACT19E-T	Wire identification tape, Tedlar; pressure sensitive adhesive	Critchley
		BACT19E-T	Wire identification tape, Tedlar; pressure sensitive adhesive	W.H. Brady
		BMS 13-47	Tape, Label Stock, Wire and Harness Identification	Critchley
		BMS 13-47	Tape, Label Stock, Wire and Harness Identification	W.H. Brady
D	1	HT-SCE-WM	Wrap around tape	Raychem
		HT-TMS-WM	Wrap around tape	Raychem

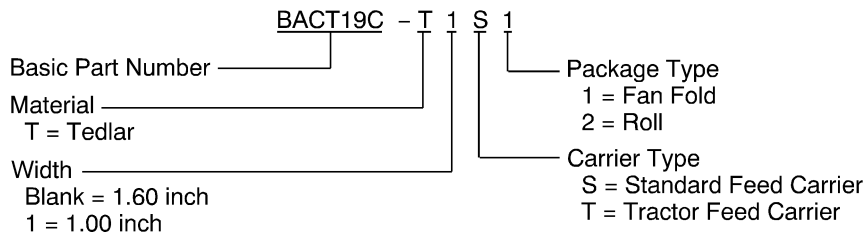
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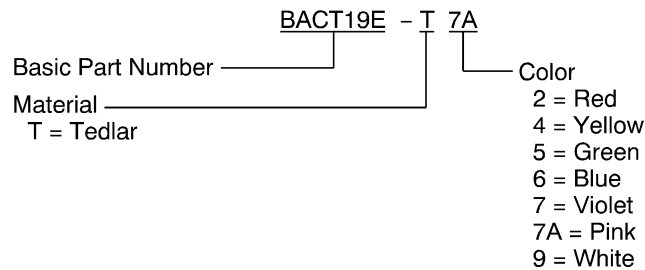
BACT19B-T IDENTIFICATION TAPE

Figure 27



BACT19C-T IDENTIFICATION TAPE

Figure 28



BACT19E-T IDENTIFICATION TAPE

Figure 29

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**Table 16
FOILS FOR HOT STAMP**

Class of the Mark	Sleeve Material	Foil		
		Part Number	Color	Supplier
1	Fiberglass	C40114	Black	Swift
		K-496	Purple	Kingsley
	Nylon	No Fault	Black	Kingsley
	Polyolefin	C40114	Black	Swift
		K-486	Black	Kingsley
		K-496	Purple	Kingsley
		No Fault	Black	Kingsley
	Silicone Fiberglass Reinforced	K-486	Black	Kingsley
2	Nylon	K-496	Purple	Kingsley
	Tedlar	C40114	Black	Swift
		K-486	Black	Kingsley
		No Fault	Black	Kingsley
	Vinyl	K-486	Black	Kingsley

D. Wire Identification Equipment

**Table 17
INDIRECT WIRE MARK DATA FOR BOOTS**

Class of the Mark	Wire Identification			
	Mark Procedure	Mark Equipment	Mark Material	
			Part Number	Supplier
1	Rubber Stamp	A Rubber Stamp	W.E. 42 White Paste	General Printing Ink

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**Table 18
INDIRECT WIRE MARK DATA FOR SLEEVES**

Class of the Mark	Wire Identification			
	Mark Procedure	Mark Equipment	Mark Material	
			Part Number	Supplier
1	Thermal Transfer	Intermec 4100	R430()	Brady
		Sumitomo Sumimark System, Model 1	ESM01SR()	Sumitomo
		Zebra 140XI Series	1330-3300-()	Critchley
			1330-5100-()	Critchley
			RJS Ribbon	Raychem
			1901 0000	Critchley
		Zebra 170XI Series	1330-3300-()	Critchley
			1330-5100-()	Critchley
			1901 0000	Critchley
		Raychem RJS System	TMS-RJS-Ribbon	Raychem
	Daisy Wheel	Raychem TMS System	RPN310347-000	Raychem
			RPN774017-000	Raychem
		Lexmark 3500	1356000	Brady
			2000 Series	Brady
		IBM Typewriter (Wheelprinter E1337765)	1337765	IBM
			1356000	IBM
		IBM Selectric II Typewriter	1136391	IBM
	Trojan Marking Machine	2000 Series	Brady	
	Dot Matrix	Critchley 395 Printers	1890BK05	Critchley
			2000 Series	Brady
		Epson Printers	7762L	Epson
			2000 Series	Brady
		Brady LS2000	2000 Series	Brady
		Brady SLV-DAT-PTR	R2080	Brady
	R5390		Brady	
	Hot Stamp	Ackerman-Gould Hot Stamp	-	-
		Kingsley Hot Stamp Machine	Refer to Table 16 for a foil	-

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**Table 19
INDIRECT WIRE MARK DATA FOR TAPES**

Class of the Mark	Wire Identification			
	Mark Procedure	Mark Equipment	Mark Material	
			Part Number	Supplier
2	Daisy Wheel	Trojan Marking Machine	2000 Series	Brady
		IBM Typewriter (Wheelprinter E1337765)	1337765	IBM
			1356000	IBM
	Thermal Transfer	Brady 300X Thermal Marker	4300 Series	Brady
		Zebra 140XI Series	1330-3300-()	Critchley
			1330-5100-()	Critchley
		Zebra 170XI Series	1330-3300-()	Critchley
			1330-5100-()	Critchley
	Dot Matrix	Facit Printers	55368504	Facit
		Epson FX-870	R2052	Brady
		Epson LQ870	2000 Series	Brady
		Printech Dot Matrix Printer	2000 Series	Brady
		Brady LS2000	2000 Series	Brady
		Brady SLV-DAT-PTR	R2080	Brady
			R5390	Brady

E. Repair of an Indirect Wire Identification Mark

This paragraph gives the procedure to repair an indirect mark that cannot be read easily. For all other conditions, the wire identification mark must be replaced; refer to Table 18.

- (1) Make a selection of a pen or an ink. Refer to Subject 20-00-11.
- (2) If it is necessary, find the specified wire identification.

Refer to:

- The Wire List in the Wiring Diagram Manual (WDM)
- The Equipment Hookup List in the WDM.

- (3) Make the necessary correction of the mark.

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F. Wire Identification with an Indirect Mark

**Table 20
CHARACTER HEIGHTS FOR DIFFERENT MATERIALS**

Material	Character Height (inch)	
	Minimum	Maximum
Boot	0.10	0.25
Sleeve	0.10	0.25
Tape	0.13	0.50

**Table 21
APPLICABLE CONDITIONS FOR AN OVERCOAT**

Material	Type of Mark	Applicable Condition
Boot	Rubber Stamp	An overcoat is necessary
Sleeve	All types that are not made by a thermal transfer or a rubber stamp	An overcoat is necessary
	Thermal Transfer	An overcoat is not necessary
Tape	All types that are not made by a thermal transfer or a rubber stamp	An overcoat is optional
	Thermal Transfer	An overcoat is not necessary

**Table 22
OVERCOAT MATERIALS**

Material	Part Number or Specification	Supplier
Aerosol spray	Acrylic	Krylon
Top Coat	Tartan Clear	Rudd Paint and Varnish Co.
Top Coat	EC-776-SR	3M

(1) Make a selection of one of these identification materials:

- A sleeve from Table 13
- A tape from Table 15.

Make sure that:

- The temperature grade and the class of the sleeve or the tape is equal to or higher than the temperature grade and the class of the wire harness
- If the material is a sleeve, the sleeve is a size that can be moved easily on the wire or wire harness.

NOTE: As an alternative, the selection can be a larger sleeve that can be held in position with wire harness ties.

(2) Make a selection of the equipment and the applicable material to make a mark.

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Refer to:

- Table 17 for the necessary equipment and material to make a mark on a boot
- Table 18 for the necessary equipment and material to make a mark on a sleeve
- Table 19 for the necessary equipment and material to make a mark on a tape.

Make sure that the class of the mark is equal to or higher than the class of the wire harness.

- (3) Make a mark on the material.

Refer to Table 20 for the necessary character height of the mark.

NOTE: For a small component, a 0.06 inch character height is satisfactory.

- (4) If the material is a tape:

- (a) For a wire harness or a cable, cut a minimum 6 inch length.
- (b) For one wire or one cable, cut a length that is equal to 1.5 or 2 times the wire circumference.

- (5) If an overcoat is necessary, apply an overcoat. Refer to Table 21.

- (a) Make a selection of an overcoat material from Table 22.
- (b) Apply a thin layer of overcoat on the wire mark.
- (c) Let the overcoat dry for a minimum of 10 minutes.
- (d) When the overcoat is not tacky, apply one more layer.

- (6) Put the wire identification on the wire, the cable, or the wire harness.

Make sure that a clamp, a shield, a tie, or a piece of equipment does not have to be removed to read the mark.

- (a) If the material is a sleeve, shrink the sleeve in position. Refer to Subject 20-10-14.

Make sure that the sleeve cannot be moved.

NOTE: As an alternative, the sleeve can be cut and held in position with wire harness ties.

CAUTION: DO NOT APPLY HEAT TO A SLEEVE NEAR A PRESSURE SEAL OR VAPOR SEAL. DAMAGE TO THE SEAL CAN OCCUR.

CAUTION: DO NOT USE A HEAT GUN OR A HOT AIR GUN TO INSTALL HEAT SHRINKABLE MATERIALS ON A FIBER OPTIC CABLE. DAMAGE TO THE CABLE ASSEMBLY CAN OCCUR AND CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE ASSEMBLY.

- (b) If the material is a heat shrinkable boot, shrink the boot in position. Refer to Subject 20-10-14.

CAUTION: DO NOT APPLY HEAT TO A BOOT NEAR A PRESSURE SEAL OR VAPOR SEAL. DAMAGE TO THE SEAL CAN OCCUR.

- (c) If the material is a tape, fold the tape around the wire, the cable, or the wire harness.
- (d) If the material is a wrap around identification tape, assemble a wire harness tie 0.25 inch from each end of the tape. Refer to Paragraph 4.C.

G. Identification of a BACC69A Fiber Optic Cable Assembly with an Indirect Mark

The indirect mark must be made with a tape. Refer to Paragraph 11.F.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****12. INSULATION OF THE FREE END OF A WIRE OR CABLE**

This paragraph gives the procedures to install insulation on these configurations of wire harness components:

- The free end of a wire
- The free end of a wire with an assembled contact or terminal
- The free end of a wire with an overall shield
- The free end of a shielded wire or a cable
- The free end of a coax cable
- The free end of a wire harness with an assembled connector.

A. Conditions for the Insulation of a Free End of a Wire or Cable

The temperature grade and the class of the insulation material must be applicable for the location on the airplane. Refer to Subject 20-00-11.

These types of insulation can be installed:

- A flexible sleeve
- A heat shrinkable sleeve
- A crimp type end cap
- A heat shrinkable end cap
- A dust cap with a polyethylene bag
- A polyethylene bag.

B. Insulation of the Free End of a Wire

- (1) Move each wire away from the wire harness.
- (2) Install the insulation.

For the installation of:

- A crimp type end cap, refer to Subject 20-30-16
- A flexible sleeve, refer to Paragraph 12.K.
- A heat shrinkable end cap, refer to Subject 20-30-16
- A heat shrinkable sleeve, refer to Paragraph 12.L.

C. Insulation of the Free End of a Wire with an Assembled Contact or Terminal

- (1) Move each wire away from the wire harness.
- (2) Install the insulation.

For the installation of:

- A flexible sleeve, refer to Paragraph 12.K.
- A heat shrinkable sleeve, refer to Paragraph 12.L.

D. Insulation of the Free End of a Shielded Wire or Cable

- (1) Move each wire or cable away from the wire harness.
- (2) Assemble a shield dead end 3.00 inches ± 0.25 inch from the end of the wire or the cable that is disconnected. Refer to Subject 20-10-15.
- (3) Install the insulation.

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For the installation of:

- An end cap, refer to Subject 20-30-16
- A flexible sleeve, refer to Paragraph 12.K.
- A heat shrinkable sleeve, refer to Paragraph 12.L.

E. Insulation of the Free End of a Coax Cable

- (1) Move each cable away from the wire harness.
- (2) If the coax cable has an assembled connector, install the insulation. Refer to Paragraph 12.F.
- (3) If the coax cable does not have an assembled connector, install the insulation.

For the installation of:

- A flexible sleeve, refer to Paragraph 12.K.
- A heat shrinkable sleeve, refer to Paragraph 12.L.
- A heat shrinkable end cap, refer to Subject 20-30-16.

F. Insulation of the Free End of a Wire Harness with an Assembled Connector

- (1) Identify the ESD sensitivity of the equipment that is attached to the other end of the wire harness. Refer to Subject 20-41-01.
- (2) If the equipment is ESD sensitive:
 - (a) Make a selection of a ESDS protective dust cap that has a tight fit on the connector. Refer to Subject 20-41-01.

NOTE: A satisfactory alternative for a dust cap is an ESDS protective bag. These conditions are applicable:

- The bag is the smallest size bag that can go on the connector
- A wire harness tie is assembled on the bag and the connector shell to hold the bag tightly.

- (b) Install the dust cap.

Refer to:

- A circular connector, refer to Paragraph 12.G.
- An ARINC 600 connector, refer to Paragraph 12.H.
- Other rectangular connectors, refer to Paragraph 12.I.

- (3) If the equipment is not ESD sensitive:

- (a) Make a selection of a dust cap that has a tight fit on the connector.

NOTE: A satisfactory alternative for a dust cap is a 0.012 inch thick polyethylene bag. These conditions are applicable:

- The bag is the smallest size bag that can go on the connector
- A wire harness tie is assembled on the bag and the connector shell to hold the bag tightly.

- (b) Install the dust cap.

Refer to:

- A circular connector, refer to Paragraph 12.G.
- An ARINC 600 connector, refer to Paragraph 12.H.
- Other rectangular connectors, refer to Paragraph 12.I.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****G. Insulation of the Free End of a Wire Harness with a Circular Connector**

- (1) Push the dust cap on the connector until it stops.

CAUTION: DO NOT PUSH THE PLASTIC DUST CAP AGAINST THE INNER SURFACE OF THE CONNECTOR COUPLING RING. DAMAGE TO THE GROUND SPRINGS THAT ARE IN THE COUPLING RING CAN OCCUR.

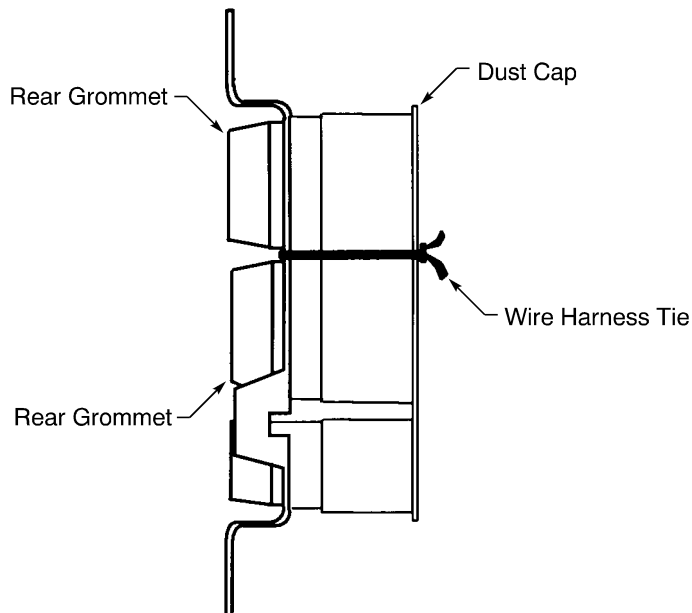
- (2) Make a selection of a 0.012 inch thick polyethylene bag.
Make sure that the bag is the smallest size that can go on the connector.
- (3) Put the bag on the connector and the wire harness.
- (4) Assemble a wire harness tie to hold the bag tightly in position. Refer to Paragraph 4.C.
Make sure that the tie is assembled on the bag and the connector shell.

H. Insulation of the Free End of a Wire Harness with an ARINC 600 Connector

- (1) Align the walls of the cap with the connector inserts.
- (2) With light, equal pressure on all sides of the dust cap, push the dust cap forward against the connector shell.

CAUTION: MORE THAN THE NECESSARY FORCE TO INSTALL THE DUST CAP MUST NOT BE APPLIED. IF THE CONNECTOR HAS GROUND SPRINGS, DAMAGE TO THE GROUND SPRINGS CAN OCCUR.

- (3) Assemble a wire harness tie tightly on the dust cap between the rear grommets of the inserts of the connector. Refer to Figure 30 and Paragraph 4.C.



INSTALLATION OF A DUST CAP ON AN ARINC 600 CONNECTOR
Figure 30

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Make sure that:

- The tie is between the rear grommets of the top and bottom inserts
- The tie is not on the rear grommets.

CAUTION: DO NOT USE A PLASTIC TIE STRAP TO ATTACH THE DUST CAP TO THE CONNECTOR. DAMAGE TO THE REAR GROMMET OF THE CONNECTOR CAN OCCUR.

- (4) Make a selection of a 0.012 inch thick polyethylene bag.
Make sure that the bag is the smallest size that can go on the connector.
- (5) Put the bag on the connector and the wire harness.
- (6) Assemble a wire harness tie to hold the bag tightly in position. Refer to Paragraph 4.C.
Make sure that the tie is assembled on the bag and the connector shell.

I. Insulation of the Free End of a Wire Harness a with a Rectangular Connector

For the installation of an ARINC 600 connector, refer to Paragraph 12.H.

- (1) Push the dust cap on the connector until it stops.
 - (a) For a plug connector, install the dust cap on the outer surface of the shell.
 - (b) For a receptacle connector, install the dust cap into the inner surface of the shell.
- (2) Make a selection of a 0.012 inch thick polyethylene bag.
Make sure that the bag is the smallest size that can go on the connector.
- (3) Put the bag on the connector and the wire harness.
- (4) Assemble a wire harness tie to hold the bag tightly in position. Refer to Paragraph 4.C.
Make sure that the tie is assembled on the bag and the connector shell.

J. Insulation of the Free End of a Splice Plug

**Table 23
SPLICE RECEPTACLE PART NUMBERS**

Splice Plug		Splice Receptacle	
Part Number	Supplier	Part Number	Supplier
48-7190-()	Amphenol	48-7191-()	Amphenol
AIS16P-()	AIE	AIS16R-()	AIE

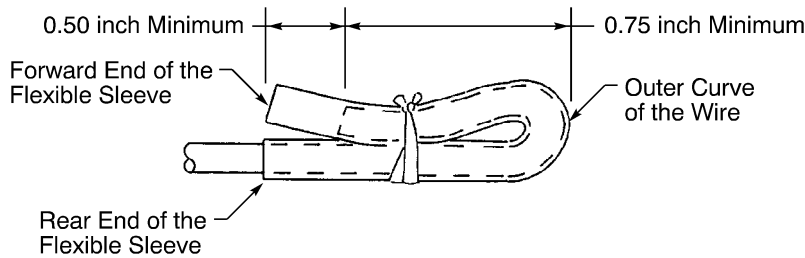
- (1) Make a selection of the applicable splice receptacle from Table 23.
- (2) Make a selection of a 0.012 inch thick polyethylene bag.
- (3) Engage the splice receptacle and the splice plug:
 - (a) Align the keys of the plug with the keyways of the receptacle.
 - (b) Push the plug forward into the receptacle until it is fully latched.
- (4) Put the bag on the splice assembly.
Make sure that the bag is the smallest size that can move over the splice plug.
- (5) Assemble a wire harness tie to hold the bag tightly in position. Refer to Paragraph 4.C.

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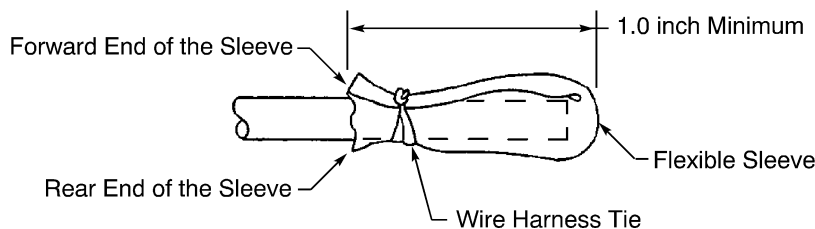
K. Installation of a Flexible Sleeve

- (1) Make a selection of a heat shrinkable sleeve or a sleeve that is flexible.
Refer to Subject 20-00-11.
- (2) Examine the end of the wire.
Make sure that the end of the wire is flat.
- (3) For an AWG 14 and smaller wire without an assembled terminal or contact, install the sleeve. Refer to Figure 31.



POSITION OF THE FLEXIBLE SLEEVE ON THE WIRE
Figure 31

- (a) Cut a 2.7 inch length of sleeve.
 - (b) Put the sleeve on the wire.
Make sure that the distance from the end of the wire to the forward end of the sleeve is a minimum of 0.50 inch.
 - (c) Fold the end of the wire back.
Make sure that the distance from the end of the wire to the outer curve of the wire is a minimum of 0.75 inch.
 - (d) Assemble a wire harness tie to hold the sleeve in position. Refer to Paragraph 4.C.
- (4) For an AWG 12 and larger wire without an assembled terminal or contact, install the sleeve. Refer to Figure 32.



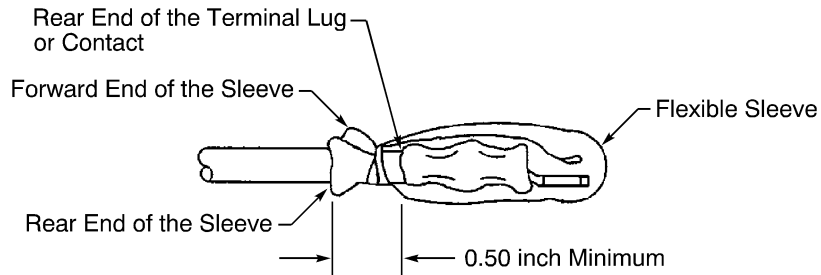
POSITION OF THE FLEXIBLE SLEEVE ON THE WIRE
Figure 32

- (a) Cut the necessary length of sleeve.
Make sure that the sleeve has the sufficient length to extend 1.0 inch from the end of the wire to the rear end of the sleeve after the sleeve is installed and folded in half.

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- (b) Put the sleeve on the wire.
Make sure that the distance from the end of the wire to the rear end of the sleeve is a minimum of 1.0 inch.
 - (c) Fold the sleeve and align the ends.
 - (d) Assemble a lacing tape wire harness tie to hold the sleeve in its position. Refer to Paragraph 4.C.
- (5) For a wire with an assembled terminal or contact, install the sleeve. Refer to Figure 33.

**POSITION OF THE FLEXIBLE SLEEVE ON THE ASSEMBLED TERMINAL****Figure 33**

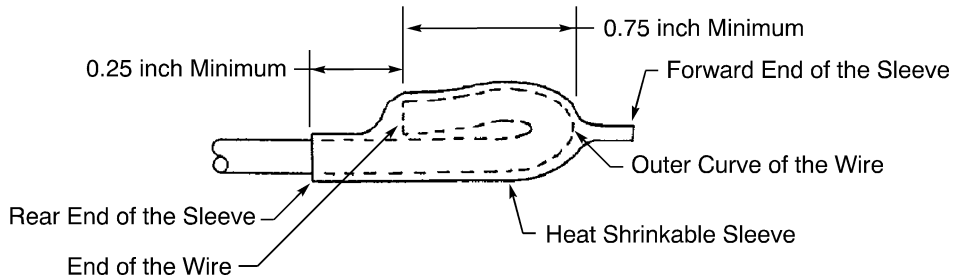
- (a) Cut the necessary length of sleeve.
Make sure that the sleeve has the sufficient length to extend 0.50 inch from the rear end of a terminal or contact after the sleeve is installed and folded in half.
- (b) Put the sleeve on the wire.
Make sure that the distance from the rear of terminal or contact to the rear end of the sleeve is a minimum of 0.50 inch.
- (c) Fold the sleeve and align the ends.
- (d) Assemble a lacing tape wire harness tie to hold the sleeve in its position. Refer to Paragraph 4.C.

L. Installation of a Heat Shrinkable Sleeve

- (1) Make a selection of a heat shrinkable sleeve.
Refer to Subject 20-00-11.
- (2) Examine the end of the wire.
Make sure that the end of the wire is flat.
- (3) For an AWG 14 and smaller wire without an assembled terminal or contact, install the sleeve. Refer to Figure 34.

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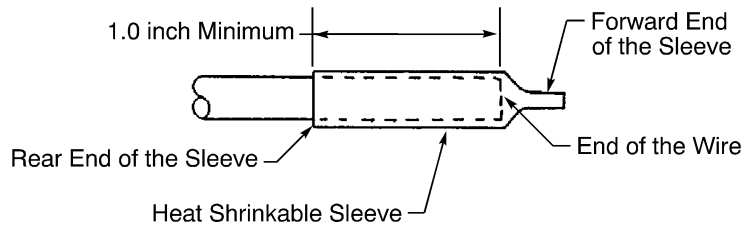
WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE WIRE

Figure 34

- (a) Cut the necessary length of sleeve.
Make sure that:
 - The sleeve has the sufficient length to extend a minimum of 1.0 inches from the end of the folded wire to the rear end of the sleeve
 - The sleeve has the sufficient length to make a seal on the forward end of the sleeve.
- (b) Fold the end of the wire back.
Make sure that the distance from the end of the wire to the outer curve of the wire is a minimum of 0.75 inch.
- (c) Put the sleeve on the wire.
Make sure that the distance from the end of the wire to the rear end of the sleeve is a minimum of 0.25 inch.
- (4) For AWG 12 and larger wire without an assembled terminal or contact, install the sleeve. Refer to Figure 35.

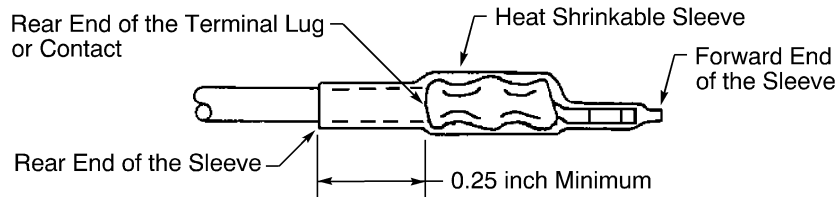


POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE WIRE

Figure 35

- (a) Cut the necessary length of sleeve.
Make sure that:
 - The sleeve has the sufficient length to make a seal on the forward end of the sleeve
 - The sleeve has the sufficient length to extend a minimum of 1.0 inch from the end of the wire to the rear end of the sleeve.
- (b) Put the sleeve on the wire.
Make sure that the distance from the end of the wire to the rear end of the sleeve is a minimum of 1.0 inch.
- (5) For all wires with an assembled terminal or contact, install the sleeve.

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STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION**

POSITION OF THE HEAT SHRINKABLE SLEEVE ON A TERMINAL
Figure 36

- (a) Cut the necessary length of sleeve.

Make sure that:

- The sleeve has the sufficient length to make a seal on the forward end of the sleeve
- The sleeve has the sufficient length to extend 0.25 inch from the rear end of a terminal or contact.

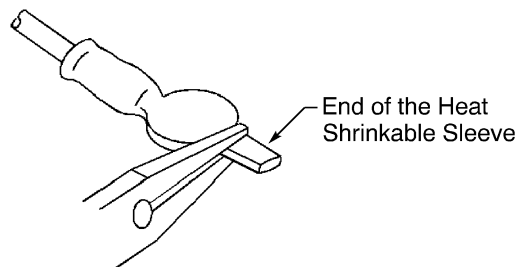
- (b) Put the sleeve on the wire.

Make sure that the distance from the rear end of the terminal or contact to the rear end of the sleeve is a minimum of 0.25 inch.

- (6) Shrink the sleeve into position. Refer to Subject 20-10-14.

- (7) Compress the forward end of the sleeve with flat jawed pliers or an equivalent tool while the sleeve is hot. Refer to Figure 36.

Make sure that the end of the sleeve is closed.



SEAL OF THE HEAT SHRINKABLE SLEEVE
Figure 37

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

13. STOW OF THE FREE END OF A WIRE OR CABLE

This paragraph gives the procedures for the stow of the free end of:

- A wire or a cable without a contact, a terminal lug, or a connector
- A wire or a cable in a wire harness that has an overall shield
- A wire or cable with an contact or a terminal lug
- A cable or a wire harness with a connector.

A. Selection of a Stow Configuration

CAUTION: THE STOW OF A WIRE OR CABLE IN A CONDUIT IS NOT PERMITTED. DAMAGE FROM ABRASION CAN OCCUR.

**Table 24
SELECTION OF A STOW CONFIGURATION**

Wiring		Stow		
Configuration	Applicable Conditions	Configuration Selection	Configuration	Procedure
A wire or a cable without a contact, a terminal, or a connector	The end of the wire or cable must have the necessary insulation; refer to Paragraph 12..	Recommended	Parallel configuration; end of the wire or cable attached to the wire harness	Paragraph 13.B.
	1. The end of the wire or cable must have the necessary insulation; refer to Paragraph 12.. 2. The wire or cable has too much length for a parallel stow.	Alternative	Wire coil configuration; end of the wire or cable attached to the wire harness	Paragraph 13.C.
	1. The end of the wire or cable must have the necessary insulation; refer to Paragraph 12.. 2. The wire or cable has too much length for a parallel stow. 3. The cable is not a coax cable.	Alternative	Folded wire configuration; end of the wire or cable attached to the wire harness	Paragraph 13.D.
AWG 16 or smaller wire with a contact or a terminal lug	The end of the wire must have the necessary insulation; refer to Paragraph 12..	Recommended	Parallel configuration; end of the wire attached to the wire harness	Paragraph 13.B.
	1. The end of the wire must have the necessary insulation; refer to Paragraph 12.. 2. The wire has too much length for a parallel stow.	Alternative	Wire coil configuration; end of the wire attached to the wire harness	Paragraph 13.C.
	1. The end of the wire must have the necessary insulation; refer to Paragraph 12.. 2. The wire has too much length for a parallel stow.	Alternative	Folded wire configuration; end of the wire attached to the wire harness	Paragraph 13.D.

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STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

Table 24 (continued)

Wiring		Stow		
Configuration	Applicable Conditions	Configuration Selection	Configuration	Procedure
AWG 14 or larger wire with a contact or a terminal lug	The end of the wire must have the necessary insulation; refer to Paragraph 12..	Recommended	Parallel configuration; end of the wire attached to a structure	Paragraph 13.I.
	1. The end of the wire must have the necessary insulation; refer to Paragraph 12.. 2. The wire has too much length for a parallel stow.	Alternative	Wire coil configuration; end of the wire attached to the structure	Paragraph 13.J.
	The end of the wire must have the necessary insulation; refer to Paragraph 12..	Alternative	Parallel configuration; end of the wire attached to the wire harness	Paragraph 13.E.
	1. The end of the wire must have the necessary insulation; refer to Paragraph 12.. 2. The wire has too much length for a parallel stow.	Alternative	Wire coil configuration; end of the wire attached to the wire harness	Paragraph 13.F.

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

Table 24 (continued)

Wiring		Stow		
Configuration	Applicable Conditions	Configuration Selection	Configuration	Procedure
A cable or a wire harness with a connector	The end of the cable or wire harness must have the necessary insulation; refer to Paragraph 12..	Recommended	Parallel configuration; the cable or wire harness attached to the structure	Paragraph 13.I.
	1. The end of the cable or wire harness must have the necessary insulation; refer to Paragraph 12.. 2. The cable or wire harness has too much length for a parallel stow.	Alternative	Wire coil configuration; end of the cable or wire harness attached to the structure	Paragraph 13.J.
	1. The end of the cable or wire harness must have the necessary insulation; refer to Paragraph 12.. 2. The cable or wire harness has too much length for a parallel stow. 3. The cable is not a coax cable. 4. The size of the largest wire is AWG 16 or smaller.	Alternative	Folded wire configuration; end of the cable or wire harness attached to the structure	Paragraph 13.K.
	The end of the cable or wire harness must have the necessary insulation; refer to Paragraph 12..	Alternative	Parallel configuration; end of the cable or wire harness attached to the wire harness	Paragraph 13.G.
	1. The end of the cable or wire harness must have the necessary insulation; refer to Paragraph 12.. 2. The cable or wire harness has too much length for a parallel stow.	Alternative	Wire coil configuration; end of the cable or wire harness attached to the wire harness	Paragraph 13.H.
AWG 16 or smaller wire or a cable in a wire harness that has an overall shield	1. The end of the wire or cable must have the necessary insulation; refer to Paragraph 12.. 2. The cable is not a coax cable. 3. The size of the largest wire is AWG 16 or smaller.	Recommended	Folded wire configuration; end of the wire or cable attached to the wire harness	Paragraph 13.D.
	The end of the wire or cable must have the necessary insulation; refer to Paragraph 12..	Alternative	Parallel configuration; end of the wire or cable attached to the wire harness	Paragraph 13.B.

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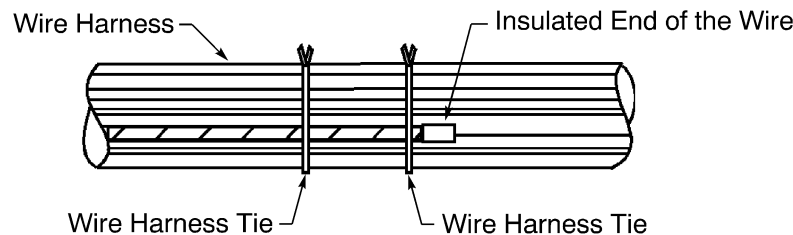
STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

Table 24 (continued)

Wiring		Stow		
Configuration	Applicable Conditions	Configuration Selection	Configuration	Procedure
AWG 14 or larger wire or a cable in a wire harness that has an overall shield	The end of the wire or cable must have the necessary insulation; refer to Paragraph 12..	Recommended	Parallel configuration; end of the wire or cable attached to the wire harness	Paragraph 13.E.

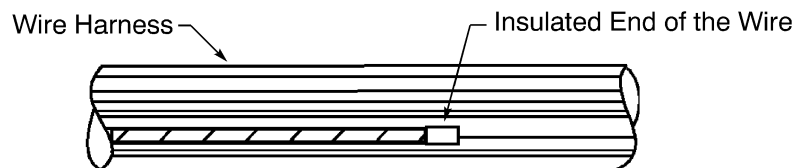
B. Wire or Cable in a Parallel Configuration with the End Attached to the Wire Harness



PARALLEL STOW CONFIGURATION
Figure 38

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) If the wire harness has an overall shield, push the shield away from the end of the wire.
- (2) Move the wire away from the wire harness.
- (3) If more than one wire makes an exit from the same area of the wire harness:
 - (a) Put the wires together.
 - (b) Assemble a wire harness tie on the wires near the wire harness.
- (4) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the wire.
Make sure that the sleeve extends from the point where the wire makes an exit from the wire harness to a maximum of 2 inches from the end of the wire.
- (5) Align the wire with the longitudinal axis of the wire harness. Refer to Figure 39.



ALIGNMENT OF THE WIRE AND THE WIRE HARNESS
Figure 39

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

- (6) Assemble the necessary wire harness ties at intervals along the wire harness and near the end of the wire. Refer to Figure 38.

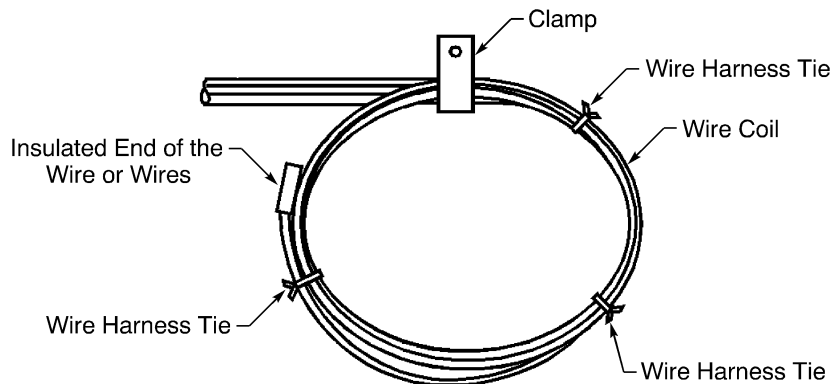
Make sure that:

- The intervals between wire harness ties on the wire are the same as the intervals of the ties on the wire harness
- Fluids cannot drain into the insulation on the end of the wire
- Contamination cannot go into the insulation on the end of the wire or cable
- The end of the wire or cable cannot be moved easily.

CAUTION: FLUID OR CONTAMINATION ON THE END OF A WIRE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

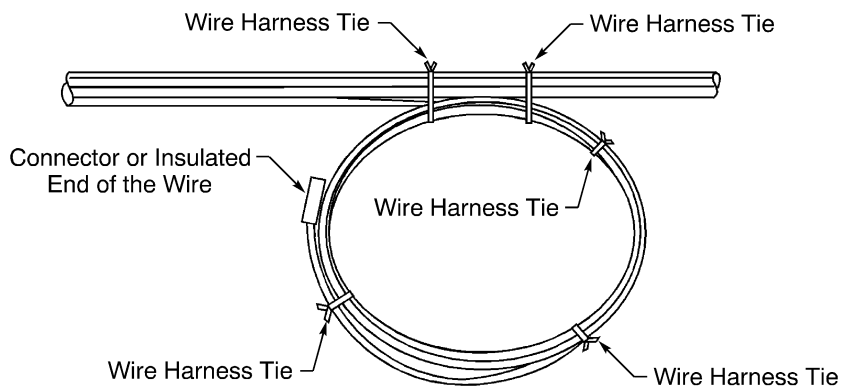
- (7) If the wire harness has an overall shield, push the overall shield back into the initial position.

C. Wire or Cable in a Wire Coil Configuration with the End Attached to the Wire Harness



WIRE COIL STOW CONFIGURATION

Figure 40



ALTERNATIVE WIRE COIL STOW CONFIGURATION

Figure 41

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION**

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) Move the wire away from the wire harness.
- (2) If more than one wire makes an exit from the same area of the wire harness:
 - (a) Put the wires together.
 - (b) Assemble a wire harness tie on the wires near the point where the wires make an exit from the wire harness.
- (3) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the wire.

Make sure that the sleeve extends from the point where the wire makes an exit from the wire harness to a maximum of 2 inches from the end of the wire.
- (4) Put the wire in the coil configuration. Refer to Figure 40 and Figure 41.

Make sure that the diameter of the coil is a minimum of six times larger than the diameter of the largest wire in the coil.
- (5) Assemble the necessary wire harness ties at intervals along the coil. Refer to Figure 40.

Make sure that the intervals between the wire harness ties on the coil are the same as the intervals of the ties on the wire harness.

NOTE: More wire harness ties can be assembled to hold the shape of the coil.

- (6) Attach the coil at the location of the nearest clamp on the wire harness. Refer to Figure 40.

NOTE: A satisfactory alternative is to put the coil against the wire harness and assemble the necessary wire harness ties. Refer to Figure 41.

- (7) Assemble the necessary wire harness ties near the end of the wire and the wire coil.

Make sure that:

- Fluids cannot drain into the insulation on the end of the wire or cable
- Contamination cannot go into the insulation on the end of the wire or cable
- The end of the wire or cable cannot be moved easily.

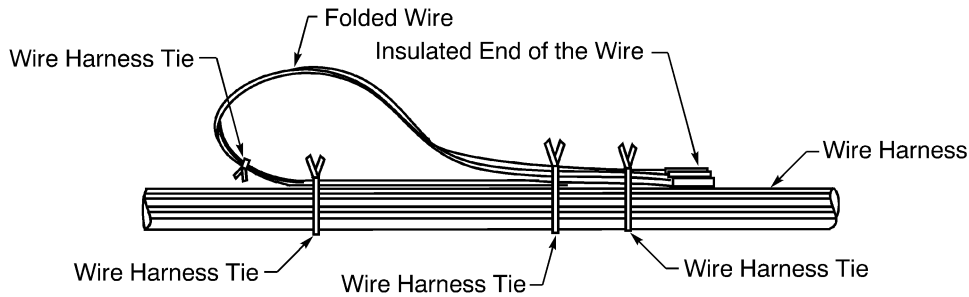
CAUTION: FLUID OR CONTAMINATION ON THE END OF A WIRE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

D. Wire or Cable in a Folded Wire Configuration with the End Attached to the Wire Harness

CAUTION: A COAX CABLE MUST NOT BE FOLDED BACK. DAMAGE TO THE COAX CABLE OCCURS.

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



FOLDED WIRE STOW CONFIGURATION

Figure 42

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

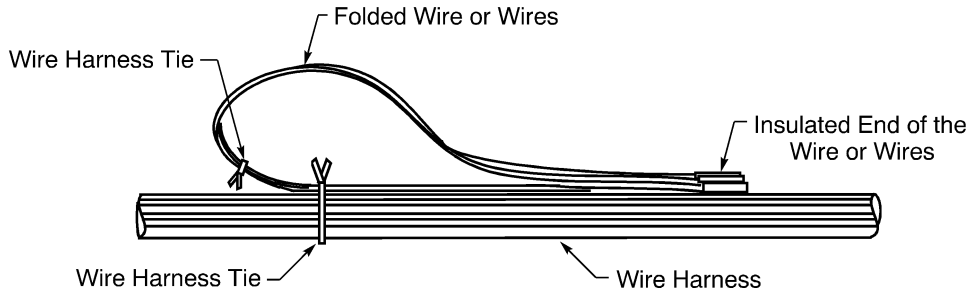
- (1) If the wire harness has an overall shield, push the shield away from the end of the wire.
- (2) Move the wire away from the wire harness.
- (3) If more than one wire makes an exit from the same area of the wire harness:
 - (a) Put the wires together.
 - (b) Assemble a wire harness tie on the wires a maximum of 5 inches from the point where the wires make an exit from the wire harness; refer to Figure 42.
- (4) Assemble a wire harness tie on the wire harness and the wire where the wire makes an exit from the wire harness. Refer to Figure 42.
- (5) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the wire.
 Make sure that the sleeve extends from the point where the wire makes an exit from the wire harness to a maximum of 2 inches from the end of the wire.
- (6) Fold the wire back against the wire harness. Refer to Figure 43 and Figure 44.

Make sure that:

- The diameter of the inner curve of the wire or wires is a minimum of six times larger than the diameter of the largest wire
- The outer curve of the wire is a minimum of 3.0 inches and a maximum of 6.0 inches from the rear of the cable clamp for a folded wire on a wire harness that has an overall shield.

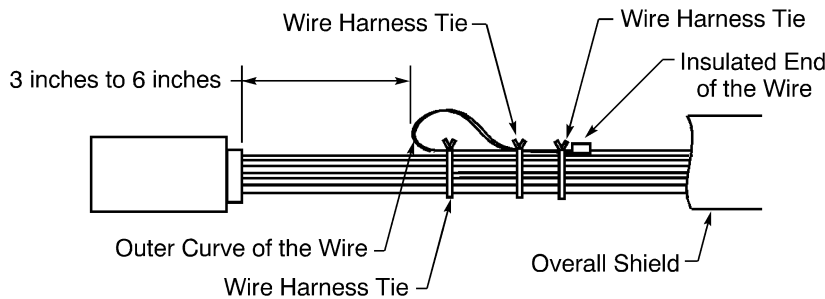
STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



POSITION OF THE FOLDED WIRE

Figure 43



POSITION OF THE FOLDED WIRE ON A WIRE HARNESS WITH AN OVERALL SHIELD

Figure 44

- (7) Assemble the necessary wire harness ties at intervals along the wire harness and near the end of the wire. Refer to Figure 42.

Make sure that:

- The intervals between wire harness ties on the wire are the same as the intervals of the ties on the wire harness
- Fluids cannot drain into the insulation on the end of the wire or cable
- Contamination cannot go into the insulation on the end of the wire or cable
- The end of the wire or cable cannot be moved easily.

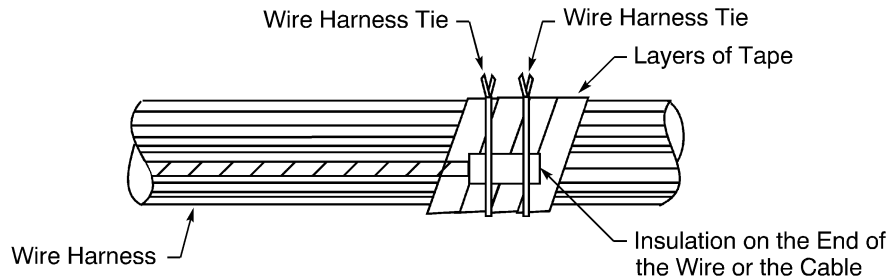
CAUTION: FLUID OR CONTAMINATION ON THE END OF A WIRE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the wire harness has an overall shield, push the overall shield back into the initial position.

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

E. AWG 14 and Larger Wire in a Parallel Configuration with the End Attached to the Wire Harness

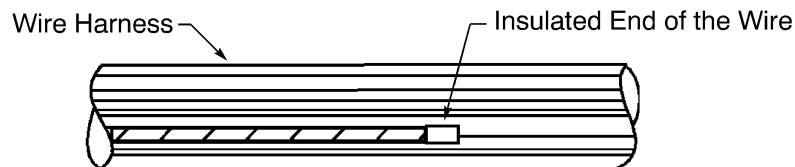


PARALLEL STOW CONFIGURATION

Figure 45

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) If the wire harness has an overall shield, push the overall shield away from the end of the wire.
- (2) Move the wire away from the wire harness.
- (3) If more than one wire makes an exit from the same area of the wire harness:
 - (a) Put the wires together.
 - (b) Assemble a wire harness tie on the wires near the point where the wires make an exit from the wire harness.
- (4) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the wire.
 Make sure that the sleeve extends from the point where the wire makes an exit from the wire harness to a maximum of 2 inches from the end of the wire.
- (5) Align the wire with the longitudinal axis of the wire harness. Refer to Figure 46.



ALIGNMENT OF THE WIRE AND THE WIRE HARNESS

Figure 46

- (6) Make a selection of a tape. Refer to Subject 20-00-11.
- (7) Put a layer of tape on the wire harness where the contact or terminal lug is against the wire harness. Refer to Figure 45.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION**

Make sure that the layer of tape:

- Makes a 50 percent overlap
- Extends approximately 0.5 inches farther than the forward end and the rear end of the contact or terminal lug.

(8) Assemble the necessary wire harness ties:

- At intervals along the wire harness
- On the contact or terminal lug.

Refer to Figure 45.

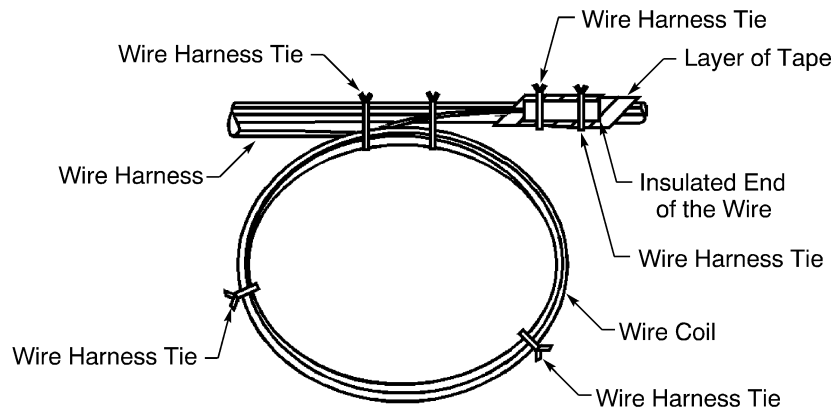
NOTE: A satisfactory alternative to the wire harness ties on the connector is one wire harness tie 2 to 3 inches from rear of the contact or terminal lug.

Make sure that:

- The intervals between wire harness ties on the wire are the same as the intervals of the ties on the wire harness
- Fluids cannot drain into the insulation on the end of the wire
- Contamination cannot go into the insulation on the end of the wire
- The end of the wire cannot be moved easily.

CAUTION: FLUID OR CONTAMINATION ON THE END OF A WIRE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

(9) If the wire harness has an overall shield, push the overall shield back into the initial position.

F. AWG 14 and Larger Wire in a Wire Coil Configuration with the End Attached to the Wire Harness

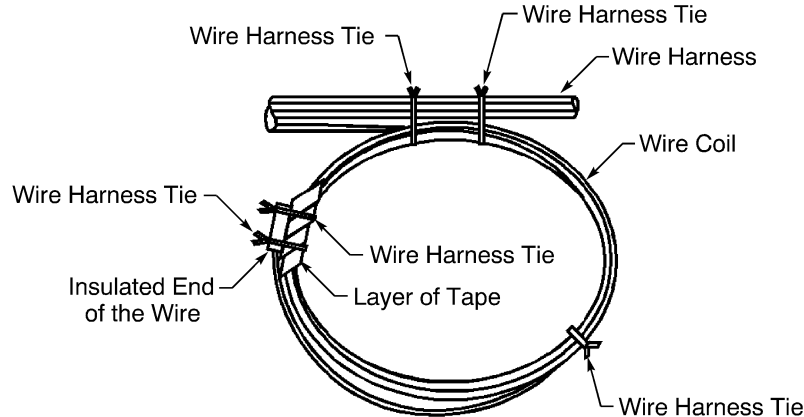
WIRE COIL STOW CONFIGURATION

Figure 47

20-10-11

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



ALTERNATIVE WIRE COIL STOW CONFIGURATION
Figure 48

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) Move the wire away from the wire harness.
- (2) If more than one wire makes an exit from the same area of the wire harness:
 - (a) Put the wires together.
 - (b) Assemble a wire harness tie on the wires near the point where the wires make an exit from the wire harness.
- (3) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the wire.
 Make sure that the sleeve extends from the point where the wire makes an exit from the wire harness to a maximum of 2 inches from the end of the wire.
- (4) Put the wire in a coil configuration. Refer to Figure 47 and Figure 48.
 Make sure that:
 - The diameter of the coil is a minimum of six times larger than the diameter of the largest wire or cable in the coil
 - The end of the wire is in the position where it can be attached to the wire harness.

NOTE: A satisfactory alternative is to put the end of the wire against the wire coil. Refer to Figure 48.
- (5) Assemble the necessary wire harness ties at intervals along the coil. Refer to Figure 47.
 Make sure that the intervals between the wire harness ties on the coil are the same as the intervals of the ties on the wire harness.

NOTE: More wire harness ties can be assembled to hold the shape of the coil.
- (6) Make a selection of a tape. Refer to Subject 20-00-11.
- (7) Put a layer of tape on the coil or the wire harness where the contact or terminal lug is against the coil or the wire harness. Refer to Figure 47 and Figure 48.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION**

Make sure that the layer of tape:

- Makes a 50 percent overlap
- Extends approximately 0.5 inches farther than the forward end and the rear end of the contact or terminal lug.

(8) Attach the coil at the location of the nearest clamp on the wire harness.

NOTE: A satisfactory alternative is to put the coil against the wire harness and assemble the necessary wire harness ties. Refer to Figure 47 and Figure 48.

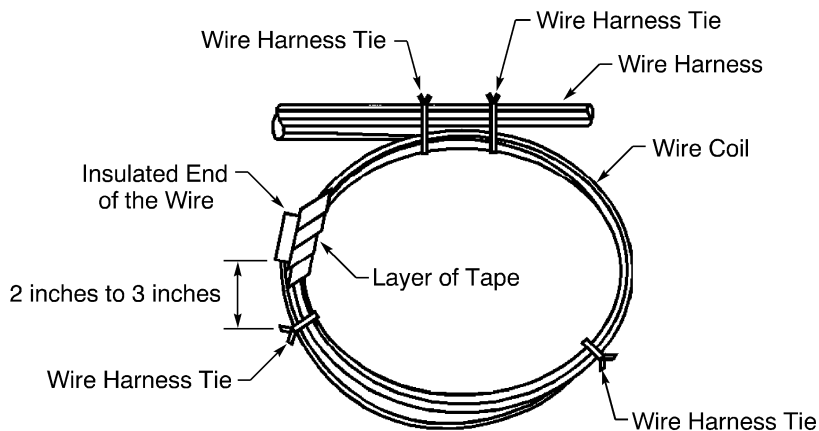
(9) Assemble two wire harness ties on the contact or the terminal lug. Refer to Figure 47 and Figure 48.

NOTE: A satisfactory alternative is to assemble a wire harness tie 2 to 3 inches from the rear of the contact or the terminal lug. Refer to Figure 49.

Make sure that:

- Fluids cannot drain into the insulation on the end of the wire
- Contamination cannot go into the insulation on the end of the wire
- The end of the wire cannot be moved easily.

CAUTION: FLUID OR CONTAMINATION ON THE END OF A WIRE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.



ALTERNATIVE POSITION OF THE WIRE HARNESS TIE

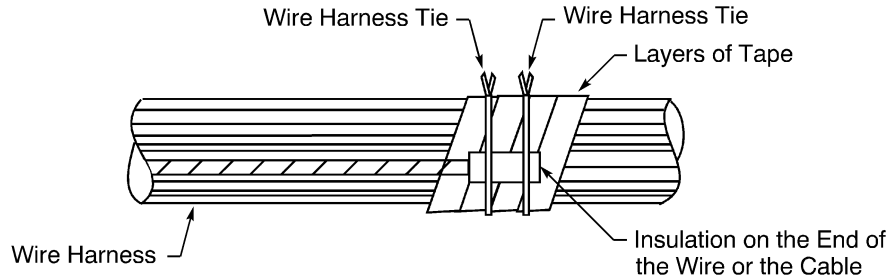
Figure 49

20-10-11

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

G. Cable or a Wire Harness with an Assembled Connector in a Parallel Configuration with the End Attached to the Wire Harness

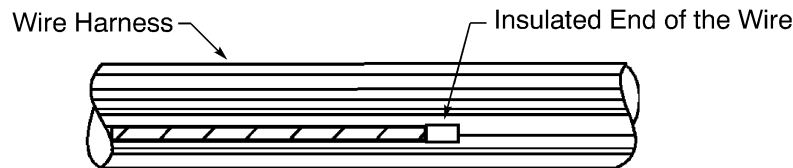


PARALLEL STOW CONFIGURATION

Figure 50

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) If the wire harness has an overall shield, push the overall shield away from the end of the wire.
- (2) Move the cable away from the wire harness.
- (3) If more than one cable makes an exit from the same area of the wire harness:
 - (a) Put the cables together.
 - (b) Assemble a wire harness tie on the wires near the point where the wires make an exit from the wire harness.
- (4) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the cable.
 Make sure that the sleeve extends from the point where the cable makes an exit from the wire harness to a maximum of 2 inches from the end of the cable.
- (5) Align the cable with the longitudinal axis of the wire harness. Refer to Figure 51.



ALIGNMENT OF THE WIRE AND THE WIRE HARNESS

Figure 51

- (6) Make a selection of a tape. Refer to Subject 20-00-11.
- (7) Put a layer of tape on the wire harness where the connector is against the wire harness. Refer to Figure 50.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION**

Make sure that the layer of tape:

- Makes a 50 percent overlap
- Extends approximately 0.5 inches farther than the forward end and the rear end of the connector.

(8) Assemble the necessary wire harness ties:

- At intervals along the wire harness
- On the connector.

Refer to Figure 50.

NOTE: A satisfactory alternative to the wire harness ties on the connector is one wire harness tie 2 to 3 inches from rear of the connector.

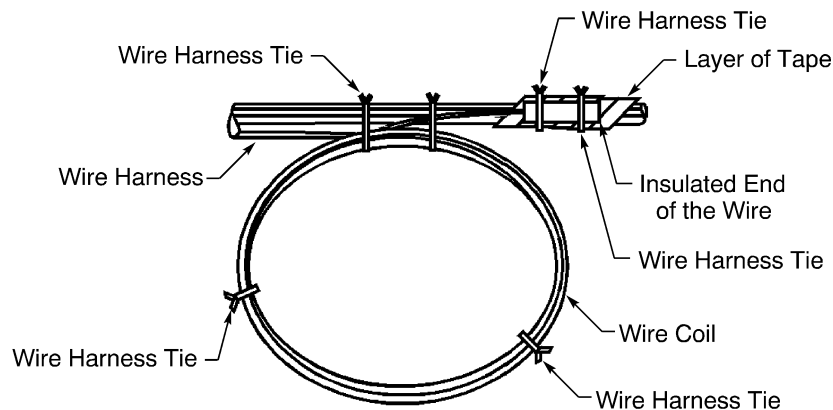
Make sure that:

- The intervals between wire harness ties on the cable are the same as the intervals of the ties on the wire harness
- Fluids cannot drain into the insulation on the connector
- Contamination cannot go into the insulation on the connector
- The connector cannot be moved easily.

CAUTION: FLUID OR CONTAMINATION IN THE CONNECTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

(9) If the wire harness has an overall shield, push the overall shield back into the initial position.

H. Cable or a Wire Harness with an Assembled Connector in a Wire Coil Configuration with the End Attached to the Wire Harness

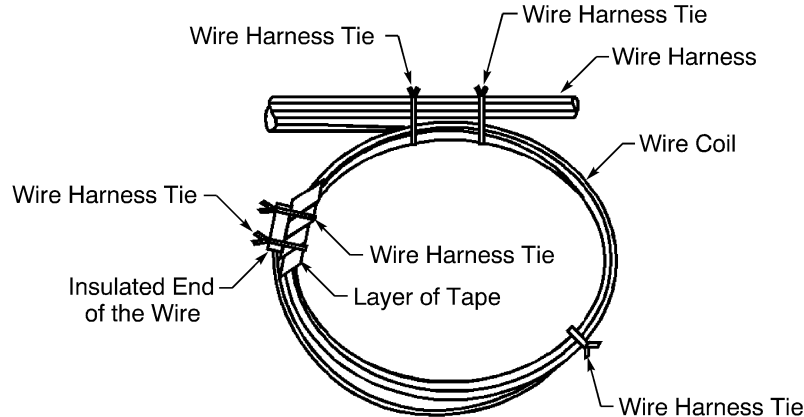


WIRE COIL STOW CONFIGURATION

Figure 52

STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



ALTERNATIVE WIRE COIL STOW CONFIGURATION

Figure 53

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) Move the cable away from the wire harness.
- (2) If more than one cable makes an exit from the same area of the wire harness:
 - (a) Put the cables together.
 - (b) Assemble a wire harness tie on the wires near the point where the wires make an exit from the wire harness.
- (3) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the cable.
 Make sure that the sleeve extends from the point where the cable makes an exit from the wire harness to a maximum of 2 inches from the end of the cable.
- (4) Put the cable in a coil configuration. Refer to Figure 52 and Figure 53.
 Make sure that:
 - The diameter of the coil is a minimum of six times larger than the diameter of the largest cable in the coil
 - The connector is in the position where it can be attached to the wire harness.

NOTE: A satisfactory alternative is to put the connector against the wire coil. Refer to Figure 53.
- (5) Assemble the necessary wire harness ties at intervals along the coil. Refer to Figure 52.
 Make sure that the intervals between the wire harness ties on the coil are the same as the intervals of the ties on the wire harness.

NOTE: More wire harness ties can be assembled to hold the shape of the coil.
- (6) Make a selection of a tape. Refer to Subject 20-00-11.
- (7) Put a layer of tape on the coil or the wire harness where the connector is against the coil or the wire harness. Refer to Figure 52 and Figure 53.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION**

Make sure that the layer of tape:

- Makes a 50 percent overlap
- Extends approximately 0.5 inches farther than the forward end and the rear end of the connector.

(8) Attach the coil at the location of the nearest clamp on the wire harness.

NOTE: A satisfactory alternative is to put the coil against the wire harness and assemble the necessary wire harness ties. Refer to Figure 52 and Figure 53.

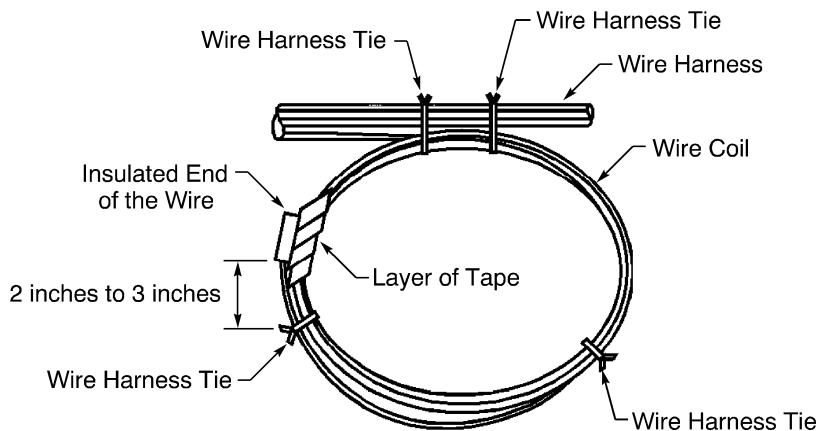
(9) Assemble two wire harness ties on the connector. Refer to Figure 52 and Figure 53.

NOTE: A satisfactory alternative is to assemble a wire harness tie 2 to 3 inches from the rear of the connector. Refer to Figure 54.

Make sure that:

- Fluids cannot drain into the insulation on the connector
- Contamination cannot go into the insulation on the connector
- The connector cannot be moved easily.

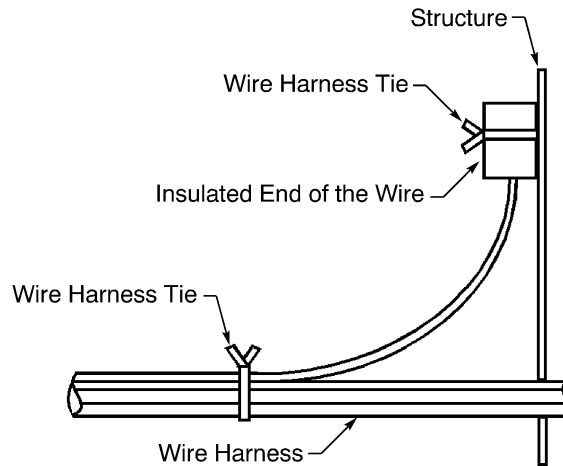
CAUTION: FLUID OR CONTAMINATION IN THE CONNECTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.



ALTERNATIVE POSITION OF THE WIRE HARNESS TIE

Figure 54

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STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION****I. Wire or Cable in a Parallel Configuration with the End Attached to the Structure**

PARALLEL STOW CONFIGURATION
Figure 55

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) Move the wire away from the wire harness.
- (2) If more than one wire makes an exit from the same area of the wire harness:
 - (a) Put the wires together.
 - (b) Assemble a wire harness tie on the wires near the point where the wires make an exit from the wire harness.
- (3) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the wire.

Make sure that the sleeve extends from the point where the wire makes an exit from the wire harness to a maximum of 2 inches from the end of the wire.
- (4) Put the end of the wire against the applicable structure. Refer to Figure 55.

Make sure that the end of the wire is pointed up.
- (5) Assemble a wire harness tie on the contact, the terminal lug, or the connector and the applicable structure. Refer to Figure 55.

NOTE: For a large contact, a large terminal lug, or a large connector, two wire harness ties are necessary.

Make sure that:

- Fluids cannot drain into the insulation on the end of the wire
- Contamination cannot go into the insulation on the end of the wire
- The end of the wire cannot be moved easily.

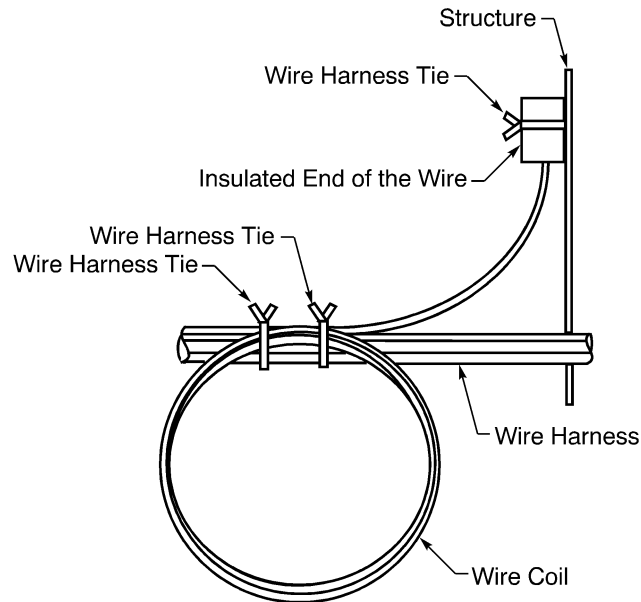
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STANDARD WIRING PRACTICES MANUAL

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

CAUTION: FLUID OR CONTAMINATION ON THE CONTACT, THE TERMINAL LUG, OR THE CONNECTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE PART.

J. Wire or Cable in a Wire Coil Configuration with the End Attached to the Structure



WIRE COIL STOW CONFIGURATION
Figure 56

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) Move the wire away from the wire harness.
- (2) If more than one wire makes an exit from the same area of the wire harness:
 - (a) Put the wires together.
 - (b) Assemble a wire harness tie on the wires near the point where the wires make an exit from the wire harness.
- (3) If the wire harness has a sleeve:
 - (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
 - (b) Put the necessary length of sleeve on the wire.
 Make sure that the sleeve extends from the point where the wire makes an exit from the wire harness to a maximum of 2 inches from the end of the wire.
- (4) Put the wire in a coil configuration. Refer to Figure 56.
 Make sure that:
 - The diameter of the coil is a minimum of six times larger than the diameter of the largest wire or cable in the coil
 - The wire coil is in a position where it can be attached with a clamp
 - The end of the wire has the sufficient length to be attached to the applicable structure.
- (5) Assemble the necessary wire harness ties at intervals along the coil.

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WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

Make sure that the diameter of the coil is a minimum of six times larger than the diameter of the largest wire or cable in the coil.

NOTE: More wire harness ties can be assembled to hold the shape of the coil.

- (6) Attach the coil at the location of the nearest clamp on the wire harness.

NOTE: A satisfactory alternative is to put the coil against the wire harness and assemble the necessary wire harness ties.

- (7) Put the end of the wire against the applicable structure. Refer to Figure 56.

Make sure that the end of the wire is pointed up.

- (8) Assemble a wire harness tie on the contact, the terminal lug, or the connector and the applicable structure. Refer to Figure 56.

NOTE: For a large contact, a large terminal lug, or a large connector, two wire harness ties are necessary.

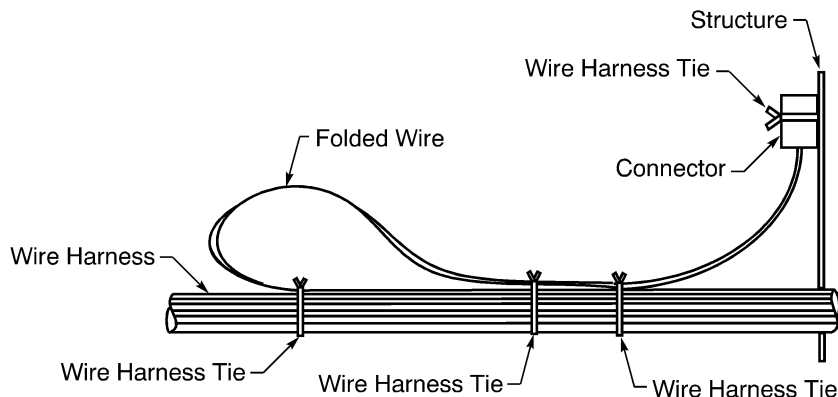
Make sure that:

- Fluids cannot drain into the insulation on the end of the wire
- Contamination cannot go into the insulation on the end of the wire
- The end of the wire cannot be moved easily.

CAUTION: FLUID OR CONTAMINATION ON THE CONTACT, THE TERMINAL LUG, OR THE CONNECTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE PART.

K. Cable or a Wire Harness in a Folded Wire Configuration with the End Attached to the Structure

CAUTION: A COAX CABLE MUST NOT BE FOLDED BACK. DAMAGE TO THE COAX CABLE OCCURS.



FOLDER WIRE STOW CONFIGURATION

Figure 57

Refer to Paragraph 4. for the procedure to assemble a wire harness tie.

- (1) Move the cable away from the wire harness.
- (2) If more than one cable makes an exit from the same area of the wire harness:
 - (a) Put the cables together.

STANDARD WIRING PRACTICES MANUAL**WIRING ASSEMBLY AND INSTALLATION CONFIGURATION**

- (b) Assemble a wire harness tie on the cables a maximum of 5 inches from the point where the cables make an exit from the wire harness.
- (3) Assemble a wire harness tie on the wire harness and the cable where the cable makes an exit from the wire harness. Refer to Figure 57.
- (4) If the wire harness has a sleeve:
- (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
- (b) Put the necessary length of sleeve on the cable.
- Make sure that the sleeve extends from the point where the cable makes an exit from the wire harness to a maximum of 2 inches from the end of the cable.
- (5) Fold the cable back against the wire harness. Refer to Figure 57.
- Make sure that the diameter of the inner curve of the cable or cables is a minimum of six times larger than the diameter of the largest cable.
- (6) Put the end of the cable against the applicable structure. Refer to Figure 57.
- Make sure that the end of the cable is pointed up.
- (7) Assemble a wire harness tie on the connector and the applicable structure. Refer to Figure 57.

NOTE: For a large connector, two wire harness ties are necessary.

Make sure that:

- Fluids cannot drain into the insulation on the connector
- Contamination cannot go into the insulation on the connector
- The connector cannot be moved easily.

CAUTION: FLUID OR CONTAMINATION IN THE CONNECTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

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STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS****1. GENERAL DATA****A. Necessary Conditions for Selection of a Clamp**

For the necessary conditions for clamp replacement, refer to Paragraph 2.A.

These conditions are applicable for all wire and cable:

- The clamp must be the correct type of clamp
- The maximum diameter of a wire harness that can be supported with a nylon loop clamp is 1.25 inches
- Only a metal loop clamp with a cushion is permitted for a wire harness with a diameter greater than 1.25 inches
- The clamp must have the correct size; refer to Paragraph 1.B. for the necessary conditions for selection of a clamp size

For coax cable in the unpressurized area, only a BACC10GE clamp is permitted.

B. Necessary Conditions for Selection of a Clamp Size

For the identification of the correct size of a clamp, refer to Paragraph 1.D.

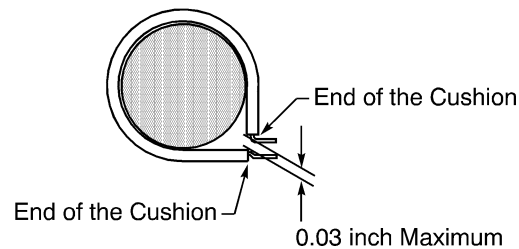
These conditions are applicable for all wire and cable:

- The clamp must hold the wire harness tightly
- If the clamp crushes or pinches the wires, a larger clamp must be installed
- A clamp must not let the wire harness move laterally in the clamp; refer to Figure 2
- A block clamp must not let the wire harness move or turn in the clamp
- If the smallest possible size of clamp lets the harness move laterally in the clamp, the diameter of the harness must be increased with a filler material
- For a loop clamp with a cushion, if the distance between the ends of the cushion is more than 0.03 inch, a larger clamp must be installed; refer to Figure 1.

For a wire harness in a loop clamp, these conditions are applicable:

- The wire harness is permitted to move in the longitudinal direction
- The wire harness is permitted to turn clockwise and counterclockwise.

Refer to Figure 2.

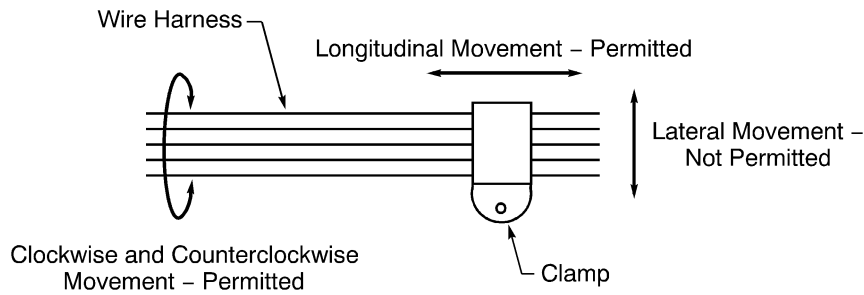


CORRECT FIT OF A LOOP CLAMP WITH A CUSHION

Figure 1

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS



PERMITTED MOVEMENT OF A WIRE HARNESS IN A CLAMP

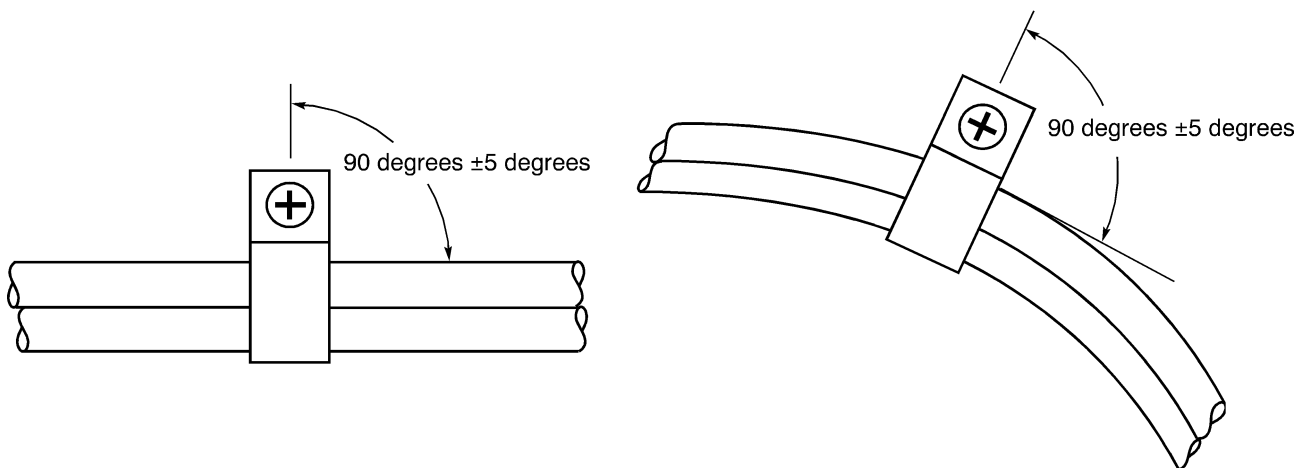
Figure 2

C. General Conditions for Clamp Installation

For the conditions that are applicable for wire harness installation, refer to Subject 20-10-11.

These conditions are applicable for all wire and cable:

- The clamp must be the correct size; refer to Paragraph 1.B. for the conditions for the selection of a clamp size
- The clamp must be perpendicular to the wire harness; refer to Figure 3
- A clamp must not be installed on a wire harness where the wires go across each other
- A clamp must not be installed on a repair of a wire or a cable
- A clamp must not be installed on a lacing tape or a plastic tie strap wire harness tie
- A clamp must not be installed on a shield ground wire assembly
- If a spacer is used for a standoff to install a nylon clamp, only an NAS42() spacer is permitted.



POSITION OF THE CLAMP IN RELATION TO THE WIRE HARNESS

Figure 3

These are more conditions that are applicable for coax cable:

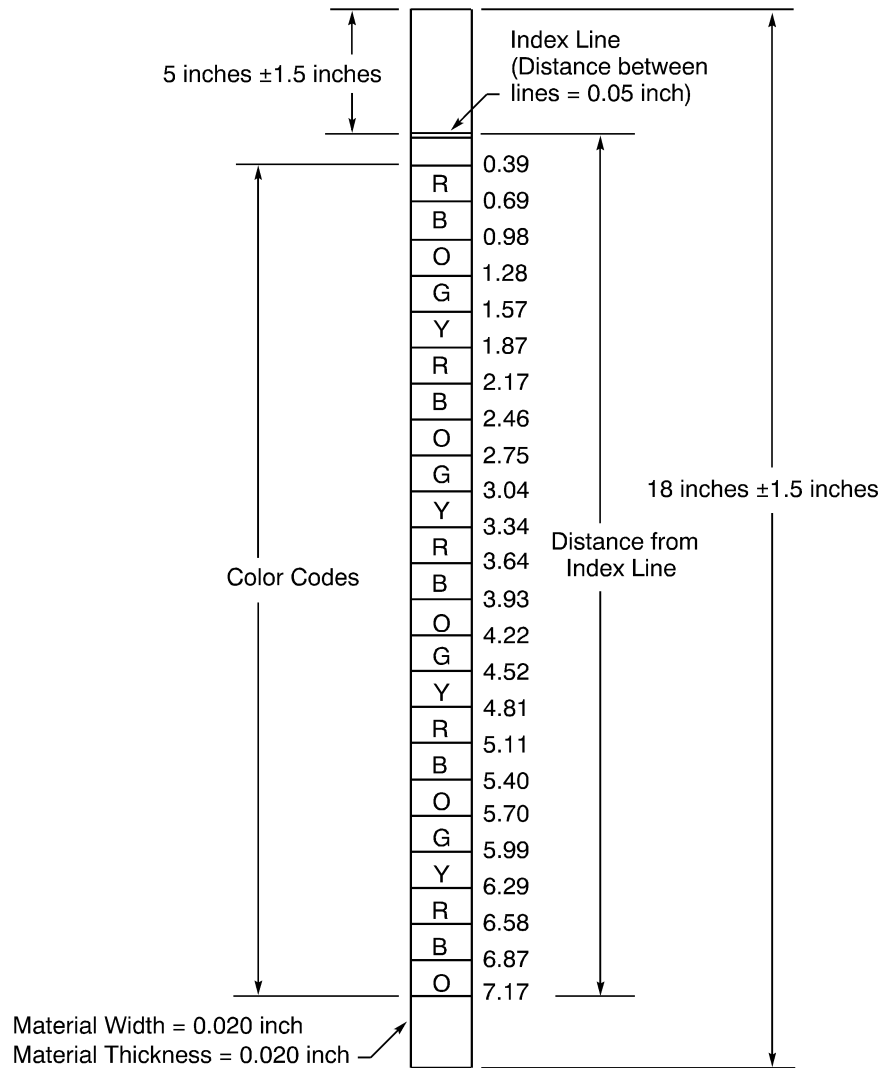
- A clamp must not be installed on the bend of a coax cable if radius of the bend is less than 6 inches
- When two coax cables are installed in a 287T0011 clamp, a BACC10DK clamp, or BACC10GE clamp, the diameter of the wire harness must be increased with one or more BMS1-52 or 69B47961-() filler rods

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D. Identification of the Correct Size of a Loop Clamp or a Block Clamp



DIMENSIONS OF THE ST2323B TOOL

Figure 4

**Table 1
COLOR CODES OF THE ST2323B TOOL**

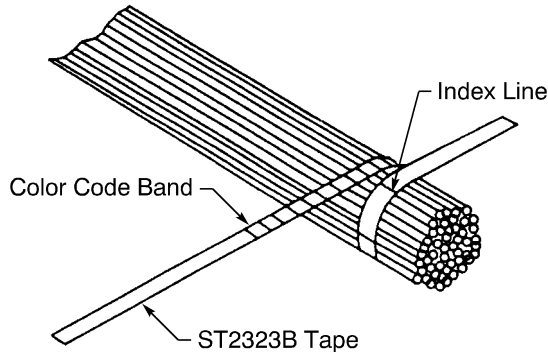
Code	Color
R	Red
B	Blue
O	Orange
G	Green
Y	Yellow

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STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS**

NOTE: If an ST2323B tool is not available, make an equivalent tool. Refer to Figure 4 and Table 1.

- (1) Wind the ST2323B tool around the wire harness at the location of the installation of the clamp.
- (2) Pull the tool tight around the wire harness and align the index line with one of the color code bands. Refer to Figure 5.



POSITION OF THE ST2323B TOOL ON THE WIRE HARNESS
Figure 5

- (3) Read the approximate diameter of the wire harness and the color from the tool. Refer to Figure 4 and Table 1.

NOTE: If the index is aligned between two of the color bands, read the smaller size and the color.

- (4) If the clamp is identified with a color, use the color for selection.
- (5) If the clamp is not identified with a color, use the diameter for selection.

E. Damage Conditions for BACS31H Ring Posts and BACS31J Support Assemblies

The ring post or the support assembly must be replaced if one of these conditions occur:

- A sharp edge is against a wire harness
- The integral screw of a ring post has a crack or is broken.

2. WIRE HARNESS SUPPORT REPLACEMENT**A. Necessary Conditions for Clamp Replacement**

These conditions are applicable when a clamp must be replaced:

- The clamp must be replaced with a clamp that has the same part number unless an alternative wire harness support is specified
- The clamp must be replaced with a clamp that has the same part number unless the specified clamp is too small to make a correct fit
- If the specified clamp is too small to make a correct fit, a clamp that is the same type and is one size larger can be installed.

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B. Necessary Conditions for Replacement of a Wire Harness Support with a BACS31H Ring Post

A wire harness support can be replaced with a BACS31H ring post if these conditions are applicable:

- The ring post is a specified alternative; refer to Paragraph 3.L.
- The location of the support is a pressurized area
- The wire harness is Temperature Grade A or Temperature Grade B
- The wire harness has a maximum diameter of 1.25 inches.

A wire harness support must not be replaced with a BACS31H ring post if the support:

- Is in a fuel tank
- Is in a high vibration area
- Holds a power feeder wire.

These conditions must occur after the wire harness is installed on the ring post:

- The wire harness separation is satisfactory; refer to Subject 20-10-19
- The clearance between the wire harness and a structure, equipment and other items is satisfactory; refer to Subject 20-10-11.

C. Necessary Conditions for Replacement of a Wire Harness Support with a BACS31J Support Assembly

A wire harness support can be replaced with a BACS31J support assembly if these conditions are applicable:

- The support assembly is a specified alternative; refer to Paragraph 3.M.
- The location of the support is a pressurized area
- The wire harness is Temperature Grade A or Temperature Grade B
- The wire harness has a maximum diameter of 1.25 inches
- The support assembly is installed on a BAC1510-407 channel bracket.

A wire harness support must not be replaced with a BACS31J support assembly if the support:

- Is in a fuel tank
- Is in a high vibration area
- Holds a power feeder wire.

These conditions must occur after the wire harness is installed on the support assembly:

- The wire harness separation is satisfactory; refer to Subject 20-10-19
- The clearance between the wire harness and a structure, equipment and other items is satisfactory; refer to Subject 20-10-11.

3. PART NUMBERS AND DESCRIPTION

A. Wire Harness Support Part Numbers

**Table 2
WIRE HARNESS SUPPORT PART NUMBERS**

Part Number	Description	Supplier	Reference
287T0011-()	Loop Clamp, Nylon	Boeing	Table 4
69B90483-()	Block Clamp	Boeing	Table 5
BACC10BU()	Loop Clamp	Boeing	Table 7
BACC10DK()	Loop Clamp, Nylon	Boeing	Table 7

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STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 2 (continued)

Part Number	Description	Supplier	Reference
BACC10DR()	Wire Harness Channel	Boeing	Table 8
BACC10DS()	Raceway Clamp	Boeing	Table 9
BACC10GE()	Loop Clamp	Boeing	Table 12
BACC10GU()	Loop Clamp	Boeing	Table 13
BACC10HS()	Loop Clamp	Boeing	Table 14
BACC10JU()	Loop Clamp	Boeing	Table 15
BACC10KL()	Loop Clamp, Three Wire	Boeing	Table 22
BACS31H()	Ring Post, Nylon	Boeing	Table 16
BACS31J()	Support Assembly, Nylon	Boeing	Table 19
BACS38J()	Stringer Clip	Boeing	Table 23
TA025041-()	Loop Clamp, Sawtooth	TA Manufacturing	Table 24
TA025097()	Loop Clamp	TA Manufacturing	Table 25

Table 3

APPROVED SUPPLIERS FOR BOEING STANDARD WIRE HARNESS SUPPORTS

Boeing Standard	Supplier
BACC10BU	J&M Products
	TA Manufacturing
	Transdigm, Adel Fasteners Division
	Umpco
BACC10DK	Nylon Molding Corporation
	Peco Manufacturing
BACC10DR	Nylon Molding Corporation
BACC10DS	Nylon Molding Corporation
	Umpco
BACC10GE	J&M Products
	Umpco
	TA Manufacturing
	Transdigm, Adel Fasteners Division
BACC10GU	J&M Products
	Transdigm, Adel Fasteners Division
	Umpco

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Table 3 (continued)

Boeing Standard	Supplier
BACC10HS	J&M Products
	Umpco
	TA Manufacturing
	Transdigm, Adel Fasteners Division
BACC10JU	Dexter-Wilson
	J&M Products
	Umpco
	Transdigm, Adel Fasteners Division
BACC10KL	J&M Products
	Umpco
	TA Manufacturing
	Transdigm, Adel Fasteners Division
BACS31H	Nylon Molding Corporation
BACS31J	Nylon Molding Corporation

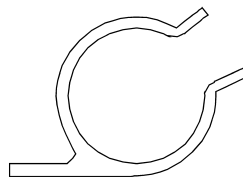
B. 287T0011 Loop Clamps

The 287T0011 clamp:

- Is a general purpose loop clamp made of nylon
- Is held closed with a wire harness tie
- Must not be installed in a fuel cell
- Is a satisfactory alternative for the BACC10DK clamp.

The 287T0011 loop clamp is installed in the pressurized area of the airplane to hold:

- A wire harness that is less than 1.25 inches in diameter
- A wire harness that is installed in an area where the temperature is 275 degrees F or less.



287T0011 LOOP CLAMP
Figure 6

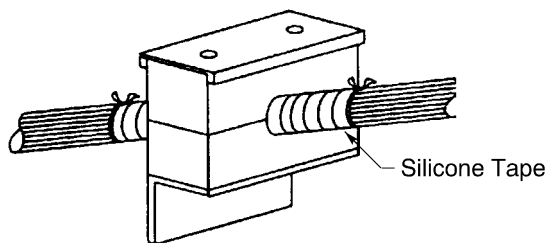
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WIRE HARNESS SUPPORTS

Table 4
287T0011 LOOP CLAMP PART NUMBERS

Wire Harness Diameter (inch)		Boeing Standard
Minimum	Maximum	
0.250	0.375	287T0011-1
0.375	0.500	287T0011-2
0.500	0.688	287T0011-3
0.688	0.938	287T0011-4
0.875	1.250	287T0011-5
1.375	1.625	287T0011-6

C. 69B90483 Block Clamps



69B90483 BLOCK CLAMP
Figure 7

Table 5
69B90483-() BLOCK CLAMP PART NUMBERS

Inner Diameter (inch)	Boeing Standard
0.750	69B90483-1
0.876	69B90483-2
0.876	69B90483-3
0.968	69B90483-8
1.000	69B90483-4
1.125	69B90483-5
1.250	69B90483-6
1.300	69B90483-7

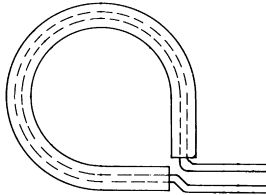
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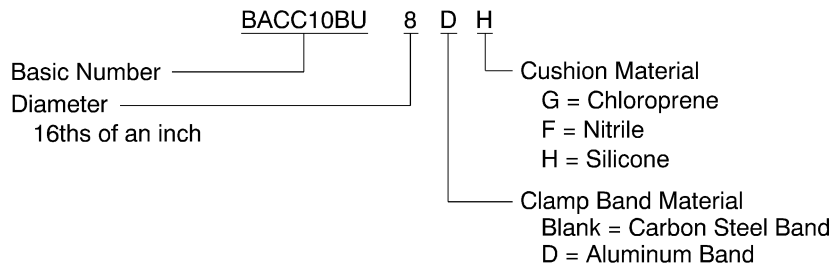
D. BACC10BU Loop Clamps

The BACC10BU clamp a general purpose loop clamp.

NOTE: The BACC10GE clamp is a satisfactory alternative for the BACC10BU clamp.



BACC10BU LOOP CLAMP
Figure 8



BACC10BU LOOP CLAMP PART NUMBER STRUCTURE
Figure 9

Table 6
BACC10BU LOOP CLAMP PART NUMBERS

Inner Diameter (inch)	Boeing Standard
0.125	BACC10BU2
0.188	BACC10BU3
0.250	BACC10BU4
0.313	BACC10BU5
0.375	BACC10BU6
0.438	BACC10BU7
0.500	BACC10BU8
0.563	BACC10BU9
0.625	BACC10BU10
0.688	BACC10BU11
0.750	BACC10BU12
0.813	BACC10BU13



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Table 6 (continued)

Inner Diameter (inch)	Boeing Standard
0.875	BACC10BU14
0.938	BACC10BU15
1.000	BACC10BU16
1.063	BACC10BU17
1.125	BACC10BU18
1.188	BACC10BU19
1.250	BACC10BU20
1.313	BACC10BU21
1.375	BACC10BU22
1.438	BACC10BU23
1.500	BACC10BU24
1.563	BACC10BU25
1.625	BACC10BU26
1.688	BACC10BU27
1.750	BACC10BU28
1.813	BACC10BU29
1.875	BACC10BU30
1.938	BACC10BU31
2.000	BACC10BU32
2.062	BACC10BU33
2.125	BACC10BU34
2.188	BACC10BU35
2.250	BACC10BU36
2.312	BACC10BU37
2.375	BACC10BU38
2.500	BACC10BU40
2.625	BACC10BU42
2.688	BACC10BU43
2.812	BACC10BU45
2.875	BACC10BU46
3.000	BACC10BU48

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STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

E. BACC10DK Loop Clamps

The BACC10DK clamp:

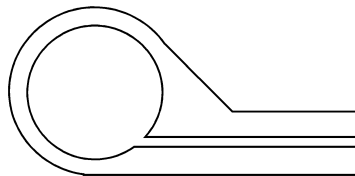
- Is a general purpose loop clamp made of nylon
- Can be installed in a fuel cell.

The BACC10DK loop clamp is installed in the pressurized area of the airplane to hold:

- A wire harness that is less than 1.25 inches in diameter
- A wire harness that is in an area where the temperature is 275 degrees F or less.

NOTE: These clamps are satisfactory alternatives for the BACC10DK clamp:

- The BACC10GE clamp
- The 287T0011 clamp.



BACC10DK LOOP CLAMP
Figure 10

Table 7
BACC10DK LOOP CLAMP PART NUMBERS

Inner Diameter (inch)	Boeing Standard	Color
0.125	BACC10DK2	Brown
0.187	BACC10DK3	Orange
0.250	BACC10DK4	Pink
0.312	BACC10DK5	Natural
0.375	BACC10DK6	Gray
0.437	BACC10DK7	Blue
0.500	BACC10DK8A	Yellow
0.562	BACC10DK9A	Brown
0.625	BACC10DK10	Orange
0.687	BACC10DK11	Pink
0.750	BACC10DK12	Natural
0.812	BACC10DK13	Gray
0.875	BACC10DK14	Blue
0.973	BACC10DK15	Yellow
1.000	BACC10DK16	Brown
1.062	BACC10DK17	Orange

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STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

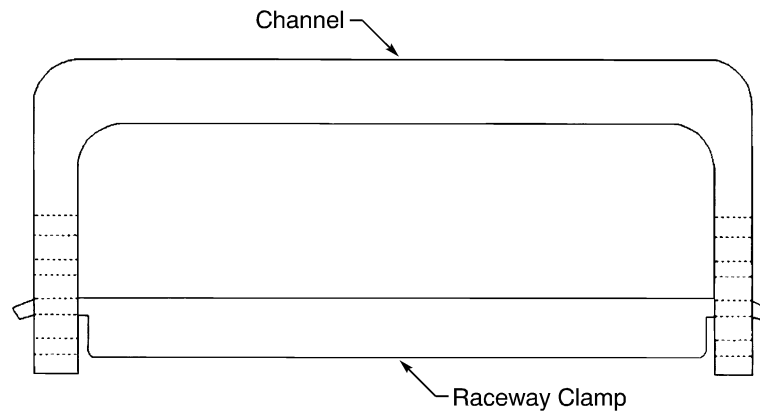
Table 7 (continued)

Inner Diameter (inch)	Boeing Standard	Color
1.125	BACC10DK18	Pink
1.187	BACC10DK19	Natural
1.250	BACC10DK20	Gray
1.500	BACC10DK24	Blue

F. BACCC10DR Wire Harness Channel and BACC10DS Raceway Clamp

The BACC10DS raceway clamp and the BACC10DR wire harness channel are:

- The two parts that make a wire harness support
- Installed in the pressurized area of the airplane.



BACC10DR WIRE HARNESS CHANNEL AND BACC10DS RACEWAY CLAMP
Figure 11

Table 8
BACC10DR WIRE HARNESS CHANNEL PART NUMBERS

Height (inch)	Number of Slots	Boeing Standard	Color
1.20	1	BACC10DR2S	Natural
		BACC10DR6	Natural
		BACC10DR10	Black
1.50	2	BACC10DR3S	Natural
		BACC10DR7	Natural
		BACC10DR11	Black

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 8 (continued)

Height (inch)	Number of Slots	Boeing Standard	Color
1.80	3	BACC10DR4S	Natural
		BACC10DR8	Natural
		BACC10DR12	Black
2.10	4	BACC10DR5S	Natural
		BACC10DR9	Natural
		BACC10DR13	Black

Table 9

BACC10DS RACEWAY CLAMP PART NUMBERS

Boeing Standard	Special Instructions
BACC10DS3	Use with BACC10DR6 through BACC10DR13

Table 10

OBSOLETE RACEWAY CLAMP PART NUMBERS

Obsolete Raceway Clamp	Replacement Raceway Clamp
BACC10DS4	BACC10DS3

G. BACC10GE Loop Clamps

The BACC10GE clamp:

- Is a general purpose loop clamp
- Must not be installed in a fuel cell
- Is a satisfactory alternative for the BACC10BU clamp
- Is a satisfactory alternative for the BACC10DK clamp.

The BACC10GE loop clamp is installed in the pressurized area of the airplane to hold:

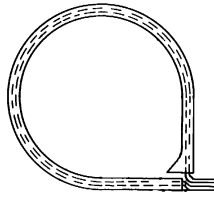
- A wire harness that is less than 1.25 inches in diameter
- A wire harness in an area where the temperature is 275 degrees F or less
- A power feeder wire harness where a BACC10KL clamp cannot be installed
- A wire harness that goes across a hinge point
- A wire harness that has a routing on an electronic shelf
- A wire harness that is installed in a panel of electrical equipment
- A flexible conduit.

The BACC10GE loop clamp is installed in these areas to hold a coax cable:

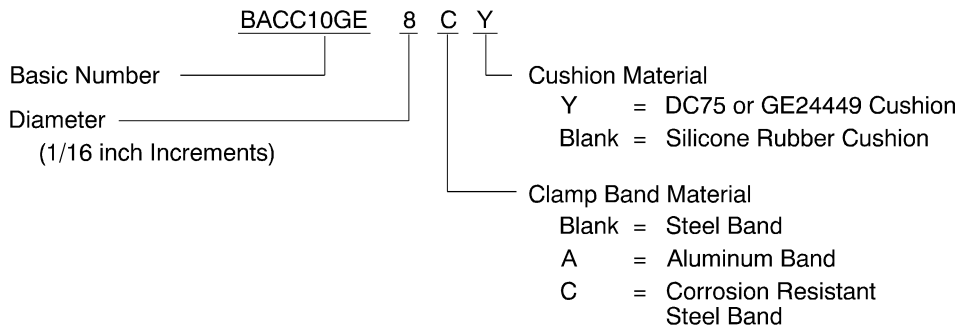
- The unpressurized area
- A high vibration area.

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS



BACC10GE LOOP CLAMP
Figure 12



BACC10GE LOOP CLAMP PART NUMBER STRUCTURE
Figure 13

Table 11
BACC10GE LOOP CLAMP PART NUMBERS

Inner Diameter (inch)	Boeing Standard
0.188	BACC10GE3
0.250	BACC10GE4
0.313	BACC10GE5
0.375	BACC10GE6
0.438	BACC10GE7
0.500	BACC10GE8
0.563	BACC10GE9
0.625	BACC10GE10
0.688	BACC10GE11
0.750	BACC10GE12
0.812	BACC10GE13
0.875	BACC10GE14
0.938	BACC10GE15
1.000	BACC10GE16
1.063	BACC10GE17

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STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 11 (continued)

Inner Diameter (inch)	Boeing Standard
1.125	BACC10GE18
1.188	BACC10GE19
1.250	BACC10GE20
1.313	BACC10GE21
1.375	BACC10GE22
1.438	BACC10GE23
1.500	BACC10GE24

H. BACC10GU Loop Clamps

The BACC10GU clamp is:

- A general purpose loop clamp
- Installed in the unpressurized area of the airplane.

NOTE: The BACC10JU clamp is a satisfactory alternative for the BACC10GU clamp.



BACC10GU LOOP CLAMP

Figure 14

**Table 12
BACC10GU LOOP CLAMP PART NUMBERS**

Wire Harness Diameter (inch)		Boeing Standard	Color
Minimum	Maximum		
0.125	0.218	BACC10GU101	Red
0.219	0.312	BACC10GU102	Blue
0.313	0.406	BACC10GU103	Orange
0.407	0.500	BACC10GU104	Green
0.501	0.593	BACC10GU105	Yellow
0.594	0.688	BACC10GU106	Red
0.689	0.781	BACC10GU107	Blue
0.782	0.875	BACC10GU108	Orange

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STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

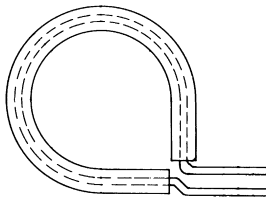
Table 12 (continued)

Wire Harness Diameter (inch)		Boeing Standard	Color
Minimum	Maximum		
0.876	0.968	BACC10GU109	Green
0.969	1.062	BACC10GU110	Yellow
1.063	1.156	BACC10GU111	Red
1.157	1.250	BACC10GU112	Blue
1.251	1.343	BACC10GU113	Orange
1.344	1.437	BACC10GU114	Green
1.438	1.531	BACC10GU115	Yellow
1.532	1.625	BACC10GU116	Red
1.626	1.718	BACC10GU117	Blue
1.719	1.812	BACC10GU118	Orange
1.813	1.906	BACC10GU119	Green
1.907	2.000	BACC10GU120	Yellow
2.001	2.093	BACC10GU121	Red
2.094	2.187	BACC10GU122	Blue
2.188	2.281	BACC10GU123	Orange
2.282	2.375	BACC10GU124	Green
2.376	2.468	BACC10GU125	Yellow

I. BACC10HS Loop Clamps

The BACC10HS loop clamp is installed in the airplane to hold:

- A wire harness that is in a high vibration area
- A wire harness that is in a high temperature area
- A wire harness that is on the engine or the landing gear.



BACC10HS LOOP CLAMP
Figure 15



707, 727-787

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 13
BACC10HS LOOP CLAMP PART NUMBERS

Inner Diameter (inch)	Boeing Standard
0.188	BACC10HS03
0.250	BACC10HS04
0.312	BACC10HS05
0.375	BACC10HS06
0.438	BACC10HS07
0.500	BACC10HS08
0.562	BACC10HS09
0.625	BACC10HS10
0.687	BACC10HS11
0.750	BACC10HS12
0.812	BACC10HS13
0.875	BACC10HS14
0.938	BACC10HS15
1.000	BACC10HS16
1.062	BACC10HS17
1.125	BACC10HS18
1.188	BACC10HS19
1.250	BACC10HS20
1.312	BACC10HS21
1.375	BACC10HS22
1.438	BACC10HS23
1.500	BACC10HS24
1.562	BACC10HS25
1.625	BACC10HS26
1.687	BACC10HS27
1.750	BACC10HS28
1.812	BACC10HS29
1.875	BACC10HS30
1.938	BACC10HS31
2.000	BACC10HS32
2.375	BACC10HS38

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WIRE HARNESS SUPPORTS

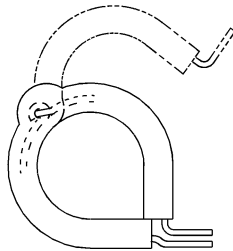
Table 13 (continued)

Inner Diameter (inch)	Boeing Standard
2.500	BACC10HS40
2.875	BACC10HS46
3.000	BACC10HS48

J. BACC10JU Loop Clamps

The BACC10JU loop clamp:

- Has a hinge
- Can be installed in the unpressurized area of the airplane.
- Is a satisfactory alternative for the BACC10GU clamp.



BACC10JU LOOP CLAMP
Figure 16

Table 14
BACC10JU LOOP CLAMP PART NUMBERS

Wire Harness Diameter (inch)		Boeing Standard	Color
Minimum	Maximum		
0.313	0.406	BACC10JU103	Orange
0.407	0.500	BACC10JU104	Green
0.501	0.593	BACC10JU105	Yellow
0.594	0.688	BACC10JU106	Red
0.689	0.781	BACC10JU107	Blue
0.782	0.875	BACC10JU108	Orange
0.876	0.968	BACC10JU109	Green
0.969	1.062	BACC10JU110	Yellow
1.063	1.156	BACC10JU111	Red
1.157	1.250	BACC10JU112	Blue
1.251	1.343	BACC10JU113	Orange

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STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 14 (continued)

Wire Harness Diameter (inch)		Boeing Standard	Color
Minimum	Maximum		
1.344	1.437	BACC10JU114	Green
1.438	1.531	BACC10JU115	Yellow

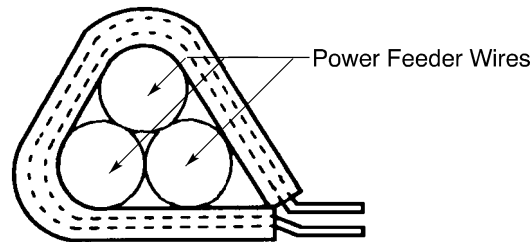
K. BACC10KL Three Wire Clamps

The BACC10KL loop clamp is installed as a support for:

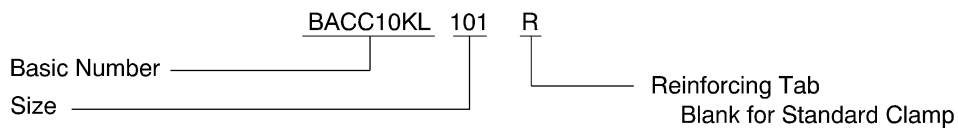
- A power feeder wire harness with three wires
- A power feeder wire harness that has a straight routing through the clamp.

The BACC10KL loop clamp with a support tab is installed:

- In a high vibration area
- On the leading edge of the wing.



BACC10KL THREE WIRE CLAMP
Figure 17



BACC10KL CLAMP PART NUMBER STRUCTURE
Figure 18

Table 15
BACC10KL THREE WIRE CLAMP PART NUMBERS

Wire Size (AWG)	Boeing Standard
4	BACC10KL101
2	BACC10KL102
1	BACC10KL103
1/0	BACC10KL104

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 15 (continued)

Wire Size (AWG)	Boeing Standard
2/0	BACC10KL105
3/0	BACC10KL106
4/0	BACC10KL107

L. BACS31H Ring Posts

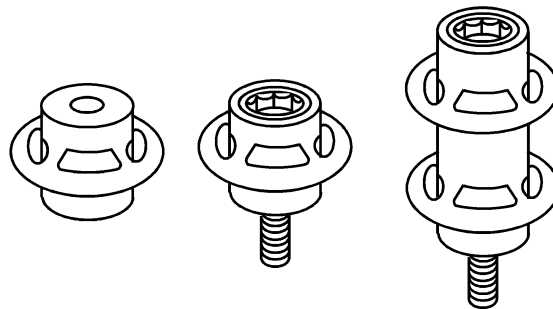
The BACS31H ring post:

- Is made of nylon
- Uses a BACS38W3 plastic tie strap to hold the wire harness
- Can hold a wire harness that is 1.25 inches or less in diameter
- Can be installed with other ring posts that are the same type.

The BACS31H ring post can replace:

- A spacer that is the same length
- A BACC10DK clamp
- A BACC10GE clamp
- A BACC10GU clamp
- A 287T0011 clamp.

Refer to Paragraph 2.B. for the necessary conditions to replace a clamp.



BACS31H1A

BACS31H1B

BACS31H2B

BACS31H RING POST

Figure 19

**Table 16
BACS31H RING POST PART NUMBERS**

Boeing Standard	Ring Post Configuration		
	Fastener Type	Length (inch)	Number of Rings
BACS31H1A	Through hole	0.75	1
BACS31H1B	Integral Screw	0.75	1

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 16 (continued)

Boeing Standard	Ring Post Configuration		
	Fastener Type	Length (inch)	Number of Rings
BACS31H2B	Integral Screw	1.50	2

**Table 17
PLASTIC TIE STRAP PART NUMBERS**

Boeing Standard	Supplier
BACS38W3	Boeing

**Table 18
COMPONENT PART NUMBERS**

Component	Boeing Standard or Specification	Supplier
Nut	BACN10YR3CD	Boeing
Screw	BACS12GU3K()	Boeing
Spacer	NAS42DD6()	A Qualified Source
Washer	NAS1149D0332J	A Qualified Source

M. BACS31J Support Assemblies

The BACS31J support assembly:

- Is a made of nylon
- Uses a BACS38W3 plastic tie strap to hold the wire harness
- Is installed on a channel bracket made to the BAC1510-407 specification.

The BACS31J support assembly has these components:

- A support
- A clip.

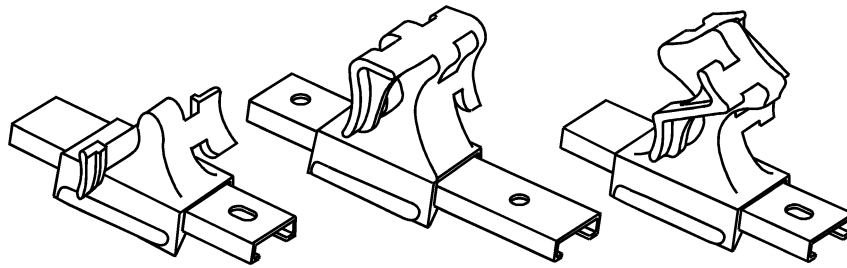
The BACS31J support assembly can replace:

- A spacer that is the same length
- A BACC10DK clamp
- A BACC10GE clamp
- A BACC10GU clamp
- A 287T0011 clamp.

Refer to Paragraph 2.C. for the necessary conditions to replace a clamp.

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

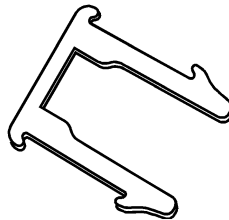


BACS31J2

BACS31J3

BACS31J4

BACS31J SUPPORT
Figure 20



BACS31J5 CLIP
Figure 21

Table 19
BACS31J SUPPORT PART NUMBERS

Boeing Standard	Support Configuration	
	Wire Harness Maximum Diameter (inch)	Maximum Number of Wire Harnesses
BACS31J2	1.25	2
BACS31J3	1.25	3
BACS31J4	1	4

Table 20
BACS31J CLIP PART NUMBERS

Boeing Standard	Supplier
BACS31J5	Boeing

Table 21
PLASTIC TIE STRAP PART NUMBERS

Boeing Standard	Supplier
BACS38W3	Boeing

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

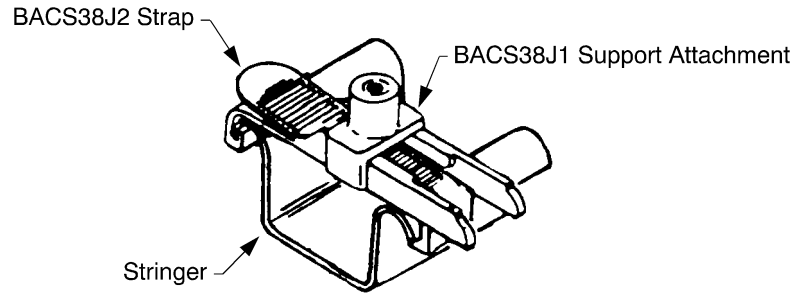
N. BACS38J Stringer Clips

A BACS38J stringer clip assembly is made from these two parts:

- A support attachment
- A strap.

Refer to Figure 22 and Table 23.

The stringer clip is installed to hold a wire harness or an insulation blanket on an airframe stringer.



BACS38J4 STRINGER CLIP ASSEMBLY
Figure 22

Table 22
BACS38J STRINGER CLIP PART NUMBERS

Boeing Standard	Description
BACS38J4	Stringer Clip, Single Insert
BACS38J5	Stringer Clip, Dual Insert
BACS38J7	Stringer Clip, Long Single Insert

Table 23
BACS38J STRINGER CLIP ASSEMBLY COMPONENTS

Boeing Standard	Description
BACS38J1	Single Insert Support Attachment
BACS38J2	Strap
BACS38J3	Dual Insert Support Attachment
BACS38J6	Long Single Insert Support Attachment

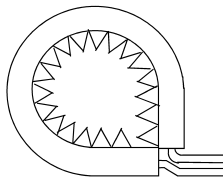
O. TA025041 Sawtooth Loop Clamps

The TA025041 loop clamp is installed:

- In a high vibration area
- In a high temperature area
- On the engine.

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS



TA025041 LOOP CLAMP
Figure 23

Table 24
TA025041-() LOOP CLAMP PART NUMBERS

Inner Diameter (inch)	Part Number
0.063	TA025041-01
0.125	TA025041-02
0.188	TA025041-03
0.250	TA025041-04
0.313	TA025041-05
0.375	TA025041-06
0.438	TA025041-07
0.500	TA025041-08
0.562	TA025041-09
0.625	TA025041-10
0.688	TA025041-11
0.750	TA025041-12
0.813	TA025041-13
0.875	TA025041-14
0.938	TA025041-15
1.000	TA025041-16
1.062	TA025041-17
1.125	TA025041-18
1.188	TA025041-19
1.250	TA025041-20
1.313	TA025041-21
1.375	TA025041-22
1.438	TA025041-23
1.500	TA025041-24
1.562	TA025041-25

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 24 (continued)

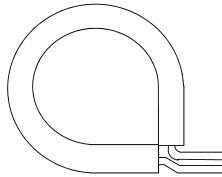
Inner Diameter (inch)	Part Number
1.625	TA025041-26
1.688	TA025041-27
1.750	TA025041-28
1.813	TA025041-29
1.875	TA025041-30
1.938	TA025041-31
2.000	TA025041-32

P. TA025097 Loop Clamps

The TA025097 loop clamp is installed to hold:

- A power feeder wire harness that does not have a straight routing through the clamp
- A power feeder wire harness that has more than or less than three power feeder wires.

A replacement clamp must have the same part number as the clamp of the initial installation.



TA025097 LOOP CLAMP
Figure 24

Table 25
TA025097 LOOP CLAMP PART NUMBERS

Inner Diameter (inch)	Part Number
0.938	TA025097-15
0.375	TA025097L06
0.438	TA025097L07
0.500	TA025097L08
0.562	TA025097L09
0.625	TA025097L10
0.688	TA025097L11
0.750	TA025097L12
0.812	TA025097L13

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STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

Table 25 (continued)

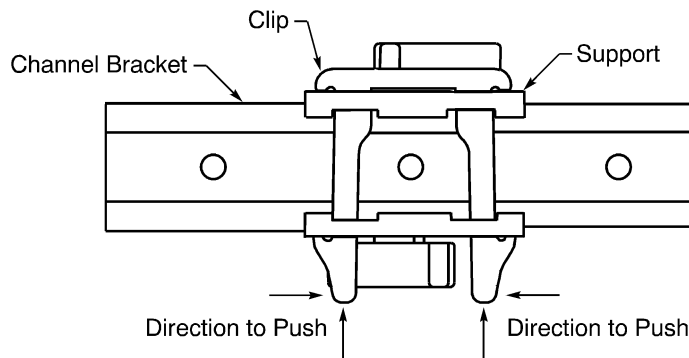
Inner Diameter (inch)	Part Number
0.875	TA025097L14
0.938	TA025097L15
1.000	TA025097L16
1.062	TA025097L17
1.125	TA025097L18
1.188	TA025097L19
1.250	TA025097L20
1.312	TA025097L21
1.375	TA025097L22
1.438	TA025097L23
1.500	TA025097L24

4. REMOVAL OF WIRE HARNESS SUPPORTS

A. Removal of a BACS31J Support Assembly

- (1) At the same time, push the ends of the clip together and push the clip back through the slots in the side of the support. Refer to Figure 25 and Figure 26.

NOTE: It is not necessary to fully remove the clip from the support assembly.

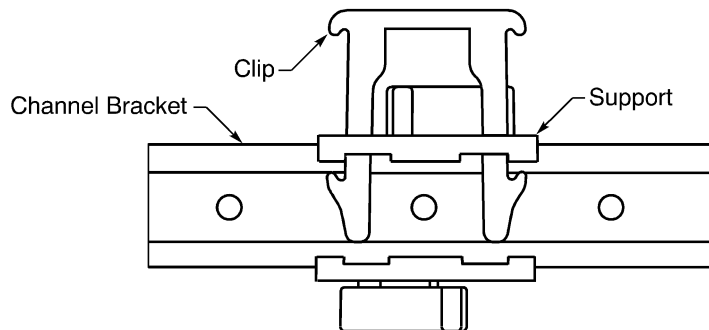


INITIAL POSITION OF THE CLIP

Figure 25

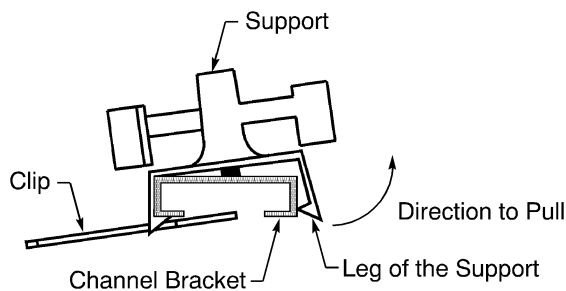
STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS



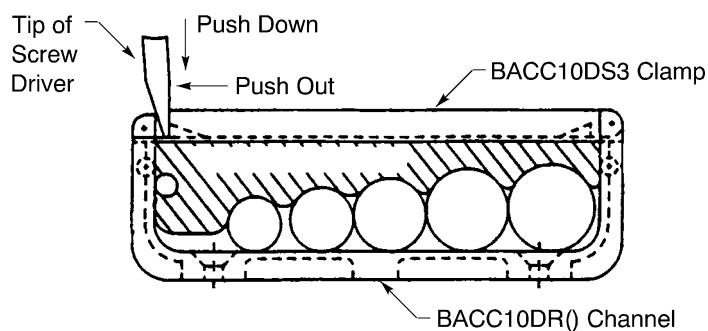
FINAL POSITION OF THE CLIP
Figure 26

- (2) At the same time, pull one leg of the support out from the bracket and turn the support on the bracket. Refer to Figure 27.



REMOVAL OF THE SUPPORT
Figure 27

B. Removal of a Raceway Clamp



REMOVAL OF THE RACEWAY CLAMP
Figure 28

Refer to Figure 28.

- (1) Put the end of a flat blade screwdriver or an equivalent tool between the clamp and the top edge of the channel.

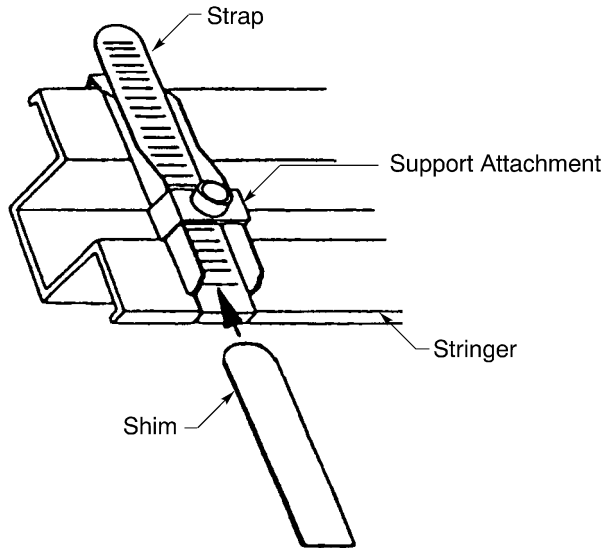
STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

- (2) Push one side of the channel away from the clamp until the clamp hook disengages from the slot in the side of the channel.
- (3) Pull clamp out from the slot on the other side of the clamp.

C. Removal of a Stringer Clip

- (1) Make a selection of a shim that is 0.032 inch thick and 0.5 inch wide.
- (2) Push the shim between the strap and the support attachment. Refer to Figure 29.



POSITION OF THE SHIM TO REMOVE THE STRINGER CLIP
Figure 29

- (3) Pull the strap out of the support attachment.
- (4) Discard the stringer clip assembly to make sure that it is not installed again.

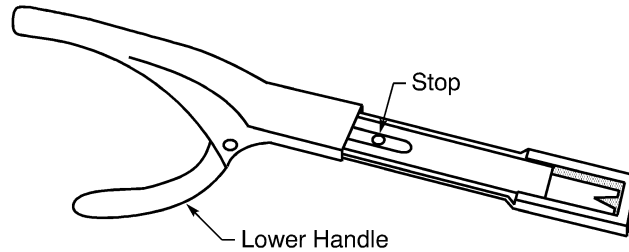
5. REMOVAL OF PLASTIC TIE STRAPS

A. Removal of a Plastic Tie Strap with an ST2318PC(-) Tool

Table 26
PLASTIC TIE STRAP REMOVAL TOOLS

Part Number	Description
ST2318PC-6	Regular Length
ST2318PC-13	Short Length

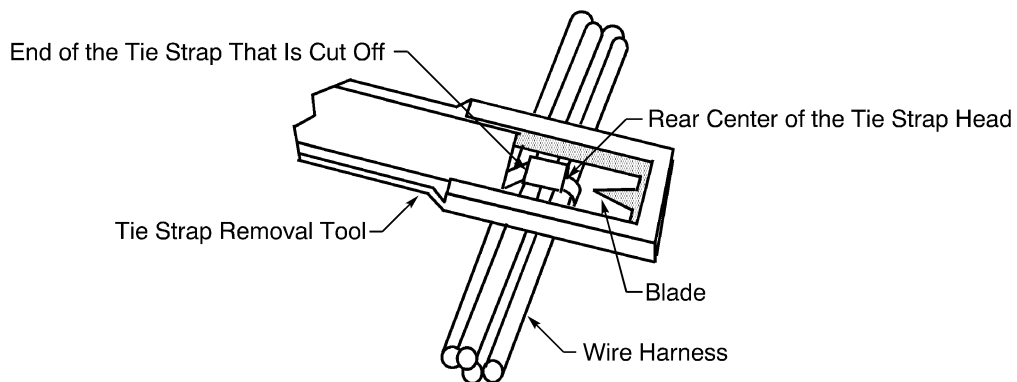
- (1) Make a selection of a plastic tie strap removal tool from Table 26.

STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS****PLASTIC TIE STRAP REMOVAL TOOL****Figure 30**

(2) Put the tool on the head of the tie. Refer to Figure 30 and Figure 31.

Make sure that:

- The tool is level with the tie strap head
- The end of the tie that is cut off is pointed to the handle of the tool
- The center of the blade is aligned with the rear center of the tie strap head.

**POSITION OF THE REMOVAL TOOL****Figure 31**

(3) Close the handle until it stops.

(4) Remove the tool.

(5) Remove the tie strap.

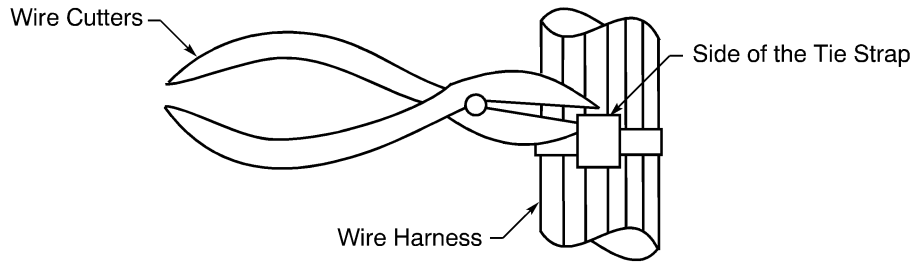
NOTE: A soft tool can be used to open the tie strap if the strap does not open easily.

B. Removal of a Plastic Tie Strap with a Wire Cutter

(1) Cut one side of the tie strap head. Refer to Figure 32.

STANDARD WIRING PRACTICES MANUAL

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POSITION OF THE WIRE CUTTER
Figure 32

- (2) Twist the tie strap head to release the tie strap.
- (3) Pull the tie strap off the wire harness.

6. INSTALLATION OF WIRE HARNESS SUPPORTS

A. Necessary Materials

Table 27
NECESSARY MATERIALS

Material	Temperature Grade	Class	Part Number or Specification	Supplier
Bushing	C	2	8507	Component Products
Film Strip	D	1	E125-2	Fluorglas
				Saint-Gobain Performance Plastics
			E125-3	Fluorglas
				Saint-Gobain Performance Plastics
			Scotch 3082	3M
Grommet	C	2	35450-()	Fenwal Electronics
Plug, Filler	A	2	BACP20BA-1	Boeing
Rod, Filler	C	1	BMS1-52	Boeing
			69B47961-()	Boeing
Seal Ring	A	1	MS29513-012	Porter Seal
			MS29513-111	Porter Seal
Tape	D	2	Scotch 70	3M
Tape, U Shaped Filler	C	1	10-62034-1	Boeing
			10-62034-2	Boeing

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

**Table 28
APPROVED SUPPLIERS OF BOEING STANDARD MATERIALS**

Boeing Standard	Approved Supplier
10-62034-()	Kirkhill Rubber
69B47961-()	Burke Industries
	FlexFab
	Rainier Rubber
	Rubber Teck
	Silicone Rubber Specialties
	Kirkhill Rubber
BACP20BA-1	American United Seal, Stillman Seal Division
	Kirkhill Rubber
BMS1-52	Burke Industries
	FlexFab
	Rainier Rubber
	Rubber Teck
	Silicone Rubber Specialties
	Kirkhill Rubber

B. Installation of a 69B90483-() Block Clamp

(1) If the clamp size is not specified, make a selection of a clamp that has the correct size.

(a) Find the correct clamp size.

Refer to:

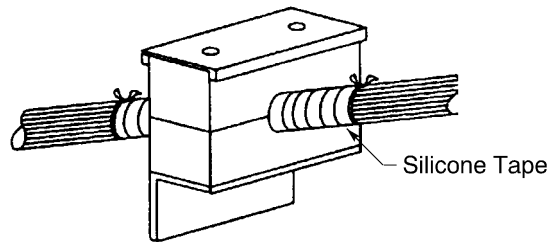
- Paragraph 1.B. for the necessary conditions for the selection of a clamp size
- Paragraph 1.D. for the procedure for the identification of the correct size of a loop clamp or a block clamp.

(b) Make a selection of a clamp from Table 5.

(2) Put the wire harness in the clamp. Refer to Figure 33.

Make sure that the wires and cables in the harness are parallel to each other at the location of the clamp.

CAUTION: IF A CLAMP IS INSTALLED WHERE WIRES OR CABLES GO ACROSS EACH OTHER, DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR. THIS CONDITION IS NOT APPLICABLE FOR MULTIPLE CONDUCTOR, TWISTED WIRE CABLES.

STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS****POSITION OF THE WIRE HARNESS IN THE BLOCK CLAMP****Figure 33**

- (3) Tighten the clamp screws.

Make sure that these conditions occur:

- The necessary conditions for the selection of a clamp size, refer to Paragraph 1.B.
- The necessary conditions for clamp installation, refer to Paragraph 1.C.

- (4) If the clamp does not hold the wire harness tightly, increase the diameter of the wire harness with tape. Refer to Figure 33.

- (a) Remove the wire harness from the clamp.
(b) Make a selection of a tape from Table 27.

NOTE: For an equivalent tape, refer to Subject 20-00-11.

Make sure that the Temperature Grade and the Class of the material are equal to or higher than the Temperature Grade and the Class of the wire harness. Refer to Subject 20-00-11.

- (c) Wind one or more layers of tape around the clamp area on the wire harness.

Make sure that each layer:

- Extends a minimum of 1 inch farther than the edge of the block clamp cushion
- Has a minimum 50 percent overlap.

- (d) Assemble a wire harness tie on each end of the layers of tape.

C. Installation of a Loop Clamp or a Three Wire Clamp

For the installation of:

- Two coax cables in a loop clamp, refer to Paragraph 6.D.
- A 287T0011 loop clamp, refer to Paragraph 6.E.
- Two coax cables in a 287T0011 loop clamp, refer to Paragraph 6.F.
- A BACC10DK loop clamp, refer to Paragraph 6.G.

- (1) If the clamp size is not specified, make a selection of a clamp that has the correct size.

- (a) Find the correct clamp size.

STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS**

Refer to:

- Paragraph 1.B. for the necessary conditions for the selection of a clamp size
- Paragraph 1.D. for the procedure for the identification of the correct size of a loop clamp or a block clamp.

(b) Make a selection of a clamp from:

- Table 6 for a BACC10BU() clamp
- Table 11 for a BACC10GE() clamp
- Table 12 for a BACC10GU() clamp
- Table 13 for a BACC10HS() clamp
- Table 14 or a BACC10JU() clamp
- Table 15 for a BACC10KL() clamp
- Table 24 for a TA025041-() clamp
- Table 25 for a TA025097() clamp.

(2) Put the wire harness in the clamp.

Make sure that the wires and cables in the harness are parallel to each other at the location of the clamp.

CAUTION: IF A CLAMP IS INSTALLED WHERE WIRES OR CABLES GO ACROSS EACH OTHER, DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR. THIS CONDITION IS NOT APPLICABLE FOR MULTIPLE CONDUCTOR, TWISTED WIRE CABLES.

(3) Attach the clamp to the structure.

(a) If it is necessary, install a spacer.

Refer to:

- Paragraph 1.C. for the general conditions for clamp installation
- Subject 20-10-11 for the necessary conditions for wire harness installation.

(b) Put a washer between the structure and the nut or the screw head to give protection to the structure.

(c) Tighten the screw.

Make sure that these conditions occur:

- The necessary conditions for the selection of a clamp size, refer to Paragraph 1.B.
- The necessary conditions for clamp installation, refer to Paragraph 1.C.

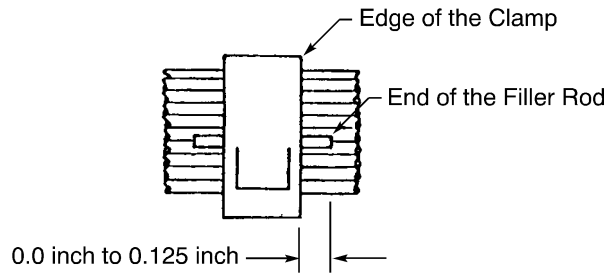
(4) If the clamp does not hold the wire harness tightly, increase the diameter of the wire harness with a filler material.

Refer to:

- Figure 34 for the position of a filler rod
- Figure 35 for the position of a film strip or a tape.

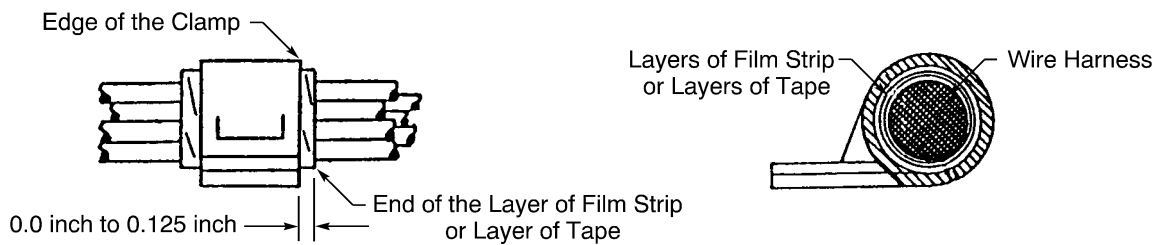
STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS



POSITION OF A FILLER ROD

Figure 34



POSITION OF A FILM STRIP OR A TAPE

Figure 35

(a) Make a selection of one of these filler materials from Table 27:

- A filler rod
- A film strip
- A grommet
- A tape.

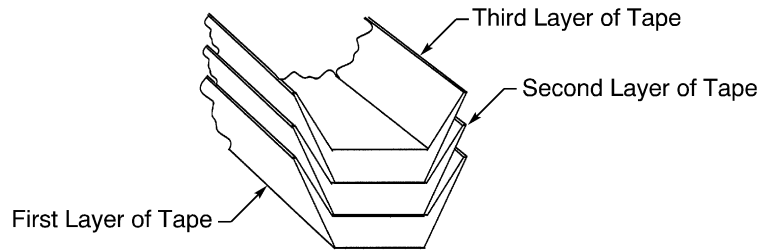
NOTE: For an equivalent film strip or an equivalent tape, refer to Subject 20-00-11.

Make sure that the Temperature Grade and the Class of the material are equal to or higher than the Temperature Grade and the Class of the wire harness. Refer to Subject 20-00-11.

(b) Install the filler material.

Make sure that:

- For coax cable, the distance from the edge of the clamp to the end of a layer of film strip or a layer of tape is 0.0 inch to 0.5 inch
- The distance from the edge of the clamp to the end of a filler rod, a layer of film strip, or a layer tape is 0.0 inch to 0.125 inch
- For U shaped filler tape, each layer of tape makes a 100 percent overlap; refer to Figure 36.

STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS****CONFIGURATION OF THE LAYERS OF THE U SHAPED FILLER TAPE****Figure 36****D. Installation of a Two Coax Cables in a Loop Clamp**

For the installation of two coax cables in a 287T0011 loop clamp, refer to Paragraph 6.F.

(1) If the clamp size is not specified, make a selection of a clamp that has the correct size.

(a) Find the correct clamp size.

Refer to:

- Paragraph 1.B. for the necessary conditions for the selection of a clamp size
- Paragraph 1.D. for the procedure for the identification of the correct size of a loop clamp or a block clamp.

(b) Make a selection of a clamp from:

- Table 6 for a BACC10BU() clamp
- Table 7 for a BACC10DK() clamp
- Table 11 for a BACC10GE() clamp
- Table 12 for a BACC10GU() clamp
- Table 13 for a BACC10HS() clamp
- Table 14 or a BACC10JU() clamp
- Table 15 for a BACC10KL() clamp
- Table 24 for a TA025041(-) clamp
- Table 25 for a TA025097() clamp.

(2) Make a selection of a filler rod from Table 27.

(3) Put the wire harness in the clamp.

Make sure that the cables in the harness are parallel to each other at the location of the clamp.

CAUTION: IF A CLAMP IS INSTALLED WHERE CABLES GO ACROSS EACH OTHER, DAMAGE TO THE CABLES CAN OCCUR.

(4) Install the necessary quantity of filler rod to make a tight fit in the clamp.

Make sure that the distance from the edge of the clamp to the end of the filler rod is 0.0 inch to 0.125 inch.

(5) Attach the clamp to the structure.

(a) If it is necessary, install a spacer.

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STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS**

Refer to:

- Paragraph 1.C. for the general conditions for clamp installation
 - Subject 20-10-11 for the necessary conditions for wire harness installation.
- (b) Put a washer between the structure and the nut or the screw head to give protection to the structure.
- (c) Tighten the screw.

Make sure that these conditions occur:

- The necessary conditions for the selection of a clamp size, refer to Paragraph 1.B.
- The necessary conditions for clamp installation, refer to Paragraph 1.C.

E. Installation of a 287T0011 Loop Clamp

For the installation of two coax cables in a 287T0011 clamp, refer to Paragraph 6.F.

CAUTION: THE 287T0011 CLAMP MUST NOT BE INSTALLED IN A FUEL CELL. IF A PLASTIC TIE STRAP, A LENGTH OF LACING TAPE, OR A FILLER ROD BECOMES FREE, A FUEL FILTER CAN BECOME CLOGGED.

- (1) If the clamp size is not specified, make a selection of a clamp that has the correct size.
- (a) Find the correct clamp size.

Refer to:

- Paragraph 1.B. for the necessary conditions for the selection of a clamp size
- Paragraph 1.D. for the procedure for the identification of the correct size of a loop clamp.

- (b) Make a selection of a clamp from Table 4.

- (2) Attach the clamp to the structure.

NOTE: Washers are not necessary.

- (3) Put the wire harness in the clamp.

Make sure that the wires and cables in the harness are parallel to each other at the location of the clamp.

CAUTION: IF A CLAMP IS INSTALLED WHERE WIRES OR CABLES GO ACROSS EACH OTHER, DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR. THIS CONDITION IS NOT APPLICABLE FOR MULTIPLE CONDUCTOR, TWISTED WIRE CABLES.

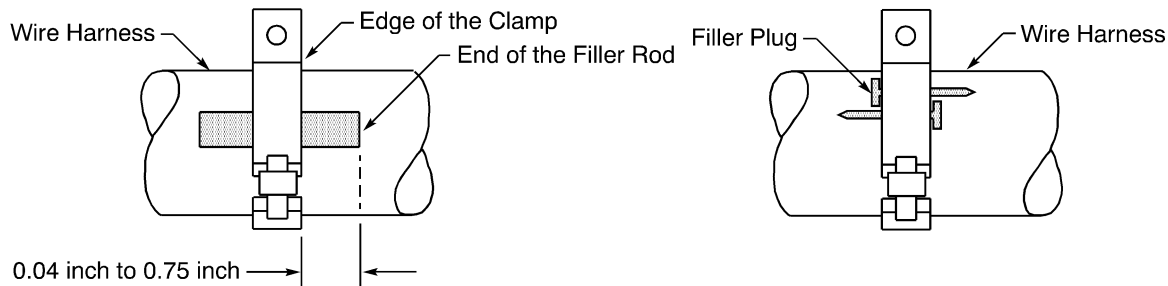
- (4) Close the clamp.
- (5) Assemble a wire harness tie through the holes in the ends of the clamp. Refer to Subject 20-10-11.
- (6) If the clamp does not hold the wire harness tightly in the clamp, increase the diameter of the wire harness with a filler material.

Refer to:

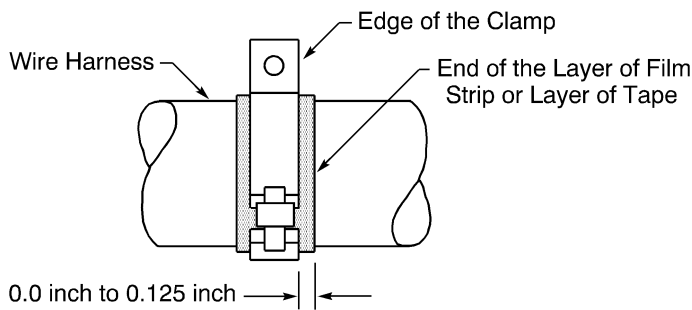
- Figure 37 for the position of a filler rod or a filler plug
- Figure 38 for the position of a film strip or a tape.

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS



POSITION OF A FILLER ROD OR A FILLER PLUG
Figure 37

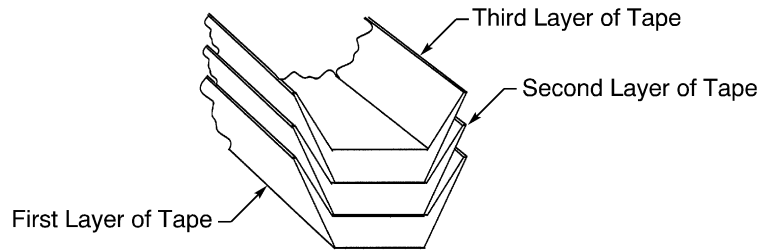


POSITION OF A FILM STRIP OR A TAPE
Figure 38

- (a) Make a selection of a filler material from Table 27.
 Make sure that the Temperature Grade and the Class of the material are equal to or higher than the Temperature Grade and the Class of the wire harness. Refer to Subject 20-00-11.
- (b) Remove the tie at the ends of the clamp.
- (c) Install the filler material.
 Make sure that:
 - For a filler rod, the filler rod is on the same side as the ears of the clamp
 - For a filler rod, the distance from the edge of the clamp to the end of the filler rod is 0.40 inch to 0.75 inch
 - For coax cable, the distance from the edge of the clamp to the end of the layer of tape is 0.0 inch to 0.5 inch
 - The distance from the edge of the clamp to the end of the layer of film strip or layer of tape is 0.0 inch to 0.125 inch
 - For U shaped filler tape, each layer of tape makes a 100 percent overlap; refer to Figure 39.

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WIRE HARNESS SUPPORTS



CONFIGURATION OF THE LAYERS OF U SHAPED FILLER TAPE

Figure 39

(7) Do Step (3) through Step (4) again.

F. Installation of Two Coax Cables in a 287T0011 Loop Clamp

For the installation of two coax cables in a loop clamp, refer to Paragraph 6.D.

(1) If the clamp size is not specified, make a selection of a clamp that has the correct size.

(a) Find the correct clamp size.

Refer to:

- Paragraph 1.B. for the necessary conditions for the selection of a clamp size
- Paragraph 1.D. for the procedure for the identification of the correct size of a loop clamp.

(b) Make a selection of a clamp from Table 4.

(2) Make a selection of a filler rod from Table 27.

(3) Attach the clamp to the structure.

NOTE: Washers are not necessary.

(4) Put the wire harness in the clamp.

Make sure that the cables in the harness are parallel to each other at the location of the clamp.

CAUTION: IF A CLAMP IS INSTALLED WHERE CABLES GO ACROSS EACH OTHER, DAMAGE TO THE CABLES CAN OCCUR.

(5) Install the necessary quantity of filler rod to make a tight fit in the clamp.

Make sure that:

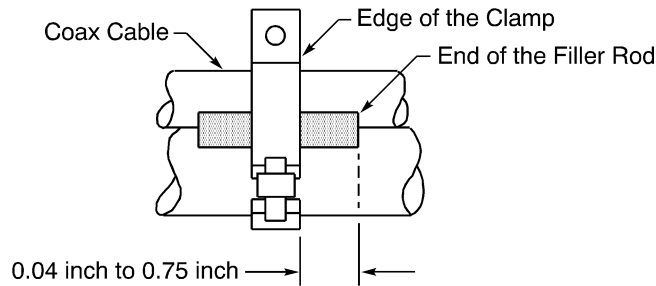
- The rod is on the same side as the ears of the clamp
- The distance from the edge of the clamp to the end of the rod is 0.40 inch to 0.75 inch.

Refer to:

- Figure 40
- Paragraph 1.C. for the applicable conditions for installation of a clamp.

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WIRE HARNESS SUPPORTS



POSITION OF A FILLER ROD

Figure 40

- (6) Close the clamp.
- (7) Assemble a wire harness tie through the holes in the ends of the clamp. Refer to Subject 20-10-11.

G. Installation of a BACC10DK Loop Clamp

- (1) If the clamp size is not specified, make a selection of a clamp that has the correct size.
 - (a) Find the correct clamp size.

Refer to:

- Paragraph 1.B. for the necessary conditions for the selection of a clamp size
- Paragraph 1.D. for the procedure for the identification of the correct size of a loop clamp or a block clamp.

- (b) Make a selection of a clamp from Table 7.
- (2) Put the clamp on the wire harness.

Make sure that the wires and cables in the harness are parallel to each other at the location of the clamp.

CAUTION: IF A CLAMP IS INSTALLED WHERE WIRES OR CABLES GO ACROSS EACH OTHER, DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR. THIS CONDITION IS NOT APPLICABLE FOR MULTIPLE CONDUCTOR, TWISTED WIRE CABLES.

- (3) Attach the clamp to the structure.
 - (a) If it is necessary, install a spacer.

Refer to:

- Paragraph 1.C. for the general conditions for clamp installation
- Subject 20-10-11 for the necessary conditions for wire harness installation
- Paragraph 6.M. for the installation of a spacer.

- (b) Tighten the screw.

Make sure that these conditions occur:

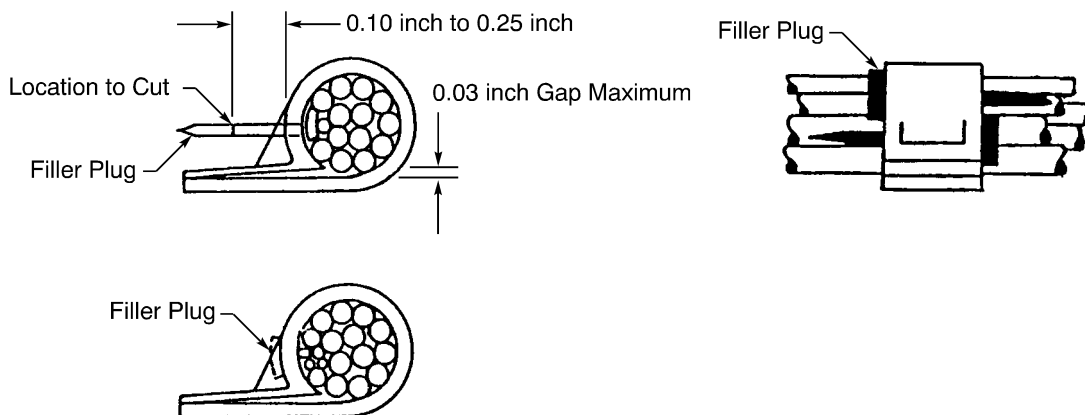
 - The necessary conditions for the selection of a clamp size, refer to Paragraph 1.B.
 - The necessary conditions for clamp installation, refer to Paragraph 1.C.
- (4) If the clamp does not hold the wire harness tightly, increase the diameter of the wire harness with a filler material.

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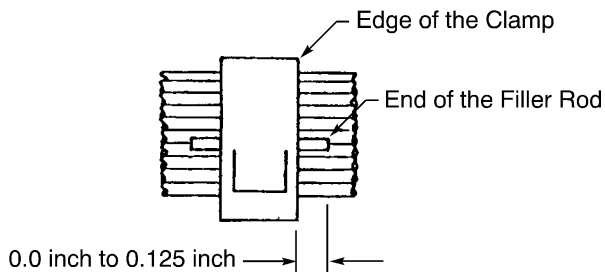
WIRE HARNESS SUPPORTS

Refer to:

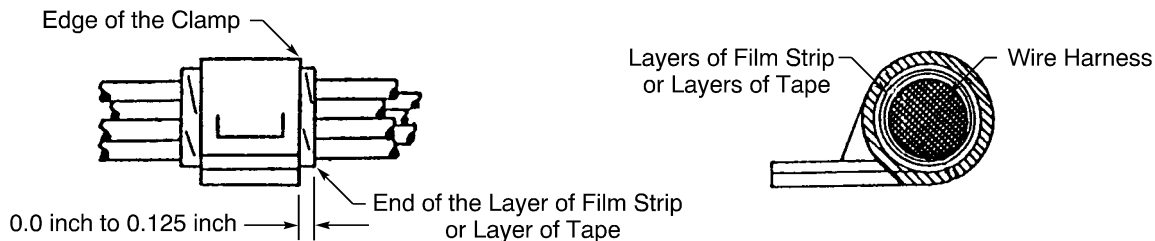
- Figure 41 for the installation configurations of a filler plug
- Figure 42 for the position of a filler rod
- Figure 43 for the position of a film strip or a tape.



INSTALLATION CONFIGURATIONS OF A FILLER PLUG
Figure 41



POSITION OF A FILLER ROD
Figure 42



POSITION OF A FILM STRIP OR A TAPE
Figure 43

(a) If the clamp installation is in a fuel cell, make a selection of a seal ring from Table 27.

STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS**

CAUTION: A SEAL RING IS THE ONLY MATERIAL TO INCREASE THE DIAMETER OF THE WIRE HARNESS THAT IS PERMITTED IN A FUEL CELL. A BUSHING, A FILM STRIP, A GROMMET, A FILLER PLUG, A FILLER ROD, OR TAPE ARE NOT PERMITTED IN THE FUEL CELL. IF ONE OF THESE MATERIALS BECOMES FREE, A FUEL FILTER CAN BECOME CLOGGED.

- (b) If the clamp installation is not in a fuel cell, make a selection of one of these filler materials from Table 27:
- A filler plug
 - A filler rod
 - A film strip
 - A tape.

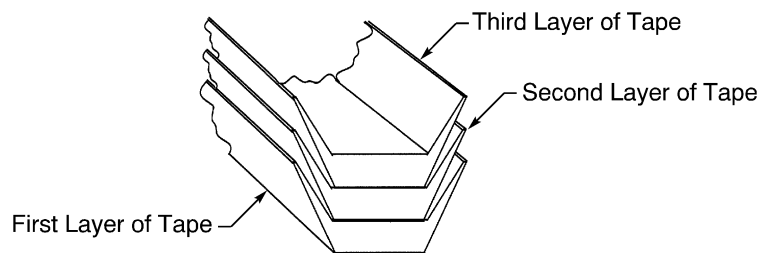
NOTE: For an equivalent film strip or an equivalent tape, refer to Subject 20-00-11.

Make sure that the Temperature Grade and the Class of the material are equal to or higher than the Temperature Grade and the Class of the wire harness. Refer to Subject 20-00-11.

- (c) Install the filler material.

Make sure that:

- For a seal ring, the seal ring is installed on the side of the clamp that is opposite from the feet of the clamp
- For coax cable, the distance from the edge of the clamp to the end of the layer of tape is 0.0 inch to 0.5 inch
- The distance from the edge of the clamp to the end of the filler rod, layers of film strip, or layers of tape is 0.0 inch to 0.125 inch
- For a filler rod, the filler rod is on the same side as the feet of the clamp
- For U shaped filler tape, each layer of tape makes a 100 percent overlap; refer to Figure 39.



CONFIGURATION OF THE LAYERS OF U SHAPED FILLER TAPE

Figure 44

H. Installation of a BACS31H1A Ring Post

NOTE: The maximum recommended number of BACS31H1A ring posts that can be assembled as one wire support is six.

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

CAUTION: THE BACS31H RING POST MUST NOT BE USED AS A SPACER IF A SPACER THAT HAS A DIFFERENT LENGTH IS SPECIFIED. IF THE WIRE HARNESS CLEARANCE IS NOT SATISFACTORY, DAMAGE TO THE WIRE HARNESS CAN OCCUR.

**Table 29
PLASTIC TIE STRAP INSTALLATION TOOLS**

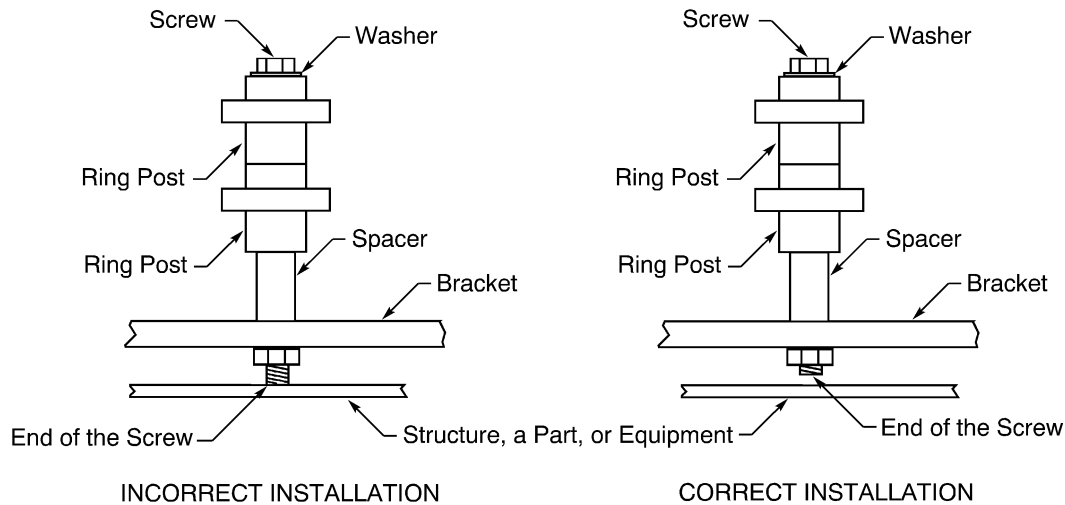
Part Number	Tool Description
GS4H	Heavy Duty
GTS	Standard Duty, Ergonomic

- (1) Make a selection of a washer from Table 18.
- (2) If a spacer is necessary or specified, make a selection of a spacer. Refer to Table 18.
- (3) If the bracket does not have a nut plate, make a selection of a nut from Table 18.
- (4) Make a selection of a screw from Table 18. Refer to Figure 45.

Make sure that the length of the screw:

- Is sufficient to engage the nut correctly
- Can not make an interference with a structure or other items when the ring post is fully installed.

- (5) Make a selection of a plastic tie strap from Table 17.
- (6) Make a selection of a tie strap installation tool from Table 29.
- (7) Install the ring post or ring posts. Refer to Figure 45.



**RING POST INSTALLATION
Figure 45**

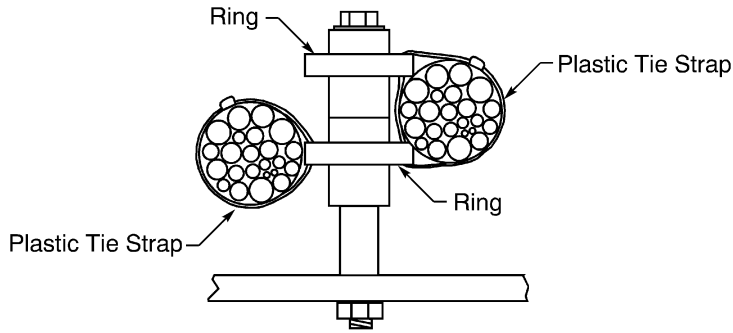
- (a) Put the washer on the on the screw.
- (b) Put the necessary number of ring posts and the spacers on the screw.
- (c) Engage the threads of the screw and the installation hole.
- (d) Tighten the screw until the ring post is tight against the bracket.

STANDARD WIRING PRACTICES MANUAL**WIRE HARNESS SUPPORTS**

Make sure that the end of the screw does not make an interference with structure, a part, or equipment.

CAUTION: DO NOT APPLY TOO MUCH TORQUE. DAMAGE TO THE RING POST CAN OCCUR.

- (8) Attach the wire harness to the ring post. Refer to Figure 46.

**WIRE HARNESS INSTALLATION****Figure 46**

- (a) Put a plastic tie strap through the applicable slot in the ring or rings.

If the tie strap goes through two rings, make sure that:

- The minimum diameter of the wire harness is 0.75 inch
- The slots in the top ring post are approximately aligned with the slots in the bottom ring post
- The ribbed side of the tie strap is pointed away from the wire harness.

- (b) Put the tie strap around the wire harness.

Make sure that all of the wires are parallel.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER WHERE THE PLASTIC TIE STRAP GOES AROUND THE WIRE HARNESS. DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR.

- (c) Put the end of the tie strap through the tie strap head.

- (d) Tighten the tie strap.

Make sure that the wire harness is held tightly.

CAUTION: THE TIE STRAP MUST HOLD THE WIRE HARNESS TIGHTLY, BUT IT MUST NOT CRUSH THE WIRES. IF THE TIE STRAP IS TOO TIGHT OR TOO LOOSE, DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR.

- (9) Examine the plastic tie strap.

Make sure that:

- The end of the strap does not have a sharp edge
- The end of the strap is a maximum of 0.01 inch from the head of the strap.

- (10) If the wire harness cannot be held tightly with the plastic tie strap, increase the diameter of the wire harness:

- (a) Remove the tie strap. Refer to Paragraph 5.

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STANDARD WIRING PRACTICES MANUAL

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- (b) Make a selection of a filler rod from Table 27.
- (c) Install the necessary quantity of the filler rod to make a tight fit.
 Make sure that the distance from the edge of the tie strap to the end of the filler rod is between 0.0 inch and 0.125 inch.
- (d) Do Step (8) and Step (9) again.

I. Installation of a BACS31H()B Ring Post

NOTE: The maximum recommended number of BACS31H1A ring posts that can be assembled as one wire support is six.

CAUTION: THE BACS31H RING POST MUST NOT BE USED AS A SPACER IF A SPACER THAT HAS A DIFFERENT LENGTH IS SPECIFIED. IF THE WIRE HARNESS CLEARANCE IS NOT SATISFACTORY, DAMAGE TO THE WIRE HARNESS CAN OCCUR.

**Table 30
PLASTIC TIE STRAP INSTALLATION TOOLS**

Part Number	Tool Description
GS4H	Heavy Duty
GTS	Standard Duty, Ergonomic

**Table 31
RING POST INSTALLATION TOOLS**

Tool Description	Size (inch)
Allen Wrench	7/32
Hex Head Driver	7/32

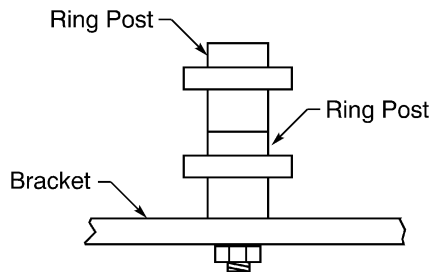
- (1) If the bracket does not have a nut plate, make a selection of a nut from Table 18.
- (2) Make a selection of a plastic tie strap from Table 17.
- (3) Make a selection of a tie strap installation tool from Table 30.
- (4) Make a selection of a ring post installation tool from Table 31.
- (5) Engage the threads of the screw with the installation hole.
- (6) Tighten the screw with the ring post installation tool until the ring post is tight against the bracket.
 Make sure that the length of the integral screw:
 - Is sufficient to engage the nut correctly
 - Can not make an interference with a structure or other items when the ring post is fully installed.

CAUTION: DO NOT APPLY TOO MUCH TORQUE. DAMAGE TO THE RING POST CAN OCCUR.

- (7) If more ring posts are necessary:
 - (a) Engage the threads of a new ring post with the threads of the top ring post. Refer to Figure 47.

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WIRE HARNESS SUPPORTS



RING POST INSTALLATION

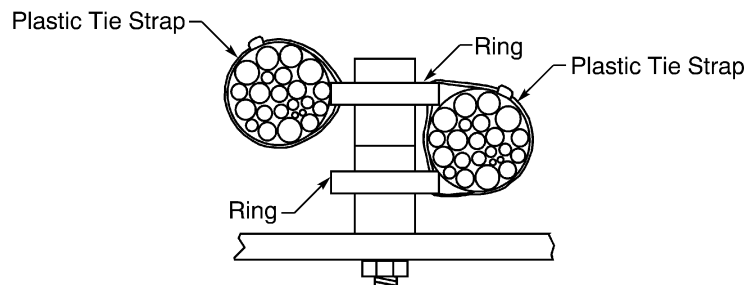
Figure 47

- (b) Tighten the screw until the ring post is tight.

Make sure that the end of the screw does not make an interference with structure, a part, or equipment.

CAUTION: DO NOT APPLY TOO MUCH TORQUE. DAMAGE TO THE RING POST CAN OCCUR.

- (8) Attach the wire harness to the ring post or ring posts. Refer to Figure 48.



WIRE HARNESS INSTALLATION

Figure 48

- (a) Put a plastic tie strap through the applicable slot in the ring or rings.

If the tie strap goes through two rings, make sure that:

- The minimum diameter of the wire harness is 0.75 inch
- The slots in the top ring post are approximately aligned with the slots in the bottom ring post
- The ribbed side of the tie strap is pointed away from the wire harness.

- (b) Put the tie strap around the wire harness.

Make sure that all of the wires are parallel.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER WHERE THE PLASTIC TIE STRAP GOES AROUND THE WIRE HARNESS. DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR.

- (c) Put the end of the tie strap through the tie strap head.

- (d) Tighten the tie strap.

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WIRE HARNESS SUPPORTS

CAUTION: THE TIE STRAP MUST HOLD THE WIRE HARNESS TIGHTLY, BUT IT MUST NOT CRUSH THE WIRES. IF THE TIE STRAP IS TOO TIGHT OR TOO LOOSE, DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR.

(9) Examine the plastic tie strap.

Make sure that:

- The end of the tie strap does not have a sharp edge
- The end of the strap is a maximum of 0.01 inch from the head of the strap.

(10) If the wire harness cannot be held tightly with the plastic tie strap, increase the diameter of the wire harness:

- (a) Remove the tie strap. Refer to Paragraph 5.
- (b) Make a selection of a filler rod from Table 27.
- (c) Install the necessary quantity of the filler rod to make a tight fit.

Make sure that the distance from the edge of the tie strap to the end of the filler rod is between 0.0 inch and 0.125 inch.

(d) Do Step (8) and Step (9) again.

J. Installation of a BACS31J Support Assembly

**Table 32
PLASTIC TIE STRAP INSTALLATION TOOLS**

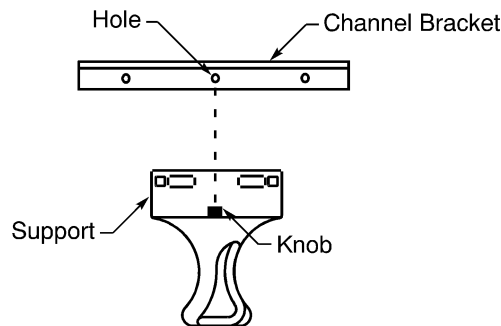
Part Number	Tool Description
GS4H	Heavy Duty
GTS	Standard Duty, Ergonomic

(1) Make a selection of a plastic tie strap from Table 21.

(2) Make a selection of a tie strap installation tool from Table 32.

(3) Install the support:

(a) Align the knob on the support with the hole in the bracket. Refer to Figure 49.



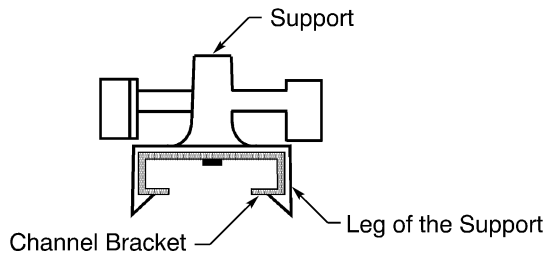
**ALIGNMENT OF THE SUPPORT AND THE BRACKET
Figure 49**

(b) Push the support against the channel bracket until the legs of the support engage the bracket. Refer to Figure 50.

STANDARD WIRING PRACTICES MANUAL

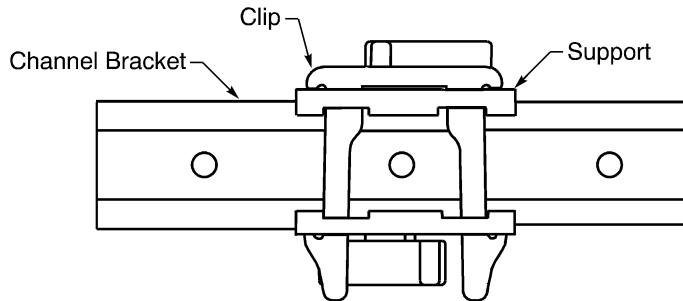
WIRE HARNESS SUPPORTS

Make sure that the knob goes into the hole in the bracket.

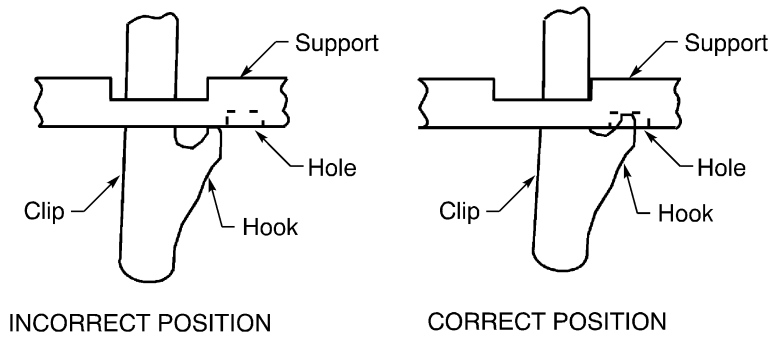


POSITION OF THE SUPPORT
Figure 50

- (c) Push the clip into the support. Refer to Figure 51 and Figure 52.
Make sure that the hooks on side of the clip engage with the holes in the support.



POSITION OF THE CLIP
Figure 51

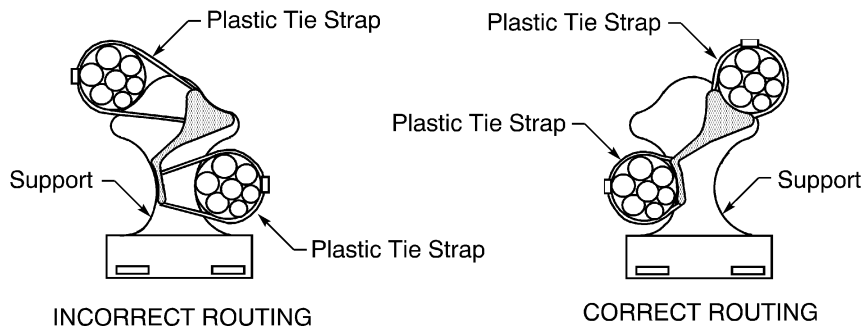


POSITION OF THE HOOKS IN THE SUPPORT
Figure 52

- (4) Attach the wire harness to the support. Refer to Figure 53.

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WIRE HARNESS SUPPORTS



WIRE HARNESS INSTALLATION

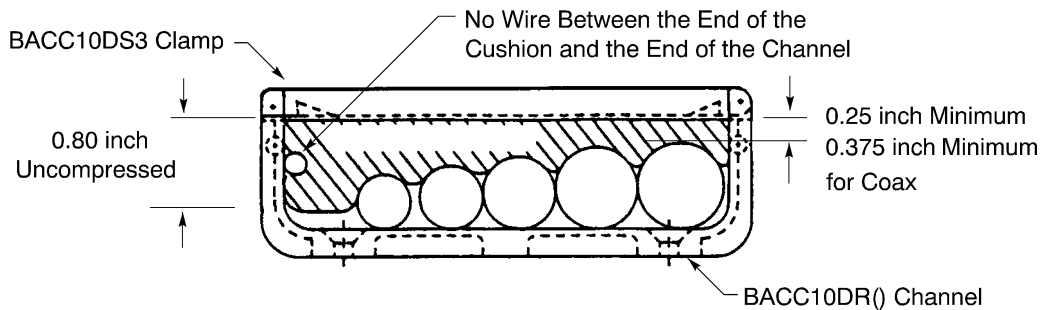
Figure 53

- (a) Put a plastic tie strap through the applicable slots in the support.
Make sure that:
 - The ribbed side of the tie strap is pointed away from the wire harness
 - The plastic tie strap has the correct routing.
 - (b) Put the tie strap around the wire harness.
Make sure that all of the wires are parallel.
- CAUTION:** THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER WHERE THE PLASTIC TIE STRAP GOES AROUND THE WIRE HARNESS. DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR.
- (c) Put the end of the tie strap through the tie strap head.
 - (d) Tighten the tie strap.
Make sure the wire harness is held tightly.
- CAUTION:** THE TIE STRAP MUST HOLD THE WIRE HARNESS TIGHTLY, BUT IT MUST NOT CRUSH THE WIRES. IF THE TIE STRAP IS TOO TIGHT OR TOO LOOSE, DAMAGE TO THE WIRES OR THE CABLES CAN OCCUR.
- (e) Examine the plastic tie strap.
Make sure that:
 - The end of the strap does not have a sharp edge
 - The end of the strap is a maximum of 0.01 inch from the head of the strap.
- (5) If the wire harness cannot be held tightly with the plastic tie strap, increase the diameter of the wire harness:
- (a) Remove the tie strap. Refer to Paragraph 5.
 - (b) Make a selection of a filler rod from Table 27.
 - (c) Install the necessary quantity of the filler rod to make a tight fit.
Make sure that the distance from the edge of the tie strap to the end of the filler rod is between 0.0 inch and 0.125 inch.
 - (d) Do Step (4) again.

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS

K. Installation of a Raceway Clamp



POSITION OF THE WIRES OR CABLES IN A RACEWAY CLAMP
Figure 54

Refer to Figure 54.

- (1) Put the wires or cables in the wire harness channel.

Make sure that:

- The wire harness is straight
- The wires or cables of the wire harness are parallel with the longitudinal axis of the channel.

- (2) Put the raceway clamp on the channel.

Make sure that:

- The cushion of the clamp is against the wires
- The center of the clamp is aligned with the center of the channel
- A wire or a cable is not between the end of the clamp cushion and the side of the channel.

- (3) Push the center of the clamp in the direction of the channel until the hooks move into the slots on each side of the channel.

- (4) Examine the installation.

Make sure that:

- The distance from the largest wire or cable to the clamp is 0.25 inch minimum for wire
- The distance from the largest cable to the clamp is 0.375 inch minimum for coax cable
- The wires or cables in the channel cannot be moved
- The clamp cushion does not extend farther than each edge of the clamp.

L. Installation of a Stringer Clip

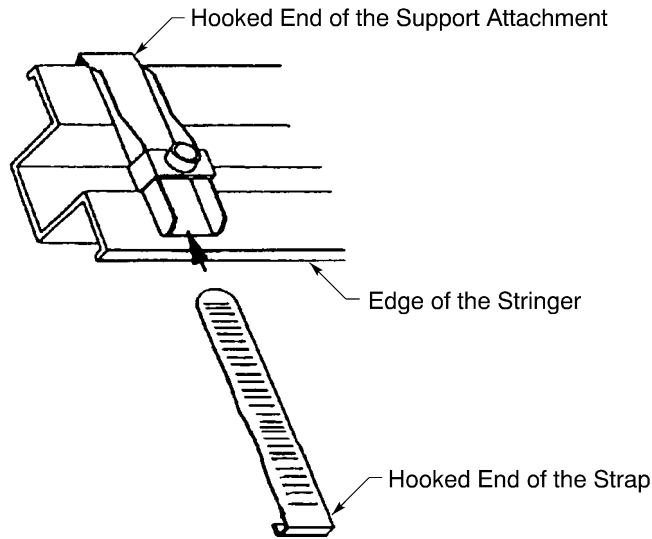
- (1) Make a selection of a stringer clip from Table 22.

CAUTION: DO NOT USE A STRINGER CLIP THAT HAS BEEN INSTALLED BEFORE. IT IS POSSIBLE THE CLIP CANNOT HOLD THE WIRE OR INSULATION BLANKET.

- (2) Put the end of the strap into the support attachment.
- (3) Put the ends of the strap with hooks and the support attachment over each edge of stringer. Refer to Figure 55.

STANDARD WIRING PRACTICES MANUAL

WIRE HARNESS SUPPORTS



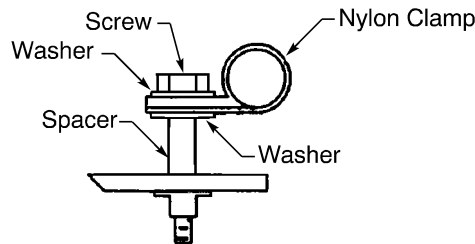
POSITION OF THE STRINGER CLIP ON THE STRINGER
Figure 55

(4) Pull the strap through the support attachment. Refer to Figure 22.

M. Installation of an NAS42() Spacer with a BACC10DK Loop Clamp

Table 33
WASHER PART NUMBERS

Washer	Supplier
AN960JD10	QPL
AN960JD10L	QPL
NAS1149D0316H	QPL
NAS1149D0363H	QPL



NAS42() SPACER INSTALLATION WITH A NYLON LOOP CLAMP
Figure 56

Refer to Figure 56.

- (1) Make a selection of an NAS42() spacer.
- (2) Make a selection of two washers from Table 33.



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WIRE HARNESS SUPPORTS

CAUTION: A NYLON WASHER MUST NOT BE INSTALLED IN A FUEL TANK. IF THE WASHER BECOMES FREE, A FUEL FILTER CAN BECOME CLOGGED.

- (3) Put a washer on the screw.
- (4) Put the screw through the hole in the clamp.
- (5) Put the other washer on the screw.
- (6) Put the screw through the hole in the spacer.
- (7) Engage the threads of the screw with the threads of the nut.

7. APPROVED TOOL SUPPLIERS

A. Plastic Tie Strap Tools

Table 34
PLASTIC TIE STRAP TOOL SUPPLIERS

Part Number	Supplier
GS4H	Panduit
GTS	Panduit
ST2318PC-6	Boeing
ST2318PC-13	Boeing

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REPAIR OF ELECTRICAL WIRE AND CABLE

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REPAIR OF ELECTRICAL WIRE AND CABLE

This Subject gives:

- The damage conditions of wire, cable, coax cable, and cable assemblies
- The repair conditions for damaged wire, cable, coax cable, and cable assemblies
- The repair procedures for damaged wire, cable, and coax cable.

1. GENERAL DATA

A. Applicable Repair Conditions for Wire and Cable

For the general conditions that are applicable for:

- The repair of wire and cable, refer to Paragraph 1.B.
- The repair of Airworthiness Limitation wiring, refer to Paragraph 1.C.
- The repair of Fuel System wiring that has Airworthiness Limitations, refer to Paragraph 1.C.
- The repair of wiring that is adjacent to a fuel tank, refer to Paragraph 1.C.
- The selection of parts and materials for a repair, refer to Paragraph 1.D.
- The repair of wire and cable with a splice, refer to Paragraph 1.E.

For the applicable damage and repair conditions of:

- Wire and cable in special systems, refer to Table 1
- Special wire and cable, refer to Table 2
- Other types of wire and cable, refer to Table 3.

**Table 1
WIRE AND CABLE IN SPECIAL SYSTEMS**

System Wire and Cable	Damage and Repair Conditions
Engine Wire Harness	Paragraph 2.T.
Fuel Quantity Indicator System that is in the Fuel Tank	Paragraph 2.V.
Fuel Quantity Indicator System that is not in the Fuel Tank	Paragraph 2.W.
Other Fuel System Wiring	Paragraph 2.U.
777 Primary Flight Control System	Subject 20-14-11

**Table 2
SPECIAL WIRE AND CABLE**

Special Wire or Cable	Damage and Repair Conditions
Aluminum Wire	Paragraph 2.J.
Bond and Ground Jumper Assembly	Paragraph 2.L.
Coax Cable	Paragraph 2.M.
Copper Power Feeder Wire	Paragraph 2.K.
Fire Resistant Wire	Paragraph 2.N.
Flat Conductor Cable Assembly	Paragraph 2.O.
S280W502-1 ARINC 629 Stanchion to LRU Stub Cable	Paragraph 2.P.

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STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Table 2 (continued)

Special Wire or Cable	Damage and Repair Conditions
S280W502-4 ARINC 629 Panel to Stanchion Stub Cable	Paragraph 2.P.
S280W651-() ARINC 629 Data Bus Cable Assembly	Paragraph 2.Q.
Shield Pull Through Shield Ground Wire	Paragraph 2.R.
Thermocouple Wire	Paragraph 2.S.

**Table 3
WIRE AND CABLE TYPES**

Wire or Cable Type	Damage and Repair Conditions
Unshielded Wire	Paragraph 2.A.
Unshielded Cable	Paragraph 2.B.
Shielded Wire	Paragraph 2.C.
Shielded Wire - Two Adjacent Shields	Paragraph 2.D.
Shielded Wire - Two Shields That Are Not Adjacent	Paragraph 2.E.
Shielded Cable	Paragraph 2.F.
Shielded Cable - Two Adjacent Shields	Paragraph 2.G.
Shielded Cable - Two Shields That Are Not Adjacent	Paragraph 2.H.
Wire or Cable with a Non-Metallic Braid	Paragraph 2.I.

B. General Conditions for the Repair of Wire and Cable

These conditions are applicable for all repairs:

- The condition that is the cause of the damage must be removed to prevent subsequent damage
- A repair must be done with clean hands and clean tools to prevent contamination that can cause a bad seal of the insulation materials
- The repair is permanent, unless it is specified differently in the applicable repair conditions or in the applicable repair procedure
- A repair done in a fuel vapor area must be applicable for a fuel vapor area.

NOTE: A fuel vapor area is an area where fuel vapors are present. Refer to Subject 20-00-10 for safety practices for fuel vapors.



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REPAIR OF ELECTRICAL WIRE AND CABLE

WARNING: HEAT SOURCES OR OTHER IGNITION SOURCES MUST NOT BE USED WHEN FUEL VAPORS ARE PRESENT. INJURY TO PERSONNEL FROM FIRE OR EXPLOSION CAN OCCUR.

CAUTION: HEAT SOURCES OR OTHER IGNITION SOURCES MUST NOT BE USED WHEN FUEL VAPORS ARE PRESENT. DAMAGE TO EQUIPMENT FROM FIRE OR EXPLOSION CAN OCCUR.

These conditions are applicable for the location of the repair:

- A repair must not be put in a conduit
- A repair must not be put in a connector backshell or a backshell adapter
- A repair must not be put on a bend of a wire or a cable
- A repair must not be put on a wire harness where the wire harness is frequently bent; for example, an instrument panel or a hinged door.

C. Airworthiness Limitations

These types of wiring configurations are specified as Critical Design Configuration Control Limitations (CDCCL):

- Fuel System Wiring that has Airworthiness Limitations
- Wiring that is installed adjacent to the fuel tank. Refer to Subject 20-10-11.

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

To find more data about CDCCL wiring, refer to Table 4 for the document that is applicable for the airplane model.

Table 4
BOEING DOCUMENTS FOR AIRWORTHINESS LIMITATIONS

Boeing Document	Airplane Model
D6-7552-AWL	707
D6-8766-AWL	727
D6-38278-CMR	737-100,-200,-200C,-300,-500
D6-13747-CMR	747-100,-200,-300,-SP
Maintenance Planning Document, Section 9	737-600,-700,-800 and later 737 models
	747-400 and later 747 models
	757
	767
	777

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REPAIR OF ELECTRICAL WIRE AND CABLE

D. General Conditions for the Selection of Parts and Materials for a Repair

These conditions are applicable for the selection of the parts and materials for a repair:

- The Temperature Grade of the insulation materials for the repair the insulation of a wire or the jacket of a cable must be the same as or higher than the Temperature Grade of the wire or the cable
- The Temperature Grade of the metal components for the repair of a wire or a cable must be the same as the Temperature Grade of the wire or the cable
- The Temperature Grade of the materials used for the repair of a wire or a cable in a high temperature area must be Temperature Grade D; refer to Subject 20-02-20
- If it is necessary to repair damage of a wire or a cable with a segment of wire or cable, the segment must have the same part number as the damaged wire or cable.

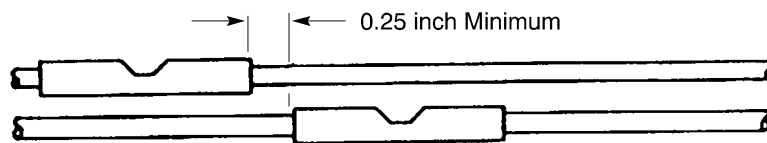
E. General Conditions for the Repair of Wire and Cable with a Splice

The replacement of a damaged wire or a damaged cable is recommended.

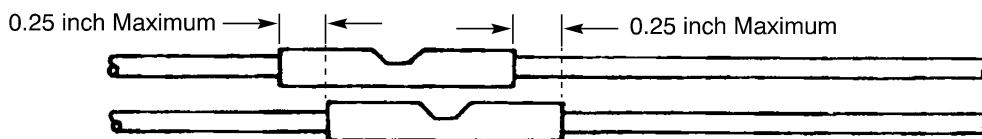
NOTE: The repair of a damaged wire or a damaged cable with a splice is a satisfactory alternative unless it is specified differently in the applicable repair conditions or in the applicable repair procedure.

These conditions are applicable:

- The general conditions for the repair or wire and cable; refer to Paragraph 1.B.
- All splice assemblies must have a sealed configuration
- The maximum number of splices that a wire can have is three; this maximum does not include splices that are installed during the production of the airplane
- When the repair of more than one wire in a wire harness is necessary, the minimum distance between the end of the splice on one wire and the opposite end of the splice on an adjacent wire must be 0.25 inch; refer to Figure 1
- When the number of splices and the lengths of the wires prevent the separation that is specified Figure 1, the splices can be installed with a maximum of 0.25 inch from the end of the splice on one wire to the same end of the splice on an adjacent wire; refer to Figure 2.



RECOMMENDED SEPARATION OF SPLICES
Figure 1



ALTERNATIVE SEPARATION OF SPLICES
Figure 2

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

For the general conditions that are applicable for:

- Splice assemblies and wire harness assembly, refer to Subject 20-10-11
- Splice assemblies and wire harness installation, refer to Subject 20-10-11.

F. Applicable Conditions for the Repair of a Splice Assembly

These conditions are applicable:

- The damage and repair conditions for a splice assembly are the same as the conditions for the type of wire or cable; refer to Paragraph 2.
- If it is necessary to replace a sealed splice assembly, the replacement must be a sealed splice assembly
- If it is necessary to replace an unsealed splice assembly, the replacement can be an unsealed splice assembly, but a sealed splice assembly is recommended.

G. Necessary Materials

**Table 5
HEAT SHRINKABLE SLEEVES**

Temperature Grade	Part Number	Supplier
B	AMS-DTL-23053/5 Class 1	An available source
	MIL-LT	Raychem
	PLF 100	Raychem
	Versafit	Raychem
D	AMS-DTL-23053/12 Class 2	An available source
	AMS-DTL-23053/12 Class 3	An available source
	Penntube I	Pennsylvania Fluorocarbon
	Penntube II	Pennsylvania Fluorocarbon
	TFE 2 to 1	Zeus Industrial Products
	TFE 2X Standard Wall	Chemplast
	TFE 2X Standard Wall	Zeus Industrial Products
	TFE 4X Thin Wall	Chemplast
	TFE 4X Thin Wall	Zeus Industrial Products

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REPAIR OF ELECTRICAL WIRE AND CABLE

**Table 6
INSULATION MATERIALS**

Material	Description	Temperature Grade	Class	Part Number	Supplier
Film Strip	TFE	D	1	E125-2	Fluorglas
					Saint-Gobain Performance Plastics
				E125-3	Fluorglas
					Saint-Gobain Performance Plastics
				P-412	Permacel
				Scotch 48	3M
Scotch 3082	3M				

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Table 6 (continued)

Material	Description	Temperature Grade	Class	Part Number	Supplier		
Tape	Polyester	A	2	M765	Connecticut Hard Rubber		
					Furon		
					Saint-Gobain Performance Plastics		
	Silicone	D	2	Scotch 70	3M		
	TFE	B	1	Scotch 63	3M		
					2242-2	Fluorglas	
				Mystick 7505		Saint-Gobain Performance Plastics	
					Scotch 61	3M	
				C		2	P-421
					2045-5		
		2245-5	Saint-Gobain Performance Plastics				
			SG015-06		Saint-Gobain Performance Plastics		
		SG016-05			Saint-Gobain Performance Plastics		
			D		2		2245-5
		SG015-06		Saint-Gobain Performance Plastics			
SG016-05				Saint-Gobain Performance Plastics			
	SG015-06	Saint-Gobain Performance Plastics					
SG016-05		Saint-Gobain Performance Plastics					

**Table 7
PROTECTIVE MATERIALS**

Material	Description	Part Number	Supplier
Tape	TFE, Glass Supported	P-440	Permacel
		SG015-06	Saint-Gobain Performance Plastics
		SG016-05	Saint-Gobain Performance Plastics

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STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

**Table 8
COATING MATERIALS**

Part Number	Supplier
Type 88	Nycote Laboratories
Vyna-Kote No. 6	Nylon Spectra-Strip

**Table 9
SHIELD MATERIALS**

Temperature Grade	Boeing Standard
B	BAC3108-()
D	BAC3106-()

NOTE: For sizes and suppliers of shield materials, refer to Subject 20-00-11.

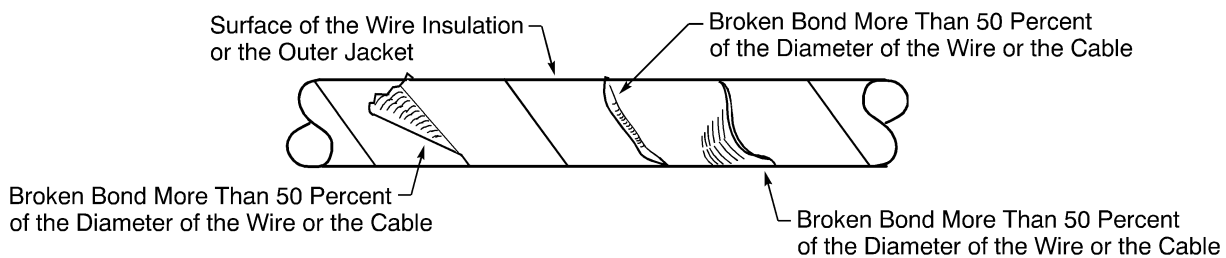
2. WIRE AND CABLE DAMAGE AND REPAIR CONDITIONS

A. Unshielded Wire

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Repair is necessary when these types of damage occur:

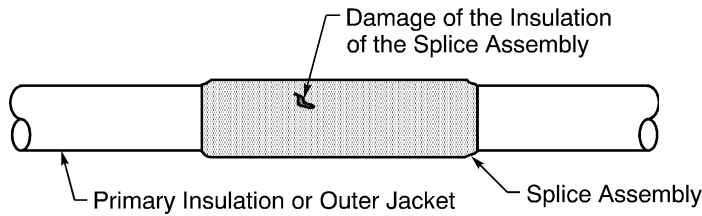
- Damage to the conductor; refer to Paragraph 4.A.
- Damage that goes through the primary insulation; refer to Paragraph 3.A.
- Damage that goes into the primary insulation; refer to Paragraph 3.A.
- The bond between the overlaps of the tape of the insulation is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 3 and Paragraph 3.C.
- Damage that goes into or through the insulation of a splice assembly when the conductor splice does not have damage; refer to Figure 4 and Paragraph 3.F.



**UNSERVICEABLE BROKEN BONDS
Figure 3**

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



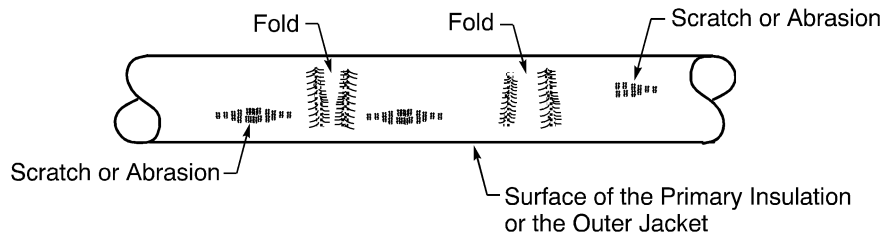
UNSERVICEABLE DAMAGE OF THE INSULATION OF A SPLICE ASSEMBLY

Figure 4

Repair is not necessary when these types of damage occur:

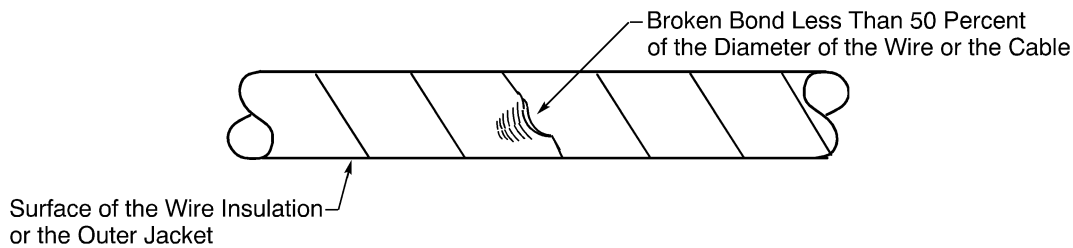
- A fold in the insulation at a bend
- A small scratch on the surface of the insulation
- Abrasion that makes the surface of the insulation rough
- The bond between the overlaps of the tape of the insulation is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 5 and Figure 6.



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 5



SERVICEABLE BROKEN BONDS

Figure 6

B. Unshielded Cable

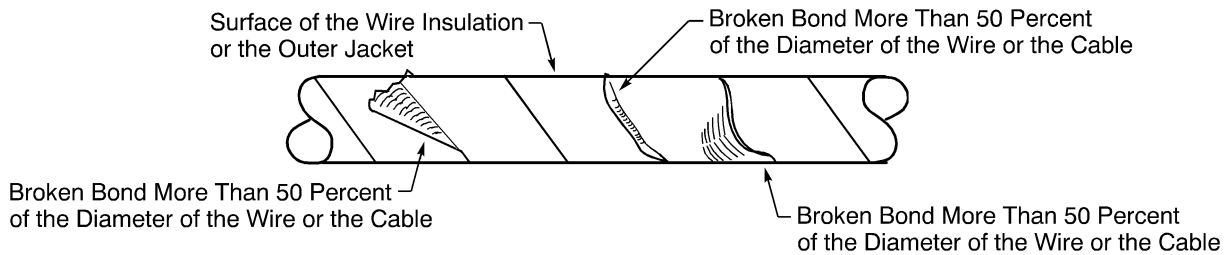
For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

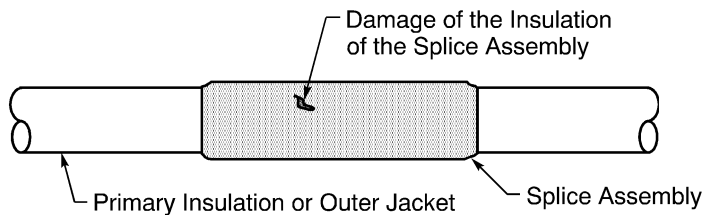
Repair is necessary when these types of damage occur:

- Damage to the conductor; refer to Paragraph 4.B.
- Damage that goes through the primary insulation of a wire in the cable; refer to Paragraph 3.D.
- Damage that goes into the primary insulation of a wire in the cable; refer to Paragraph 3.D.
- Damage that goes through the jacket; refer to Paragraph 3.B.
- Damage that goes into the jacket; refer to Paragraph 3.B.
- The bond between the overlaps of the tape of a jacket is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 7 and Paragraph 3.C.
- Damage that goes into or through the insulation of a splice assembly when the component wires do not have damage; refer to Figure 8 and Paragraph 3.F.



UNSERVICABLE BROKEN BONDS

Figure 7



UNSERVICABLE DAMAGE OF THE INSULATION OF A SPLICE ASSEMBLY

Figure 8

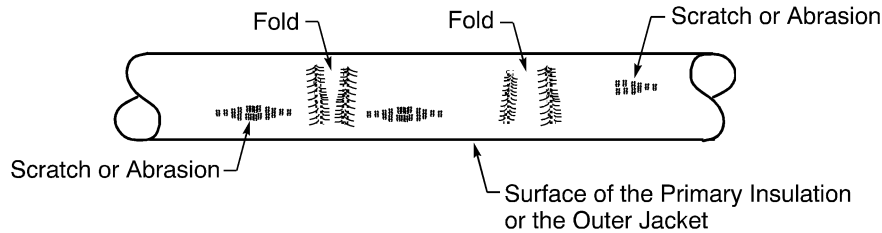
Repair is not necessary when these types of damage occur:

- A fold in the jacket at a bend
- A small scratch on the surface of the jacket or primary insulation
- Abrasion that makes the surface of the jacket or primary insulation rough
- The bond between the overlaps of the tape of a jacket is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 9 and Figure 10.

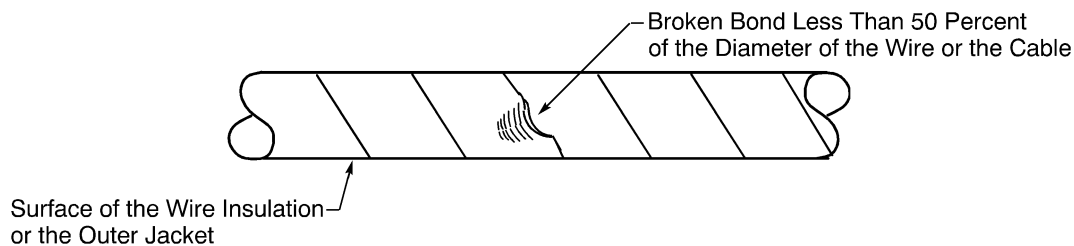
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 9



SERVICEABLE BROKEN BONDS

Figure 10

C. Shielded Wire

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

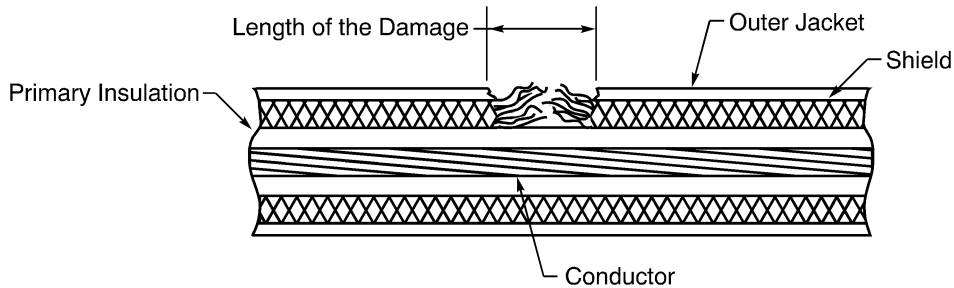
Repair is necessary when these types of damage occur:

- Damage to the conductor; refer to Paragraph 5.A.
- Damage to the primary insulation; refer to Paragraph 5.A.
- Damage to the shield is more than 1 inch in length or more than 25 percent of the circumference of the shield, and near the end of the wire; refer to Paragraph 6.A.
- Damage to the shield is more than 1 inch in length or more than 25 percent of the circumference of the shield; refer to Paragraph 5.A.
- Damage to the shield is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 6.C.
- Damage that goes through the jacket, but the shield has no damage; refer to Paragraph 3.B.
- Damage that goes into the jacket; refer to Paragraph 3.B.
- The bond between the overlaps of the tape of a jacket is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 12 and Paragraph 3.C.
- Damage that goes into the insulation of the shield splice assembly, but the shield has no damage; refer to Figure 13 and Paragraph 3.F.

Refer to Figure 11.

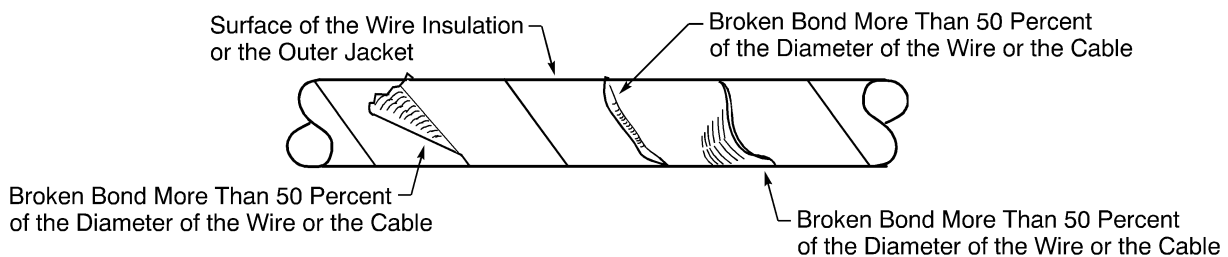
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



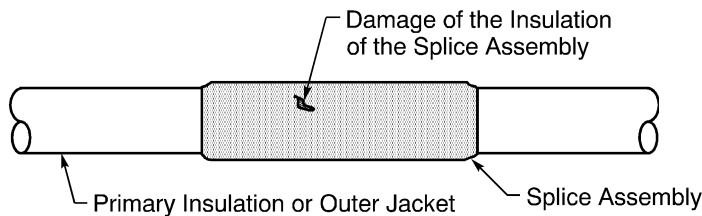
UNSERVICEABLE JACKET AND SHIELD DAMAGE

Figure 11



UNSERVICEABLE BROKEN BONDS

Figure 12



UNSERVICEABLE DAMAGE OF THE INSULATION OF A SHIELD SPLICE ASSEMBLY

Figure 13

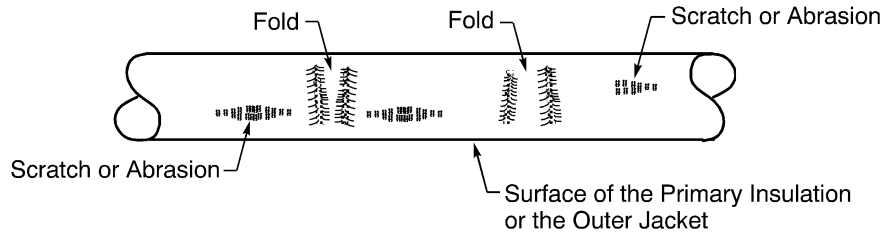
Repair is not necessary when these types of damage occur:

- A fold in the jacket or the primary insulation at a bend
- A small scratch on the surface of the jacket or the primary insulation
- Abrasion that makes the surface of the jacket or the primary insulation rough
- The bond between the overlaps of the tape of the jacket is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 14 and Figure 15.

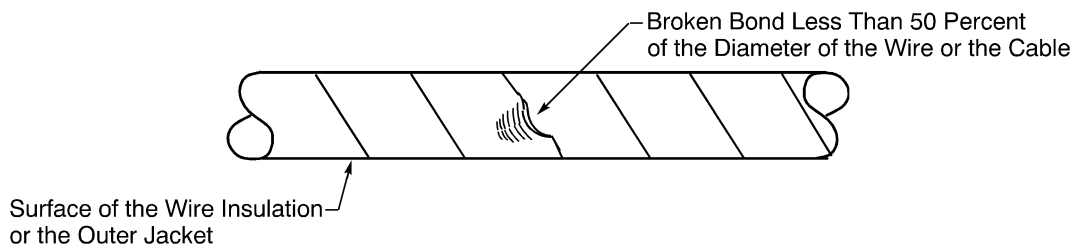
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 14



SERVICEABLE BROKEN BONDS

Figure 15

D. Shielded Wire - Two Adjacent Shields

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

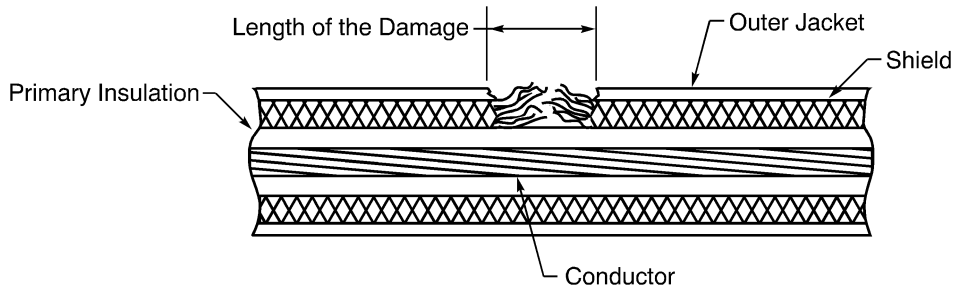
Repair is necessary when these types of damage occur:

- Damage to the conductor; refer to Paragraph 5.B.
- Damage to the primary insulation; refer to Paragraph 5.B.
- Damage to the shield is more than 1 inch in length or more than 25 percent of the circumference of the shield, and near the end of the wire; refer to Paragraph 6.A.
- Damage to the shield is more than 1 inch in length or more than 25 percent of the circumference of the shield; refer to Paragraph 5.B.
- Damage to the shield is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 6.C.
- Damage that goes through the jacket, but the shield has no damage; refer to Paragraph 3.B.
- Damage that goes into the jacket; refer to Paragraph 3.B.
- The bond between the overlaps of the tape of a jacket is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 17 and Paragraph 3.C.
- Damage that goes into the insulation of the shield splice assembly, but the shield has no damage; refer to Figure 18 and Paragraph 3.F.

Refer to Figure 16.

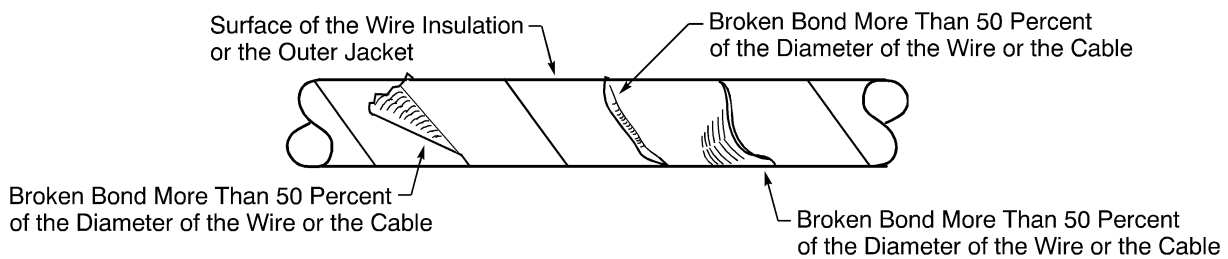
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



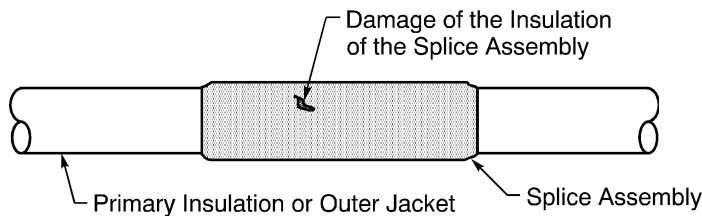
UNSERVICEABLE JACKET AND SHIELD DAMAGE

Figure 16



UNSERVICEABLE BROKEN BONDS

Figure 17



UNSERVICEABLE DAMAGE OF THE INSULATION OF A SHIELD SPLICE ASSEMBLY

Figure 18

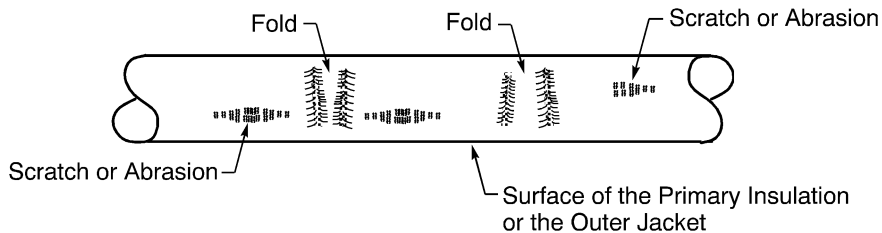
Repair is not necessary when these types of damage occur:

- A fold in the jacket or the primary insulation at a bend
- A small scratch on the surface of the jacket or the primary insulation
- Abrasion that makes the surface of the jacket or the primary insulation rough
- The bond between the overlaps of the tape of the jacket is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 19 and Figure 20.

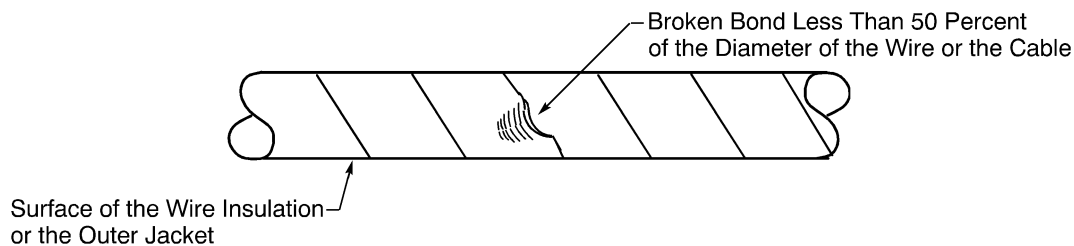
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 19



SERVICEABLE BROKEN BONDS

Figure 20

E. Shielded Wire - Two Shields That Are Not Adjacent

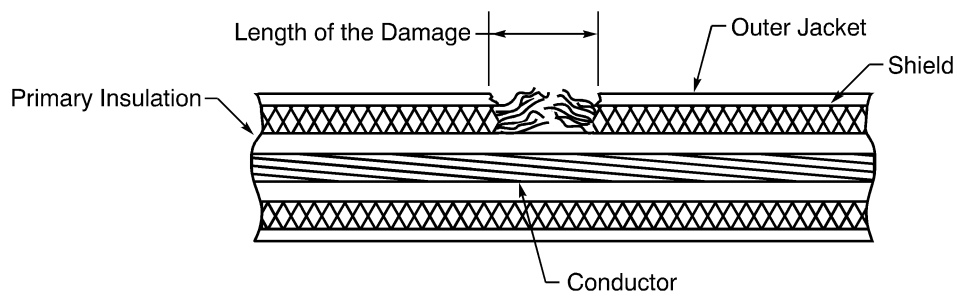
For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Repair is necessary when these types of damage occur:

- Damage to the conductor; when the repair is done in a fuel vapor area, refer to Paragraph 5.C.
- Damage to the conductor; refer to Paragraph 5.D.
- Damage to the primary insulation; when the repair is done in a fuel vapor area, refer to Paragraph 5.C.
- Damage to the primary insulation; refer to Paragraph 5.D.
- Damage to the inner shield; when the repair is done in a fuel vapor area, refer to Paragraph 5.C.
- Damage to the inner shield; refer to Paragraph 5.D.
- Damage to the inner insulation; when the repair is done in a fuel vapor area, refer to Paragraph 5.C.
- Damage to the inner insulation; refer to Paragraph 5.D.
- Damage to the outer shield is more than 1 inch in length or more than 25 percent of the circumference of the shield, and near the end of the wire; refer to Paragraph 6.A.
- Damage to the outer shield is more than 1 inch in length or more than 25 percent of the circumference of the shield; when the repair is done in a fuel vapor area, refer to Paragraph 5.C.
- Damage to the outer shield is more than 1 inch in length or more than 25 percent of the circumference of the shield; refer to Paragraph 5.D.
- Damage to the outer shield is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 6.C.
- Damage that goes through the jacket, but the shield has no damage; refer to Paragraph 3.B.
- Damage that goes into the jacket; refer to Paragraph 3.B.
- The bond between the overlaps of the tape of a jacket is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 22 and Paragraph 3.C.
- Damage that goes into the insulation of the shield splice assembly, but the shield has no damage; refer to Figure 23 and Paragraph 3.F.

Refer to Figure 21.

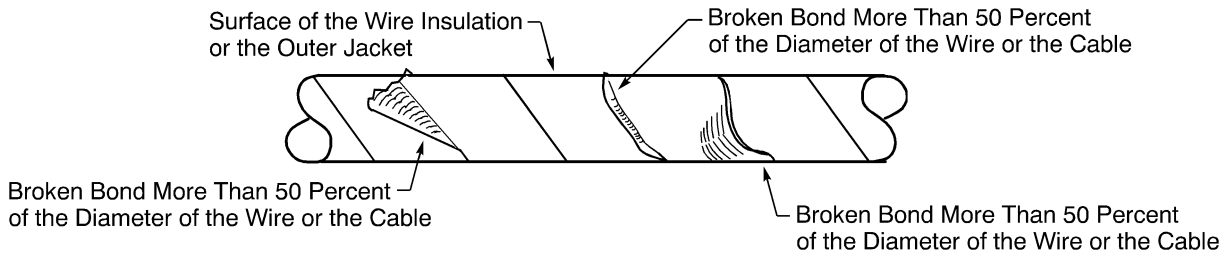


UNSERVICEABLE JACKET AND SHIELD DAMAGE

Figure 21

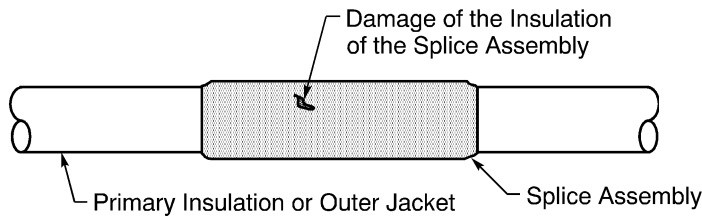
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



UNSERVICEABLE BROKEN BONDS

Figure 22



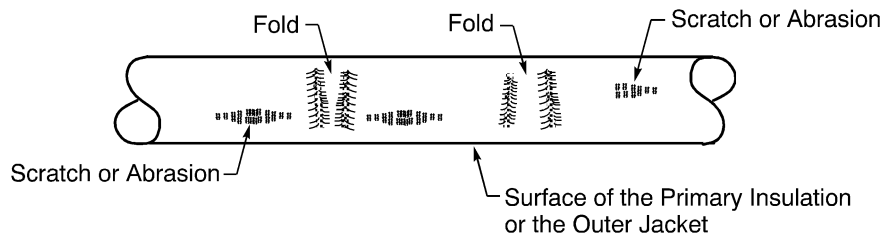
UNSERVICEABLE DAMAGE OF THE INSULATION OF A SHIELD SPLICE ASSEMBLY

Figure 23

Repair is not necessary when these types of damage occur:

- A fold in the jacket or the primary insulation at a bend
- A small scratch on the surface of the jacket or the primary insulation
- Abrasion that makes the surface of the jacket or the primary insulation rough
- The bond between the overlaps of the tape of the jacket is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 24 and Figure 25.

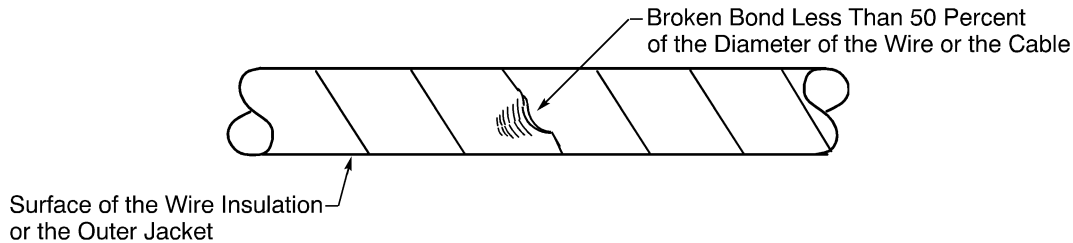


SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 24

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE BROKEN BONDS
Figure 25

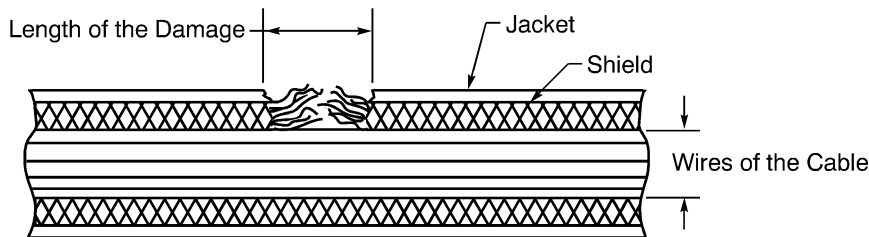
F. Shielded Cable

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Repair is necessary when these types of damage occur:

- Damage to the conductor; refer to Paragraph 5.E.
- Damage to the primary insulation; refer to Paragraph 5.E.
- Damage to the shield is more than 1 inch in length or more than 25 percent of the circumference of the shield, and near the end of the cable; refer to Paragraph 6.A.
- Damage to the shield is more than 1 inch in length or more than 25 percent of the circumference of the shield; refer to Paragraph 5.E.
- Damage to the shield is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 6.C.
- Damage that goes through the jacket, but the shield has no damage; refer to Paragraph 3.B.
- Damage that goes into the jacket; refer to Paragraph 3.B.
- The bond between the overlaps of the tape of a jacket is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 27 and Paragraph 3.C.
- Damage that goes into the insulation of the shield splice assembly, but the shield has no damage; refer to Figure 28 and Paragraph 3.F.

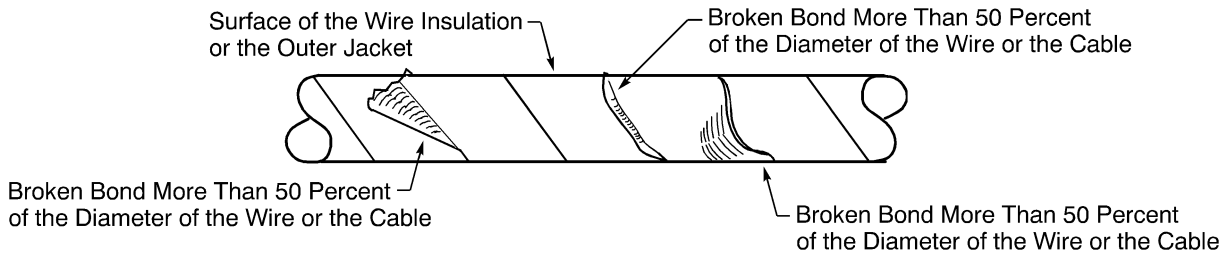
Refer to Figure 26.



UNSERVICEABLE JACKET AND SHIELD DAMAGE
Figure 26

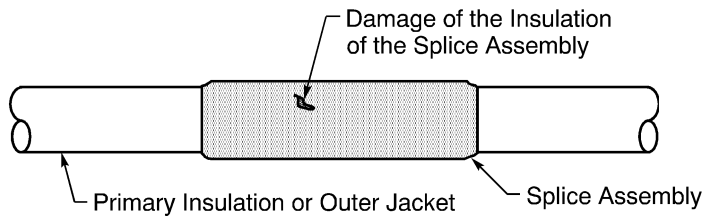
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



UNSERVICEABLE BROKEN BONDS

Figure 27



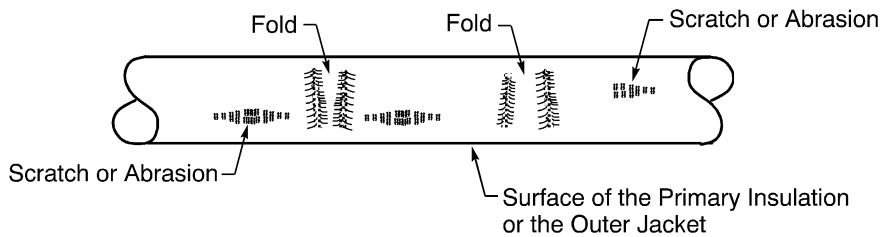
UNSERVICEABLE DAMAGE OF THE INSULATION OF A SHIELD SPLICE ASSEMBLY

Figure 28

Repair is not necessary when these types of damage occur:

- A fold in the jacket or the primary insulation at a bend
- A small scratch on the surface of the jacket or the primary insulation
- Abrasion that makes the surface of the jacket or the primary insulation rough
- The bond between the overlaps of the tape of the jacket is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 29 and Figure 30.

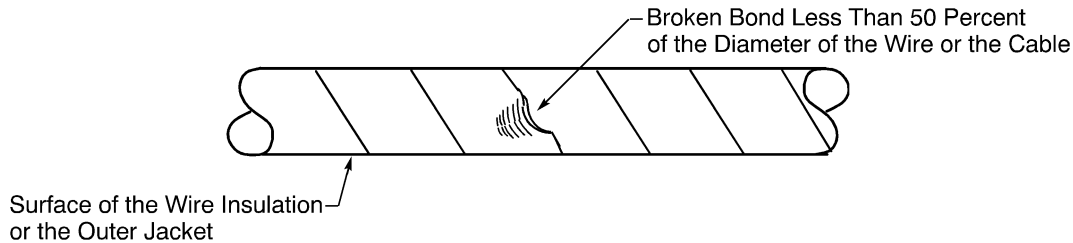


SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 29

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE BROKEN BONDS
Figure 30

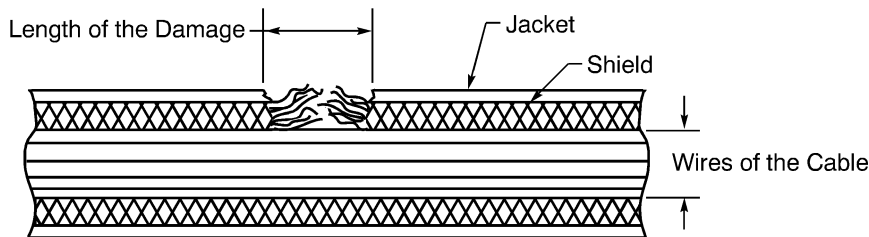
G. Shielded Cable - Two Adjacent Shields

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Repair is necessary when these types of damage occur:

- Damage to the conductor; refer to Paragraph 5.F.
- Damage to the primary insulation; refer to Paragraph 5.F.
- Damage to the shield is more than 1 inch in length or more than 25 percent of the circumference of the shield, and near the end of the cable; refer to Paragraph 6.A.
- Damage to the shield is more than 1 inch in length or more than 25 percent of the circumference of the shield; refer to Paragraph 5.F.
- Damage to the shield is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 6.C.
- Damage that goes through the jacket, but the shield has no damage; refer to Paragraph 3.B.
- Damage that goes into the jacket; refer to Paragraph 3.B.
- The bond between the overlaps of the tape of a jacket is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 32 and Paragraph 3.C.
- Damage that goes into the insulation of the shield splice assembly, but the shield has no damage; refer to Figure 33 and Paragraph 3.F.

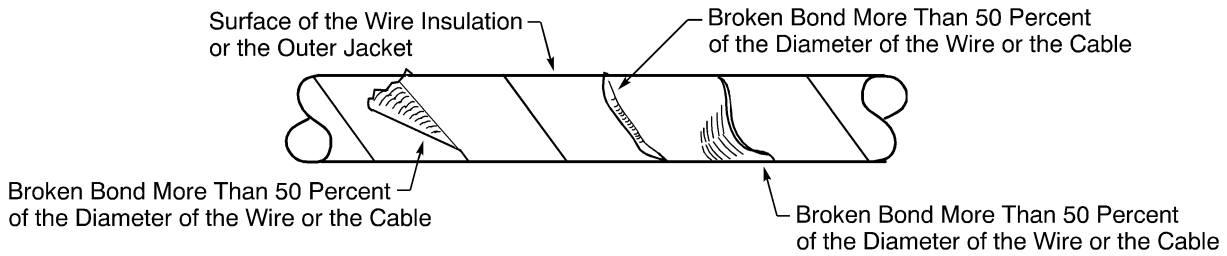
Refer to Figure 31.



UNSERVICEABLE JACKET AND SHIELD DAMAGE
Figure 31

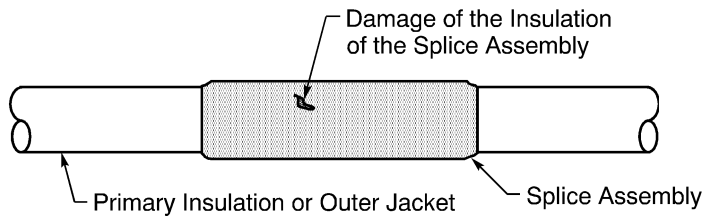
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



UNSERVICEABLE BROKEN BONDS

Figure 32



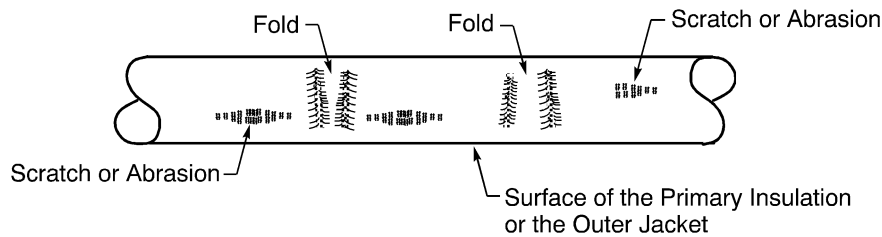
UNSERVICEABLE DAMAGE OF THE INSULATION OF A SHIELD SPLICE ASSEMBLY

Figure 33

Repair is not necessary when these types of damage occur:

- A fold in the jacket or the primary insulation at a bend
- A small scratch on the surface of the jacket or the primary insulation
- Abrasion that makes the surface of the jacket or the primary insulation rough
- The bond between the overlaps of the tape of the jacket is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 34 and Figure 35.

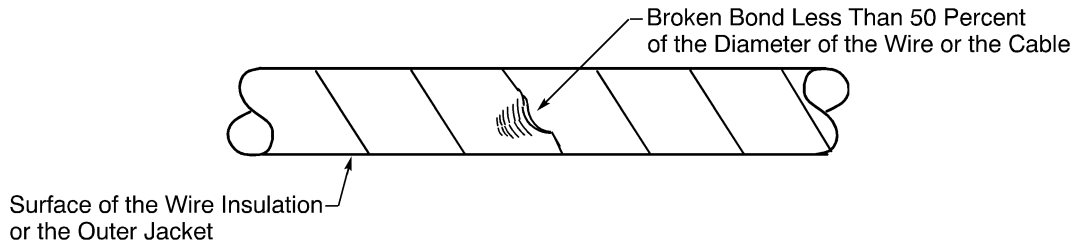


SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 34

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE BROKEN BONDS
Figure 35

H. Shielded Cable - Two Shields That Are Not Adjacent

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

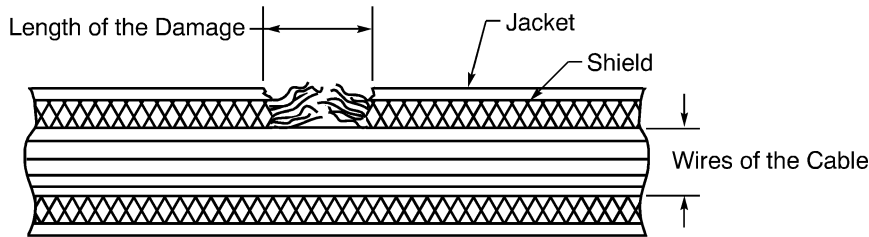
Repair is necessary when these types of damage occur:

- Damage to the conductor; when the repair is done in a fuel vapor area, refer to Paragraph 5.G.
- Damage to the conductor; refer to Paragraph 5.H.
- Damage to the primary insulation; when the repair is done in a fuel vapor area, refer to Paragraph 5.G.
- Damage to the primary insulation; refer to Paragraph 5.H.
- Damage to the inner shield; when the repair is done in a fuel vapor area, refer to Paragraph 5.G.
- Damage to the inner shield; refer to Paragraph 5.H.
- Damage to the inner insulation; when the repair is done in a fuel vapor area, refer to Paragraph 5.G.
- Damage to the inner insulation; refer to Paragraph 5.H.
- Damage to the outer shield is more than 1 inch in length or more than 25 percent of the circumference of the shield, and near the end of the wire; refer to Paragraph 6.A.
- Damage to the outer shield is more than 1 inch in length or more than 25 percent of the circumference of the shield; when the repair is done in a fuel vapor area, refer to Paragraph 5.G.
- Damage to the outer shield is more than 1 inch in length or more than 25 percent of the circumference of the shield; refer to Paragraph 5.H.
- Damage to the outer shield is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 6.C.
- Damage that goes through the jacket, but the shield has no damage; refer to Paragraph 3.B.
- Damage that goes into the jacket; refer to Paragraph 3.B.
- The bond between the overlaps of the tape of a jacket is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 37 and Paragraph 3.C.
- Damage that goes into the insulation of the shield splice assembly, but the shield has no damage; refer to Figure 38 and Paragraph 3.F.

Refer to Figure 36.

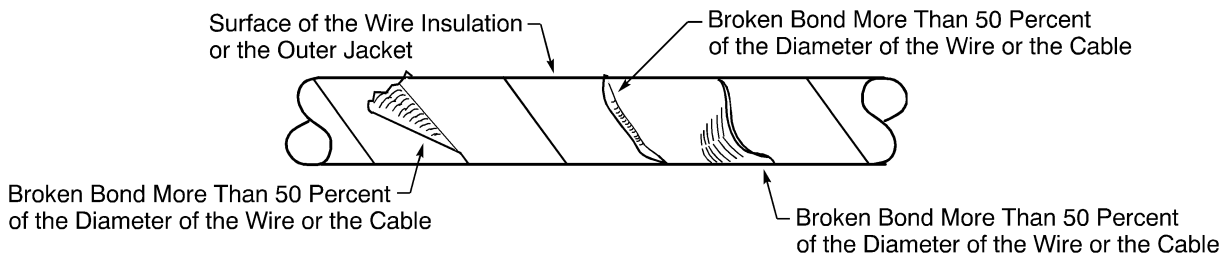
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



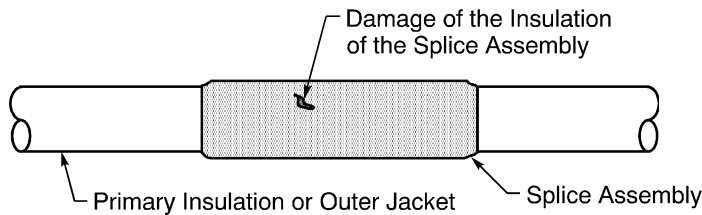
UNSERVICEABLE JACKET AND SHIELD DAMAGE

Figure 36



UNSERVICEABLE BROKEN BONDS

Figure 37



UNSERVICEABLE DAMAGE OF THE INSULATION OF A SHIELD SPLICE ASSEMBLY

Figure 38

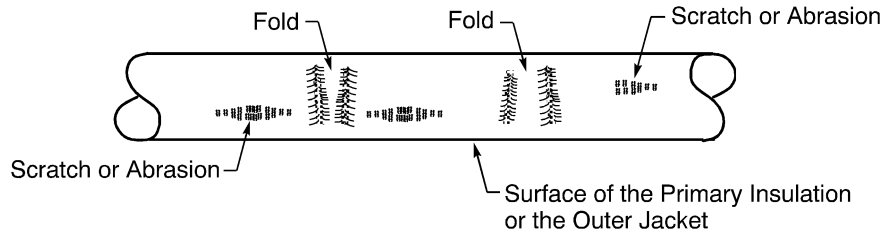
Repair is not necessary when these types of damage occur:

- A fold in the jacket or the primary insulation at a bend
- A small scratch on the surface of the jacket or the primary insulation
- Abrasion that makes the surface of the jacket or the primary insulation rough
- The bond between the overlaps of the tape of the jacket is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 39 and Figure 40.

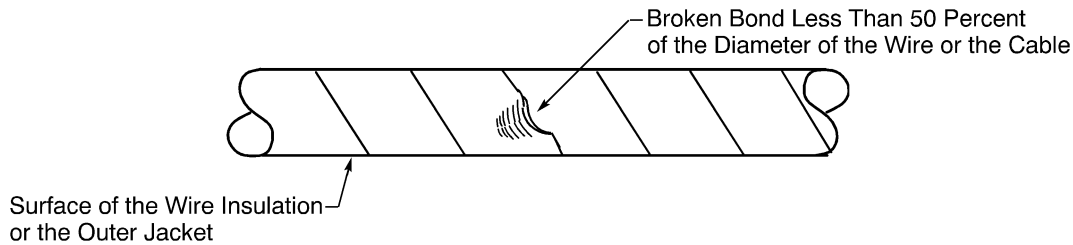
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 39



SERVICEABLE BROKEN BONDS

Figure 40

I. Wire or Cable With a Non-Metallic Braid

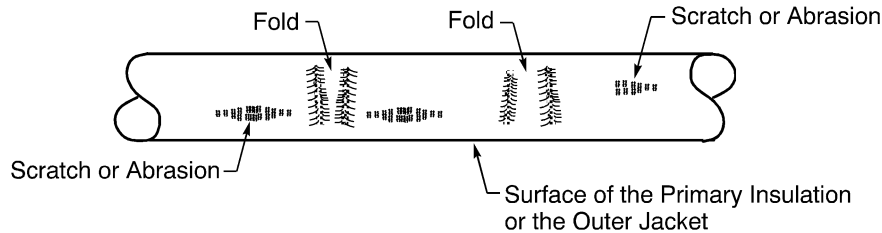
For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Repair of the braid is necessary when the damage goes through the braid; refer to Paragraph 3.E.

Repair is not necessary when these types of damage occur:

- A fold in the braid at a bend
- Abrasion that makes the surface of the braid rough.

Refer to Figure 41.



SERVICEABLE FOLDS AND ABRASION

Figure 41

If there is damage to the wire or cable, refer to the wire and cable damage conditions for the applicable wire or cable configuration.

J. Aluminum Wire

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

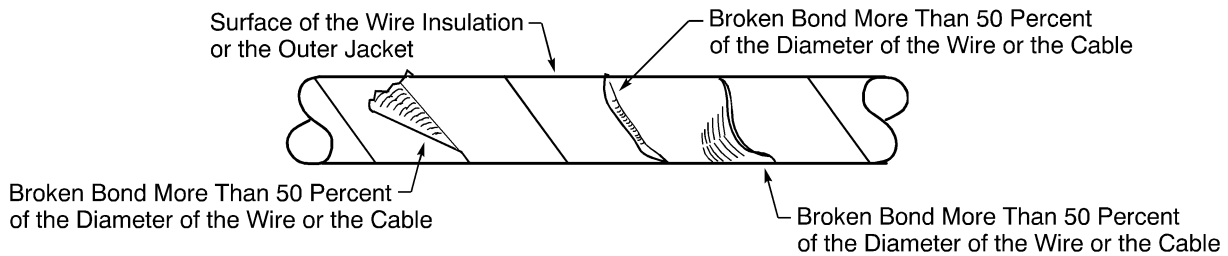
This paragraph is applicable for wires with an aluminum conductor. Refer to Subject 20-00-13.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Repair is necessary when these types of damage occur:

- Damage to the conductor; repair with a splice, refer to Subject 20-30-13
- Damage that goes through the primary insulation; refer to Paragraph 3.A.
- Damage that goes into the primary insulation; refer to Paragraph 3.A.
- The bond between the overlaps of the tape of the insulation is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 42 and Paragraph 3.C.
- Damage to the insulation of a splice assembly when the conductor splice does not have damage; refer to Paragraph 3.F.



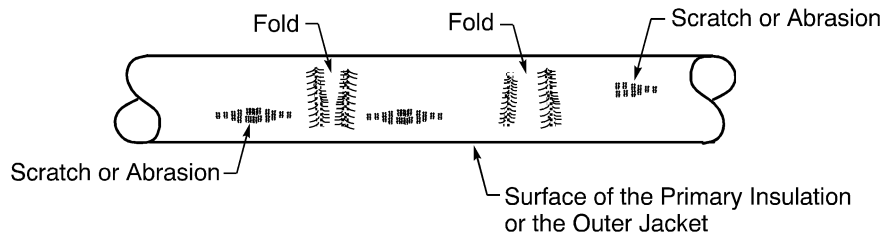
UNSERVICEABLE BROKEN BONDS

Figure 42

Repair is not necessary when these types of damage occur:

- A fold in the insulation at a bend
- A small scratch on the surface of the insulation
- Abrasion that makes the surface of the insulation rough
- The bond between the overlaps of the tape of the insulation is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 43 and Figure 44.

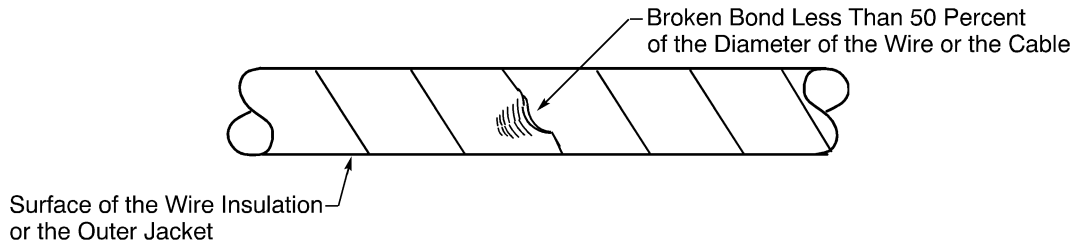


SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 43

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE BROKEN BONDS
Figure 44

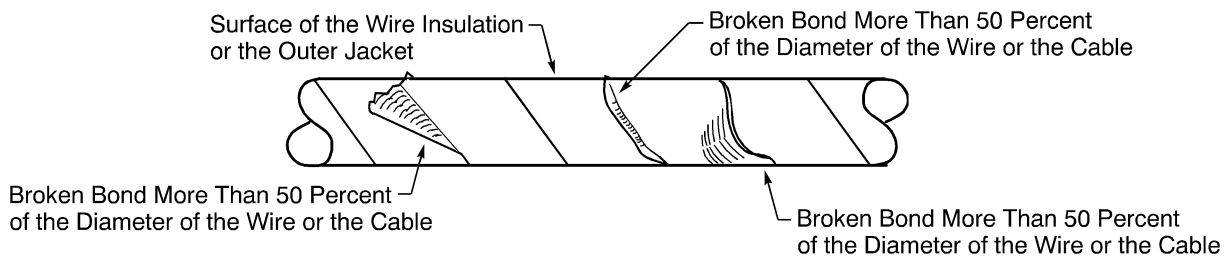
K. Copper Power Feeder Wire

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

This paragraph is applicable for copper AWG 8 through AWG 4/0 wires that supply large quantities of power to equipment during normal airplane operation.

Repair is necessary when these types of damage occur:

- Damage to the conductor; repair with a splice, refer to Subject 20-30-13
- Damage that goes through the primary insulation; refer to Paragraph 3.A.
- Damage that goes into the primary insulation; refer to Paragraph 3.A.
- The bond between the overlaps of the tape of the insulation is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 45 and Paragraph 3.C.
- Damage to the insulation of a splice assembly when the conductor splice does not have damage; refer to Paragraph 3.F.



UNSERVICEABLE BROKEN BONDS
Figure 45

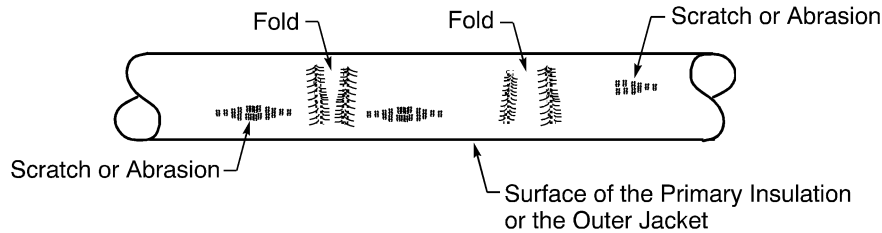
Repair is not necessary when these types of damage occur:

- A fold in the insulation at a bend
- A small scratch on the surface of the insulation
- Abrasion that makes the surface of the insulation rough
- The bond between the overlaps of the tape of the insulation is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 46 and Figure 47.

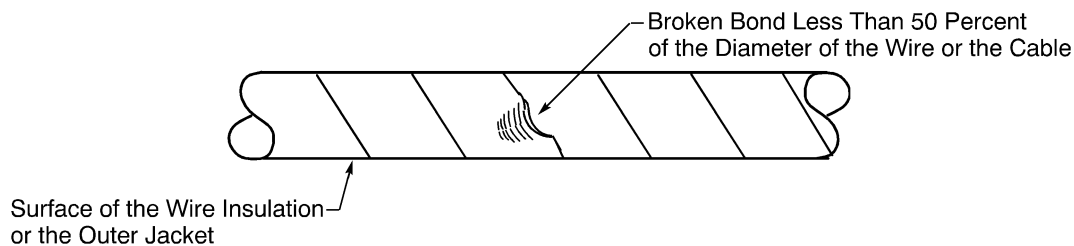
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 46



SERVICEABLE BROKEN BONDS

Figure 47

L. Bond and Ground Jumper Assembly

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Replacement of the jumper assembly can be necessary if there are broken strands of the conductor. Refer to Subject 20-20-00 for the damage limits and service conditions.

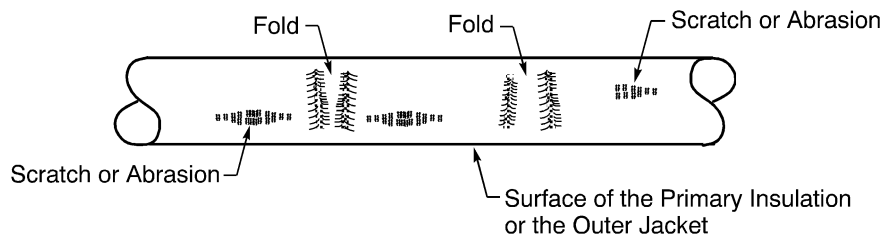
Repair of an insulated jumper is necessary when these types of damage occur:

- Damage that goes through the insulation; refer to Paragraph 3.A.
- Damage that goes into the insulation; refer to Paragraph 3.A.

Repair is not necessary when these types of damage occur:

- A fold in the insulation at a bend
- A small scratch on the surface of the insulation
- Abrasion that makes the surface of the insulation rough
- The bond between the overlaps of the tape of the insulation is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 48.



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 48

20-10-13

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE****M. Coax Cable**

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

The replacement of a coax cable is recommended if the damage to the shield or the dielectric is high.

Replacement of a coax cable is necessary when one of these conditions occurs:

- A coax cable that has a splice, has more damage that makes it necessary to repair the cable with a splice again
- The cable is in the Low Range Radio Altimeter Antenna System
- The cable is a tuned capture or tracking antenna cable that are connected to the Collins 51RV1, 51RV2, or 51RV4 VOR/ILS receivers.

CAUTION: COAX CABLES IN THESE SYSTEMS ARE SENSITIVE TO REPAIRS. IF THESE CABLES HAVE DAMAGE, THEY CANNOT BE REPAIRED AND MUST BE REPLACED:

- THE CABLES OF THE LOW RANGE RADIO ALTIMETER ANTENNA SYSTEM
- THE TUNED CAPTURE AND TRACKING ANTENNA CABLES THAT ARE CONNECTED TO THE COLLINS 51RV1, 51RV2, OR 51RV4 VOR/ILS RECEIVERS.

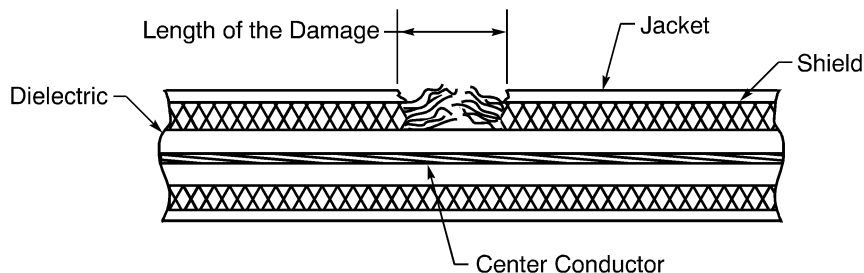
Repair is necessary when these types of damage occur:

- Damage to the shield is more than 1 inch in length; refer to Paragraph 7.B. or Paragraph 7.C. for a repair with a splice
- Damage to the shield is more than 25 percent of the circumference of the shield; refer to Paragraph 7.B. or Paragraph 7.C. for a repair with a splice
- Damage to the shield is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 7.A.
- Damage that goes through the jacket; refer to Paragraph 3.B.
- Damage that goes into the jacket; refer to Paragraph 3.B.

Refer to Figure 49.

CAUTION: COAX CABLES IN SOME SYSTEMS ARE SENSITIVE TO REPAIRS WITH A SPLICE. BEFORE A REPAIR WITH A SPLICE IS MADE ON A CABLE, AN ANALYSIS OF THE SYSTEM MUST BE DONE TO FIND THE APPLICABLE REPAIR CONDITIONS FOR THAT COAX CABLE IN THAT SYSTEM.

NOTE: Boeing Service Engineering can answer questions about the damage and repair conditions applicable for coax cables in a system.



UNSERVICEABLE JACKET AND SHIELD DAMAGE

Figure 49

20-10-13

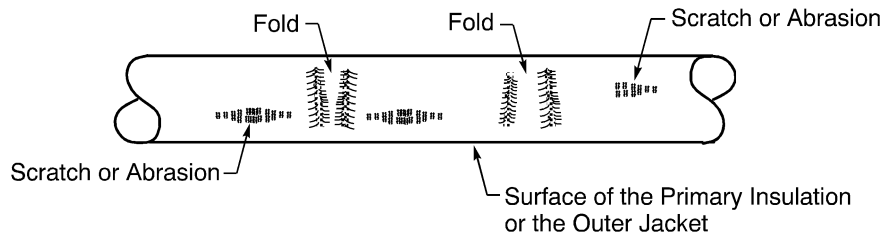
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Repair is not necessary when these types of damage occur:

- A fold in the jacket at a bend
- A small scratch on the surface of the jacket
- Abrasion that makes the surface of the jacket rough.

Refer to Figure 50.



SERVICEABLE SCRATCHES AND ABRASION ON A COAX CABLE JACKET
Figure 50

N. Fire Resistant Wire

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Replacement of a fire resistant wire is necessary when one of these conditions occurs:

- A wire that has a temporary repair, has more damage that makes it necessary to repair the wire again
- The wire has a temporary repair it has been a maximum of 500 flight hours subsequent to the repair
- A BMS 13-67 wire has damage that goes into the shield.

CAUTION: REPLACEMENT OF THE FIRE RESISTANT WIRE THAT HAS TEMPORARY REPAIR IS NECESSARY. THE WIRE MUST BE REPLACED AT A MAXIMUM OF 500 FLIGHT HOURS SUBSEQUENT TO THE REPAIR.

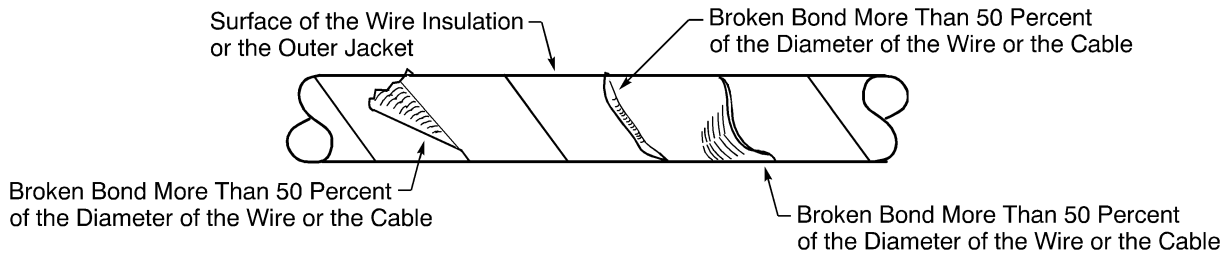
CAUTION: REPLACEMENT OF A BMS 13-67 WIRE THAT HAS DAMAGE TO THE SHIELD IS NECESSARY.

These conditions are applicable for unshielded fire resistant wire:

- If the conductor has damage, a temporary repair can be made; refer to Paragraph 9.B.
- If the damage goes through all the layers of insulation and the conductor can be seen, but the conductor does not have damage a temporary repair can be made; refer to Paragraph 9.A.
- If the bond between the overlaps of the tape of the insulation is broken for a length more than 50 percent of the diameter of the wire, a permanent repair can be made; refer to Figure 51 and Paragraph 9.A.
- If the damage goes into the outer layer of insulation but not through the outer layer of insulation, a permanent repair can be made; refer to Paragraph 9.A.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



UNSERVICEABLE BROKEN BONDS

Figure 51

These conditions are applicable for BMS 13-67 fire resistant wire and cable:

- If the damage goes into the shield, the wire or cable must be replaced
- If the damage goes through all the layers of insulation and the shield can be seen, but the shield does not have damage, a temporary repair can be made; refer to Paragraph 9.A.
- If the damage goes into the outer layer of insulation, but not through the outer layer of insulation, a temporary repair can be made; refer to Paragraph 9.A.

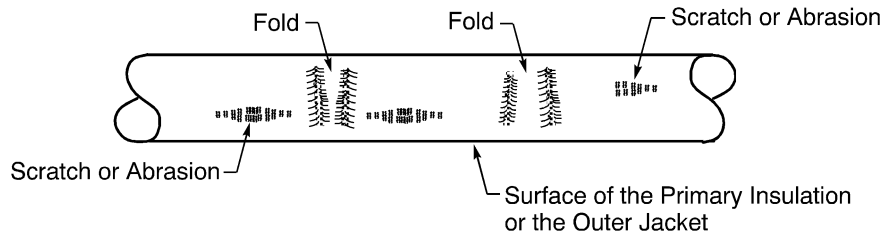
These conditions are applicable for other shielded fire resistant wire and cable:

- If the damage goes into the shield, the wire or cable must be replaced
- If the damage goes through all the layers of insulation and the shield can be seen, but the shield does not have damage, a temporary repair can be made; refer to Paragraph 9.A.
- If the damage goes into the outer layer of insulation, but not through the outer layer of insulation, a permanent repair can be made; refer to Paragraph 9.A.

Repair is not necessary when these type of damage occur:

- A fold in the insulation at a bend
- A small scratch on the surface of the insulation
- Abrasion that makes the surface of the insulation rough
- The bond between the overlaps of the tape of the insulation is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 52 and Figure 53.

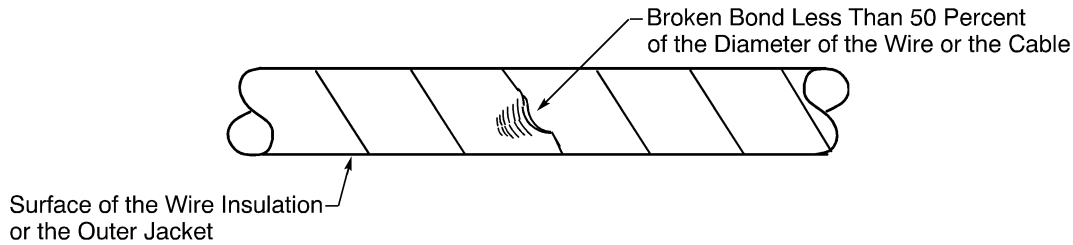


SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 52

STANDARD WIRING PRACTICES MANUAL

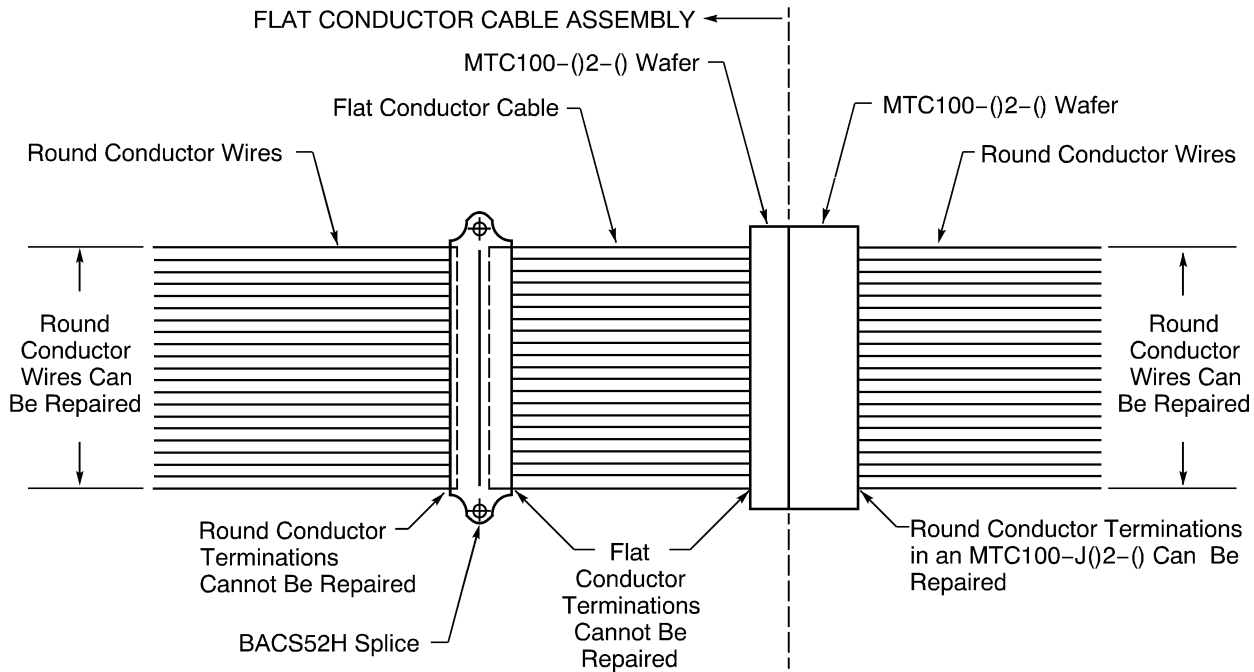
REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE BROKEN BONDS
Figure 53

O. Flat Conductor Cable Assembly

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.



FLAT CONDUCTOR CABLE ASSEMBLY
Figure 54

Refer to Figure 54.

Replacement of the cable assembly is necessary if these components have damage:

- The flat conductor cable
- The wafer of the connector
- The termination of the flat conductor cable
- The termination of a round conductor wire in the splice
- The BACS52H splice.

NOTE: The Boeing Spares Organization supplies the flat conductor cable assembly.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Repair is possible if these components have damage:

- A round conductor wire; refer to Paragraph 2.A.
- The termination of a round conductor wire in an MTC100-J()2(-) wafer of the connector; refer to Subject 20-73-00 to replace the round conductor wire.

P. ARINC 629 S280W502(-) Stub Cable

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Replacement is necessary when:

- Damage to the conductor of a cable that has a repair
- Damage to the shield of a cable that has a repair
- Damage to the primary insulation of a cable that has a repair.

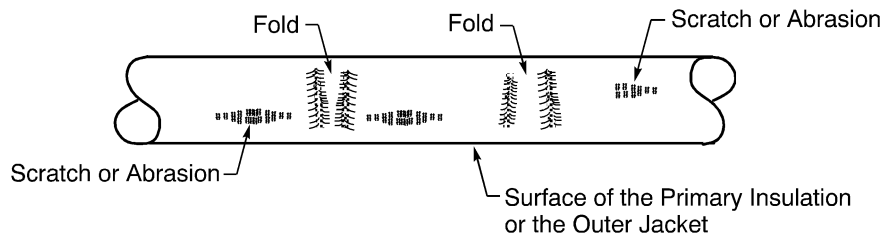
Repair is necessary when these types of damage occur:

- Damage to the conductor; repair with a splice, refer to Subject 20-11-11
- Damage to the shield that is more than 1 inch in length or more than 25 percent of the circumference of the shield; repair with a splice, refer to Subject 20-11-11
- Damage to the shield that is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 6.C. for the repair of the shield
- Damage to the primary insulation; repair with a splice, refer to Subject 20-11-11
- Damage to the jacket of the cable; refer to Paragraph 3.B. for the repair of the jacket.

Repair is not necessary when these types of damage occur:

- A fold in the jacket or the primary insulation at a bend
- A small scratch on the surface of the jacket or the primary insulation
- Abrasion that makes the surface of the jacket or the primary insulation rough.

Refer to Figure 55.



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 55

Q. ARINC 629 S280W651(-) Data Bus Cable Assembly

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Replacement is necessary when a cable, that has four splice assemblies on the same wire, has a damage condition that makes it necessary to repair that wire with a splice again.

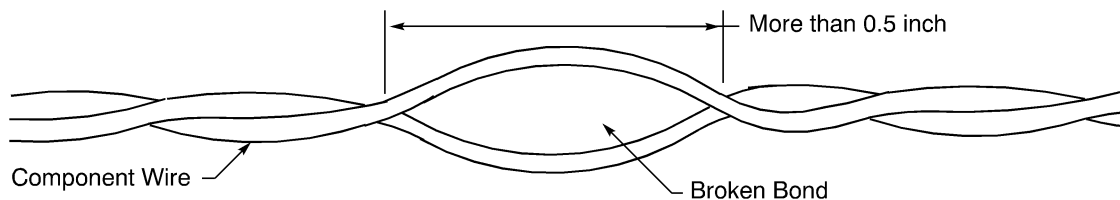
STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Repair of an unshielded cable is necessary when these types of damage occur:

- Damage to the conductor; refer to Subject 20-11-11 for the repair with a splice
- Damage that goes through the primary insulation; refer to Subject 20-11-11 for the repair of the primary insulation of the wire
- Damage that goes into the primary insulation; refer to Subject 20-11-11 for the repair of the primary insulation of a wire
- The bond between the component wires is broken for a distance more than 0.5 inch at a location that is not at a coupler, a suppressor, or a clamp; refer to Figure 56 for the unserviceable condition and Subject 20-11-11 for the repair of the broken bond
- The bond between the overlaps of the tape of the insulation is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 57 for the unserviceable condition and Subject 20-11-11 for the repair of the broken bonds.

Repair of a shielded cable is necessary when these types of damage occur:

- Damage to the conductor; refer to Subject 20-11-11 for the repair with a splice
- Damage to the primary insulation; refer to Subject 20-11-11 for the repair with a splice
- Damage to the shield that is more than 1 inch in length or more than 25 percent of the circumference of the shield; refer to Subject 20-11-11 for the repair with a splice
- Damage to the shield that is less than 1 inch in length and less than 25 percent of the circumference of the shield; refer to Paragraph 6.C. for the repair of the shield
- Damage that goes through the jacket, but the shield has no damage; refer to Paragraph 3.B. for the repair of the jacket
- Damage that goes into the jacket; refer to Paragraph 3.B. for the repair of the jacket
- The bond between the component wires is broken for a distance more than 0.5 inch at a location that is not at a coupler, a suppressor, or a clamp; refer to Figure 56 for the unserviceable condition and Subject 20-11-11 for the repair of the broken bond
- The bond between the overlaps of the tape of the jacket is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 57 for the unserviceable condition and Paragraph 3.C. for the repair of the broken bonds.

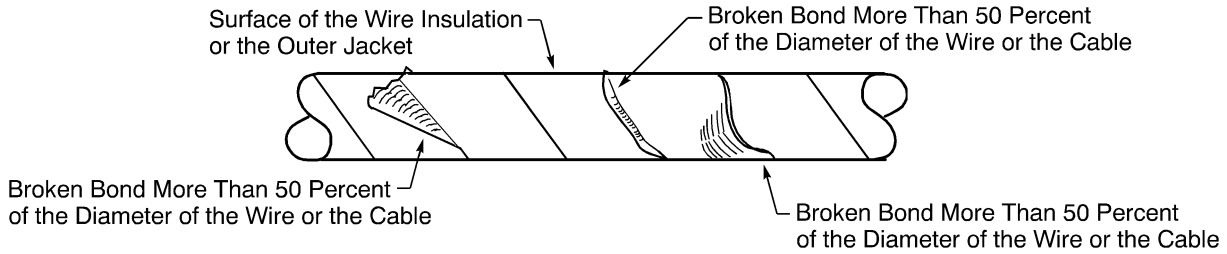


UNSERVICEABLE BROKEN BOND OF THE COMPONENT WIRES

Figure 56

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



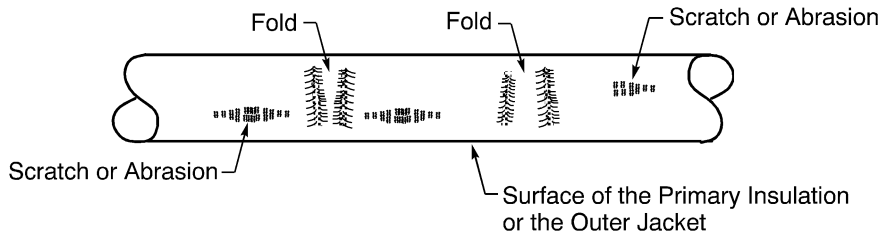
UNSERVICEABLE BROKEN BONDS OF THE TAPE

Figure 57

Repair is not necessary when these types of damage occur:

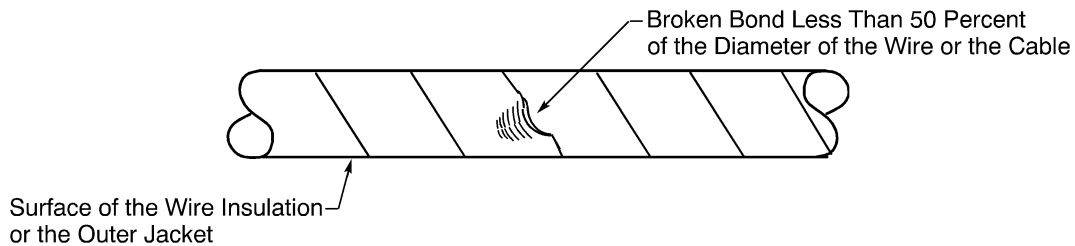
- A fold in the jacket or the primary insulation at a bend
- A small scratch on the surface of the jacket or the primary insulation
- Abrasion that makes the surface of the jacket or the primary insulation rough.

Refer to Figure 58 and Figure 59.



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 58



SERVICEABLE BROKEN BONDS

Figure 59

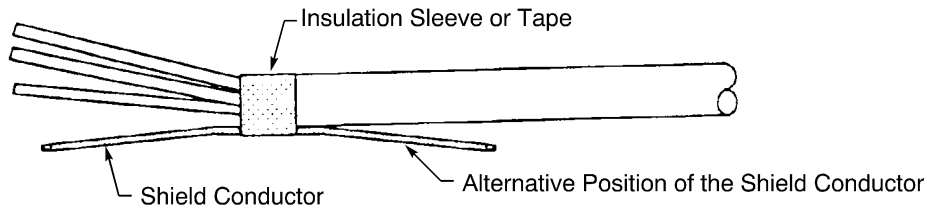
R. Shield Pull Through Shield Ground Wire

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Repair is necessary when one or more of the strands of the shield conductor are damaged; refer to Figure 60 and Paragraph 8.A.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SHIELD PULL THROUGH SHIELD GROUND WIRE

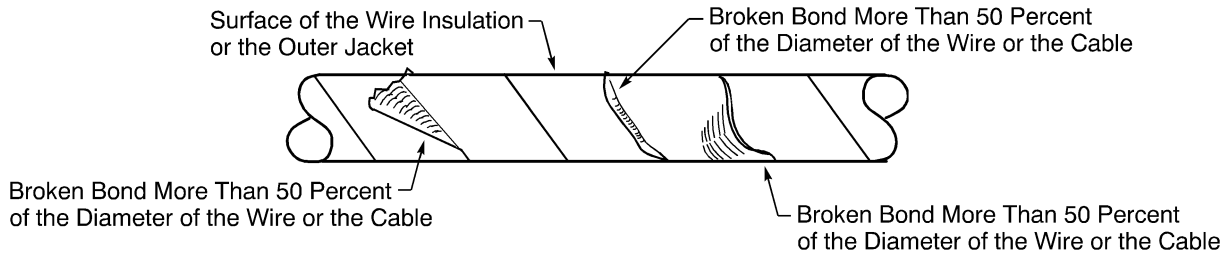
Figure 60

S. Thermocouple Wire

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Repair is necessary when these types of damage occur:

- Damage to the conductor; refer to Paragraph 10.A.
- Damage that goes through the primary insulation; refer to Paragraph 3.A.
- Damage that goes into the primary insulation; refer to Paragraph 3.A.
- The bond between the overlaps of the tape of the insulation is broken for a length more than 50 percent of the diameter of the wire; refer to Figure 61 and Paragraph 3.C.
- Damage to the insulation of a splice assembly when the conductor splice does not have damage; refer to Paragraph 3.F.



UNSERVICEABLE BROKEN BONDS

Figure 61

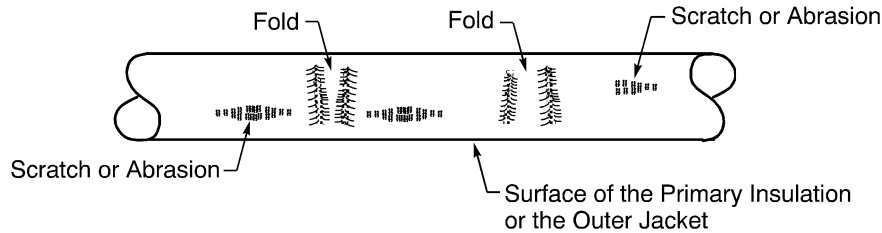
Repair is not necessary when these types of damage occur:

- A fold in the insulation at a bend
- A small scratch on the surface of the insulation
- Abrasion that makes the surface of the insulation rough
- The bond between the overlaps of the tape of the insulation is broken for a length that is less than 50 percent of the diameter of the wire.

Refer to Figure 62 and Figure 63.

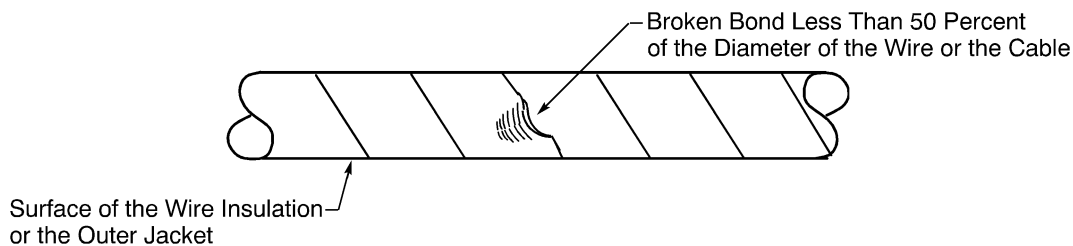
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 62



SERVICEABLE BROKEN BONDS

Figure 63

T. Engine Wire Harness Wire and Cable

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Refer to Table 3 for the location of the applicable wire and cable damage conditions.

An engine wire harness wire or cable that is repaired with a splice:

- Is a temporary repair
- Must be replaced at a maximum of 500 flight hours subsequent to the repair.

CAUTION: REPLACEMENT OF THE WIRE THAT HAS TEMPORARY REPAIR IS NECESSARY. THE WIRE MUST BE REPLACED AT A MAXIMUM OF 500 FLIGHT HOURS SUBSEQUENT TO THE REPAIR.

U. Fuel System Wiring

Fuel Systems Wiring is specified as a Critical Design Configuration Control Limitation (CDCCL).

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

For the conditions that are applicable for:

- The data in this paragraph, refer to Paragraph 1.A.
- Fuel Quantity Indicator System wiring that is in the fuel tank, refer to Paragraph 2.V.
- Fuel Quantity Indicator System wiring that is not in the fuel tank, refer to Paragraph 2.W.

V. Fuel Quantity Indicator System Wire and Cable that are Installed in a Fuel Tank

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

Fuel Quantity Indicator System Wire and Cable is specified as Critical Design Configuration Limitation (CDCCL).

STANDARD WIRING PRACTICES MANUAL

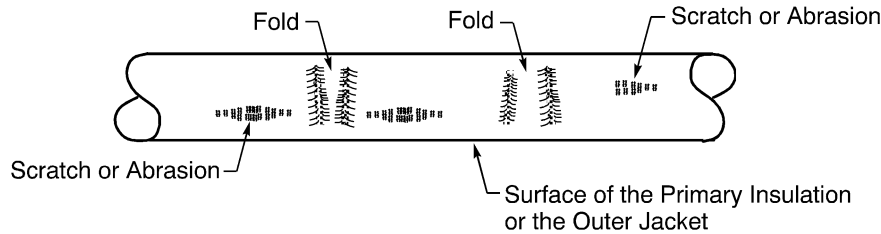
REPAIR OF ELECTRICAL WIRE AND CABLE

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

Repair is not is necessary when these types of damage occur:

Refer to Figure 64.

- A fold in the insulation at a bend
- A small scratch on the surface of the insulation
- Abrasion that makes the surface of the insulation rough.



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 64

Table 10 gives the damage conditions and repair procedures for the specified fuel quantity indicator system wire and cable that are installed in the fuel tank.

CAUTION: A FQIS CABLE WITH A GREEN OUTER BRAID THAT HAS A TEMPORARY REPAIR MUST BE REPLACED AT A MAXIMUM OF 4000 FLIGHT HOURS SUBSEQUENT TO THE REPAIR.

NOTE: The replacement of the wire or cable is a satisfactory alternative to the repair of the wire or cable.

**Table 10
DAMAGE CONDITIONS AND REPAIR PROCEDURES**

Fuel Quantity Indicator System	Damage Condition	Repair Condition	Reference
Hi-Z	The conductor has damage	Assembly of a splice	Subject 20-14-12
	The conductor insulation has damage	Assembly of a splice	Subject 20-14-12
	The shield has damage	Assembly of a splice	Subject 20-14-12
	The damage goes through the outer jacket	Assembly of a splice	Subject 20-14-12
	The outer jacket has damage	Assembly of a splice	Subject 20-14-12
	The bond between the overlaps of the tape of the outer jacket is broken	Assembly of a splice	Subject 20-14-12
	The green outer braid has damage, the cable jacket has no damage	Repair of the green outer braid - Permanent Repair	Subject 20-14-12
	The green outer braid has damage less than one inch in length, the cable jacket has no damage	Repair of the green outer braid - Temporary Repair	Subject 20-14-12

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Table 10 (continued)

Fuel Quantity Indicator System	Damage Condition	Repair Condition	Reference
Low-Z	The conductor has damage	Assembly of a splice	Subject 20-14-12
	The damage goes through the insulation	Assembly of a splice	Subject 20-14-12
	The insulation has damage	Assembly of a splice	Subject 20-14-12
	The bond between the overlaps of the insulation tape is broken	Assembly of a splice	Subject 20-14-12
	The green outer braid has damage, the cable jacket has no damage	Repair of the green outer braid - Permanent Repair	Subject 20-14-12
	The green outer braid has damage less than one inch in length, the cable jacket has no damage	Repair of the green outer braid - Temporary Repair	Subject 20-14-12

W. Fuel Quantity Indicator System Wire and Cable that are not Installed in a Fuel Tank

For the conditions that are applicable to the data in this paragraph, refer to Paragraph 1.A.

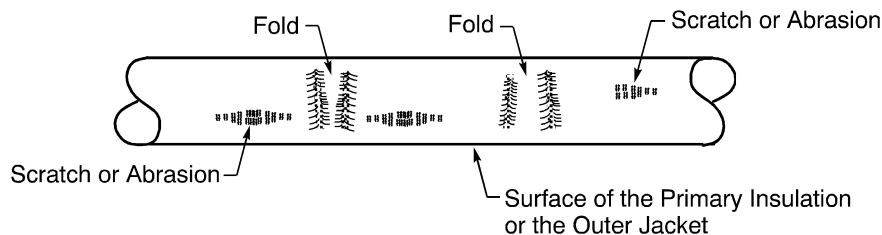
Fuel Quantity Indicator System Wire and Cable is specified as Critical Design Configuration Limitation (CDCCL).

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

Repair not is necessary when these types of damage occur:

Refer to Figure 65.

- A fold in the insulation at a bend
- A small scratch on the surface of the insulation
- Abrasion that makes the surface of the insulation rough.



SERVICEABLE SCRATCHES, FOLDS, AND ABRASION

Figure 65

Table 11 gives the damage conditions and repair procedures for the specified fuel quantity indicator system wire and cable that is external to the fuel tank.

NOTE: The replacement of the wire or cable is a satisfactory alternative to the repair of the wire or cable.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

**Table 11
DAMAGE CONDITIONS AND REPAIR PROCEDURES**

Wire or Cable	Damage Condition	Applicable Condition	Repair Procedure	
BMS13-60T27	Damage to the inner jacket	Fuel Vapor	Paragraph 5.C.	
		No Fuel Vapor	Paragraph 5.C. Paragraph 5.D.	
	Damage to the outer shield is more than 1 inch in length, or more than 25 percent of the circumference of the shield	Fuel Vapor	Paragraph 5.C.	
		No Fuel Vapor	Paragraph 5.C. Paragraph 5.D.	
	Damage to the shield is less than 1 inch in length and less than 25 percent of the circumference of the shield	Fuel Vapor	Paragraph 6.C.	
		No Fuel Vapor	Paragraph 6.C.	
	Damage goes into or through the outer jacket, but the outer shield has no damage	Fuel Vapor	Paragraph 3.B.	
		No Fuel Vapor	Paragraph 3.B.	
	10-60816-61	Damage to the inner jacket	Fuel Vapor	Paragraph 5.C.
			No Fuel Vapor	Paragraph 5.C. Paragraph 5.D.
		Damage to the outer shield is more than 1 inch in length, or more than 25 percent of the circumference of the shield	Fuel Vapor	Paragraph 5.C.
			No Fuel Vapor	Paragraph 5.C. Paragraph 5.D.
Damage to the outer shield is less than 1 inch in length and less than 25 percent of the circumference of the shield		Fuel Vapor	Paragraph 6.C.	
		No Fuel Vapor	Paragraph 6.C.	
Damage goes into or through the outer jacket, but the outer shield has no damage		Fuel Vapor	Paragraph 3.B.	
		No Fuel Vapor	Paragraph 3.B.	

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Table 11 (continued)

Wire or Cable	Damage Condition	Applicable Condition	Repair Procedure
55A6087-20	Damage to the inner jacket	Fuel Vapor	Paragraph 5.C.
		No Fuel Vapor	Paragraph 5.C.
			Paragraph 5.D.
			Paragraph 11.B.
	Damage to the outer shield is more than 1 inch in length, or more than 25 percent of the circumference of the shield	Fuel Vapor	Paragraph 5.C.
		No Fuel Vapor	Paragraph 5.C.
			Paragraph 5.D.
			Paragraph 11.B.
	Damage to the outer shield is less than 1 inch in length and less than 25 percent of the circumference of the shield	Fuel Vapor	Paragraph 6.C.
		No Fuel Vapor	Paragraph 6.C.
	Damage goes through the outer jacket, but the outer shield has no damage	Fuel Vapor	Paragraph 3.B.
		No Fuel Vapor	Paragraph 3.B.
Damage goes into the outer jacket	Fuel Vapor	Paragraph 3.B.	
		Paragraph 11.A.	
	No Fuel Vapor	Paragraph 3.B.	
		Paragraph 11.A.	

Table 12

APPROVED SUPPLIERS FOR FQIS WIRE AND CABLE

Wire or Cable	Supplier
BMS13-60T27C01G20	Tensolite
10-60816-61	Tensolite
	Thermax
55A6087-20	Raychem

3. REPAIR OF THE INSULATION OF WIRE AND CABLE

A. Repair of the Primary Insulation of a Wire

Refer to:

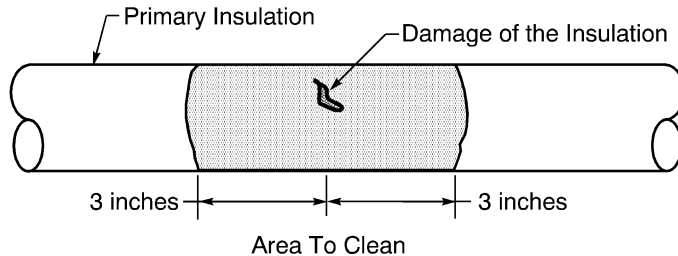
- Paragraph 1.B. for the applicable conditions for the repair of wire
 - Paragraph 2. for the damage and repair conditions for the wire that must have a repair.
- (1) Remove loose pieces of insulation and rough edges at the area of the damage.
Make sure that the insulation has a smooth surface.
 - (2) Clean the insulation with isopropyl alcohol. Refer to Figure 66.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure:

- To clean the damaged area of the insulation
- To clean the insulation approximately 3 inches on each side of the damage
- That the cleaned area is dry.



AREA TO CLEAN
Figure 66

(3) If the damage is a cavity in the insulation, fill in the cavity.

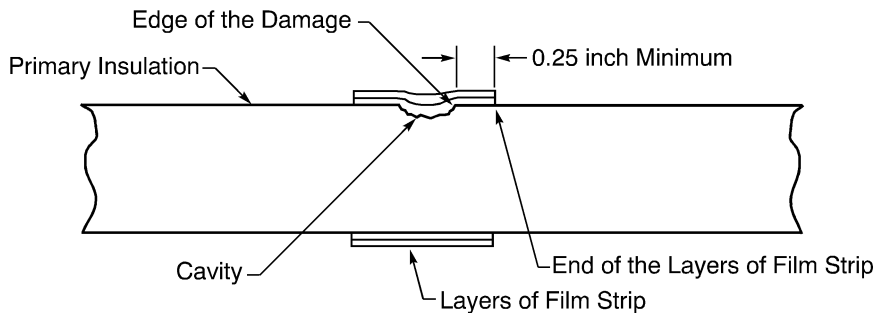
(a) Make a selection of a Temperature Grade D film strip from Table 6.

NOTE: A Temperature Grade D TFE tape from Table 6 is a satisfactory alternative to the film strip.

(b) Wind the necessary layers of film strip on the insulation to fill the cavity and make a smooth surface. Refer to Figure 67.

Make sure that each layer of film strip:

- Extends a minimum of 0.25 inch farther than each end of the damaged area
- Makes a 50 percent minimum circumferential overlap
- Is wound a minimum of two times on the insulation
- Is wound in the opposite direction of the layer before.



CAVITY FILLED WITH FILM STRIP
Figure 67

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

(4) Make a selection of one of these tapes from Table 6:

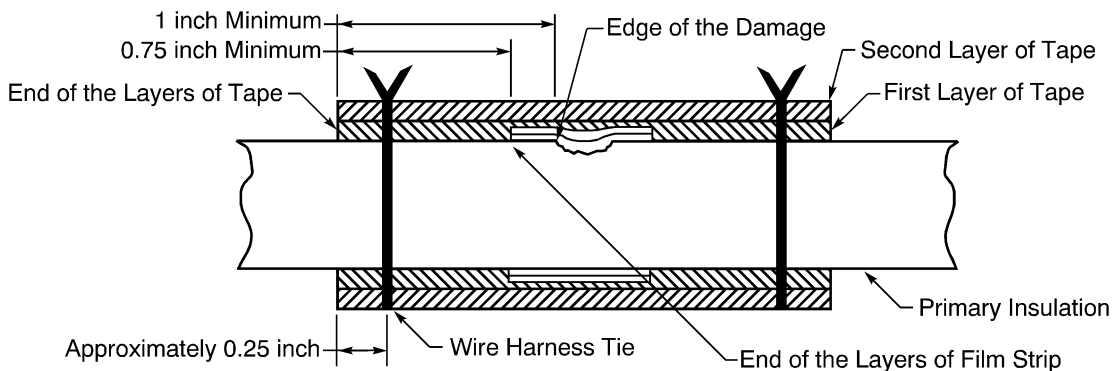
- Temperature Grade D TFE tape
- Temperature Grade C silicone tape.

Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.

(5) Wind two layers of the tape on the damaged area. Refer to Figure 68.

Make sure that:

- If film strip is used to fill the cavity, each end of the tape extends a minimum of 0.75 inch farther than each end of the film strip
- Each end of the tape extends a minimum of 1 inch farther than each end of the damaged area
- Each layer of tape makes a 50 percent minimum circumferential overlap
- Each layer of tape is wound a minimum of two times on the wire
- The second layer of tape is wound in the opposite direction of the first layer.



TAPE AND WIRE HARNESS TIES ON THE INSULATION WITH DAMAGE

Figure 68

(6) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.25 inch from the end of the tape.

Make sure that the lacing tape is the correct Temperature Grade.

Refer to:

- Figure 68
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

B. Repair of the Outer Jacket of a Cable

Refer to:

- Refer to Paragraph 1.B. for the applicable conditions for the repair of cable
- Paragraph 2. for the damage and repair conditions for the cable that must have a repair.

(1) Make a selection of one of these tapes from Table 6:

- Temperature Grade D TFE tape
- Temperature Grade C silicone tape.

Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

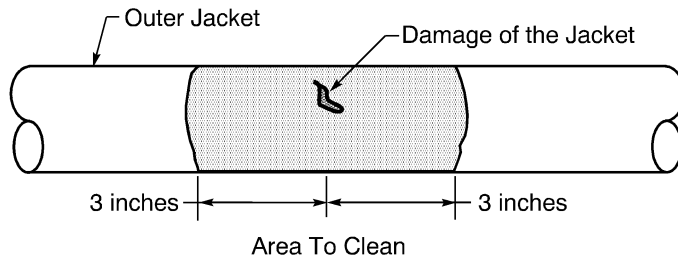
(2) Remove loose pieces of insulation and rough edges at the area of the damage.

Make sure that the insulation has a smooth surface.

(3) Clean the outer jacket with isopropyl alcohol. Refer to Figure 69.

Make sure:

- To clean the damaged area of the outer jacket
- To clean the outer jacket approximately 3 inches on each side of the damage
- That the cleaned area is dry.

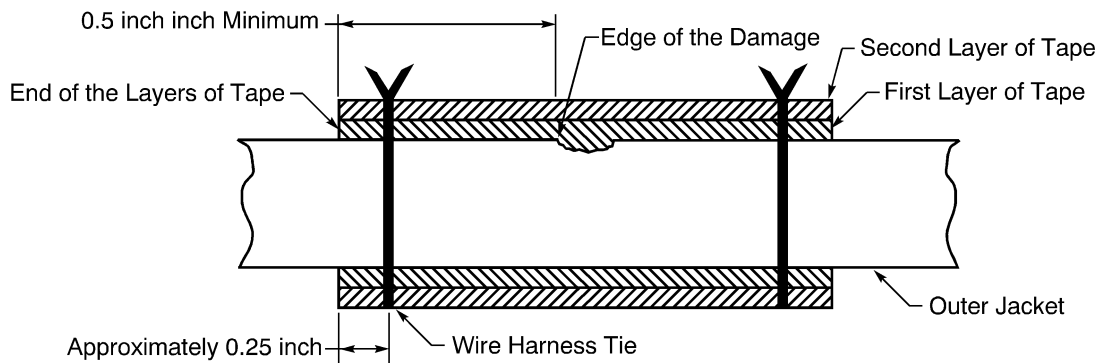


AREA TO CLEAN
Figure 69

(4) Wind two layers of the tape on the damaged area. Refer to Figure 70.

Make sure that:

- Each end of the tape extends a minimum of 0.5 inch farther than each end of the damaged area
- Each layer of tape makes a 50 percent minimum circumferential overlap
- Each layer of tape is wound a minimum of two times on the cable
- The second layer of tape is wound in the opposite direction of the first layer.



TAPE AND WIRE HARNESS TIES ON THE CABLE
Figure 70

(5) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.25 inch from the end of the tape.

Make sure that the lacing tape is the correct Temperature Grade.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Refer to:

- Figure 70
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

C. Repair of a Broken Bond Between Overlaps in the Primary Insulation and Outer Jacket

Refer to:

- Paragraph 1.B. for the applicable conditions for the repair of wire and cable
- Paragraph 2. for the damage and repair conditions for the wire or the cable that must have a repair.

(1) Make a selection of one of these insulation materials from Table 6:

- Temperature Grade D TFE tape
- Temperature Grade D film strip
- Temperature Grade C silicone tape.

Make sure that the insulation material is the correct Temperature Grade.

(2) Remove loose pieces of insulation and rough edges at the area of the broken bond.

Make sure that the insulation has a smooth surface.

(3) Clean the insulation with isopropyl alcohol.

Make sure:

- To clean the damaged area of the insulation
- To clean the insulation approximately 3 inches on each side of damage
- That the cleaned area is dry.

(4) Wind two layers of the insulation material on the wire.

Make sure that:

- Each end of the insulation material extends a minimum of 1 inch farther than each end of the damaged area
- Each layer makes a 50 percent minimum circumferential overlap
- Each layer is wound a minimum of two times on the wire
- The second layer of tape is wound in the opposite direction of the first layer.

(5) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.25 inch from the end of the insulation material.

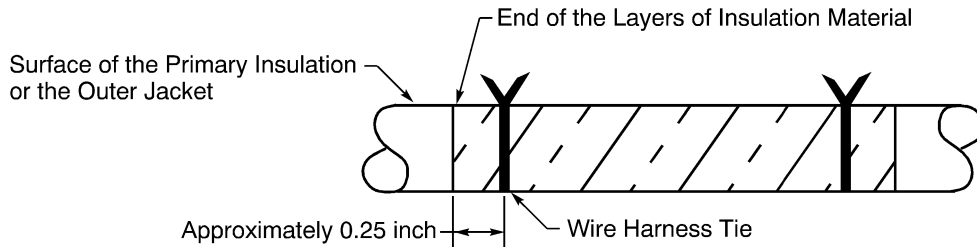
Make sure that the lacing tape is the correct Temperature Grade.

Refer to:

- Figure 71
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



LOCATION OF WIRE HARNESS TIES

Figure 71

D. Repair of the Primary Insulation of a Wire in a Cable

Refer to Paragraph 1.B. for the applicable conditions for the repair of wire and cable.

- (1) Make a selection of a Temperature Grade D film strip from Table 6.

NOTE: A Temperature Grade D TFE tape from Table 6 is a satisfactory alternative to the film strip.

- (2) Make a selection of one of these tapes from Table 6:

- Temperature Grade D TFE tape
- Temperature Grade C silicone tape.

Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.

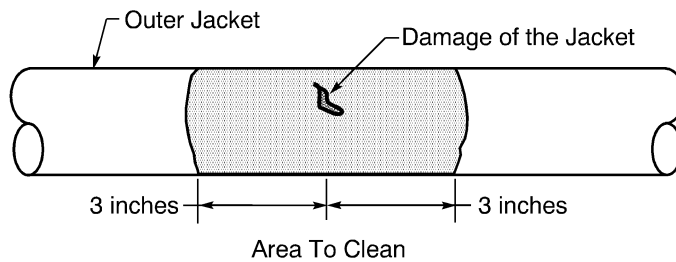
- (3) Remove loose pieces of insulation and rough edges at the area of the damage.

Make sure that the insulation has a smooth surface.

- (4) Clean the jacket with isopropyl alcohol. Refer to Figure 72.

Make sure:

- To clean the damaged area of the jacket
- To clean the jacket from the damaged area to a minimum of 3 inches on each side of the damage
- That the cleaned area is dry.



AREA TO CLEAN

Figure 72

- (5) Remove the necessary length of the jacket on each side of the damage.
Make sure a sufficient length is removed to repair the wires in the cable.

STANDARD WIRING PRACTICES MANUAL

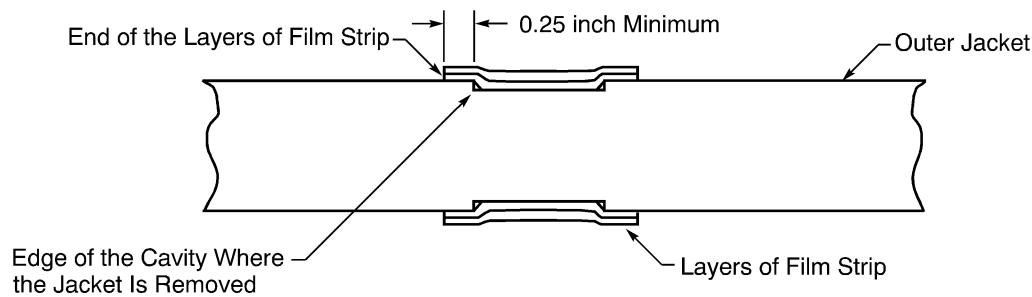
REPAIR OF ELECTRICAL WIRE AND CABLE

CAUTION: DO NOT CUT THE PRIMARY INSULATION ON THE WIRES IN THE CABLE WHEN THE LENGTH OF THE JACKET IS REMOVED. DAMAGE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

- (6) Repair the primary insulation of each wire with damage. Refer to Paragraph 3.A.
- (7) Wind the necessary layers of film strip on the cable to fill the cavity where the jacket is removed and to make a smooth surface. Refer to Figure 73.

Make sure that each layer of film strip:

- Makes an overlap of 0.25 inch minimum on each end of the outer jacket
- Makes a 50 percent minimum circumferential overlap
- Is wound a minimum of two times on the cable
- Is wound in the opposite direction of the layer before.

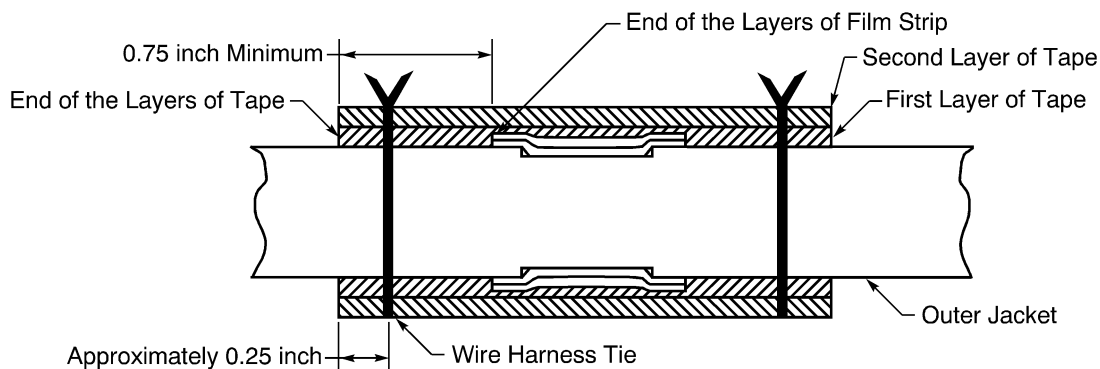


FILM STRIP ON THE CABLE
Figure 73

- (8) Put two layers of the tape on the damage. Refer to Figure 74.

Make sure that:

- Each end of the tape extends a minimum of 0.75 inch from each end of the film strip
- Each layer makes a 50 percent circumferential overlap
- The second layer of tape is in the opposite direction of the first layer.



TAPE AND WIRE HARNESS TIES ON THE CABLE
Figure 74

- (9) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.25 inch from the end of the tape.

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REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure that the lacing tape is the correct Temperature Grade.

Refer to:

- Figure 74
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

E. Repair of a Non-Metallic Braid

Refer to Paragraph 1.B. for the applicable conditions for the repair of wire and cable.

(1) Make a selection of one of these tapes from Table 6:

- Temperature Grade C or D TFE tape
- Temperature Grade C silicone tape
- Temperature Grade A polyester tape.

Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.

(2) Make a selection of a coating material from Table 8.

(3) Prepare the end of the braid:

- (a) Cut the ends of the damaged area of the braid.
Make sure that the ends of the braid are smooth and straight.
- (b) Apply a layer of the varnish on the end of the braid.
- (c) Cure the varnish at room temperature.

(4) If it is necessary, do Step (3) again.

(5) Wind a layer of the tape on the damaged area of the wire or cable.

Make sure that:

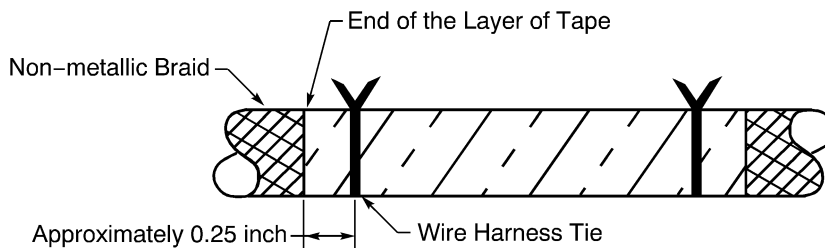
- Each end of the tape extends a minimum of 0.75 inch farther than each end of the damaged area
- The tape makes a 50 percent circumferential overlap.

(6) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.25 inch from the end of the tape.

Make sure that the lacing tape is the correct Temperature Grade.

Refer to:

- Figure 75
- Subject 20-10-11 for the procedure to assemble a wire harness tie.



TAPE AND WIRE HARNESS TIE ON THE WIRE OR CABLE

Figure 75

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

F. Repair of the Insulation of a Splice Assembly

For the damage and repair conditions that are applicable for:

- Wire and cable, refer to Paragraph 1.B.
- A splice assembly, refer to Paragraph 1.F.

- (1) Make a selection of a Temperature Grade C silicone tape from Table 6.

Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.

- (2) Remove loose pieces of insulation and rough edges at the area of the damage.

Make sure that the insulation has a smooth surface.

- (3) Clean the insulation of the splice assembly and the insulation of the wire or cable with isopropyl alcohol.

Make sure:

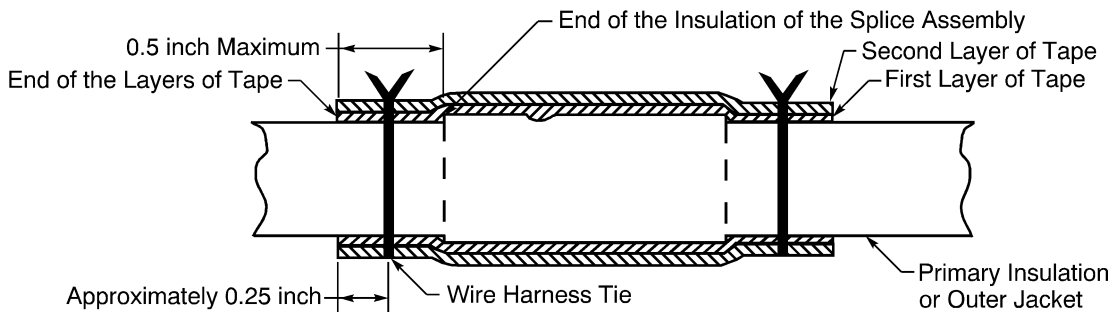
- To clean all of the insulation of the splice
- To clean the insulation of the wire or cable a minimum of 1 inch farther than each end of the splice.

- (4) Let the cleaned areas dry.

- (5) Wind a minimum of two layers of tape on the splice. Refer to Figure 76.

Make sure that each layer of tape:

- Extends a minimum of 0.5 inch farther than each end of the splice
- The tape makes 50 percent circumferential overlap
- The second layer of tape is in the opposite direction of the first layer.



POSITION OF THE TAPE AND THE WIRE HARNESS TIES

Figure 76

- (6) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.25 inch from the end of the tape.

Make sure that the lacing tape is the correct Temperature Grade.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Refer to:

- Figure 76
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

4. REPAIR OF UNSHIELDED WIRE AND UNSHIELDED CABLE WITH A SPLICE ASSEMBLY**A. Repair of a Wire**

Refer to Paragraph 1.E. for the applicable conditions for the repair of wire with a splice.

(1) Remove the damaged length of the wire.

(a) On one side of the damage, cut the wire.

Make sure that the end of the wire is perpendicular to the longitudinal axis of the wire.

(b) On the other side of the damage, cut the wire.

Make sure that the end of the wire is perpendicular to the longitudinal axis of the wire.

(2) Clean the insulation with isopropyl alcohol.

Make sure:

- To clean the area of the insulation from the end of each wire to a minimum of 3 inches from the end
- That the cleaned area is dry.

(3) Assemble a sealed splice.

For the splice of:

- An AWG 8 or larger high temperature wire, refer to Subject 20-30-13
- All other wires, refer to Subject 20-30-12 for the selection of a sealed splice configuration.

Make sure that the configuration is applicable for the wire.

B. Repair of a Cable

Refer to Paragraph 1.E. for the applicable conditions for the repair of cable with a splice.

(1) Remove the damaged length of the cable.

(a) On one side of the damage, cut the cable.

Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.

(b) On the other side of the damage, cut the cable.

Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.

(2) Clean the jacket with isopropyl alcohol.

Make sure:

- To clean the area of the jacket from the end of each cable to a minimum of 3 inches from the end
- That the cleaned area is dry.

(3) Assemble a sealed splice.

Refer to the selection of a sealed splice configuration in Subject 20-30-12.

Make sure that the configuration is applicable for the cable.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE****5. REPAIR OF SHIELDED WIRE AND SHIELDED CABLE WITH A SPLICE ASSEMBLY****A. Repair of a Shielded Wire with a Splice Assembly**

Refer to Paragraph 1.E. for the applicable conditions for the repair of wire with a splice.

- (1) Remove the damaged length of the shielded wire.
 - (a) On one side of the damage, cut the shielded wire.

Make sure that the end of the shielded wire is perpendicular to the longitudinal axis of the wire.
 - (b) On the other side of the damage, cut the shielded wire.

Make sure that the end of the shielded wire is perpendicular to the longitudinal axis of the wire.
- (2) Clean the jacket with isopropyl alcohol.

Make sure:

 - To clean the area from the end of each wire to a minimum of 3 inches from the end.
 - That the cleaned area is dry.
- (3) Assemble a sealed splice.

Refer to the selection of a sealed splice configuration in Subject 20-30-12.
Make sure that the configuration is applicable for the shielded wire.

B. Repair of a Shielded Wire with a Splice Assembly - Two Adjacent Shields

Refer to Paragraph 1.E. for the applicable conditions for the repair of wire with a splice.

- (1) Remove the damaged length of the shielded wire.
 - (a) On one side of the damage, cut the shielded wire.

Make sure that the end of the shielded wire is perpendicular to the longitudinal axis of the wire.
 - (b) On the other side of the damage, cut the shielded wire.

Make sure that the end of the shielded wire is perpendicular to the longitudinal axis of the wire.
- (2) Clean the outer jacket with isopropyl alcohol.

Make sure:

 - To clean the area from the end of each wire to a minimum of 3 inches from the end.
 - That the cleaned area is dry.
- (3) Assemble a sealed splice.

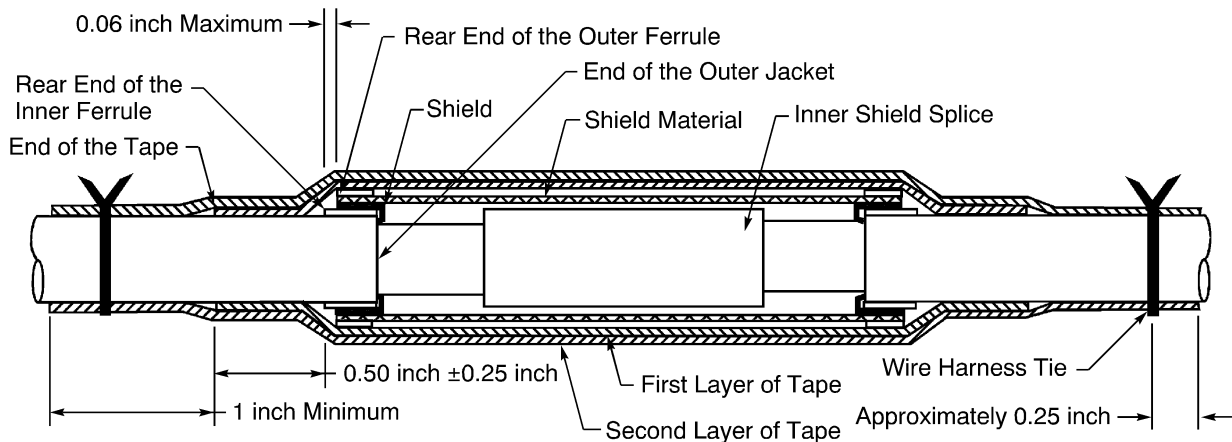
Refer to the selection of a sealed splice configuration in Subject 20-30-12.
Make sure that the configuration is applicable for the shielded wire.

C. Repair of a Shielded Wire with a Splice Assembly in a Fuel Vapor Area - Two Round Conductor Shields That Are Not Adjacent

Refer to Paragraph 1.E. for the applicable conditions for the repair of wire with a splice.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



CONFIGURATION OF THE SPLICE ASSEMBLY

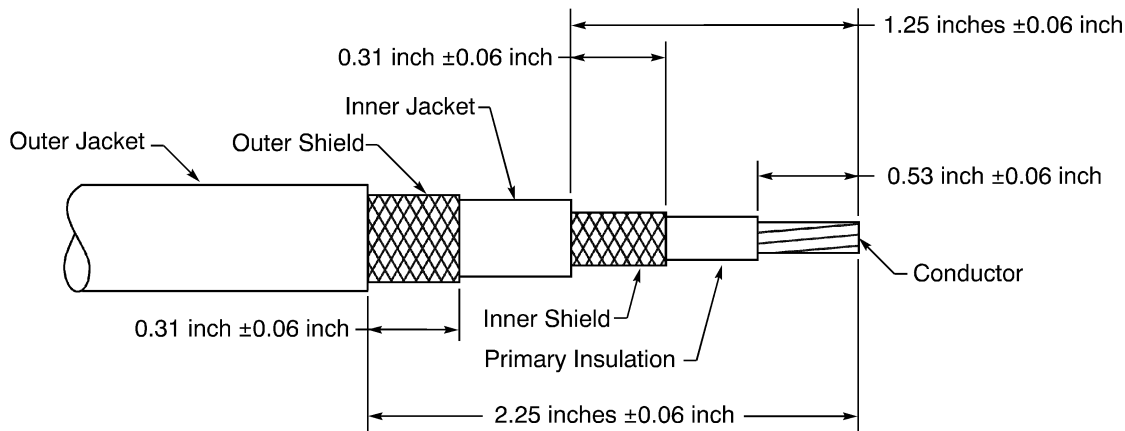
Figure 77

Refer to Figure 77.

(1) Prepare each end of the shielded wire.

Refer to:

- Figure 78
- Subject 20-00-15 for the outer jacket and insulation removal procedures.



SHIELDED WIRE PREPARATION

Figure 78

- (a) Remove 2.25 inches ± 0.06 inch of the outer jacket from the end of the wire.
- (b) Remove the necessary length of the outer shield from the end of the wire.
Make sure that the distance between the end of the outer jacket and the end of the outer shield is 0.31 inch ± 0.06 inch.
- (c) Remove 1.25 inch ± 0.06 inch of the inner jacket from the end of the wire.
- (d) Remove the necessary length of the inner shield from the end of the wire.

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STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Make sure that the distance between the end of the inner jacket and the end of the inner shield is 0.31 inch \pm 0.06 inch.

- (e) Remove 0.53 inch \pm 0.06 inch of the primary insulation from the end of the wire.
- (2) Make a selection of a shield material for the outer shield from Table 9.

Make sure that the shield material has:

- The applicable Temperature Grade
- The smallest diameter that can go on the folded back outer shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (3) Cut a 5.5 inch \pm 0.1 inch length of the shield material for the outer shield.
- (4) Make a selection of a shield material for the inner shield from Table 9.

Make sure that the shield material has:

- The applicable Temperature Grade
- The smallest diameter that can go on the folded back inner shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (5) Cut a 3.5 inch \pm 0.1 inch length of the shield material for the inner shield.
- (6) Make a selection of two sets of inner ferrules and outer ferrules for the outer shield. Refer to Subject 20-30-12.

Make sure that:

- The ferrules have the applicable Temperature Grade
- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the inner ferrule, the folded back outer shield, and the shield material.

- (7) Put one inner ferrule on the outer jacket of each wire.
- (8) Put the shield material for the outer shield on the outer jacket of one wire.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.

- (9) Put the 2 outer ferrules on the shield material for the outer shield.
- (10) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules for the inner shield. Refer to Subject 20-30-12.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the inner jacket
- The outer ferrule is the smallest ferrule that can move freely on the inner ferrule, the folded back inner shield, and the shield material.

- (11) Put one inner ferrule on the inner jacket of each wire.
- (12) Put the shield material for the inner shield on the inner jacket of one wire.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.

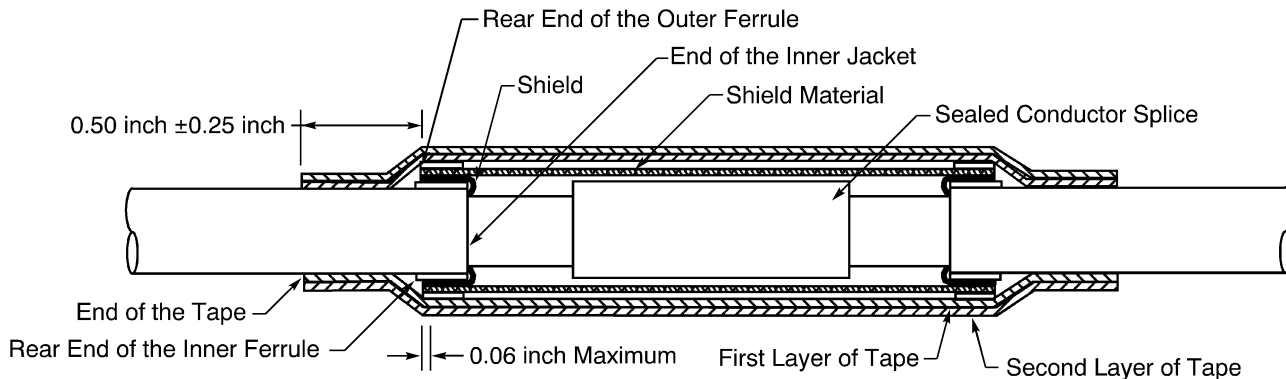
- (13) Put the two outer ferrules on the shield material for the inner shield.
- (14) Make a selection of an applicable butt splice assembly configuration for a wire. Refer to Subject 20-30-12.

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STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

- (15) Assemble the splice of the wire. Refer to the assembly procedure for the butt splice assembly configuration.
Make sure to cut the conductor to the correct length specified in the assembly procedure for the splice.
- (16) Make a selection of the necessary ferrule crimp tools for the outer and inner shield splice. Refer to Subject 20-30-12.
- (17) Assemble the end of the inner shield splice opposite the end with the shield material. Refer to Figure 79.



CONFIGURATION OF THE INNER SHIELD SPLICE ASSEMBLY

Figure 79

- (a) Move the strands of the shield apart and make them straight.
 - (b) Align the forward end of the inner ferrule with the end of the inner jacket.
 - (c) Fold the strands of the shield back on the inner ferrule.
Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.
 - (d) Align the end of the shield material with the end of the strands of the shield that are folded back.
 - (e) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
 - (f) Crimp the ferrules.
- (18) Do Step (17) again to assemble the other end of the inner shield splice. Refer to Figure 79.
Make sure that the shield material is pulled tight before the ferrules are crimped.
 - (19) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the inner shield splice.
 - (20) Make a selection of an insulation tape from Table 6.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.

(21) Put insulation tape on the inner shield splice. Refer to Figure 79.

(a) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
- Makes a 50 percent overlap.

(b) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

(22) Assemble the end of the outer shield splice opposite the end with the shield material.

(a) Move the strands of the shield apart and make them straight.

(b) Align the forward end of the inner ferrule with the end of the inner jacket.

(c) Fold the strands of the shield back on the inner ferrule.

Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.

(d) Align the end of the shield material with the end of the strands of the shield that are folded back.

(e) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

(f) Crimp the ferrules.

(23) Do Step (22) again to assemble the other end of the outer shield splice.

Make sure that the shield material is pulled tight before the ferrules are crimped.

(24) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the outer shield splice.

(25) Put insulation tape on the outer shield splice.

(a) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
- Makes a 50 percent overlap.

(b) Tightly wind a second layer of the tape on the splice assembly.

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REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure that the layer of tape:

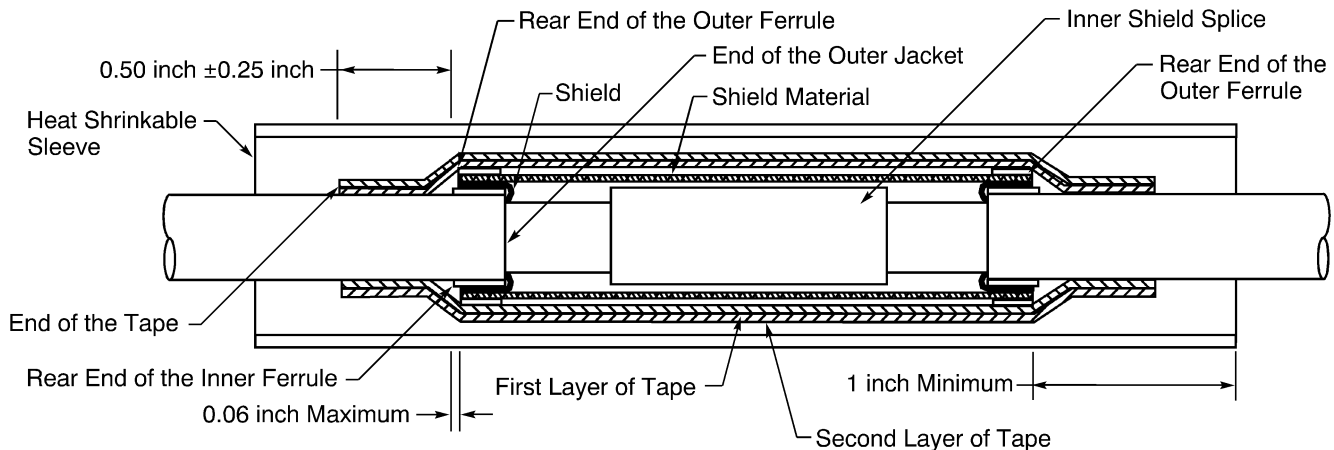
- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

(26) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the tie material is the correct Temperature Grade.

D. Repair of a Shielded Wire with a Splice Assembly - Two Round Conductor Shields That Are Not Adjacent

Refer to Paragraph 1.E. for the applicable conditions for the repair of wire with a splice.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 80

Refer to Figure 80.

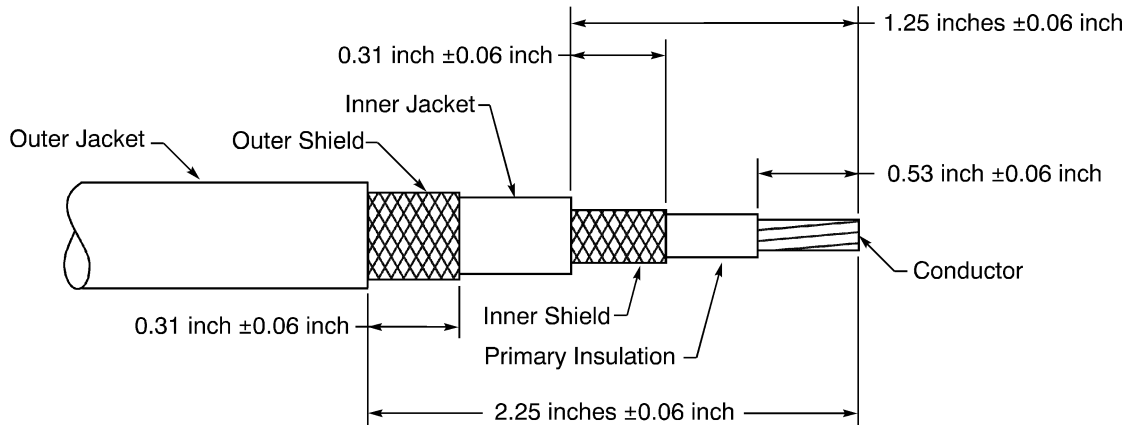
(1) Prepare each end of the shielded wire.

Refer to:

- Figure 81
- Subject 20-00-15 for the outer jacket and insulation removal procedures.

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REPAIR OF ELECTRICAL WIRE AND CABLE



SHIELDED WIRE PREPARATION
Figure 81

- (a) Remove 2.25 inches ± 0.06 inch of the outer jacket from the end of the wire.
- (b) Remove the necessary length of the outer shield from the end of the wire.
Make sure that the distance between the end of the outer jacket and the end of the outer shield is 0.31 inch ± 0.06 inch.
- (c) Remove 1.25 inch ± 0.06 inch of the inner jacket from the end of the wire.
- (d) Remove the necessary length of the inner shield from the end of the wire.
Make sure that the distance between the end of the inner jacket and the end of the inner shield is 0.31 inch ± 0.06 inch.
- (e) Remove 0.53 inch ± 0.06 inch of the primary insulation from the end of the wire.

- (2) Make a selection of a shield material for the outer shield from Table 9.

Make sure that the shield material has:

- The applicable Temperature Grade
- The smallest diameter that can go on the folded back outer shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (3) Cut a 5.5 inch ± 0.1 inch length of the shield material for the outer shield.
- (4) Make a selection of a shield material for the inner shield from Table 9.

Make sure that the shield material has:

- The applicable Temperature Grade
- The smallest diameter that can go on the folded back inner shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (5) Cut a 3.5 inch ± 0.1 inch length of the shield material for the inner shield.
- (6) Make a selection of a heat shrinkable sleeve from Table 5.

Make sure that the sleeve has:

- The applicable Temperature Grade
- The smallest diameter that can move freely on the outer jacket.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

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- (7) Cut a 7.5 inch minimum length of the heat shrinkable sleeve.
- (8) Put the sleeve on the outer jacket of one of the wires.
- (9) Make a selection of two sets of inner ferrules and outer ferrules for the outer shield. Refer to Subject 20-30-12.

Make sure that:

- The ferrules have the applicable Temperature Grade
- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the inner ferrule, the folded back outer shield, and the shield material.

- (10) Put one inner ferrule on the outer jacket of each wire.
- (11) Put the shield material for the outer shield on the outer jacket of one wire.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.

- (12) Put the 2 outer ferrules on the shield material for the outer shield.
- (13) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules for the inner shield. Refer to Subject 20-30-12.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the inner jacket
- The outer ferrule is the smallest ferrule that can move freely on the inner ferrule, the folded back inner shield, and the shield material.

- (14) Put one inner ferrule on the inner jacket of each wire.
- (15) Put the shield material for the inner shield on the inner jacket of one wire.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.

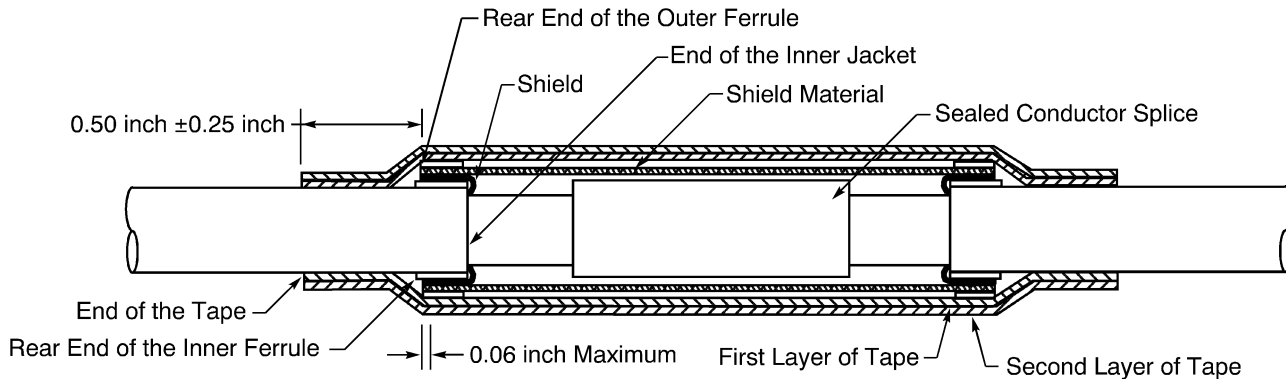
- (16) Put the two outer ferrules on the shield material for the inner shield.
- (17) Make a selection of an applicable butt splice assembly configuration for a wire. Refer to Subject 20-30-12.
- (18) Assemble the splice of the wire. Refer to the assembly procedure for the butt splice assembly configuration.

Make sure to cut the conductor to the correct length specified in the assembly procedure for the splice.

- (19) Make a selection of the necessary ferrule crimp tools for the outer and inner shield splice. Refer to Subject 20-30-12.
- (20) Assemble the end of the inner shield splice opposite the end with the shield material. Refer to Figure 82.

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REPAIR OF ELECTRICAL WIRE AND CABLE



CONFIGURATION OF THE INNER SHIELD SPLICE ASSEMBLY

Figure 82

- (a) Move the strands of the shield apart and make them straight.
 - (b) Align the forward end of the inner ferrule with the end of the inner jacket.
 - (c) Fold the strands of the shield back over the inner ferrule.
Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.
 - (d) Align the end of the shield material with the end of the strands of the shield that are folded back.
 - (e) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
 - (f) Crimp the ferrules.
- (21) Do Step (20) again to assemble the other end of the inner shield splice. Refer to Figure 82.
Make sure that the shield material is pulled tight before the ferrules are crimped.
 - (22) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the inner shield splice.
 - (23) Make a selection of an insulation tape from Table 6.
Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.
 - (24) Put insulation tape on the inner shield splice. Refer to Figure 82.
 - (a) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
 - Makes a 50 percent overlap.
 - (b) Tightly wind a second layer of the tape on the splice assembly.

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Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

(25) Assemble the end of the outer shield splice opposite the end with the shield material.

- (a) Move the strands of the shield apart and make them straight.
- (b) Align the forward end of the inner ferrule with the end of the inner jacket.
- (c) Fold the strands of the shield back on the inner ferrule.

Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.

- (d) Align the end of the shield material with the end of the strands of the shield that are folded back.
- (e) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

(f) Crimp the ferrules.

(26) Do Step (25) again to assemble the other end of the outer shield splice.

Make sure that the shield material is pulled tight before the ferrules are crimped.

(27) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the outer shield splice.

(28) Put insulation tape on the outer shield splice.

(a) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
- Makes a 50 percent overlap.

(b) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

(29) Align the center of the heat shrinkable sleeve with the center of the splice assembly.

(30) Shrink the sleeve into its position. Refer to Subject 20-10-14.

E. Repair of a Shielded Cable with a Splice Assembly

Refer to Paragraph 1.E. for the applicable conditions for the repair of cable with a splice.

(1) Remove the damaged length of the shielded cable.

(a) On one side of the damage, cut the shielded cable.

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Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.

- (b) On the other side of the damage, cut the shielded cable.

Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.

- (2) Clean the jacket with isopropyl alcohol.

Make sure:

- To clean the area of the jacket from the end of each cable to a minimum of 3 inches from the end
- That the cleaned area is dry.

- (3) Assemble a sealed splice.

Refer to the selection of a sealed splice configuration in Subject 20-30-12.

Make sure that the configuration is applicable for the shielded cable.

F. Repair of a Shielded Cable with a Splice Assembly - Two Adjacent Shields

Refer to Paragraph 1.E. for the applicable conditions for the repair of cable with a splice.

- (1) Remove the damaged length of the shielded cable.

- (a) On one side of the damage, cut the shielded cable.

Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.

- (b) On the other side of the damage, cut the shielded cable.

Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.

- (2) Clean the outer jacket with isopropyl alcohol.

Make sure:

- To clean the area of the jacket from the end of each cable to a minimum of 3 inches from the end
- That the cleaned area is dry.

- (3) Assemble a sealed splice.

Refer to the selection of a sealed splice configuration in Subject 20-30-12.

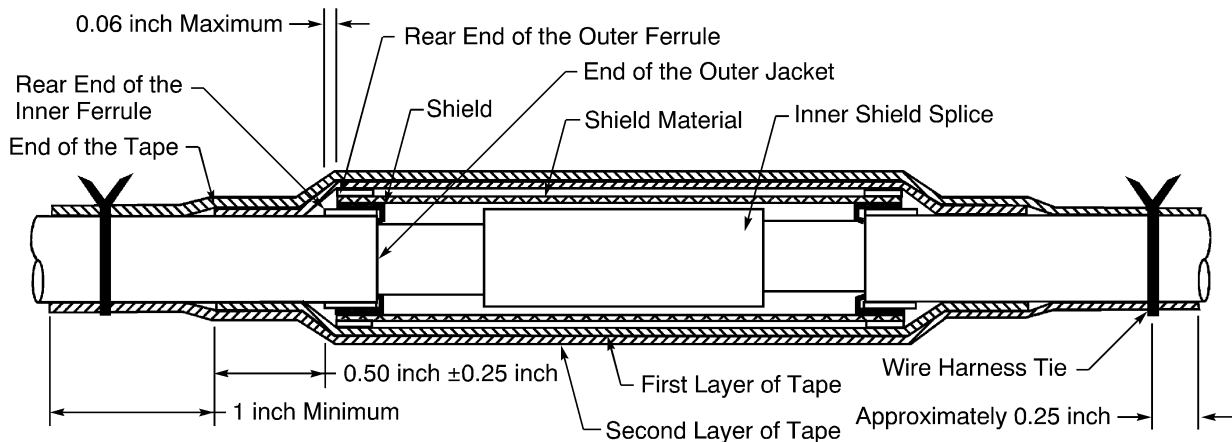
Make sure that the configuration is applicable for the shielded cable.

G. Repair of a Shielded Cable with a Splice Assembly in a Fuel Vapor Area - Two Round Conductor Shields That Are Not Adjacent

Refer to Paragraph 1.E. for the applicable conditions for the repair of cable with a splice.

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REPAIR OF ELECTRICAL WIRE AND CABLE



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 83

Refer to Figure 83.

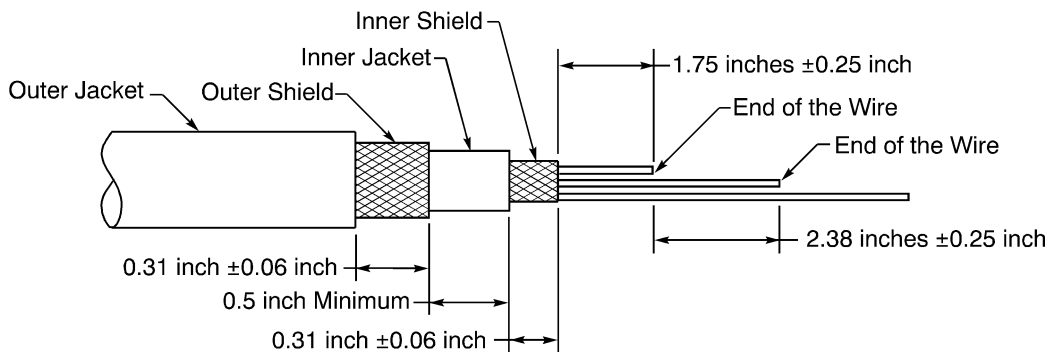
(1) Prepare each end of the shielded cable.

Refer to:

- Figure 84
- Subject 20-00-15 for the outer jacket and insulation removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the outer shield is 0.31 inch \pm 0.06 inch
- The minimum distance from the end of the outer shield to the end of the inner jacket is 0.50 inch
- The distance from the end of the inner jacket to the end of the inner shield is 0.31 inch \pm 0.06 inch
- The distance from the end of the inner shield to the end of the nearest wire is 1.75 inches \pm 0.25 inch
- The distance from the end of a wire to the end of a different wire is 2.38 inches \pm 0.25 inch.



SHIELDED CABLE PREPARATION

Figure 84

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

- (2) Make a selection of a shield material for the outer shield from Table 9.

Make sure that the shield material has:

- The applicable Temperature Grade
- The smallest diameter that can go on the folded back outer shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (3) Cut a 5.5 inch ± 0.1 inch length of the shield material for the outer shield.

- (4) Make a selection of a shield material for the inner shield from Table 9.

Make sure that the shield material has:

- The applicable Temperature Grade
- The smallest diameter that can go on the folded back inner shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (5) Cut a 3.5 inch ± 0.1 inch length of the shield material for the inner shield.

- (6) Make a selection of two sets of inner ferrules and outer ferrules for the outer shield. Refer to Subject 20-30-12.

Make sure that:

- The ferrules have the applicable Temperature Grade
- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the inner ferrule, the folded back outer shield, and the shield material.

- (7) Put one inner ferrule on the outer jacket of each cable.

- (8) Put the shield material for the outer shield on the outer jacket of one cable.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.

- (9) Put the 2 outer ferrules on the shield material for the outer shield.

- (10) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules for the inner shield. Refer to Subject 20-30-12.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the inner jacket
- The outer ferrule is the smallest ferrule that can move freely on the inner ferrule, the folded back inner shield, and the shield material.

- (11) Put one inner ferrule on the inner jacket of each cable.

- (12) Put the shield material for the inner shield on the inner jacket of one cable.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.

- (13) Put the two outer ferrules on the shield material for the inner shield.

- (14) Make a selection of an applicable butt splice assembly configuration for a wire. Refer to Subject 20-30-12.

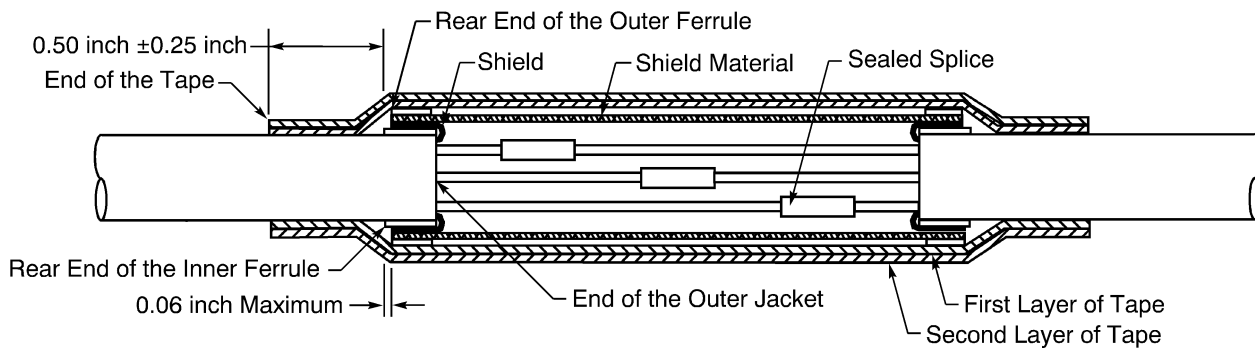
- (15) Assemble the splices of the wires. Refer to the assembly procedure for the butt splice assembly configuration.

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REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure to cut the conductor to the correct length specified in the assembly procedure for the splice.

- (16) Make a selection of the necessary ferrule crimp tools for the outer and inner shield splice. Refer to Subject 20-30-12.
- (17) Assemble the end of the inner shield splice opposite the end with the shield material. Refer to Figure 85.



CONFIGURATION OF THE INNER SHIELD SPLICE ASSEMBLY

Figure 85

- (a) Move the strands of the shield apart and make them straight.
 - (b) Align the forward end of the inner ferrule with the end of the inner jacket.
 - (c) Fold the strands of the shield back on the inner ferrule.
Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.
 - (d) Align the end of the shield material with the end of the strands of the shield that are folded back.
 - (e) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
 - (f) Crimp the ferrules.
- (18) Do Step (17) again to assemble the other end of the inner shield splice. Refer to Figure 85.
Make sure that the shield material is pulled tight before the ferrules are crimped.
 - (19) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the inner shield splice.
 - (20) Make a selection of an insulation tape from Table 6.
Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.
 - (21) Put insulation tape on the inner shield splice. Refer to Figure 85.
 - (a) Tightly wind a layer of the tape on the splice assembly.

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Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
- Makes a 50 percent overlap.

- (b) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

- (22) Assemble the end of the outer shield splice opposite the end with the shield material.

- (a) Move the strands of the shield apart and make them straight.
(b) Align the forward end of the inner ferrule with the end of the inner jacket.
(c) Fold the strands of the shield back on the inner ferrule.

Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.

- (d) Align the end of the shield material with the end of the strands of the shield that are folded back.
(e) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

- (f) Crimp the ferrules.

- (23) Do Step (22) again to assemble the other end of the outer shield splice.

Make sure that the shield material is pulled tight before the ferrules are crimped.

- (24) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the outer shield splice.

- (25) Put insulation tape on the outer shield splice.

- (a) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
- Makes a 50 percent overlap.

- (b) Tightly wind a second layer of the tape on the splice assembly.

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REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure that the layer of tape:

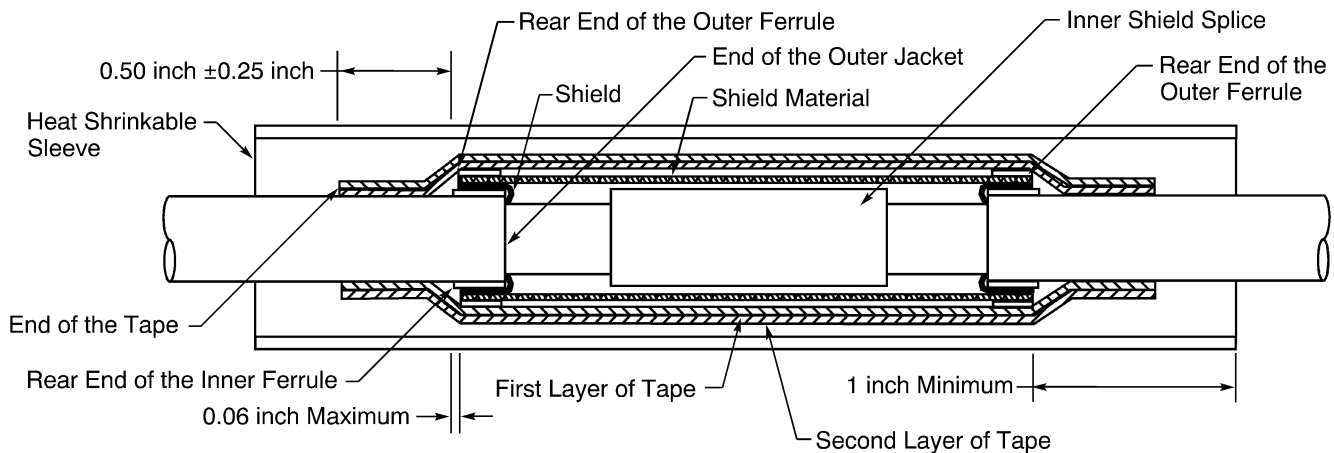
- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

(26) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the tie material is the correct Temperature Grade.

H. Repair of a Shielded Cable with a Splice Assembly - Two Round Conductor Shields That Are Not Adjacent

Refer to Paragraph 1.E. for the applicable conditions for the repair of cable with a splice.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 86

Refer to Figure 86.

(1) Prepare each end of the shielded cable.

Refer to:

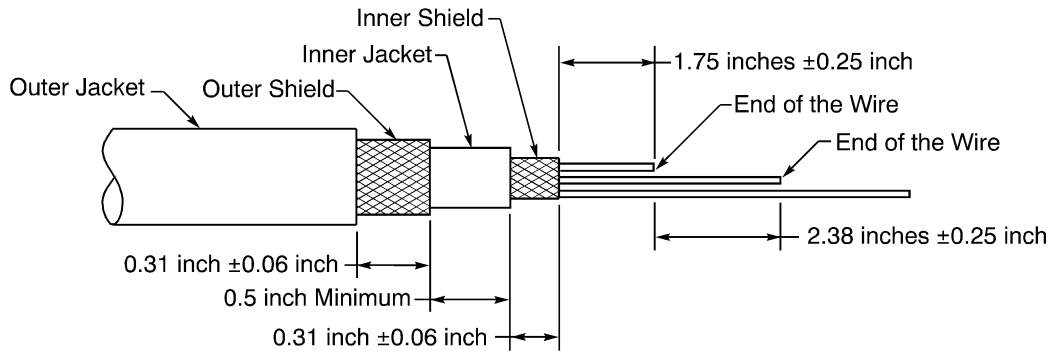
- Figure 87
- Subject 20-00-15 for the outer jacket and insulation removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the outer shield is 0.31 inch \pm 0.06 inch
- The minimum distance from the end of the outer shield to the end of the inner jacket is 0.50 inch
- The distance from the end of the inner jacket to the end of the inner shield is 0.31 inch \pm 0.06 inch
- The distance from the end of the inner shield to the end of the nearest wire is 1.75 inches \pm 0.25 inch
- The distance from the end of a wire to the end of a different wire is 2.38 inches \pm 0.25 inch.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



SHIELDED CABLE PREPARATION

Figure 87

- (2) Make a selection of a shield material for the outer shield from Table 9.

Make sure that the shield material has:

- The applicable Temperature Grade
- The smallest diameter that can go on the folded back outer shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (3) Cut a 5.5 inch ±0.1 inch length of the shield material for the outer shield.

- (4) Make a selection of a shield material for the inner shield from Table 9.

Make sure that the shield material has:

- The applicable Temperature Grade
- The smallest diameter that can go on the folded back inner shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (5) Cut a 3.5 inch ±0.1 inch length of the shield material for the inner shield.

- (6) Make a selection of a heat shrinkable sleeve from Table 5.

Make sure that the sleeve has:

- The applicable Temperature Grade
- The smallest diameter that can move freely on the outer jacket.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (7) Cut the necessary length of the heat shrinkable sleeve.

Make sure that the sleeve extends one inch farther than the rear end of the outer ferrule on each side of the splice assembly.

- (8) Put the sleeve on the outer jacket of one of the cables.

- (9) Make a selection of two sets of inner ferrules and outer ferrules for the outer shield. Refer to Subject 20-30-12.

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Make sure that:

- The ferrules have the applicable Temperature Grade
- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the inner ferrule, the folded back outer shield, and the shield material.

(10) Put one inner ferrule on the outer jacket of each cable.

(11) Put the shield material for the outer shield on the outer jacket of one cable.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.

(12) Put the 2 outer ferrules on the shield material for the outer shield.

(13) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules for the inner shield. Refer to Subject 20-30-12.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the inner jacket
- The outer ferrule is the smallest ferrule that can move freely on the inner ferrule, the folded back inner shield, and the shield material.

(14) Put one inner ferrule on the inner jacket of each cable.

(15) Put the shield material for the inner shield on the inner jacket of one cable.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.

(16) Put the two outer ferrules on the shield material for the inner shield.

(17) Make a selection of an applicable butt splice assembly configuration for a wire. Refer to Subject 20-30-12.

(18) Assemble the splices of the wires. Refer to the assembly procedure for the butt splice assembly configuration.

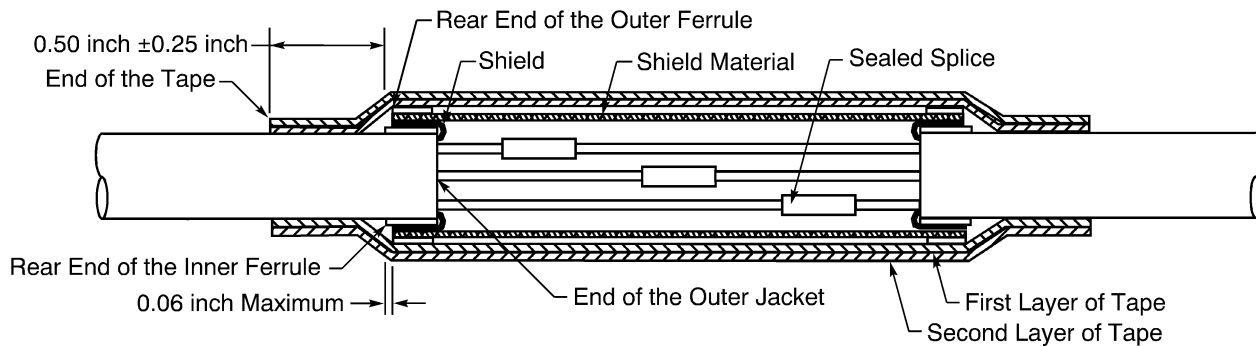
Make sure to cut the conductor to the correct length specified in the assembly procedure for the splice.

(19) Make a selection of the necessary ferrule crimp tools for the outer and inner shield splice. Refer to Subject 20-30-12.

(20) Assemble the end of the inner shield splice opposite the end with the shield material. Refer to Figure 88.

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REPAIR OF ELECTRICAL WIRE AND CABLE



CONFIGURATION OF THE INNER SHIELD SPLICE ASSEMBLY

Figure 88

- (a) Move the strands of the shield apart and make them straight.
 - (b) Align the forward end of the inner ferrule with the end of the inner jacket.
 - (c) Fold the strands of the shield back on the inner ferrule.
Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.
 - (d) Align the end of the shield material with the end of the strands of the shield that are folded back.
 - (e) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
 - (f) Crimp the ferrules.
- (21) Do Step (20) again to assemble the other end of the inner shield splice. Refer to Figure 88.
Make sure that the shield material is pulled tight before the ferrules are crimped.
 - (22) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the inner shield splice.
 - (23) Make a selection of an insulation tape from Table 6.
Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.
 - (24) Put insulation tape on the inner shield splice. Refer to Figure 88.
 - (a) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
 - Makes a 50 percent overlap.
 - (b) Tightly wind a second layer of the tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

(25) Assemble the end of the outer shield splice opposite the end with the shield material.

- (a) Move the strands of the shield apart and make them straight.
- (b) Align the forward end of the inner ferrule with the end of the inner jacket.
- (c) Fold the strands of the shield back over the inner ferrule.

Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.

- (d) Align the end of the shield material with the end of the strands of the shield that are folded back.
- (e) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

(f) Crimp the ferrules.

(26) Do Step (25) again to assemble the other end of the outer shield splice.

Make sure that the shield material is pulled tight before the ferrules are crimped.

(27) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the outer shield splice.

(28) Put insulation tape on the outer shield splice.

(a) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
- Makes a 50 percent overlap.

(b) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

(29) Align the center of the heat shrinkable sleeve with the center of the splice assembly.

(30) Shrink the sleeve into its position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

6. REPAIR OF THE SHIELD OF A SHIELDED WIRE AND A SHIELDED CABLE

A. Selection of a Sealed Shield Splice Configuration

Refer to:

- Paragraph 2. for the damage and repair conditions of the applicable shielded wire or shielded cable
- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice.

**Table 13
SEALED SHIELD SPLICE CONFIGURATIONS**

Maximum Temperature Grade	Number of Shields	Shield Conductor	Applicable Condition	Shield Splice Assembly	
				Configuration	Procedure
B	1	Flat	No Fuel Vapor	Solder Shield Splice Sleeve	Paragraph 6.D.
				Solder Sleeves, Tape, Sleeve	Paragraph 6.E.
				Solder Sleeves, Tape, Ties	Paragraph 6.F.
		Round	No Fuel Vapor	Solder Shield Splice Sleeve	Paragraph 6.D.
				Solder Sleeves, Tape, Sleeve - No Shield Fold Back	Paragraph 6.E.
				Solder Sleeves, Tape, Ties - No Shield Fold Back	Paragraph 6.F.
				Solder Sleeves, Tape, Sleeve - Shield Fold Back	Paragraph 6.G.
				Solder Sleeves, Tape, Ties - Shield Fold Back	Paragraph 6.H.
B	2	Flat	No Fuel Vapor	Solder Shield Splice Sleeve	Paragraph 6.D.
		Round			
	2	Flat	No Fuel Vapor	Solder Sleeves, Tape, Sleeve	Paragraph 6.E.
		Round			
	2	Flat	No Fuel Vapor	Solder Sleeves, Tape, Ties	Paragraph 6.F.
		Round			

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REPAIR OF ELECTRICAL WIRE AND CABLE

Table 13 (continued)

Maximum Temperature Grade	Number of Shields	Shield Conductor	Applicable Condition	Shield Splice Assembly	
				Configuration	Procedure
B	2	Round	No Fuel Vapor	Solder Shield Splice Sleeve	Paragraph 6.D.
		Round			
	2	Round	No Fuel Vapor	Solder Sleeves, Tape, Sleeve - No Shield Fold Back	Paragraph 6.E.
		Round			
	2	Round	No Fuel Vapor	Solder Sleeves, Tape, Ties - No Shield Fold Back	Paragraph 6.F.
		Round			
	2	Round	No Fuel Vapor	Solder Sleeves, Tape, Sleeve - Shield Fold Back	Paragraph 6.G.
		Round			
	2	Round	No Fuel Vapor	Solder Sleeves, Tape, Ties - Shield Fold Back	Paragraph 6.H.
		Round			
D	1	Round	Fuel Vapor	Mechanical Ferrules, Tape, Ties	Paragraph 6.J.
				Shield-Kon, Tape, Ties	Paragraph 6.L.
			No Fuel Vapor	Mechanical Ferrules, Tape, Sleeve	Paragraph 6.I.
				Mechanical Ferrules, Tape, Ties	Paragraph 6.J.
				Shield-Kon, Tape, Sleeve	Paragraph 6.K.
				Shield-Kon, Tape, Ties	Paragraph 6.L.
D	2	Round	Fuel Vapor	Mechanical Ferrules, Tape, Ties	Paragraph 6.J.
		Round			
	2	Round	Fuel Vapor	Shield-Kon, Tape, Ties	Paragraph 6.L.
		Round			
	2	Round	No Fuel Vapor	Mechanical Ferrules, Tape, Sleeve	Paragraph 6.I.
		Round			
	2	Round	No Fuel Vapor	Mechanical Ferrules, Tape, Ties	Paragraph 6.J.
		Round			
	2	Round	No Fuel Vapor	Shield-Kon, Tape, Sleeve	Paragraph 6.K.
		Round			
	2	Round	No Fuel Vapor	Shield-Kon, Tape, Ties	Paragraph 6.L.
		Round			

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

B. Selection of a Solder Sleeve

**Table 14
SOLDER SLEEVE PART NUMBERS**

Maximum O.D. of the Jacket (inch)	Minimum O.D. of the Shield (inch)	Solder Sleeve	
		Part Number	Supplier
0.095	0.020	D-144-25	Raychem
0.105	0.020	BACS13CT1N	Boeing
0.145	0.030	BACS13CT2N	Boeing
0.145	0.030	M83519/1-2	QPL
0.200	0.050	BACS13CT3N	Boeing
0.200	0.050	M83519/1-3	QPL
0.255	0.070	BACS13CT4N	Boeing
0.255	0.070	M83519/1-4	QPL
0.300	0.100	BACS13CT5N	Boeing
0.300	0.100	M83519/1-5	QPL

**Table 15
APPROVED SUPPLIERS OF BOEING STANDARD SOLDER SLEEVES**

Boeing Standard	Supplier
BACS13CT	Raychem

C. Shield Repair - Tape and Ties

Refer to Paragraph 1.B. for the applicable conditions for the repair of wire and cable.

(1) Make a selection of one of these tapes from Table 6:

- Temperature Grade C or D TFE Tape
- Temperature Grade A polyester tape.

Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.

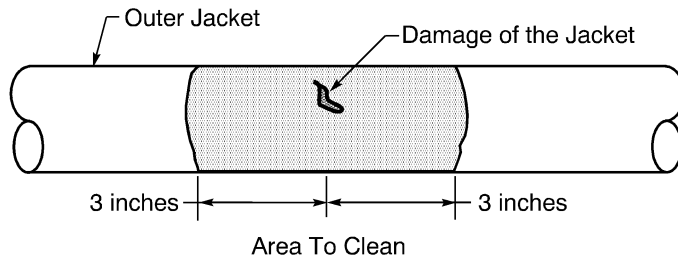
(2) Clean the jacket with isopropyl alcohol. Refer to Figure 89.

Make sure:

- To clean the damaged area of the jacket
- To clean the jacket approximately 3 inches on each side of the damage
- That the cleaned area is dry.

STANDARD WIRING PRACTICES MANUAL

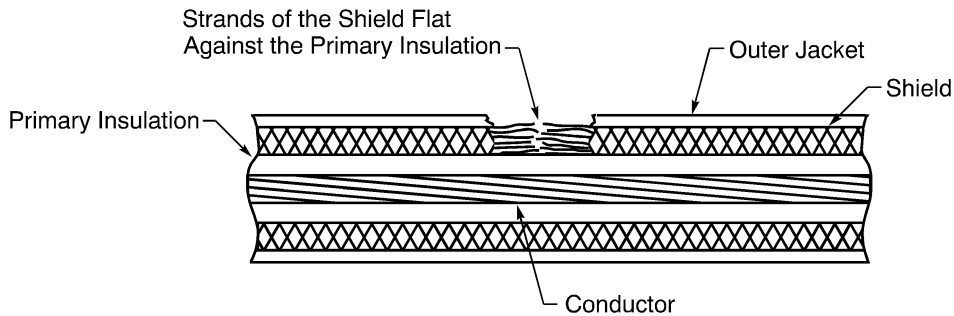
REPAIR OF ELECTRICAL WIRE AND CABLE



AREA TO CLEAN
Figure 89

- (3) Put the strands of the damaged shield:
- Flat against the primary insulation
 - Even and symmetrical around the circumference of the area with damage.

Refer to Figure 90.

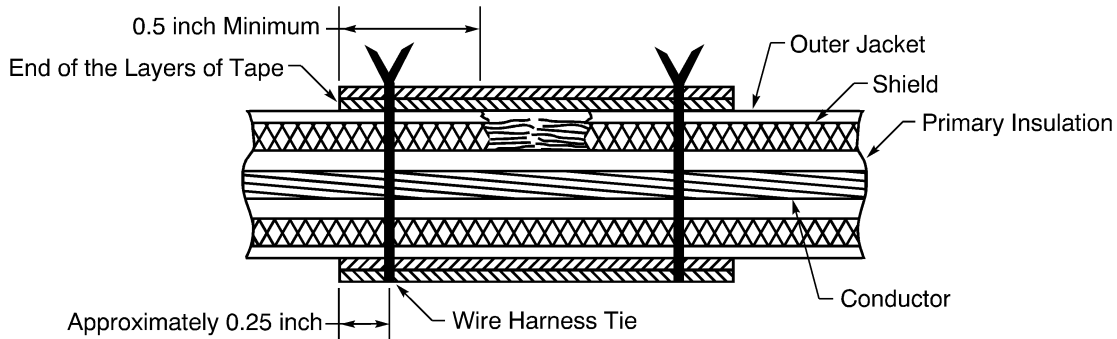


POSITION OF THE SHIELD FOR REPAIR
Figure 90

- (4) Put a minimum of two layers of the tape on the damaged area. Refer to Figure 91.
- Make sure that:
- Each end of the tape extends a minimum of 0.5 inch farther than each end of the damaged area
 - The tape makes 50 percent circumferential overlap
 - The second layer of tape is in the opposite direction of the first layer.

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REPAIR OF ELECTRICAL WIRE AND CABLE



TAPE AND WIRE HARNESS TIES ON THE SHIELDED WIRE OR SHIELDED CABLE

Figure 91

- (5) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.25 inch from each end of the tape.

Make sure that the lacing tape is the correct Temperature Grade.

Refer to:

- Figure 91
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

D. Shield Repair - Solder Shield Splice Sleeve

**Table 16
SOLDER SHIELD SPLICE SLEEVE**

Jacket O.D. (inch)		Part Number	Supplier
Maximum	Minimum		
0.11	0.06	D-155-0350	Raychem
0.15	0.08	D-155-0450	Raychem
0.15	0.08	D-155-0475	Raychem
0.19	0.09	D-155-0550	Raychem
0.19	0.09	D-155-0575	Raychem
0.23	0.12	D-155-0675	Raychem
0.35	0.18	D-155-0975	Raychem

**Table 17
LENGTH OF THE JACKET TO REMOVE**

Solder Shield Splice Sleeve	Jacket Removal Length L (inch)	
	Target	Tolerance
D-155-0350	2.18	±0.04
D-155-0450	2.18	±0.04

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Table 17 (continued)

Solder Shield Splice Sleeve	Jacket Removal Length L (inch)	
	Target	Tolerance
D-155-0475	3.16	± 0.04
D-155-0550	2.18	± 0.04
D-155-0575	3.16	± 0.04
D-155-0675	3.16	± 0.04
D-155-0975	3.16	± 0.04

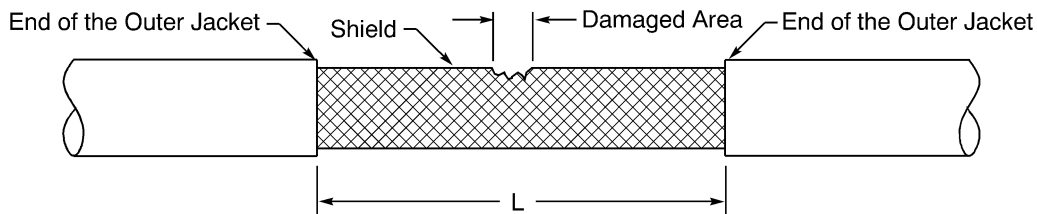
Refer to Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice.

- (1) Make a selection of a solder shield splice sleeve from Table 16.

Make sure that the O.D of the wire or cable is:

- Near but not more than the maximum jacket O.D for the sleeve
- More than the minimum jacket O.D. for the sleeve.

- (2) Remove the necessary length of the outer jacket. Refer to Figure 92.



JACKET REMOVAL
Figure 92

- (a) Find the length of the jacket to remove from Table 17.
- (b) Carefully cut the jacket around the circumference of the wire or the cable on each side of the damaged area of the shield.

Make sure that:

- The distance between the two ends of the jacket is equal to the jacket removal length
- The damaged area is in the center of the two ends of the jacket.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

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REPAIR OF ELECTRICAL WIRE AND CABLE

CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (3) Clean the jacket with isopropyl alcohol.

Make sure:

- To clean the outer jacket approximately 3 inches from each end of the jacket
- That the cleaned area is dry.

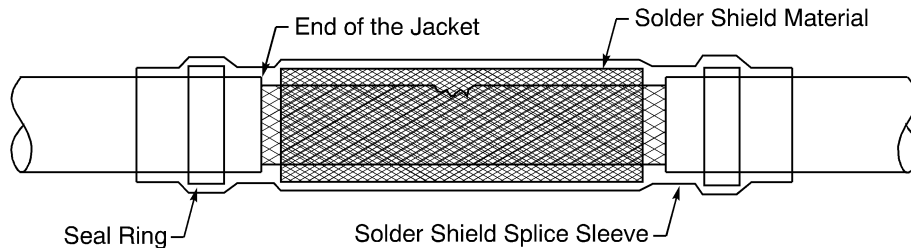
- (4) Put the strands of the damaged shield:

- Flat against the primary insulation
- Even and symmetrical around the circumference of the area with damage.

- (5) Put the sleeve on the wire or cable.

- (6) Push the sleeve on the area where the jacket is removed. Refer to Figure 93.

Make sure that each end of the jacket is between the seal ring and the solder shield material in the sleeve.



POSITION OF THE SOLDER SHIELD SPLICE SLEEVE

Figure 93

- (7) Shrink one end of the shield splice sleeve. Refer to Subject 20-10-14.

- (a) Apply heat at the center of the sleeve until the solder melts and the sleeve begins to shrink.
- (b) Continue to apply heat from the center of the sleeve to one end of the sleeve until the solder melts and flows.

- (8) Do Step (7) again for the other end of the sleeve.

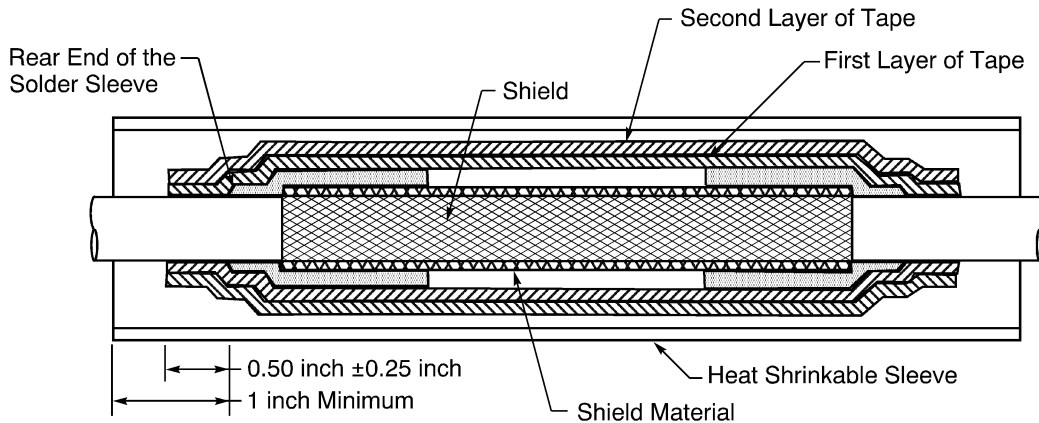
E. Shield Repair - Solder Sleeves, Shield Material, Tape, and a Sleeve without Shield Folded Back

Refer to:

- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice
- Figure 94 for the configuration of the splice assembly.

STANDARD WIRING PRACTICES MANUAL

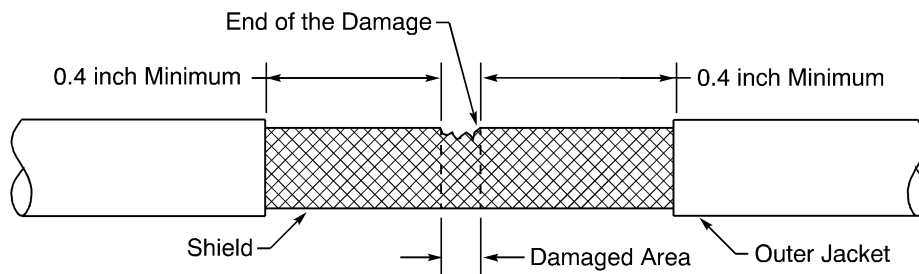
REPAIR OF ELECTRICAL WIRE AND CABLE



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 94

- (1) Remove the necessary length of the outer jacket. Refer to Figure 95.



JACKET REMOVAL

Figure 95

- (a) On one side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (b) On the other side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (2) Clean the jacket with isopropyl alcohol.

Make sure:

- To clean the area from each end of the jacket to a minimum of 3 inches to the rear
- That the cleaned area is dry.

- (3) Make a selection of a Temperature Grade B shield material from Table 9.

Make sure that the shield material has the smallest diameter that can be put on the shield.

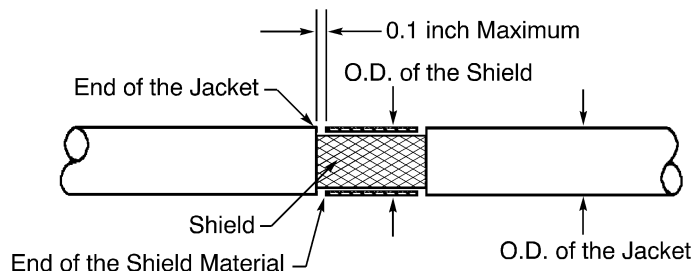
NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (4) Put the strands of the damaged shield:

- Flat against the primary insulation
- Even and symmetrical around the circumference of the area with damage.

- (5) Cut a length of the shield material that is equal to the length of the jacket that is removed from the wire or the cable. Refer to Figure 96.

Make sure that each end of the shield material is a maximum of 0.1 inch from the nearest end of the jacket.



POSITION OF THE SHIELD MATERIAL

Figure 96

- (6) Put the shield material on the wire or cable. Refer to Figure 96.

- (7) Make a selection of two solder sleeves from Table 14.

Refer to Figure 96 for the applicable dimensions of the shield splice assembly.

- (8) Assemble one end of the shield splice.

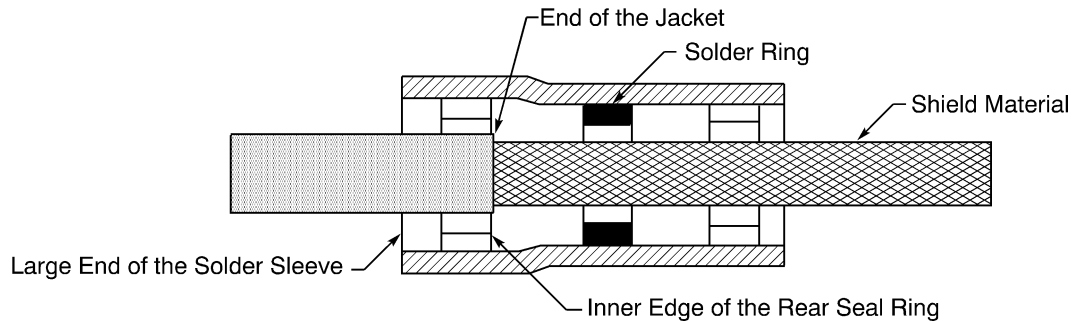
- (a) Put the solder sleeve on the wire or cable. Refer to Figure 97.

Make sure that:

- The end of the shield material is a maximum of 0.1 inch from the end of the jacket
- The inner edge of the rear seal ring is aligned with the end of the jacket
- The seal ring does not make an overlap with the shield.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



POSITION OF THE SOLDER SLEEVE

Figure 97

- (b) Shrink the solder sleeve into position.
Make sure that:
 - The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (9) Do Step (8) again to assemble the other end of the shield splice.
Make sure the shield material is pulled tight before the end of the splice is assembled.
- (10) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 5.
Make sure that the sleeve has the smallest diameter that can be put on the splice assembly.
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (11) Cut the necessary length of the heat shrinkable sleeve.
Make sure that the length is a minimum of 1 inch farther than the rear end of the solder sleeve on each end of the splice assembly.
- (12) Make a selection of a Temperature Grade B or higher TFE insulation tape from Table 6.
- (13) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at the other end of the splice
 - Makes a 50 percent overlap.
- (14) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts where the first layer of tape stops
 - Stops where the first layer of tape starts
 - Makes a 50 percent overlap.
- (15) Put the sleeve on the shield splice assembly.
Make sure that each end of the sleeve is a minimum of 0.25 inch farther than the end of the tape on each end of the splice assembly.
- (16) Shrink the sleeve into position. Refer to Subject 20-10-14.

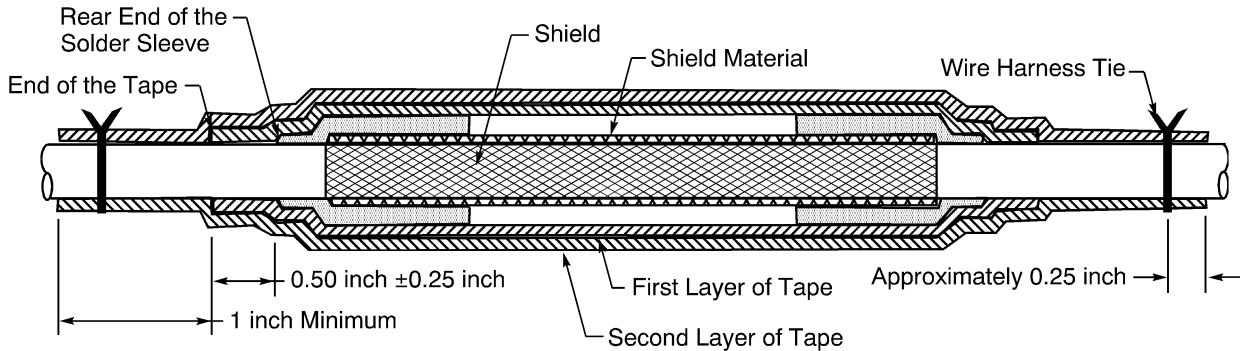
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

F. Shield Repair - Solder Sleeves, Shield Material, Tape, and Ties without Shield Folded Back

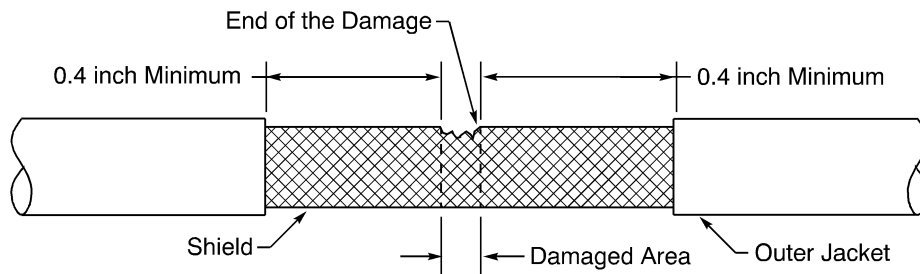
Refer to:

- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice
- Figure 98 for the configuration of the splice assembly.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 98

- (1) Remove the necessary length of the outer jacket. Refer to Figure 99.



JACKET REMOVAL
Figure 99

- (a) On one side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (b) On the other side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (2) Clean the jacket with isopropyl alcohol.

Make sure:

- To clean the outer jacket approximately 3 inches from each end of the jacket
- That the cleaned area is dry.

- (3) Make a selection of a Temperature Grade B shield material from Table 9.

Make sure that the shield material has the smallest diameter that can be put on the shield.

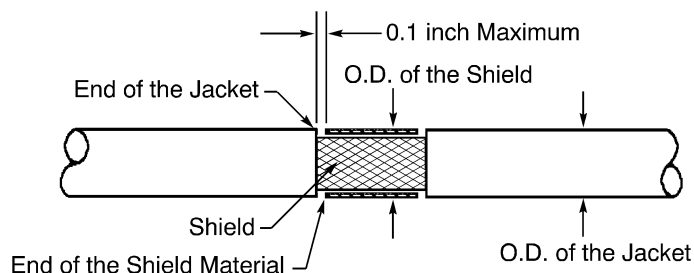
NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (4) Put the strands of the damaged shield:

- Flat against the primary insulation
- Even and symmetrical around the circumference of the area with damage.

- (5) Cut a length of the shield material that is equal to the length of the jacket that is removed from the wire or the cable. Refer to Figure 100.

Make sure that each end of the shield material is a maximum of 0.1 inch from the nearest end of the jacket.



POSITION OF THE SHIELD MATERIAL

Figure 100

- (6) Put the shield material on the wire or cable. Refer to Figure 100.

- (7) Make a selection of two solder sleeves from Table 14.

Refer to Figure 100 for the applicable dimensions of the shield splice assembly.

- (8) Assemble one end of the shield splice.

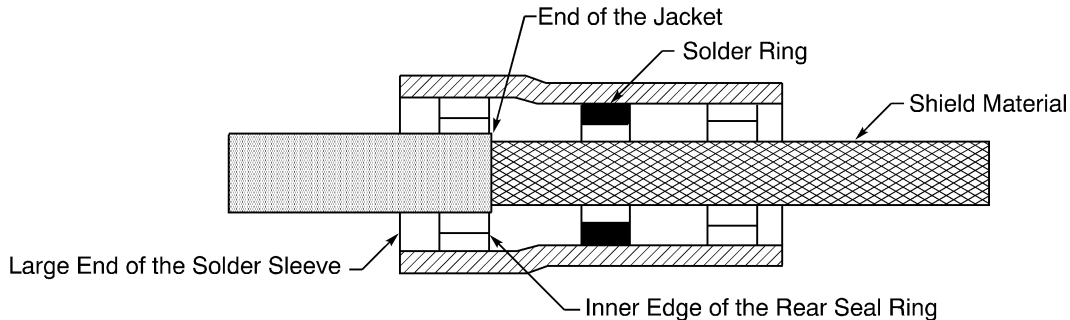
- (a) Put the solder sleeve on the wire or cable. Refer to Figure 101.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure that:

- The end of the shield material is a maximum of 0.1 inch from the end of the jacket
- The inner edge of the rear seal ring is aligned with the end of the jacket
- The seal ring does not make an overlap with the shield.



POSITION OF THE SOLDER SLEEVE ON THE SHIELD MATERIAL

Figure 101

(b) Shrink the solder sleeve into position.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

(9) Do Step (8) again to assemble the other end of the shield splice.

Make sure the shield material is pulled tight before the end of the splice is assembled.

(10) Make a selection of a Temperature Grade B or higher TFE insulation tape from Table 6.

(11) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at the other end of the splice
- Makes a 50 percent overlap.

(12) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

(13) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

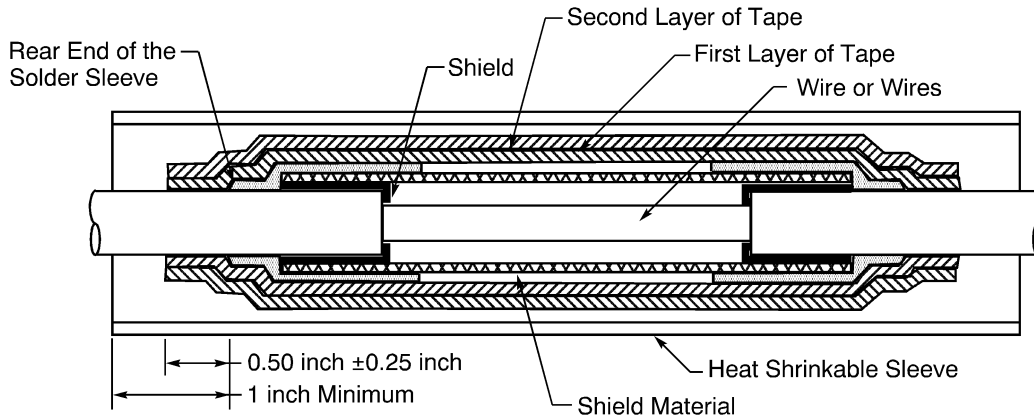
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REPAIR OF ELECTRICAL WIRE AND CABLE

G. Shield Repair - Solder Sleeves, Shield Material, Tape, and a Sleeve with Shield Folded Back

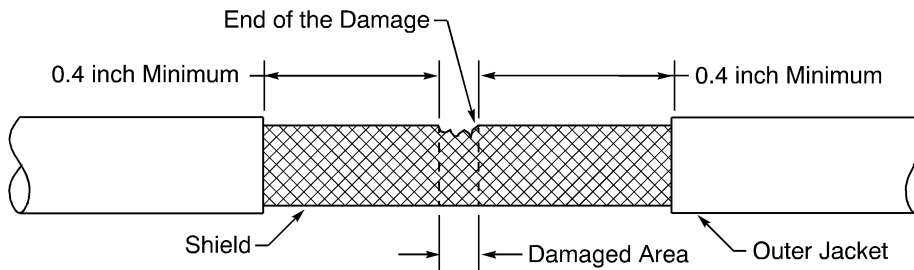
Refer to:

- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice
- Figure 102 for the configuration of the splice assembly.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 102

- (1) Remove the necessary length of the outer jacket. Refer to Figure 103.



JACKET REMOVAL
Figure 103

- (a) On one side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (b) On the other side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

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REPAIR OF ELECTRICAL WIRE AND CABLE

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

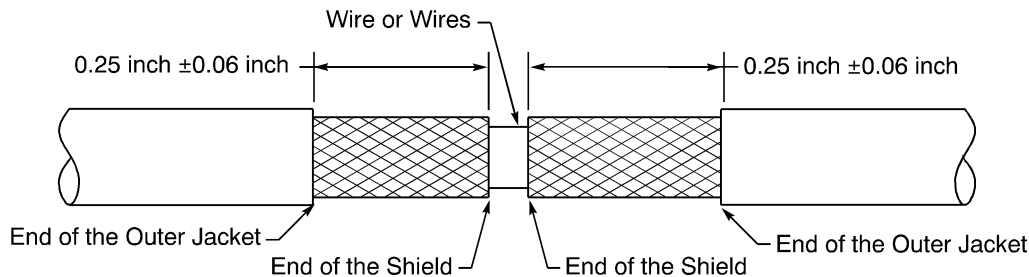
CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (2) Clean the jacket with isopropyl alcohol.

Make sure:

- To clean the jacket approximately 3 inches from each end of the jacket
- That the cleaned area is dry.

- (3) Prepare the shield. Refer to Figure 104.



SHIELD PREPARATION
Figure 104

- (a) Carefully cut around the circumference of the shield on each side of the damaged area.

Make sure that the distance from the end of the jacket to the end of the shield is 0.25 inch ± 0.06 inch.

- (b) Remove the unwanted shield with the damage.

- (4) Fold the shield back against the jacket on the rear end of the splice assembly.

- (5) Make a selection of a Temperature Grade B shield material from Table 9.

Make sure that the shield material has the smallest diameter that can be put on the folded back shield.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (6) Cut the necessary length of the shield material.

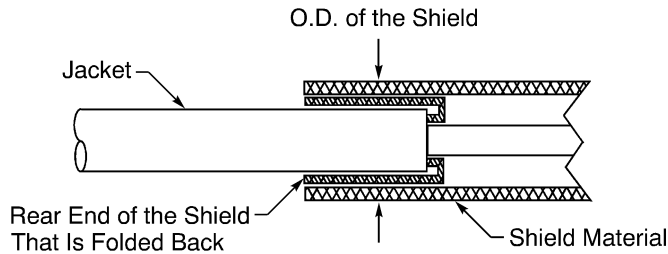
Make sure that the length of the shield material is a minimum of 0.5 inch more than the length of the jacket that is removed from the wire or the cable.

- (7) Put the shield material on the wire or cable. Refer to Figure 105.

Make sure that the rear end of the shield material is aligned with the end of the folded back shield.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

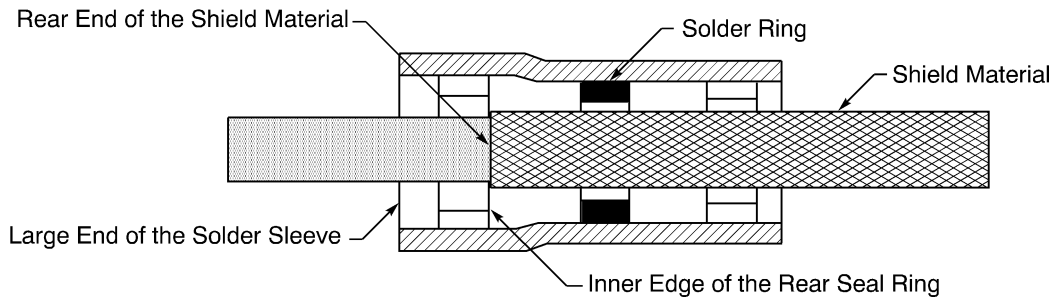


POSITION OF THE SHIELD MATERIAL
Figure 105

- (8) Make a selection of two solder sleeves from Table 14.
Refer to Figure 105 for the applicable dimensions of the shield splice assembly.
- (9) Assemble one end of the shield splice.
 - (a) Put the solder sleeve on the wire or cable. Refer to Figure 106.

Make sure that:

- The inner edge of the rear seal ring is aligned with the end of the shield and the shield material
- The seal ring does not make an overlap with the shield and the shield material.



POSITION OF THE SOLDER SLEEVE ON THE SHIELD MATERIAL
Figure 106

- (b) Shrink the solder sleeve into position.

Make sure that:

 - The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (10) Fold the shield back against the jacket on the forward end of the splice assembly.
- (11) If it is necessary, cut the shield material.
Make sure that the shield material is aligned with the end of the folded back shield.
- (12) Do Step (9) again to assemble the other end of the shield splice.
Make sure the shield material is pulled tight before the end of the splice is assembled.
- (13) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 5.
Make sure that the sleeve has the smallest diameter that can be put on the splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

STANDARD WIRING PRACTICES MANUAL

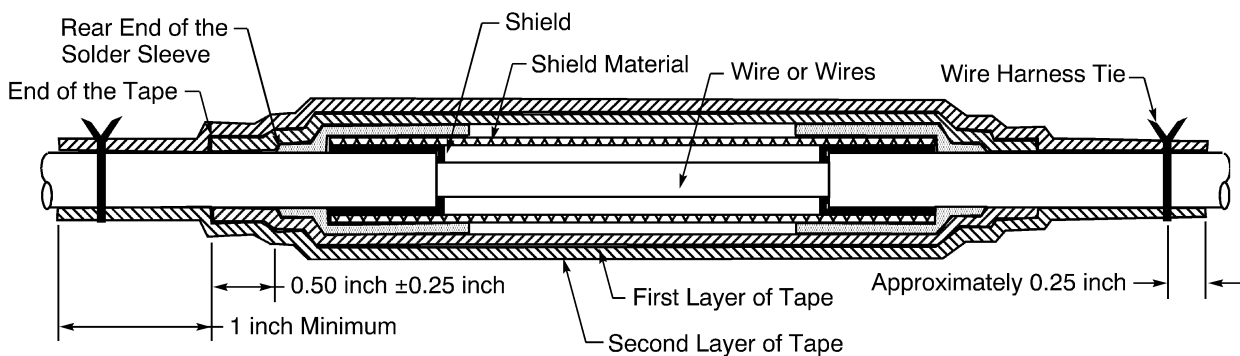
REPAIR OF ELECTRICAL WIRE AND CABLE

- (14) Cut the necessary length of the heat shrinkable sleeve.
Make sure that the length is a minimum of 1 inch farther than the rear end of the solder sleeve on each end of the splice assembly.
- (15) Make a selection of a Temperature Grade B or higher TFE insulation tape from Table 6.
- (16) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at the other end of the splice
 - Makes a 50 percent overlap.
- (17) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts where the first layer of tape stops
 - Stops where the first layer of tape starts
 - Makes a 50 percent overlap.
- (18) Put the sleeve on the shield splice assembly.
Make sure that each end of the sleeve is a minimum of 0.25 inch farther than the tape on each end of the splice assembly.
- (19) Shrink the sleeve into position. Refer to Subject 20-10-14.

H. Shield Repair - Solder Sleeves, Shield Material, Tape, and Ties with Shield Folded Back

Refer to:

- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice
- Figure 107 for the configuration of the splice assembly.

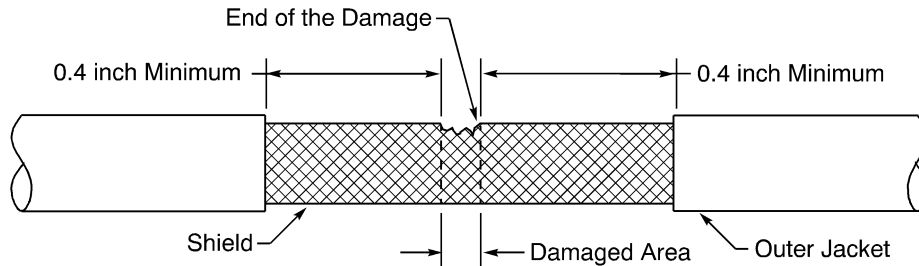


CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 107

- (1) Remove the necessary length of the outer jacket. Refer to Figure 108.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



JACKET REMOVAL

Figure 108

- (a) On one side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (b) On the other side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (2) Clean the jacket with isopropyl alcohol.

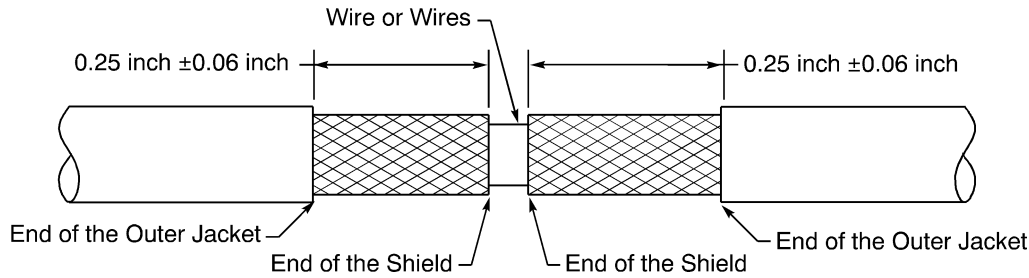
Make sure:

- To clean the jacket approximately 3 inches from each end of the jacket
- That the cleaned area is dry.

- (3) Prepare the shield. Refer to Figure 109.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



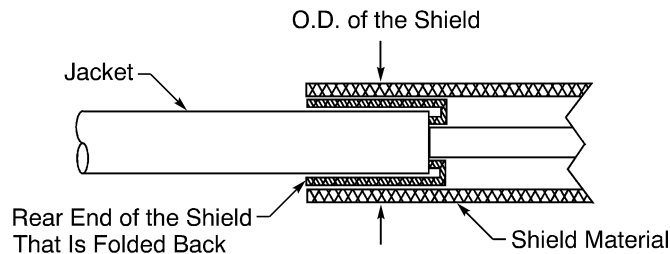
SHIELD PREPARATION

Figure 109

- (a) Carefully cut around the circumference of the shield on each side of the damaged area.
Make sure that the distance from the end of the jacket to the end of the shield is 0.25 inch ± 0.06 inch.
- (b) Remove the unwanted shield with the damage.
- (4) Fold the shield back against the jacket on the rear end of the splice assembly.
- (5) Make a selection of a Temperature Grade B shield material from Table 9.
Make sure that the shield material has the smallest diameter that can be put on the folded back shield.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (6) Cut the necessary length of the shield material.
Make sure that the length of the shield material is a minimum of 0.5 inch more than the length of the jacket that is removed from the wire or the cable.
- (7) Put the shield material on the wire or cable. Refer to Figure 110.
Make sure that the rear end of the shield material is aligned with the end of the folded back shield.



POSITION OF THE SHIELD MATERIAL

Figure 110

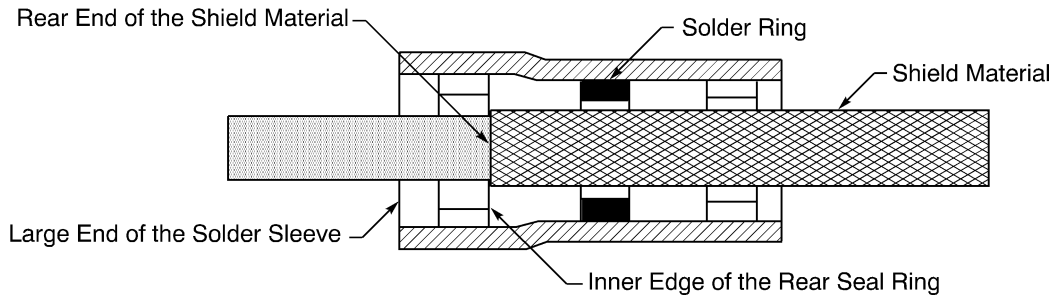
- (8) Make a selection of two solder sleeves from Table 14.
Refer to Figure 110 for the applicable dimensions of the shield splice assembly.
- (9) Assemble one end of the shield splice.
 - (a) Put the solder sleeve on the wire or cable. Refer to Figure 111.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure that:

- The inner edge of the rear seal ring is aligned with the end of the shield and the shield material
- The seal ring does not make an overlap with the shield and the shield material.



POSITION OF THE SOLDER SLEEVE ON THE SHIELD MATERIAL

Figure 111

(b) Shrink the solder sleeve into position.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

(10) Fold the shield back against the jacket on the forward end of the splice assembly.

(11) If it is necessary, cut the shield material.

Make sure that the shield material is aligned with the end of the folded back shield.

(12) Do Step (9) again to assemble the other end of the shield splice.

Make sure the shield material is pulled tight before the end of the splice is assembled.

(13) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 5.

Make sure that the sleeve has the smallest diameter that can be put on the splice assembly.

(14) Cut the necessary length of the heat shrinkable sleeve.

Make sure that the length is a minimum of 1 inch farther than the rear end of the solder sleeve on each end of the splice assembly.

(15) Make a selection of a Temperature Grade B or higher TFE insulation tape from Table 6.

(16) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at the other end of the splice
- Makes a 50 percent overlap.

(17) Tightly wind a second layer of the tape on the splice assembly.

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REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

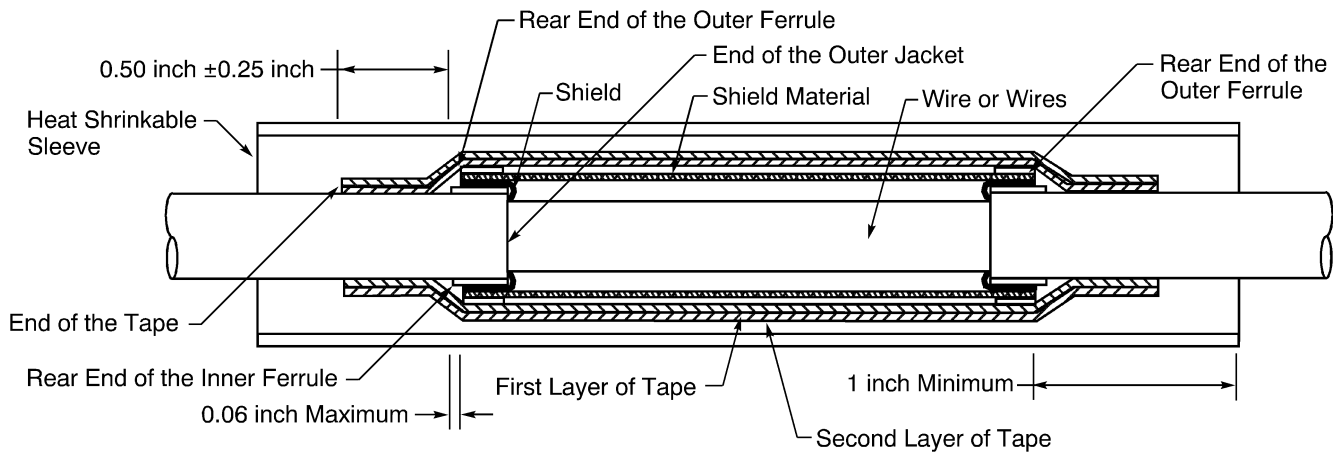
(18) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

I. Shield Repair - Mechanical Ferrules, Shield Material, Tape, and a Sleeve

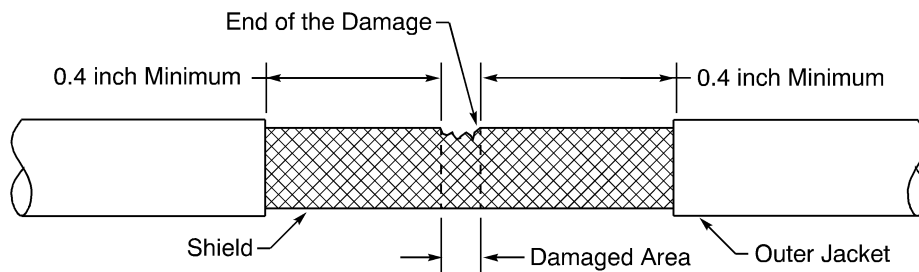
Refer to:

- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice
- Figure 112 for the configuration of the splice assembly.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 112

(1) Remove the necessary length of the outer jacket. Refer to Figure 113.



JACKET REMOVAL
Figure 113

(a) On one side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (b) On the other side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

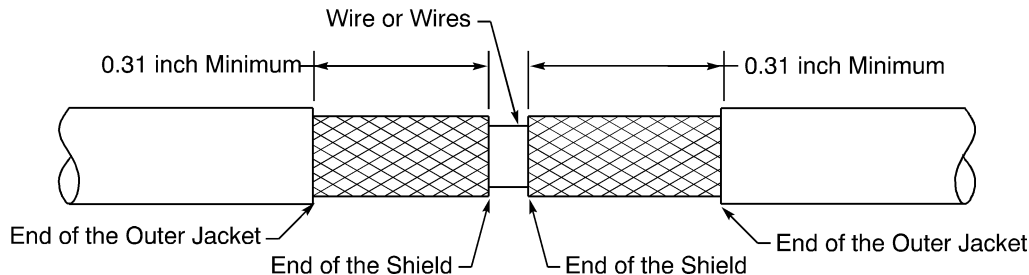
CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (2) Prepare the shield. Refer to Figure 114.



SHIELD PREPARATION

Figure 114

- (a) Carefully cut around the circumference of the shield on each side of the damaged area. Make sure that the distance from the end of the jacket to the end of the shield is a minimum of 0.31 inch.

- (b) Remove the unwanted shield with the damage.

- (3) Make a selection of two sets of inner and outer mechanical ferrules. Refer to Subject 20-30-12.

Make sure that:

- The ferrules are the correct Temperature Grade
- The inner ferrule has the smallest diameter that can move freely on the jacket
- The outer ferrule has the smallest diameter that can be put on the inner ferrule and shield.

- (4) Make a selection of a ferrule crimp tool. Refer to Subject 20-30-12.

- (5) Put one inner ferrule on the jacket of the wire or cable, to the rear of the area to repair.

- (6) Move the strands of the rear shield apart and make them straight.

- (7) Align the forward end of the inner ferrule with the end of the jacket.

- (8) Fold the strands of the rear shield back on the inner ferrule.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.

- (9) Make a selection of a shield material from Table 9.

Make sure that the shield material has:

- The correct Temperature Grade
- The smallest diameter that can be put on the folded back shield.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (10) Cut the necessary length of the shield material.

Make sure that the length of the shield material is a minimum of 0.62 inch more than the length of the jacket that is removed from the wire or the cable.

- (11) Put the shield material on the wire or cable.
(12) Put the two outer ferrules on the shield material.
(13) Align the end of the shield material with the end of the shield that is folded back.
(14) Align the rear end of one of the outer ferrules with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

- (15) Crimp the ferrules.
(16) Put the other inner ferrule on the jacket of the wire or cable forward of the area to repair.
(17) Move the strands of the forward shield apart and make them straight.
(18) Align the forward end of the inner ferrule with the end of the jacket.
(19) Fold the strands of the forward shield back over the inner ferrule.

Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.

- (20) Put the end of the shield material on the folded back shield.
(21) Align the rear end of the other outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The shield material is pulled tight
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

- (22) Crimp the ferrules.
(23) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
(24) Make a selection of a heat shrinkable sleeve from Table 5.

Make sure that the sleeve has:

- The correct Temperature Grade
- The smallest diameter that can be put on the splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

20-10-13

STANDARD WIRING PRACTICES MANUAL

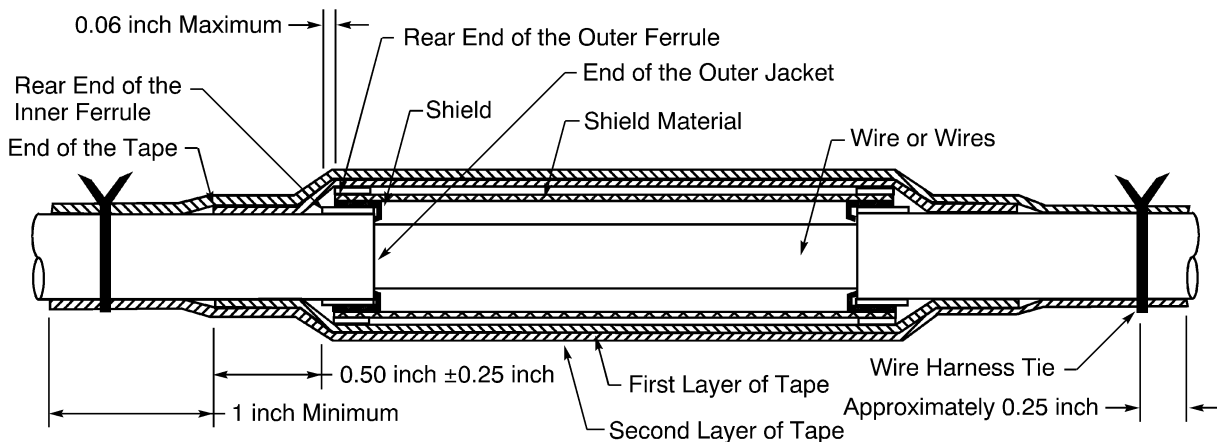
REPAIR OF ELECTRICAL WIRE AND CABLE

- (25) Cut the necessary length of the sleeve.
Make sure that the length is a minimum of 1 inch farther than the rear end of the ferrules on each end of the splice assembly.
- (26) Make a selection of a TFE insulation tape from Table 6.
Make sure that the insulation tape is the correct Temperature Grade.
- (27) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
 - Makes a 50 percent overlap.
- (28) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts where the first layer of tape stops
 - Stops where the first layer of tape starts
 - Makes a 50 percent overlap.
- (29) Put the sleeve on the shield splice assembly.
Make sure that each end of the sleeve is a minimum of 0.25 inch farther than the tape on each end of the splice assembly.
- (30) Shrink the sleeve into its position. Refer to Subject 20-10-14.

J. Shield Repair - Mechanical Ferrules, Shield Material, Tape, and Ties

Refer to:

- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice
- Figure 115 for the configuration of the splice assembly.

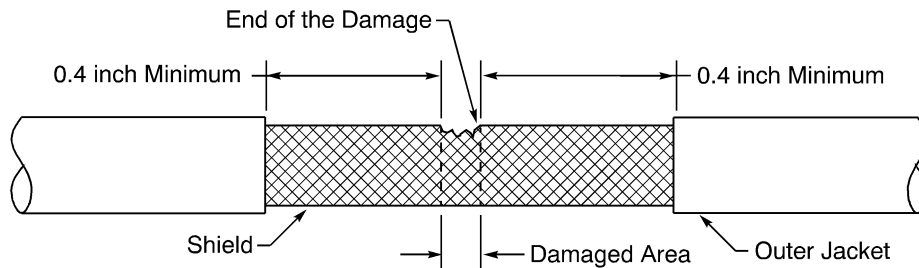


CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 115

- (1) Remove the necessary length of the outer jacket. Refer to Figure 116.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



JACKET REMOVAL

Figure 116

- (a) On one side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (b) On the other side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.4 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

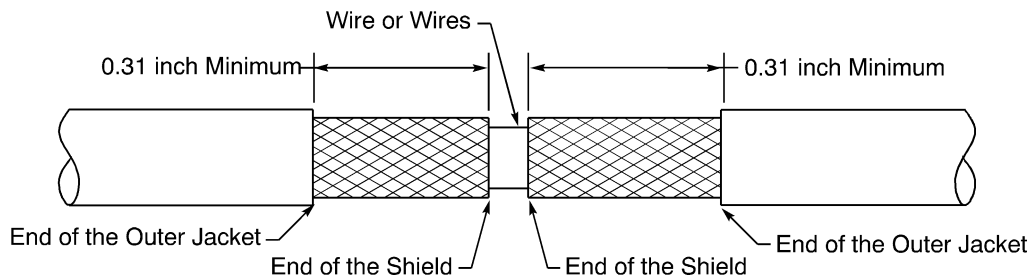
CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (2) Prepare the shield. Refer to Figure 117.



SHIELD PREPARATION

Figure 117

- (a) Carefully cut around the circumference of the shield on each side of the damaged area.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Make sure that the distance from the end of the jacket to the end of the shield is a minimum of 0.31 inch.

- (b) Remove the unwanted shield with the damage.
- (3) Make a selection of two sets of inner and outer mechanical ferrules. Refer to Subject 20-30-12.
Make sure that:
- The ferrules are the correct Temperature Grade
 - The inner ferrule has the smallest diameter that can move freely on the jacket
 - The outer ferrule has the smallest diameter that can be put on the inner ferrule and shield.
- (4) Make a selection of a ferrule crimp tool. Refer to Subject 20-30-12.
- (5) Put one inner ferrule on the jacket of the wire or cable, to the rear of the area to repair.
- (6) Move the strands of the rear shield apart and make them straight.
- (7) Align the forward end of the inner ferrule with the end of the jacket.
- (8) Fold the strands of the rear shield back on the inner ferrule.
Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.
- (9) Make a selection of a shield material from Table 9.
Make sure that the shield material has:
- The correct Temperature Grade
 - The smallest diameter that can be put on the folded back shield.
- NOTE: For alternative shield materials, refer to Subject 20-00-11.
- (10) Cut the necessary length of the shield material.
Make sure that the length of the shield material is a minimum of 0.62 inch more than the length of the jacket that is removed from the wire or the cable.
- (11) Put the shield material on the wire or cable.
- (12) Put the two outer ferrules on the shield material.
- (13) Align the end of the shield material with the end of the shield that is folded back.
- (14) Align the rear end of one of the outer ferrules with the rear end of the inner ferrule.
Make sure that:
- The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (15) Crimp the ferrules.
- (16) Put the other inner ferrule on the jacket of the wire or cable forward of the area to repair.
- (17) Move the strands of the forward shield apart and make them straight.
- (18) Align the forward end of the inner ferrule with the end of the jacket.
- (19) Fold the strands of the forward shield back over the inner ferrule.
Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.
- (20) Put the end of the shield material on the folded back shield.
- (21) Align the rear end of the other outer ferrule with the rear end of the inner ferrule.

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STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Make sure that:

- The outer ferrule goes around the shield material
- The shield material is pulled tight
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

(22) Crimp the ferrules.

(23) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.

(24) Make a selection of a TFE insulation tape from Table 6.

Make sure that the insulation tape is the correct Temperature Grade.

(25) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
- Makes a 50 percent overlap.

(26) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

(27) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the lacing tape is the correct Temperature Grade.

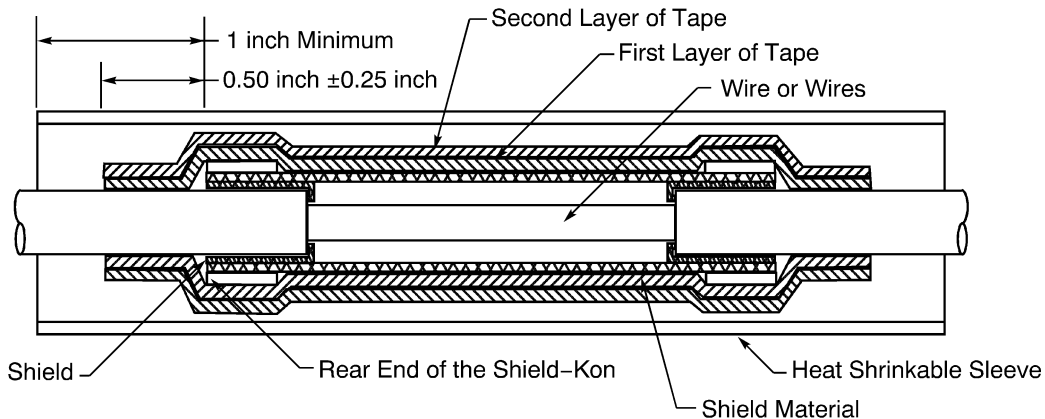
K. Shield Repair - Shield-Kons, Shield Material, Tape, and a Sleeve

Refer to:

- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice
- Figure 118 for the configuration of the splice assembly.

STANDARD WIRING PRACTICES MANUAL

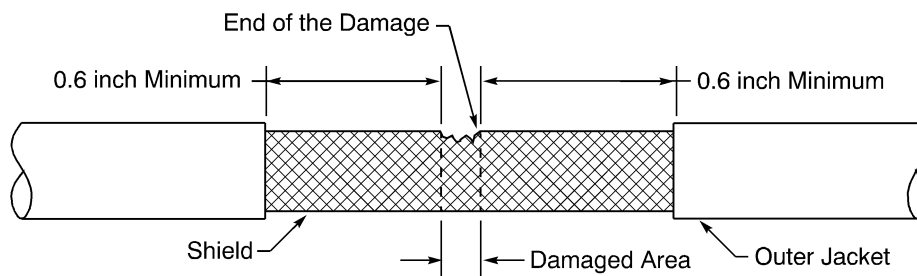
REPAIR OF ELECTRICAL WIRE AND CABLE



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 118

- (1) Remove the necessary length of the outer jacket. Refer to Figure 119.



JACKET REMOVAL

Figure 119

- (a) On one side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.6 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (b) On the other side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.6 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

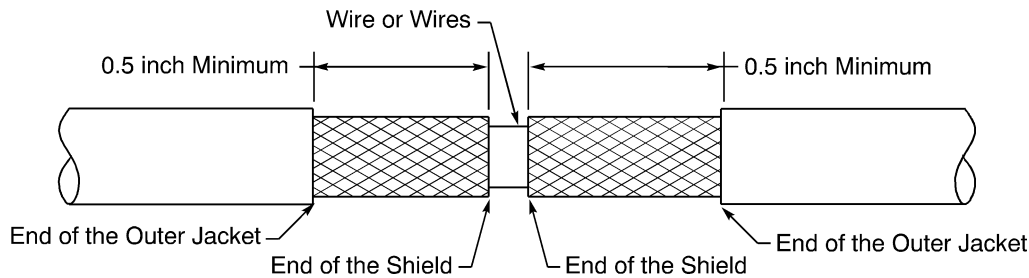
NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

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REPAIR OF ELECTRICAL WIRE AND CABLE

CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (2) Prepare the shield. Refer to Figure 120.



SHIELD PREPARATION
Figure 120

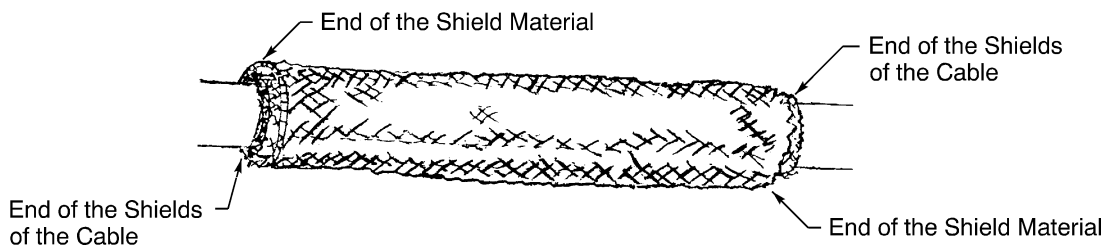
- (a) Carefully cut around the circumference of the shield on each side of the damaged area. Make sure that the distance from the end of the jacket to the end of the shield is a minimum of 0.5 inch.
- (b) Remove the unwanted shield with the damage.
- (3) Fold the end of each shield against the outer jacket.
- (4) Make a selection of a shield material from Table 9.

Make sure that the shield material has:

- The correct Temperature Grade
- The smallest diameter that can be put on the folded back shield.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (5) Cut the necessary length of the shield material. Make sure that the minimum length is the distance between the two ends of the folded back shields.
- (6) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (7) Put the shield material on the wire or cable.
- (8) Align one end of the shield material with the end of the folded back shield. Refer to Figure 121.

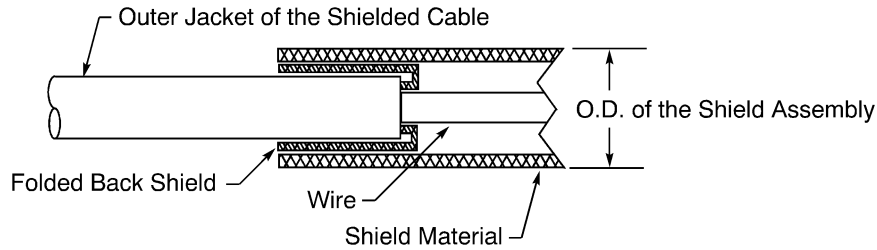


POSITION OF THE SHIELD MATERIAL
Figure 121

- (9) Measure the outer diameter of the shield assembly. Refer to Figure 122.

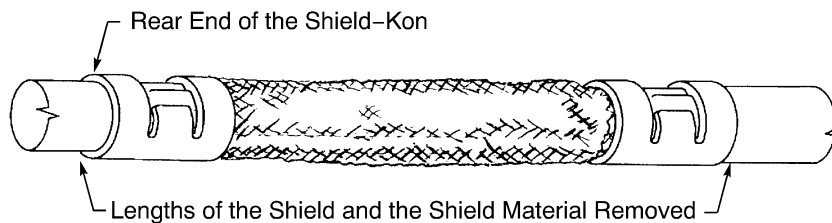
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 122

- (10) Make a selection of two Shield-Kons that have the correct dimensions. Refer to Subject 20-30-12. Make sure that the Shield-Kons are the correct Temperature Grade.
- (11) Assemble the splice of the shield.
 - (a) Make a selection of a Shield-Kon crimp tool. Refer to Subject 20-30-12.
 - (b) Remove the temporary layer of tape around the end of each shield.
 - (c) Align one end of the shield material with the end of the shield. Refer to Figure 121.
 - (d) Put one of the Shield-Kons into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (e) Put the crimp tool and the Shield-Kon on the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (f) Crimp the Shield-Kon.
 - (g) Put the other Shield-Kon into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (h) Make the shield material smooth and tight.
 - (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (j) Crimp the Shield-Kon.
 - (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 123.



SHIELD SPLICE ASSEMBLY
Figure 123

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

- (12) Make a selection of a heat shrinkable sleeve from Table 5.

Make sure that the sleeve has:

- The correct Temperature Grade
- The smallest diameter that can be put on the splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (13) Cut the necessary length of the sleeve.

Make sure that the length is a minimum of 1 inch farther than the rear end of the Shield-Kon on each end of the splice assembly.

- (14) Make a selection of a TFE insulation tape from Table 6.

Make sure that the insulation tape is the correct Temperature Grade.

- (15) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
- Makes a 50 percent overlap.

- (16) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

- (17) Put the sleeve on the shield splice assembly.

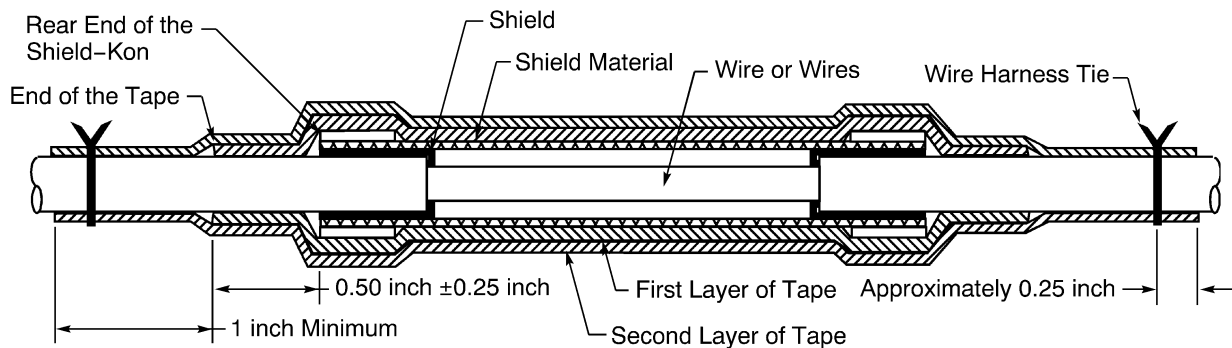
Make sure that each end of the sleeve is a minimum of 0.25 inch farther than the tape on each end of the splice assembly.

- (18) Shrink the sleeve into its position. Refer to Subject 20-10-14.

L. Shield Repair - Shield-Kons, Shield Material, Tape, and Ties

Refer to:

- Paragraph 1.E. for the applicable conditions for the repair of wire and cable with a splice
- Figure 124 for the configuration of the splice assembly.



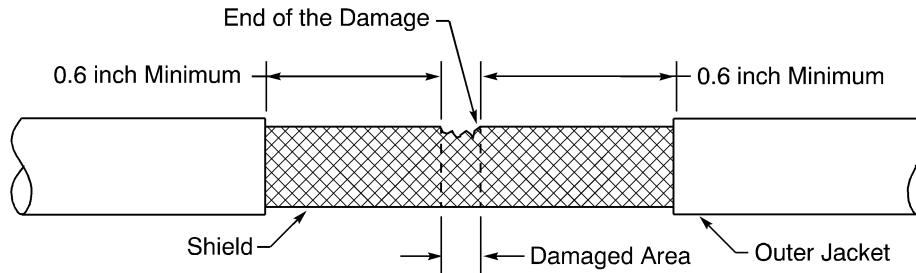
CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 124

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

- (1) Remove the necessary length of the outer jacket. Refer to Figure 125.



JACKET REMOVAL
Figure 125

- (a) On one side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.6 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (b) On the other side of the damaged area, carefully cut the jacket around the circumference of the wire or the cable a minimum of 0.6 inch from the end of the damage, away from the damaged area.

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (c) Cut the jacket lightly along the length of the jacket to be removed.

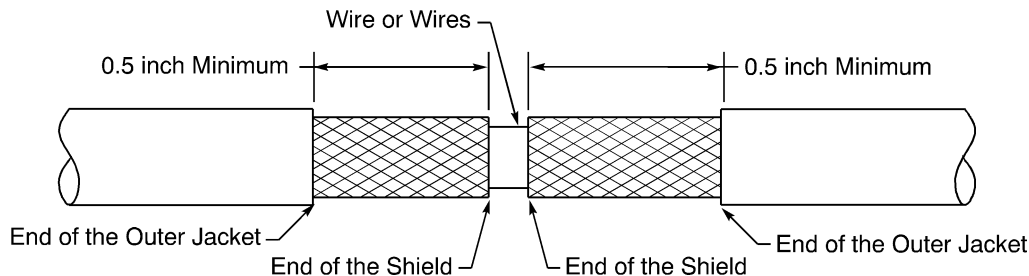
CAUTION: DO NOT CUT ALL THE WAY THROUGH THE JACKET. DAMAGE CAN OCCUR TO THE SHIELD OR WIRE.

- (d) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or the cable can be bent at the lines where the jacket was cut.

CAUTION: DO NOT BEND THE WIRE OR THE CABLE MORE THAN 3 TIMES THE DIAMETER. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.

- (2) Prepare the shield. Refer to Figure 126.



SHIELD PREPARATION
Figure 126

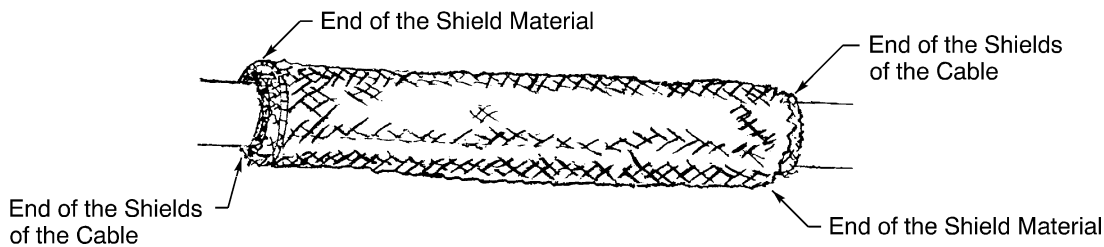
STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

- (a) Carefully cut around the circumference of the shield on each side of the damaged area.
Make sure that the distance from the end of the jacket to the end of the shield is a minimum of 0.5 inch.
- (b) Remove the unwanted shield with the damage.
- (3) Fold the end of each shield against the outer jacket.
- (4) Make a selection of a shield material from Table 9.
Make sure that the shield material has:
 - The correct Temperature Grade
 - The smallest diameter that can be put on the folded back shield.

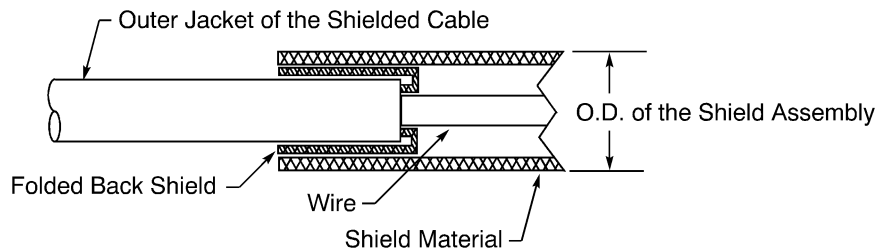
NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (5) Cut the necessary length of the shield material.
Make sure that the minimum length is the distance between the two ends of the folded back shields.
- (6) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (7) Put the shield material on the wire or cable.
- (8) Align one end of the shield material with the end of the folded back shield. Refer to Figure 127.



POSITION OF THE SHIELD MATERIAL
Figure 127

- (9) Measure the outer diameter of the shield assembly. Refer to Figure 128.

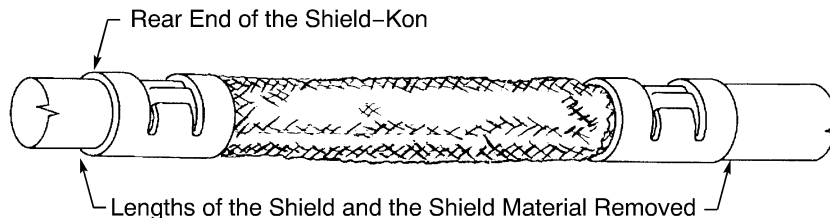


MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 128

- (10) Make a selection of two Shield-Kons that have the correct dimensions. Refer to Subject 20-30-12.
Make sure that the Shield-Kons are the correct Temperature Grade.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

- (11) Assemble the splice of the shield.
- Make a selection of a Shield-Kon crimp tool. Refer to Subject 20-30-12.
 - Remove the temporary layer of tape around the end of each shield.
 - Align one end of the shield material with the end of the shield. Refer to Figure 127.
 - Put one of the Shield-Kons into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - Put the crimp tool and the Shield-Kon on the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - Crimp the Shield-Kon.
 - Put the other Shield-Kon into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - Make the shield material smooth and tight.
 - Put the crimp tool and the Shield-Kon on the other end of the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - Crimp the Shield-Kon.
 - Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 129.



SHIELD SPLICE ASSEMBLY
Figure 129

- (12) Make a selection of a TFE insulation tape from Table 6.
Make sure that the insulation tape is the correct Temperature Grade.
- (13) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
 - Makes a 50 percent overlap.
- (14) Tightly wind a second layer of the tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF ELECTRICAL WIRE AND CABLE**

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

- (15) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the lacing tape is the correct Temperature Grade.

7. REPAIR OF COAX CABLE**A. Repair of the Shield of a Coax Cable**

For the conditions that are applicable for the repair of coax cable, refer to Paragraph 2.M.

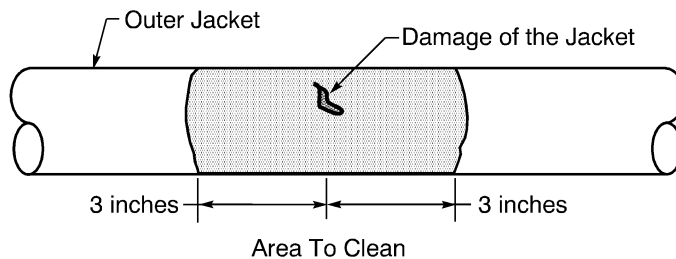
- (1) Make a selection of one of these tapes from Table 6:
- Temperature Grade C or D TFE Tape
 - Temperature Grade A polyester tape

Make sure that the tape has a temperature grade that is applicable for the location at the wire installation.

- (2) Remove loose pieces of insulation and rough edges at the area of the damage.
Make sure that the insulation has a smooth surface.
- (3) Clean the jacket with isopropyl alcohol. Refer to Figure 130.

Make sure:

- To clean the damaged area of the jacket
- To clean the jacket approximately 3 inches on each side of the damage.



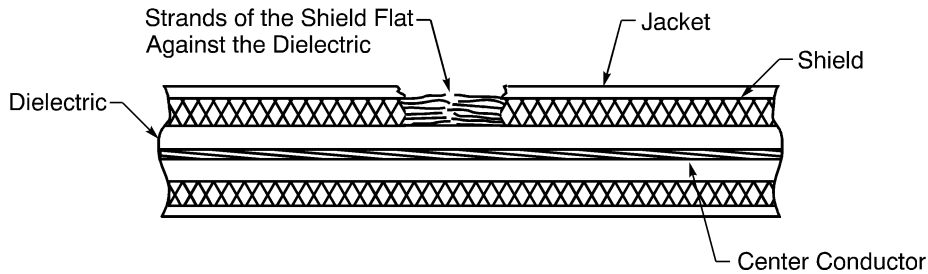
AREA TO CLEAN
Figure 130

- (4) Let the cleaned area dry.
- (5) Put the strands of the damaged shield:
- Flat against the primary insulation
 - Even and symmetrical around the circumference of the area with damage.

Refer to Figure 131.

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REPAIR OF ELECTRICAL WIRE AND CABLE

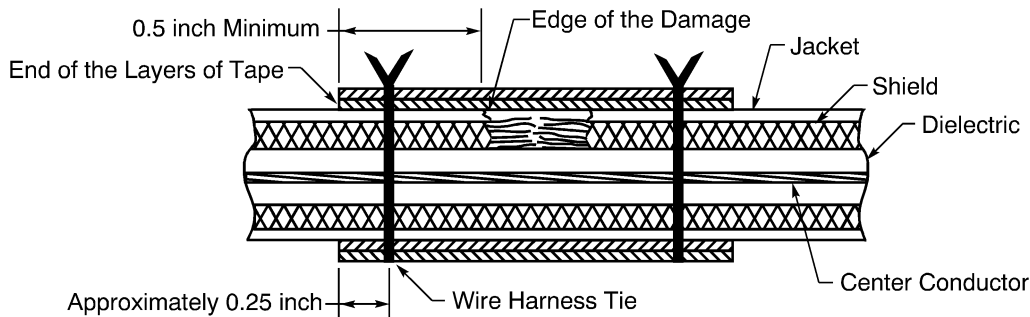


POSITION OF THE SHIELD FOR REPAIR
Figure 131

(6) Put a minimum of two layers of the tape on the damaged area. Refer to Figure 132.

Make sure that:

- Each end of the tape extends a minimum of 0.5 inch farther than each end of the damaged area
- The tape makes 50 percent circumferential overlap
- The second layer of tape is in the opposite direction of the first layer.



POSITION OF THE LAYERS OF TAPE AND THE WIRE HARNESS TIES
Figure 132

(7) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.25 inch from the end of the tape.

Make sure that the lacing tape is the correct Temperature Grade.

Refer to:

- Figure 132
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

B. Repair of a Coax Cable with a Splice

For the conditions that are applicable for the repair of coax cable, refer to Paragraph 2.M.

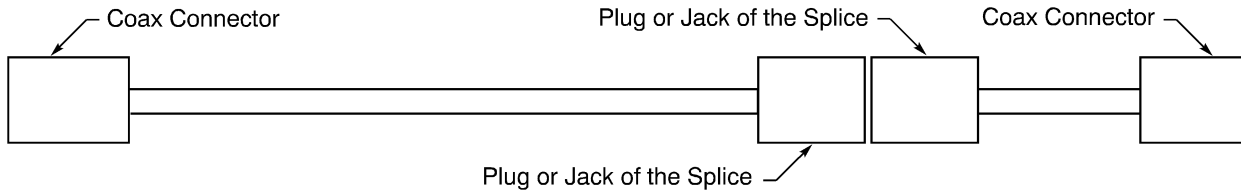
NOTE: If the coax cable does not have the sufficient length to make a jack connector and a plug connector, a repair can be made with a splice and a new length of coax cable. Refer to Paragraph 7.C.

(1) Make a selection of a jack connector and a straight plug connector that are specified for the coax cable. Refer to Subject 20-51-00.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE

- (2) Remove the length of the damaged coax cable.
- (3) Assemble the splice. Refer to Figure 133.



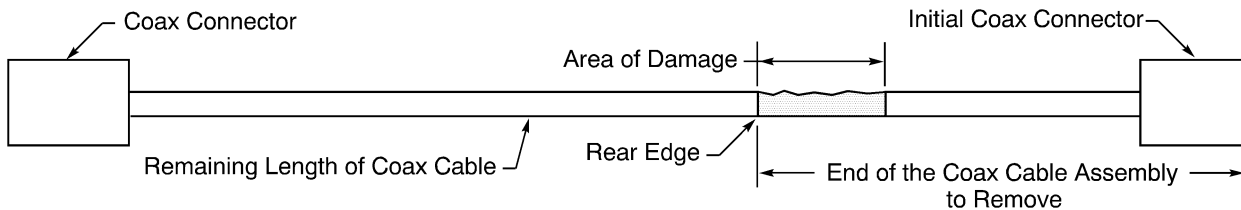
COAX CABLE SPLICE
Figure 133

- (a) Assemble the jack connector on the end of one length of the cable. Refer to the Subject that is applicable for the assembly of the jack.
- (b) Assemble the plug connector on the end of the other length of the cable. Refer to the Subject that is applicable for the assembly of the jack.
- (4) Engage the jack connector and the plug connector for the splice.

C. Repair of a Coax Cable with a Splice and a New Length of Coax Cable

For the conditions that are applicable for the repair of coax cable, refer to Paragraph 2.M.

- (1) Find the part number or the specification of the coax cable. Refer to the WDM and Subject 20-00-13.
- (2) Make a selection of a jack connector and a straight plug connector that are specified for the coax cable. Refer to Subject 20-51-00.
- (3) Make a selection of the end of the coax cable assembly to remove. Refer to Figure 134.

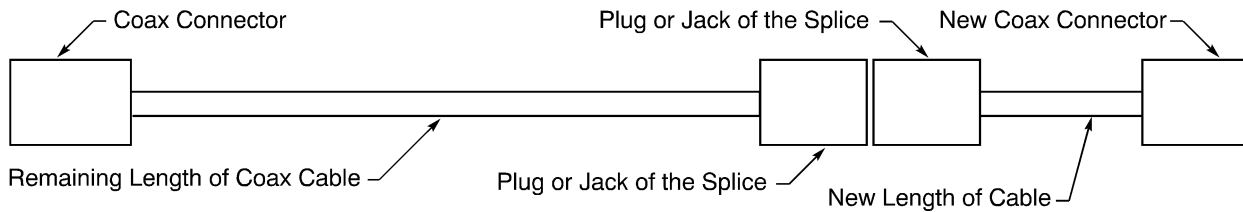


REMOVAL OF ONE END OF THE COAX CABLE ASSEMBLY
Figure 134

- (4) Cut the coax cable at the rear edge of the area of damage. Refer to Figure 134.
- (5) Cut a new length of the same type of coax cable that is as long as the length of coax cable that is removed.
- (6) Assemble the splice. Refer to Figure 135.

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REPAIR OF ELECTRICAL WIRE AND CABLE



SPLICE OF THE NEW LENGTH OF COAX CABLE

Figure 135

- (a) Assemble the jack or the plug connector on the end of the remaining length of coax cable. Refer to the Subject that is applicable for the connector.
 - (b) Assemble the other connector on one end of the new length of coax cable. Refer to the Subject that is applicable for the connector.
- (7) Assemble a new coax connector on the other end of the new length of coax cable. Refer to the Subject that is applicable for the connector.

Make sure that:

- The new connector has the same part number as the initial coax connector; refer to Figure 134 and Figure 135
- The new length of coax cable is equal to the length of coax cable that is removed.

- (8) Engage the jack connector and the plug connector for the splice.

8. REPAIR OF SHIELD GROUND WIRE

A. Repair of a Shield Pull Through Shield Ground Wire

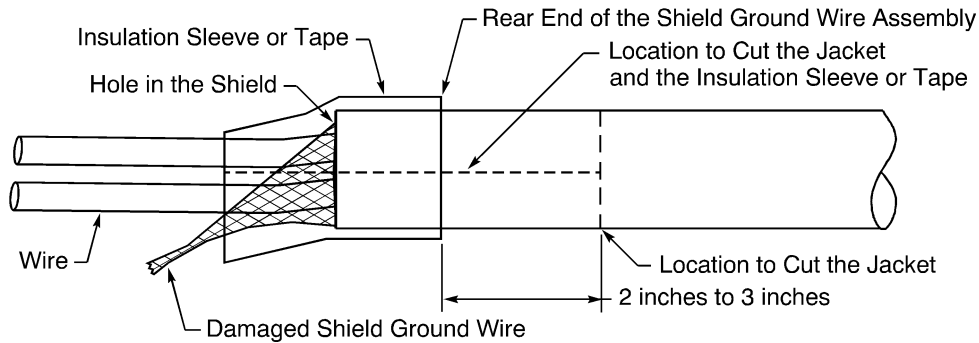
This paragraph gives the procedure to repair a damaged shield pull through shield ground wire with a shield extension and a shield ground wire.

**Table 18
NECESSARY LENGTH OF THE SHIELD EXTENSION**

Shield Ground Wire Assembly Configuration	Necessary Length of the Shield Extension
Mechanical Ferrule, Shield Folded Back	Distance from the end of the jacket to the mark plus 0.35 inch
Mechanical Ferrule, Shield Not Folded Back	Distance from the end of the jacket to the mark
Shield-Kon, Shield Folded Back	Distance from the end of the jacket to the mark plus 0.35 inch
Shield Pull Through	Distance from the end of the jacket to the mark plus the length of the shield ground wire
Solder Sleeve, Shield Folded Back	Distance from the end of the jacket to the mark plus 0.35 inch
Solder Sleeve, Shield Not Folded Back	Distance from the end of the jacket to the mark

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REPAIR OF ELECTRICAL WIRE AND CABLE



CABLE PREPARATION

Figure 136

Refer to Figure 136.

- (1) If it is necessary remove the contact assemblies from the connector.
Refer to the Subject that is applicable for the connector.
- (2) Cut the jacket around the circumference of the wire or the cable, 2 inches to 3 inches from the rear end of the shield ground wire assembly.
- (3) Carefully cut the jacket and the insulation sleeve or tape lightly along the length of the cable.
Make sure cut the jacket and the sleeve or the tape from the location the jacket is cut circumferentially to the end of the sleeve or the tape.

CAUTION: DO NOT CUT THE SHIELD. DAMAGE TO THE SHIELD OR THE WIRES CAN OCCUR.

- (4) Remove the unwanted jacket and the unwanted insulation sleeve or tape from the wires.
- (5) Make a mark on a wire where the wires are pulled through the shield.
- (6) At the end of the jacket, carefully cut the shield around the circumference of the wire or the cable.

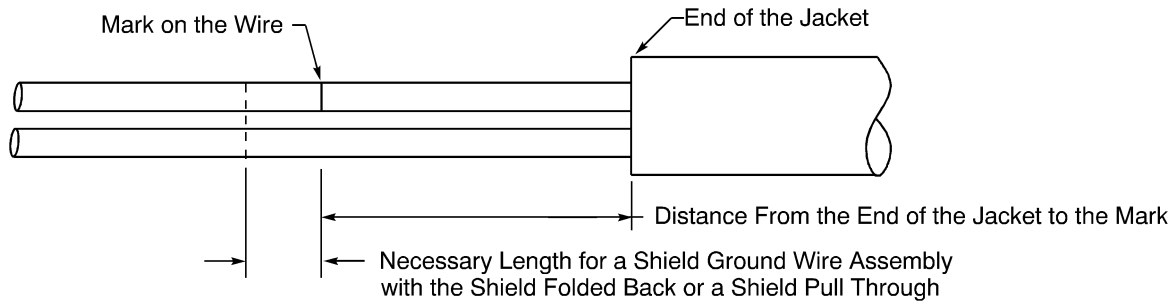
CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES OF THE CABLE. DAMAGE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (7) Remove the unwanted length of the shield.
- (8) Make a selection of a shield ground wire assembly configuration. Refer to Subject 20-10-15.
- (9) Assemble a shield extension. Refer to Subject 20-10-15.

Make sure that the length of the shield extension is correct for the shield ground wire assembly configuration. Refer to Table 18 and Figure 137.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



NECESSARY LENGTH OF THE SHIELD EXTENSION

Figure 137

- (10) Assemble a shield ground wire at the end of the shield extension. Refer to Subject 20-10-15.
- (11) Assemble a terminal lug on the end of the shield ground wire. Refer to Subject 20-30-11.

9. REPAIR OF A FIRE RESISTANT WIRE

A. Repair of the Insulation of a Fire Resistant Wire

For the damage and repair conditions that are applicable for the repair of fire resistant wire, refer to Paragraph 2.N.

CAUTION: IF THE REPAIR IS A TEMPORARY REPAIR, THE WIRE MUST BE REPLACED AT A MAXIMUM OF 500 FLIGHT HOURS SUBSEQUENT TO THE REPAIR.

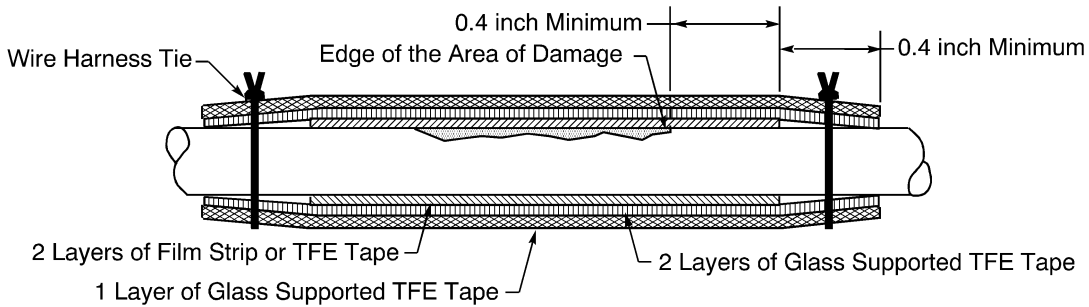
CAUTION: THIS PROCEDURE IS APPLICABLE ONLY FOR THE FIRE RESISTANT WIRES IN TABLE 19. IF THIS PROCEDURE IS USED TO REPAIR OTHER FIRE RESISTANT WIRES, THE REPAIR CAN GIVE AN UNSATISFACTORY PERFORMANCE.

**Table 19
FIRE RESISTANT WIRES**

Part Number or Specification	Supplier
24-00033	Champlain
24-00034	Champlain
BMS 13-55	QPL
BMS 13-67	QPL
BMS 13-8	QPL
M25038/1-()-()	QPL

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REPAIR OF ELECTRICAL WIRE AND CABLE



INSULATION REPAIR

Figure 138

Refer to Figure 138.

- (1) Make a selection of one of these insulation materials from Table 6:
 - Temperature Grade D film strip
 - Temperature Grade D TFE tape.
- (2) Make a selection of a glass supported TFE tape from Table 7.
- (3) Remove loose pieces of insulation and rough edges at the area of the damage.
Make sure that the insulation has a smooth surface.
- (4) Wind a layer of TFE tape or film strip on the wire.
Make sure that:
 - The end of the tape is a minimum of 0.4 inch farther than the end of the damaged area
 - The tape or film strip makes a 50 percent overlap
- (5) Wind a second layer of TFE tape or film strip on the wire.
Make sure that:
 - The layer of tape is wound in the opposite direction of the first layer of tape
 - The end of the tape is aligned with the end of the first layer of tape
 - The tape or film strip makes a 50 percent overlap.
- (6) Wind a layer of glass supported TFE tape on the wire.
Make sure that:
 - The end of the tape is a minimum of 0.4 inch farther than the end of the first layers of tape
 - The tape makes a 50 percent overlap
- (7) Wind a second layer of glass supported TFE tape on the wire.
Make sure that:
 - The layer of tape is wound in the opposite direction of the first layer of tape
 - The end of the tape is aligned with the end of the first layer of tape
 - The tape makes a 50 percent overlap.
- (8) Wind a third layer of glass supported TFE tape on the wire.

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REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure that:

- The layer of tape is wound in the opposite direction of the last layer of tape
 - The end of the tape is a minimum of 0.25 inch farther than the end of the first two layers of glass supported tape
 - The tape makes a 50 percent overlap
- (9) Assemble a lacing tape wire harness tie on each end of the repair approximately 0.35 inch from the end of the sleeve.

Refer to Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie in a high vibration area.

Make sure that:

- The Temperature Grade of the lacing tape is Temperature Grade D
- The tie is on the end of the first two layers of glass supported tape.

B. Repair of Unshielded Fire Resistant Wire with a Splice

For the damage and repair conditions that are applicable for the repair of fire resistant wire, refer to Paragraph 2.N.

CAUTION: THE REPAIR OF FIRE RESISTANT WIRE WITH A SPLICE IS A TEMPORARY REPAIR ONLY. THE WIRE:

- CAN BE REPAIRED ONCE WITH A MAXIMUM OF TWO SPLICES FOR EACH WIRE SEGMENT
- MUST BE REPLACED AT A MAXIMUM OF 500 FLIGHT HOURS SUBSEQUENT TO THE REPAIR.

CAUTION: THIS PROCEDURE IS APPLICABLE ONLY FOR THE FIRE RESISTANT WIRES IN TABLE 20. IF THIS PROCEDURE IS USED TO REPAIR OTHER FIRE RESISTANT WIRES, THE REPAIR CAN GIVE AN UNSATISFACTORY PERFORMANCE.

**Table 20
FIRE RESISTANT WIRES**

Part Number or Specification	Wire Size (AWG)	Supplier
24-00033	18	Champlain
24-00034	16	Champlain
81993	18	Filotex
85842	16	Filotex
BMS 13-55	18	QPL
	16	QPL
BMS 13-8	18	QPL
H22-4000	18	Rockbestos
M25038/1-()-()	18	QPL
	16	QPL

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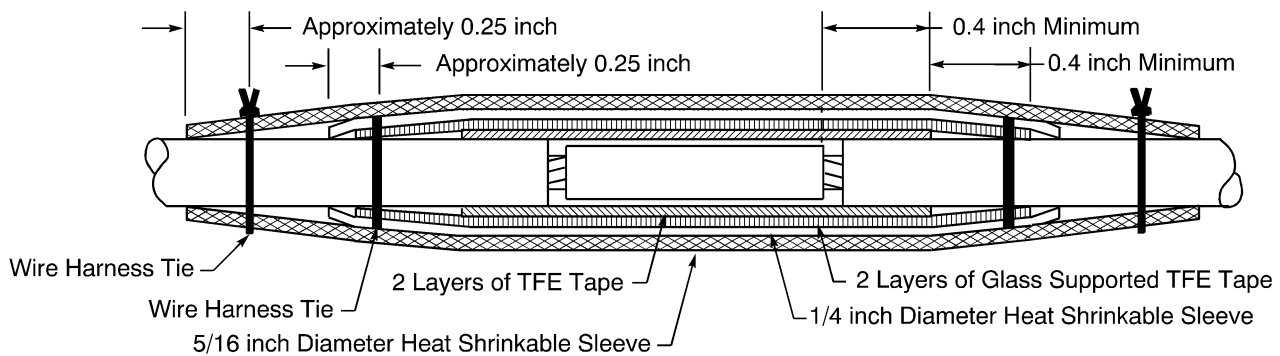
REPAIR OF ELECTRICAL WIRE AND CABLE

**Table 21
SPLICE PART NUMBERS**

Wire Size (AWG)	Splice	
	Part Number	Supplier
18	BACT12C20	QPL
16	BACT12C15	QPL

**Table 22
SPLICE CRIMP TOOLS**

Wire Size (AWG)	Splice	Crimp Tool	
		Part Number	Supplier
18	BACT12C20	46673	AMP
16	BACT12C15	46988	AMP



**CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 139**

Refer to Figure 139.

- (1) Make a selection these Temperature Grade D heat shrinkable sleeves from Table 5:
 - A 3.00 inch \pm 0.25 inch length of 1/4 inch diameter sleeve
 - A 4.00 inch \pm 0.25 inch length of 5/16 inch diameter sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

- (2) Make a selection of a Temperature Grade D TFE tape from Table 6.
- (3) Make a selection of a glass supported TFE tape from Table 7.
- (4) Make a selection of a splice from Table 21.
- (5) Make a selection of a crimp tool Table 22.
- (6) Put the lengths of the heat shrinkable sleeve on the end of the wire in this sequence:
 - The 5/16 inch diameter sleeve
 - The 1/4 inch diameter sleeve.
- (7) Remove the necessary length of the insulation from the end of each wire. Refer to Table 23.

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REPAIR OF ELECTRICAL WIRE AND CABLE

**Table 23
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Removal Length (inch)		
	Minimum	Target	Maximum
18	0.22	0.25	0.28
16	0.22	0.25	0.28

- (8) Assemble one end of the splice:
 - (a) Put the end of a wire into the crimp barrel of the splice.
Make sure that all of the strands of the conductor are in the crimp barrel of the splice.
 - (b) Crimp the splice.
- (9) Do Step (8) again for the other wire in the other end of the splice.
- (10) Wind a layer of TFE tape on the wire.
Make sure that:
 - The end of the tape is a minimum of 0.4 inch farther than the end of the damaged area
 - The tape makes a 50 percent overlap
- (11) Wind a second layer of TFE tape on the wire.
Make sure that:
 - The layer of tape is wound in the opposite direction of the first layer of tape
 - The end of the tape is aligned with the end of the first layer of tape
 - The tape makes a 50 percent overlap.
- (12) Wind a layer of glass supported TFE tape on the wire.
Make sure that:
 - The end of the tape is a minimum of 0.4 inch farther than the end of the first layers of tape
 - The tape makes a 50 percent overlap
- (13) Wind a second layer of glass supported TFE tape on the wire.
Make sure that:
 - The layer of tape is wound in the opposite direction of the first layer of glass supported TFE tape
 - The end of the tape is aligned with the end of the first layer of tape
 - The tape makes a 50 percent overlap.
- (14) Align the center of the 1/4 inch diameter heat shrinkable sleeve with the center of the splice.
- (15) Assemble a lacing tape wire harness tie on each end of the sleeve approximately 0.25 inch from the end of the sleeve. Refer to Subject 20-10-11.

Refer to Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie in a high vibration area.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.
- (16) Align the center of the 5/16 inch diameter heat shrinkable sleeve with the center of the splice.
- (17) Assemble a lacing tape wire harness tie on each end of the sleeve approximately 0.25 inch from the end of the sleeve.

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Refer to Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie in a high vibration area.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

10. REPAIR OF A THERMOCOUPLE WIRE WITH A SPLICE

A. Repair of Alumel and Chromel Thermocouple Wires with a Splice

**Table 24
ALUMEL AND CHROMEL SPLICE PART NUMBERS**

Wire Material	Splice		
	Part Number	Color	Supplier
Alumel	1-322325-0	Green	AMP
Chromel	1-322325-1	Grey	AMP

**Table 25
SPLICE CRIMP TOOLS**

Basic Unit	Setting	Supplier
46673	3	AMP

- (1) Make a selection of a splice from Table 24.
Make sure to use:
 - The alumel splice with alumel wire
 - The chromel splice with chromel wire.
- (2) Make a selection of a crimp tool from Table 25.
- (3) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 5.
Make sure that the heat shrinkable sleeve has the smallest diameter that can be installed on the splice assembly.
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (4) Cut a 2.50 inch \pm 0.25 inch length of the heat shrinkable sleeve.
- (5) Make a selection of one of these two insulation materials from Table 6:
 - Temperature Grade D TFE tape
 - Temperature Grade D film strip.
- (6) Make a selection of a protective tape from Table 6.
- (7) Remove the damaged length of the wire.
 - (a) On one side of the damage, cut the wire.
Make sure that the end of the wire is perpendicular to the longitudinal axis of the wire.
 - (b) On the other side of the damage, cut the wire.
Make sure that the end of the wire is perpendicular to the longitudinal axis of the wire.
- (8) Clean the insulation with isopropyl alcohol.

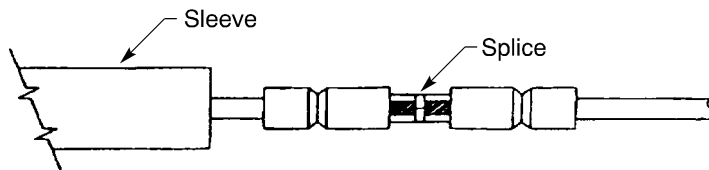
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REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure:

- To clean the area of the insulation from the end of each wire to a minimum of 3 inches from the end
- That the cleaned area is dry.

- (9) Put the heat shrinkable sleeve on the wire.
- (10) Remove 0.25 inch \pm 0.06 inch of the insulation from the end of the wire.
- (11) Put the wire into the splice until it stops.
- (12) Crimp the splice. Refer to Figure 140.

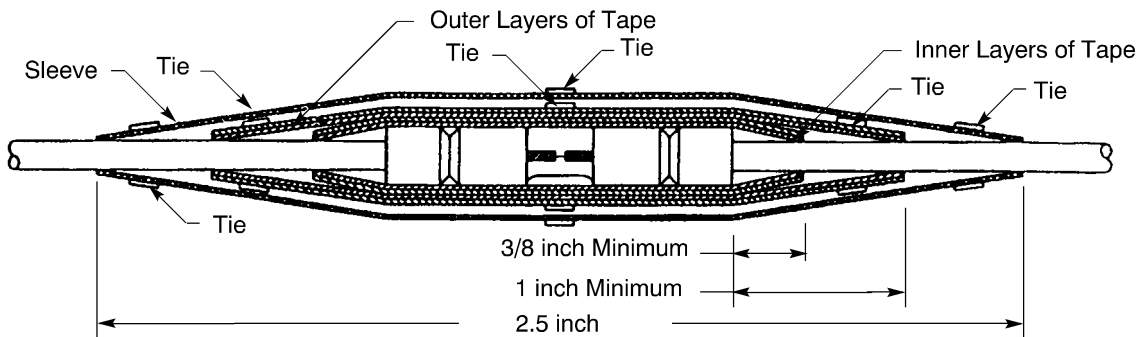


ALUMEL AND CHROMEL SPLICE ASSEMBLY
Figure 140

- (13) Put two layers of the insulation tape or the insulation film strip on the splice assembly. Refer to Figure 141.

Make sure that:

- Each end of each layer extends a minimum of 0.38 inch farther than each end of the splice
- The tape makes a 50 percent overlap
- The second layer is wound in the opposite direction of the first layer.



INSULATION OF THE SPLICE
Figure 141

- (14) Put two layers of the protective tape on the splice assembly.

Make sure that:

- Each end of each layer extends a minimum of 1 inch farther than each end of the splice
- The tape makes a 50 percent overlap
- The second layer is wound in the opposite direction of the first layer.

Refer to Figure 141.

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REPAIR OF ELECTRICAL WIRE AND CABLE

(15) Assemble a lacing tape wire harness tie:

- At each end of the tape
- In the middle of the tape.

Refer to:

- Figure 141
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

(16) Align the center of the heat shrinkable sleeve with the center of the splice.

Refer to Figure 141.

(17) Assemble a lacing tape wire harness tie:

- At each end of the sleeve
- In the middle of the sleeve.

Refer to:

- Figure 141
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

11. REPAIR OF FUEL QUANTITY INDICATOR SYSTEM CABLE

A. Repair of the Jacket of Hi Z Cables External to the Fuel Tank

**Table 26
NECESSARY MATERIALS**

Material	Part Number	Supplier
Naphtha, aliphatic	TT-N-95	Any Source
Sealant	E.C. 776SR	3M Company
	Nycote Type 7-11	Nycote Laboratories
	Nycote Type 88	Nycote Laboratories

- (1) Make a selection of a sealant from Table 26.
- (2) Remove loose pieces of insulation and rough edges at the area of the damage.
Make sure that the insulation has a smooth surface.
- (3) Clean the damaged area of cable with aliphatic naphtha.
- (4) Apply one layer of primer.
- (5) Cure the primer at room temperature.
- (6) Apply a layer of sealant.

B. Repair of Hi Z Cables External to the Fuel Tank with a Splice

This paragraph gives the procedure that can be used to:

- Repair an isolated, damaged point on a cable
- Replace a section of a damaged cable.

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REPAIR OF ELECTRICAL WIRE AND CABLE

**Table 27
SPLICE KIT PART NUMBERS**

Part Number	Supplier
D-150-0194	Raychem

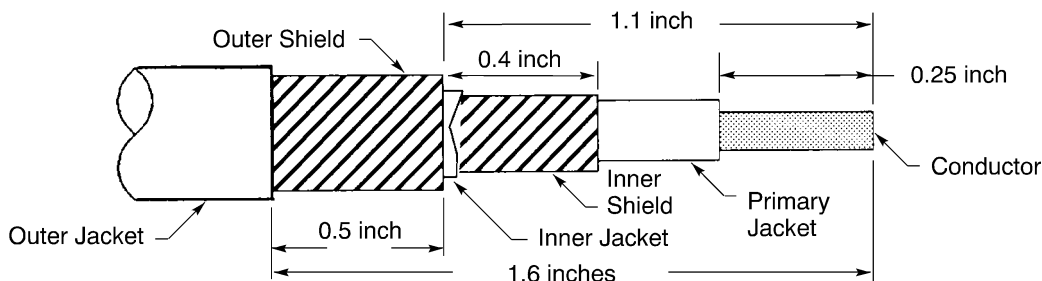
**Table 28
RAYCHEM D-150-0194 SPLICE KIT COMPONENTS**

Description	Part Number	Supplier
Solder Shield Splice, Inner Shield	D-155-0450	Raychem
Solder Shield Splice, Outer Shield	D-155-0575	Raychem
Splice, Miniseal (2 pieces)	D-436-37	Raychem

**Table 29
NECESSARY TOOLS**

Tool	Description	Supplier
AD-1377	Splice Crimp Tool	Raychem
CV-5300	Minigun with MG-1 Reflector	Raychem

- (1) Remove the damaged length of cable.
- (2) Prepare each end of the remaining cable. Refer to Figure 142.



**HI Z CABLE TRIM DIMENSIONS
Figure 142**

- (a) Remove 1.6 inches of the outer jacket from the end of the cable.
- (b) Remove the necessary length of the outer shield.
Make sure that the end of the shield is 0.5 inch from the end of the jacket.
- (c) Fold the shield back over the jacket.
- (d) Remove 1.1 inches of the inner jacket from the end of the cable.
- (e) Push the inner shield toward the outer jacket to open the strands of the inner shield.
- (f) Pull the inner shield back to its initial position.
- (g) Remove the length of the inner shield so that the end of the shield is 0.4 inch from the end of the inner jacket.

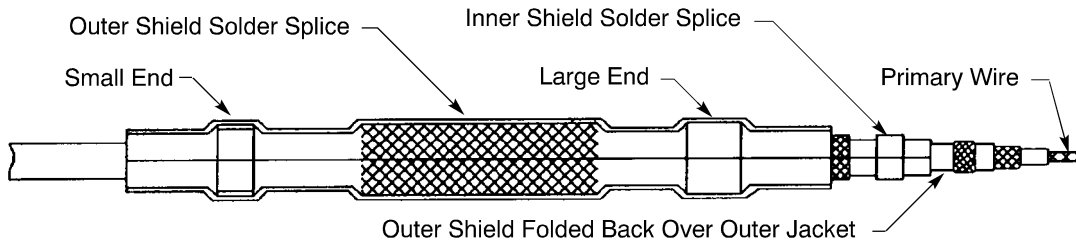
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REPAIR OF ELECTRICAL WIRE AND CABLE

- (h) Remove 0.25 inch of the primary jacket from the end of the cable.
- (3) Assemble the miniseal splice. Refer to Figure 143 and Table 27.

NOTE: To make the steps of this procedure more clear, one end of the cable is Cable A and the other end is Cable B.



POSITION OF THE SOLDER SHIELD SPLICES ON CABLE A
Figure 143

- (a) Put an outer shield solder splice and an inner shield solder splice on Cable A. Make sure to put the small end of the splice on the cable first.
- (b) Make a selection of a crimp tool from Table 29.
- (c) Put the crimp barrel component of the miniseal splice on the primary wire.
- (d) Crimp the component on the wire.
- (e) Put the sleeve component of the miniseal splice on the cable so that it extends farther than the crimp barrel.
- (f) Put the primary wire of Cable B into the crimp barrel component of the miniseal splice.
- (g) Crimp the component on the wire.
- (h) Make a selection of a hot air gun from Table 29 or an equivalent source of heat. Make sure that the hot air gun:
 - Has a reflector
 - Is ready for operation; refer to Paragraph 12.B.

WARNING: THE OPERATION OF A HOT AIR GUN CAN CAUSE AN EXPLOSION. REFER TO THE SAFETY PRACTICES IN SUBJECT 20-00-10 FOR THE NECESSARY PRECAUTIONS TO PREVENT:

- DAMAGE TO THE EQUIPMENT
- INJURY TO THE PERSON.

- (i) Move the sleeve component of the miniseal splice. Make sure that the center of the sleeve is aligned with the center of the crimp barrel.
- (j) Apply heat to the miniseal splice until the inserts melt and the solder flows.

CAUTION: DO NOT APPLY TOO MUCH HEAT TO THE ADJACENT WIRES. DAMAGE TO THE WIRES CAN OCCUR.

- (4) Push the inner shield solder splice so that the center of the splice is aligned with the center of the miniseal splice.
- (5) Shrink the inner shield solder splice:

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REPAIR OF ELECTRICAL WIRE AND CABLE

- (a) Apply heat to the center of the splice until the solder melts and the sleeve shrinks.
- (b) Move the heat to one end slowly so that the solder melts and the sleeve shrinks.

NOTE: Before the end of the splice is reached, approximately 1/4 inch, shrink the end of the sleeve to make a seal.

- (c) Start at the edge of the center of the splice that is not melted and slowly move the heat to the other end so that the solder melts and the sleeve shrinks.

NOTE: Before the end of the splice is reached, approximately 1/4 inch, shrink the end of the sleeve to make a seal.

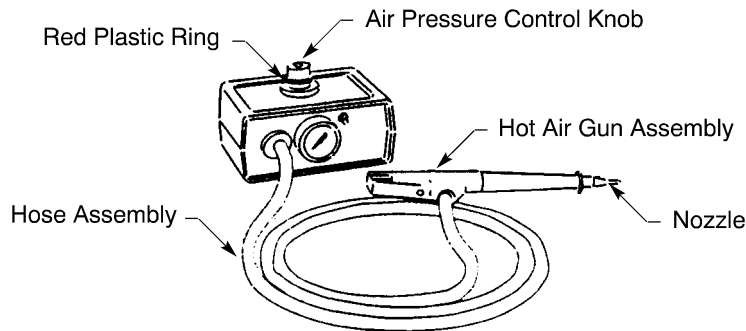
- (6) Fold the outer shield wire back into position over the end of the inner splice.
- (7) Put the outer solder shield splice over the inner shield splice and end of the outer shield.
- (8) Do Step (5) to shrink the outer shield solder splice.

12. HOT AIR GUNS

A. Part Numbers and Description

**Table 30
HOT AIR GUN PART NUMBERS**

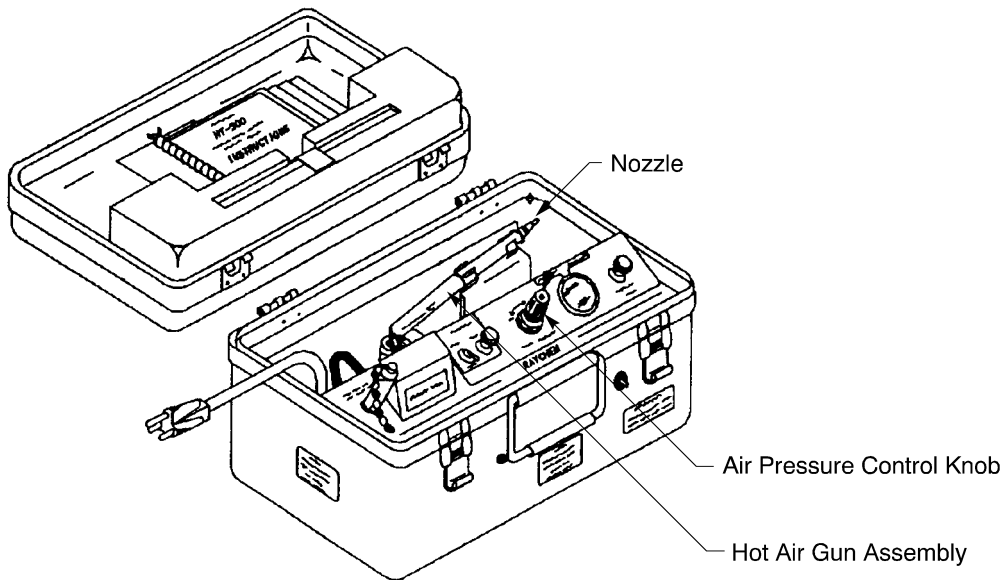
Part Number	Description	Power Supply	Supplier
AA-400	Super Heater Mark II Hot Air Gun	115 VAC, 60 Hz	Raychem
HT-900	Hot Air Gun	115 VAC, 50 Hz to 400 Hz	Raychem



**RAYCHEM MODEL AA-400 HOT AIR GUN
Figure 144**

STANDARD WIRING PRACTICES MANUAL

REPAIR OF ELECTRICAL WIRE AND CABLE



RAYCHEM MODEL HT-900 HOT AIR GUN

Figure 145

B. Operation of the Hot Air Gun

WARNING: DO NOT OPERATE THE HOT AIR GUN ON OR NEAR THE AIRPLANE WHEN THERE ARE FLAMMABLE:

- LIQUIDS
- VAPORS
- GASES.

WARNING: A HOT WORK PERMIT MUST BE RECEIVED FROM THE FIRE DEPARTMENT BEFORE THE HOT AIR GUNS ARE USED ON OR NEAR THE AIRPLANE.

- (1) Make a selection of a hot air gun from Table 30.

WARNING: THE RAYCHEM AA-400 HOT AIR GUN MUST NOT BE USED ON OR NEAR THE AIRPLANE.

NOTE: To do work on or near the airplane, the Raychem HT-900 hot air gun must be used.

- (2) To operate the Raychem AA-400 hot air gun:
- (a) Turn the air pressure control knob fully to the counterclockwise position. Refer to Figure 144.

NOTE: The red plastic ring below the knob must be raised to unlock the knob.

- (b) Attach a source of compressed air to the fitting on the control unit.

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REPAIR OF ELECTRICAL WIRE AND CABLE

Make sure that the source of the compressed air:

- Is clean
- Is dry
- Is free of oil
- Can supply a minimum of 4 CFM at 60 psi.

(3) To operate the Raychem HT-900 hot air gun:

- (a) Turn the air pressure control knob fully to the counterclockwise position. Refer to Figure 145.
- (b) Attach a source of compressed air or compressed nitrogen to the fitting on the control unit.

Make sure that the source of the compressed air or compressed nitrogen:

- Is clean
- Is dry
- Is free of oil
- Can supply a minimum of 4 CFM at 80 psi to 200 psi.

(4) Connect the power cord to the power supply.

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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF SHRINKABLE SLEEVES

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	A. Cold Shrinkable Sleeves	2

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STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF SHRINKABLE SLEEVES****1. PART NUMBERS AND DESCRIPTION****A. Shrinkable Sleeve Part Numbers**

Refer to the shrinkable sleeves shown in Subject 20-00-11.

2. INSTALLATION OF HEAT SHRINKABLE SLEEVES

WARNING: THE OPERATION OF A HOT AIR GUN OR A HEAT GUN CAN CAUSE AN EXPLOSION. REFER TO THE SAFETY PRACTICES IN Subject 20-00-10 FOR THE NECESSARY PRECAUTIONS TO AVOID:

- DAMAGE TO THE EQUIPMENT
- INJURY TO THE PERSON.

A. General Conditions for the Installation

Make sure that the sleeve can be:

- Moved easily over the component
- Held in position permanently after the heat is applied.

After the heat is applied, the sleeve must make 3/16 inch to 1/2 inch overlap with the insulation of the wire or cable on these assemblies:

- A contact
- A shield termination
- A splice
- A terminal
- A wire bundle breakout.

B. Installation of Heat Shrinkable Sleeves

- (1) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (2) Cut the sleeve so that the length of the sleeve is the sufficient length.

NOTE: The sufficient length is the necessary length plus a maximum 10 percent of the necessary length because of the longitudinal shrinkage of the sleeve.

- (3) To prevent heat damage, put a split Teflon sleeve or fish paper on the wire at each end of the heat shrinkable sleeve so that:
 - The end of the protection touches the end of the sleeve
 - The protection extends a minimum 1 inch from the end of the sleeve.
- (4) To prevent heat damage to all of the adjacent wires with shields, put the protection on those wires.
- (5) Heat the hot gun for 15 seconds minimum.
- (6) Shrink the sleeve in position:
 - (a) Hold the gun 3 inches minimum from the sleeve
 - (b) Point the gun at the center of the sleeve for 5 to 10 seconds.

CAUTION: DO NOT APPLY THE HEAT FOR MORE THAN 20 SECONDS AT ANY ONE TIME.

- (7) If the sleeve does not fully shrink:
 - (a) Wait for of 5 minutes minimum so that the cable becomes cool.
 - (b) Do Step (6) again.



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INSTALLATION OF SHRINKABLE SLEEVES

3. INSTALLATION OF COLD SHRINK SLEEVES

A. Cold Shrinkable Sleeves

Cold shrinkable sleeves are used in:

- The assembly of copalum splices; refer to Subject 20-30-13
 - The assembly of copalum terminals; refer to Subject 20-30-14.
- (1) Make a selection of a cold shrinkable sleeve from Subject 20-00-11.
 - (2) Put the sleeve on the wire.
 - (3) Hold the sleeve in position with one hand.
 - (4) Pull the core off in a counterclockwise direction with the other hand.
The sleeve shrinks over the wire as the core is removed.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

This Subject gives the procedures to assemble:

- A shield ground wire
- A shield dead end
- A shield extension.

1. APPLICABLE CONDITIONS FOR SHIELD TERMINATION

A. General Data

For the conditions that are applicable for:

- Shield terminations and wire harness assembly, refer to Subject 20-10-11
- Shield terminations and wire harness installation, refer to Subject 20-10-11.

B. Airworthiness Limitations

These types of wiring configurations are specified as Critical Design Configuration Control Limitations (CDCCL):

- Fuel System Wiring that has Airworthiness Limitations
- Wiring that is installed adjacent to the fuel tank. Refer to Subject 20-10-11.

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

To find more data about CDCCL wiring, refer to Table 1 for the document that is applicable for the airplane model.

Table 1
BOEING DOCUMENTS FOR AIRWORTHINESS LIMITATIONS

Boeing Document	Airplane Model
D6-7552-AWL	707
D6-8766-AWL	727
D6-38278-CMR	737-100,-200,-200C,-300,-500
D6-13747-CMR	747-100,-200,-300,-SP
Maintenance Planning Document, Section 9	737-600,-700,-800 and later 737 models
	747-400 and later 747 models
	757
	767
	777

C. Selection of a Shield Ground Wire Configuration

For the shield termination of special shielded wires and shielded cables, refer to Paragraph 3.

For the applicable conditions related to:

- The maximum length of a shield ground wire, refer to Paragraph 1.D.
- The maximum length of wire without a shield, refer to Paragraph 1.E.
- The configuration of shield ground wires on adjacent wires, refer to Paragraph 1.F.
- Shield ground wires with the same ground connection, refer to Paragraph 1.G.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

**Table 2
SELECTION OF A SHIELD GROUND WIRE CONFIGURATION**

Shield Configuration	Maximum Temperature Grade	Shield Ground Wire Configuration		Assembly Procedure
		Insulation	Shield Connection	
Shield with Flat Conductors	B	-	Shield Dead End	Paragraph 12.B.
		Insulated	Solder Sleeve, No Integral Wire, Shield Not Folded	Paragraph 8.C.
			Solder Sleeve with Integral Wire, Shield Not Folded	Paragraph 9.C.
			Solder Sleeve with Integral Wire and Shield Extension, Shield Not Folded	Paragraph 11.D.
		Uninsulated	Solder Sleeve with Integral Wire, Shield Not Folded	Paragraph 10.C.
Shield with Round Conductors	B	-	Shield Dead End	Paragraph 12.A.
		Insulated	Mechanical Ferrules, Shield Folded	Paragraph 6.B.
			Mechanical Ferrules, Shield Not Folded	Paragraph 6.D.
			Mechanical Ferrules and Shield Extension	Paragraph 11.A.
			RSK Shield-Kon	Paragraph 7.A.
			RSK Shield-Kon and Shield Extension	Paragraph 11.B.
			Solder Sleeve, Shield Folded	Paragraph 8.B.
			Solder Sleeve with Integral Wire, Shield Folded	Paragraph 9.B.
			Solder Sleeve with Integral Wire and Shield Extension, Shield Folded	Paragraph 11.C.
			Solder Sleeve, Shield Not Folded	Paragraph 8.C.
			Solder Sleeve with Integral Wire, Shield Not Folded	Paragraph 9.C.
			Solder Sleeve with Integral Wire and Shield Extension, Shield Not Folded	Paragraph 11.D.
		Uninsulated	Shield Pull Through, Sleeve Strain Relief	Paragraph 5.A.
			Shield Pull Through, Tape Strain Relief	Paragraph 5.B.
			Solder Sleeve with Integral Wire, Shield Folded	Paragraph 10.B.
			Solder Sleeve with Integral Wire, Shield Not Folded	Paragraph 10.C.

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ASSEMBLY OF SHIELD GROUND WIRES

Table 2 (continued)

Shield Configuration	Maximum Temperature Grade	Shield Ground Wire Configuration		Assembly Procedure
		Insulation	Shield Connection	
Shield with Round Conductors	D	-	Shield Dead End	Paragraph 12.A.
		Insulated	Mechanical Ferrules, Shield Folded	Paragraph 6.B.
			Mechanical Ferrules, Shield Not Folded	Paragraph 6.D.
			Mechanical Ferrules and Shield Extension	Paragraph 11.A.
			RSK Shield-Kon	Paragraph 7.A.
			RSK Shield-Kon and Shield Extension	Paragraph 11.B.
		Uninsulated	Shield Pull Through, Sleeve Strain Relief	Paragraph 5.A.
			Shield Pull Through, Tape Strain Relief	Paragraph 5.B.
Two Shields, Adjacent, Outer with Round Conductors, Inner with Flat Conductors	B	-	Shield Dead End	Paragraph 12.B.
		Insulated	Mechanical Ferrules, Outer Shield Folded	Paragraph 6.C.
			Solder Sleeve, No Integral Wire, Shield Not Folded	Paragraph 8.C.
			Solder Sleeve with Integral Wire, Shield Not Folded	Paragraph 9.C.
			Solder Sleeve with Integral Wire and Shield Extension, Shield Not Folded	Paragraph 11.D.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 2 (continued)

Shield Configuration	Maximum Temperature Grade	Shield Ground Wire Configuration		Assembly Procedure
		Insulation	Shield Connection	
Two Shields, Adjacent, Outer with Round Conductors, Inner with Round Conductors	B	-	Shield Dead End	Paragraph 12.A.
		Insulated	Mechanical Ferrules, Shield Folded	Paragraph 6.B.
			Mechanical Ferrules, Shield Not Folded	Paragraph 6.D.
			Mechanical Ferrules and Shield Extension	Paragraph 11.A.
			RSK Shield-Kon	Paragraph 7.A.
			RSK Shield-Kon and Shield Extension	Paragraph 11.B.
			Solder Sleeve, Shield Folded	Paragraph 8.B.
			Solder Sleeve with Integral Wire, Shield Folded	Paragraph 9.B.
			Solder Sleeve with Integral Wire and Shield Extension, Shield Folded	Paragraph 11.C.
			Solder Sleeve, Shield Not Folded	Paragraph 8.C.
			Solder Sleeve with Integral Wire, Shield Not Folded	Paragraph 9.C.
		Solder Sleeve with Integral Wire and Shield Extension, Shield Not Folded	Paragraph 11.D.	
		Uninsulated	Shield Pull Through, Sleeve Strain Relief	Paragraph 5.A.
			Shield Pull Through, Tape Strain Relief	Paragraph 5.B.
			Solder Sleeve with Integral Wire, Shield Folded	Paragraph 10.B.
			Solder Sleeve with Integral Wire, Shield Not Folded	Paragraph 10.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 2 (continued)

Shield Configuration	Maximum Temperature Grade	Shield Ground Wire Configuration		Assembly Procedure
		Insulation	Shield Connection	
Two Shields, Adjacent, Outer with Round Conductors, Inner with Round Conductors	D	-	Shield Dead End	Paragraph 12.A.
		Insulated	Mechanical Ferrules, Shield Folded	Paragraph 6.B.
			Mechanical Ferrules, Shield Not Folded	Paragraph 6.D.
			Mechanical Ferrules and Shield Extension	Paragraph 11.A.
			RSK Shield-Kon	Paragraph 7.A.
			RSK Shield-Kon and Shield Extension	Paragraph 11.B.
		Uninsulated	Shield Pull Through, Sleeve Strain Relief	Paragraph 5.A.
			Shield Pull Through, Tape Strain Relief	Paragraph 5.B.
Two Shields, Not Adjacent, Outer with Round Conductors, Inner with Round Conductors	B	Insulated	Mechanical Ferrules, Shields Not Folded	Paragraph 6.F.
	D	Insulated		
	B	-	Shield Dead Ends	Paragraph 12.C.
	D	-		

D. Maximum Length of a Shield Ground Wire

**Table 3
SHIELD GROUND WIRE MAXIMUM LENGTH**

Ground Connection	Maximum Length (inches)	Special Conditions
Contact, ARINC Connector Ground Block	3	-
Contact, Connector Insert	2	-
Terminal Lug to Connector Strain Relief Backshell	2	-
Terminal Lug to Structure	6	-
Data Bus	18	757 Data Bus Cables (5000 series wire numbers)

E. Maximum Length of Wire without a Shield

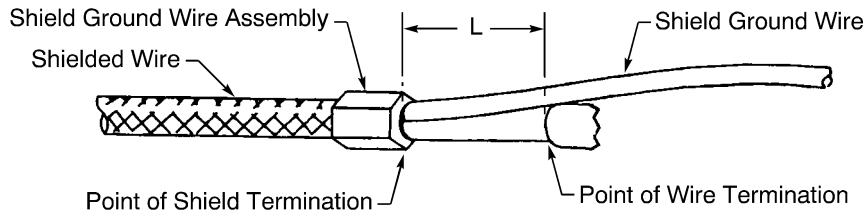
The connection of the shield and the shield ground wire must be as close as possible to the point of the termination of the wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Refer to Table 4 and Figure 1 for the maximum length of wire without a shield.

NOTE: The point of the shield termination is the end of the continuous metal around the primary insulation of the conductor.



LENGTH OF THE WIRE WITHOUT A SHIELD
Figure 1

Table 4
LENGTH OF THE WIRE WITHOUT A SHIELD

Type of Wire Termination	Point of Wire Termination	Length L (inch)	
		Minimum	Maximum
Connector with Integral Grommet and Strain Relief	Rear of Strain Relief	-	1.5
Connector with Integral Grommet and no Strain Relief	Connector Grommet or Potting	-	1.5
Connector with Removable Grommet and Strain Relief	Rear of the Strain Relief	-	1.5
Connector with Removable Grommet and no Strain Relief	Rear of the Connector Shell	-	4
Splice	Rear of the Conductor Splice	0.5	1.5
Terminal Lug	Rear of the Crimp Barrel	0.5	0.75
Terminal Module	Surface of the Module	1.5	2.0

F. Configuration of Shield Ground Wires on Adjacent Wires

Refer to Figure 2.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

For shield ground wire assemblies on adjacent wires, these conditions are applicable:

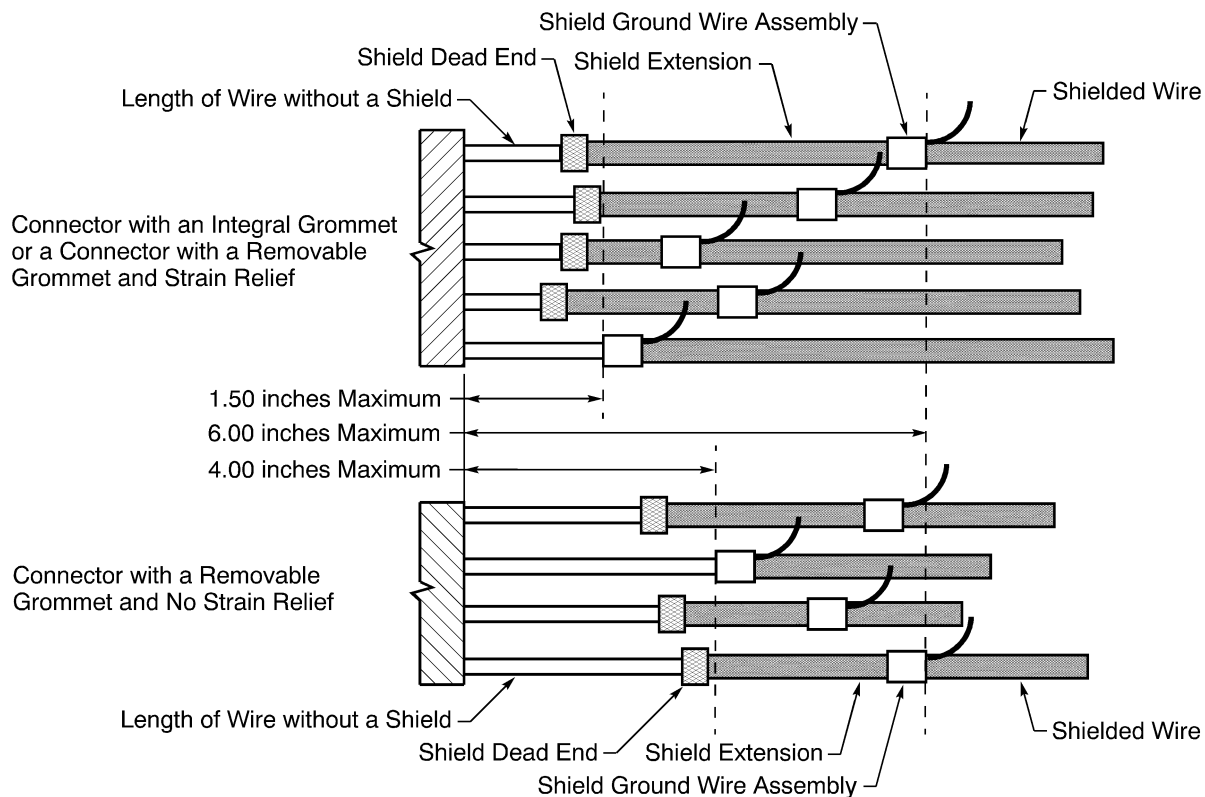
- The shield ground wire assemblies must not be put in adjacent locations
- A shield extension can be assembled when the number of shield ground wires makes it necessary to put a shield ground wire assembly at a location where the length of wire without a shield is greater than the maximum length for the type of wire termination; refer to Table 4

If a shield extension is necessary, these conditions are applicable:

- The shield ground wire assembly must not be put farther than 6 inches from the point of the wire termination
- The end of the shield extension, that is opposite of the end with the shield ground wire, must be a dead end
- The shield dead ends must not be put in adjacent locations
- If the point of wire termination is the potting of a connector, the shield dead end must not extend into the area where sealant must be applied.

If the necessary distance for all of the shield ground wire assemblies on the wire harness is greater than 6 inches, these conditions are applicable:

- The shield ground wire assemblies can be put in adjacent locations
- The number of adjacent shield ground wire assemblies must be kept to a minimum.



POSITION OF SHIELD GROUND WIRE ASSEMBLIES ON ADJACENT WIRES

Figure 2

20-10-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

G. Shield Ground Wires with the Same Ground Connection

For two or more shield ground wires that have the same connection to ground, these conditions are applicable:

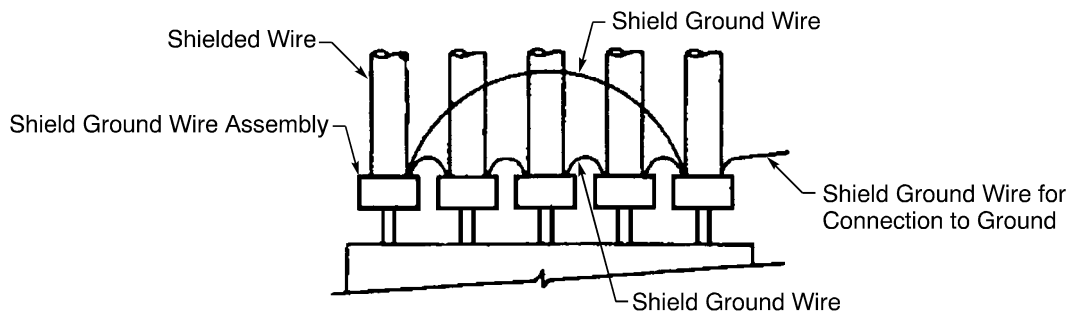
- The number of shield ground wires can be decreased to one shield ground wire with a splice; refer to Subject 20-30-12 and 20-10-15.
- The one shield ground wire must be an AWG 20 wire; refer to Table 5.

If the connection of the shield ground wire to ground is a ground stud, these conditions are applicable:

- The shield ground wires must be attached to the ground stud with a terminal lug
- The maximum number of shield ground wires for one terminal lug is 6.

For 5 or more shield ground wires of a wire harness that can have the same connection to ground, these conditions are applicable:

- A closed loop configuration of shield ground wires can be made; refer to Figure 3
- As an alternative, the shield ground wires between adjacent shield ground wire assemblies can be connected to each other with a closed end splice; refer to Subject 20-30-12 and 20-10-15.
- If a closed end splice is used to connect the shield ground wires of shield ground wire assemblies, the splice assembly must be attached to the wire harness with a wire harness tie.



CLOSED LOOP CONFIGURATION OF SHIELD GROUND WIRES
Figure 3

2. SELECTION OF SHIELD GROUND WIRE ASSEMBLY COMPONENTS

A. Selection of a Shield Ground Wire

Table 5
SHIELD GROUND WIRES

Area of the Airplane	Temperature Grade	Wire		
		Specification	Size (AWG)	Color
Pressurized	-	BMS 13-16 Type 1	20	Black
		BMS 13-16 Type 1	20	White with Black Stripe

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 5 (continued)

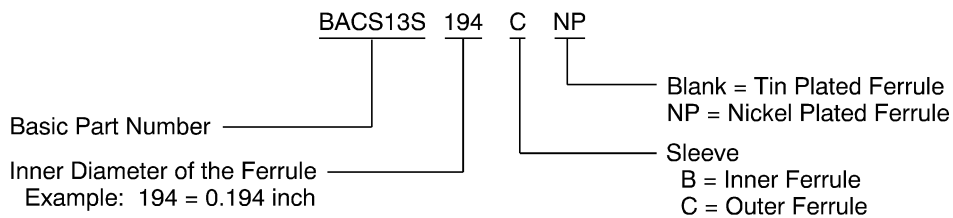
Area of the Airplane	Temperature Grade	Wire		
		Specification	Size (AWG)	Color
Unpressurized	A	BMS 13-16 Type 1	18	Black
		BMS 13-16 Type 1	18	White with Black Stripe
	B	BMS 13-16 Type 1	18	Black
		BMS 13-16 Type 1	18	White with Black Stripe
	C	BMS 13-16 Type 1	18	Black
		BMS 13-16 Type 1	18	White with Black Stripe
D	BMS 13-31 Type 1	18	Gray	

- (1) If the type, the color, and the size of the old shield ground wire are known, use a shield ground wire that is the same as the old wire.
- (2) If the type, the color, and the size of the old shield ground wire are not known, make a selection of a wire from Table 5.

NOTE: AWG 22 wire can be used for a shield ground wire for assemblies that have wire wrap wire inside:

- A junction box
- An electronic module
- A Survivability or a Vulnerability box.

B. Selection of Mechanical Ferrules



BACS13S FERRULE PART NUMBER STRUCTURE

Figure 4

**Table 6
TEMPERATURE GRADE OF FERRULES**

Maximum Temperature Grade	Ferrule
B	BACS13S()
D	BACS13S()NP



707, 727-787

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 7
APPROVED SUPPLIERS OF BOEING STANDARD MECHANICAL FERRULES

Boeing Standard	Supplier
BACS13S()	Thomas & Betts
BACS13S()NP	Thomas & Betts

NOTE: The mechanical ferrules specified in Table 8 are Temperature Grade B.

NOTE: For the part numbers of the mechanical ferrules that are Temperature Grade D, NP is added to the end of the part number specified in Table 8. Refer to Figure 4 and Table 6.

NOTE: Temperature Grade D mechanical ferrules do not have color codes. If NP is added to the end of the part number, the color codes that are specified in Table 6 are not applicable. Refer to Figure 4.

Table 8
SELECTION OF AN INNER FERRULE AND AN OUTER FERRULE

Inner Ferrule		Shield Ground Wire		Outer Ferrule	
Part Number	Color	Quantity	Size (AWG)	Part Number	Color
BACS13S046B	Tin	0 or 1	22	BACS13S128C	Blue
		2 or 3	24		
BACS13S058B	Yellow	0 or 1	24	BACS13S128C	Blue
			22		
			20	BACS13S128C	Blue
			BACS13S149C	Purple	
		18	BACS13S128C	Blue	
		BACS13S149C	Purple		
2 or 3	22	BACS13S149C	Purple		
	20				
BACS13S063B	Red	0 or 1	22	BACS13S128C	Blue
			BACS13S149C	Purple	
			20	BACS13S128C	Blue
			BACS13S149C	Purple	
		18	BACS13S128C	Blue	
		BACS13S149C	Purple		
2 or 3	22	BACS13S156C	Yellow		
	20				

20-10-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 8 (continued)

Inner Ferrule		Shield Ground Wire		Outer Ferrule		
Part Number	Color	Quantity	Size (AWG)	Part Number	Color	
BACS13S071B	Green	0 or 1	24	BACS13S128C	Blue	
					BACS13S149C	Purple
			22	BACS13S149C	Purple	
				BACS13S156C	Yellow	
			20	BACS13S149C	Purple	
			18			
		2 or 3	24	BACS13S156C	Yellow	
			22			
20	BACS13S175C		Blue			
BACS13S080B	Blue	0 or 1	22	BACS13S156C	Yellow	
					BACS13S149C	Purple
			20	BACS13S156C	Yellow	
				BACS13S149C	Purple	
			18	BACS13S156C	Yellow	
		2 or 3	22	BACS13S175C	Blue	
			20			
		BACS13S090B	Orange	0 or 1	24	BACS13S156C
					BACS13S175C	Blue
20	BACS13S156C				Yellow	
	BACS13S175C				Blue	
	18			BACS13S156C	Yellow	
				BACS13S175C	Blue	
2 or 3	22			BACS13S175C	Blue	
	20					
BACS13S096B	Purple	0 or 1	24	BACS13S156C	Yellow	
					BACS13S175C	Blue
			22			
			20			
			18			
		2 or 3	22	BACS13S175C	Blue	
				BACS13S175C	Blue	
20	BACS13S187C		Orange			

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 8 (continued)

Inner Ferrule		Shield Ground Wire		Outer Ferrule	
Part Number	Color	Quantity	Size (AWG)	Part Number	Color
BACS13S101B	Yellow	0 or 1	24	BACS13S175C	Blue
			22		
			20		
			18		
		2 or 3	24	BACS13S175C	Blue
			20	BACS13S187C	Orange
BACS13S109B	Red	0 or 1	24	BACS13S175C	Blue
			22	BACS13S187C	Orange
			20	BACS13S175C	Blue
				BACS13S187C	Orange
			18	BACS13S175C	Blue
				BACS13S187C	Orange
		BACS13S194C	Red		
		2 or 3	24	BACS13S187C	Orange
			22		
			20	BACS13S199C	Tin
24	BACS13S199C		Tin		
BACS13S124B	Green	0 or 1	24	BACS13S199C	Tin
			22	BACS13S187C	Orange
				BACS13S199C	Tin
			20	BACS13S194C	Red
				BACS13S199C	Tin
			18	BACS13S194C	Red
		BACS13S199C		Tin	
		BACS13S205C	Yellow		
		2 or 3	24	BACS13S205C	Yellow
			22		
20					

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 8 (continued)

Inner Ferrule		Shield Ground Wire		Outer Ferrule	
Part Number	Color	Quantity	Size (AWG)	Part Number	Color
BACS13S128B	Tin	0 or 1	24	BACS13S199C	Tin
			22	BACS13S205C	Yellow
			20	BACS13S199C	Tin
				BACS13S205C	Yellow
			18	BACS13S199C	Tin
		BACS13S205C		Yellow	
		2 or 3	22	BACS13S219C	Green
20					
BACS13S134B	Orange	0 or 1	22	BACS13S205C	Yellow
				BACS13S219C	Green
			20	BACS13S199C	Tin
				BACS13S205C	Yellow
			18	BACS13S199C	Tin
		BACS13S205C		Yellow	
		2 or 3	22	BACS13S219C	Green
20					
BACS13S149B	Blue	0 or 1	24	BACS13S219C	Green
			22	BACS13S219C	Green
				BACS13S232C	Orange
			20	BACS13S219C	Green
				BACS13S225C	Purple
		18	BACS13S219C	Green	
			BACS13S225C	Purple	
2 or 3	22	BACS13S232C	Orange		
BACS13S156B	Red	0 or 1	22	BACS13S232C	Orange
			20		
			18		
BACS13S165B	Tin	0 or 1	20	BACS13S232C	Orange

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 8 (continued)

Inner Ferrule		Shield Ground Wire		Outer Ferrule	
Part Number	Color	Quantity	Size (AWG)	Part Number	Color
BACS13S175B	Green	0 or 1	22	BACS13S275C	Tin
			20	BACS13S261C	Yellow
			18		
		2 or 3	22	BACS13S281C	Purple
			20		
BACS13S187B	Yellow	0 or 1	22	BACS13S281C	Purple
			20	BACS13S275C	Tin
				BACS13S287C	Blue
			18	BACS13S275C	Tin
		BACS13S287C		Blue	
		2 or 3	22	BACS13S287C	Blue
			20		
BACS13S194B	Blue	0 or 1	22	BACS13S287C	Blue
			20	BACS13S281C	Purple
				BACS13S287C	Blue
			18	BACS13S275C	Tin
		BACS13S287C		Blue	
		2 or 3	22	BACS13S287C	Blue
			20	BACS13S297C	Green
BACS13S205B	Orange	0 or 1	22	BACS13S312C	Yellow
			20	BACS13S287C	Blue
			18		
		2 or 3	22	BACS13S312C	Yellow
			20		
BACS13S219B	Tin	0 or 1	20	BACS13S297C	Green
			18	BACS13S312C	Yellow
				BACS13S297C	Green
			2 or 3	BACS13S312C	Yellow
		22		BACS13S327C	Tin
		20			

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 8 (continued)

Inner Ferrule		Shield Ground Wire		Outer Ferrule	
Part Number	Color	Quantity	Size (AWG)	Part Number	Color
BACS13S225B	Yellow	0 or 1	20	BACS13S297C	Green
			18	BACS13S312C	Yellow
			22	BACS13S297C	Green
			20	BACS13S312C	Yellow
		2 or 3	22	BACS13S327C	Tin
			20		
BACS13S232B	Red	0 or 1	20	BACS13S312C	Yellow
			18		
		2 or 3	20	BACS13S327C	Tin
BACS13S250B	Green	0 or 1	22	BACS13S348C	Orange
			20	BACS13S327C	Tin
			18		
		2 or 3	22	BACS13S348C	Orange
			20		
			22		
BACS13S261B	Blue	0 or 1	22	BACS13S359C	Purple
			20	BACS13S348C	Orange
			18		
		2 or 3	22	BACS13S359C	Purple
			20		
			22		
BACS13S266B	Tin	0 or 1	22	BACS13S359C	Purple
			20	BACS13S348C	Orange
			18	BACS13S359C	Purple
			22	BACS13S348C	Orange
		2 or 3	22	BACS13S359C	Purple
			20		
BACS13S275B	Orange	0 or 1	20	BACS13S359C	Purple
			18		
		2 or 3	22	BACS13S375C	Yellow

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 8 (continued)

Inner Ferrule		Shield Ground Wire		Outer Ferrule	
Part Number	Color	Quantity	Size (AWG)	Part Number	Color
BACS13S281B	Yellow	0 or 1	22	BACS13S405C	Red
			20	BACS13S375C	Yellow
			18		
		2 or 3	22	BACS13S405C	Red
			20		
BACS13S287B	Tin	0 or 1	22	BACS13S405C	Red
		2 or 3	22	BACS13S405C	Red
			20		
BACS13S297B	Red	0 or 1	20	BACS13S375C	Yellow
			18		
		2 or 3	20	BACS13S405C	Red
BACS13S312B	Purple	0 or 1	22	BACS13S425C	Tin
		2 or 3	22	BACS13S425C	Tin
			20		
BACS13S375B	Blue	0 or 1	22	BACS13S460C	Tin
			20		
			18		
		2 or 3	22	BACS13S460C	Tin

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

C. Selection of an RSK Shield-Kon

**Table 9
SELECTION OF AN RSK SHIELD-KON**

Maximum Temperature Grade	Shield O.D. (inch)		Shield Ground Wire		Part Number	Color	Supplier
	Minimum	Maximum	Count	Size (AWG)			
B	0.05	0.09	0	-	RSK101	Red	Thomas & Betts
			1	24	RSK101	Red	Thomas & Betts
			1	22	RSK101	Red	Thomas & Betts
			2	24	RSK101	Red	Thomas & Betts
	0.09	0.145	0	-	RSK201	Blue	Thomas & Betts
			1	22	RSK201	Blue	Thomas & Betts
			1	20	RSK201	Blue	Thomas & Betts
			2	22	RSK201	Blue	Thomas & Betts
	0.144	0.200	0	-	RSK301	Yellow	Thomas & Betts
			1	22	RSK301	Yellow	Thomas & Betts
			1	20	RSK301	Yellow	Thomas & Betts
			2	22	RSK301	Yellow	Thomas & Betts
			2	20	RSK301	Yellow	Thomas & Betts
	0.200	0.300	0	-	RSK401	Green	Thomas & Betts
			1	20	RSK401	Green	Thomas & Betts
			1	18	RSK401	Green	Thomas & Betts
			2	20	RSK401	Green	Thomas & Betts

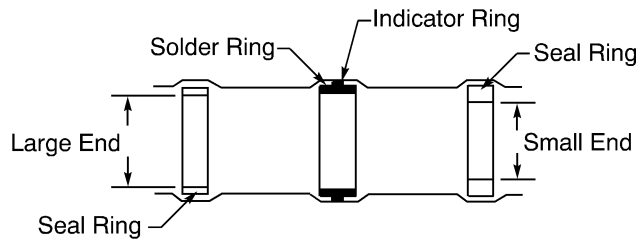
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 9 (continued)

Maximum Temperature Grade	Shield O.D. (inch)		Shield Ground Wire		Part Number	Color	Supplier
	Minimum	Maximum	Count	Size (AWG)			
D	0.301	0.325	0	-	SK501HT	-	Thomas & Betts
			1	22	SK501HT	-	Thomas & Betts
			1	20	SK501HT	-	Thomas & Betts
			2	22	SK501HT	-	Thomas & Betts
			2	20	SK501HT	-	Thomas & Betts
	0.401	0.425	0	-	SK601HT	-	Thomas & Betts
			1	20	SK601HT	-	Thomas & Betts
			1	18	SK601HT	-	Thomas & Betts
			2	20	SK601HT	-	Thomas & Betts
			2	20	SK601HT	-	Thomas & Betts

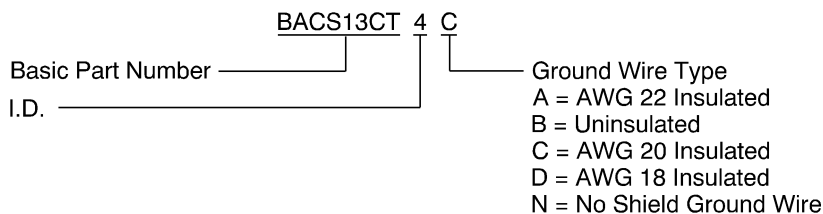
D. Selection of a Solder Sleeve without an Integral Wire



BACS13CT(N) SOLDER SLEEVE
Figure 5

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



BACS13CT PART NUMBER STRUCTURE

Figure 6

**Table 10
SELECTION OF A SOLDER SLEEVE - NO INTEGRAL WIRE**

Maximum O.D. of the Shield Ground Wire Assembly (inch)	Minimum O.D. (inch)		Solder Sleeve		
	Shield	Wire	Part Number	Maximum Temperature Grade	Supplier
0.095	0.020	0.075	D-144-25	B	Raychem
0.105	0.020	0.035	BACS13CT1N	B	Boeing
	0.030	0.040	BACS13BH1	B	Boeing
0.145	0.030	0.055	BACS13CT2N	B	Boeing
			M83519/1-2	B	QPL
0.175	0.050	0.080	BACS13BH2	B	Boeing
0.200	0.050	0.085	BACS13CT3N	B	Boeing
			M83519/1-3	B	QPL
0.255	0.070	0.130	BACS13CT4N	B	Boeing
			M83519/1-4	B	QPL
0.275	0.100	0.150	BACS13BH3	B	Boeing
0.300	0.100	0.170	BACS13CT5N	B	Boeing
			M83519/1-5	B	QPL

**Table 11
APPROVED SUPPLIERS OF BOEING STANDARD SOLDER SLEEVES**

Boeing Standard	Supplier
BACS13CT	Raychem

**Table 12
ALTERNATIVE SOLDER SLEEVE PART NUMBERS**

Specified Solder Sleeve		Alternative Solder Sleeve	
Part Number	Supplier	Part Number	Supplier
D-144-25	Raychem	BACS13CT1N	Boeing

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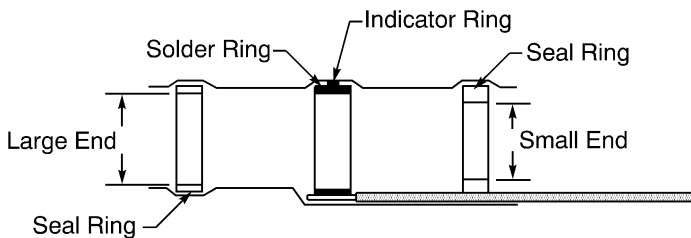
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 12 (continued)

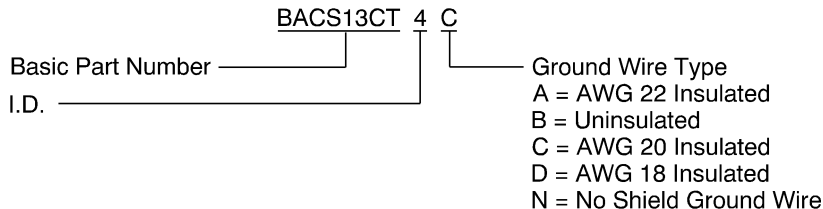
Specified Solder Sleeve		Alternative Solder Sleeve	
Part Number	Supplier	Part Number	Supplier
BACS13BH1	Boeing	BACS13CT2N	Boeing
BACS13BH2	Boeing	BACS13CT3N	Boeing
BACS13BH3	Boeing	BACS13CT5N	Boeing
BACS13BH4	Boeing	BACS13CT4N	Boeing

E. Selection of a Solder Sleeve with an Insulated Integral Wire



BACS13CT(A), BACS13CT(C), AND BACS13CT(D) SOLDER SLEEVES

Figure 7



BACS13CT PART NUMBER STRUCTURE

Figure 8

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

**Table 13
SELECTION OF A SOLDER SLEEVE - INSULATED INTEGRAL WIRE**

Shield Ground Wire Size (AWG)	Maximum O.D. of the Jacket (inch)	Minimum O.D. (inch)		Solder Sleeve		
		Shield	Wire	Part Number	Maximum Temperature Grade	Supplier
22	0.105	0.035	0.020	BACS13CT1A	B	Boeing
				M83519/2-6	B	QPL
	0.145	0.055	0.030	BACS13CT2A	B	Boeing
	0.200	0.085	0.050	BACS13CT3A	B	Boeing
	0.255	0.130	0.070	BACS13CT4A	B	Boeing
	0.300	0.170	0.100	BACS13CT5A	B	Boeing
20	0.105	0.035	0.020	BACS13CT1C	B	Boeing
	0.145	0.055	0.030	BACS13CT2C	B	Boeing
				M83519/2-2	B	QPL
	0.200	0.085	0.050	BACS13CT3C	B	Boeing
				M83519/2-3	B	QPL
	0.255	0.130	0.070	BACS13CT4C	B	Boeing
0.300	0.170	0.100	BACS13CT5C	B	Boeing	
			M83519/2-5	B	QPL	
18	0.145	0.055	0.030	BACS13CT2D	B	Boeing
	0.200	0.085	0.050	BACS13CT3D	B	Boeing
	0.255	0.130	0.070	BACS13CT4D	B	Boeing
	0.300	0.170	0.100	BACS13CT5D	B	Boeing

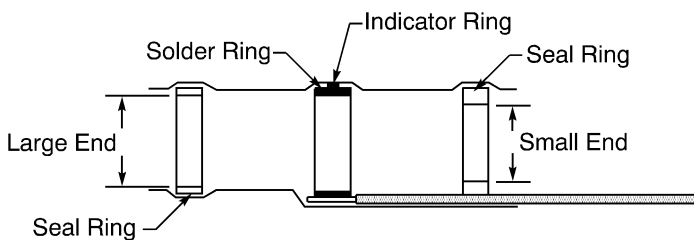
**Table 14
APPROVED SUPPLIERS OF BOEING STANDARD SOLDER SLEEVES**

Boeing Standard	Supplier
BACS13CT	Raychem

STANDARD WIRING PRACTICES MANUAL

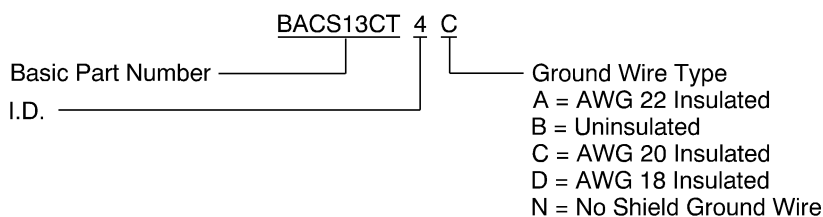
ASSEMBLY OF SHIELD GROUND WIRES

F. Selection of a Solder Sleeve with an Uninsulated Integral Wire



BACS13CT()B SOLDER SLEEVE

Figure 9



BACS13CT PART NUMBER STRUCTURE

Figure 10

**Table 15
SELECTION OF A SOLDER SLEEVE - UNINSULATED INTEGRAL WIRE**

Maximum O.D. of the Jacket (inch)	Minimum O.D. (inch)		Shield Ground Wire Size (CAU)	Solder Sleeve	
	Shield	Wire		Boeing Standard	Maximum Temperature Grade
0.105	0.035	0.020	10	BACS13CT1B	B
0.145	0.055	0.030	10	BACS13CT2B	B
0.200	0.085	0.050	10	BACS13CT3B	B
0.255	0.130	0.070	10	BACS13CT4B	B
0.300	0.170	0.100	10	BACS13CT5B	B

**Table 16
APPROVED SUPPLIERS OF BOEING STANDARD SOLDER SLEEVES**

Boeing Standard	Supplier
BACS13CT	Raychem

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

G. Selection of a Shield Material

**Table 17
SHIELD MATERIALS**

Maximum Temperature Grade	Boeing Standard
B	BAC3108-()
D	BAC3106-()

NOTE: For sizes and suppliers of shield materials, refer to Subject 20-00-11.

H. Selection of an Insulation Material

**Table 18
INSULATION MATERIALS**

Material	Maximum Temperature Grade	Part Number	Supplier
Sleeve, Heat Shrinkable	B	AMS-DTL-23053/5 Class 1	An available source
		MIL-LT	Raychem
	D	TFE 2X	Chemplast
		TFE 4X	Chemplast
Tape	D	Scotch 70	3M
		912-10X2	Arlon

3. SHIELD TERMINATION FOR SPECIAL CABLES

A. Selection of a Shield Termination Procedure

**Table 19
SHIELD TERMINATION PROCEDURES FOR SPECIAL SHIELDED CABLES**

Cable	Description	Supplier	Shield Termination Procedure
10-60875-1	Unshielded Cable with a 10-60875-4 Component Wire	Boeing	Paragraph 3.D.
10-60875-2	Unshielded Cable with a 10-60875-4 Component Wire	Boeing	Paragraph 3.D.
10-60875-4	Shielded Wire	Boeing	Paragraph 3.E.
10-60875-5	Shielded Cable with a 10-60875-4 Component Wire	Boeing	Paragraph 3.C.
10-60875-8	Shielded Wire	Boeing	Paragraph 3.E.
10-60875-9	Shielded Cable with a 10-60875-4 Component Wire	Boeing	Paragraph 3.C.
44A7620-20	Shielded Thermocouple Cable	Raychem	Paragraph 3.B.
44A7620-22	Shielded Thermocouple Cable	Raychem	Paragraph 3.B.

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ASSEMBLY OF SHIELD GROUND WIRES

B. Shield Termination for Raychem 44A7620 Thermocouple Cables

The paragraph gives the procedure to assemble these shield terminations for the Raychem 44A7620-22 and 44A7260-20 shielded cables:

- A shield dead end
- A shield ground wire with mechanical ferrules.

NOTE: A satisfactory alternative for the shield ground wire termination is the assembly of a shield ground wire with a solder sleeve. Refer to Paragraph 8. or Paragraph 9.

**Table 20
MECHANICAL FERRULE PART NUMBERS**

Cable	Shield Termination	Ferrule		
		Type	Boeing Standard	Color
44A7620-22	Shield Dead End	Inner	BACS13S-124B	Tin
		Outer	BACS13S-175C	Blue
	Shield Ground Wire	Inner	BACS13S-124B	Tin
		Outer	BACS13S-199C	Tin
44A7620-20	Shield Dead End	Inner	BACS13S-128B	Tin
		Outer	BACS13S-175C	Blue
	Shield Ground Wire	Inner	BACS13S-128B	Tin
		Outer	BACS13S-199C	Tin

- (1) Make a selection of an inner ferrule from Table 20.
- (2) Make a selection of an outer ferrule from Table 20.
Make sure that outer ferrule is applicable for the type of shield termination.
- (3) Make a selection of a ferrule crimp tool from Table 23.
- (4) Make a selection of a heat shrinkable sleeve from Table 18.
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (5) Prepare the cable. Refer to Paragraph 4.
- (6) Remove the necessary length of shield from the end of the cable to make the distance from the end of the jacket to the end of the shield equal to 0.62 inch ±0.06 inch.
- (7) If the shield termination is a shield ground wire:
 - (a) Make a selection of a shield ground wire from Table 5.
Make sure that the length of the shield ground wire is the minimum length that is necessary to attach the wire to the specified ground.
 - (b) Remove 0.3 inch ±0.1 inch of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
- (8) Put the inner ferrule on the cable.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that the inner ferrule is:

- Between the shield and the wires of the cable
- Against the end of the cable jacket.

(9) Put the outer ferrule on the cable.

Make sure that:

- The shield is between the inner ferrule and the outer ferrule
- The center of the outer ferrule is aligned with the center of the inner ferrule
- The forward end of the inner ferrule does not extend more than 0.06 inch farther than the forward end of the outer ferrule.

(10) If the shield termination is a shield ground wire, put the bare conductor of the shield ground wire between the outer ferrule and the shield.

Make sure that the length of the bare conductor of the shield ground wire:

- Extends the full length of the outer ferrule
- Extends a small amount farther than the rear end of the outer ferrule.

(11) Crimp the outer ferrule.

(12) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

(13) Put the necessary length of heat shrinkable sleeve on the cable.

Make sure that the distance:

- From the end of the sleeve to the end of the ferrule where the shield ground wire makes an exit from the assembly is 0.5 inch minimum
- From the other end of the sleeve to the other end of the ferrule is 0.25 inch minimum.

(14) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Shield Termination for 10-60875 FQIS Cables and Component Wires

The paragraph gives the procedure to assemble these shield terminations for the Boeing 10-60875 FQIS shielded cables and component wires:

- A shield dead end
- A shield ground wire with mechanical ferrules.

**Table 21
MECHANICAL FERRULE PART NUMBERS**

Cable	Shield Termination	Ferrule		
		Type	Boeing Standard	Color
10-60875-5	Shield Dead End	Inner	BACS13S-219B	Green
		Outer	BACS13S-281C	Blue
	Shield Ground Wire	Inner	BACS13S-219B	Green
		Outer	BACS13S-297C	Tin

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 21 (continued)

Cable	Shield Termination	Ferrule		
		Type	Boeing Standard	Color
10-60875-9	Shield Dead End	Inner	BACS13S-219B	Green
		Outer	BACS13S-281C	Blue
	Shield Ground Wire	Inner	BACS13S-219B	Green
		Outer	BACS13S-297C	Tin

- (1) Make sure that the cable has a shield.

NOTE: The 10-60875 cable and component wires are specified as having Critical Design Configuration Control Limitations (CDCCL). Refer to Paragraph 1.B.

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

- (2) Make a selection of an inner ferrule from Table 21.
- (3) Make a selection of an outer ferrule from Table 21.
Make sure that the outer ferrule is applicable for the type of shield termination.
- (4) Make a selection of a ferrule crimp tool from Table 23.
- (5) Prepare the cable. Refer to Paragraph 4.
- (6) Remove the necessary length of shield from the end of the cable to make the distance from the end of the jacket to the end of the shield equal to 0.62 inch \pm 0.06 inch.
- (7) If the shield termination is a shield ground wire:
- (a) Make a selection of a shield ground wire from Table 5.
Make sure that the length of the shield ground wire is the minimum length that is necessary to attach the wire to the specified ground.
- (b) Remove 0.3 inch \pm 0.1 inch of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
- (8) Put the inner ferrule on the cable.
Make sure that the inner ferrule is:
- Between the shield and the wires of the cable
 - Against the end of the cable jacket.
- (9) Put the outer ferrule on the cable.
Make sure that:
- The shield is between the inner ferrule and the outer ferrule
 - The center of the outer ferrule is aligned with the center of the inner ferrule
 - The forward end of the inner ferrule does not extend more than 0.06 inch farther than the forward end of the outer ferrule.
- (10) If the shield termination is a shield ground wire, put the bare conductor of the shield ground wire between the outer ferrule and the shield.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that the length of the bare conductor of the shield ground wire:

- Extends the full length of the outer ferrule
- Extends a small amount farther than the rear end of the outer ferrule.

- (11) Crimp the outer ferrule.
- (12) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

- (13) Assemble the shield termination of the 10-60875-4 component wire. Refer to Paragraph 3.E.

D. Shield Termination for Component Wires of Unshielded 10-60875 FQIS Cables

The paragraph gives the procedure to assemble these shield terminations for a shielded component wire of a Boeing 10-60875 FQIS unshielded cable:

- A shield dead end
- A shield ground wire with mechanical ferrules.

- (1) Make sure that the component wire has a shield.

NOTE: The 10-60875 cable and component wires are specified as having Critical Design Configuration Control Limitations (CDCCL). Refer to Paragraph .1.B.

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

- (2) Prepare the cable. Refer to Paragraph 4.

NOTE: The 10-60875 cable and component wires are specified as having Critical Design Configuration Control Limitations (CDCCL). Refer to Paragraph .1.B.

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

- (3) Assemble the shield termination of the 10-60875-4 component wire. Refer to Paragraph 3.E. .

E. Shield Termination for 10-60875 FQIS Wires

The paragraph gives the procedure to assemble these shield terminations for the Boeing 10-60875 FQIS shielded wires:

- A shield dead end
- A shield ground wire with mechanical ferrules.

**Table 22
MECHANICAL FERRULE PART NUMBERS**

Cable	Shield Termination	Ferrule		
		Type	Boeing Standard	Color
10-60875-4	Shield Dead End	Inner	BACS13S-080B	Blue
		Outer	BACS13S-128C	Blue
	Shield Ground Wire	Inner	BACS13S-080B	Blue
		Outer	BACS13S-156C	Yellow

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ASSEMBLY OF SHIELD GROUND WIRES

Table 22 (continued)

Cable	Shield Termination	Ferrule		
		Type	Boeing Standard	Color
10-60875-8	Shield Dead End	Inner	BACS13S-080B	Blue
		Outer	BACS13S-128C	Blue
	Shield Ground Wire	Inner	BACS13S-080B	Blue
		Outer	BACS13S-156C	Yellow

- (1) Make sure that the wire has a shield.

NOTE: The 10-60875 cable and component wires are specified as having Critical Design Configuration Control Limitations (CDCCL). Refer to Paragraph 1.B.

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

- (2) Make a selection of an inner ferrule from Table 22.
- (3) Make a selection of an outer ferrule from Table 22.
Make sure that the outer ferrule is applicable for the type of shield termination.
- (4) Make a selection of a ferrule crimp tool from Table 23.
- (5) Prepare the wire. Refer to Paragraph .4.
- (6) Remove the necessary length of shield from the wire to make the distance from the end of the jacket to the end of the shield equal to 0.62 inch \pm 0.06 inch.
- (7) If the shield termination is a shield ground wire:
- (a) Make a selection of a shield ground wire from Table 5.
Make sure that the length of the shield ground wire is the minimum length that is necessary to attach the wire to the specified ground.
- (b) Remove 0.3 inch \pm 0.1 inch of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
- (8) Put the inner ferrule on the wire.
Make sure that the inner ferrule is:
- Between the shield and the primary insulation of the wire
 - Against the end of the jacket of the wire.
- (9) Put the outer ferrule on the wire.
Make sure that:
- The shield is between the inner ferrule and the outer ferrule
 - The center of the outer ferrule is aligned with the center of the inner ferrule
 - The forward end of the inner ferrule does not extend more than 0.06 inch farther than the forward end of the outer ferrule.
- (10) If the shield termination is a shield ground wire, put the bare conductor of the shield ground wire between the outer ferrule and the shield.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

Make sure that the length of the bare conductor of the shield ground wire:

- Extends the full length of the outer ferrule
- Extends a small amount farther than the rear end of the outer ferrule.

(11) Crimp the outer ferrule.

(12) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

4. WIRE AND CABLE PREPARATION**A. Jacket Removal from the End of a Wire or Cable**

(1) Make a selection of a wire or cable jacket removal tool. Refer to Subject 20-00-15.

NOTE: One of these tools is a satisfactory alternative:

- A sharp knife
- A thermal tool for insulation removal
- The Reon Manufacturing R-720 cable jacket removal tool for BMS13-51 cable.

(2) Make a selection of the location on the jacket of the wire or cable to make the shield termination. Refer to Paragraph 1. for the conditions that are applicable for shield termination.

(3) Carefully cut the jacket around the circumference of the wire or cable at that location.

CAUTION: DO NOT CUT ALL OF THE WAY THROUGH THE JACKET. DAMAGE TO THE SHIELD OR THE COMPONENT WIRES CAN OCCUR.

(4) If it is necessary, carefully cut the jacket longitudinally the location to the end of the wire or cable.

CAUTION: DO NOT CUT ALL OF THE WAY THROUGH THE JACKET. DAMAGE TO THE SHIELD OR THE COMPONENT WIRE CAN OCCUR.

(5) Pull the jacket apart at the lines where it is cut.

NOTE: If it is necessary, the wire or cable can be bent to make the removal easier.

CAUTION: DO NOT BEND THE WIRE OR CABLE MORE THAN THE POINT WHERE THE RADIUS OF THE BEND IS LESS THAN 3 TIMES THE DIAMETER OF THE WIRE OR CABLE. DAMAGE TO THE WIRE OR CABLE CAN OCCUR.

(6) Examine the jacket, the shield, and primary insulation of the component wires for damage.

For the conditions that are applicable after the removal of a jacket from the end of a wire or cable, refer to Subject 20-00-15.

5. ASSEMBLY OF A SHIELD GROUND WIRE WITH A SHIELD PULL THROUGH**A. Shield Pull Through with Sleeve Strain Relief**

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

STANDARD WIRING PRACTICES MANUAL

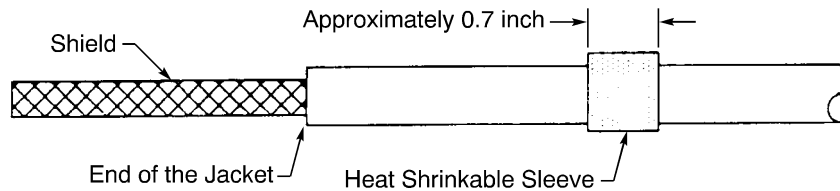
ASSEMBLY OF SHIELD GROUND WIRES

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

- (1) Make a selection of a heat shrinkable sleeve from Table 18.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (2) Put an approximate 0.7 inch length of heat shrinkable sleeve on the wire or cable.
- (3) Prepare the wire or cable. Refer to Figure 11 and Paragraph 4.A.



JACKET REMOVAL

Figure 11

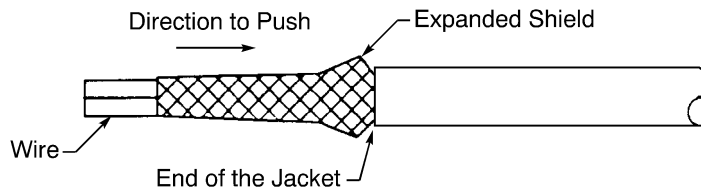
- (4) If the wire or cable has adjacent shields, remove the outer shield.

CAUTION: DAMAGE TO THE REMAINING INNER SHIELD MUST BE PREVENTED. DAMAGE TO THE CONDUCTORS OF THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

- (a) Move the strands of the outer shield apart.
- (b) Carefully cut the strands of the shield at the end of the jacket.

Make sure that the end of the outer shield is aligned with the end of the jacket.

- (5) Push the shield rearward to expand it at the end of the jacket. Refer to Figure 12.



EXPANDED SHIELD

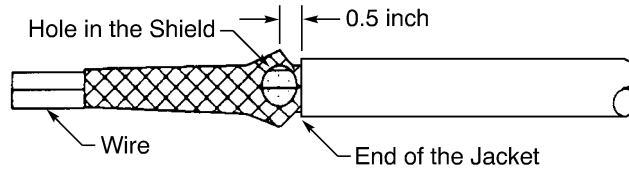
Figure 12

- (6) Make a hole in the shield with a nylon awl or an equivalent tool. Refer to Figure 13.

Make sure that the center of the hole is approximately 0.5 inch from the end of the cable jacket.

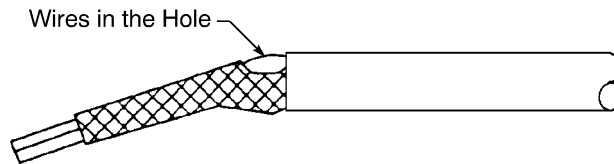
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



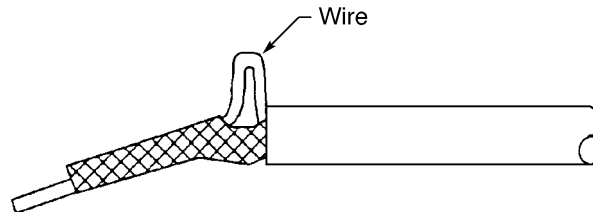
LOCATION OF THE HOLE IN THE SHIELD
Figure 13

- (7) Carefully bend the wire or cable until the component wires can be seen in the hole. Refer to Figure 14.



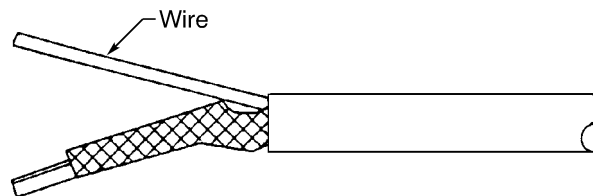
POSITION OF THE HOLE ON THE BEND OF THE CABLE
Figure 14

- (8) Carefully pull a wire through the hole in the shield with the nylon awl. Refer to Figure 15.



POSITION OF THE WIRE THROUGH THE HOLE IN THE SHIELD
Figure 15

- (9) Pull the wire out of the hole. Refer to Figure 16.



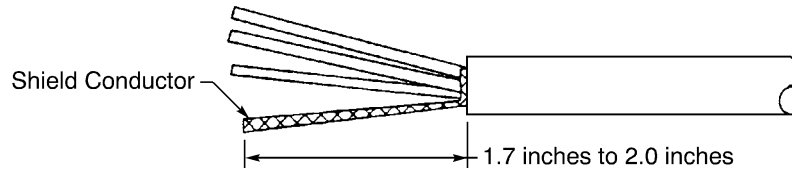
POSITION OF THE WIRE OUT OF THE SHIELD
Figure 16

- (10) Do Step (8) and Step (9) again for each wire in the cable.
- (11) Pull the end of the shield tight to make a flat and symmetrical conductor.
- (12) Remove the necessary length from the end of the shield conductor to make the distance from the end of the conductor to the end of the jacket equal to 1.7 inches to 2.0 inches. Refer to Figure 17.

20-10-15

STANDARD WIRING PRACTICES MANUAL

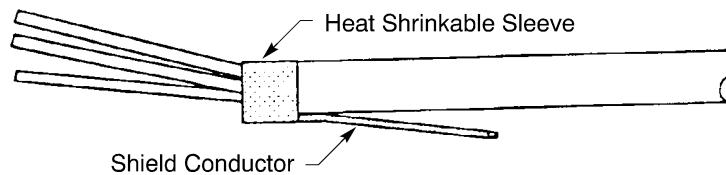
ASSEMBLY OF SHIELD GROUND WIRES



LENGTH OF THE SHIELD CONDUCTOR

Figure 17

- (13) Fold the shield conductor back on the jacket of the wire or cable.
Make sure that the free end of the conductor is pointed away from the end of the cable.
- (14) Align the center of the sleeve with the end of the shield. Refer to Figure 18.
Make sure that:
 - The rear end of the sleeve makes an overlap with the end of the jacket
 - The free end of the shield conductor is pointed in the correct direction out of the sleeve.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 18

- (15) Shrink the sleeve into its position. Refer to Subject 20-10-14.

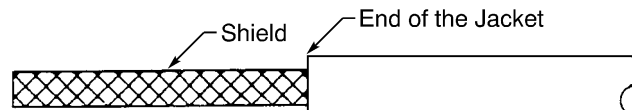
B. Shield Pull Through with Tape Strain Relief

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

- (1) Make a selection of tape from Table 18.
- (2) Prepare the wire or cable. Refer to Figure 19 and Paragraph 4.A.



JACKET REMOVAL

Figure 19

- (3) If the wire or cable has adjacent shields, remove the outer shield.

STANDARD WIRING PRACTICES MANUAL

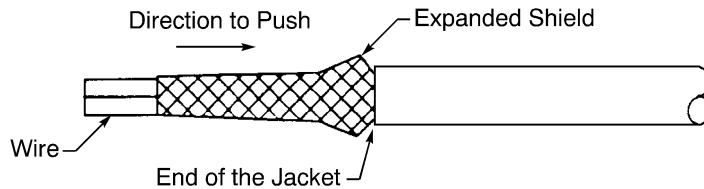
ASSEMBLY OF SHIELD GROUND WIRES

CAUTION: DAMAGE TO THE REMAINING INNER SHIELD MUST BE PREVENTED. DAMAGE TO THE CONDUCTORS OF THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

- (a) Move the strands of the outer shield apart.
- (b) Carefully cut the strands of the shield at the end of the jacket.

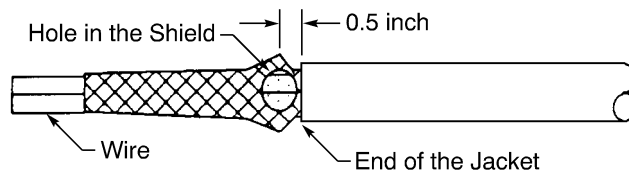
Make sure that the end of the outer shield is aligned with the end of the jacket.

- (4) Push the shield rearward to expand it at the end of the jacket. Refer to Figure 20.



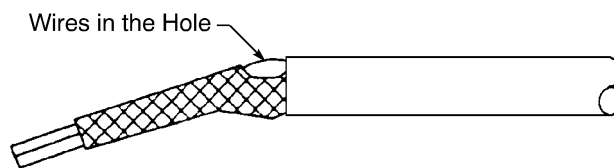
EXPANDED SHIELD
Figure 20

- (5) Make a hole in the shield with a nylon awl or an equivalent tool. Refer to Figure 21.
Make sure that the center of the hole is approximately 0.5 inch from the end of the cable jacket.



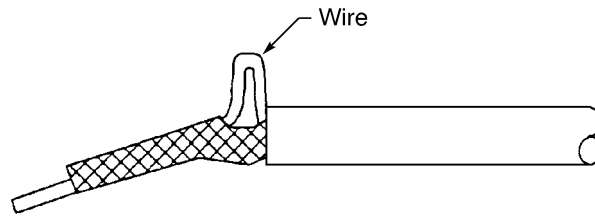
LOCATION OF THE HOLE IN THE SHIELD
Figure 21

- (6) Carefully bend the wire or cable until the component wires can be seen in the hole. Refer to Figure 22.

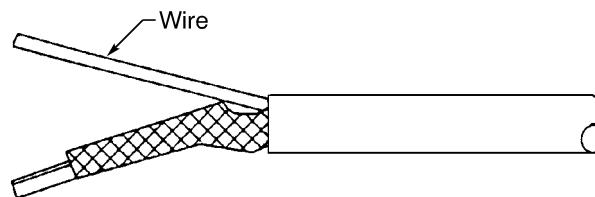


POSITION OF THE HOLE ON THE BEND OF THE CABLE
Figure 22

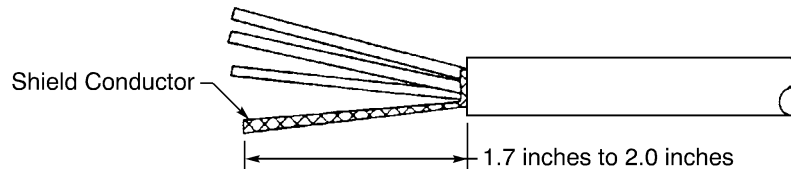
- (7) Carefully pull a wire through the hole in the shield with the nylon awl. Refer to Figure 23.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES****POSITION OF THE WIRE THROUGH THE HOLE IN THE SHIELD****Figure 23**

- (8) Pull the wire out of the hole. Refer to Figure 24.

**POSITION OF THE WIRE OUT OF THE SHIELD****Figure 24**

- (9) Do Step (7) and Step (8) again for each wire in the cable.
(10) Pull the end of the shield tight to make a flat and symmetrical conductor.
(11) Remove the necessary length from the shield conductor to make the distance from the end of the conductor to the end of the jacket equal to 1.7 inches to 2.0 inches. Refer to Figure 25.

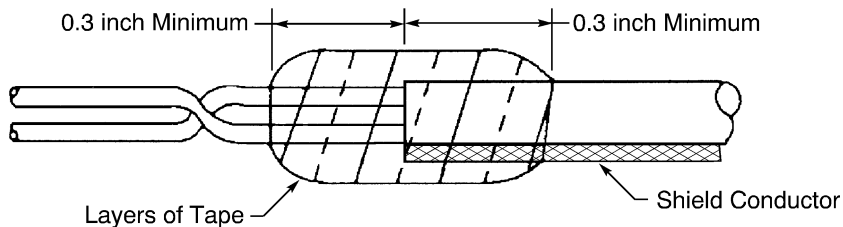
**LENGTH OF THE SHIELD CONDUCTOR****Figure 25**

- (12) Fold the shield conductor back on the jacket of the wire or cable.
Make sure that the free end of the conductor is pointed away from the end of the cable.
(13) Put two layers of tape on the shield conductor, the jacket, and the wires of the cable. Refer to Figure 26.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

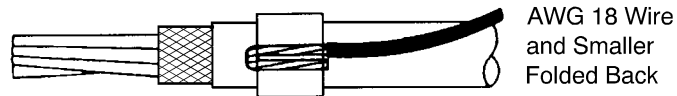
Make sure that:

- Each layer has a 0.25 inch overlap
- The rear end of each each layer extends a minimum of 0.3 inch farther than the rear end of the shield
- The forward end of each each layer extends a minimum of 0.3 inch farther than the forward end of the shield
- The second layer is wound in the opposite direction of the first layer
- The free end of the shield conductor is pointed in the correct direction out of the layers of tape.



POSITION OF THE LAYERS OF TAPE

Figure 26

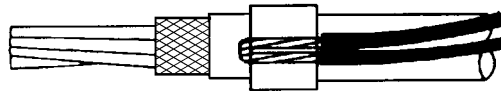
6. ASSEMBLY OF A SHIELD GROUND WIRE WITH MECHANICAL FERRULES**A. Shield Ground Wire Configurations**

CONFIGURATION OF ONE SHIELD GROUND WIRE

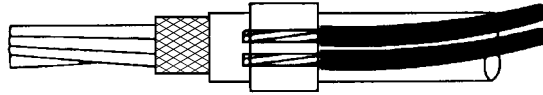
Figure 27

STANDARD WIRING PRACTICES MANUAL

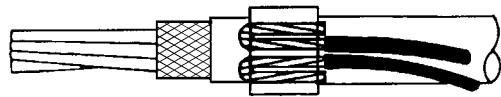
ASSEMBLY OF SHIELD GROUND WIRES



AWG 20 Wire with
Insulation Removed
From the Center



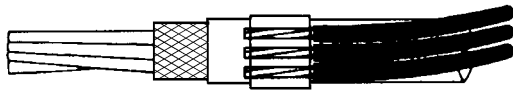
AWG 20 Wire with
Insulation Removed
From the End



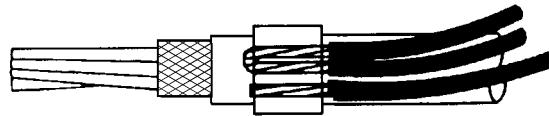
AWG 22 and Smaller
Wire Folded Back

CONFIGURATION OF TWO SHIELD GROUND WIRES

Figure 28



AWG 20 Wire with
Insulation Removed
From the End



AWG 20 Wire with
Insulation Removed
From the Center

CONFIGURATION OF THREE SHIELD GROUND WIRES

Figure 29

B. Shield Ground Wire - Shield Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Make a selection of a tape from Table 18.
Make sure the tape has the correct Temperature Grade.
- (4) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

NOTE: If two shield ground wires are specified, a satisfactory alternative to the minimum length is two times the minimum length from which the insulation can be removed at the center. Refer to Figure 28.

- (5) Measure the O.D. of the wire or cable.
- (6) Make a selection of an inner ferrule from Table 8.

NOTE: The applicable ferrule has an I.D. that is a small amount larger than the O.D. of the wire or cable. Refer to Figure 4.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (7) Make a selection of an outer ferrule that is specified for the inner ferrule from Table 8.

NOTE: In Table 8, more than one outer ferrule can be specified for one inner ferrule. It is possible that shields of different wires and cables have different thicknesses. This can make it necessary to use a smaller or a larger outer ferrule.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

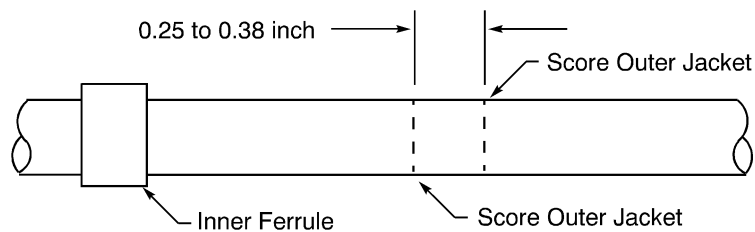
- (8) Put the inner ferrule on the wire or cable.

Make sure that the ferrule is the smallest ferrule that can be moved freely on the jacket of the wire or cable.

- (9) Remove the necessary length of the shield:

- (a) Use a sharp knife to score around the outer jacket at two positions. Make the distance between the scores 0.25 - 0.38 inches. Refer to Figure 30.

CAUTION: DO NOT CUT FULLY THROUGH THE CABLE JACKET. CUTTING THROUGH THE CABLE JACKET CAN DAMAGE THE SHIELD AND THE INTERNAL CONDUCTORS AND CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.



DIMENSION BETWEEN THE SCORES IN THE OUTER JACKET

Figure 30

- (b) Tear or pull the outer jacket at the first score line until the first piece of outer jacket is not attached. Refer to Figure 31.

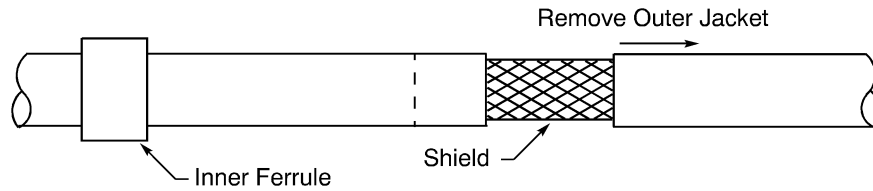
NOTE: The cable can be bent to help remove the first piece of the outer jacket.

CAUTION: DO NOT BEND THE CABLE TO A RADIUS THAT IS LESS THAN 3 TIMES THE CABLE DIAMETER. DAMAGE TO THE CABLE CAN OCCUR.

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STANDARD WIRING PRACTICES MANUAL

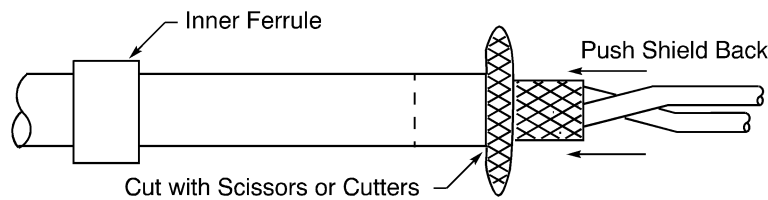
ASSEMBLY OF SHIELD GROUND WIRES



REMOVAL OF THE FIRST PIECE OF OUTER JACKET

Figure 31

- (c) Remove the first piece of the outer jacket. Refer to Figure 31.
- (d) Push the shield back to make a ring against the second piece of the outer jacket. Refer to Figure 32.



SHIELD PUSH BACK AND TRIM

Figure 32

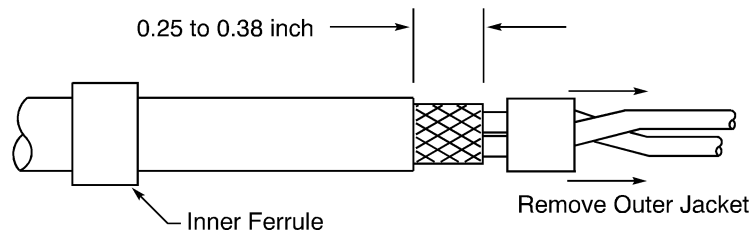
- (e) Cut the shield with scissors or cutters. Refer to Figure 32.

CAUTION: DO NOT CUT THE SHIELD WITH A KNIFE AGAINST THE CABLE. DAMAGE TO THE INNER CONDUCTORS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (f) Tear or pull the outer jacket at the second score line until the second piece of outer jacket is not attached. Refer to Figure 33.

NOTE: The cable can be bent to help remove the second piece of the outer jacket.

CAUTION: DO NOT BEND THE CABLE TO A RADIUS THAT IS LESS THAN 3 TIMES THE CABLE DIAMETER. DAMAGE TO THE CABLE CAN OCCUR.



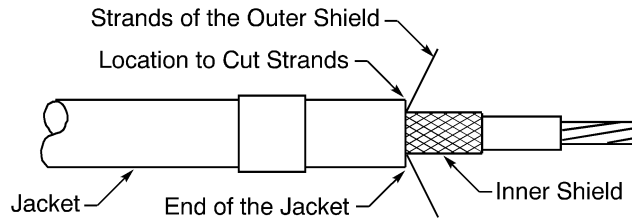
REMOVAL OF THE SECOND PIECE OF OUTER JACKET

Figure 33

- (10) If the cable has adjacent shields, remove the outer shield. Refer to Figure 34.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



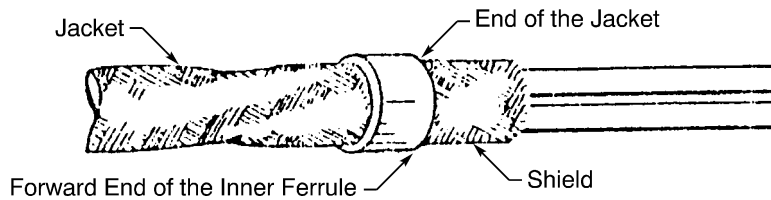
REMOVAL OF THE OUTER SHIELD

Figure 34

- (a) Move the strands of the outer shield apart and make them straight.
- (b) Cut the strands of the outer shield at the end of the jacket.

CAUTION: THE STRANDS OF THE OUTER SHIELD MUST BE CUT CAREFULLY. DAMAGE TO THE INNER SHIELD OR THE WIRE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

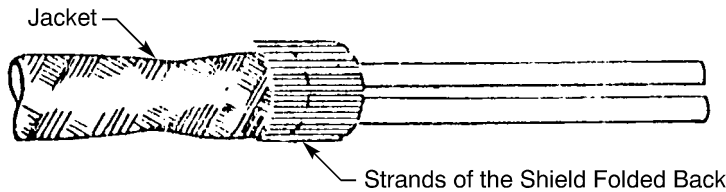
- (11) Move the strands of the remaining shield apart and make them straight.
- (12) Push the inner ferrule forward until the forward end of the ferrule is aligned with the end of the jacket. Refer to Figure 35.



POSITION OF THE INNER FERRULE

Figure 35

- (13) Fold the strands of the shield back on the inner ferrule. Refer to Figure 36.
Make sure that the strands of the shield are smooth and symmetrical around the circumference of the inner ferrule.



STRANDS OF THE SHIELD FOLDED BACK

Figure 36

- (14) Remove the necessary length of insulation from one end of each shield ground wire. Refer to Subject 20-00-15.

Make sure that the conductor of each shield ground wire has the sufficient length to extend the full length of the outer ferrule.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

- (15) Put the conductor of each shield ground wire on the shield and the inner ferrule.
Make sure that each shield ground wire is pointed in the correct direction.

CAUTION: MORE THAN THREE SHIELD GROUND WIRES MUST NOT BE INSTALLED IN ONE SHIELD GROUND WIRE ASSEMBLY. MORE THAN THREE SHIELD GROUND WIRES CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

For the configuration of:

- One shield ground wire, refer to Figure 27
- Two shield ground wires, refer to Figure 28
- Three shield ground wires, refer to Figure 29.

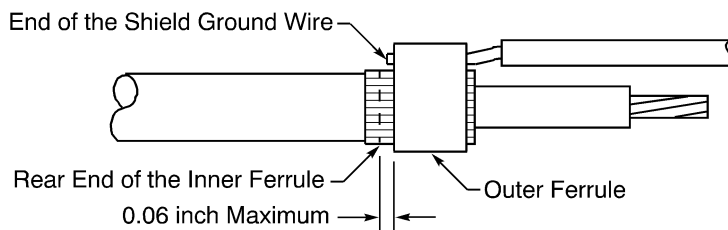
- (16) Put the outer ferrule on the inner ferrule.

Refer to:

- Figure 37 for a shield ground wire that is pointed forward
- Figure 38 for a shield ground wire that is pointed rearward.

Make sure that:

- The outer ferrule is the smallest that can be crimped on the inner ferrule and the shield ground wires
- The rear end of the inner ferrule does not extend farther than 0.06 inch from the rear end of the outer ferrule
- The end of each shield ground wire extends farther than the end of the outer ferrule
- For a shield ground wire that is pointed forward, the end of each shield ground wire does not extend farther than the rear end of the inner ferrule
- For a shield ground wire that is pointed rearward, the end of each shield ground wire does not extend farther than the forward end of the shield.



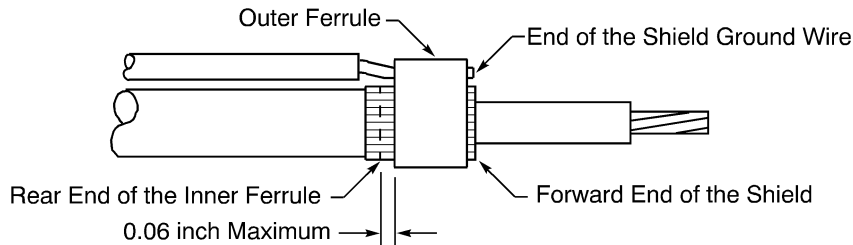
POSITION OF THE OUTER FERRULE - SHIELD GROUND WIRE POINTED FORWARD

Figure 37

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STANDARD WIRING PRACTICES MANUAL

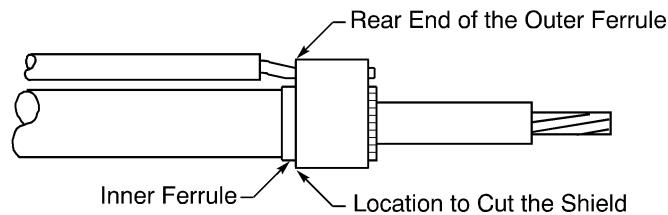
ASSEMBLY OF SHIELD GROUND WIRES



POSITION OF THE OUTER FERRULE - SHIELD GROUND WIRE POINTED REARWARD
Figure 38

- (17) Make a selection of a ferrule crimp tool from Table 23.
- (18) Crimp the outer ferrule.
- (19) Remove the unwanted length of the shield that extends farther than the rear end of the outer ferrule. Refer to Figure 39.

NOTE: The outer surface of the inner ferrule can be used to cut against.



REMOVAL OF THE UNWANTED LENGTH OF SHIELD
Figure 39

- (20) Put two layers of tape on the shield ground wire assembly.

Refer to:

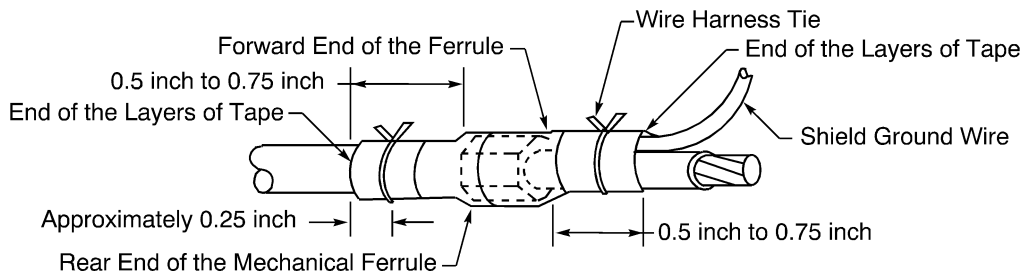
- Figure 40 for a shield ground wire that is pointed forward
- Figure 41 for a shield ground wire that is pointed rearward.

Make sure that:

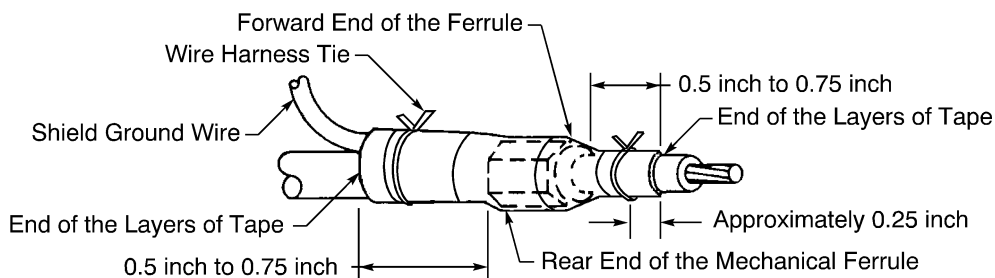
- Each layer has a 50 percent overlap
- The rear end of each layer extends 0.5 inch to 0.75 inch from the rear end of the outer ferrule
- The forward end of each layer extends 0.5 inch to 0.75 inch from the forward end of the outer ferrule
- The second layer is wound in the opposite direction of the first layer.

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ASSEMBLY OF SHIELD GROUND WIRES



POSITION OF THE LAYERS OF TAPE - SHIELD GROUND WIRE POINTED FORWARD
Figure 40



POSITION OF THE LAYERS OF TAPE - SHIELD GROUND WIRE POINTED REARWARD
Figure 41

- (21) Assemble a wire harness tie on each end of the shield ground wire assembly approximately 0.25 inch from the end of the layers of tape.

Refer to:

- Figure 40 for a shield ground wire that is pointed forward
- Figure 41 for a shield ground wire that is pointed rearward
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

C. Shield Ground Wire - Outer Shield Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has an outer shield with round conductors and an adjacent inner shield with flat conductors.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Make a selection of a tape from Table 18.
 Make sure the tape has the correct Temperature Grade.
- (4) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

NOTE: If two shield ground wires are specified, a satisfactory alternative to the minimum length is two times the minimum length from which the insulation can be removed at the center. Refer to Figure 28.

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ASSEMBLY OF SHIELD GROUND WIRES

- (5) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

NOTE: If two shield ground wires are specified, a satisfactory alternative to the minimum length is two times the minimum length from which the insulation can be removed at the center. Refer to Figure 28.

- (6) Measure the O.D. of the wire or cable.
- (7) Make a selection of an inner ferrule from Table 8.

NOTE: The applicable ferrule has an I.D. that is a small amount larger than the O.D. of the wire or cable. Refer to Figure 4.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (8) Make a selection of an outer ferrule that is specified for the inner ferrule from Table 8.

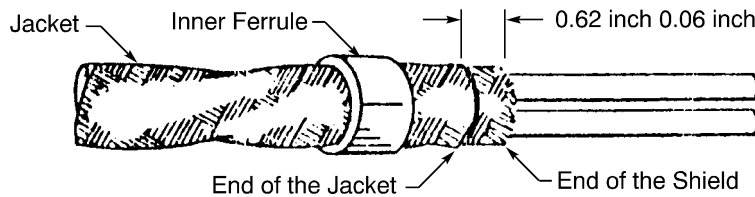
NOTE: In Table 8, more than one outer ferrule can be specified for one inner ferrule. It is possible that shields of different wires and cables have different thicknesses. This can make it necessary to use a smaller or a larger outer ferrule.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (9) Put the inner ferrule on the wire or cable.

Make sure that the ferrule is the smallest ferrule that can be moved freely on the jacket of the wire or cable.

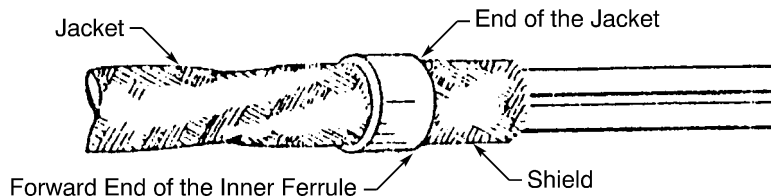
- (10) Remove the necessary length of the shield or adjacent shields to make the distance from the end of the shield to the end of the jacket equal to 0.62 inch \pm 0.06 inch. Refer to Figure 42.



LENGTH OF THE SHIELD

Figure 42

- (11) Move the stands of the outer shield apart and make them straight.
- (12) Push the inner ferrule forward until the forward end of the ferrule is aligned with the end of the jacket. Refer to Figure 43.



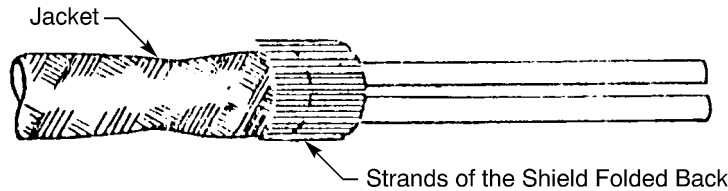
POSITION OF THE INNER FERRULE

Figure 43

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

- (13) Fold the strands of the outer shield back on the inner ferrule. Refer to Figure 44.

Make sure that the strands of the shield are smooth and symmetrical around the circumference of the inner ferrule.

**STRANDS OF THE SHIELD FOLDED BACK****Figure 44**

- (14) Remove the necessary length of insulation from one end of each shield ground wire. Refer to Subject 20-00-15.

Make sure that the conductor of each shield ground wire has the sufficient length to extend the full length of the outer ferrule.

- (15) Put the conductor of each shield ground wire on the shield and the inner ferrule.

Make sure that each shield ground wire is pointed in the correct direction.

CAUTION: MORE THAN THREE SHIELD GROUND WIRES MUST NOT BE INSTALLED IN ONE SHIELD GROUND WIRE ASSEMBLY. MORE THAN THREE SHIELD GROUND WIRES CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

For the configuration of:

- One shield ground wire, refer to Figure 27
- Two shield ground wires, refer to Figure 28
- Three shield ground wires, refer to Figure 29.

- (16) Put the outer ferrule on the inner ferrule.

Refer to:

- Figure 45 for a shield ground wire that is pointed forward
- Figure 46 for a shield ground wire that is pointed rearward.

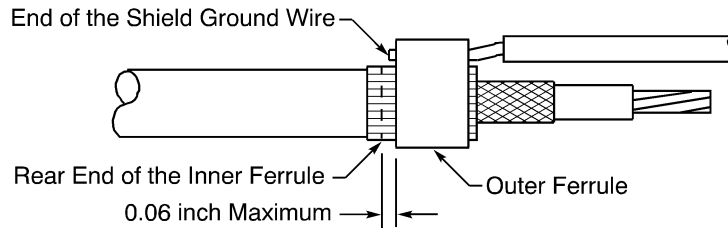
Make sure that:

- The outer ferrule is the smallest that can be crimped on the inner ferrule and the shield ground wires
- The rear end of the inner ferrule does not extend farther than 0.06 inch from the rear end of the outer ferrule
- The end of each shield ground wire extends farther than the end of the outer ferrule
- For a shield ground wire that is pointed forward, the end of each shield ground wire does not extend farther than the rear end of the inner ferrule
- For a shield ground wire that is pointed rearward, the end of each shield ground wire does not extend farther than the end of the forward end of the shield.

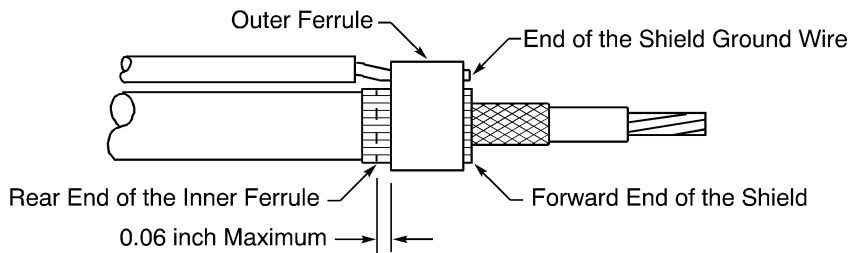
20-10-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



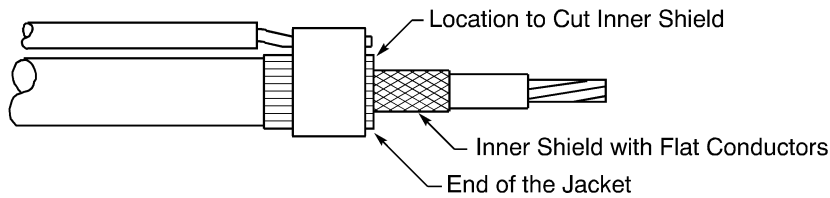
POSITION OF THE OUTER FERRULE - SHIELD GROUND WIRE POINTED FORWARD
Figure 45



POSITION OF THE OUTER FERRULE - SHIELD GROUND WIRE POINTED REARWARD
Figure 46

- (17) Make a selection of a ferrule crimp tool from Table 23.
- (18) Crimp the outer ferrule.
- (19) Remove the length of the inner shield at the end of the jacket. Refer to Figure 47.

CAUTION: THE INNER SHIELD MUST BE CUT CAREFULLY. DAMAGE TO THE OUTER SHIELD OR THE WIRE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.



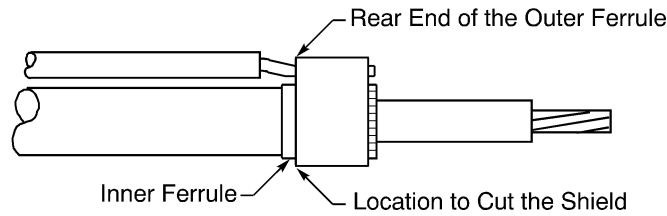
REMOVAL OF THE INNER SHIELD
Figure 47

- (20) Remove the unwanted length of the shield that extends farther than the rear end of the outer ferrule. Refer to Figure 48.

NOTE: The outer surface of the inner ferrule can be used to cut against.

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REMOVAL OF THE UNWANTED LENGTH OF SHIELD

Figure 48

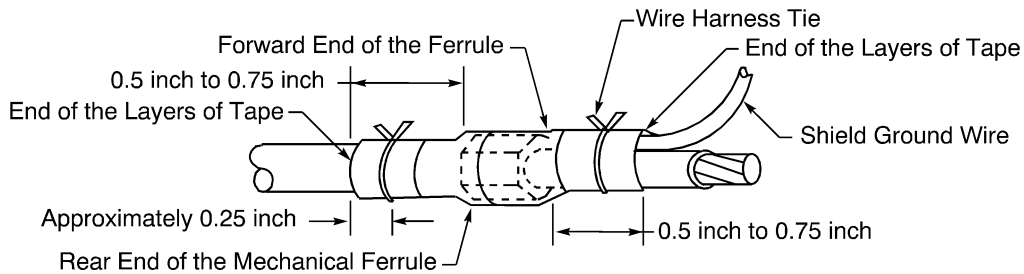
(21) Put two layers of tape on the shield ground wire assembly.

Refer to:

- Figure 49 for a shield ground wire that is pointed forward
- Figure 50 for a shield ground wire that is pointed rearward.

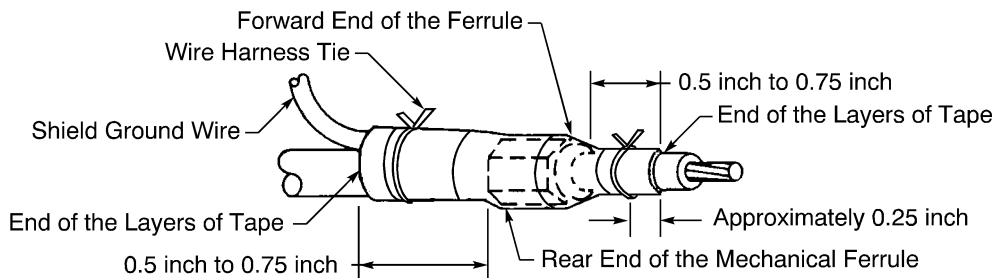
Make sure that:

- Each layer has a 50 percent overlap
- The end of each layer extends 0.5 inch to 0.75 inch from the rear end of the outer ferrule
- The end of each layer extends 0.5 inch to 0.75 inch from the forward end of the outer ferrule
- The second layer is wound in the opposite direction of the first layer.



POSITION OF THE LAYERS OF TAPE - SHIELD GROUND WIRE POINTED FORWARD

Figure 49



POSITION OF THE LAYERS OF TAPE - SHIELD GROUND WIRE POINTED REARWARD

Figure 50

(22) Assemble a wire harness tie on each end of the shield ground wire assembly approximately 0.25 inch from the end of the layers of tape.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

Refer to:

- Figure 49 for a shield ground wire that is pointed forward
- Figure 50 for a shield ground wire that is pointed rearward
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

D. Shield Ground Wire - Shield Not Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

For the procedure to assemble a shield ground wire that is not at the end of a cable, refer to Paragraph 6.E.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

NOTE: If two shield ground wires are specified, a satisfactory alternative to the minimum length is two times the minimum length from which the insulation can be removed at the center. Refer to Figure 28.

- (4) Measure the O.D. of the shield.
- (5) Make a selection of an inner ferrule from Table 8.

NOTE: The applicable ferrule has an I.D. that is a small amount larger than the O.D. of the shield of the cable. Refer to Figure 4.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (6) Make a selection of an outer ferrule that is specified for the inner ferrule from Table 8.

NOTE: In Table 8, more than one outer ferrule can be specified for one inner ferrule. It is possible that shields of different wires and cables have different thicknesses. This can make it necessary to use a smaller or a larger outer ferrule.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (7) Make a selection of a ferrule crimp tool from Table 23.
- (8) Put the outer ferrule on the cable.
- (9) Put the inner ferrule on the cable. Refer to Figure 51.

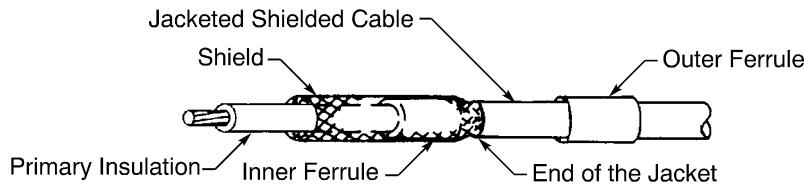
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- The inner ferrule is the smallest ferrule that can be moved freely on the primary insulation of the wire
- The inner ferrule is between the shield and the primary insulation
- The rear end of the inner ferrule is tight against the end of the cable jacket.

CAUTION: THE INNER FERRULE MUST BE LARGE ENOUGH TO PREVENT DAMAGE TO THE PRIMARY INSULATION OF THE WIRE. DAMAGE TO THE PRIMARY INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.



POSITION OF THE INNER FERRULE
Figure 51

- (10) Remove the necessary length of insulation from one end of each shield ground wire. Refer to Subject 20-00-15.

NOTE: Removal of the necessary length of the insulation from the center of the shield ground wire is an acceptable alternative if the length of the ground wire is two times the minimum length. Refer to Step (3).

- (11) Put the conductor of each shield ground wire between the jacket and the outer ferrule.

Make sure that:

- The free end of the shield ground wire is pointed in the correct direction
- The length of bare conductor extends the full length of the outer ferrule
- The bare conductor extends a small amount farther than the rear end of the outer ferrule.

CAUTION: MORE THAN THREE SHIELD GROUND WIRES MUST NOT BE INSTALLED IN ONE SHIELD GROUND WIRE ASSEMBLY ON A CABLE WITH ONE SHIELD. MORE THAN THREE SHIELD GROUND WIRES CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

CAUTION: MORE THAN TWO SHIELD GROUND WIRES MUST NOT BE INSTALLED IN ONE SHIELD GROUND WIRE ASSEMBLY ON A CABLE WITH ADJACENT SHIELDS. MORE THAN TWO SHIELD GROUND WIRES CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

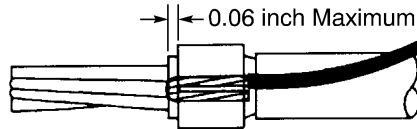
For the configuration of:

- One shield ground wire, refer to Figure 27
- Two shield ground wires, refer to Figure 28
- Three shield ground wires, refer to Figure 29.

- (12) Push the outer ferrule and the shield ground wires forward until the center of the outer ferrule is aligned with the center of the inner ferrule. Refer to Figure 52.

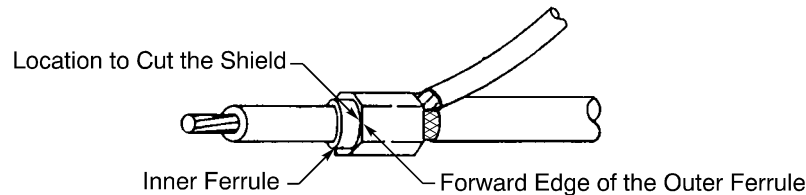
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.

**POSITION OF THE OUTER FERRULE ON THE INNER FERRULE****Figure 52**

- (13) Crimp the outer ferrule.
- (14) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule. Refer to Figure 53.

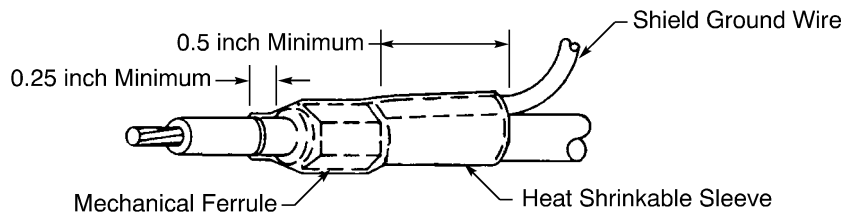
NOTE: The outer surface of the inner ferrule can be used to cut against.

**REMOVAL OF THE UNWANTED LENGTH OF SHIELD****Figure 53**

- (15) Make a selection of a heat shrinkable sleeve from Table 18.
Make sure that the sleeve has the smallest diameter that can be moved freely on the shield ground wire assembly.
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
NOTE: As an alternative, a layer of tape can be put on the shield ground wire assembly. Refer to Table 18.
- (16) If the shield ground wire is pointed away from the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the wire or cable. Refer to Figure 54.
Make sure that the distance:
 - From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
 - From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.

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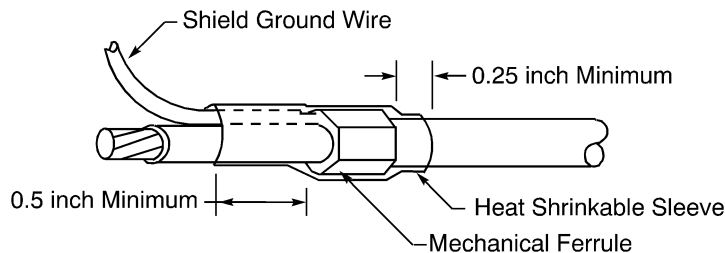
ASSEMBLY OF SHIELD GROUND WIRES



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 54

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (17) If the shield ground wire is pointed forward to the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the wire or cable. Refer to Figure 55. Make sure that the distance:
 - From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
 - From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 55

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.

E. Shield Ground Wire - Not at the End of a Wire or Cable

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

- (4) Remove the necessary length of insulation from one end of each shield ground wire.

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ASSEMBLY OF SHIELD GROUND WIRES

- (5) Measure the O.D. of the shield.
- (6) Make a selection of an inner ferrule from Table 8.

NOTE: The applicable ferrule has an I.D. that is a small amount larger than the O.D. of the shield of the cable. Refer to Figure 4.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (7) Make a selection of an outer ferrule that is specified for the inner ferrule from Table 8.

NOTE: In Table 8, more than one outer ferrule can be specified for one inner ferrule. It is possible that shields of different wires and cables have different thicknesses. This can make it necessary to use a smaller or a larger outer ferrule.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

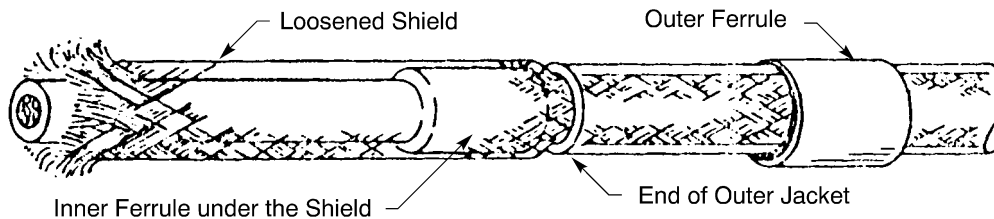
- (8) Make a selection of a ferrule crimp tool from Table 23.
- (9) Put the outer ferrule on the cable.
- (10) Push the shield in the direction of the end of the jacket to make the shield loose.
- (11) Put the inner ferrule on the cable. Refer to Figure 56.

Make sure that:

- The inner ferrule is the smallest ferrule that can be moved freely on the primary insulation of the wire
- The inner ferrule is between the shield and the primary insulation
- The rear end of the inner ferrule is tight against the end of the cable jacket.

NOTE: A rigid tube that has the same diameter and thickness as the ferrule can be used to push the ferrule into the correct position.

CAUTION: THE INNER FERRULE MUST BE LARGE ENOUGH TO PREVENT DAMAGE TO THE PRIMARY INSULATION OF THE WIRE. DAMAGE TO THE PRIMARY INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.



POSITION OF THE INNER FERRULE
Figure 56

- (12) Put the conductor of each shield ground wire between the shield and the outer ferrule.

Make sure that:

- The free end of the shield ground wire is pointed in the correct direction
- The length of bare conductor extends the full length of the outer ferrule
- The bare conductor extends a small amount farther than the rear end of the outer ferrule.

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ASSEMBLY OF SHIELD GROUND WIRES

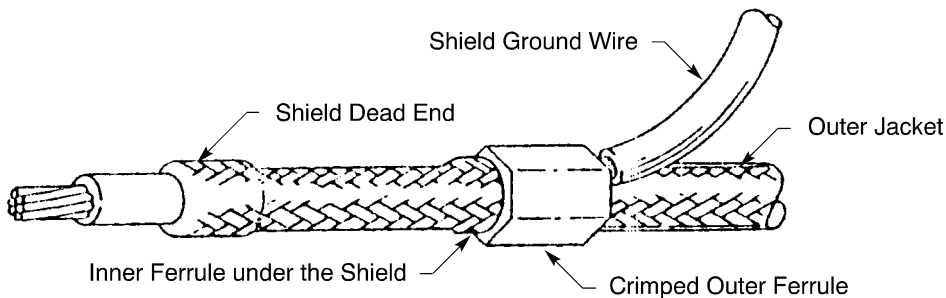
CAUTION: MORE THAN THREE SHIELD GROUND WIRES MUST NOT BE INSTALLED IN ONE SHIELD GROUND WIRE ASSEMBLY ON A CABLE WITH ONE SHIELD. MORE THAN THREE SHIELD GROUND WIRES CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

CAUTION: MORE THAN TWO SHIELD GROUND WIRES MUST NOT BE INSTALLED IN ONE SHIELD GROUND WIRE ASSEMBLY ON A CABLE WITH ADJACENT SHIELDS. MORE THAN TWO SHIELD GROUND WIRES CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

- (13) Push the outer ferrule and the shield ground wires forward until the center of the outer ferrule is aligned with the center of the inner ferrule.
Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.

- (14) Crimp the outer ferrule.
- (15) Pull the end of the loose shield forward to the end of the cable.
- (16) Assemble a shield dead end at the end of the wire or cable.

Refer to Figure 57 and Paragraph 12.A.



SHIELD DEAD END
Figure 57

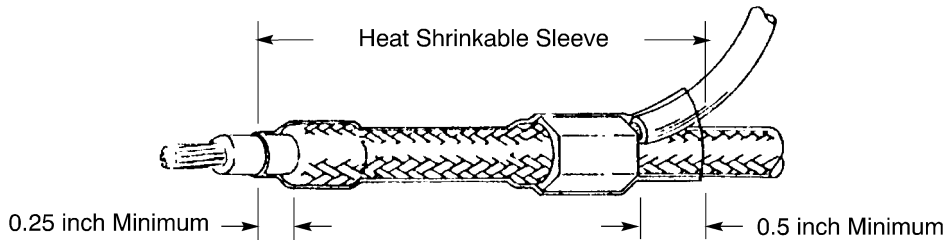
- (17) Make a selection of a heat shrinkable sleeve from Table 18.
Make sure that the sleeve has the smallest diameter that can be moved freely on the shield ground wire assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (18) If the shield ground wire is pointed away from the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the wire or cable. Refer to Figure 58.
Make sure that the distance:
 - From the rear end of the ferrule to the rear end of the sleeve is 0.5 inch minimum
 - From the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



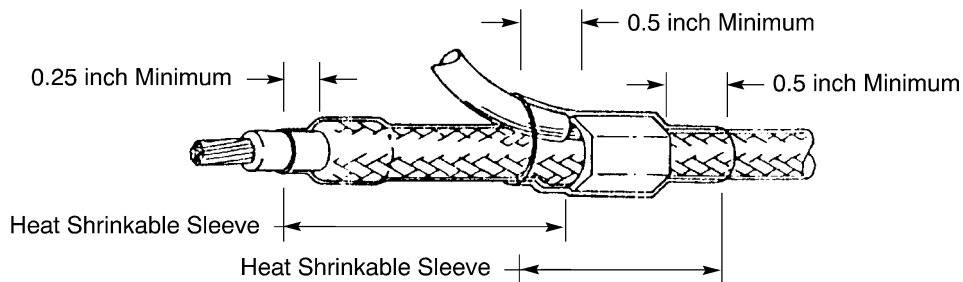
POSITION OF THE FIRST HEAT SHRINKABLE SLEEVE

Figure 58

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (19) If the shield ground wire is pointed forward to the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the forward end of the shield ground wire assembly. Refer to Figure 59.

Make sure that:

- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum
- The rear end of the sleeve is aligned with the forward end of the ferrule.



POSITION OF THE SECOND HEAT SHRINKABLE SLEEVE

Figure 59

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (c) Put the necessary length of heat shrinkable sleeve on the ferrule and the shield ground wire. Refer to Figure 59.
 - Make sure that the distance:
 - From the rear end of the ferrule to the rear end of the sleeve is 0.5 inch minimum
 - From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.
- (d) Shrink the sleeve into its position. Refer to Subject 20-10-14.

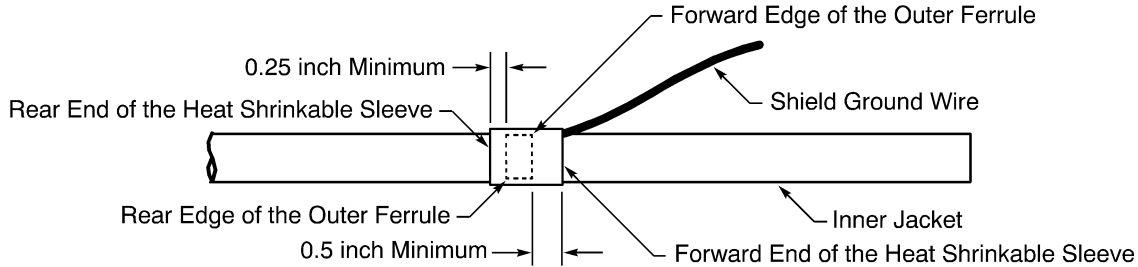
F. Shield Ground Wires - Shields Not Folded Back

This paragraph gives the procedure to assemble the shield ground wires of a cable that has two shields that are not adjacent.

STANDARD WIRING PRACTICES MANUAL

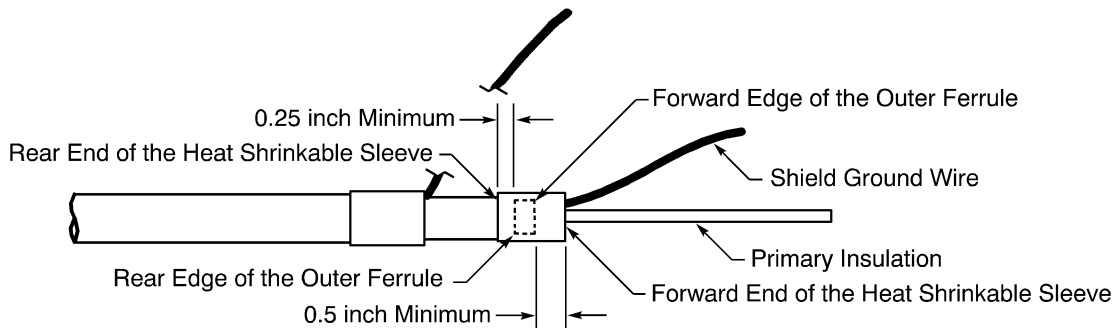
ASSEMBLY OF SHIELD GROUND WIRES

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.



SHIELD GROUND WIRE OF THE OUTER SHIELD

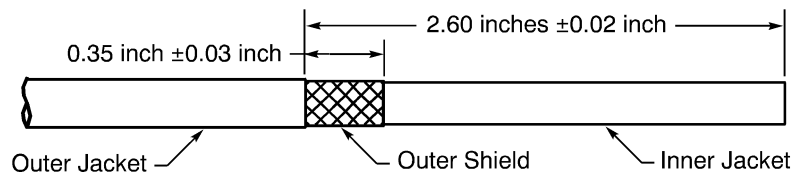
Figure 60



SHIELD GROUND WIRE OF THE INNER SHIELD

Figure 61

- (1) Prepare the cable for the shield ground wire of the outer shield. Refer to Figure 62.



OUTER JACKET AND OUTER SHIELD REMOVAL

Figure 62

- (a) Remove 2.60 inches ± 0.02 inch of the outer jacket from the end of the cable. Refer to Paragraph 4.A.
- (b) Remove the necessary length of the outer shield to make the distance from the end of the shield to the end of the outer jacket equal to 0.35 inch ± 0.03 inch.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

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For the maximum length of the shield ground wire, refer to Paragraph 1.D.

- (4) Measure the O.D. of the shield.
- (5) Make a selection of an inner ferrule from Table 8.

NOTE: The applicable ferrule has an I.D. that is a small amount larger than the O.D. of the shield of the cable. Refer to Figure 4.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (6) Make a selection of an outer ferrule that is specified for the inner ferrule from Table 8.

NOTE: In Table 8, more than one outer ferrule can be specified for one inner ferrule. It is possible that shields of different wires and cables have different thicknesses. This can make it necessary to use a smaller or a larger outer ferrule.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (7) Make a selection of a ferrule crimp tool from Table 23.
- (8) Put the outer ferrule on the cable.
- (9) Put the inner ferrule on the cable. Refer to Figure 62.

Make sure that:

- The inner ferrule is the smallest ferrule that can be moved freely on the inner jacket of the cable
- The inner ferrule is between the outer shield and the inner jacket
- The rear end of the inner ferrule is tight against the end of the outer jacket.

CAUTION: THE INNER FERRULE MUST BE LARGE ENOUGH TO PREVENT DAMAGE TO THE INNER JACKET OF THE CABLE. DAMAGE TO THE INNER JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

- (10) Remove the necessary length of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
- (11) Put the conductor of the shield ground wire between the jacket and the outer ferrule.

Make sure that:

- The free end of the shield ground wire is pointed forward to the end of the cable
- The length of bare conductor extends the full length of the outer ferrule
- The bare conductor extends a small amount farther than the rear end of the outer ferrule.

- (12) Push the outer ferrule and the shield ground wire forward until the center of the outer ferrule is aligned with the center of the inner ferrule.

Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.

- (13) Crimp the outer ferrule.
- (14) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

- (15) Make a selection of a heat shrinkable sleeve from Table 18.

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ASSEMBLY OF SHIELD GROUND WIRES

Make sure that the sleeve has the smallest diameter that can be moved freely on the shield ground wire assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

NOTE: As an alternative, a layer of tape can be put on the shield ground wire assembly. Refer to Table 18.

- (16) Put the necessary length of heat shrinkable sleeve on the wire or cable.

Make sure that the distance:

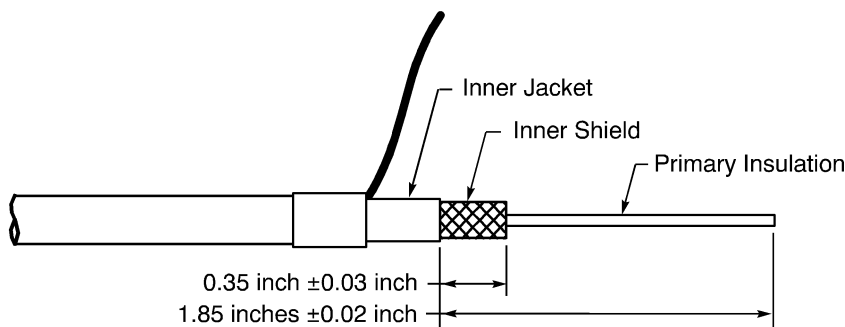
- From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
- From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.

Refer to:

- Figure 60 for the shield ground wire of the outer shield
- Figure 61 for the shield ground wire of the inner shield.

- (17) Shrink the sleeve into its position. Refer to Subject 20-10-14.

- (18) Prepare the cable for the shield ground wire of the inner shield. Refer to Figure 63.



INNER JACKET AND INNER SHIELD REMOVAL

Figure 63

- (a) Remove 1.85 inches ± 0.02 inch of the inner jacket from the end of the cable. Refer to Paragraph 4.A.
 - (b) Remove the necessary length of the inner shield to make the distance from the end of the shield to the end of the jacket equal to 0.35 inch ± 0.03 inch.
- (19) Do Step (2) through Step (8) for the shield ground wire of the inner shield.
 - (20) Put the inner ferrule on the cable. Refer to Figure 63.

Make sure that:

- The inner ferrule is the smallest ferrule that can be moved freely on the primary insulation of the wire
- The inner ferrule is between the shield and the primary insulation
- The rear end of the inner ferrule is tight against the end of the inner jacket.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

CAUTION: THE INNER FERRULE MUST BE LARGE ENOUGH TO PREVENT DAMAGE TO THE PRIMARY INSULATION OF THE WIRE. DAMAGE TO THE PRIMARY INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

(21) Do Step (10) through Step (17) for the shield ground wire of the inner shield.

7. ASSEMBLY OF A SHIELD GROUND WIRE - RSK SHIELD-KON

A. Shield Ground Wire Assembly

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

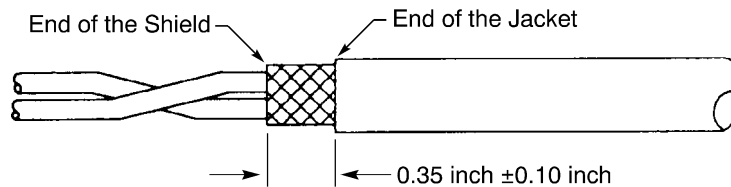
CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

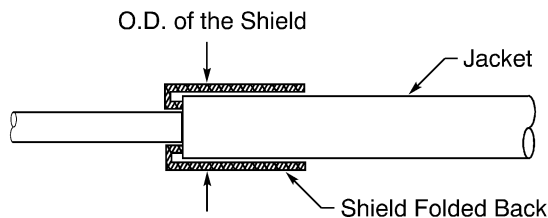
- (4) Remove the necessary length of the shield from the end of the wire or cable to make the length of the shield equal to 0.35 inch \pm 0.10 inch. Refer to Figure 64.



LENGTH OF THE SHIELD

Figure 64

- (5) Fold the shield back on the jacket of the wire or cable. Refer to Figure 65.
Make sure that the shield is even and symmetrical around the circumference of the wire or cable.



SHIELD FOLDED BACK

Figure 65

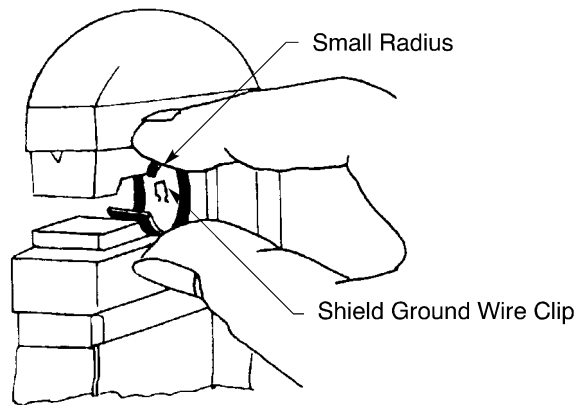
20-10-15

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

- (6) Make a selection of an RSK Shield-Kon from Table 9.
Refer to Figure 65 for the applicable dimensions of the shield ground wire assembly.
- (7) Make a selection of crimp tool from Table 24.
- (8) Remove 0.3 inch \pm 0.1 inch of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
- (9) Put the Shield-Kon in the jaws of the upper and lower dies of the crimp tool. Refer to Figure 66.

Make sure that:

- The shield ground wire clip is pointed up
- The center of the Shield-Kon is aligned with the center of the die.



POSITION OF THE SHIELD-KON IN THE CRIMP TOOL

Figure 66

- (10) Put the conductor of the shield ground wire in the shield ground wire clip of the Shield-Kon. Refer to Figure 67.

Make sure that:

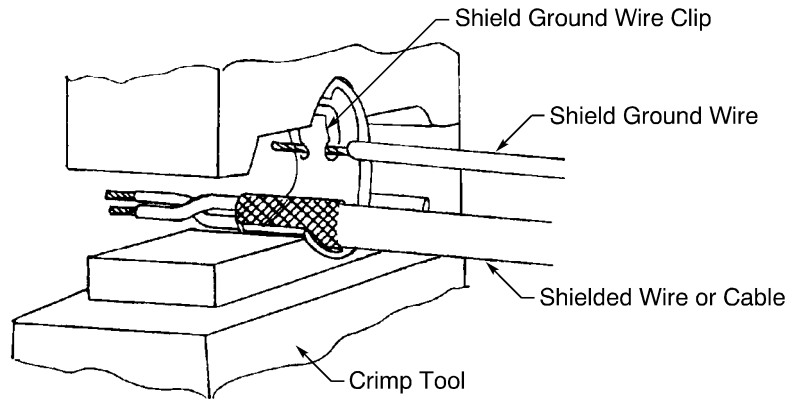
- The shield ground wire is pointed in the correct direction
- The conductor of the shield ground wire is in the correct position in the shield ground clip.

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ASSEMBLY OF SHIELD GROUND WIRES

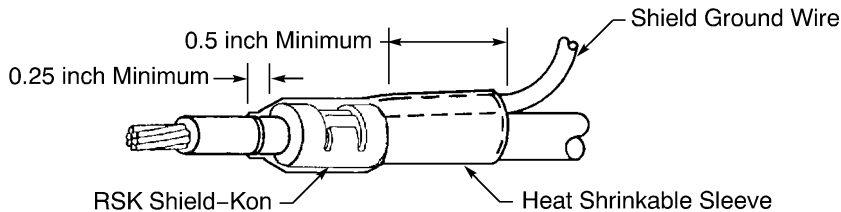


POSITION OF THE SHIELD GROUND WIRE AND THE WIRE OR CABLE
Figure 67

- (11) Put the wire or cable in the bottom of the Shield-Kon. Refer to Figure 67.
 Make sure that the rear end of the Shield-Kon is aligned with the rear end of the shield.
- (12) Crimp the Shield-Kon.
- (13) Install the insulation of the shield ground wire assembly.
 For insulation with:
 - A heat shrinkable sleeve, refer to Paragraph 7.B.
 - A tape, refer to Paragraph 7.C.

B. Insulation with Heat Shrinkable Sleeve

- (1) Make a selection of a heat shrinkable sleeve from Table 18.
 Make sure that the sleeve has the smallest diameter that can be moved freely on the shield ground wire assembly.
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (2) If the shield ground wire is pointed away from the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the wire or cable. Refer to Figure 68.
 Make sure that:
 - The distance from the forward end of the Shield-Kon to the forward end of the heat shrinkable sleeve is 0.25 inch minimum
 - The distance from the rear end of the Shield-Kon to the rear end of the heat shrinkable sleeve is 0.5 inch minimum.

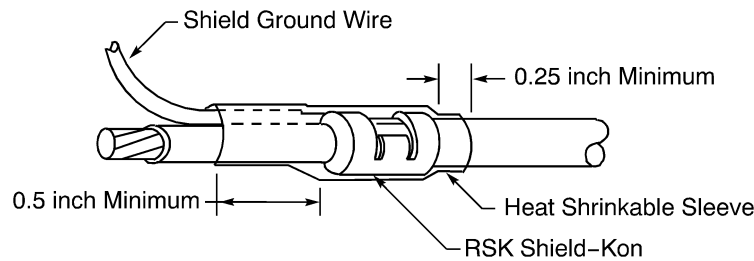


POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 68

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
 - (3) If the shield ground wire is pointed forward to the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the wire or cable. Refer to Figure 69.
- Make sure that:
- The distance from the forward end of the Shield-Kon to the forward end of the heat shrinkable sleeve is 0.5 inch minimum
 - The distance from the rear end of the Shield-Kon to the rear end of the heat shrinkable sleeve is 0.25 inch minimum.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 69

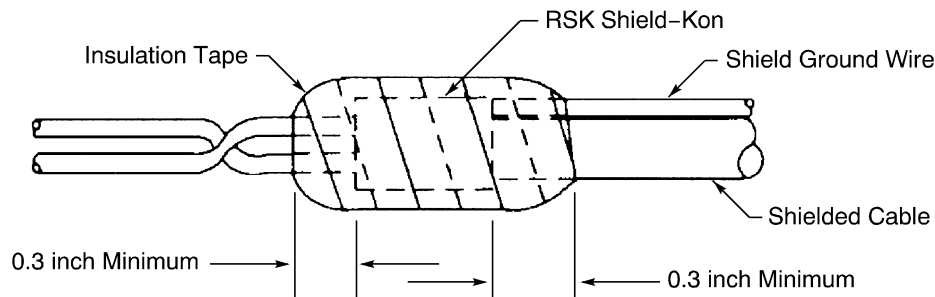
- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Insulation with Tape

- (1) Make a selection of a tape from Table 18.
- (2) Put two layers of tape on the shield ground wire assembly. Refer to Figure 70.

Make sure that:

- Each layer has a 0.25 inch overlap
- The rear end of each each layer extends a minimum of 0.3 inch farther than the rear end of the Shield-Kon
- The forward end of each each layer extends a minimum of 0.3 inch farther than the forward end of the Shield-Kon
- The second layer is wound in the opposite direction of the first layer.



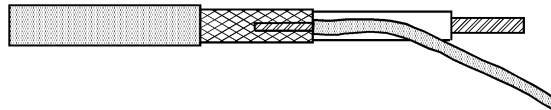
POSITION OF THE LAYERS OF TAPE
Figure 70

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES****8. ASSEMBLY OF A SHIELD GROUND WIRE - SOLDER SLEEVE WITHOUT AN INTEGRAL WIRE**

This paragraph gives the procedures to assemble a shield ground wire with a solder sleeve that does not have an integral wire.

For the assembly of a shield ground wire with a solder sleeve that has:

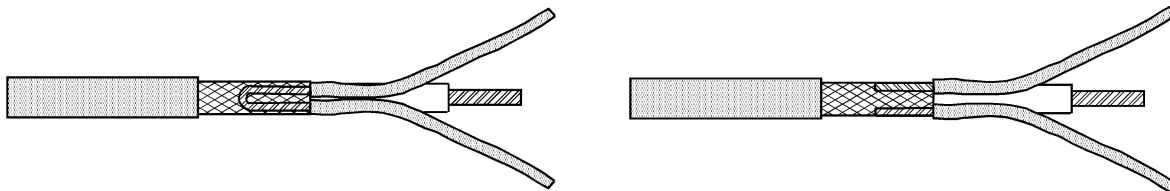
- An insulated integral wire, refer to Paragraph 9.
- An uninsulated integral wire, refer to Paragraph 10.

A. Shield Ground Wire Configurations

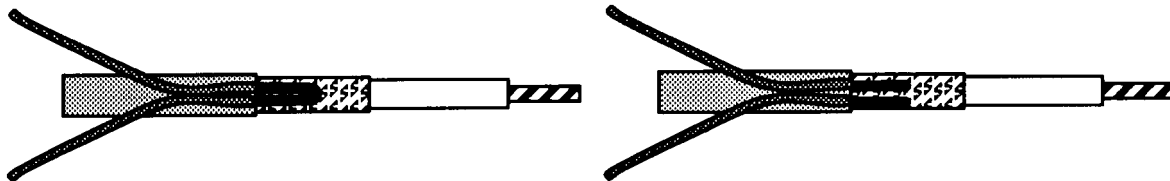
POSITION OF ONE SHIELD GROUND WIRE
Figure 71



ALTERNATIVE POSITION OF ONE SHIELD GROUND WIRE
Figure 72



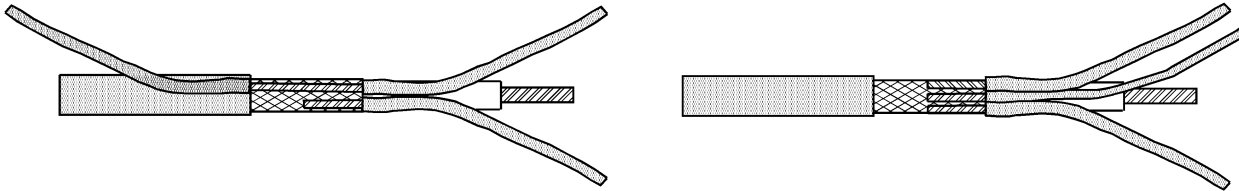
POSITIONS OF TWO SHIELD GROUND WIRES
Figure 73



ALTERNATIVE POSITIONS OF TWO SHIELD GROUND WIRES
Figure 74

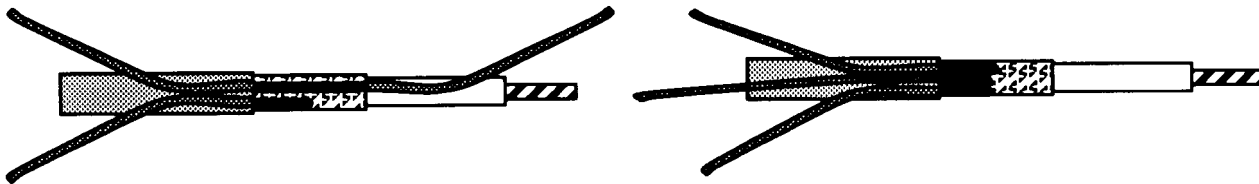
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



POSITIONS OF THREE SHIELD GROUND WIRES

Figure 75



ALTERNATIVE POSITIONS OF THREE SHIELD GROUND WIRES

Figure 76

B. Shield Ground Wire - Shield Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

For the procedure to assemble a shield ground wire:

- With a shield that is not folded back, refer to Paragraph 8.C.
- That is not at the end of a wire or cable, refer to Paragraph 8.D.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

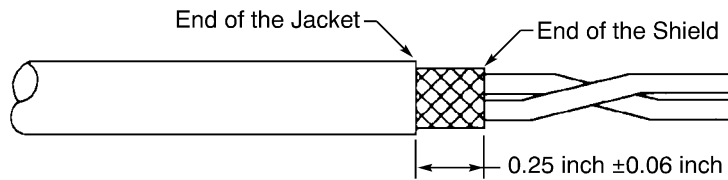
- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

- (4) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 77.

STANDARD WIRING PRACTICES MANUAL

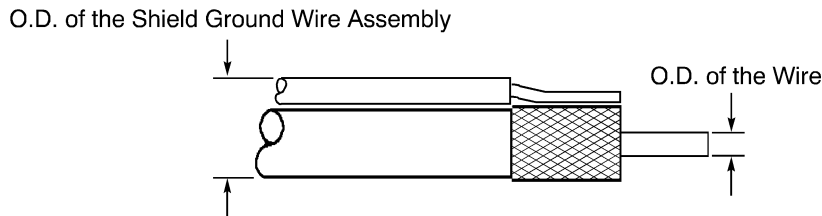
ASSEMBLY OF SHIELD GROUND WIRES



LENGTH OF THE SHIELD

Figure 77

- (5) Fold the shield back on the jacket of the wire or cable.
Make sure that the shield is even and symmetrical around the circumference of the wire or cable.
- (6) Remove 0.25 inch \pm 0.06 inch of insulation from one end of each shield ground wire.
- (7) Make a selection of a solder sleeve from Table 10.
Refer to Figure 78 for the applicable dimensions of the shield ground wire assembly.



DIMENSIONS FOR SOLDER SLEEVE SELECTION

Figure 78

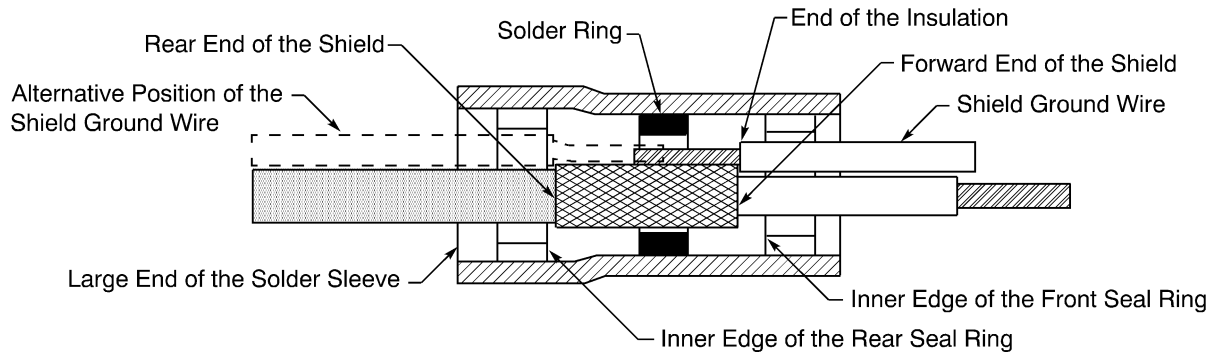
- (8) Put the conductor of each shield ground wire against the shield of the wire or cable.
For the position of:
 - One shield ground wire, refer to Figure 71 and Figure 72
 - Two shield ground wires, refer to Figure 73 and Figure 74
 - Three shield ground wires, refer to Figure 75 and Figure 76.

CAUTION: THE STRANDS OF THE SHIELD GROUND WIRE MUST NOT GO INTO THE SHIELD OF THE CABLE. A SHORT CIRCUIT BETWEEN THE CONDUCTOR OF THE WIRE AND THE SHIELD CAN OCCUR.

- (9) Put the solder sleeve on the wire or cable. Refer to Figure 5 and Figure 79.
Make sure that:
 - The large end of the solder sleeve is put on the wire or cable first
 - The end of the insulation of the shield ground wire is aligned with the end of the shield
 - The inner edge of the rear seal ring is aligned with the rear end of the shield.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE

Figure 79

(10) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve and the shield ground wire stay in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

C. Shield Ground Wire - Shield Not Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- A shield with flat conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with flat conductors.

For the procedure to assemble a shield ground wire:

- With a shield that is folded back, refer to Paragraph 8.B.
- That is not at the end of a wire or cable, refer to Paragraph 8.D.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

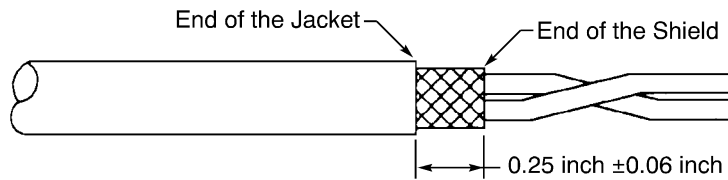
- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

- (4) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 80.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

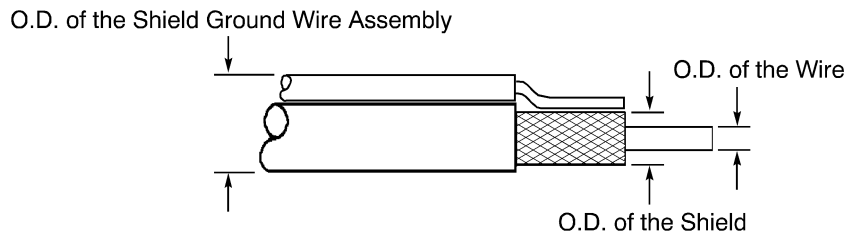


LENGTH OF THE SHIELD

Figure 80

- (5) Remove 0.25 inch \pm 0.06 inch of insulation from one end of each shield ground wire.
- (6) Make a selection of a solder sleeve from Table 10.

Refer to Figure 81 for the applicable dimensions of the shield ground wire assembly.



DIMENSIONS FOR SOLDER SLEEVE SELECTION

Figure 81

- (7) Put the conductor of each shield ground wire against the shield of the wire or cable. For the position of:
 - One shield ground wire, refer to Figure 71 and Figure 72
 - Two shield ground wires, refer to Figure 73 and Figure 74
 - Three shield ground wires, refer to Figure 75 and Figure 76.

CAUTION: THE STRANDS OF THE SHIELD GROUND WIRE MUST NOT GO INTO THE SHIELD OF THE CABLE. A SHORT CIRCUIT BETWEEN THE CONDUCTOR OF THE WIRE AND THE SHIELD CAN OCCUR.

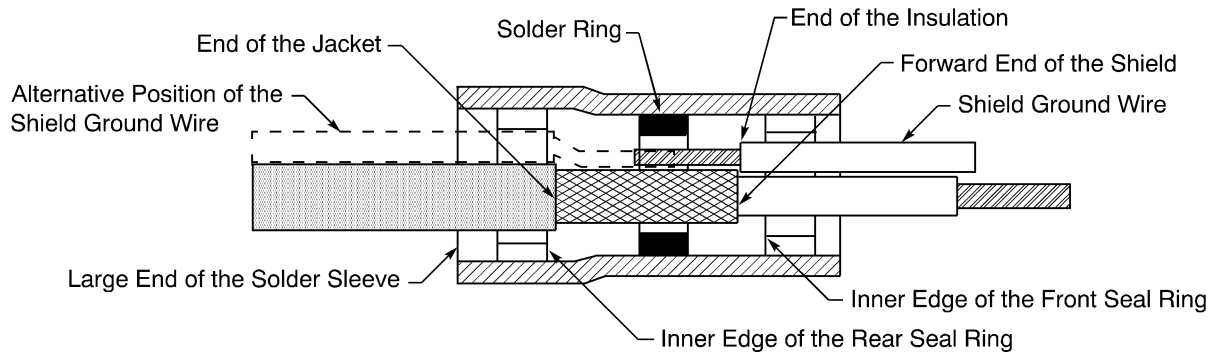
- (8) Put the solder sleeve on the wire or cable. Refer to Figure 5 and Figure 82.

Make sure that:

- The large end of the solder sleeve is put on the wire or cable first
- The end of the insulation of the shield ground wire is aligned with the end of the shield
- The inner edge of the rear seal ring is aligned with the end of the jacket.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE

Figure 82

- (9) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

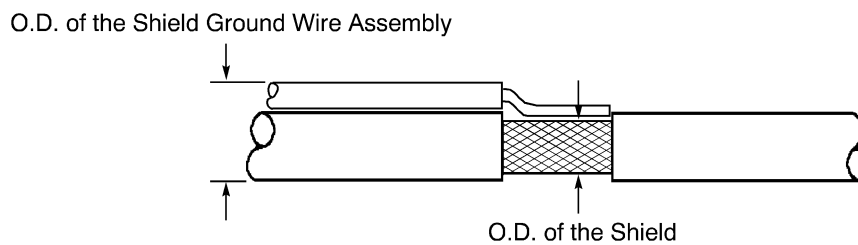
- The solder sleeve and the shield ground wire stay in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

D. Shield Ground Wire - Not at the End of a Wire or Cable

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
 - A shield with flat conductors
 - An outer shield with round conductors and an adjacent inner shield with round conductors
 - An outer shield with round conductors and an adjacent inner shield with flat conductors.
- (1) Remove 0.25 inch \pm 0.06 inch of the jacket from the wire or cable at the location of the shield termination.
Refer to Paragraph 4.A. for the applicable jacket removal tool.
 - (2) Make a selection of a shield ground wire from Table 5.
 - (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.
For the maximum length of the shield ground wire, refer to Paragraph 1.D.
 - (4) Remove 0.25 inch \pm 0.06 inch of insulation from the one end of each shield ground wire.
 - (5) Make a selection of a solder sleeve from Table 10.

Refer to Figure 83 for the applicable dimensions of the shield ground wire assembly.



DIMENSIONS FOR SOLDER SLEEVE SELECTION

Figure 83

20-10-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

(6) Put the conductor of each ground wire against the shield of the cable.

For the position of:

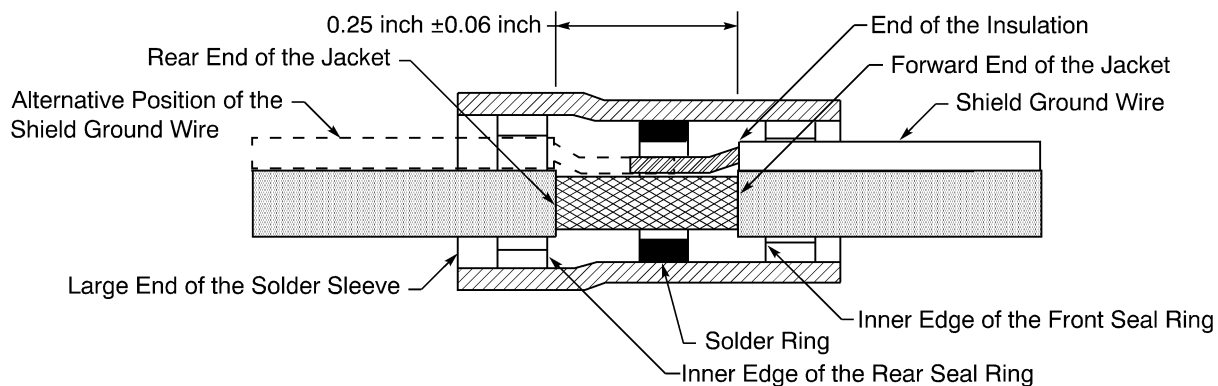
- One shield ground wire, refer to Figure 71 and Figure 72
- Two shield ground wires, refer to Figure 73 and Figure 74
- Three shield ground wires, refer to Figure 75 and Figure 76.

CAUTION: THE STRANDS OF THE SHIELD GROUND WIRE MUST NOT GO INTO THE SHIELD OF THE CABLE. A SHORT CIRCUIT BETWEEN THE CONDUCTOR OF THE WIRE AND THE SHIELD CAN OCCUR.

(7) Put the solder sleeve on the wire or cable. Refer to Figure 5 and Figure 84.

Make sure that:

- The large end of the solder sleeve is put on the wire or cable first
- The end of the insulation of the shield ground wire is aligned with the end of the jacket
- The inner edge of the rear seal ring is aligned with the rear end of the jacket



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE
Figure 84

(8) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve and the shield ground wire stay in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

9. ASSEMBLY OF A SHIELD GROUND WIRE - SOLDER SLEEVE WITH AN INSULATED INTEGRAL WIRE

This paragraph gives the procedures to assemble a shield ground wire with solder sleeve that has an insulated integral wire.

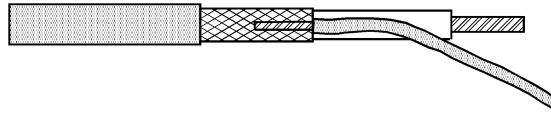
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

For the assembly of a shield ground wire with a solder sleeve that:

- Does not have an integral wire, refer to Paragraph 8.
- Has an uninsulated integral wire, refer to Paragraph 10.

A. Shield Ground Wire Configurations



POSITION OF ONE SHIELD GROUND WIRE
Figure 85

B. Shield Ground Wire - Shield Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

For the procedure to assemble a shield ground wire:

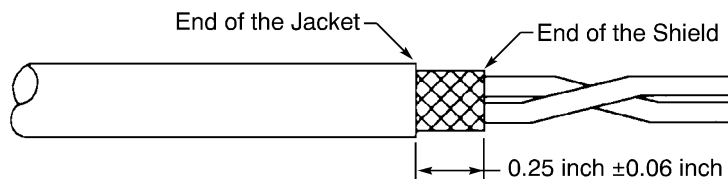
- With a shield that is not folded back, refer to Paragraph 9.C.
- That is not at the end of a wire or cable, refer to Paragraph 9.D.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 86.



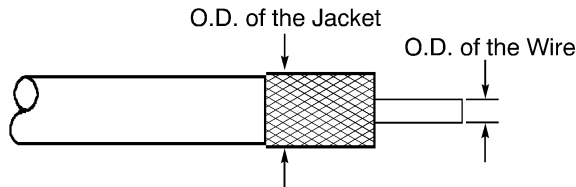
LENGTH OF THE SHIELD
Figure 86

- (3) Fold the shield back on the jacket of the wire or cable.
Make sure that the shield is even and symmetrical around the circumference of the wire or cable.
- (4) Make a selection of a solder sleeve from Table 13.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Refer to Figure 87 for the applicable dimensions of the shield ground wire assembly.

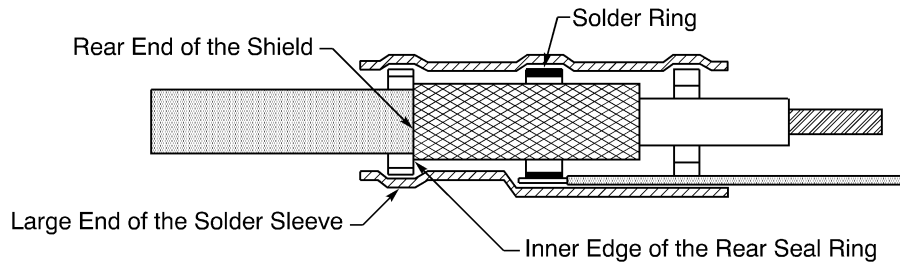


DIMENSIONS FOR SOLDER SLEEVE SELECTION
Figure 87

- (5) Put the solder sleeve on the wire or cable. Refer to Figure 7 and Figure 88.

Make sure that:

- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the rear end of the shield.



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE
Figure 88

- (6) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

- (7) Remove the necessary length from the end of the shield ground wire.

Make sure that:

- The length of the shield ground wire is sufficient to attach the wire to the specified ground
- The length of the shield ground wire is not more than the maximum length; refer to Paragraph 1.D.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

C. Shield Ground Wire - Shield Not Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- A shield with flat conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with flat conductors.

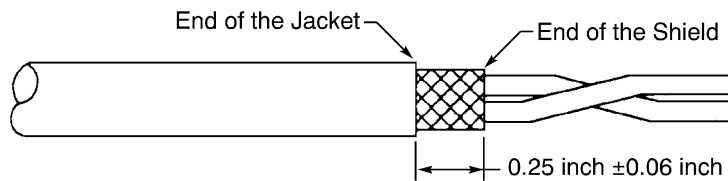
For the procedure to assemble a shield ground wire:

- With a shield that is folded back, refer to Paragraph 9.B.
- That is not at the end of a wire or cable, refer to Paragraph 9.D.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

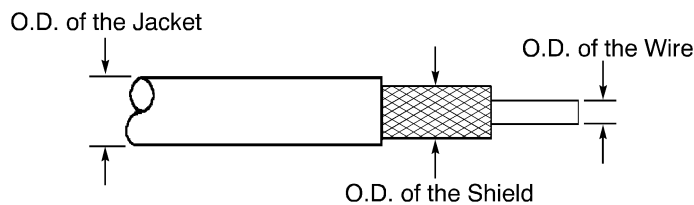
NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 89.



LENGTH OF THE SHIELD
Figure 89

- (3) Make a selection of a solder sleeve from Table 13.
Refer to Figure 90 for the applicable dimensions of the shield ground wire assembly.



DIMENSIONS FOR SOLDER SLEEVE SELECTION
Figure 90

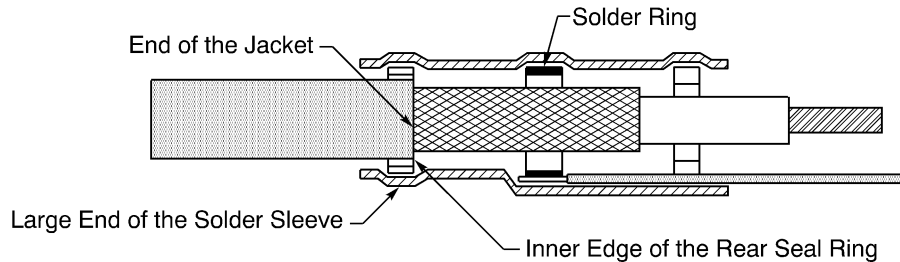
- (4) Put the solder sleeve on the wire or cable. Refer to Figure 7 and Figure 91.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the end of the jacket.



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE

Figure 91

- (5) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

- (6) Remove the necessary length from the end of the shield ground wire.

Make sure that:

- The length of the shield ground wire is sufficient to attach the wire to the specified ground
- The length of the shield ground wire is not more than the maximum length; refer to Paragraph 1.D.

D. Shield Ground Wire - Not at the End of a Wire or Cable

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- A shield with flat conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with flat conductors.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Remove 0.25 inch \pm 0.06 inch of the jacket from the wire or cable at the location of the shield termination.

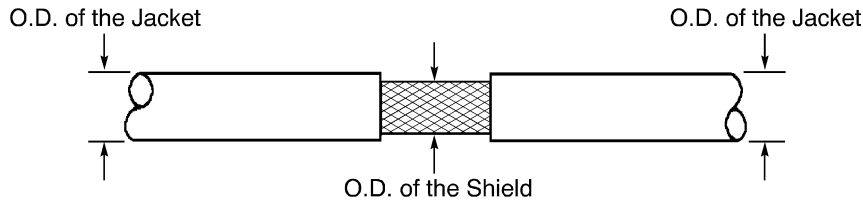
Refer to Paragraph 4.A. for the applicable jacket removal tool.

- (2) Make a selection of a solder sleeve from Table 13.

Refer to Figure 92 for the applicable dimensions of the shield ground wire assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

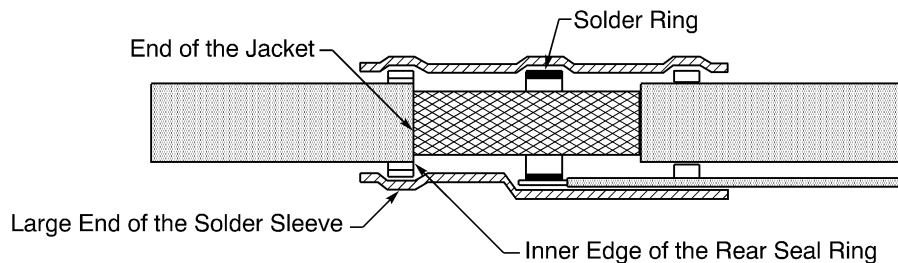


DIMENSIONS FOR SOLDER SLEEVE SELECTION
Figure 92

(3) Put the solder sleeve on the cable. Refer to Figure 7 and Figure 93.

Make sure that:

- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the end of the jacket.



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE
Figure 93

(4) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

(5) Remove the necessary length from the end of the shield ground wire.

Make sure that:

- The length of the shield ground wire is sufficient to attach the wire to the specified ground
- The length of the shield ground wire is not more than the maximum length; refer to Paragraph 1.D.

10. ASSEMBLY OF A SHIELD GROUND WIRE - SOLDER SLEEVE WITH AN UNINSULATED INTEGRAL WIRE

This paragraph gives the procedures to assemble a shield ground wire with a solder sleeve that has an uninsulated integral wire.

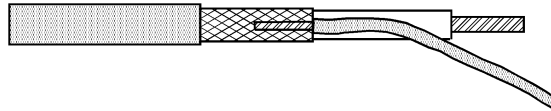
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

For the assembly of a shield ground wire with a solder sleeve that:

- Does not have an integral wire, refer to Paragraph 8.
- Has an insulated integral wire, refer to Paragraph 9.

A. Shield Ground Wire Configurations



POSITION OF ONE SHIELD GROUND WIRE
Figure 94

B. Shield Ground Wire - Shield Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

For the procedure to assemble a shield ground wire:

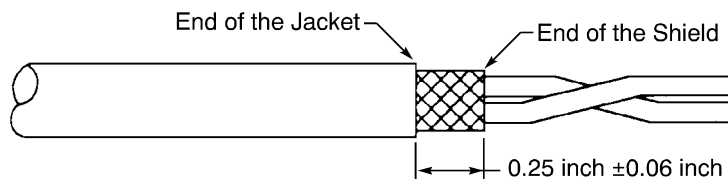
- With a shield that is not folded back, refer to Paragraph 10.C.
- That is not at the end of a wire or cable, refer to Paragraph 10.D.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 95.



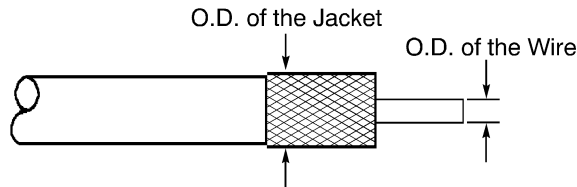
LENGTH OF THE SHIELD
Figure 95

- (3) Fold the shield back on the jacket of the wire or cable.
Make sure that the shield is even and symmetrical around the circumference of the wire or cable.
- (4) Make a selection of a solder sleeve from Table 15.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Refer to Figure 96 for the applicable dimensions of the shield ground wire assembly.

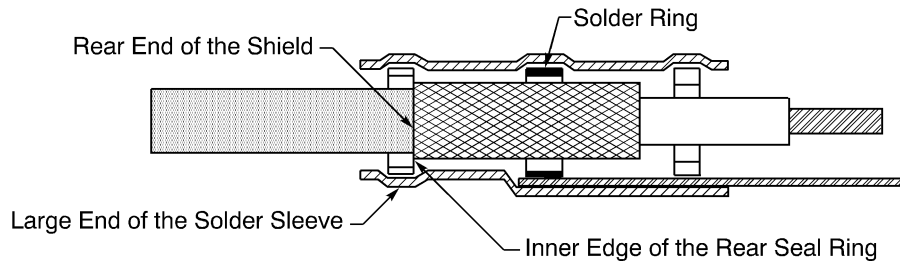


DIMENSIONS FOR SOLDER SLEEVE SELECTION
Figure 96

- (5) Put the solder sleeve on the wire or cable. Refer to Figure 9 and Figure 97.

Make sure that:

- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the rear end of the shield.



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE
Figure 97

- (6) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

- (7) Remove the necessary length from the end of the shield ground wire.

Make sure that:

- The length of the shield ground wire is sufficient to attach the wire to the specified ground
- The length of the shield ground wire is not more than the maximum length; refer to Paragraph 1.D.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

C. Shield Ground Wire - Shield Not Folded Back

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- A shield with flat conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with flat conductors.

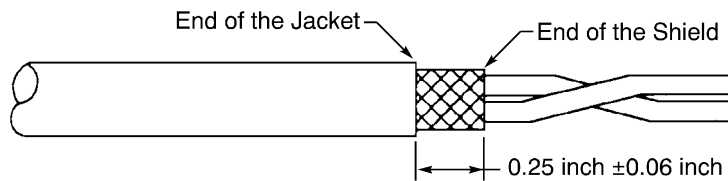
For the procedure to assemble a shield ground wire:

- With a shield that is folded back, refer to Paragraph 10.B.
- That is not at the end of a wire or cable, refer to Paragraph 10.D.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

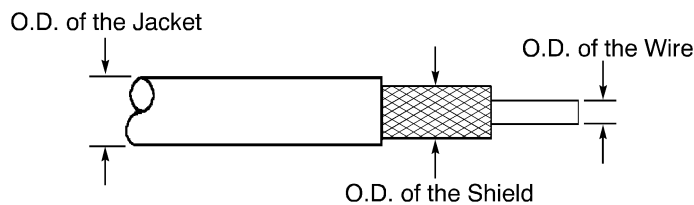
NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 98.



LENGTH OF THE SHIELD
Figure 98

- (3) Make a selection of a solder sleeve from Table 15.
Refer to Figure 99 for the applicable dimensions of the shield ground wire assembly.



DIMENSIONS FOR SOLDER SLEEVE SELECTION
Figure 99

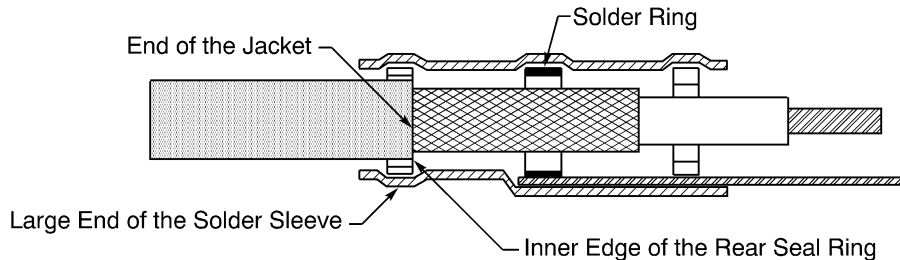
- (4) Put the solder sleeve on the wire or cable. Refer to Figure 9 and Figure 100.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the end of the jacket.



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE
Figure 100

- (5) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

- (6) Remove the necessary length from the end of the shield ground wire.

Make sure that:

- The length of the shield ground wire is sufficient to attach the wire to the specified ground
- The length of the shield ground wire is not more than the maximum length; refer to Paragraph 1.D.

D. Shield Ground Wire - Not at the End of a Wire or Cable

This paragraph gives the procedure to assemble a shield ground wire on a wire or cable that has:

- A shield with round conductors
- A shield with flat conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with flat conductors.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Remove 0.25 inch \pm 0.06 inch of the jacket from the wire or cable at the location of the shield termination.

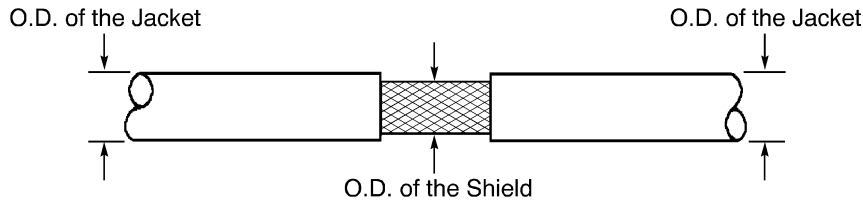
Refer to Paragraph 4.A. for the applicable jacket removal tool.

- (2) Make a selection of a solder sleeve from Table 15.

Refer to Figure 101 for the applicable dimensions of the shield ground wire assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

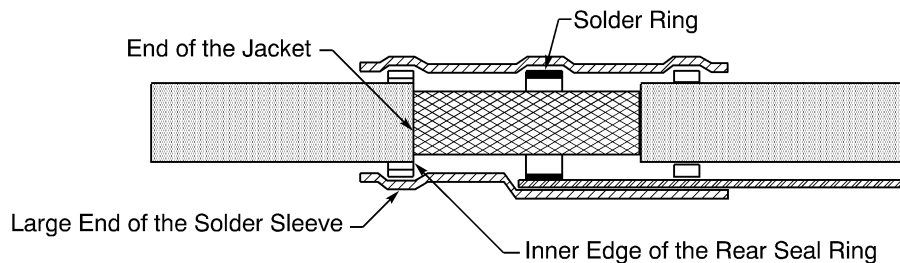


DIMENSIONS FOR SOLDER SLEEVE SELECTION
Figure 101

(3) Put the solder sleeve on the wire or cable. Refer to Figure 9 and Figure 102.

Make sure that:

- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the end of the jacket.



POSITION OF THE SOLDER SLEEVE AND THE SHIELD GROUND WIRE
Figure 102

(4) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

(5) Remove the necessary length from the end of the shield ground wire.

Make sure that:

- The length of the shield ground wire is sufficient to attach the wire to the specified ground
- The length of the shield ground wire is not more than the maximum length; refer to Paragraph 1.D.

11. ASSEMBLY OF A SHIELD GROUND WIRE AND A SHIELD EXTENSION

A. Shield Ground Wire and a Shield Extension - Mechanical Ferrules

This paragraph gives the procedure to assemble a shield ground wire and a shield extension on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

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ASSEMBLY OF SHIELD GROUND WIRES

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

CAUTION: MORE THAN TWO SHIELD GROUND WIRES MUST NOT BE INSTALLED IN ONE SHIELD GROUND WIRE ASSEMBLY. MORE THAN TWO SHIELD GROUND WIRES CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

- (4) Measure the O.D. of the wire or cable.
- (5) Make a selection of an inner ferrule from Table 8.

NOTE: The applicable ferrule has an I.D. that is a small amount larger than the O.D. of the wire or cable. Refer to Figure 4.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (6) Make a selection of an outer ferrule that is specified for the inner ferrule from Table 8.

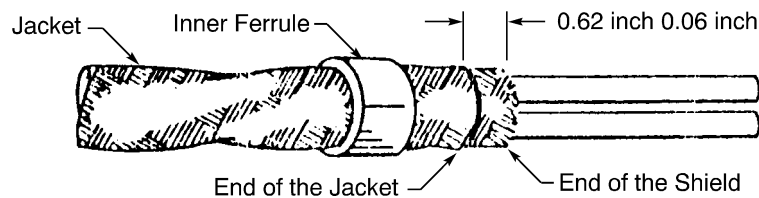
NOTE: In Table 8, more than one outer ferrule can be specified for one inner ferrule. It is possible that shields of different wires and cables have different thicknesses. This can make it necessary to use a smaller or a larger outer ferrule.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (7) Put the inner ferrule on the wire or cable.
- (8) Put the inner ferrule on the wire or cable.

Make sure that the ferrule is the smallest ferrule that can be moved freely on the jacket of the wire or cable.

- (9) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the jacket equal to 0.62 inch \pm 0.06 inch. Refer to Figure 103.

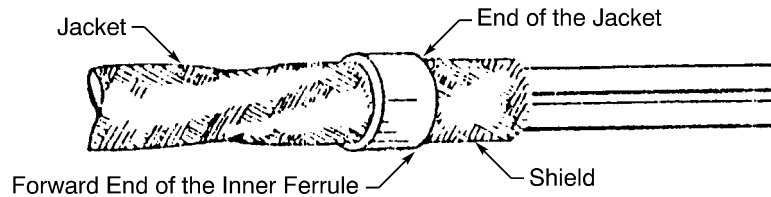


LENGTH OF THE SHIELD
Figure 103

- (10) Push the inner ferrule forward until the forward edge of the ferrule is aligned with the end of the jacket. Refer to Figure 104.

STANDARD WIRING PRACTICES MANUAL

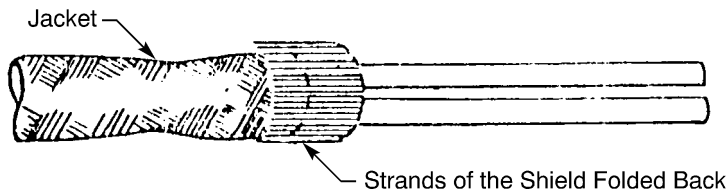
ASSEMBLY OF SHIELD GROUND WIRES



POSITION OF THE INNER FERRULE

Figure 104

- (11) Move the stands of the shield apart and make them straight.
- (12) Fold the strands of the shield back on the inner ferrule. Refer to Figure 105.
Make sure that the strands of the shield are even and symmetrical around the circumference of the wire or cable.



SHIELD FOLDED BACK

Figure 105

- (13) Remove the necessary length of insulation from one end of each shield ground wire. Refer to Subject 20-00-15.
- (14) Make a selection of a shield material from Table 17.
Make sure that the shield has the smallest diameter that can be put on the inner ferrule and the strands of the shield.

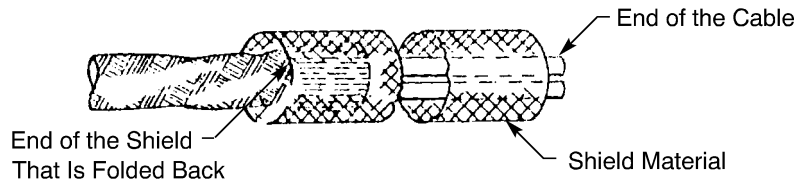
NOTE: A length of shield from a larger size of the same type of wire or cable is a satisfactory alternative.

NOTE: For other alternative shield materials, refer to Subject 20-00-11.

- (15) Cut the necessary length of the shield material.
Make sure that the length of the shield material is sufficient:
 - To align one end with the rear end of the shield that is folded back
 - To assemble a shield dead end on the other end in the correct position; refer to Paragraph 1.F.
- (16) Put the shield material on the wire or cable. Refer to Figure 106.
Make sure that the rear end of the shield material is aligned with the rear end of the shield that is folded back.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



POSITION OF THE SHIELD MATERIAL

Figure 106

(17) Put the conductor of each shield ground wire on the shield material and the inner ferrule.

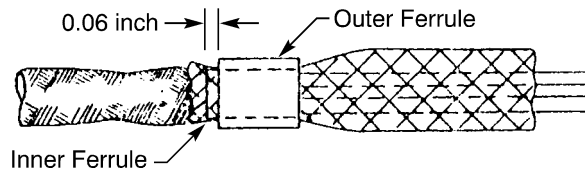
Make sure that:

- Each shield ground wire is pointed in the correct direction
- The conductor of each shield ground wire extends the full length of the ferrules.

(18) Put the outer ferrule on the inner ferrule. Refer to Figure 107.

Make sure that:

- The outer ferrule is the smallest that can be crimped on the inner ferrule and the shield ground wires
- The rear end of the inner ferrule does not extend farther than 0.06 inch from the rear end of the outer ferrule
- The shield ground wires extend farther than the end of the outer ferrule
- The shield ground wires do not extend farther than the end of the inner ferrule.



POSITION OF THE OUTER FERRULE

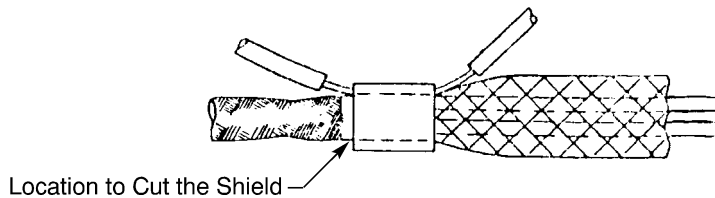
Figure 107

(19) Make a selection of a ferrule crimp tool from Table 23.

(20) Crimp the outer ferrule.

(21) Remove the unwanted length of the shield that extends farther than the rear edge of the outer ferrule. Refer to Figure 108.

NOTE: The outer surface of the inner ferrule can be used to cut against.



REMOVAL OF THE UNWANTED LENGTH OF SHIELD

Figure 108

20-10-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

- (22) Assemble a shield dead end on the opposite end of the shield material. Refer to Paragraph 12.A.
- (23) Make a selection of a heat shrinkable sleeve from Table 18.

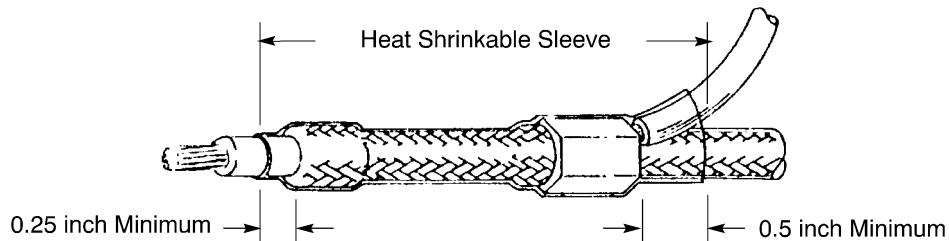
Make sure that the sleeve has the smallest diameter that can be moved freely on the shield ground wire assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (24) If the shield ground wire is pointed away from the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the ferrule, the shield ground wire, the extension, and the dead end. Refer to Figure 109.

Make sure that:

- The distance from the rear end of the ferrule to the rear end of the sleeve is 0.5 inch minimum
- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum.

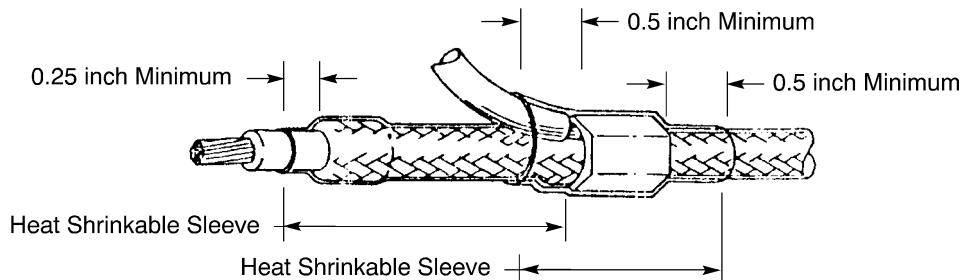


POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 109

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (25) If the shield ground wire is pointed forward to the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the extension and the dead end. Refer to Figure 110.

Make sure that:

- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum
- The rear end of the sleeve is aligned with the forward end of the ferrule.



POSITION OF THE HEAT SHRINKABLE SLEEVES
Figure 110

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (c) Put the necessary length of heat shrinkable sleeve on the ferrule and the shield ground wire. Refer to Figure 110.

Make sure that:

- The distance from the rear end of the ferrule to the rear end of the sleeve is 0.5 inch minimum
- The distance from the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.

- (d) Shrink the sleeve into its position. Refer to Subject 20-10-14.

B. Shield Ground Wire and a Shield Extension - RSK Shield-Kon

This paragraph gives the procedure to assemble a shield ground wire and a shield extension on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

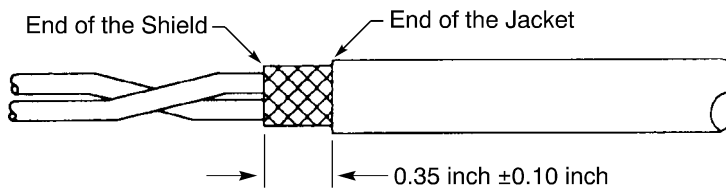
CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Make a selection of a shield ground wire from Table 5.
- (3) Cut the minimum length of the shield ground wire that is necessary to attach the wire to the specified ground.

For the maximum length of the shield ground wire, refer to Paragraph 1.D.

- (4) Remove the necessary length of the shield from the end of the wire or cable to make the length of the shield equal to 0.35 inch \pm 0.10 inch. Refer to Figure 111.



LENGTH OF THE SHIELD
Figure 111

- (5) Fold the shield back on the jacket of the wire or cable.
Make sure that the shield is even and symmetrical around the circumference of the wire or cable.
- (6) Remove 0.3 inch \pm 0.1 inch of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
- (7) Make a selection of a shield material from Table 17.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

Make sure that the shield material has the smallest diameter that can be put on the shield and the jacket of the wire or cable.

NOTE: A length of shield from a larger size of the same type of wire or cable is a satisfactory alternative.

NOTE: For other alternative shield materials, refer to Subject 20-00-11.

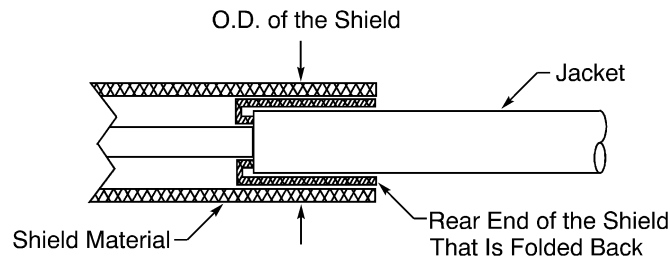
- (8) Cut the necessary length of the shield material.

Make sure that the length of the shield material is sufficient:

- To align one end with the rear end of the shield that is folded back
- To assemble a shield dead end on the other end in the correct position; refer to Paragraph 1.F.

- (9) Put the shield material on the wire or cable. Refer to Figure 112.

Make sure that the rear end of the shield material is aligned with the rear end of the shield that is folded back.

**POSITION OF THE SHIELD MATERIAL****Figure 112**

- (10) Make a selection of an RSK Shield-Kon from Table 9.

Refer to Figure 112 for the applicable dimensions of the shield ground wire assembly.

- (11) Make a selection of an RSK Shield-Kon crimp tool from Table 24.

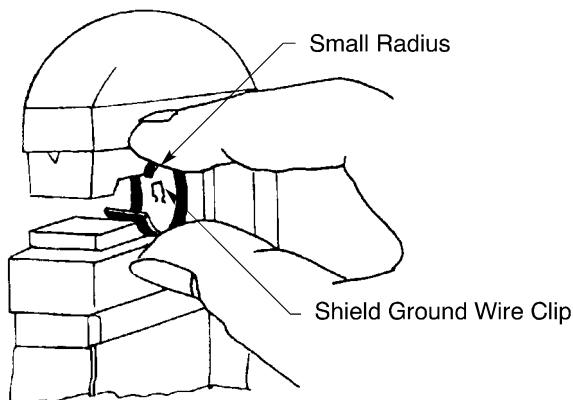
- (12) Put the Shield-Kon in the jaws of the upper and lower dies of the crimp tool. Refer to Figure 113.

Make sure that:

- The shield ground wire clip is pointed up
- The center of the Shield-Kon is aligned with the center of the die.

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ASSEMBLY OF SHIELD GROUND WIRES



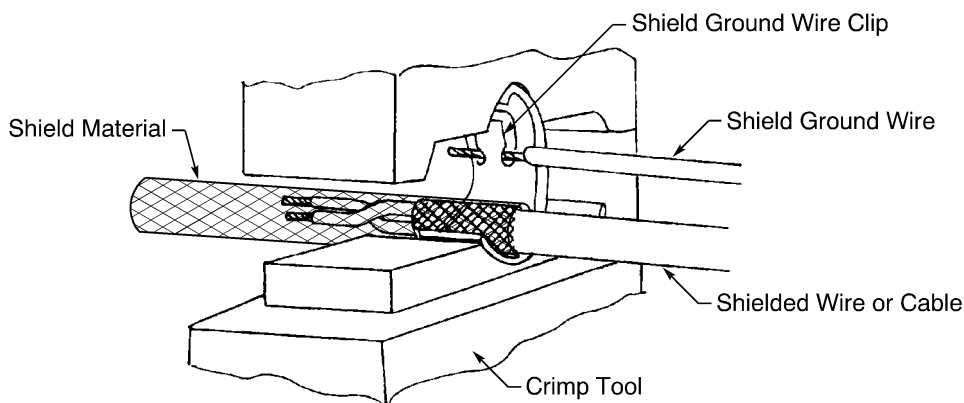
POSITION OF THE SHIELD-KON IN THE CRIMP TOOL

Figure 113

- (13) Put the conductor of the shield ground wire in the shield ground clip of the Shield-Kon. Refer to Figure 114.

Make sure that:

- The shield ground wire is pointed in the correct direction
- The conductor of the shield ground wire is in the correct position in the shield ground clip.



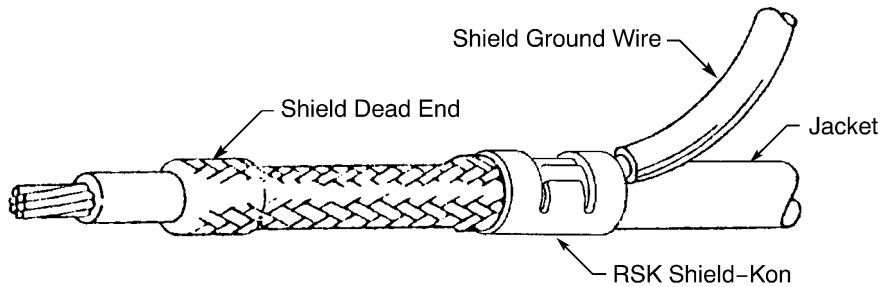
POSITION OF THE SHIELD GROUND WIRE, THE WIRE OR CABLE, AND THE SHIELD MATERIAL

Figure 114

- (14) Put the wire or cable and the shield material in the bottom of the Shield-Kon. Refer to Figure 114. Make sure that the rear end of the Shield-Kon is aligned with the rear end of the shield material.
- (15) Crimp the Shield-Kon.
- (16) Assemble a shield dead end on the opposite end of the shield material. Refer to Figure 115 and Paragraph 12.A.

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ASSEMBLY OF SHIELD GROUND WIRES



SHIELD EXTENSION AND SHIELD DEAD END

Figure 115

- (17) Make a selection of a heat shrinkable sleeve from Table 18.

Make sure that the sleeve has the smallest diameter that can be moved freely on the shield ground wire assembly.

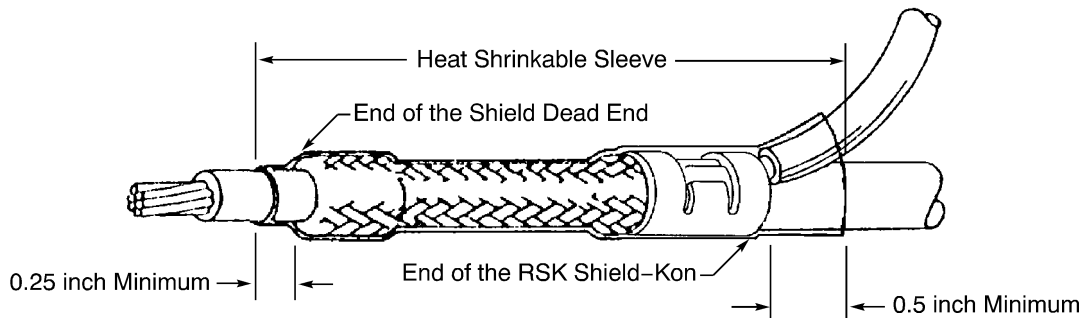
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (18) If the shield ground wire is pointed away from the end of the wire or cable:

- (a) Put the necessary length of heat shrinkable sleeve on the Shield-Kon, the shield ground wire, the extension, and the dead end. Refer to Figure 116.

Make sure that:

- The distance from the rear end of the Shield-Kon to the rear end of the sleeve is 0.5 inch minimum
- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 116

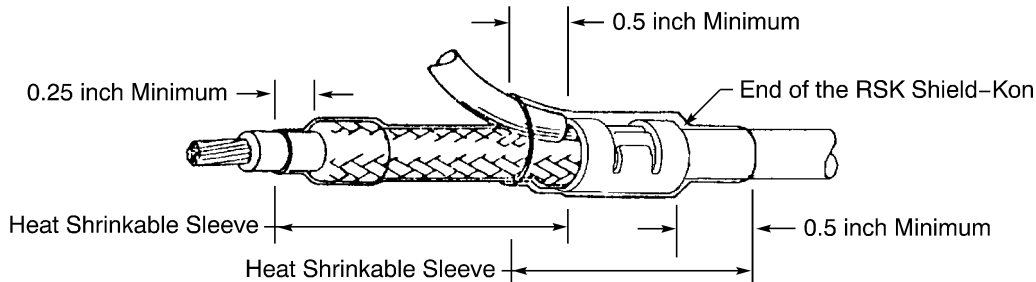
- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (19) If the shield ground wire is pointed forward to the end of the wire or cable:
- (a) Put the necessary length of heat shrinkable sleeve on the extension and the dead end. Refer to Figure 117.

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ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum
- The rear end of the sleeve is aligned with the forward end of the Shield-Kon.



POSITION OF THE HEAT SHRINKABLE SLEEVES

Figure 117

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (c) Put the necessary length of heat shrinkable sleeve on the Shield-Kon and the shield ground wire. Refer to Figure 117.

Make sure that:

- The distance from the rear end of the Shield-Kon to the rear end of the sleeve is 0.5 inch minimum
- The distance from the forward end of the Shield-Kon to the forward end of the sleeve is 0.5 inch minimum.

- (d) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Shield Ground Wire and a Shield Extension - Solder Sleeve, Shield Folded Back

This paragraph gives the procedure to assemble a shield ground wire and a shield extension on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

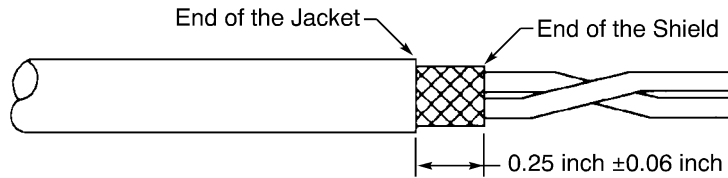
CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 118.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



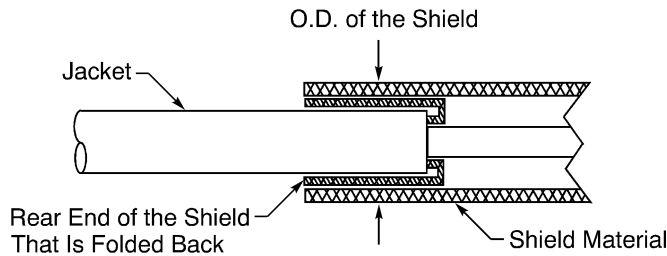
LENGTH OF THE SHIELD
Figure 118

- (3) Fold the shield back on the jacket of the wire or cable.
Make sure that the shield is even and symmetrical around the circumference of the wire or cable.
- (4) Make a selection of a shield material from Table 17.
Make sure that the shield material has:
 - The correct Temperature Grade
 - The smallest diameter that can be put on the shield and the jacket of the wire or cable.

NOTE: A length of shield from a larger size of the same type of wire or cable is a satisfactory alternative.

NOTE: For other alternative shield materials, refer to Subject 20-00-11.

- (5) Cut the necessary length of shield material.
Make sure that the length of the shield material is sufficient:
 - To align one end with the rear end of the shield that is folded back
 - To assemble a shield dead end on the other end in the correct position; refer to Paragraph 1.F.
- (6) Put the shield material on the wire or cable. Refer to Figure 119.
Make sure that the rear end of the shield material is aligned with the rear end of the shield that is folded back.



POSITION OF THE SHIELD MATERIAL
Figure 119

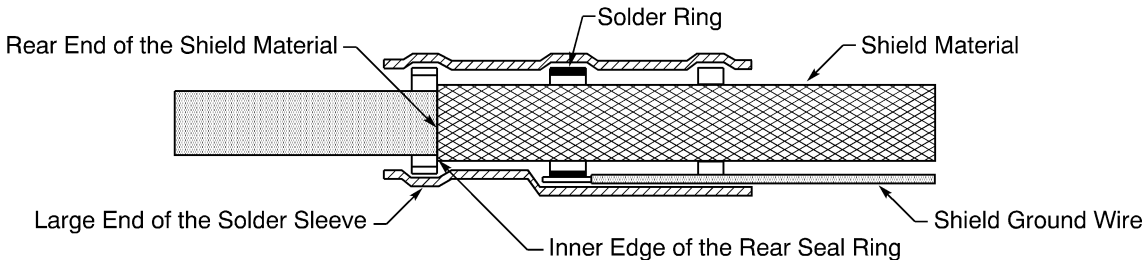
- (7) Make a selection of a solder sleeve from Table 13.
Refer to Figure 119 for the applicable dimensions of the shield ground wire assembly.
- (8) Put the solder sleeve on the wire or cable. Refer to Figure 120.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- The shield ground wire is pointed in the correct direction
- The inner edge of the rear seal ring is aligned with the rear end of the shield material.



POSITION OF THE SOLDER SLEEVE

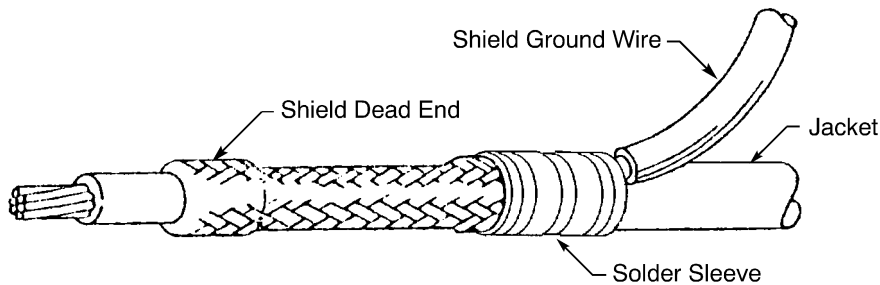
Figure 120

- (9) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

- (10) Assemble a shield dead end on the opposite end of the shield material. Refer to Figure 121 and Paragraph 12.A.



SHIELD EXTENSION AND SHIELD DEAD END

Figure 121

- (11) Make a selection of a heat shrinkable sleeve from Table 18.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

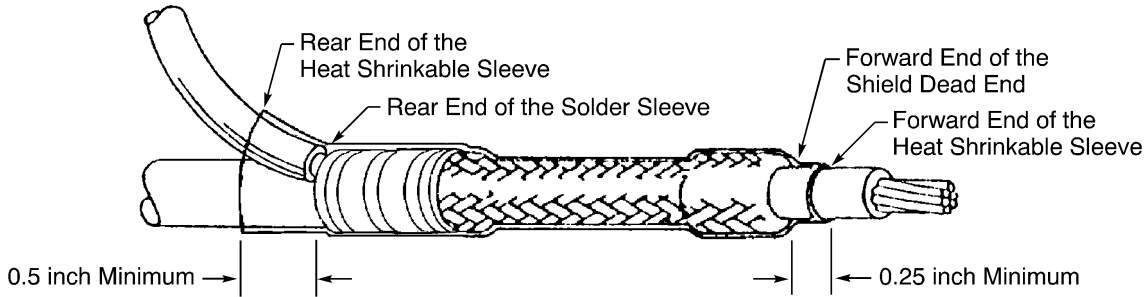
- (12) If the shield ground wire is pointed away from the end of the wire or cable:
- (a) Put the necessary length of heat shrinkable sleeve on the solder sleeve, the shield ground wire, the extension, and the dead end. Refer to Figure 122.

Make sure that:

- The distance from the rear end of the solder sleeve to the rear end of the sleeve is 0.5 inch minimum
- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



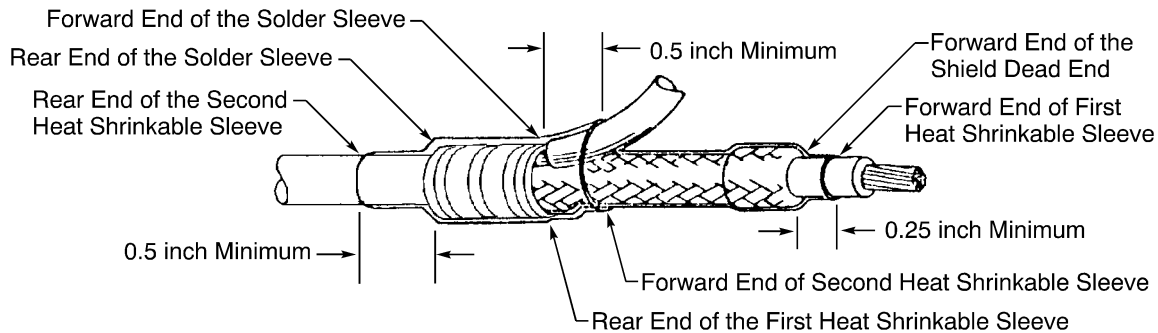
POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 122

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (13) If the shield ground wire is pointed forward to the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the extension and the dead end. Refer to Figure 123.

Make sure that:

- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum
- The rear end of the heat shrinkable sleeve is aligned with the forward end of the solder sleeve.



POSITION OF THE HEAT SHRINKABLE SLEEVES

Figure 123

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (c) Put the necessary length of heat shrinkable sleeve on the solder sleeve and the shield ground wire. Refer to Figure 123.

Make sure that:

- The distance from the rear end of the solder sleeve to the rear end of the heat shrinkable sleeve is 0.5 inch minimum
- The distance from the forward end of the solder sleeve to the forward end of the heat shrinkable sleeve is 0.5 inch minimum.

- (d) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (14) Remove the necessary length from the end of the shield ground wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- The length of the shield ground wire is sufficient to attach the wire to the specified ground
- The length of the shield ground wire is not more than the maximum length; refer to Paragraph 1.D.

D. Shield Ground Wire and a Shield Extension - Solder Sleeve, Shield Not Folded Back

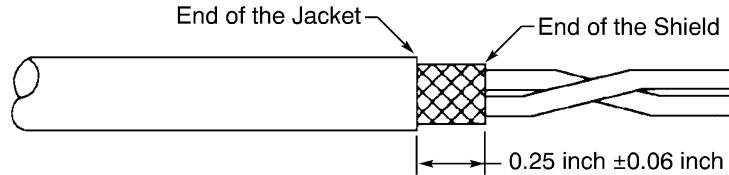
This paragraph gives the procedure to assemble a shield ground wire and a shield extension on a wire or cable that has:

- A shield with round conductors
- A shield with flat conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with flat conductors.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 124.



LENGTH OF THE SHIELD
Figure 124

- (3) Make a selection of a shield material from Table 17.

Make sure that the shield material has:

- The correct Temperature Grade
- The smallest diameter that can be put on the shield of the wire or cable.

NOTE: A length of shield from a larger size of the same type of wire or cable is a satisfactory alternative.

NOTE: For other alternative shield materials, refer to Subject 20-00-11.

- (4) Cut the necessary length of shield material.

Make sure that the length of the shield material is sufficient:

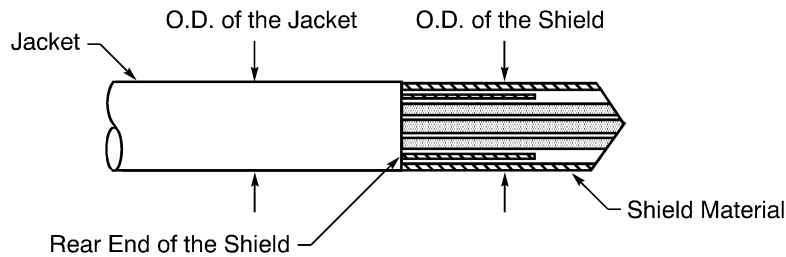
- To align one end with the rear end of the shield
- To assemble a shield dead end on the other end in the correct position; refer to Paragraph 1.F.

- (5) Put the shield material on the wire or cable. Refer to Figure 125.

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ASSEMBLY OF SHIELD GROUND WIRES

Make sure that the rear end of the shield material is aligned with the rear end of the shield.

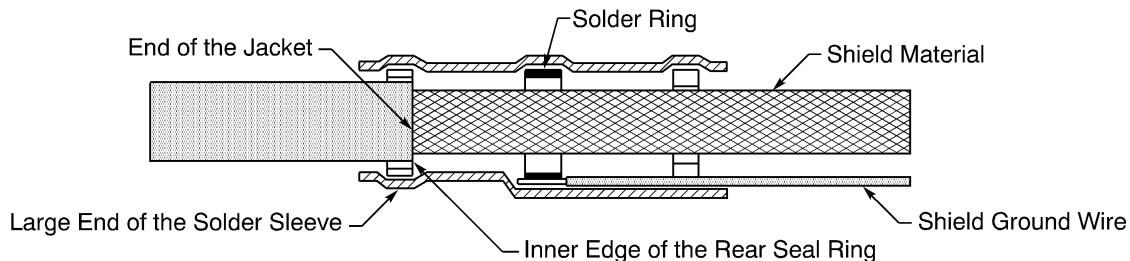


POSITION OF THE SHIELD MATERIAL
Figure 125

- (6) Make a selection of a solder sleeve from Table 13.
Refer to Figure 125 for the applicable dimensions of the shield ground wire assembly.
- (7) Put the solder sleeve on the wire or cable. Refer to Figure 126.

Make sure that:

- The shield ground wire is pointed in the correct direction
- The inner edge of the rear seal ring is aligned with the end of the jacket.



POSITION OF THE SOLDER SLEEVE
Figure 126

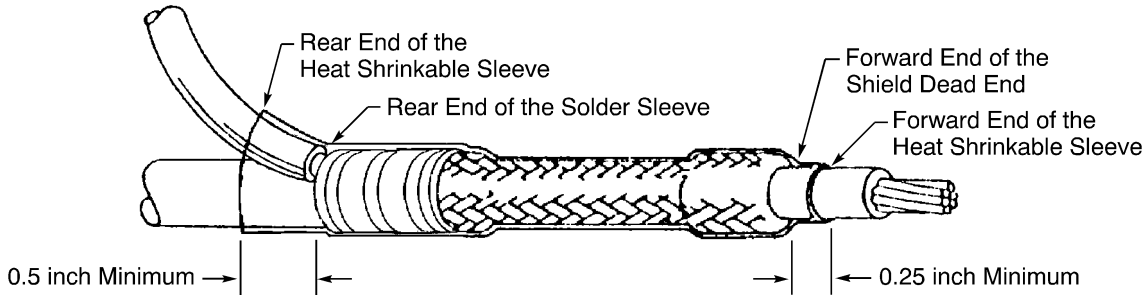
- (8) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.
Make sure that:
 - The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (9) Assemble a shield dead end on the opposite end of the shield material. Refer to Paragraph 12.A.
- (10) Install a shield dead end on the opposite end of the shield extension, refer to Paragraph 12.A.
- (11) Make a selection of a heat shrinkable sleeve from Table 18.
- (12) If the shield ground wire is pointed away from the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the solder sleeve, the shield ground wire, the extension, and the dead end. Refer to Figure 127.

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ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- The distance from the rear end of the solder sleeve to the rear end of the sleeve is 0.5 inch minimum
- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum.



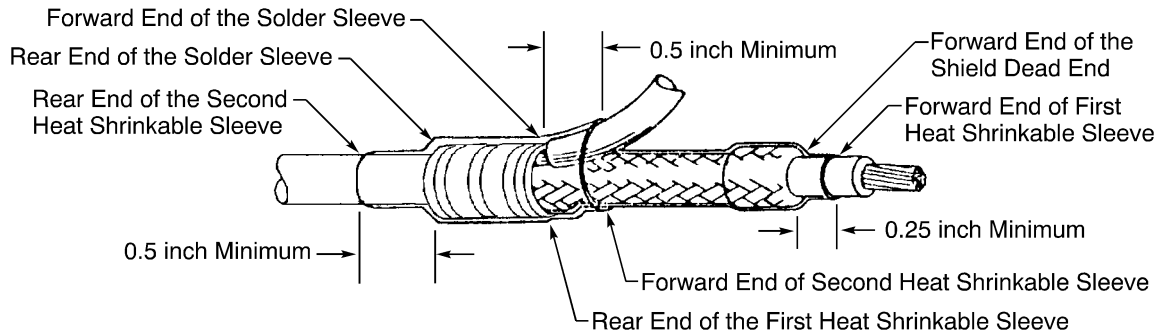
POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 127

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (13) If the shield ground wire is pointed forward to the end of the wire or cable:
 - (a) Put the necessary length of heat shrinkable sleeve on the extension and the dead end. Refer to Figure 128.

Make sure that:

- The distance from the forward end of the dead end to the forward end of the sleeve is 0.25 inch minimum
- The rear end of the heat shrinkable sleeve is aligned with the forward end of the solder sleeve.



POSITION OF THE HEAT SHRINKABLE SLEEVES

Figure 128

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (c) Put the necessary length of heat shrinkable sleeve on the solder sleeve and the shield ground wire. Refer to Figure 128.

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ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- The distance from the rear end of the solder sleeve to the rear end of the heat shrinkable sleeve is 0.5 inch minimum
- The distance from the forward end of the solder sleeve to the forward end of the heat shrinkable sleeve is 0.5 inch minimum.

(d) Shrink the sleeve into its position. Refer to Subject 20-10-14.

(14) Remove the necessary length from the end of the shield ground wire.

Make sure that:

- The length of the shield ground wire is sufficient to attach the wire to the specified ground
- The length of the shield ground wire is not more than the maximum length; refer to Paragraph 1.D.

12. ASSEMBLY OF A SHIELD DEAD END

A. Shield Dead End - Shield Folded Back

This paragraph gives the procedure to assemble a shield dead on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

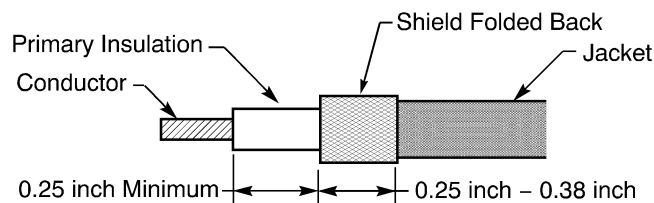
CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE SHIELD DEAD END.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

(1) If the wire or cable does not have a jacket, fold the shield back at the specified point of the shield termination.

Make sure that the length of the shield that is folded back is between 0.25 inch and 0.38 inch.

(2) If the wire or cable has a jacket, prepare the shield. Refer to Figure 129.



LENGTH OF THE SHIELD
Figure 129

- (a) Prepare the wire or cable. Refer to Paragraph 4.A.
- (b) Push the end of the shield in the direction of the end of the jacket to expand the shield at the end of the jacket.
- (c) Cut the shield with scissors or wire cutters where the circumference is largest to make the length of the shield equal to 0.25 inch to 0.38 inch.

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ASSEMBLY OF SHIELD GROUND WIRES

CAUTION: DO NOT A USE KNIFE TO CUT AGAINST THE PRIMARY INSULATION. DAMAGE TO THE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE OR CABLE.

(d) Fold the shield back on the jacket.

Make sure that the length of the shield is between 0.25 inch and 0.38 inch.

NOTE: As an alternative, the strands of the shield can be moved apart and folded back symmetrically against the jacket.

(3) Make a selection of an insulation material from Table 18.

Make sure that the material has the correct Temperature Grade.

(4) If the insulation material is a heat shrinkable sleeve:

(a) Put a length of the sleeve that is 0.5 inch longer than the length of the shield on the wire or cable.

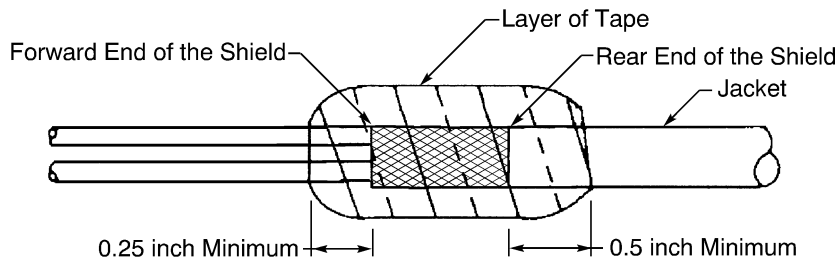
(b) Align the center of the sleeve and the center of the shield.

(c) Shrink the sleeve into its position. Refer to Subject 20-10-14.

(5) If the insulation material is tape, put two layers of tape on the wire or cable. Refer to Figure 130.

Make sure that:

- Each layer of tape makes a 0.25 inch overlap
- The end of each layer is 0.25 inch minimum farther than the forward end of the shield
- The end of each layer is 0.5 inch minimum farther than the rear end of the shield
- The second layer is wound in the opposite direction of the first layer.



POSITION OF THE LAYERS OF TAPE

Figure 130

B. Shield Dead End - Shield Not Folded Back

This paragraph gives the procedure to assemble a shield dead end on a wire or cable that has:

- A shield with round conductors
- A shield with flat conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with flat conductors.

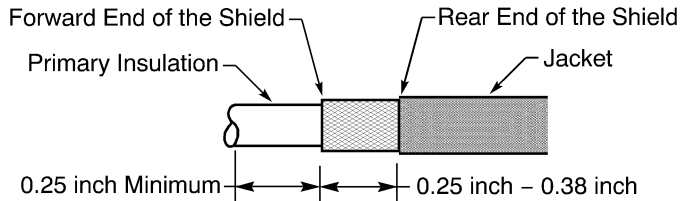
NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

(1) Prepare the wire or cable. Refer to Paragraph 4.A.

(2) Remove the necessary length of shield to make the distance from the end of the shield to the end of the jacket equal to 0.25 inch to 0.38 inch. Refer to Figure 131.

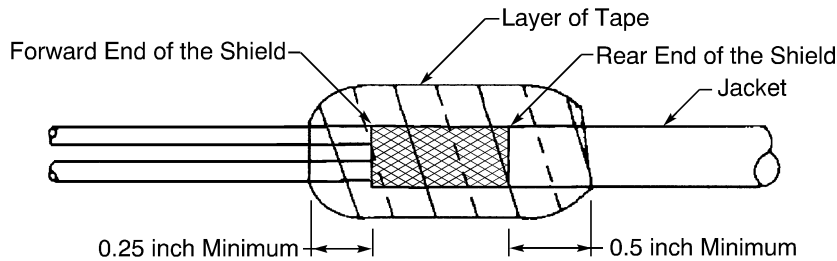
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES



LENGTH OF THE SHIELD
Figure 131

- (3) Make a selection of an insulation material from Table 18.
Make sure that the material has the correct Temperature Grade.
- (4) If the insulation material is a heat shrinkable sleeve:
 - (a) Put a length of the sleeve that is 0.5 inch longer than the length of the shield on the wire or cable.
 - (b) Align the center of the sleeve and the center of the shield.
 - (c) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (5) If the insulation material is tape, put two layers of tape on the wire or cable. Refer to Figure 132.
Make sure that:
 - Each layer of tape makes a 0.25 inch overlap
 - The end of each layer is 0.25 inch minimum farther than the forward end of the shield
 - The end of each layer is 0.5 inch minimum farther than the rear end of the shield
 - The second layer is wound in the opposite direction of the first layer.



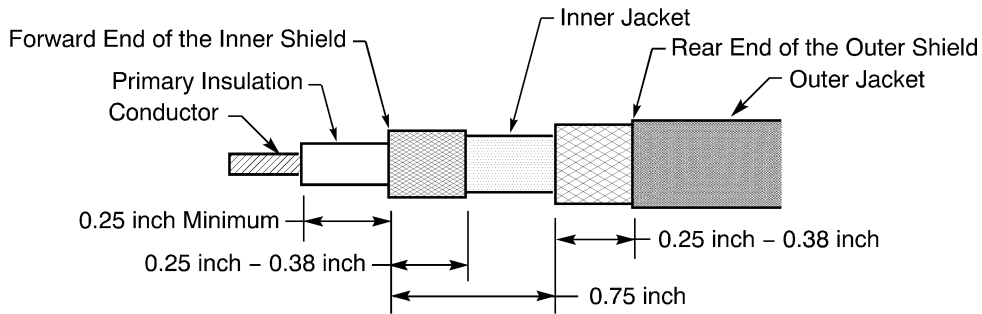
POSITION OF THE LAYERS OF TAPE
Figure 132

C. Shield Dead End - Shields Not Adjacent

This paragraph gives the procedure to assemble a shield dead on a wire or cable that has an outer jacket, an outer shield, an inner jacket, and an inner shield.

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ASSEMBLY OF SHIELD GROUND WIRES



LENGTH OF THE SHIELDS

Figure 133

Refer to Figure 133.

- (1) Remove the necessary length of outer jacket from the end of the wire or cable. Refer to Paragraph 4.A.
- (2) Push the end of the outer shield in the direction of the end of the jacket to expand the shield at the end of the jacket.
- (3) Cut the outer shield with scissors or wire cutters to make the length of the shield between 0.25 inch and 0.38 inch.

CAUTION: DO NOT A USE KNIFE TO CUT AGAINST THE INNER JACKET. DAMAGE TO THE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE OR CABLE.

- (4) Remove the necessary length of the inner jacket to make the length from the end of the jacket to the end of the outer shield equal to 0.75 inch. Refer to Paragraph 4.A.
- (5) Push the end of the inner shield in the direction of the end of the inner jacket to expand the shield at the end of the jacket.
- (6) With a pair of scissors or wire cutters, cut the shield where the circumference is largest to make the length of the shield equal to 0.25 inch to 0.38 inch.

CAUTION: DO NOT A USE KNIFE TO CUT AGAINST THE PRIMARY INSULATION. DAMAGE TO THE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE OR CABLE.

- (7) Fold the shield back on the jacket.
Make sure that the length of the shield is between 0.25 inch and 0.38 inch.

NOTE: As an alternative, the strands of the shield can be moved apart and folded back symmetrically against the jacket.

- (8) Make a selection of an insulation material from Table 18.
Make sure that the material has the correct Temperature Grade.
- (9) If the insulation material is a heat shrinkable sleeve:
 - (a) Put a length of the sleeve that is 0.5 inch longer than the distance from the forward end of the inner shield to the rear end of the outer shield.
 - (b) Align the center of the sleeve and the center point between the two shields.
 - (c) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (10) If the insulation material is tape, put two layers of tape on the wire or cable. Refer to Figure 134.

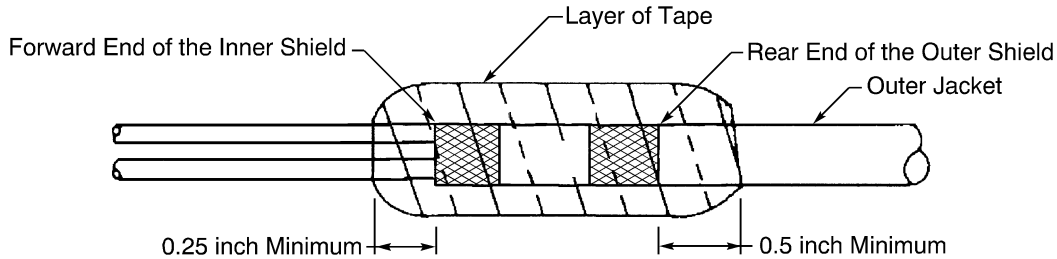
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that:

- Each layer of tape makes a 0.25 inch overlap
- The end of each layer is 0.25 inch minimum farther than the forward end of the inner shield
- The end of each layer is 0.5 inch minimum farther than the rear end of the outer shield
- The second layer is wound in the opposite direction of the first layer.



POSITION OF THE LAYERS OF TAPE
Figure 134

13. ASSEMBLY OF A SHIELD EXTENSION

A. Shield Extension - Mechanical Ferrules

This paragraph gives the procedure to assemble a shield extension on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Measure the O.D. of the wire or cable.
- (3) Make a selection of an inner ferrule from Table 8.

NOTE: The applicable ferrule has an I.D. that is a small amount larger than the O.D. of the wire or cable. Refer to Figure 4.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (4) Make a selection of an outer ferrule that is specified for the inner ferrule and 2 or 3 shield ground wires from Table 8.

NOTE: In Table 8, more than one outer ferrule can be specified for one inner ferrule. It is possible that shields of different wires and cables have different thicknesses. This can make it necessary to use a smaller or a larger outer ferrule.

Make sure that the ferrule has the correct Temperature Grade; refer to Figure 4 and Table 6.

- (5) Put the inner ferrule on the wire or cable.

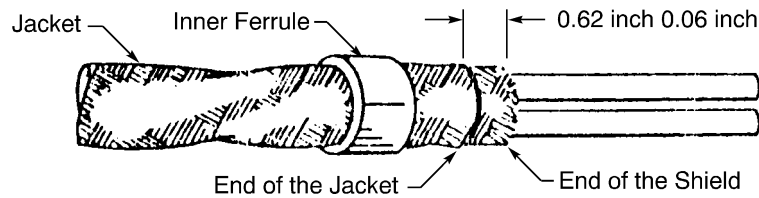
Make sure that the ferrule is the smallest ferrule that can be moved freely on the jacket of the wire or cable.

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ASSEMBLY OF SHIELD GROUND WIRES

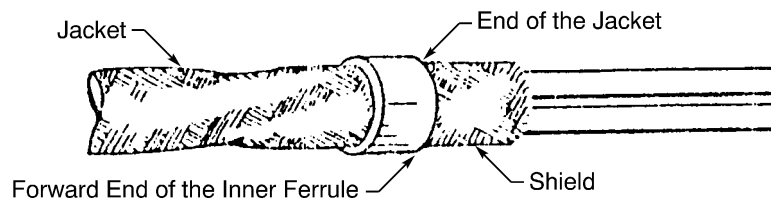
- (6) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to 0.62 inch \pm 0.06. Refer to Figure 135.



LENGTH OF THE SHIELD

Figure 135

- (7) Push the inner ferrule forward until the forward edge of the ferrule is aligned with the end of the jacket. Refer to Figure 136.

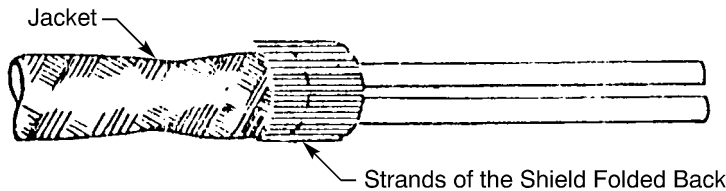


POSITION OF THE INNER FERRULE

Figure 136

- (8) Move the stands of the shield apart and make them straight.
 (9) Fold the strands of the shield back on the inner ferrule. Refer to Figure 137.

Make sure that the strands of the shield are even and symmetrical around the circumference of the wire or cable.



SHIELD FOLDED BACK

Figure 137

- (10) Make a selection of shield material from Table 17.
 Make sure that the shield material has the smallest diameter that can be put on the inner ferrule and the strands of the shield.

NOTE: A length of shield from a larger size of the same type of wire or cable is a satisfactory alternative.

NOTE: For other alternative shield materials, refer to Subject 20-00-11.

- (11) Cut the necessary length of shield material.

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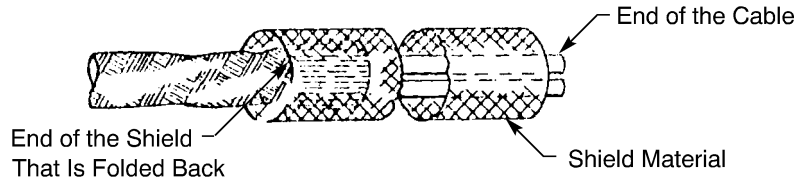
ASSEMBLY OF SHIELD GROUND WIRES

Make sure that the length of the shield material is sufficient:

- To align one end with the rear end of the shield that is folded back
- To assemble a shield dead end or a shield ground wire on the other end in the correct position; refer to Paragraph 1.F.

(12) Put the shield material on the cable. Refer to Figure 138.

Make sure that the rear end of the shield material is aligned with the rear end of the shield that is folded back.

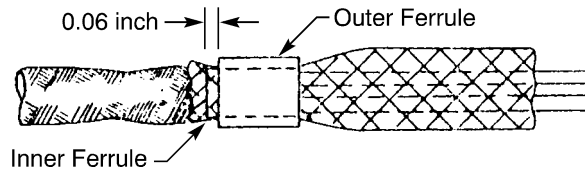


POSITION OF THE SHIELD MATERIAL
Figure 138

(13) Put the outer ferrule on the inner ferrule. Refer to Figure 139.

Make sure that:

- The outer ferrule is the smallest that can be crimped on the inner ferrule and the shield material
- The rear end of the inner ferrule does not extend farther than 0.06 inch from the rear end of the outer ferrule.



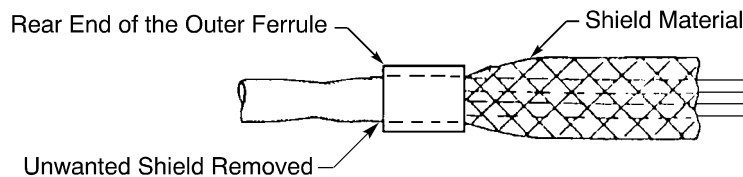
POSITION OF THE OUTER FERRULE
Figure 139

(14) Make a selection of a ferrule crimp tool from Table 23.

(15) Crimp the outer ferrule.

(16) Remove the unwanted length of the shield that extends farther than the rear edge of the outer ferrule. Refer to Figure 140.

NOTE: The outer surface of the inner ferrule can be used to cut against.



REMOVAL OF THE UNWANTED LENGTH OF SHIELD
Figure 140

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

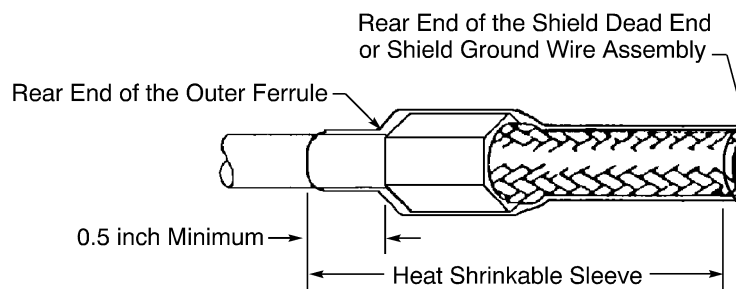
- (17) Make a selection of a heat shrinkable sleeve from Table 18.

Make sure that the sleeve has the smallest diameter that can be moved freely on the outer ferrule and the extension.

- (18) Put the necessary length of heat shrinkable sleeve on the shield extension assembly. Refer to Figure 141.

Make sure that the length of the sleeve is sufficient to put:

- The rear end of the sleeve 0.5 inch minimum to the rear of the rear end of the outer ferrule
- The forward end of the sleeve at the location where the rear end of the shield dead end or the shield ground wire assembly must be put.

**POSITION OF THE HEAT SHRINKABLE SLEEVE****Figure 141**

- (19) Shrink the sleeve into its position. Refer to Subject 20-10-14.

B. Shield Extension - RSK Shield-Kon

This paragraph gives the procedure to assemble a shield extension on a wire or cable that has:

- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

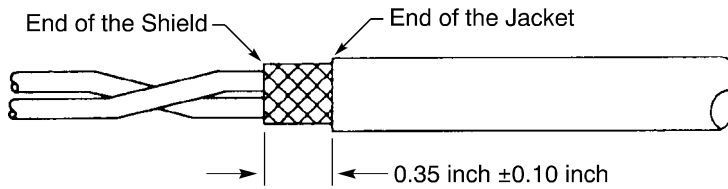
NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Remove the necessary length of the shield from the end of the wire or cable to make the length of the shield equal to 0.35 inch \pm 0.10 inch. Refer to Figure 142.

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ASSEMBLY OF SHIELD GROUND WIRES



LENGTH OF THE SHIELD

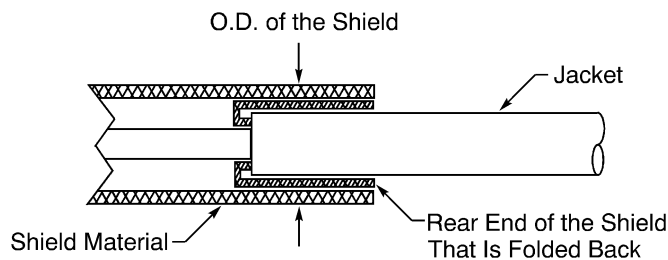
Figure 142

- (3) Fold the shield back on the jacket of the wire or cable.
Make sure that the shield is even and symmetrical around the circumference of the wire or cable.
- (4) Make a selection of a shield material from Table 17.
Make sure that the shield material has:
 - The correct Temperature Grade
 - The smallest diameter that can be put on the shield and the jacket of the wire or cable.

NOTE: A length of shield from a larger size of the same type of wire or cable is a satisfactory alternative.

NOTE: For other alternative shield materials, refer to Subject 20-00-11.

- (5) Cut the necessary length of shield material.
Make sure that the length of the shield material is sufficient:
 - To align one end with the rear end of the shield that is folded back
 - To assemble a shield dead end or a shield ground wire on the other end in the correct position; refer to Paragraph 1.F.
- (6) Put the shield material on the cable. Refer to Figure 143.
Make sure that the rear end of the shield material is aligned with the rear end of the shield that is folded back.



POSITION OF THE SHIELD MATERIAL

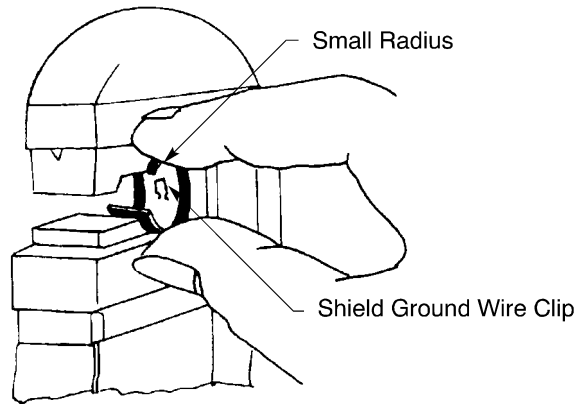
Figure 143

- (7) Make a selection of an RSK Shield-Kon from Table 9.
Refer to Figure 143 for the applicable dimensions of the shield extension assembly.
- (8) Make a selection of an RSK Shield-Kon crimp tool from Table 24.
- (9) Put the Shield-Kon into the jaws of the upper and lower dies of the crimp tool. Refer to Figure 144.

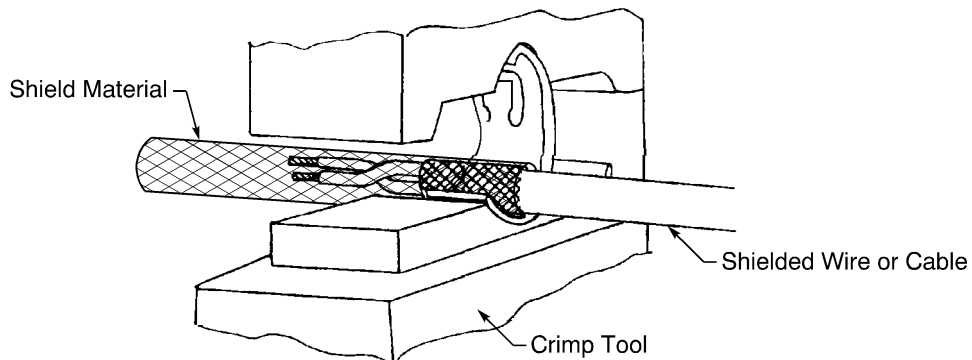
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

Make sure that:

- The shield ground wire clip is pointed up
- The center of the Shield-Kon is aligned with the center of the die.

**POSITION OF THE SHIELD-KON IN THE CRIMP TOOL****Figure 144**

- (10) Put the wire or cable and the shield material in the bottom of the Shield-Kon. Refer to Figure 145. Make sure that the rear end of the Shield-Kon is aligned with the rear end of the shield material.

**POSITION OF THE WIRE OR CABLE AND THE SHIELD MATERIAL****Figure 145**

- (11) Crimp the Shield-Kon.
- (12) Make a selection of a heat shrinkable sleeve from Table 18. Make sure that the sleeve has:
- The correct Temperature Grade
 - The smallest diameter that can be moved freely on the Shield-Kon and the extension.
- (13) Put the necessary length of heat shrinkable sleeve on the shield extension assembly. Refer to Figure 146.

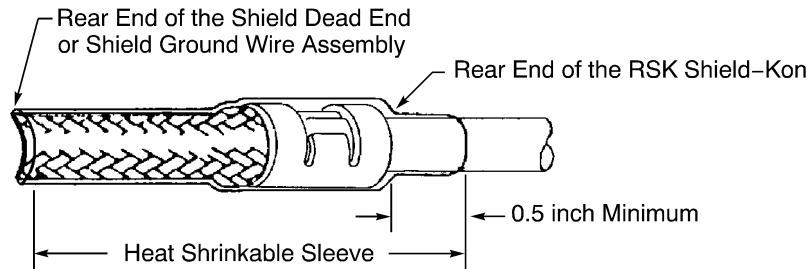
20-10-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Make sure that the length of the sleeve is sufficient to put:

- The rear end of the sleeve 0.5 inch minimum to the rear of the rear end of the Shield-Kon
- The forward end of the sleeve at the location where the rear end of the shield dead end or the shield ground wire assembly must be put.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 146

(14) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Shield Extension - Solder Sleeve, Shield Folded Back

This paragraph gives the procedure to assemble a shield extension on a wire or cable that has:

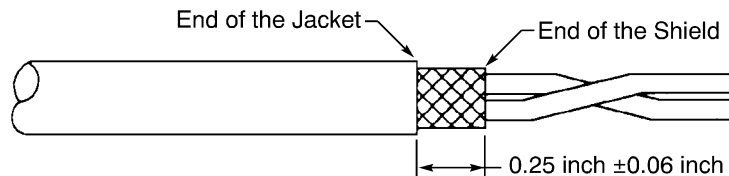
- A shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors.

CAUTION: A SHIELD EXTENSION ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

CAUTION: THIS PROCEDURE CAUSES DAMAGE TO A SHIELD THAT HAS FLAT CONDUCTORS. DAMAGE TO THE FLAT CONDUCTORS OF A SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Prepare the wire or cable. Refer to Paragraph 4.A.
- (2) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 147.



LENGTH OF THE SHIELD

Figure 147

- (3) Fold the shield back on the jacket of the wire or cable.

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ASSEMBLY OF SHIELD GROUND WIRES

Make sure that the shield is even and symmetrical around the circumference of the wire or cable.

- (4) Make a selection of a shield material from Table 17.

Make sure that the shield material has:

- The correct Temperature Grade
- The smallest diameter that can be put on the shield and the jacket of the wire or cable.

NOTE: A length of shield from a larger size of the same type of wire or cable is a satisfactory alternative.

NOTE: For other alternative shield materials, refer to Subject 20-00-11.

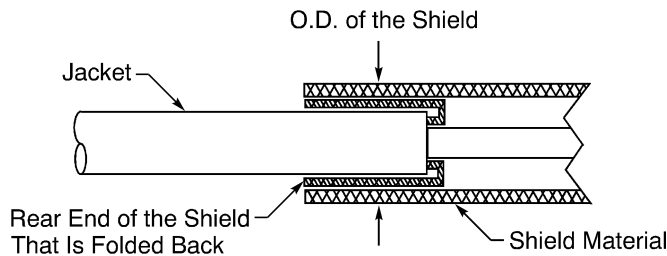
- (5) Cut the necessary length of shield material.

Make sure that the length of the shield material is sufficient:

- To align one end with the rear end of the shield that is folded back
- To assemble a shield dead end or a shield ground wire on the other end in the correct position; refer to Paragraph 1.F.

- (6) Put the shield material on the wire or cable. Refer to Figure 148.

Make sure that the rear end of the shield material is aligned with the rear end of the shield that is folded back.



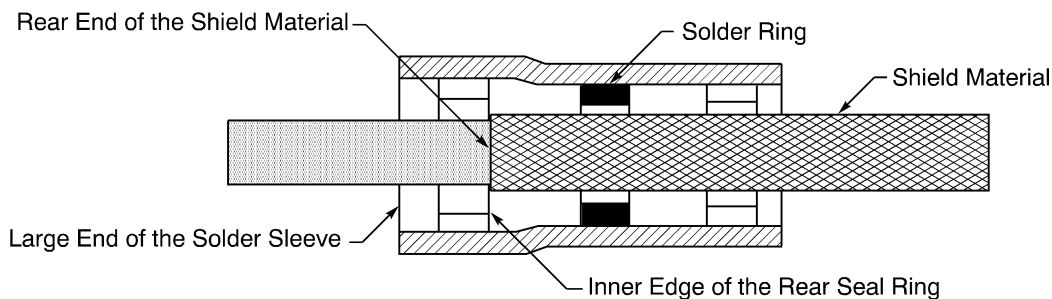
POSITION OF THE SHIELD MATERIAL
Figure 148

- (7) Make a selection of a solder sleeve from Table 10.

Refer to Figure 148 for the applicable dimensions of the shield extension assembly.

- (8) Put the solder sleeve on the wire or cable. Refer to Figure 149.

Make sure that the inner edge of the rear seal ring is aligned with the rear end of the shield material.



POSITION OF THE SOLDER SLEEVE
Figure 149

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SHIELD GROUND WIRES**

- (9) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

- (10) Make a selection of a heat shrinkable sleeve from Table 18.

Make sure that the sleeve has:

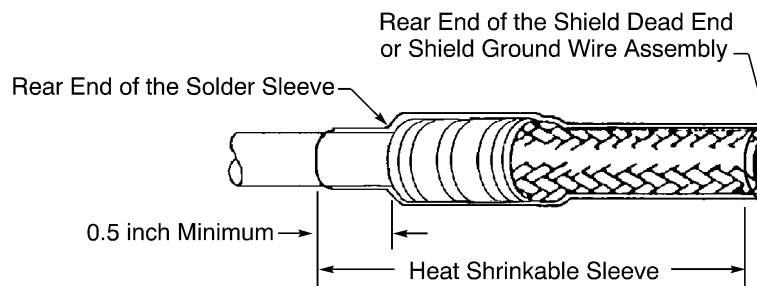
- The correct Temperature Grade
- The smallest diameter that can be moved freely on the solder sleeve and the extension.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (11) Put the necessary length of heat shrinkable sleeve on the shield extension assembly. Refer to Figure 150.

Make sure that the length of the sleeve is sufficient to put:

- The rear end of the sleeve 0.5 inch minimum to the rear of the rear end of the solder sleeve
- The forward end of the sleeve at the location where the rear end of the shield dead end or the shield ground wire assembly must be put.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 150

- (12) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Shield Extension - Solder Sleeve, Shield Not Folded Back

This paragraph gives the procedure to assemble a shield extension on a wire or cable that has:

- A shield with round conductors
- A shield with flat conductors
- An outer shield with round conductors and an adjacent inner shield with round conductors
- An outer shield with round conductors and an adjacent inner shield with flat conductors.

CAUTION: A SHIELD EXTENSION ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A WIRE OR A CABLE THAT HAS A SHIELD WITH NICKEL PLATED CONDUCTORS. THE SOLDER SLEEVE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTION OF THE SHIELD TO GROUND.

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

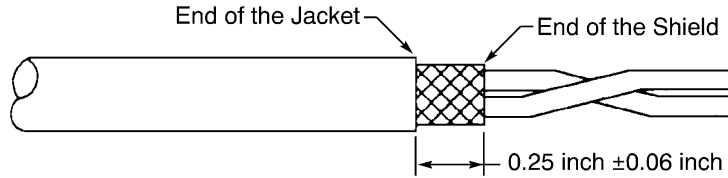
- (1) Prepare the wire or cable. Refer to Paragraph 4.A.

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- (2) Remove the necessary length of shield from the wire or cable to make the length of the shield equal to 0.25 inch \pm 0.06 inch. Refer to Figure 151.



LENGTH OF THE SHIELD
Figure 151

- (3) Make a selection of a shield material from Table 17.

Make sure that the shield material has:

- The correct Temperature Grade
- The smallest diameter that can be put on the shield of the wire or cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

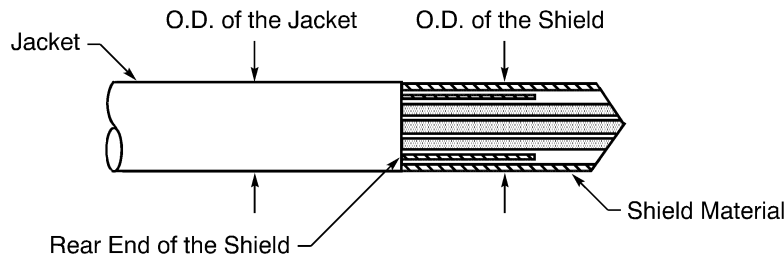
- (4) Cut the necessary length of shield material.

Make sure that the length of the shield material is sufficient:

- To align one end with the rear end of the shield
- To assemble a shield dead end or a shield ground wire on the other end in the correct position; refer to Paragraph 1.F.

- (5) Put the shield material on the wire or cable. Refer to Figure 152.

Make sure that the rear end of the shield material is aligned with the rear end of the shield.



POSITION OF THE SHIELD MATERIAL
Figure 152

- (6) Make a selection of a solder sleeve from Table 10.

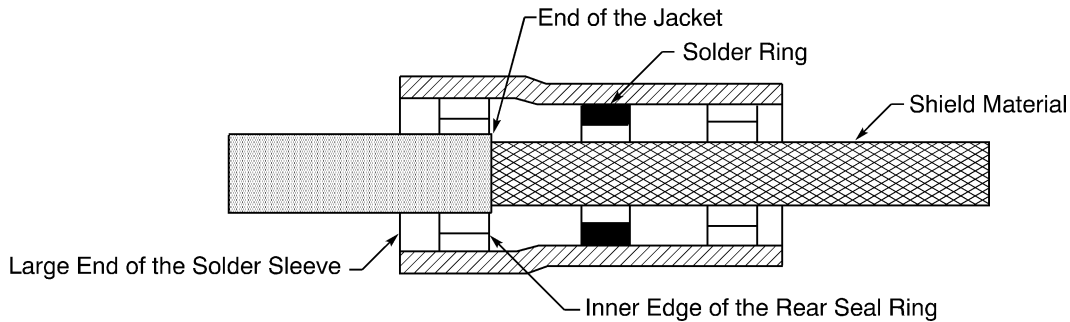
Refer to Figure 152 for the applicable dimensions of the shield extension assembly.

- (7) Put the solder sleeve on the wire or cable. Refer to Figure 153.

Make sure that the inner edge of the rear seal ring is aligned with the end of the jacket.

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POSITION OF THE SOLDER SLEEVE
Figure 153

- (8) Shrink the solder sleeve into its position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

- (9) Make a selection of a heat shrinkable sleeve from Table 18.

Make sure that the sleeve has:

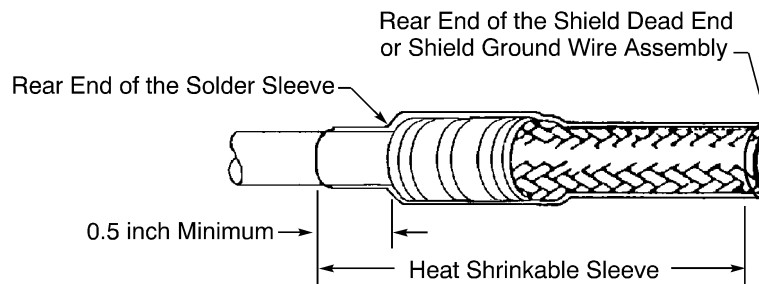
- The correct Temperature Grade
- The smallest diameter that can be moved freely on the solder sleeve and the extension.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (10) Put the necessary length of heat shrinkable sleeve on the shield extension assembly. Refer to Figure 154.

Make sure that the length of the sleeve is sufficient to put:

- The rear end of the sleeve 0.5 inch minimum to the rear of the rear end of the solder sleeve
- The forward end of the sleeve at the location where the rear end of the shield dead end or the shield ground wire assembly must be put.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 154

- (11) Shrink the sleeve into its position. Refer to Subject 20-10-14.

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14. CRIMP TOOLS

A. Mechanical Ferrule Crimp Tools

**Table 23
MECHANICAL FERRULE CRIMP TOOLS**

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S101C	44-000	44-136	B	0.105
	612648	612734	-	
	613214	613812	-	
	620175	620304	B	
	HX4	Y136	B	
	M22520/5-01	M22520/5-33	B	
	ST2966M	-	-	
	ST965-19	-	-	
	ST965A-19	-	-	
	ST965B	ST965B-19	-	
	WT219	-	-	
	WT419	-	-	
	WT440	4419	-	
BACS13S128C	44-000	44-137	B	0.128
	612648	612778	-	
	613214	613848	-	
	620175	620305	B	
	HX4	Y137	B	
	M22520/5-01	M22520/5-35	B	
	ST2966M	-	1	
	ST965-5	-	-	
	ST965A-0	-	-	
	ST965B	ST965B-0	-	
	WT200	-	-	
	WT200-12	-	S	
	WT400	-	-	
WT440	4400	-		

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S149C	44-000	44-138	B	0.151
	612648	612981	-	
	612648	613844	S	
	613214	613003	-	
	620175	620306	B	
	HX4	Y138	B	
	M22520/5-01	M22520/5-37	B	
	ST2966M	-	2	
	ST965-4	-	S	
	ST965A-1	-	-	
	ST965B	ST965B-1	-	
	WT201	-	-	
	WT201-03-10	-	S	
	WT401	-	-	
	WT440	4401	-	
BACS13S156C	44-000	44-139	B	0.160
	612648	612661	-	
	612648	613844	L	
	613214	613847	-	
	620175	620307	B	
	HX4	Y139	B	
	M22520/5-01	M22520/5-39	B	
	ST2966M	-	3	
	ST965-1	-	S	
	ST965A-2	-	-	
	ST965B	ST965B-2	-	
	WT202	-	-	
	WT202-06-08	-	S	
	WT402	-	-	
	WT440	4402	-	

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S175C	44-000	44-140	B	0.178
	612648	612663	S	
	612648	612742	-	
	613214	613849	-	
	620175	620308	B	
	HX4	Y140	B	
	M22520/5-01	M22520/5-41	B	
	ST2966M	-	4	
	ST965-4	-	M	
	ST965A-3	-	-	
	ST965B	ST965B-3	-	
	WT201-03-10	-	M	
	WT203	-	-	
	WT403	-	-	
	WT440	4403	-	
BACS13S187C	44-000	44-141	B	0.197
	612648	612746	-	
	612648	620467	S	
	613214	613810	-	
	620175	620309	B	
	HX4	Y141	B	
	M22520/5-01	M22520/5-43	B	
	ST2966M	-	5	
	ST965-1	-	M	
	ST965A-6	-	-	
	ST965B	ST965B-6	-	
	WT202-06-08	-	M	
	WT206	-	-	
	WT406	-	-	
	WT440	4406	-	

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S194C	44-000	44-141	B	0.197
	612648	612746	-	
	612648	620467	S	
	613214	613810	-	
	620175	620309	B	
	HX4	Y141	B	
	M22520/5-01	M22520/5-43	B	
	ST2966M	-	5	
	ST965-1	-	M	
	ST965A-6	-	-	
	ST965B	ST965B-6	-	
	WT202-06-08	-	M	
	WT206	-	-	
	WT406	-	-	
	WT440	4406	-	
BACS13S199C	44-000	44-141	B	0.197
	612648	612746	-	
	612648	620467	S	
	613214	613810	-	
	620175	620309	B	
	HX4	Y141	B	
	M22520/5-01	M22520/5-43	B	
	ST2966M	-	5	
	ST965-1	-	M	
	ST965A-6	-	-	
	ST965B	ST965B-6	-	
	WT202-06-08	-	M	
	WT206	-	-	
	WT406	-	-	
	WT440	4406	-	

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S205C	44-000	44-142	B	0.213
	612648	612763	-	
	612648	620467	L	
	613214	613851	-	
	620175	620299	B	
	HX4	Y142	B	
	M22520/5-01	M22520/5-19	B	
	ST2966M	-	6	
	ST965-1	-	L	
	ST965A-8	-	-	
	ST965B	ST965B-8	-	
	WT202-06-08	-	L	
	WT208	-	-	
	WT408	-	-	
	WT440	4408	-	
BACS13S219C	44-000	44-142	B	0.213
	612648	612763	-	
	612648	620467	L	
	613214	613851	-	
	620175	620299	B	
	HX4	Y142	B	
	M22520/5-01	M22520/5-19	B	
	ST2966M	-	6	
	ST965-1	-	L	
	ST965A-8	-	-	
	ST965B	ST965B-8	-	
	WT202-06-08	-	L	
	WT208	-	-	
	WT408	-	-	
	WT440	4408	-	

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S225C	44-000	44-143	B	0.218
	612648	612971	-	
	613214	613005	-	
	620175	620310	B	
	HX4	Y143	B	
	M22520/5-01	M22520/5-45	B	
	ST2966M	-	-	
	ST965-9	-	-	
	ST965A-9	-	-	
	ST965B	ST965B-9	-	
	WT209	-	-	
	WT409	-	-	
	WT440	4409	-	
BACS13S232C	44-000	44-143	A	0.231
	612648	612663	L	
	612648	612675	S	
	612648	612748	-	
	613214	613846	-	
	620175	620310	A	
	HX4	Y143	A	
	M22520/5-01	M22520/5-45	A	
	ST2966M	-	7	
	ST965-4	-	L	
	ST965A-10	-	-	
	ST965B	ST965B-10	-	
	WT201-03-10	-	L	
	WT210	-	-	
	WT410	-	-	
WT440	4410	-		

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S261C	44-000	44-142	A	0.255
	612648	612675	L	
	612648	612766	-	
	613214	613850	-	
	620175	620299	A	
	HX4	Y142	A	
	M22520/5-01	M22520/5-19	A	
	ST2966M	-	8	
	ST965-2	-	S	
	ST965A-11	-	-	
	ST965B	ST965B-11	-	
	WT211	-	-	
	WT211-14	-	S	
	WT411	-	-	
	WT440	4411	-	
BACS13S275C	44-000	44-141	A	0.268
	612648	612776	-	
	613214	613009	-	
	620175	620309	A	
	HX4	Y141	A	
	M22520/5-01	M22520/5-43	A	
	ST2966M	-	9	
	ST965-12	-	-	
	ST965A-12	-	-	
	ST965B	ST965B-12	-	
	WT200-12	-	L	
	WT212	-	-	
	WT412	-	-	
	WT440	4412	-	

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S281C	44-000	44-140	A	0.290
	612648	612893	-	
	613214	613011	-	
	620175	620308	A	
	HX4	Y140	A	
	M22520/5-01	M22520/5-41	A	
	ST2966M	-	10	
	ST965-2	-	L	
	ST965A-14	-	-	
	ST965B	ST965B-14	-	
	WT211-14	-	L	
	WT214	-	-	
	WT414	-	-	
	WT440	4414	-	
BACS13S287C	44-000	44-140	A	0.290
	612648	612893	-	
	613214	613011	-	
	620175	620308	A	
	HX4	Y140	A	
	M22520/5-01	M22520/5-41	A	
	ST2966M	-	10	
	ST965-2	-	L	
	ST965A-14	-	-	
	ST965B	ST965B-14	-	
	WT211-14	-	L	
	WT214	-	-	
	WT414	-	-	
	WT440	4414	-	



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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S297C	44-000	44-140	A	0.290
	612648	612893	-	
	613214	613011	-	
	620175	620308	A	
	HX4	Y140	A	
	M22520/5-01	M22520/5-41	A	
	ST2966M	-	10	
	ST965-2	-	L	
	ST965A-14	-	-	
	ST965B	ST965B-14	-	
	WT211-14	-	L	
	WT214	-	-	
	WT414	-	-	
	WT440	4414	-	
BACS13S312C	44-000	44-139	A	0.309
	612648	612973	-	
	613214	613013	-	
	620175	620307	A	
	HX4	Y139	A	
	M22520/5-01	M22520/5-39	A	
	ST2966M	-	11	
	ST965-6	-	S	
	ST965A-15	-	-	
	ST965B	ST965B-15	-	
	WT215	-	-	
	WT215-16	-	S	
	WT415	-	-	
	WT440	4415	-	

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ASSEMBLY OF SHIELD GROUND WIRES

Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S327C	44-000	44-138	A	0.314
	612648	612899	-	
	620175	620306	A	
	HX4	Y138	A	
	M22520/5-01	M22520/5-37	A	
	ST2966M	-	-	
	ST965A-16	-	-	
	ST965B	ST965B-16	-	
	WT215-16	-	L	
	WT216	-	-	
	WT416	-	-	
	WT440	4416	-	
	BACS13S348C	44-000	44-137	
612648		612989	-	
620175		620305	A	
HX4		Y137	A	
M22520/5-01		M22520/5-35	A	
ST2966M		-	12	
ST965-3		-	S	
ST965A-17		-	-	
ST965B		ST965B-17	-	
WT217		-	-	
WT217-18		-	S	
WT417		-	-	
WT440		4417	-	

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ASSEMBLY OF SHIELD GROUND WIRES

Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S359C	44-000	44-136	A	0.343
	612648	612992	-	
	620175	620304	A	
	HX4	Y136	A	
	M22520/5-01	M22520/5-33	A	
	WT221	-	-	
	WT221-22	-	S	
	WT540	5450	-	
BACS13S375C	44-000	44-144	-	0.359
	612648	612969	-	
	620175	620311	-	
	HX4	Y144	-	
	M22520/5-01	M22520/5-47	-	
	WT221-22	-	L	
	WT222	-	-	
	WT540	5451	-	
BACS13S405C	44-000	44-145	-	0.384
	612648	612739	-	
	620175	620301	-	
	HX4	Y145	-	
	M22520/5-01	M22520/5-23	-	
	ST2966M	-	13	
	ST965-3	-	L	
	WT217-18	-	L	
	WT218	-	-	
	WT540	5452	-	

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S415C	44-000	44-145	-	0.384
	612648	612739	-	
	620175	620301	-	
	HX4	Y145	-	
	M22520/5-01	M22520/5-23	-	
	ST2966M	-	13	
	ST965-3	-	L	
	WT217-18	-	L	
	WT218	-	-	
	WT540	5452	-	
BACS13S425C	44-000	44-178	-	0.429
	612648	612807	-	
	620175	620316	-	
	HX4	Y178	-	
	M22520/5-01	M22520/5-61	-	
	ST2966M	-	16	
	ST965-29	-	-	
	WT229	-	-	
	WT540	5454	-	
BACS13S460C	44-000	44-148	-	0.454
	612648	612909	-	
	620175	620314	-	
	HX4	Y148	-	
	M22520/5-01	M22520/5-53	-	
	ST2966M	-	14	
	ST965-6	-	L	
	WT215-20	-	L	
	WT220	-	-	
	WT540	5456	-	

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Table 23 (continued)

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S500C	44-000	44-149	-	0.475
	612648	612977	-	
	620175	620300	-	
	HX4	Y149	-	
	M22520/5-01	M22520/5-21	-	
	ST2966M	-	15	
	ST965-23	-	-	
	WT223	-	-	
	WT540	5457	-	

B. RSK Shield-Kon Crimp Tools

**Table 24
RSK SHIELD-KON CRIMP TOOLS**

RSK Shield-Kon	Shield Diameter (inch)		Crimp Tool	
	Minimum	Maximum	Basic Unit	Die Set
RSK101	0.050	0.070	13300	101A
			WT740	101A
	0.070	0.090	13300	101B
			WT740	101B
RSK201	0.090	0.100	13300	201C
			WT740	201C
	0.100	0.118	13300	201D
			WT740	201D
	0.119	0.131	13300	201E
			WT740	201E
	0.132	0.143	13300	201F
			WT740	201F

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ASSEMBLY OF SHIELD GROUND WIRES

Table 24 (continued)

RSK Shield-Kon	Shield Diameter (inch)		Crimp Tool	
	Minimum	Maximum	Basic Unit	Die Set
RSK301	0.143	0.185	13300	301H
			WT740	301H
	0.144	0.162	13300	301G
			WT740	301G
	0.186	0.201	13300	301J
			WT740	301J
RSK401	0.200	0.230	13300	401K
			WT740	401K
	0.231	0.250	13300	401L
			WT740	401L
	0.251	0.275	13300	401M
			WT740	401M
	0.276	0.300	13300	401N
			WT740	401N
SK501HT	0.301	0.325	HX4	501P
			M22520/5-01	501P
SK601HT	0.401	0.425	HX4	601Q
			M22520/5-01	601Q

15. APPROVED TOOL SUPPLIERS

A. Mechanical Ferrule Crimp Tools

**Table 25
MECHANICAL FERRULE CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
44-000	Balmar
44-136	Balmar
44-137	Balmar
44-138	Balmar
44-139	Balmar
44-140	Balmar
44-141	Balmar
44-142	Balmar

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Table 25 (continued)

Crimp Tool	Supplier
44-143	Balmar
44-144	Balmar
44-145	Balmar
44-148	Balmar
44-149	Balmar
44-178	Balmar
4400	Thomas & Betts
4401	Thomas & Betts
4402	Thomas & Betts
4403	Thomas & Betts
4406	Thomas & Betts
4408	Thomas & Betts
4409	Thomas & Betts
4410	Thomas & Betts
4411	Thomas & Betts
4412	Thomas & Betts
4414	Thomas & Betts
4415	Thomas & Betts
4416	Thomas & Betts
4417	Thomas & Betts
4419	Thomas & Betts
5450	Thomas & Betts
5451	Thomas & Betts
5452	Thomas & Betts
5454	Thomas & Betts
5456	Thomas & Betts
5457	Thomas & Betts
612648	Buchanan
612661	Buchanan
612663	Buchanan
612675	Buchanan
612734	Buchanan
612739	Buchanan

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 25 (continued)

Crimp Tool	Supplier
612742	Buchanan
612746	Buchanan
612748	Buchanan
612763	Buchanan
612766	Buchanan
612776	Buchanan
612778	Buchanan
612807	Buchanan
612893	Buchanan
612899	Buchanan
612909	Buchanan
612969	Buchanan
612971	Buchanan
612973	Buchanan
612977	Buchanan
612981	Buchanan
612989	Buchanan
612992	Buchanan
613003	Buchanan
613005	Buchanan
613009	Buchanan
613011	Buchanan
613013	Buchanan
613214	Buchanan
613810	Buchanan
613812	Buchanan
613844	Buchanan
613846	Buchanan
613847	Buchanan
613848	Buchanan
613849	Buchanan
613850	Buchanan
613851	Buchanan

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 25 (continued)

Crimp Tool	Supplier
620175	Buchanan
620299	Buchanan
620300	Buchanan
620301	Buchanan
620304	Buchanan
620305	Buchanan
620306	Buchanan
620307	Buchanan
620308	Buchanan
620309	Buchanan
620310	Buchanan
620311	Buchanan
620314	Buchanan
620316	Buchanan
620467	Buchanan
HX4	Daniels
M22520/5-01	QPL
M22520/5-19	QPL
M22520/5-21	QPL
M22520/5-23	QPL
M22520/5-33	QPL
M22520/5-35	QPL
M22520/5-37	QPL
M22520/5-39	QPL
M22520/5-41	QPL
M22520/5-43	QPL
M22520/5-45	QPL
M22520/5-47	QPL
M22520/5-53	QPL
M22520/5-61	QPL
ST2966M	Boeing
ST965-1	Boeing
ST965-2	Boeing

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 25 (continued)

Crimp Tool	Supplier
ST965-3	Boeing
ST965-4	Boeing
ST965-5	Boeing
ST965-6	Boeing
ST965-9	Boeing
ST965-12	Boeing
ST965-19	Boeing
ST965-23	Boeing
ST965-29	Boeing
ST965A-0	Boeing
ST965A-1	Boeing
ST965A-2	Boeing
ST965A-3	Boeing
ST965A-6	Boeing
ST965A-8	Boeing
ST965A-9	Boeing
ST965A-10	Boeing
ST965A-11	Boeing
ST965A-12	Boeing
ST965A-14	Boeing
ST965A-15	Boeing
ST965A-16	Boeing
ST965A-17	Boeing
ST965A-19	Boeing
ST965B	Boeing
ST965B-0	Boeing
ST965B-1	Boeing
ST965B-2	Boeing
ST965B-3	Boeing
ST965B-6	Boeing
ST965B-8	Boeing
ST965B-9	Boeing
ST965B-10	Boeing

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 25 (continued)

Crimp Tool	Supplier
ST965B-11	Boeing
ST965B-12	Boeing
ST965B-14	Boeing
ST965B-15	Boeing
ST965B-16	Boeing
ST965B-17	Boeing
ST965B-19	Boeing
WT200	Thomas & Betts
WT200-12	Thomas & Betts
WT201	Thomas & Betts
WT201-03-10	Thomas & Betts
WT202	Thomas & Betts
WT202-06-08	Thomas & Betts
WT203	Thomas & Betts
WT206	Thomas & Betts
WT208	Thomas & Betts
WT209	Thomas & Betts
WT210	Thomas & Betts
WT211	Thomas & Betts
WT211-14	Thomas & Betts
WT212	Thomas & Betts
WT214	Thomas & Betts
WT215	Thomas & Betts
WT215-16	Thomas & Betts
WT215-20	Thomas & Betts
WT216	Thomas & Betts
WT217	Thomas & Betts
WT217-18	Thomas & Betts
WT218	Thomas & Betts
WT219	Thomas & Betts
WT220	Thomas & Betts
WT221	Thomas & Betts
WT221-22	Thomas & Betts

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

Table 25 (continued)

Crimp Tool	Supplier
WT222	Thomas & Betts
WT223	Thomas & Betts
WT229	Thomas & Betts
WT400	Thomas & Betts
WT401	Thomas & Betts
WT402	Thomas & Betts
WT403	Thomas & Betts
WT406	Thomas & Betts
WT408	Thomas & Betts
WT409	Thomas & Betts
WT410	Thomas & Betts
WT411	Thomas & Betts
WT412	Thomas & Betts
WT414	Thomas & Betts
WT415	Thomas & Betts
WT416	Thomas & Betts
WT417	Thomas & Betts
WT419	Thomas & Betts
WT440	Thomas & Betts
WT540	Thomas & Betts
Y136	Daniels
Y137	Daniels
Y138	Daniels
Y139	Daniels
Y140	Daniels
Y141	Daniels
Y142	Daniels
Y143	Daniels
Y144	Daniels
Y145	Daniels
Y148	Daniels
Y149	Daniels
Y178	Daniels

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SHIELD GROUND WIRES

B. RSK Shield-Kon Crimp Tools

Table 26
RSK SHIELD-KON CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
101A	Thomas & Betts
101B	Thomas & Betts
13300	Thomas & Betts
201C	Thomas & Betts
201D	Thomas & Betts
201E	Thomas & Betts
201F	Thomas & Betts
301H	Thomas & Betts
301G	Thomas & Betts
301H	Thomas & Betts
301J	Thomas & Betts
401K	Thomas & Betts
401L	Thomas & Betts
401M	Thomas & Betts
401N	Thomas & Betts
501P	Thomas & Betts
601Q	Thomas & Betts
HX4	Daniels
M22520/5-01	QPL
WT740	Thomas & Betts

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS

1. PART NUMBERS AND DESCRIPTION

A. Molded Tee Fitting Part Numbers

**Table 1
MOLDED TEE FITTING PART NUMBERS**

Part Number	Supplier
301A022	Raychem

B. Heat Shrinkable Boot Part Numbers

**Table 2
HEAT SHRINKABLE BOOT PART NUMBERS**

Part Number	Description	Supplier
202A()-3-00	Straight Boot	Raychem
222A()-3-00	90 Degree Boot	Raychem

C. Convoluted Teflon Tube Part Numbers

**Table 3
CONVOLUTED TEFLON TUBE PART NUMBERS**

Inner Diameter (inch)	Part Number	Supplier
3/16	CFT-06-0-00	Icore
9/32	CFT-09-0-00	Icore

**Table 4
ALTERNATIVE CONVOLUTED TEFLON TUBE PART NUMBERS**

Specified Part Number	Alternative Part Number
CFT-06-0-00	ZCT TS-012
CFT-09-0-00	ZCT TS-018

D. Necessary Materials

**Table 5
NECESSARY MATERIALS**

Material	Specification or Part Number	Supplier	Notes
Adhesive	S-1006	Raychem	-
	S-1009	Raychem	-

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS

Table 5 (continued)

Material	Specification or Part Number	Supplier	Notes
Catalyst, RTV	F	Dow Corning	Only For 3110 RTV Potting Compound
	S	Dow Corning	Only For 3110 RTV Potting Compound
Emery Cloth	No. 240	Any Source	-
	No. 320	Any Source	-
Masking Tape	1/2 Inch Width	Any Source	-
Naptha, aliphatic	TT-N-95	Any Source	-
Solvent	BMS 11-7	Boeing	-

Table 6

APPROVED SUPPLIERS OF BOEING STANDARD SOLVENTS

Boeing Specification	Approved Supplier
BMS 11-7	AZKO/Dexter Aerospace Finishes
	Barton Solvents
	Elf Atochem Turco Products
	Pratt and Lambert Industrial Coating

**Table 7
POTTING COMPOUNDS**

Temperature Grade	Cure Time (hours)	Part Number or Specification	Supplier	Description
A	48	MIL-S-8516	QPL	Polysulfide
	48	WS 516	J and R Industries	Polysulfide
C	2 (10 Percent Catalyst F)	3110 RTV	Dow Corning	Silicone
	6.5 (10 Percent Catalyst S)	3110 RTV	Dow Corning	Silicone

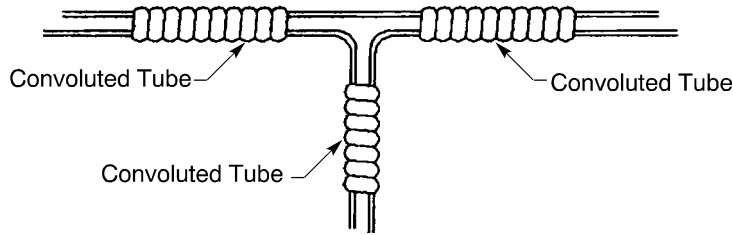
2. ASSEMBLY OF MOLDED TEE FITTINGS

A. Convoluted Tube Installation

- (1) Make a selection of a convoluted Teflon tube from Table 3.
- (2) Make a selection of a masking tape from Table 5.
- (3) Put the tube on the wire in 3 locations. Refer to Figure 1.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS

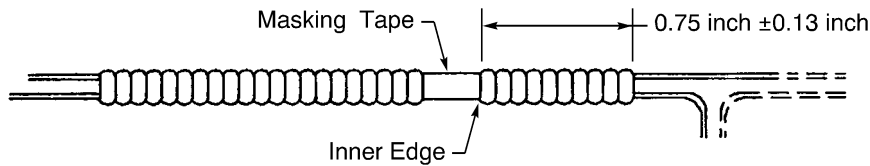


POSITION OF THE CONVOLUTED TUBES
Figure 1

- (4) Wind two layers of the tape around each tube as a mark for the position of the molded tee. Refer to Figure 2.

Make sure that:

- The inner edge of the tape is 0.75 inch \pm 0.13 inch from the end of the tube that is near the tee
- The edge of the tape is parallel to the edge of the tube.

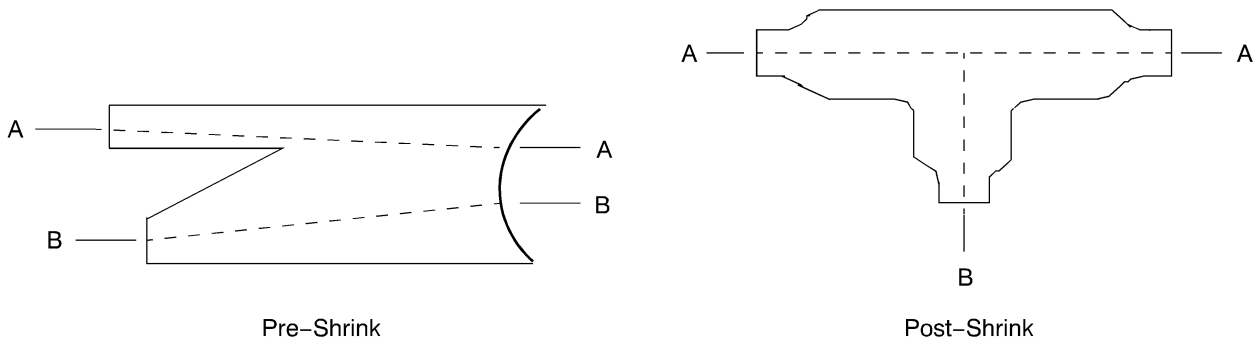


POSITION OF THE TAPE ON THE TUBE
Figure 2

B. Molded Tee Installation

- (1) Make a selection of a 500 degree F hot air gun without a reflector. Refer to Subject 20-10-14.
- (2) Put the wire harness or cable through the molded tee.

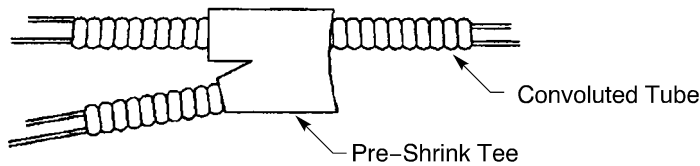
Refer to Figure 3 and Figure 4.



CONFIGURATION OF THE MOLDED TEE
Figure 3

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS



POSITION OF THE TEE ON THE TUBES
Figure 4

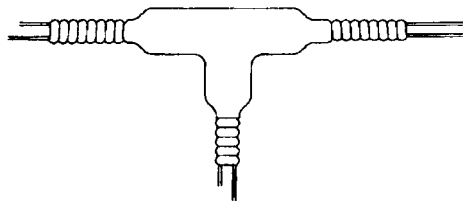
- (3) Push each tube into the molded tee until the inner edge of the tape is at the edge of the each tee.
- (4) Shrink the center of the molded tee.

CAUTION: DO NOT APPLY TOO MUCH HEAT TO THE MOLDED TEE. DAMAGE TO THE MOLDED TEE CAN OCCUR.

- (5) Shrink each end of a tee until the tee is tight against the tube. Refer to Figure 5.

CAUTION: DO NOT APPLY TOO MUCH HEAT TO THE MOLDED TEE. DAMAGE TO THE MOLDED TEE CAN OCCUR.

Make sure that after the tee is in its shrunk state, the contour of the tubes can be seen.



FINAL CONFIGURATION OF THE MOLDED TEE
Figure 5

- (6) Remove all of the tape.

3. ASSEMBLY OF A STRAIGHT HEAT SHRINKABLE BOOT

A. Boot Installation

- (1) For a wire harness that contains a wire or a cable with Teflon insulation, make a selection of a 750 degree F hot air gun. Refer to Subject 20-10-14.

NOTE: A reflector is recommended.

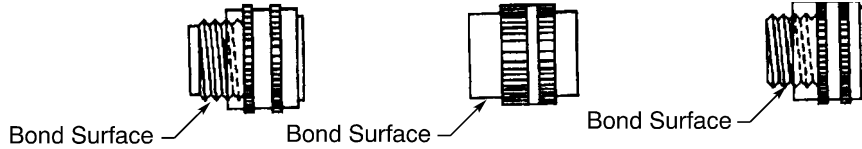
- (2) For a wire harness that contains a wire or a cable with insulation that is not Teflon, make a selection of a 500 degree F hot air gun. Refer to Subject 20-10-14.

NOTE: A reflector is recommended.

- (3) Prepare the surfaces of the connector and the boot to make a bond with an adhesive. Refer to Figure 6 and Paragraph 3.B.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS



BOND SURFACES ON CONNECTORS

Figure 6

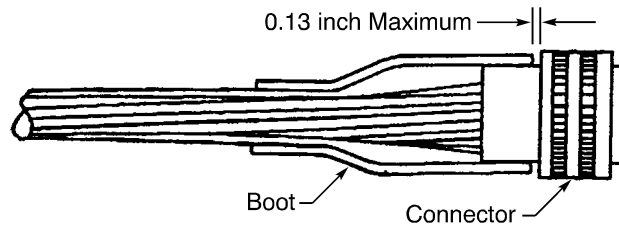
- (4) Put the boot on the cable or the wire harness.
- (5) Assemble the connector. Refer to the applicable Subject for the connector.
- (6) Apply the adhesive:
 - (a) Make a selection of an adhesive from Table 5.
 - (b) Make a selection of a solvent from Table 5.
 - (c) Apply the adhesive on the bond surface of these components:
 - The boot
 - The connector
 - The cable or harness jacket.

Make sure that the adhesive extends 0.13 inch farther than the bond surface.

- (7) Move the boot into its position on the threads of the connector. Refer to Figure 7.

Make sure that:

- The coupling nut can be turned freely
- The distance between the forward end of the boot and the rear end of the coupling nut is 0.13 inch maximum.



INSTALLATION OF A BOOT THAT IS BONDED TO THE CONNECTOR

Figure 7

- (8) Shrink the boot.

Make sure that:

- The intake air vent on the hot air gun is open
- The hot air gun is at the full operation temperature
- A heat shield is used to give the insulation of the wire or cable protection from damage
- Heat is applied for no longer than 40 seconds at one time
- The distance between the forward end of the boot and the rear end of the coupling nut is 0.13 inch maximum.

NOTE: If all of the wires in the harness or cable have Teflon insulation, the heat can be applied for a maximum of 3 minutes.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS**

- (9) If unwanted adhesive is on the boot or the connector, remove the unwanted adhesive immediately with a clean wiper and solvent.
- (10) If it is necessary to apply heat again, let the boot cool for 5 minutes before the heat is applied again.
- (11) Seal the boot with potting compound if:
 - The potting compound is specified
 - The initial installation had potting compound.

Refer to Paragraph 3.C.

B. Bond Surface Preparation

For the conditions that are applicable for this procedure, refer to Paragraph 3.A.

- (1) Make a selection of an aliphatic naphtha from Table 5.
- (2) Prepare the surfaces of the boot that must make a bond with the adhesive.
 - (a) Wind a piece of emery cloth around an applicable rod or tool.
 - (b) Make the bond surfaces rough.
 - (c) Shake the loose particles out of the boot.
 - (d) Clean the bond surfaces with a clean wiper and naphtha.
 - (e) Dry the boot with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE BOOT. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

- (3) Clean the other surfaces that must make a bond with the adhesive.
 - (a) Clean the bond surfaces of the connector with a clean wiper and naphtha. Refer to Figure 6.
 - (b) Dry the connector with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE CONNECTOR. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

- (c) Clean the bond surface of each wire or cable with a clean wiper and naphtha.

Make sure to clean the insulation of each wire or cable approximately 1 inch farther than the bond surface.
- (d) Dry the insulation with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE INSULATION. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

C. Seal of the Boot with Potting Compound

For the conditions that are applicable for this procedure, refer to Paragraph 3.A.

- (1) Make a selection of a potting compound from Table 7.
- (2) If the potting compound is a silicone compound, make a selection of a catalyst from Table 5.

Refer to the manufacturer's instructions to mix the compound with the catalyst.

- (3) Fill the boot with potting compound.

Make sure that air is not caught in the boot.

NOTE: To make a continuous flow of the potting compound, a constant pressure is recommended.

- (4) Lightly tap the boot on a solid surface or shake the boot to release air that is caught in the boot.

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS**

(5) Let the potting compound cure for the specified time. Refer to Table 7.

4. ASSEMBLY OF A 90 DEGREE HEAT SHRINKABLE BOOT**A. Boot Installation**

- (1) Make a selection of an adhesive from Table 5.
- (2) For a wire harness that contains a wire or a cable with Teflon insulation, make a selection of a 750 degree F hot air gun. Refer to Subject 20-10-14.

NOTE: A reflector is recommended.

- (3) For a wire harness that contains a wire or a cable with insulation that is not Teflon, make a selection of a 500 degree F hot air gun. Refer to Subject 20-10-14.

NOTE: A reflector is recommended.

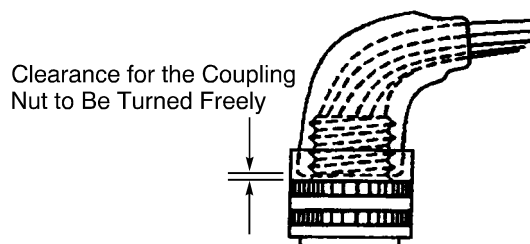
- (4) Prepare the boot. Refer to Paragraph 4.B.
- (5) Prepare the bond surface. Refer to Paragraph 4.C.
- (6) Put the boot on the cable or the wire harness.
- (7) Assemble the connector components. Refer to the applicable Subject for the connector.
- (8) Put the cable or wire harness in an approximate 90 degree position. Refer to Figure 9.
- (9) Apply the adhesive on the bond surface of these components:
 - The boot
 - The connector
 - The cable or harness jacket.

Make sure that the adhesive extends 0.13 inch farther than the bond surface.

- (10) Move the boot into its position on the threads of the connector. Refer to Figure 8.

Make sure that:

- The coupling nut can be turned freely
- The boot assembly is in the correct clock position on the connector.



INSTALLATION OF A 90 DEGREE BOOT
Figure 8

- (11) Shrink the boot.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS

Make sure that:

- The intake air vent on the hot air gun is open
- The hot air gun is at the full operation temperature
- A heat shield is used to give the insulation of the wire or cable protection from damage
- Heat is applied for no longer than 40 seconds at one time.

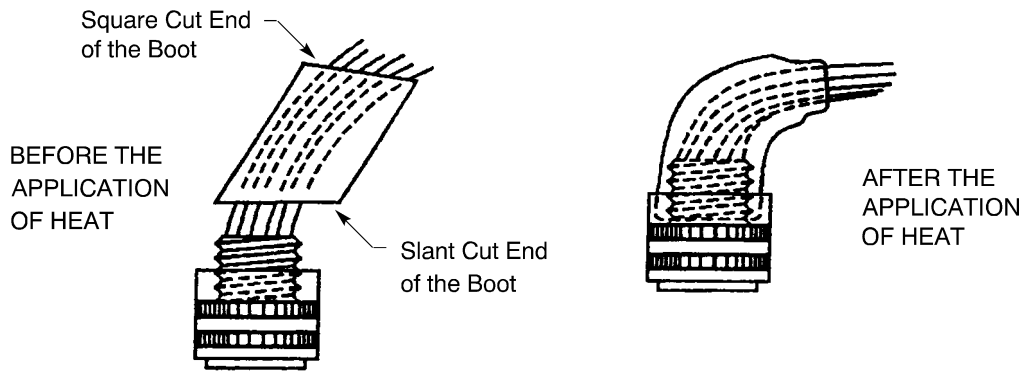
NOTE: If all of the wires in the harness or cable have Teflon insulation, the heat can be applied for a maximum of 3 minutes.

- (12) Remove the unwanted adhesive immediately with a clean wiper and solvent.
- (13) If it is necessary to apply heat again, let the boot cool for 5 minutes before the heat is applied again.
- (14) Seal the boot with potting compound if:
 - The potting compound is specified
 - The initial installation had potting compound.

Refer to Paragraph 4.D.

B. Boot Preparation

For the conditions that are applicable to this procedure, refer to Paragraph 4.A.



PREPARATION OF A 90 DEGREE BOOT
Figure 9

Refer to Figure 9.

- (1) Put a 1/4 to 5/16 inch diameter rod approximately 0.5 inch into the square cut end of the boot. Refer to Figure 9.
- (2) Shrink the boot on the rod.
- (3) Let the boot cool.
- (4) Remove the rod from the boot.

C. Bond Surface Preparation

For the conditions that are applicable for this procedure, refer to Paragraph 4.A.

- (1) Make a selection of an aliphatic naphtha from Table 5.
- (2) Prepare the surfaces of the boot that must make a bond with the adhesive.
 - (a) Wind a piece of emery cloth around an applicable rod or tool.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF MOLDED TEE FITTINGS AND HEAT SHRINKABLE BOOTS**

- (b) Make the bond surfaces rough.
- (c) Shake the loose particles out of the boot.
- (d) Clean the bond surfaces with a clean wiper and naphtha.
- (e) Dry the boot with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE BOOT. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

- (3) Clean the other surfaces that must make a bond with the adhesive.
 - (a) Clean the bond surfaces of the connector with a clean wiper and naphtha. Refer to Figure 6.
 - (b) Dry the connector with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE CONNECTOR. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

- (c) Clean the bond surface of each wire or cable with a clean wiper and naphtha.
Make sure to clean the insulation of each wire or cable approximately 1 inch farther than the bond surface.
- (d) Dry the insulation with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE INSULATION. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

D. Seal of the Boot with Potting Compound

For the conditions that are applicable for this procedure, refer to Paragraph 4.A.

- (1) Make a selection of a potting compound from Table 7.
- (2) If the potting compound is a silicone compound, make a selection of a catalyst from Table 5.
Refer to the manufacturer's instructions to mix the compound with the catalyst.

- (3) Fill the boot assembly with potting compound.
Make sure that air is not caught in the boot.

NOTE: To make a continuous flow of the potting compound, a constant pressure is recommended.

- (4) Lightly tap the boot on a solid surface or shake the boot to release air that is caught in the boot.
- (5) Let the potting compound cure for the specified time. Refer to Table 7.



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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF ZIPPERTUBING

<u>Paragraph</u>		<u>Page</u>
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	B. Description	1
2.	<u>INSTALLATION OF ZIPPERTUBING</u>	1
	A. Assembly of the Shield Ground Terminals	1
	B. Zippertubing Installation	2

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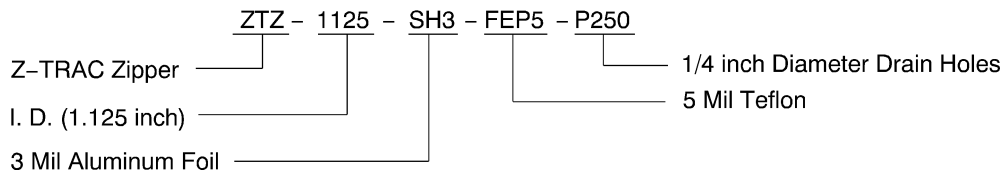
INSTALLATION OF ZIPPERTUBING

1. PART NUMBERS AND DESCRIPTION

A. Zippertubing Part Numbers

**Table 1
ZIPPERTUBING PART NUMBERS**

Part Number	I.D. (inch)	Supplier
ZTZ-1125-SH3FEP5-P250	1.125	Zippertubing Company
ZTZ-1380-SH3FEP5-P250	1.380	Zippertubing Company
ZTZ-1500-SH3FEP5-P250	1.500	Zippertubing Company



**ZTZ-() ZIPPERTUBING PART NUMBER STRUCTURE
Figure 1**

B. Description

Zippertubing:

- Is installed on specified wire bundles in the leading edge of the wing for protection lightning
- Is supplied in bulk quantities
- Can be cut to the correct fit for the installation.

The material has these technical features:

- A 5 mil teflon layer laminated to a 3 mil aluminum foil layer
- A Z-Trac zipper closure is included in the teflon tubing
- An integral full length ground shield is included in the foil.

2. INSTALLATION OF ZIPPERTUBING

A. Assembly of the Shield Ground Terminals

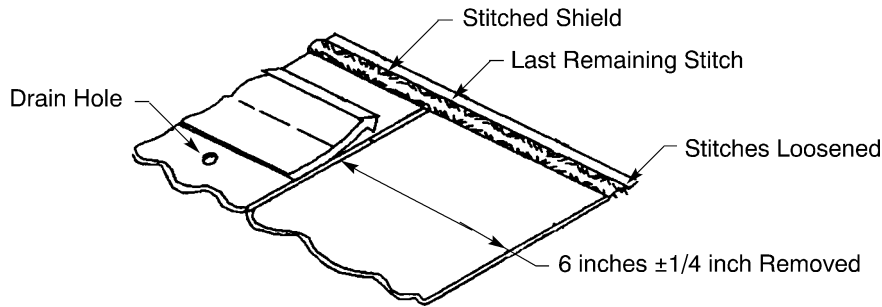
- (1) Cut the Zippertubing so that the length is 12 inches more than the necessary length. The greater length permits the assembly of the shield ground terminals at each end.
- (2) Loosen 6 inches ± 1/4 inch of the stitches of the shield at both ends. Refer to Figure 2.

Make sure that:

- The shield is not damaged
- The threads of the stitches have the sufficient length so that they can be tightly attached after the tube has been cut.

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INSTALLATION OF ZIPPERTUBING



PREPARATION OF THE ZIPPERTUBING

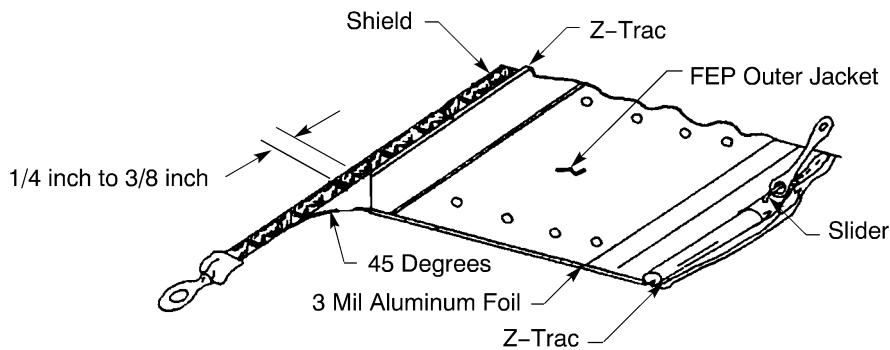
Figure 2

- (3) Move the shield out of the way.
- (4) Cut the Zippertubing up to 1/8 inch from the last remaining stitch of the shield.
- (5) Attach the threads of the stitches to each other tightly and permanently.
- (6) Remove the unwanted length of the threads.
- (7) Make a selection of a BACT12AC-() terminal with a size 14-16 wire barrel. Refer to Subject 20-30-11.
- (8) Assemble a terminal on both ends of the shield:
 - (a) On the last 1/2 inch at the end of the shield, move the strands of the shield apart.
 - (b) Lightly twist the strands together.
 - (c) Put the end of the shield in the crimp barrel of the terminal.
 - (d) Crimp the terminal.

B. Zippertubing Installation

- (1) Put the Zippertubing in the position so that:
 - The aluminum foil side is down
 - The shield ground terminal is to the left.
- (2) Cut a 1/4 inch to 3/8 inch width of the front edge the necessary length so that the front edge and the shield make an approximate 45 degree angle.

Refer to Figure 3.



PREPARATION OF THE ZIPPERTUBING FOR INSTALLATION

Figure 3



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INSTALLATION OF ZIPPERTUBING

- (3) Pull the slider down approximately one inch.
- (4) Turn the Zippertubing over.
- (5) Put the Zippertubing into a trough form.
- (6) Put the cable into the trough.
- (7) Put the remaining Zippertubing around the cable so that:
 - The ends of the Zippertubing make an overlap
 - The end with the shield is under the end with the slider.
- (8) Put the 45 degree angle edge, that is adjacent to the shield, into the slider.
- (9) Make the Zippertubing straight and symmetrical along the Z-Trac.
- (10) Pull the slider to the other edge of the Zippertubing.

NOTE: To close the Zippertubing smoothly, make sure to keep each Z-Trac low and parallel.

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INSTALLATION OF SLEEVES ON WIRING

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B. Configuration of Sleeves on Wire Bundles	1
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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF SLEEVES ON WIRING

This Subject gives the general conditions for the installation of sleeves for the protection and support of electrical wiring.

1. GENERAL DATA

A. General Conditions

Only Skydrol resistant materials are used on wire bundles in specified Skydrol areas.

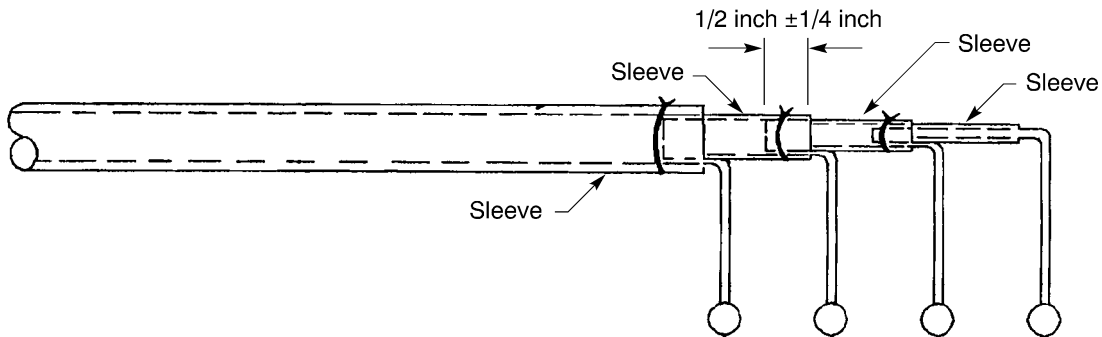
B. Configuration of Sleeves on Wire Bundles

Figure 1 shows a wire bundle that has many breakouts and is a usual configuration of the sleeves when the wires are attached to circuit breakers.

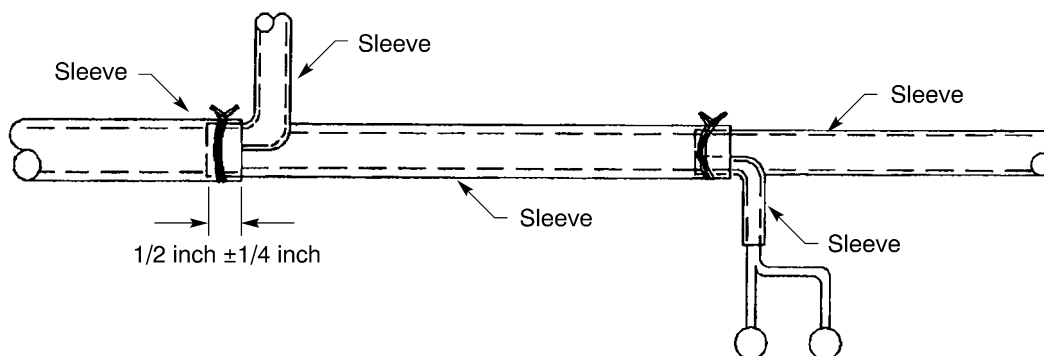
Figure 2 shows an alternative configuration.

NOTE: It is:

- Not necessary to install a sleeve on the breakout wire since the wire is controlled when it is attached to the circuit breaker
- Necessary to assemble a wire bundle tie only at the location of the breakout when the breakout wire is 6 inches or less in length.



SLEEVES ON A WIRE BUNDLE WITH CONTROLLED BREAKOUTS
Figure 1



ALTERNATIVE CONFIGURATION OF SLEEVES ON WIRE BUNDLE BREAKOUTS
Figure 2

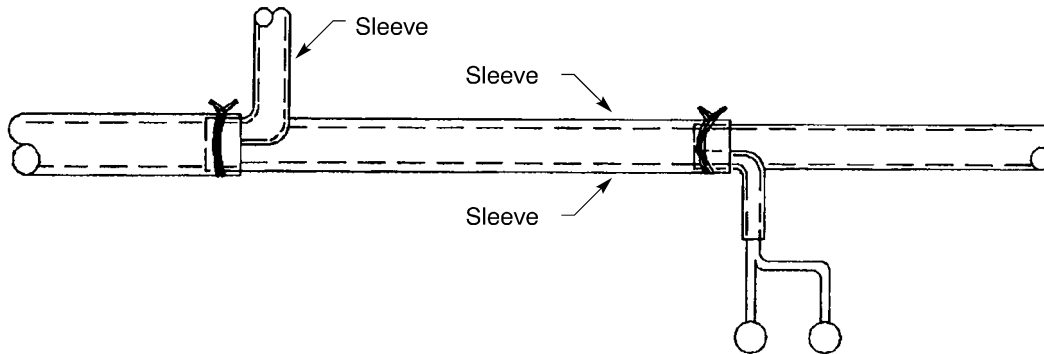
STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF SLEEVES ON WIRING

When it is necessary to install a TFE 2XTW or a TFE 2XSW sleeve on a wire bundle and the diameter of an available TFE sleeve is not sufficient, these conditions are applicable:

- The wires of the wire bundle can be divided into groups
- The size of the groups can be the size of the available sleeves
- The necessary number of wire harness ties can be assembled to make a single wire bundle.

Refer to Figure 3.



ALTERNATIVE CONFIGURATION OF TFE SLEEVES

Figure 3

When a sleeve is installed on the wire or wire bundle at a connector, these conditions are applicable:

- If the connector has a cable clamp, put the end of the sleeve under the clamp
- If the connector does not have a cable clamp, assemble a wire bundle tie on the sleeve a minimum of 1.0 inch from the connector.

C. Fiberglass Sleeves

The ends of all fiberglass sleeves must have a coating of Nycote 88 varnish or an equivalent varnish so that the strands of the fiberglass are held together.

NOTE: Blue dye can be added to the varnish so that the varnish can be seen.

When a fiberglass sleeve is installed on a group of wires and at least one shield ground wire is not terminated in a connector, the conditions for the installation of the sleeve are different for:

- A connector with a backshell
- A connector without a backshell.

For the connectors with backshells, the end of the sleeve:

- Is not under the cable clamp of the connector
- Is as close as possible to the cable clamp of the connector
- Does not extend past the shield ground wire breakout
- Has a wire bundle tie.

For the connectors without backshells, the end of the sleeve:

- Is approximately two inches from the connector
- Does not extend past the shield ground wire breakout
- Has a wire bundle tie.



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WIRE SEPARATION

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STANDARD WIRING PRACTICES MANUAL**WIRE SEPARATION**

This Subject gives:

- The general conditions for wire separation
- The special conditions for wire separation in the specified models.

1. GENERAL CONDITIONS FOR THE SEPARATION OF CIRCUITS**A. General Data**

The airplane wiring is designed and installed:

- To prevent the propagation of the effects of electrical faults to other independent power sources
- To prevent possibility that the failure of a component in a redundant system can disable another related, redundant system
- To avoid electromagnetic interference (EMI) between electromagnetic compatibility (EMC) circuits that are not compatible.

B. Necessary Conditions of Separation for Wire Harness Design

These are the applicable types of separation:

- Separation between independent power sources (Functional Separation)
- Separation between redundant system circuits (Functional Separation)
- Separation between EMC circuits that are not compatible (Electromagnetic Separation).

To obey these conditions:

- Electrical circuits, for which separation is necessary, are put in different wire harness assemblies
- If the circuits cannot be put in different wire harnesses, separation is done within the same wire harness with sleeves and shielded wire except in the case where the EMC circuits are not compatible.

C. Functional Separation Group

The primary conditions for the functional separation of circuits are:

- Separation between the independent power sources for a single system
- Separation between the redundant system circuits.

NOTE: In relation to functional separation, the airplane engine systems are redundant for each engine.

D. EMC Separation Group

These are the 3 basic separation codes:

- Code 1 for circuits contain the noisy, interference wiring; usually power lines
- Code 2 for all the wiring that satisfies the conditions of EMC
- Code 3 for the sensitive, susceptible circuits; such as audio or analog.

E. EMC Separation Group Code 1 - Source of Interference Circuits

These are system wires that carry power current or other EMI offensive circuits. Examples of these are:

- Both AC and DC generator and power feeders
- Other 400 Hz power wires that go beyond 12000V-ft or 400A-ft of potential coupling
- Automatically switching DC circuits that switch 5 amps or more
- Both AC and DC inductive load turnoff transients that are not suppressed.

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STANDARD WIRING PRACTICES MANUAL**WIRE SEPARATION****F. EMC Separation Group Code 2 - Passive Circuits**

These are systems wires which are expected to tolerate and not degrade the electromagnetic environment in the airplane. Examples of these are:

- AC signal or control circuits that are not susceptible to common mode coupling of 100 mV RMS or less
- 400 Hz power wires do not go beyond 12000V-ft or 400A-ft when they are located with their own Category 2 system harness.

G. EMC Separation Group Code 3 - Sensitive or Susceptible Circuits

These are system wires that cannot satisfy the limits of Category 2 susceptibility.

H. Sub-Functional Separation Category

Some more separation may be necessary within a functional separation code because of special system functional conditions. Decisions for sub-functional conditions are made in relation to:

- The airplane model
- The system.

NOTE: When a sub-functional separation is given, that separation must be kept.

2. WIRE HARNESS IDENTIFICATION FOR FUNCTIONAL SEPARATION**A. Functional/EMC/Sub-Functional Separation Code**

The separation code has these properties:

- A separation code is assigned to each wire harness
- When the sub-functional separation is not necessary for 737, 747, 757, and 767 airplane models, the third digit is removed; only 2 digits are necessary
- When the sub-functional separation is not necessary for 777 airplane model, the fourth digit is removed; only 3 digits are necessary
- An N code identifies a wire that does not have any separation conditions and can have the same routing as a wire harness from any other functional separation group.

B. Color Codes of the Separation Groups

NOTE: Refer to the specified model for the color codes that are used for each functional separation code.

A color code system is used so that:

- The separation group of a wire harness can be identified
- The installation and inspection of a wire harness on the airplane is easier.

For the 737, 747, 757, and 767 airplane models, all wire harnesses have color codes except these types:

- A coax cable that is installed as a single cable and does not have any wire harness ties
- Wire harnesses in which all wires are covered with sleeves (white tie material)
- Wire harnesses which that contain only shielded wires (white tie material)
- Shelf harnesses (white tie material)
- Wire harnesses that are identified as neutral (N).

For the 777 airplane model, all wires harnesses have have color codes except these types:

- A coax cable that is installed as a single cable and does not have any wire harness ties
- Shelf harnesses (white tie material)
- Wire harnesses that are identified as neutral (N).

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WIRE SEPARATION

3. WIRE HARNESS FUNCTIONAL SEPARATION

A. Separation by a Distance

Refer to Table 1 to find the minimum distance for the specified separation code of each model.

NOTE: In the areas where a turbine burst occurs, a larger physical separation is necessary between the specified engine functions.

NOTE: More protection or a larger physical separation, or both are given in the areas where damage, that is caused by a mechanical failure, can occur to the primary and the redundant wiring. Some types of mechanical failures are:

- The rupture of a pneumatic duct
- A tire tread that is thrown.

These standby system power wires must be isolated from all other wiring through separation by distance:

- Battery to hot battery bus
- Hot battery bus to battery bus and static inverter
- Static inverter to standby AC bus.

CAUTION: THE STANDBY SYSTEM POWER WIRES MUST NOT HAVE THE SAME ROUTING AS ANY OTHER WIRING. DAMAGE, THAT IS CAUSED BY THE FAILURE OF THE OTHER WIRING, CAN OCCUR TO THE STANDBY SYSTEM POWER WIRES.

**Table 1
FUNCTIONAL SEPARATION BY MINIMUM DISTANCE**

Separation Code	Area	Model	Distance (inch)
1	Not Pressurized	747	1/2
	Pressurized	747	1/4
2	Not Pressurized	747	1/2
	Pressurized	747	1/4
3	Not Pressurized	747	1/2
	Pressurized	747	1/4
4	Not Pressurized	747	1/2
	Pressurized	747	1/4
A	Not Pressurized	737	1/4
		757	1/4
		767	1/4
	Pressurized	737	1/4
		757	1/4
		767	1/4
AK	Not Pressurized	777	1/2
	Pressurized	777	1/4

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WIRE SEPARATION

Table 1 (continued)

Separation Code	Area	Model	Distance (inch)
BK	Not Pressurized	777	1/2
	Pressurized	777	1/4
C	Not Pressurized	757	1/4
		767	1/4
		777	1/2
	Pressurized	757	1/4
		767	1/4
		777	1/4
CP	Not Pressurized	777	1/2
	Pressurized	777	1/4
H	Not Pressurized	757	1/4
		767	1/4
	Pressurized	757	1/4
		767	1/4
L	Not Pressurized	737	1/4
		747	1/2
		757	1/4
		767	1/4
		777	1/2
	Pressurized	737	1/4
		747	1/4
		757	1/4
		767	1/4
		777	1/4
LM	Not Pressurized	777	1/2
	Pressurized	777	1/4
LP	Not Pressurized	777	1/2
	Pressurized	777	1/4
LR	Not Pressurized	777	1/2
	Pressurized	777	1/4
LS	Not Pressurized	777	1/2
	Pressurized	777	1/4

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WIRE SEPARATION

Table 1 (continued)

Separation Code	Area	Model	Distance (inch)
NN	Not Pressurized	777	1/2
	Pressurized	777	1/4
R	Not Pressurized	737	1/4
		747	1/2
		757	1/4
		767	1/4
		777	1/2
	Pressurized	737	1/4
		747	1/4
		757	1/4
		767	1/4
		777	1/4
RM	Not Pressurized	777	1/2
	Pressurized	777	1/4
RP	Not Pressurized	777	1/2
	Pressurized	777	1/4
RR	Not Pressurized	777	1/2
	Pressurized	777	1/4
RS	Not Pressurized	777	1/2
	Pressurized	777	1/4
S	Not Pressurized	737	1/4
		747	1/2
		757	1/4
		767	1/4
		777	1/2
	Pressurized	737	1/4
		747	1/4
		757	1/4
		767	1/4
		777	1/4
SY	Not Pressurized	777	1/2
	Pressurized	777	1/4

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STANDARD WIRING PRACTICES MANUAL**WIRE SEPARATION****B. Separation by an Insulation Material**

Insulation sleeves or insulation tubes are used to give the specified separation for the wire harness when these conditions occur:

- The 1/4 inch distance of separation in the pressurized area is not possible
- The 1/4 inch distance of separation in the area that is not pressurized for all airplane models except the 747 and the 777 is not possible
- The 1/2 inch distance of separation in the area that is not pressurized for the 747 and the 777 airplane models is not possible.

To give the specified separation in the areas that are:

- Pressurized, Varglas non-fray, Type HO or Type HP insulation sleeves are used
- Not pressurized, TFE Teflon sleeves or TFE tubes with a wall thickness of 9.0 mils or larger are used.

NOTE: The separation by an insulation material is not necessary where a BACC18AD type of fusible link, single-phase circuit breaker is used to protect the circuit in the wiring that is:

- In the flight deck
- In the E/E compartment
- In between the flight deck and the E/E compartment.

C. Separation by a Fusible Link Circuit Breaker

NOTE: Separation by a fusible link circuit breaker is not sufficient when a wire harness is in a location where it is open to:

- A turbine burst
- The failure of a pneumatic duct
- A tire tread that is thrown
- Other types of physical damage.

If wires with different functional separation codes come directly from a circuit breaker source and are protected with a fusible link circuit breaker:

- The separation by an insulation material is not necessary
- The wires can have the same routing.

A wire, that has the same routing as another wire, must have a insulation sleeve or insulation tube if all of these conditions occur:

- The wires have different functional separation codes
- The wire is not protected with a fusible link circuit breaker
- The other wire is protected with a fusible link circuit breaker.

4. WIRE HARNESS EMC SEPARATION**A. Separation Between EMC Groups**

An analysis of the EMC codes is made for the routing of each specified wire harness.

As a general rule, the EMC wire harnesses with:

- Code 1 and Code 3 do not have the same routing
- Code 2 can have the same routing as a wire harness Code 1 or Code 3 after sufficient analysis.

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STANDARD WIRING PRACTICES MANUAL**WIRE SEPARATION****5. MODIFICATION OF AIRPLANE WIRING**

This paragraph gives the procedures to keep the correct separation of wire harnesses when a modification is made to the wiring of an airplane.

A. A Change in the Routing of a Wire Harness

- (1) Refer to the specified conditions for the airplane model.
- (2) If the conditions for separation by distance in Paragraph 3.A. cannot be obeyed, put a sleeve on either:
 - The full harness, if it is necessary
 - Only at the point where the wire harnesses touch, if it is sufficient.

Refer to Paragraph 3.B.

B. A Wire That Is Added to a Wire Harness

- (1) Find the separation group of the wire harness from the applicable chart in the Wiring Diagram Manual Chapter 91.
- (2) Find the separation group of the new wire from its function and its EMC condition.
- (3) If it is necessary, make a selection of either of these types of separation:
 - (a) Use a shielded wire.
 - (b) Put a sleeve on the wire. Refer to Paragraph 3.B.

NOTE: It is not necessary to put a sleeve on each individual wire, if the wires are in the same separation group.

- (4) Put the wires of the redundant circuits through the different connectors.
- (5) Assemble the wire harness ties again with the same color of tie material.

Make sure that the wire harness with the new wire does not touch another wire harness that has a color code that does not agree with the color code of the new harness.

C. A New Wire Harness

- (1) Find the separation group of the new harness from its function and its EMC condition.

NOTE: A wire harness can have only one functional separation group code.

- (2) Examine every circuit or wire in the new harness.

For circuits that do not agree with the selection of the separation group for the harness, make sure that these conditions for separation are obeyed:

- The separation by distance; refer to Paragraph 3.A.
- The separation by insulation material; refer to Paragraph 3.B.
- The separation with shielded wire.

CAUTION: AN INSULATION SLEEVE DOES NOT GIVE THE SUFFICIENT SEPARATION FOR THE CIRCUITS OF THE EMC GROUPS THAT ARE NOT COMPATIBLE.

- (3) Put the wires of the redundant circuits through the different connectors.
- (4) Examine the physical location of the installation of a new harness in relation to the wire harnesses that are installed on the airplane.
 - (a) Assemble the wire harness ties of the new harness with the correct color of tie material for the identification of the separation group of the wire harness. Refer to Subject 20-10-11.

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- (b) Obey the specified conditions for separation. Refer to Paragraph 3.
- (5) Add this data to the applicable charts in the Wiring Diagram Manual Chapter 91:
 - The new harness number
 - The separation group
 - The routing.

6. MODEL 737-300, MODEL 737-400, AND MODEL 737-500

A. Functional Separation of the Fail-Passive Autoland System

NOTE: The 737 Wiring Diagram Manual 91-06-() Subjects give the functional separation codes.

These are the conditions for the autoland system:

- All circuits are given a separation code
- A color code system is used in airplane wiring, shelve wiring, and panel wiring; refer to Table 2.

The codes A, B, E, and F identify the necessary separation between:

- Independent power sources
- Redundant system circuits.

The code N identifies circuits for which separation is not necessary.

**Table 2
COLOR CODES FOR 737 SEPARATION**

Autoland Channel Code	Circuit	Tie Material Color
A	System A power, logic, excitation; sensor instrument	Red
B	System B power, logic, excitation; sensor instrument	Yellow
E	Cross channel wires; buffer protected	Blue
F	Common cruise wires	Orange
N	Other systems; identification of wires is not necessary	White

7. MODEL 737-600, MODEL 737-700, MODEL 737-800, MODEL 737-900, AND MODEL 737-900ER

A. Wire Harness Separation

Refer to Table 3 for the Power Source Separation Codes for the 737-600, 737-700, 737-800, 737-900 and 737-900ER.

STANDARD WIRING PRACTICES MANUAL

WIRE SEPARATION

**Table 3
COLOR CODES FOR 737-600, 737-700, 737-800, 737-900, AND 737-900ER SEPARATION**

Power Source Separation Code	Circuit	Tie Material Color
L	Left Generator feeders and controls. Circuits which are powered from the left power system, and do not meet the requirements for Category N shall be assigned a power separation code of L.	White
R	Right generator feeders and controls. Circuits which are powered from the right power system, and do not meet the requirements for Category N shall be assigned a power separation code of R.	White
S	Circuits which are dependent upon power from the battery, hot battery, and AC or DC standby busses, and do not meet the requirements for Category N shall be assigned a power separation code of S.	White
A	Circuits which are associated with APU power feeders and controls, and do not meet the requirements of Category N shall be assigned a power separation code of A.	White
N	Neutral circuits.	White

NOTE: Category "N" neutral circuits are one of these types of circuits:

- a. Circuits protected by the following primary distribution circuit breaker size or smaller and are not associated with Standby and APU power sources and controls.
 - DC-2.5 Amp
 - 1-Phase AC-5.0 Amp
 - 3-Phase AC-3.0 Amp.
- b. Circuits that are current limited by circuit impedance or transformer action to values equal to or less than those in (a) above.
- c. Circuits that are energized only on the ground.

NOTE: Neutral circuits are exempt from separation requirements and can be routed with any power source if the redundant system separation and EMC requirements are obeyed.

8. MODEL 747-100, MODEL 747-200, AND MODEL 747-300

When the Fail-Operational Autoland System is installed, the separation of the wire harnesses by auto pilot channel is necessary.

A. Functional Separation for the Fail-Operational Autoland System

NOTE: The 747 Wiring Diagram Manual 91-00-() Subjects give the functional separation codes.

When separation by distance is used, a minimum of 1/4 inch of separation is necessary.

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WIRE SEPARATION

When the necessary distance of separation of different wire harnesses between the wire harness clamps cannot be kept, any of these alternatives are satisfactory:

- More wire harness clamps must be installed
- More insulation material must be installed
- Another type of physical separation must be used.

When insulation sleeves are used for separation:

- Varglas Type HO or Type HP sleeves are used in the other areas
- TFE sleeves are used in areas where resistance to high abrasion is necessary.

B. Identification of Wire Harnesses

The wire harnesses of the Fail-Operational Autoland System are identified by color codes:

- So that the correct separation of channels is kept after rework or modification
- With colored lacing tape or colored plastic ties
- That are given in Table 4.

NOTE: Color identification if the channel is not applicable to:

- Coax cables
- Shelf and panel integration wire harnesses.

**Table 4
COLOR CODES FOR 747 SEPARATION**

Autopilot Channel Code	Tie Material Color
A	Red
B	Yellow
C	Green
D	Orange
E	Blue
F	Brown
G	Black

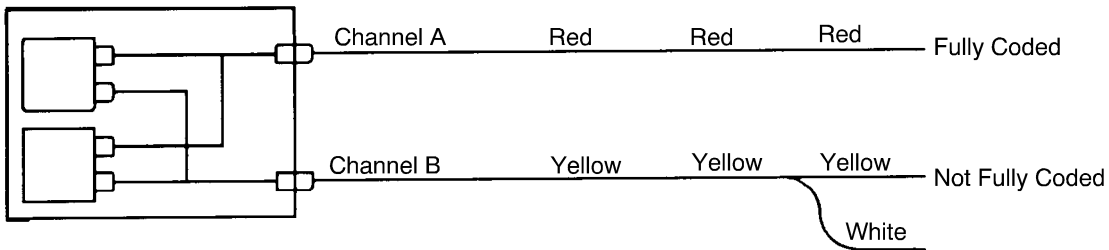
C. Wire Harnesses Identified by Color Codes

A wire harness:

- Can be either fully color coded or not fully color coded; refer to Figure 1
- That has a Fail-Operational Autoland System circuit in every of the branch of the harness are fully color coded
- That has one of more branches that do not have a Fail-Operational Autoland System circuit is not fully color coded.

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WIRE SEPARATION



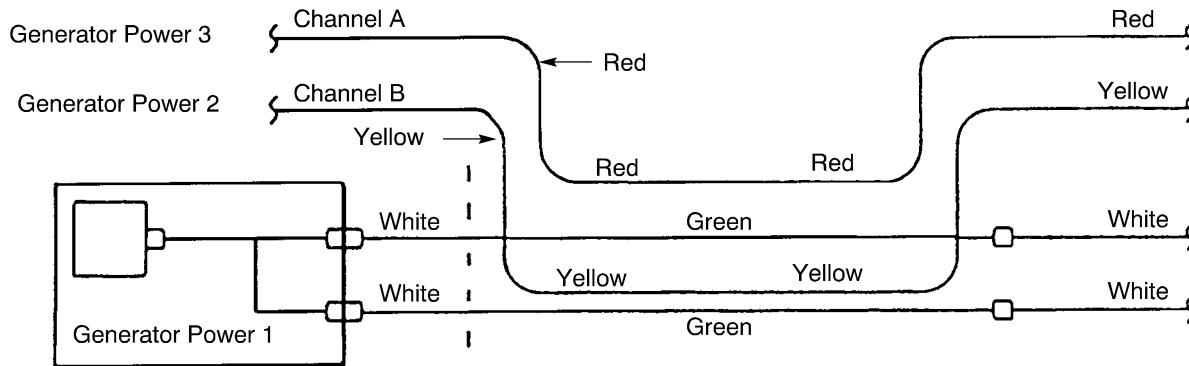
COLOR CODED WIRE HARNESS
Figure 1

Wire harnesses that do not have any Fail-Operational Autoland System circuits can be called Associated Fail-Operational Autoland System wire harnesses when both of these conditions occur:

- They have routing that is near a Fail-Operational Autoland System wire harness
- They have a different generator power source than the Fail-Operational Autoland System wire harness.

To make sure that the different power sources are correctly isolated, the Associated wire harnesses are color coded for the part that has the routing that is near Fail-Operational Autoland System wire harness.

Refer to the Generator Power 1 in Figure 2.



COLOR CODED ASSOCIATED WIRE HARNESS
Figure 2

It is necessary to keep the specified separation as close as possible to the termination when two or more Fail-Operational Autoland System wire harnesses:

- Have different channel assignments
- Have wires that are spliced together or are electrically common.

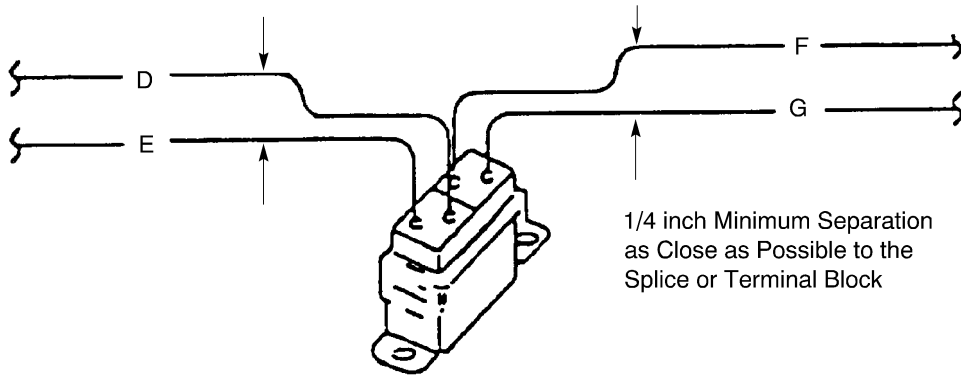
Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL

WIRE SEPARATION

This configuration:

- Is functionally correct
- Keeps the specified separation of channels
- Occurs where the stabilizer trim control circuits of both the Captain and the First Officer are in parallel.



ELECTRICALLY COMMON TERMINATION
Figure 3

9. MODEL 747-400

A. Functional Separation

NOTE: The 747-400 Wiring Diagram Manual 91-06-() and 91-07-() Subjects give the functional separation codes.

These conditions are applicable:

- All circuits are given a separation code; refer to Table 5
- The necessary separation between independent power sources and redundant system circuits is identified by Codes 1, 2, 3, and 4
- The necessary separation between EMC circuits that are not compatible is identified by Codes 1, 2, and 3
- Circuits for which separation is not necessary are identified by Code N.

Table 5
COLOR CODES FOR 747-400 FUNCTIONAL SEPARATION

Functional Separation Code	Circuit	Tie Material Color
1	All electrical and avionic circuits that are powered from bus Number 1 and do not have N or S standby codes	Green
2	All electrical and avionic circuits powered from bus Number 2 that do not have N or S standby codes	Yellow
3	All electrical and avionic circuits powered from Number 3 that do not have N or S standby codes	Red

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WIRE SEPARATION

Table 5 (continued)

Functional Separation Code	Circuit	Tie Material Color
4	All electrical and avionic circuits powered from Number 4 that do not have N or S standby codes	Brown
N	Power circuits and other circuits in which current is kept to a limit; refer to Table 6	White
S	Any circuit that is supplied power from the battery; DC Standby, Hot Battery, or AC Standby	Blue

Table 6

CODE N, NON-REDUNDANT CIRCUITS OR NON-REDUNDANT POWER CIRCUITS IN 747-400 FUNCTIONAL SEPARATION

Circuit or Component	Note
DC 2.5 amperes or smaller circuit breaker, BACC18Z type	Does not apply to battery bus, DC Standby Bus, and Hot Battery Bus unless the load is not critical and is not necessary during Standby Power Only operation
1 Phase AC 5.0 amperes or smaller circuit breaker, BACC18Z type	Does not apply to AC Standby
3 Phase AC 3.0 amperes or smaller circuit breaker, BACC18AC type	-
Current is kept to a limit by circuit impedance or transformer action	Current is less than or equal to DC 2.5 amperes, 1 Phase AC 5.0 amperes, or 3 Phase AC 3.0 amperes
Power is supplied from the ground handling bus and are not energized during flight	-
Ground seeking circuits that use Master Dim and Test Power	Neutral on the ground side of lamps

10. MODEL 757

A. Functional Separation

NOTE: The 757 Wiring Diagram Manual 91-05-() Subjects give the functional separation codes.

These conditions are applicable:

- All circuits are given a separation code; refer to Table 7
- The necessary separation between independent power sources is identified by Codes A, C, H, L, R, and S
- The necessary separation between redundant system circuits is identified by Codes C, H, L, and R
- The necessary separation between EMC circuits that are not compatible is identified by Codes 1, 2, or 3
- Circuits for which separation is not necessary are identified by Code N.

STANDARD WIRING PRACTICES MANUAL

WIRE SEPARATION

**Table 7
COLOR CODES FOR 757 FUNCTIONAL SEPARATION**

Functional Separation Code	Circuit	Tie Material Color
A	Circuits that are related to the APU Electrical Power and the APU Control and can cause shutdown of the auxiliary generator power	Orange
C	Circuits that are related to the power that is supplied by the center bus powered circuits; redundant system circuits are included	Yellow
H	Circuits that are related to the Extended Range Operations (EROPS); the Hydraulic Motor Driven AC and DC Generator Systems, electrical power feeders, control and protection	Purple
L	Circuits that are related to the power that is supplied by the left power system and do not have N codes; redundant system circuits are included	Red
N	Power circuits and other circuits in which current is kept to a limit; refer to Table 8	White
R	Circuits that are related to the power supplied by the right power system and do not have N codes; redundant system circuits are included	Green
S	Any circuit that is supplied power from the battery; DC Standby, Hot Battery, or AC Standby	Blue

NOTE: For Code C circuits, power is supplied to the center buses:

- From the left power system during normal operations
- From the standby power system during a Category III Autoland; in this mode, can have the same routing as Code S circuits.

**Table 8
CODE N, NON-REDUNDANT CIRCUITS OR NON-REDUNDANT POWER CIRCUITS IN 757 FUNCTIONAL SEPARATION**

Circuit or Component	Note
DC 2.5 amperes or smaller circuit breaker, BACC18Z type	Does not apply to battery bus, DC Standby Bus, and Hot Battery Bus unless the load is not critical and is not necessary during Standby Power Only operation
1 Phase AC 5.0 amperes or smaller circuit breaker, BACC18Z type	Does not apply to AC Standby
3 Phase AC 3.0 amperes or smaller circuit breaker, BACC18AC type	-
Current is kept to a limit by circuit impedance or transformer action	Current is less than or equal to DC 2.5 amperes, 1 Phase AC 5.0 amperes, or 3 Phase AC 3.0 amperes
Power is supplied from the ground handling bus and are not energized during flight	-
Ground seeking circuits that use Master Dim and Test Power	Neutral on the ground side of lamps

STANDARD WIRING PRACTICES MANUAL

WIRE SEPARATION

B. Engine Wire Harness Separation

Installation of the wire harnesses that have engine control and indication circuits must be kept as they are supplied:

- To make sure that separation of redundant engine systems is correct
- To keep engine to engine separation.

11. MODEL 767

A. Functional Separation

NOTE: The 767 Wiring Diagram Manual 91-06-() Subjects give the functional separation codes.

These conditions are applicable:

- All circuits are given a separation code; refer to Table 9
- The necessary separation between independent power sources is identified by Codes A, C, H, L, R, and S
- The necessary separation between redundant system circuits is identified by Codes C, H, L, and R
- The necessary separation between EMC circuits that are not compatible is identified by Codes 1, 2, or 3
- Circuits for which separation is not necessary are identified by Code N.

**Table 9
COLOR CODES FOR 767 FUNCTIONAL SEPARATION**

Functional Separation Code	Circuit	Tie Material Color
A	Circuits that are related to the APU Electrical Power and the APU Control and can cause shutdown of the auxiliary generator power	Orange
C	Circuits that are related to the power that is supplied by the center bus powered circuits; redundant system circuits are included	Yellow
H	Circuits that are related to the Extended Range Operations (EROPS); the Hydraulic Motor Driven AC and DC Generator Systems, electrical power feeders, control and protection	Purple
L	Circuits that are related to the power that is supplied by the left power system and do not have N codes; redundant system circuits are included	Red
N	Power circuits and other circuits in which current is kept to a limit; refer to Table 10	White
R	Circuits that are related to the power supplied by the right power system and do not have N codes; redundant system circuits are included	Green
S	Any circuit that is supplied power from the battery; DC Standby, Hot Battery, or AC Standby	Blue

STANDARD WIRING PRACTICES MANUAL

WIRE SEPARATION

NOTE: For Code C circuits, power is supplied to the center buses:

- From the left power system during normal operations
- From the standby power system during a Category III Autoland; in this mode, can have the same routing as Code S circuits.

**Table 10
CODE N, NON-REDUNDANT CIRCUITS OR NON-REDUNDANT POWER CIRCUITS IN 767 FUNCTIONAL SEPARATION**

Circuit or Component	Note
DC 2.5 amperes or smaller circuit breaker, BACC18Z type	Does not apply to battery bus, DC Standby Bus, and Hot Battery Bus unless the load is not critical and is not necessary during Standby Power Only operation
1 Phase AC 5.0 amperes or smaller circuit breaker, BACC18Z type	Does not apply to AC Standby
3 Phase AC 3.0 amperes or smaller circuit breaker, BACC18AC type	-
Current is kept to a limit by circuit impedance or transformer action	Current is less than or equal to DC 2.5 amperes, 1 Phase AC 5.0 amperes, or 3 Phase AC 3.0 amperes
Power is supplied from the ground handling bus and are not energized during flight	-
Ground seeking circuits that use Master Dim and Test Power	Neutral on the ground side of lamps

12. MODEL 777

A. Functional Separation

NOTE: The 777 Wiring Diagram Manual 91-05-() Subjects give the functional separation codes.

These conditions are applicable:

- All circuits are given a separation code; refer to Table 11
- Wire harnesses that have different functional separation codes have the same routing only if the Wiring Diagram Manual shows the same routing
- If wire harnesses that have different functional separation codes have the same routing, the harnesses are held together with white lacing tape or natural color plastic ties.

It is not necessary to identify these wire harnesses with a color code:

- Wire harnesses installed in the location of the engine
- Wire harnesses installed in the struts
- Wire harnesses installed in the shelves and panels
- Coax cables.

NOTE: Coax cables and wire harnesses that contain coax cables for which a color code is not necessary must be held together or installed with white lacing tape.

STANDARD WIRING PRACTICES MANUAL**WIRE SEPARATION**

NOTE: Wire harnesses and cables for which a color code is not necessary can be held together or installed with either of these tie materials:

- White lacing tape
- Natural color plastic ties.

Table 11
COLOR CODES FOR 777 FUNCTIONAL SEPARATION

Functional Separation Code	Circuit	Tie Material Color
AK	Auxiliary Power Unit	Orange
BK	Back-up Power; Variable Speed Constant Frequency	Magenta
CP	Center Primary; Flight Control DC Permanent Magnet Generator	Blue
LM	Left Main; Left Integrated Drive Generator	Yellow
LP	Left Primary; Flight Control DC Permanent Magnet Generator	Red
LR	Left Redundant	Grey
LS	Left Secondary	Black
NN	Neutral	White
RM	Right Main; Right Integrated Drive Generator	Brown
RP	Right Primary; Flight Control DC Permanent Magnet Generator	Green
RR	Right Redundant	Light Pink
RS	Right Secondary	Light Brown
SY	DC Standby, AC Standby, or Hot Battery Bus	Purple

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INSTALLATION OF PRESSURE BULKHEAD SEALS

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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS

This Subject gives the procedures to seal a wire harness that has a routing through the pressure bulkhead.

1. PART NUMBERS AND DESCRIPTION

A. Wire Harness Seal Part Numbers

**Table 1
BACS45 WIRE HARNESS SEAL PART NUMBERS**

Flange Shape	Dimension (inch)			Boeing Standard	Reference
	A	B	C		
Circular	0.48	0.88	1.20	BACS45B1	Figure 1
	0.78	1.18	1.20	BACS45B2	Figure 1
	1.16	1.56	1.40	BACS45B3	Figure 1
	1.34	1.74	1.62	BACS45B4	Figure 1
	1.50	2.12	1.62	BACS45B5	Figure 1
Oval	0.50	0.75	1.00	BACS45A12	Figure 2
	0.50	0.75	1.50	BACS45A212	Figure 2
	0.75	1.00	1.00	BACS45A13	Figure 2
	0.75	1.00	1.50	BACS45A213	Figure 2
Square	1.16	1.56	1.40	BACS45A11	Figure 3
	1.34	1.80	1.62	BACS45A14	Figure 3

**Table 2
APPROVED SUPPLIERS OF BOEING STANDARD WIRE HARNESS SEALS**

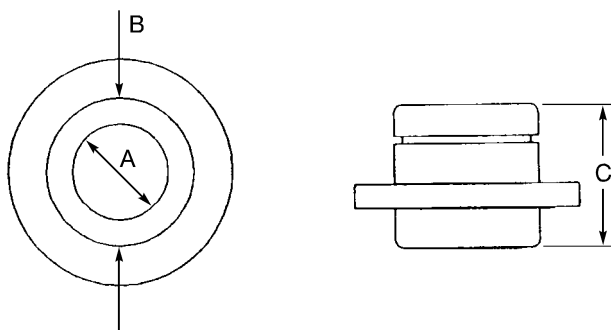
Boeing Standard	Supplier
BACS45A()	An available source
BACS45B()	An available source

**Table 3
RECOMMENDED SUPPLIERS OF BOEING STANDARD WIRE HARNESS SEALS**

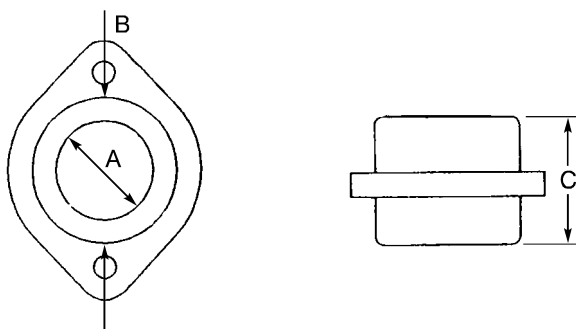
Boeing Standard	Recommended Supplier
BACS45A()	Component Products Corp. - Mukilteo, Wa.
	Nylon Molding Corp. - Monrovia, Ca.
	WSI Technologies - Hayward, Ca.
BACS45B()	Component Products Corp. - Mukilteo, Wa.
	Nylon Molding Corp. - Monrovia, Ca.
	WSI Technologies - Hayward, Ca.

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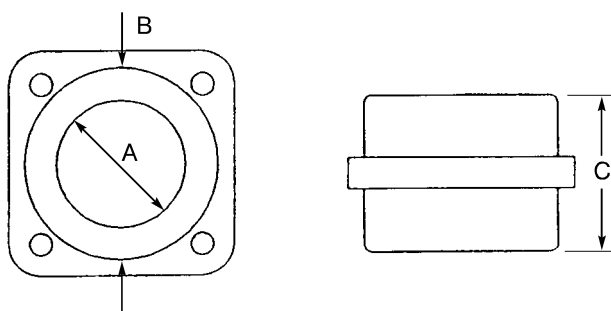
INSTALLATION OF PRESSURE BULKHEAD SEALS



BACS45() WIRE HARNESS SEAL WITH A CIRCULAR FLANGE
Figure 1



BACS45() WIRE HARNESS SEAL WITH AN OVAL FLANGE
Figure 2



BACS45() WIRE HARNESS SEAL WITH A SQUARE FLANGE
Figure 3



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INSTALLATION OF PRESSURE BULKHEAD SEALS

B. Pressure Bulkhead Seal Assembly Component Part Numbers

**Table 4
SEAL RING PART NUMBERS**

Wire Harness Seal	Seal Ring	
	Width (inches)	Boeing Standard
BACS45B1	0.025	BACS11BD1
		BACS45B70
	0.040	BACS11BD2
		BACS45B71
BACS45B2	0.025	BACS11BD3
		BACS45B72
	0.040	BACS11BD4
		BACS45B73
BACS45B3	0.025	BACS11BD5
		BACS45B74
	0.040	BACS11BD6
		BACS45B75
BACS45B4	0.025	BACS11BD7
		BACS45B76
	0.040	BACS11BD8
		BACS45B77
BACS45B5	0.025	BACS11BD9
		BACS45B78
	0.040	BACS11BD10
		BACS45B79

**Table 5
OBSOLETE SEAL RING PART NUMBERS**

Obsolete Seal Ring	Replacement Seal Ring
BACS45B70	BACS11BD1
BACS45B71	BACS11BD2
BACS45B72	BACS11BD3
BACS45B73	BACS11BD4
BACS45B74	BACS11BD5
BACS45B75	BACS11BD6

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INSTALLATION OF PRESSURE BULKHEAD SEALS

Table 5 (continued)

Obsolete Seal Ring	Replacement Seal Ring
BACS45B76	BACS11BD7
BACS45B77	BACS11BD8
BACS45B78	BACS11BD9
BACS45B79	BACS11BD10

Table 6

APPROVED SUPPLIERS OF BOEING STANDARD SEAL RINGS

Boeing Standard	Supplier
BACS11BD()	An available source

Table 7

PRESSURE BULKHEAD SEAL ASSEMBLY COMPONENT PART NUMBERS

Component Type	Standard	Supplier
Cover Plate	BACS45A26	Boeing
Filler	BACF3J1	Boeing
	BACF3J2	Boeing
	BACF3J3	Boeing
	BACF3J4	Boeing
	BACF3J5	Boeing
	BACF3K1	Boeing
	BACF3K2	Boeing
	BACF3K3	Boeing
	BACF3K4	Boeing
	BACF3K5	Boeing
	BACS45A36	Boeing
	BACS45A37	Boeing
	BACS45A38	Boeing
	BACS45A39	Boeing
	BACS45A40	Boeing
	BACS45B50	Boeing
	BACS45B51	Boeing
	BACS45B52	Boeing
BACS45B53	Boeing	
BACS45B54	Boeing	

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INSTALLATION OF PRESSURE BULKHEAD SEALS

Table 7 (continued)

Component Type	Standard	Supplier
Screw	BACS12CB3-10	Boeing
Seal Plate	BACP19N1	Boeing
	BACP19N2	Boeing
	BACP19P1	Boeing
	BACS45A34	Boeing
	BACS45B30	Boeing
	BACS45B40	Boeing
Snap Ring	MS16624	QPL

Table 8

OBSOLETE COMPONENT PART NUMBERS

Component Type	Obsolete Component	Replacement Component
Filler	BACS45A36	BACF3K2
	BACS45A37	BACF3K3
	BACS45A38	BACF3K4
	BACS45A39	BACF3K5
	BACS45A40	BACF3K1
	BACS45B50	BACF3J1
	BACS45B51	BACF3J2
	BACS45B52	BACF3J3
	BACS45B53	BACF3J4
	BACS45B54	BACF3J5
Seal Plate	BACS45B30	BACP19N2
	BACS45B34	BACS19P1
	BACS45B40	BACP19N1

Table 9

APPROVED SUPPLIERS OF BOEING STANDARD PRESSURE BULKHEAD SEAL ASSEMBLY COMPONENTS

Component	Boeing Standard	Supplier
Filler	BACF3J()	An available source
	BACF3K()	
Screw	BACS12CB()	An available source
Seal Plate	BACP19N()	An available source
	BACP19P()	

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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS

C. Coil Spacer Part Numbers

Table 10
COIL SPACER PART NUMBERS

Inner Diameter (inch)	Boeing Standard
0.03	BACS18AY1
	BACS45A18
0.06	BACS18AY3
	BACS45A20
0.09	BACS18AY4
	BACS45A221
0.12	BACS18AY5
	BACS45A23
0.25	BACS18AY6
	BACS45A24

Table 11
OBSOLETE COIL SPACER PART NUMBERS

Obsolete Coil Spacer	Replacement Coil Spacer
BACS45A18	BACS18AY1
BACS45A20	BACS18AY3
BACS45A221	BACS18AY4
BACS45A23	BACS18AY5
BACS45A24	BACS18AY6

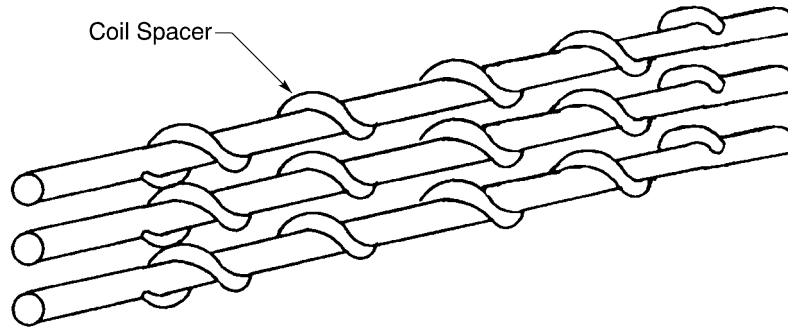
Table 12
APPROVED SUPPLIERS OF BOEING STANDARD COIL SPACERS

Boeing Standard	Supplier
BACS18AY()	An available source
BACS45A()	An available source

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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS



COIL SPACERS
Figure 4

D. Star Spacer Part Numbers

Table 13
WIRE HARNESS STAR SPACER PART NUMBERS

Configuration	Dimension A (inch)	Boeing Standard	Reference
3 Separations	0.68	BACS18AX2	Figure 5
		BACS45A115	Figure 5
	0.88	BACS18AX1	Figure 5
		BACS45A105	Figure 5
	1.06	BACS18AX7	Figure 5
		BACS45A206	Figure 5
	1.32	BACS18AX8	Figure 5
		BACS45A207	Figure 5
1.68	BACS18AX9	Figure 5	
	BACS45A208	Figure 5	
4 Separations	0.75	BACS18AX4	Figure 6
		BACS45A30	Figure 6
	1.00	BACS18AX5	Figure 6
		BACS45A31	Figure 6
	1.25	BACS18AX6	Figure 6
		BACS45A32	Figure 6
6 Separations	1.40	BACS18AX3	Figure 7
		BACS45A29	Figure 7

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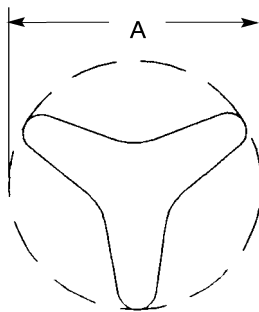
INSTALLATION OF PRESSURE BULKHEAD SEALS

**Table 14
OBSOLETE STAR SPACER PART NUMBERS**

Obsolete Star Spacer	Replacement Star Spacer
BACS45A29	BACS18AX3
BACS45A30	BACS18AX4
BACS45A31	BACS18AX5
BACS45A32	BACS18AX6
BACS45A105	BACS18AX1
BACS45A115	BACS18AX2
BACS45A206	BACS18AX7
BACS45A207	BACS18AX8
BACS45A208	BACS18AX9

**Table 15
APPROVED SUPPLIERS OF BOEING STANDARD STAR SPACERS**

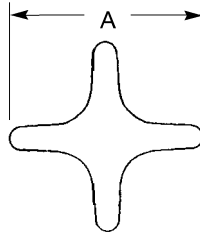
Boeing Standard	Supplier
BACS18AX()	An available source
BACS45A()	An available source



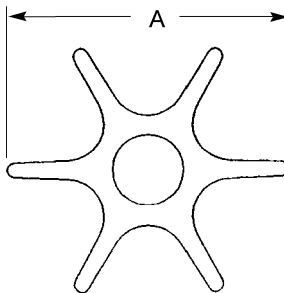
**STAR SPACER WITH THREE SEPARATIONS
Figure 5**

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS



STAR SPACER WITH FOUR SEPARATIONS
Figure 6



STAR SPACER WITH SIX SEPARATIONS
Figure 7

E. Necessary Materials

Table 16
NECESSARY MATERIALS

Material	Specification	Part Number	Description or Special Instructions	Supplier
Adhesion Promoter	-	PR-187	For polythioether sealant on a cured polysulfide sealant	PRC-Desoto International
Sealant	BMS 5-37	PR-1428 B-2	Polysulfide sealant for insulated wire	PRC-Desoto International
	BMS 5-45	PR-1776	Polysulfide sealant for insulated wire	PRC-Desoto International
	BMS 5-95	Pro-Seal 870 B-1/2	Polysulfide sealant for seal fillets	PRC-Desoto International
		Pro-Seal 870 B-2	Polysulfide sealant for seal fillets	PRC-Desoto International
		PR-1436G E-2	Polysulfide sealant for seal fillets	PRC-Desoto International
	-	PR-1828 B-1/2	Polythioether sealant for insulated wire and seal fillets	PRC-Desoto International

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS

Table 16 (continued)

Material	Specification	Part Number	Description or Special Instructions	Supplier
Solvent	O-E-760	-	Ethyl Alcohol	An available source
	TT-I-735	-	Isopropyl Alcohol	An available source
	BMS 11-7	-	Mixture of Naphtha, Ethyl Acetate, MEK, Isopropyl Alcohol	Pratt and Lambert Industrial Coating Division
		-	Mixture of Naphtha, Ethyl Acetate, MEK, Isopropyl Alcohol	Elf Atochem
		-	Mixture of Naphtha, Ethyl Acetate, MEK, Isopropyl Alcohol	AZKO/Dexter Aerospace Finishes
	-	Mixture of Naphtha, Ethyl Acetate, MEK, Isopropyl Alcohol	Barton Solvents	
P-D-680	-	Type I Stoddard Solvent	An available source	
Vinyl Tape	-	P-29	Flame retarding, weather resistant, vinyl	Permacel
		P-29 Plus	Flame retarding, weather resistant, vinyl	Permacel
Masking Tape	-	P-70	High Temperature Masking	Permacel
		P-781	High Temperature Masking	Permacel
		Scotch 2693	High Temperature Masking	3M

**Table 17
SEALANT CURE TIMES**

Part Number	Cure Time (hours)
PR-1428 B-2	24
PR-1436G E-2	48
PR-1828 B-1/2	3
Pro-Seal 870 B-1/2	30
Pro-Seal 870 B-2	48
Pro-Seal 890 B-2	48

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS

Table 18
WIRE WITH TEFLON INSULATION

Type of Wire	Insulation Material
BMS 13-16	PTFE
BMS 13-28	TFE
BMS 13-29	TFE
BMS 13-31	TFE
BMS 13-55	PTFE
BMS 13-58	PTFE
BMS 13-60	PTFE

2. REMOVAL OF THE PRESSURE BULKHEAD SEAL

A. Seal Removal

CAUTION: DO NOT CAUSE DAMAGE TO:

- THE STRUCTURE
- THE WIRE HARNESS, IF THE WIRE HARNESS MUST BE USED AGAIN.

(1) Make a selection of a scraper made of wood or plastic.

CAUTION: DO NOT USE A SCRAPER THAT IS MADE OF A MATERIAL THAT IS HARDER THAN 2024-T3 ALUMINUM. A HARDER MATERIAL CAN CAUSE DAMAGE TO THE STRUCTURE.

(2) Make a selection of a solvent from Table 16.

(3) Remove the sealant on and around the installation hardware of the seal fitting.

(4) Remove the installation hardware.

(5) Remove the seal fitting from the structure:

- (a) Carefully put the scraper between the seal fitting and the structure.
- (b) Move the two halves of the seal apart.

(6) If the fitting must be replaced, discard the seal fitting.

(7) If the wire harness must be installed again:

- (a) Carefully remove the sealant from each wire or cable.
- (b) Clean the wire or cable with solvent.

(8) Remove the sealant from each side of the structure with the scraper.

CAUTION: DO NOT USE A SCRAPER THAT IS MADE OF A MATERIAL THAT IS HARDER THAN 2024-T3 ALUMINUM. A HARDER MATERIAL CAN CAUSE DAMAGE TO THE STRUCTURE.

(9) Clean each side of the structure with solvent.

(10) Remove the remaining solvent with a clean, dry cloth.

STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF PRESSURE BULKHEAD SEALS****3. INSTALLATION OF A NEW WIRE OR CABLE IN THE PRESSURE BULKHEAD SEAL****A. Seal Preparation**

This paragraph gives the procedure to make a groove or a hole through the sealant for a new wire or cable.

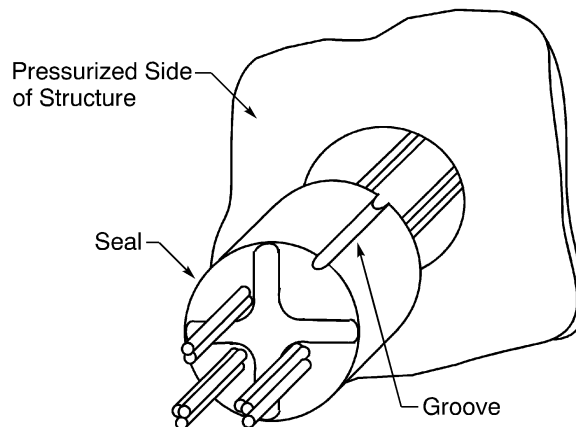
CAUTION: A HOLE SHOULD BE MADE THROUGH A SEAL, ONLY IF IT IS NECESSARY. THIS PROCEDURE HAS A HIGH RISK OF DAMAGE TO THE WIRE.

- (1) Examine the wire harness on each side of the pressure bulkhead seal.
- (2) Remove the seal from the bulkhead but do not remove the sealant around the wires. Refer to Paragraph 2.
- (3) Make a groove in the seal.

NOTE: As an alternative, a hole can be made through the sealant. Refer to Step (4).

- (a) If a spacer is installed in the seal, find the section that has the smallest number of wires.
- (b) Find an area near the edge of the seal that has no wires.
- (c) Cut a groove in the edge of the sealant. Refer to Figure 8.

Make sure that the groove has a sufficient depth for the wire.



PREPARATION OF THE GROOVE
Figure 8

- (4) If the alternative procedure to make a hole is necessary, make a hole with a circular tool:
 - (a) Find a location to make a hole in the sealant where damage to the wires or the cables cannot occur.
 - (b) Make a selection of one of these tools:
 - A drill
 - A small hollow tube that removes a core of the sealant
 - A 0.125 inch diameter stainless steel rod that has a point.
 - (c) Carefully push the tool through the sealant.

NOTE: The hole is easier to make if the tool is lubricated while it goes through the sealant.

STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF PRESSURE BULKHEAD SEALS**

WARNING: IF THE TOOL IS NOT CAREFULLY CONTROLLED AS IT GOES THROUGH, IT CAN CAUSE INJURY TO A PERSON ON THE OTHER SIDE OF THE SEALANT.

CAUTION: IF THE TOOL IS NOT CAREFULLY CONTROLLED AS IT GOES THROUGH, IT CAN CAUSE DAMAGE TO A WIRE OR A CABLE IN THE SEALANT.

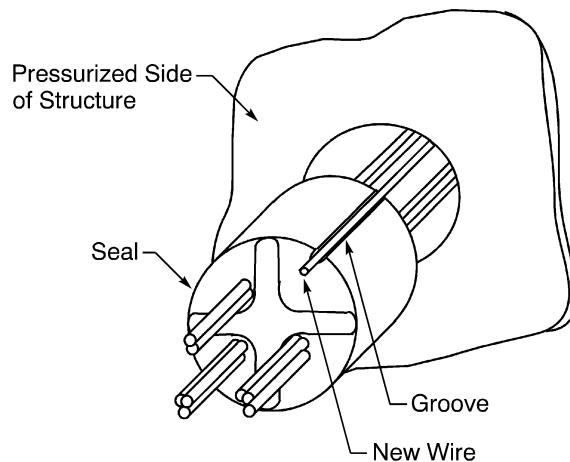
- (5) Examine the wires that are installed in the pressure seal.
Make sure that the wires do not have damage.

B. Wire Installation

- (1) Make a selection of a sealant from Table 16.
Refer to Table 17 for the cure time of each sealant.
- (2) If the sealant is a polythioether type sealant make a selection of an adhesion promoter from Table 16.
- (3) Make a selection of a solvent from Table 16.
- (4) With a clean wipe and solvent, clean these surfaces:
- The groove in the seal
 - The end of the seal on the pressurized side of structure.

CAUTION: A SURFACE THAT SEALANT MAKES A BOND WITH MUST BE CLEAN. A CONTAMINATION ON A SURFACE CAN CAUSE AN UNSATISFACTORY BOND BETWEEN THE SEALANT AND THE SURFACE.

- (5) If the sealant is a polythioether type sealant:
- (a) Apply the adhesion promoter to:
- The groove or the hole in the seal
 - The end of the seal on the pressurized side of structure.
- (b) Let the adhesion promoter dry for a minimum of 30 minutes before the polythioether sealant is applied.
- (6) Carefully put the end of the wire through the groove or the hole in the sealant from the pressurized side of the structure. Refer to Figure 9.



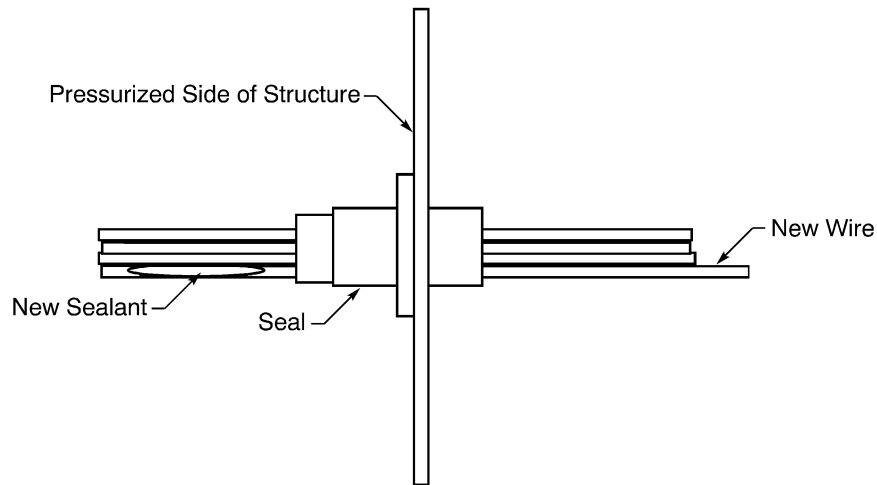
POSITION OF THE NEW WIRE IN THE GROOVE
Figure 9

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STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF PRESSURE BULKHEAD SEALS**

- (7) Pull the wire through the seal until the wire is approximately 4 inches from the final position.
- (8) Put a layer of sealant around the new wire or the new cable. Refer to Figure 10.

Make sure that the new sealant on the wire can make an overlap with the old sealant when the wire is in the final position.

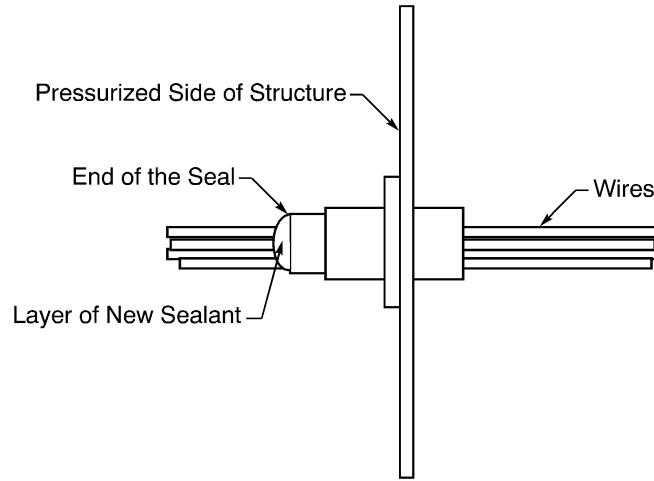
**SEAL OF THE NEW WIRE****Figure 10**

- (9) Put the seal assembly back in the structure.
- (10) Pull the wire into the final position.
Make sure that the layer of new sealant on the wire makes an overlap with the old sealant.
- (11) On the pressurized side of the seal, put a layer of sealant around:
- The new wire or the new cable
 - All of the wires that go through the seal.

Refer to Figure 11.

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS



SEAL OF WIRES
Figure 11

(12) Let the sealant cure for the specified time. Refer to Table 17.

4. ASSEMBLY OF A PRESSURE BULKHEAD SEAL

A. Wire Preparation

- (1) Make a selection of a wire harness seal from Table 1.
- (2) Make a selection of a solvent from Table 16.
- (3) Put the wires, the cables, or the wire harness through the cutout.
- (4) Install the wires, or the cables, or the wire harness.

Make sure that the wire harness has 2 inches of slack on the pressurized side of the cutout so that the assembly of the seal is easier.

- (5) Clean all of the surfaces where the sealant must be applied.
- (6) Remove the remaining solvent with a clean, dry cloth.

B. Spacer Installation

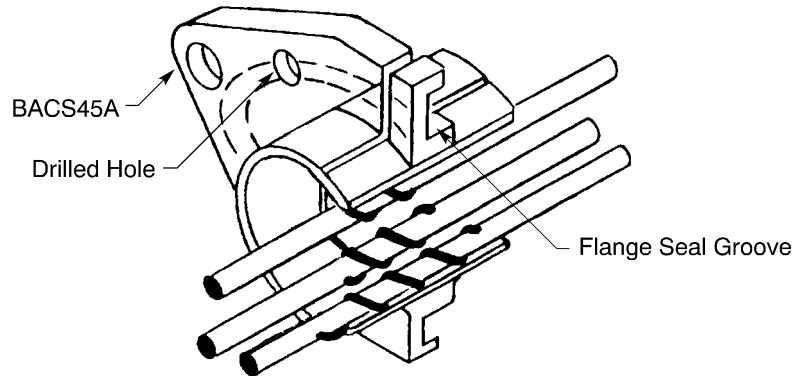
To fill the area between the wires, cables, or wire harness with sealant, it is necessary to install one of these types of spacers:

- A coil spacer
- A star spacer.

- (1) To install a coil spacer:
 - (a) Make a selection of a coil spacer from Table 11. Refer to Figure 4.
 - (b) Put a coil spacer on each wire and each multiconductor cable. Refer to Figure 12.
Make sure that the spacer is in the center of the cutout.

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS



COIL SPACERS IN THE CENTER OF THE SEAL

Figure 12

(2) To install a star spacer:

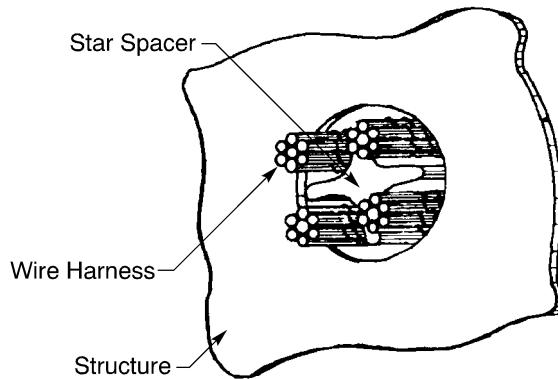
(a) Make a selection of a star spacer from Table 14.

Refer to:

- Figure 7
- Figure 6
- Figure 5.

(b) Put the star spacer between the wires, the cables, or the wire harness. Refer to Figure 13.

Make sure that the spacer is in the center of the cutout.



STAR SPACER IN THE CENTER OF THE CUTOUT

Figure 13

(3) Remove all wire harness ties that are 3 inches or less from the cutout to make sure that the sealant can fill the area around the wires or the group of wires in the harness.

C. Assembly of a Seal for a Single Cutout

(1) Make a selection of the necessary components for the seal installation from Table 7.

(2) Make a selection of a solvent from Table 16.

STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF PRESSURE BULKHEAD SEALS**

(3) To assemble a BACS45A seal:

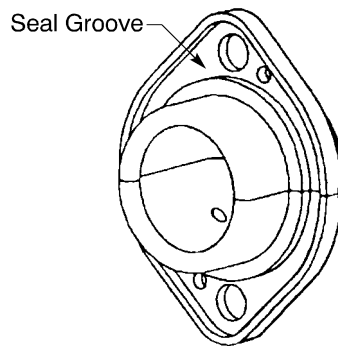
(a) Make a selection of a sealant from Table 16.

Refer to Table 17 for the cure time of each sealant.

(b) With a clean wipe and solvent, clean the surfaces that the sealant must make a bond with.

CAUTION: A SURFACE THAT SEALANT MAKES A BOND WITH MUST BE CLEAN. A CONTAMINATION ON A SURFACE CAN CAUSE AN UNSATISFACTORY BOND BETWEEN THE SEALANT AND THE SURFACE.

(c) Fill each half of the seal groove with sealant. Refer to Figure 14.



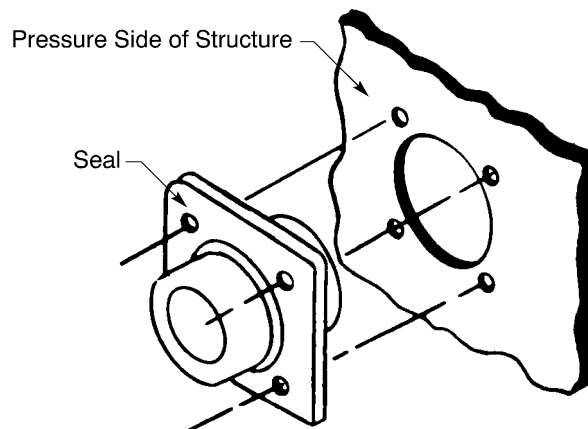
SEAL GROOVE OF THE BACS45A() SEAL

Figure 14

(d) Put the halves of the seal around the wires on the pressurized side of the cutout so that:

- The seal groove is turned to the cutout
- The center of the seal is aligned with the center of the spacers.

(e) Attach the seal to the pressurized side of the structure. Refer to Figure 15.



ASSEMBLY OF THE BACS45A() SEAL

Figure 15

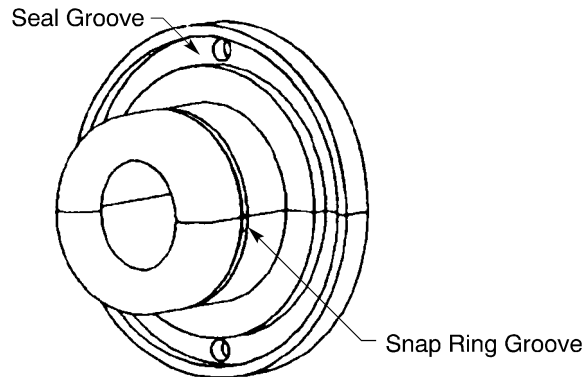
STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF PRESSURE BULKHEAD SEALS**

(4) To assemble a BACS45B seal:

- (a) Make a selection of a seal ring from Table 4.
- (b) Make a selection of a snap ring from Table 7.
- (c) With a clean wipe and solvent, clean the surfaces that the sealant must touch.

CAUTION: A SURFACE THAT SEALANT MAKES A BOND WITH MUST BE CLEAN. A CONTAMINATION ON A SURFACE CAN CAUSE AN UNSATISFACTORY BOND BETWEEN THE SEALANT AND THE SURFACE.

(d) Fill each half of the seal groove with the sealant. Refer to Figure 16.



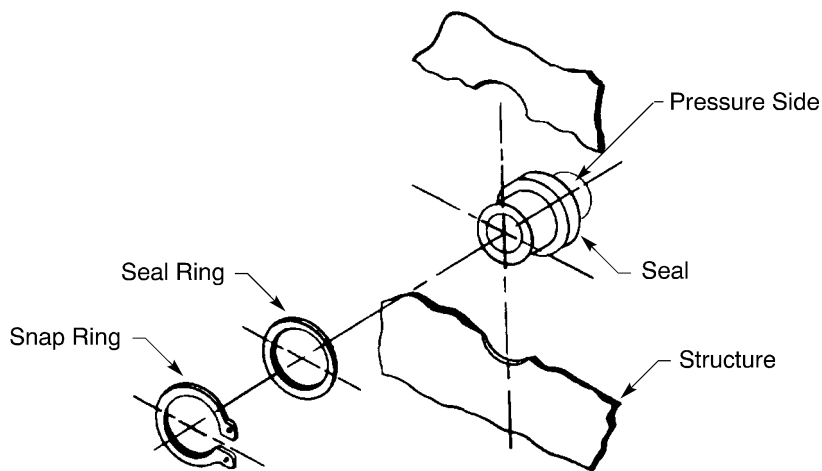
SEAL GROOVE OF THE BACS45B() SEAL
Figure 16

- (e) Put the halves of the seal around the wires on the pressurized side of the cutout so that:
 - The seal groove is turned to the cutout
 - The center of the seal is aligned with the center of the spacers.
- (f) Put the necessary number of seal rings between the snap ring groove and the structure to make a tight fit when the snap ring is installed. Refer to Figure 17.

Make sure that the maximum distance the seal can move in the longitudinal direction is 0.10 inch.

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS



ASSEMBLY OF THE BACS45B() SEAL

Figure 17

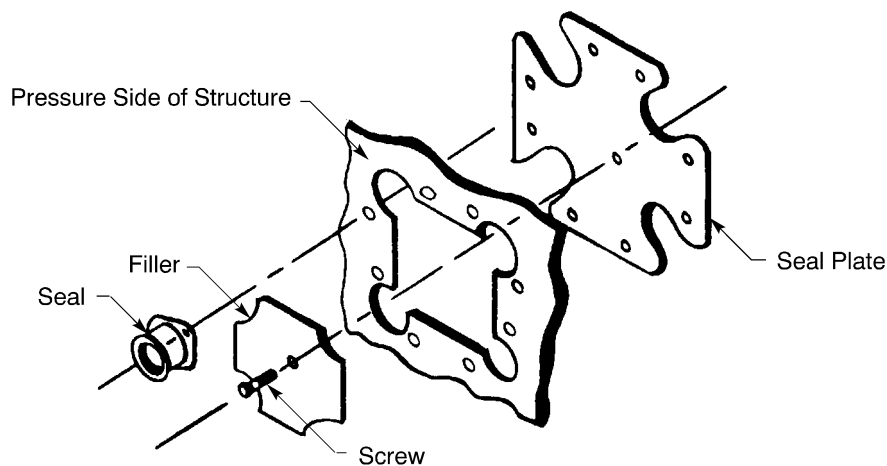
(g) Put the snap ring in the snap ring groove. Refer to Figure 16.

D. Assembly of BACS45A Seals with a BACS45A or BACS19P Seal Plate

Table 19

SEAL PLATE ASSEMBLY COMPONENTS

Component	Boeing Standard
Cover Plate	BACS45A26
Filler	BACF3K1
	BACF3K2
	BACF3K3
	BACF3K4
	BACF3K5
	BACS45A36
	BACS45A37
	BACS45A38
	BACS45A39
	BACS45A40
Screw	BACS12CB3-10

STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF PRESSURE BULKHEAD SEALS****ASSEMBLY OF THE BACS45A SEAL AND SEAL PLATE****Figure 18**

Refer to:

- Figure 18
- Table 19 for the correct cover plate, filler, and screw.

- (1) Put the seal plate on the unpressurized side of the structure.
- (2) Put the wires or wire harness in the correct positions.
- (3) Align the correct filler in the structure hole from the pressurized side.
- (4) Install the center screw.
- (5) Install the cover plates over all the holes in the seal plate that are not used.
- (6) Install a seal around each harness in the remaining holes.

Refer to Paragraph 4.C.

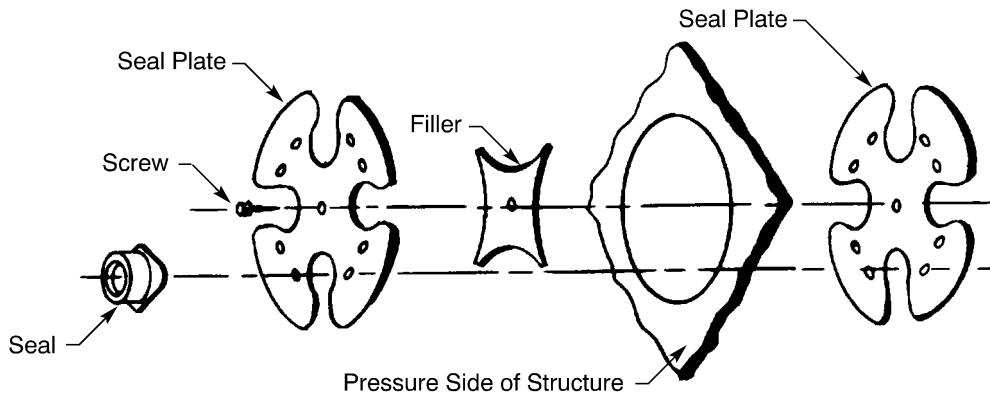
STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS

E. Assembly of BACS45A Seals with the BACS45B or BACS19N Seal Plates

**Table 20
BACS45B SEAL PLATE ASSEMBLY COMPONENTS**

Component	Boeing Standard
Cover Plate	BACS45A26
Filler	BACF3J1
	BACF3J2
	BACF3J3
	BACF3J4
	BACF3J5
	BACS45B50
	BACS45B51
	BACS45B52
	BACS45B53
	BACS45B54
Screw	BACS12CB3-10



ASSEMBLY OF THE SEAL PLATES

Figure 19

Refer to:

- Figure 19
 - Table 20 for the correct cover plate, filler, and screw.
- (1) Put the seal plate on the unpressurized side of the structure.
 - (2) Put the wires or wire harness in the correct positions.
 - (3) Align the correct filler in the structure hole from the pressurized side.
 - (4) Put the seal plate in position over the filler on the pressurized side of the structure hole.
 - (5) Align the screw holes.

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STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF PRESSURE BULKHEAD SEALS**

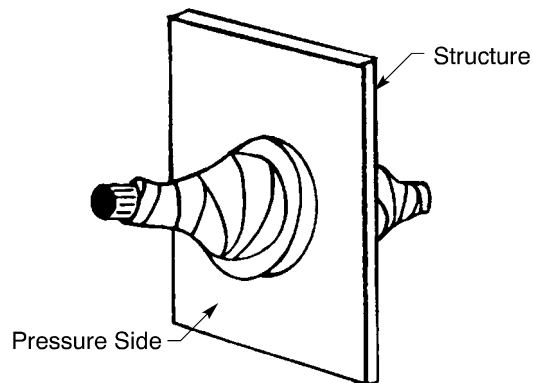
- (6) Install the center screw.
- (7) Install the cover plates over all the holes in the seal plate that are not used.
- (8) Install a seal around each harness in the remaining holes.

Refer to Paragraph 4.C.

5. INSTALLATION OF THE PRESSURE BULKHEAD SEAL**A. Assembly of the Sealant Mold**

The sealant mold made with:

- Plastic tape is recommended
 - Paper tape is the satisfactory alternative.
- (1) To make a sealant mold with plastic tape:
 - (a) Make a selection of a plastic tape from Table 16.
 - (b) Wind several layers of the tape around the seal assembly on each side of the structure. Refer to Figure 20.



PLASTIC TAPE SEALANT MOLD

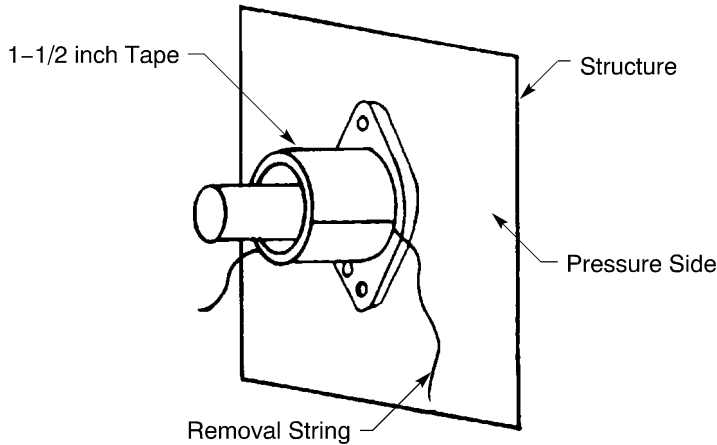
Figure 20

- (2) To make a sealant mold with paper tape:
 - (a) Make a selection of a tape from Table 16.
 - (b) On the pressurized side, put an 8 inch length of string on the seal assembly so that it is parallel to the wires or wire harness.

The string is used to remove the tape after the sealant has cured.
 - (c) Put three equal and symmetrical layers of 1-1/2 inch wide tape around the end of the assembly. Refer to Figure 21.

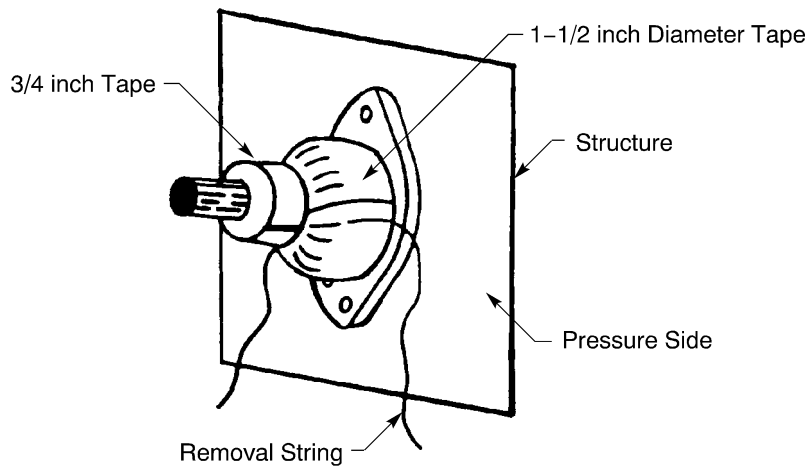
STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS



INITIAL STEP OF THE PAPER TAPE SEALANT MOLD
Figure 21

- (d) Make a symmetrical form with the tape against the end of the seal that is adjacent to the wires or wire harness.
- (e) Wind three layers of 3/4 inch masking tape around the end of the paper tape. Refer to Figure 22.



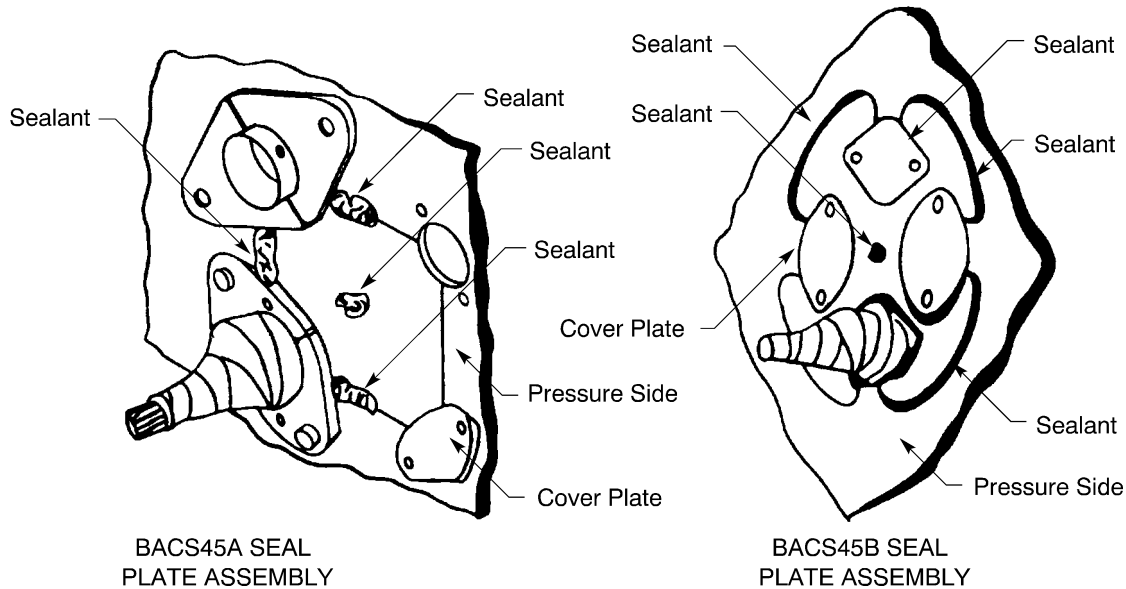
PAPER TAPE SEALANT MOLD
Figure 22

- (f) Do Step (a) through Step (e) again for the seal that is on the unpressurized side of the structure.

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS

B. Installation of the Sealant



LOCATION OF THE SEALANT ON THE FILLER AND THE SEAL PLATE
Figure 23

- (1) Make a selection of a fillet sealant from Table 16.
Refer to Table 17 for the cure time of each sealant.
- (2) Make a selection of a sealant from Table 16.
- (3) With a clean wipe and solvent, clean the surfaces that the sealant must make a bond with.

CAUTION: A SURFACE THAT SEALANT MAKES A BOND WITH MUST BE CLEAN. A CONTAMINATION ON A SURFACE CAN CAUSE AN UNSATISFACTORY BOND BETWEEN THE SEALANT AND THE SURFACE.

- (4) Put a layer of the sealant on:
 - The joints of the filler
 - The center screw
 - The edges of the BACS45B seal plate.

Refer to Figure 23.

- (5) Make a hole in the sealant mold over all of the injection hole of the seal.

NOTE: As an alternative, a hole can be made at the end of the mold that is adjacent to the wires or wire harness.

- (6) Put the sealant into each injection hole with a sealant gun at 80 psi to 100 psi pressure.



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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF PRESSURE BULKHEAD SEALS

Make sure:

- That the sealant comes out from around the wires at the edges of the mold
 - To complete the injection of the sealant in the specified time for the sealant
 - That the sealant is continuous and has no voids, holes, bubbles, cracks, unwanted objects, used sealant, or metal particles.
- (7) Let the sealant cure for the specified time. Refer to Table 17.
- (8) Remove all of the sealant molds.
- (9) Put a layer of the fillet sealant:
- On the heads of the screws
 - Around the outer edges of the seal flange.

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STANDARD WIRING PRACTICES MANUAL

POWER FEEDER WIRE HARNESS RACEWAY SEAL

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B. Raceway Seal Removal	1
2. <u>ASSEMBLY OF THE RACEWAY SEAL</u>	1
A. Raceway Seal Assembly	1
B. Assembly of the Power Feeder Cable Terminals	2

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STANDARD WIRING PRACTICES MANUAL

POWER FEEDER WIRE HARNESS RACEWAY SEAL

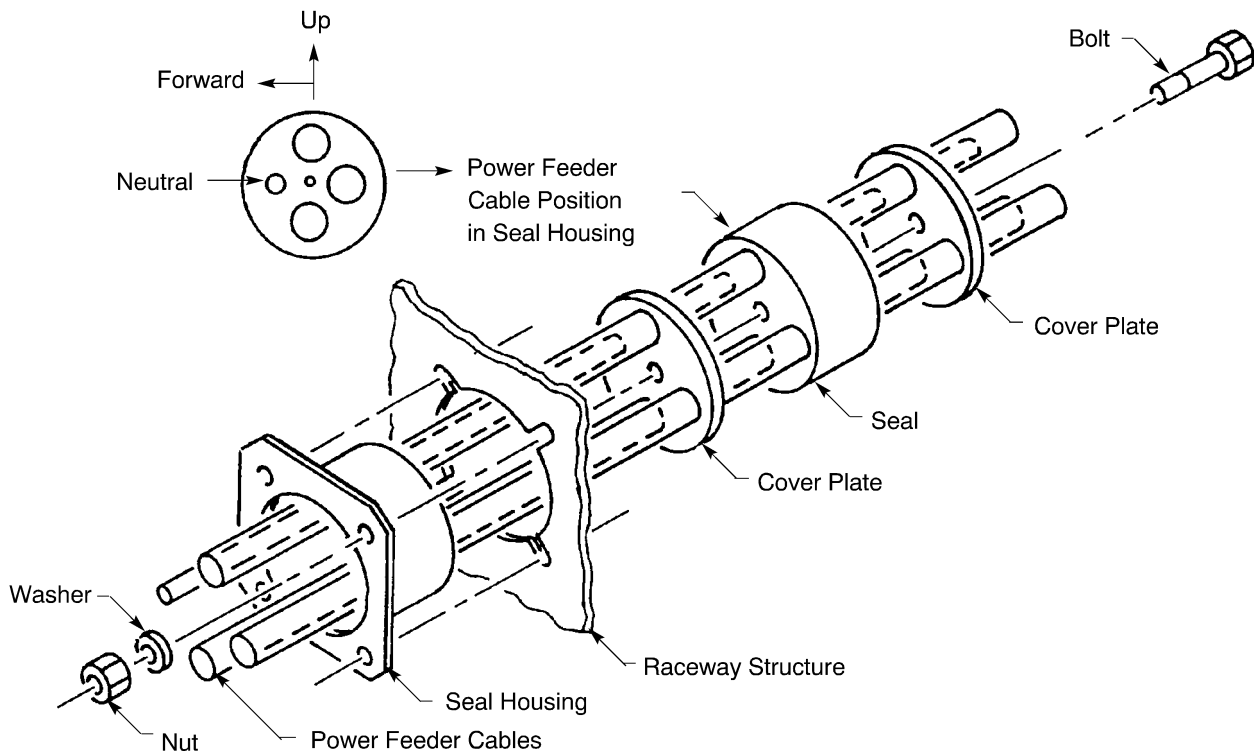
This Subject gives the procedures to remove and install the raceway seal for the power feeder wire harness.

1. REMOVAL OF THE RACEWAY SEAL

A. Preparation for Removal

- (1) Remove the fanning strip from the power feeder cables near the power feeder terminals.
- (2) Remove the terminals from the ends of the power feeder cables.

B. Raceway Seal Removal



POWER FEEDER CABLE RACEWAY SEAL
Figure 1

Refer to Figure 1.

- (1) Remove these components from the seal assembly:
 - The bolt
 - The nut
 - The washer.
- (2) Pull the power feeder cables through the seal housing.
- (3) Remove the cover plates and the seal from the power feeder cables.

2. ASSEMBLY OF THE RACEWAY SEAL

A. Raceway Seal Assembly

- (1) Put the power feeder cables through the cover plates and the seal.

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STANDARD WIRING PRACTICES MANUAL

POWER FEEDER WIRE HARNESS RACEWAY SEAL

Make sure the cables are in the correct position. Refer to Figure 1.

- (2) Find the seal and the cover plates inside the seal housing.
- (3) Put the bolt through:
 - The seal housing
 - The cover plates
 - The seal.

NOTE: The bolt can be installed from either side.

- (4) Put the washer and the nut on the bolt.
- (5) Torque the nut to whichever occurs first:
 - 75 inch-pounds to 90 inch-pounds
 - The is against the end of the threads.

CAUTION: MAKE SURE THAT THE COVER PLATES DO NOT CATCH ON THE SEAL HOUSING.

- (6) Examine the assembly.

Make sure that:

- The seal comes out of the cover plate at the wire penetration holes
- The cover plate is not caught on the edge of the seal housing
- The cover plate does not extend outside the seal housing.

B. Assembly of the Power Feeder Cable Terminals

- (1) Assemble a terminal on the ends of the power feeder cables.
Refer to Subject 20-30-11.
- (2) Put the fanning strip on the wire harness next to the terminal lugs. Refer to Table 1.

Table 1
POWER FEEDER TERMINAL LUGS

Description	Wire Color
T1	Red
T2	Yellow
T3	Blue
N	Neutral



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STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

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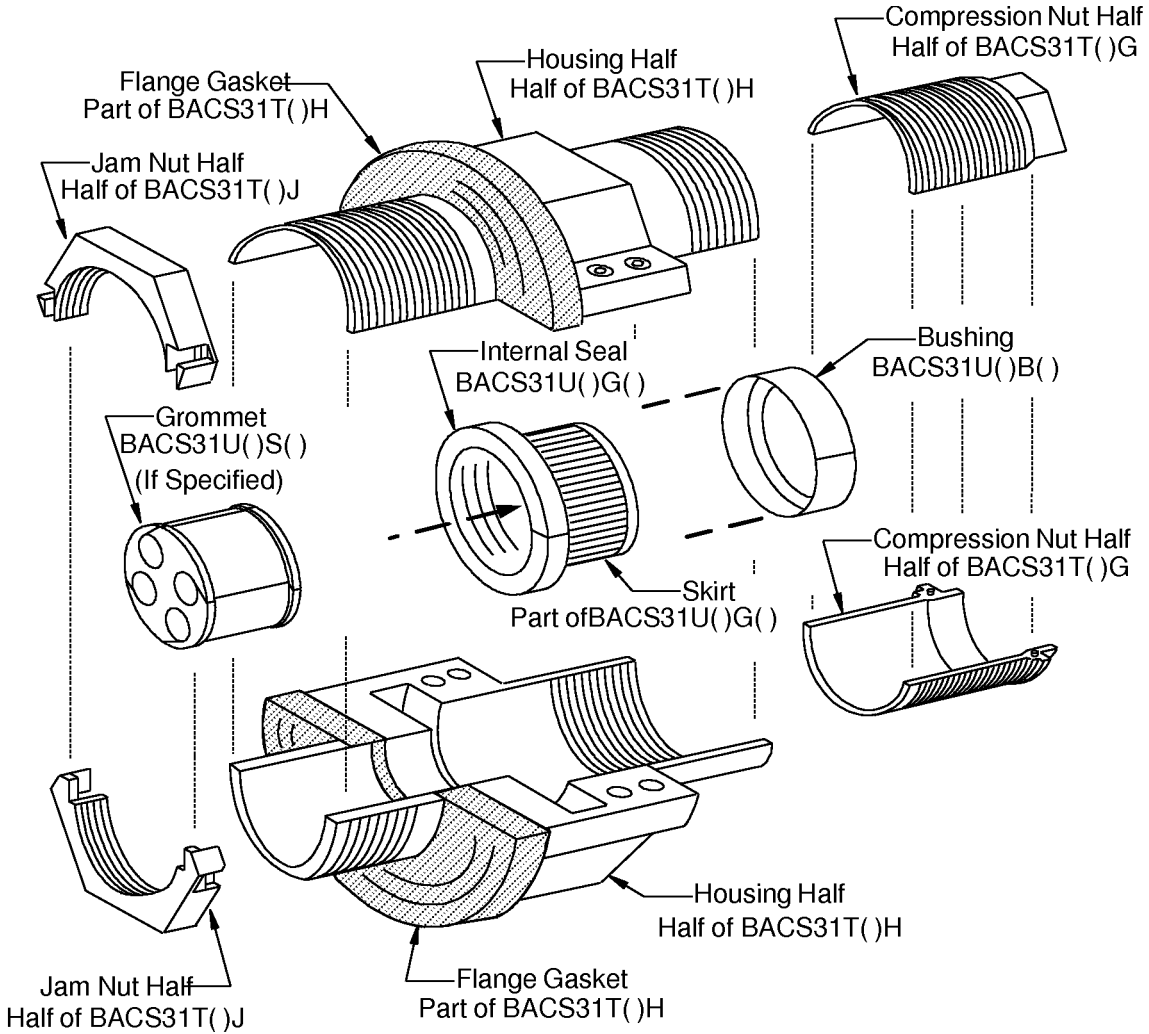
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STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

1. GENERAL DATA

A. Seal Fitting Part Numbers

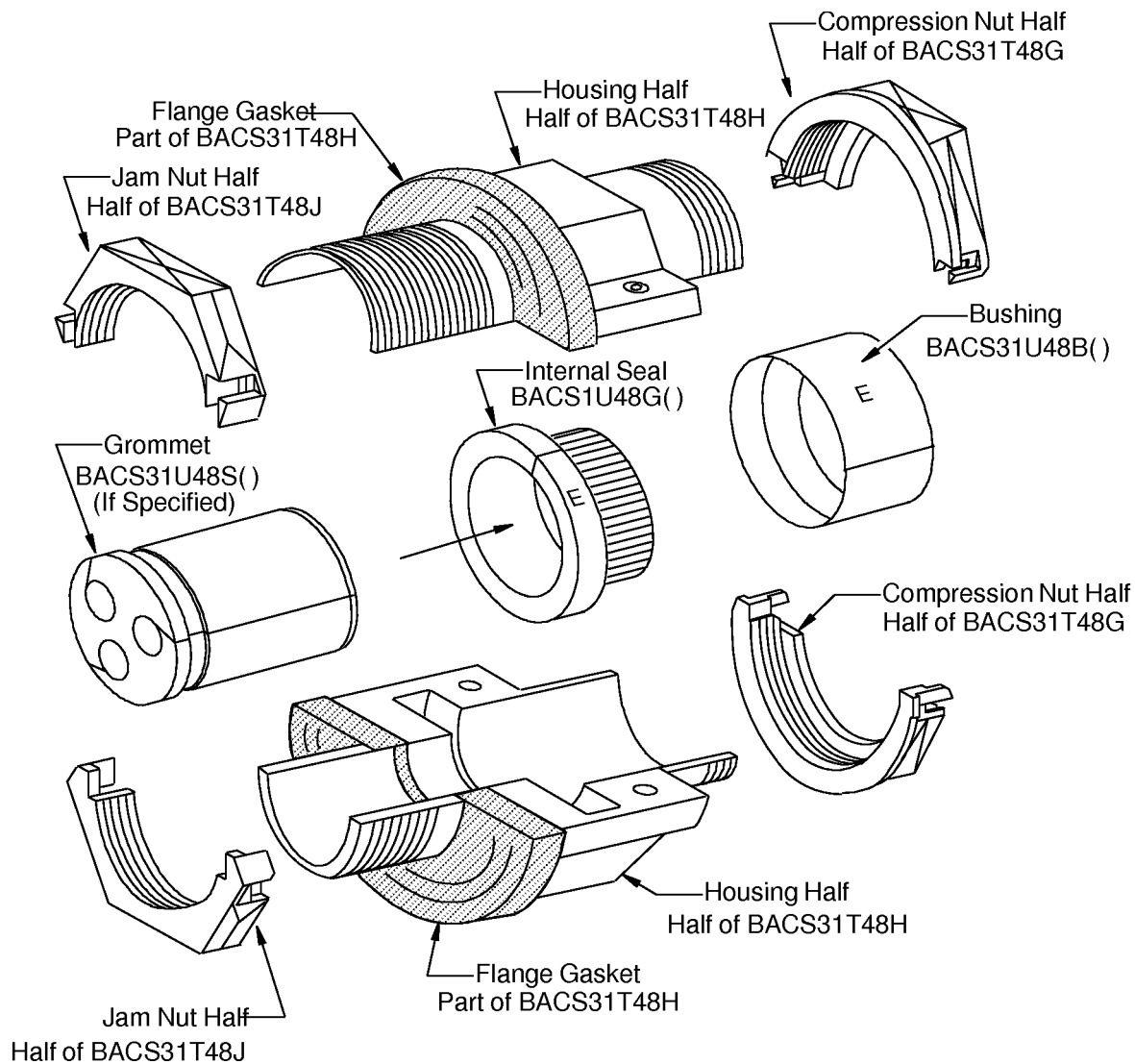


SHELL SIZE 24 AND 36 SEAL FITTING COMPONENTS

Figure 1

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

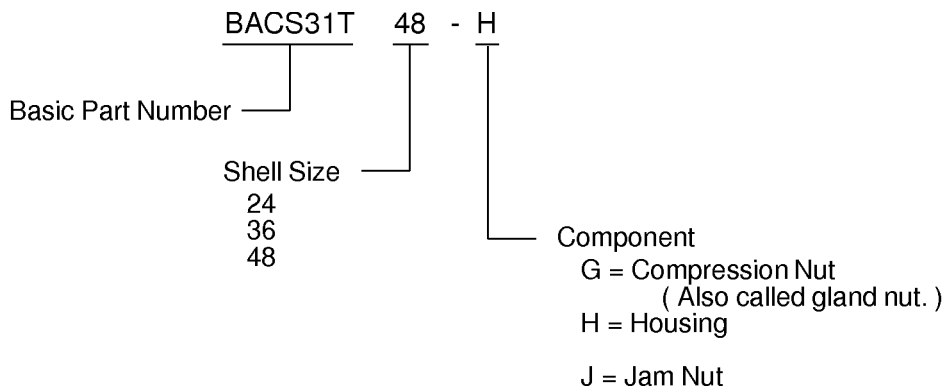


SHELL SIZE 48 SEAL FITTING COMPONENTS

Figure 2

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

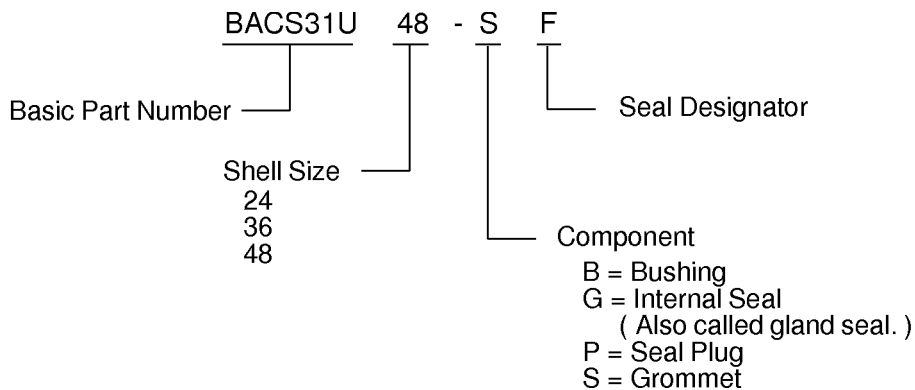


PART NUMBER STRUCTURE FOR THE HOUSING COMPONENTS OF THE SEAL FITTING
Figure 3

Table 1
Seal Fitting Housing Component Part Numbers

Shell Size	Part	Part Number
24	Housing	BACS31T24H
	Jam Nut	BACS31T24J
	Compression Nut	BACS31T24G
36	Housing	BACS31T36H
	Jam Nut	BACS31T36J
	Compression Nut	BACS31T36G
48	Housing	BACS31T48H
	Jam Nut	BACS31T48J
	Compression Nut	BACS31T48G

NOTE: For the seal fitting assembly, one Housing, one Jam Nut, and one Compression Nut are necessary.



PART NUMBER STRUCTURE FOR THE INTERNAL COMPONENTS OF THE SEAL FITTING
Figure 4

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STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

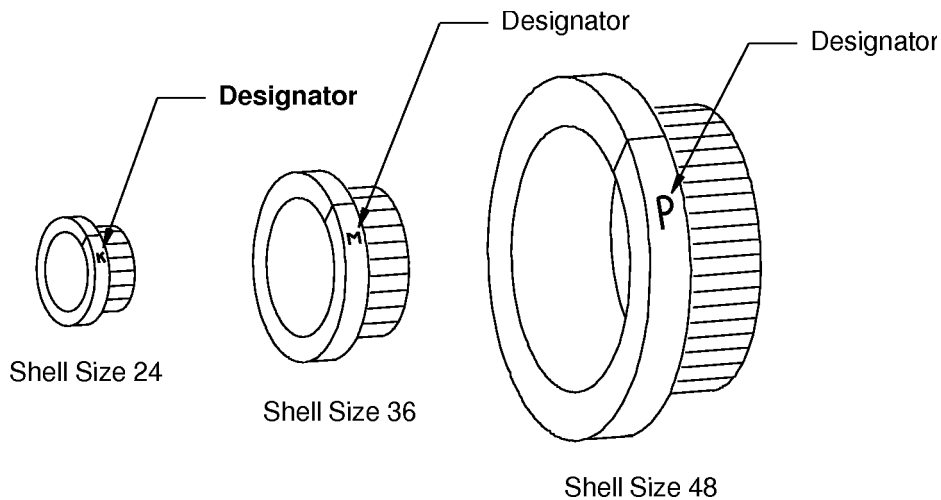
Table 2
Seal Fitting Internal Component Part Numbers

Shell Size	Part	Part Number
24	Grommet	BACS31U24S()
	Internal Seal	BACS31U24G()
	Bushing	BACS31U24B()
36	Grommet	BACS31U36S()
	Internal Seal	BACS31U36G()
	Bushing	BACS31U36B()
48	Grommet	BACS31U48S()
	Internal Seal	BACS31U48G()
	Bushing	BACS31U48B()

Refer to Paragraph 1.B. for the Seal Designator for the Grommet.

NOTE: If a Grommet is not used, one Internal Seal, and one Bushing are necessary.

NOTE: If a Grommet is used, one Internal Seal, one Bushing, and one Grommet are necessary.

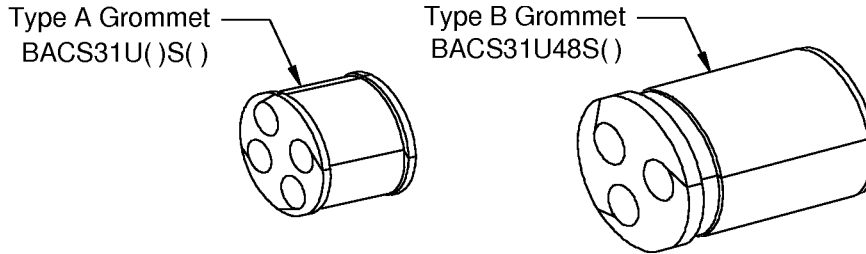


INTERNAL SEALS
Figure 5

Type A Grommets are used with shell size 24 and 36 seal fittings. Type B Grommets are used with shell size 48 seal fittings. Refer to Figure F6.

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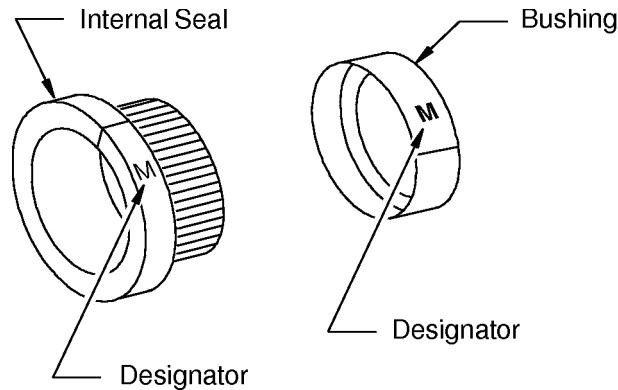
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



TYPE A AND TYPE B GROMMETS
Figure 6

NOTE: The Bushing and the Internal Seal must have the same Designator. Refer to Figure 7 .

Make sure that the Designator on the replacement Bushing and the Designator on the replacement Internal Seal is the same as the Designator on the Bushing and on the Internal Seal of the original configuration.



LOCATION OF THE DESIGNATOR ON THE INTERNAL SEAL AND ON THE BUSHING
Figure 7

Table 3
Seal Plug Part Numbers

Seal Plug Part Number	Grommet Hole Letter Designator	Grommet Hole Diameter Range (inch)
BACS31UP1	A	0.250 to 0.315
BACS31UP2	B	0.375 to 0.440
BACS31UP3	C	0.500 to 0.560
BACS31UP4	D	0.625 to 0.690
BACS31UP5	E	0.750 to 0.815
BACS31UP6	F	0.950 to 1.015

NOTE: Only the grommet holes of the diameter ranges that are given in Table 3 can have a seal plug.

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DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

B. Grommet Configurations for the Seal Fittings

**Table 4
BACS31U(S) Grommet Configurations for The BACS31T Seal Fittings**

Grommet			Reference
Shell Size	Seal Designator	Part Number	
24	K1	BACS31U24SK1	Figure 8
	K3	BACS31U24SK3	Figure 9
	K4	BACS31U24SK4	Figure 10
	K5	BACS31U24SK5	Figure 11
	K6	BACS31U24SK6	Figure 12
36	M1	BACS31U36SM1	Figure 13
	M2	BACS31U36SM2	Figure 14
	M3	BACS31U36SM3	Figure 15
	M4	BACS31U36SM4	Figure 16
48	P1	BACS31U48SP1	Figure 17
	P2	BACS31U48SP2	Figure 18
	P3	BACS31U48SP3	Figure 19
	P4	BACS31U48SP4	Figure 20
	P5	BACS31U48SP5	Figure 21
	P6	BACS31U48SP6	Figure 22
	P7	BACS31U48SP7	Figure 23
	P8	BACS31U48SP8	Figure 24
	P9	BACS31U48SP9	Figure 25
	P10	BACS31U48SP10	Figure 26
	P11	BACS31U48SP11	Figure 27
	P12	BACS31U48SP12	Figure 28
	P13	BACS31U48SP13	Figure 29
	P14	BACS31U48SP14	Figure 30
	P15	BACS31U48SP15	Figure 31
	P16	BACS31U48SP16	Figure 32
	P17	BACS31U48SP17	Figure 33
	P18	BACS31U48SP18	Figure 34
	P19	BACS31U48SP19	Figure 35

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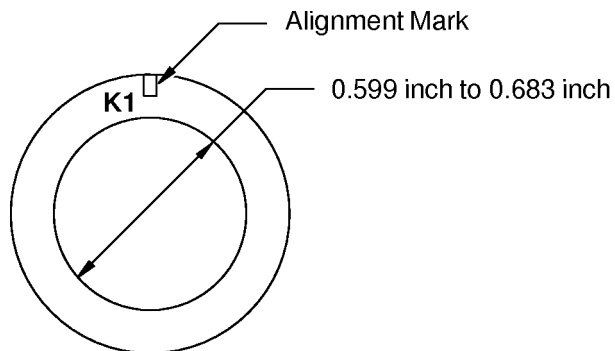
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

NOTE: Figure 8 through Figure 35 show the diameter limits for sealed wire harnesses, single wires, or single cables that go through the wire cavity holes in the grommet.

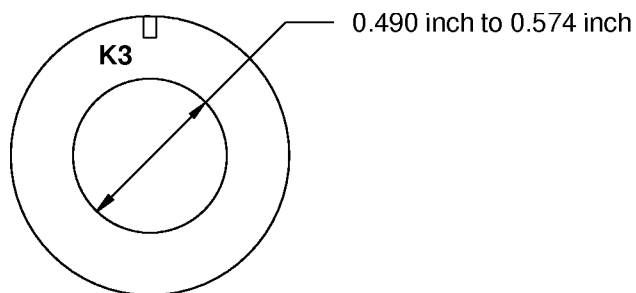
NOTE: Each grommet arrangement has an alignment mark. Refer to Figure 8 .

NOTE: Grommet holes have a Letter Designator that defines the wire harness diameter range for that hole. Refer to Table 3.

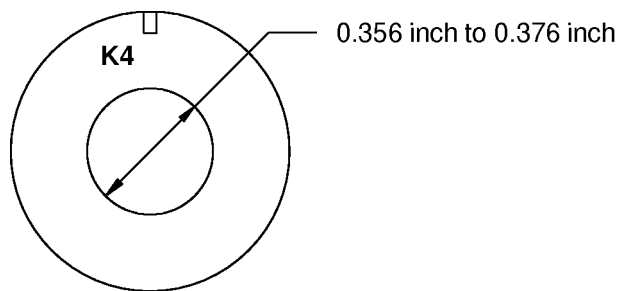
NOTE: Only the grommet holes of the diameter ranges that are given in Table 3 can have a seal plug.



SHELL SIZE 24 GROMMET ARRANGEMENT - SEAL DESIGNATOR K1
Figure 8



SHELL SIZE 24 GROMMET ARRANGEMENT - SEAL DESIGNATOR K3
Figure 9

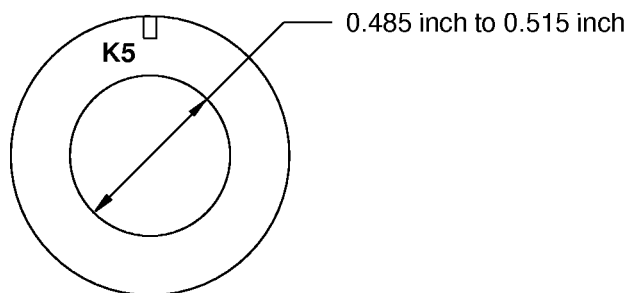


SHELL SIZE 24 GROMMET ARRANGEMENT - SEAL DESIGNATOR K4
Figure 10

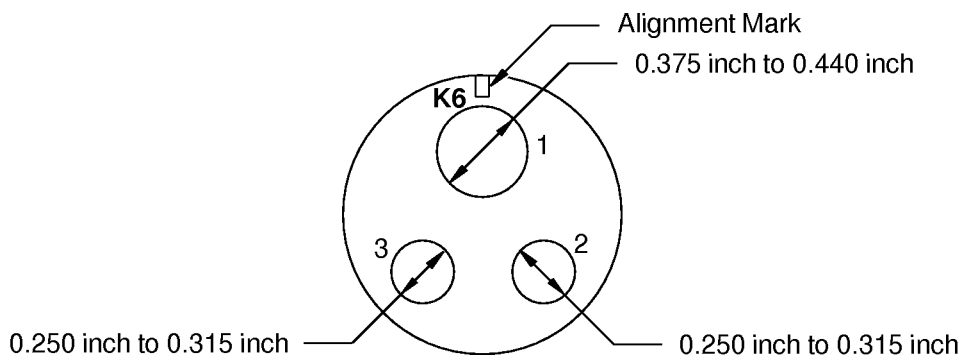
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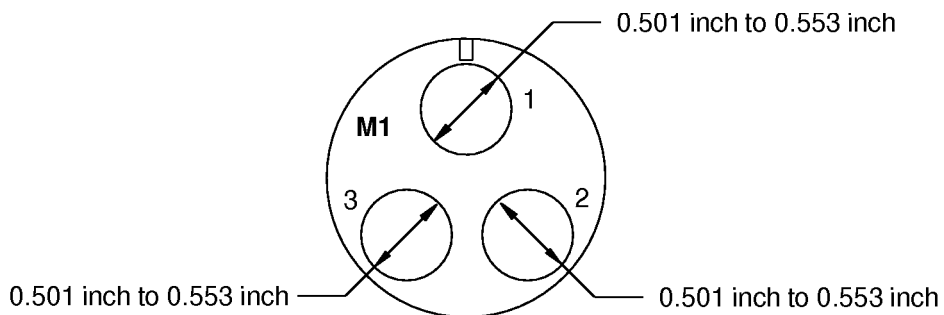
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



SHELL SIZE 24 GROMMET ARRANGEMENT - SEAL DESIGNATOR K5
Figure 11



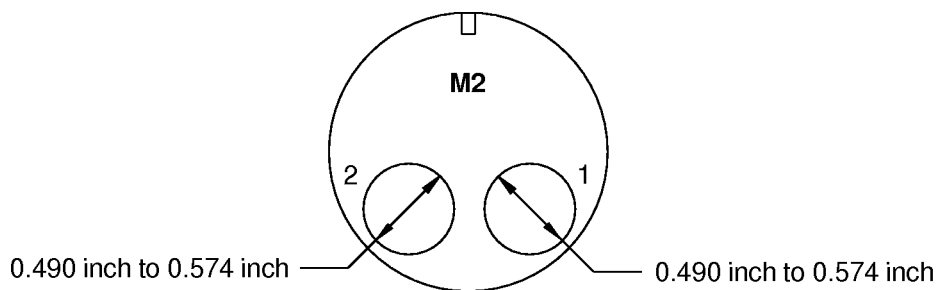
SHELL SIZE 24 GROMMET ARRANGEMENT - SEAL DESIGNATOR K6
Figure 12



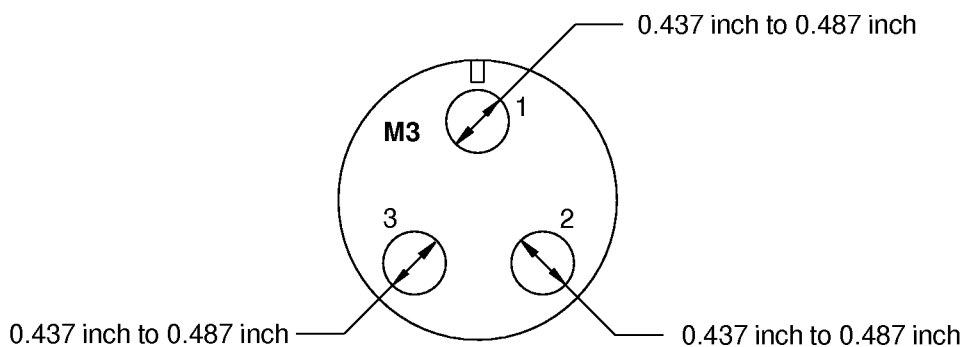
SHELL SIZE 36 GROMMET ARRANGEMENT - SEAL DESIGNATOR M1
Figure 13

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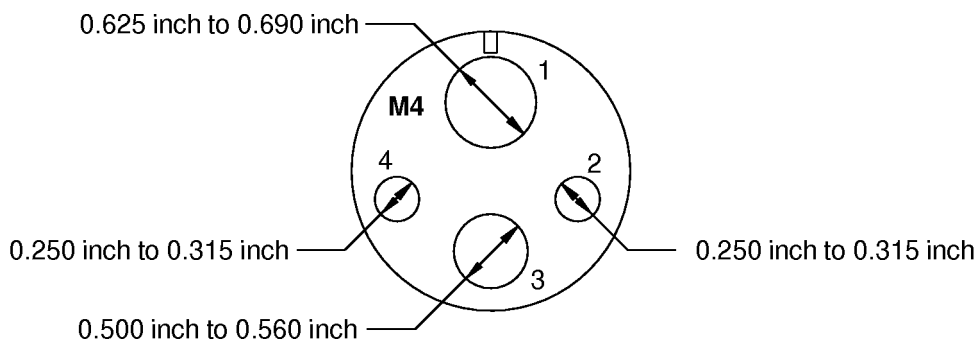
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



SHELL SIZE 36 GROMMET ARRANGEMENT - SEAL DESIGNATOR M2
Figure 14



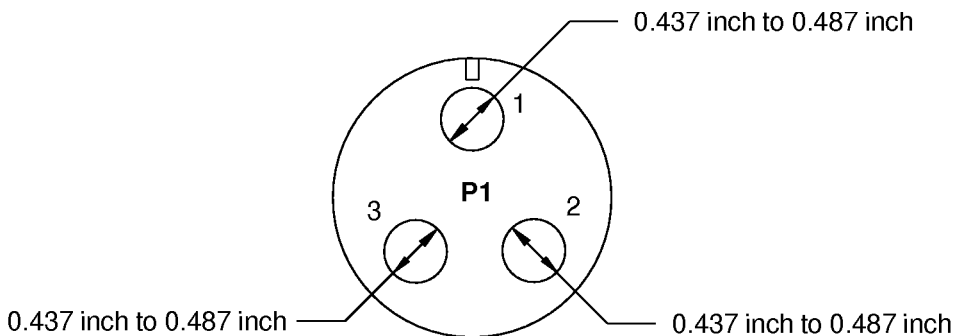
SHELL SIZE 36 GROMMET ARRANGEMENT - SEAL DESIGNATOR M3
Figure 15



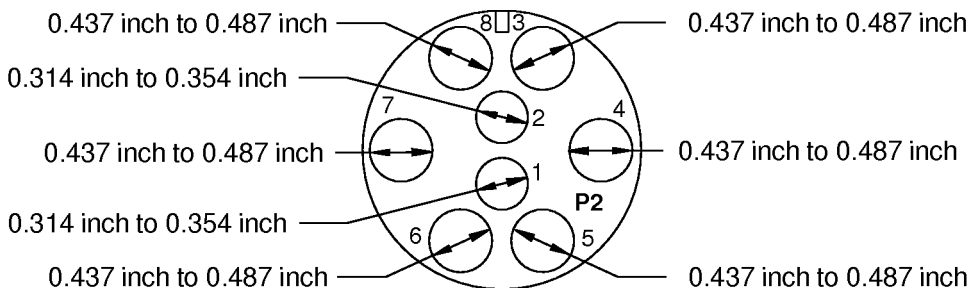
SHELL SIZE 36 GROMMET ARRANGEMENT - SEAL DESIGNATOR M4
Figure 16

STANDARD WIRING PRACTICES MANUAL

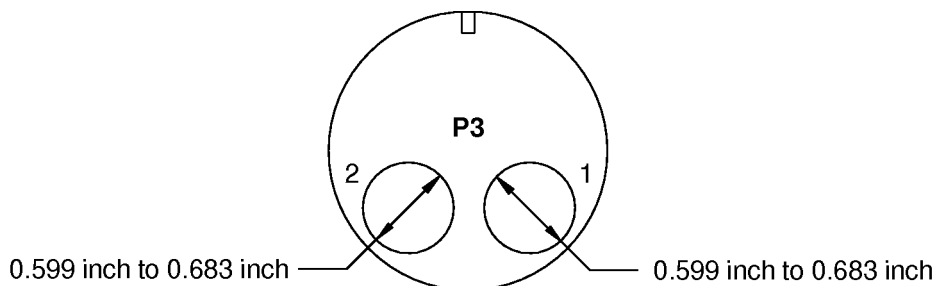
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P1
Figure 17



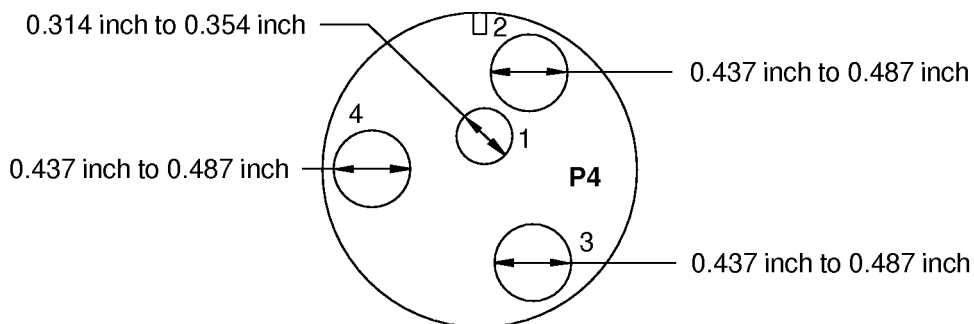
SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P2
Figure 18



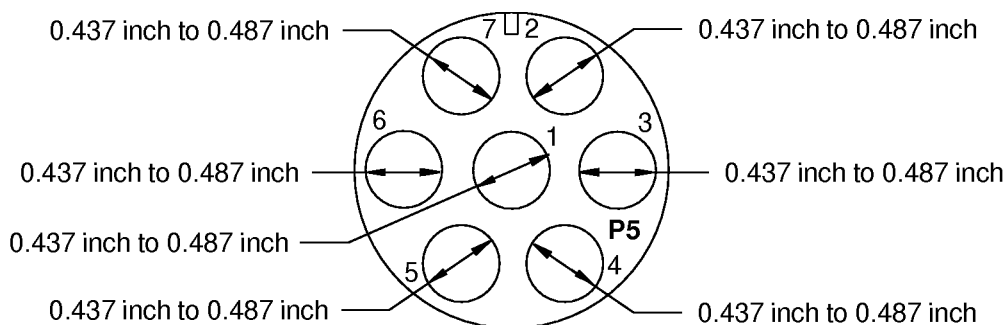
SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P3
Figure 19

STANDARD WIRING PRACTICES MANUAL

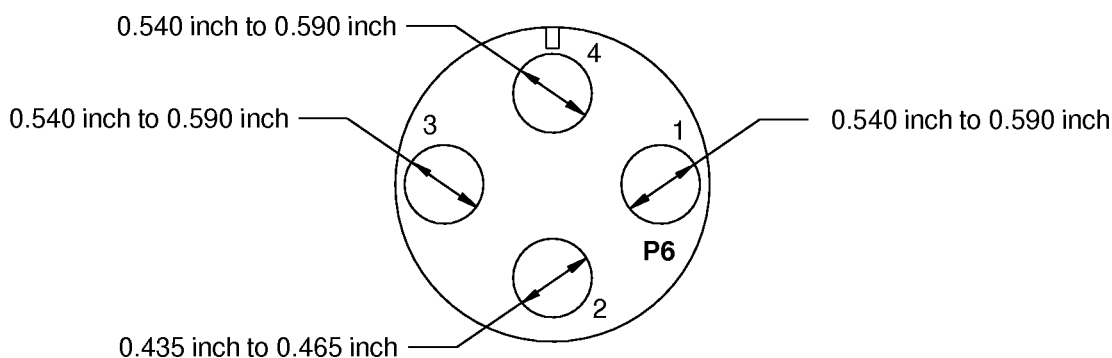
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P4
Figure 20



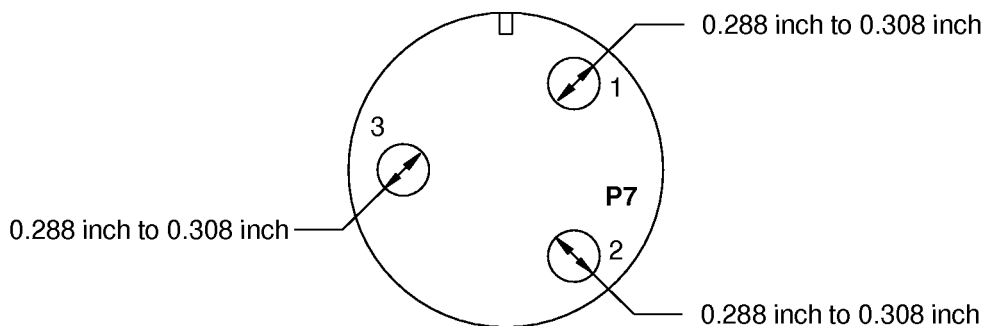
SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P5
Figure 21



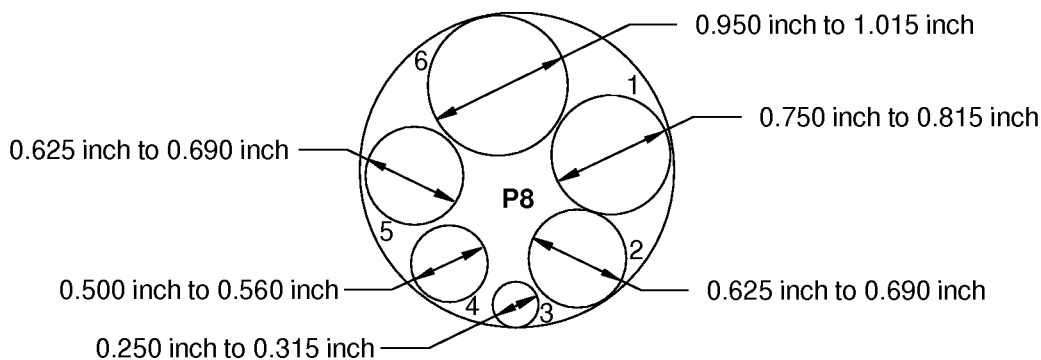
SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P6
Figure 22

STANDARD WIRING PRACTICES MANUAL

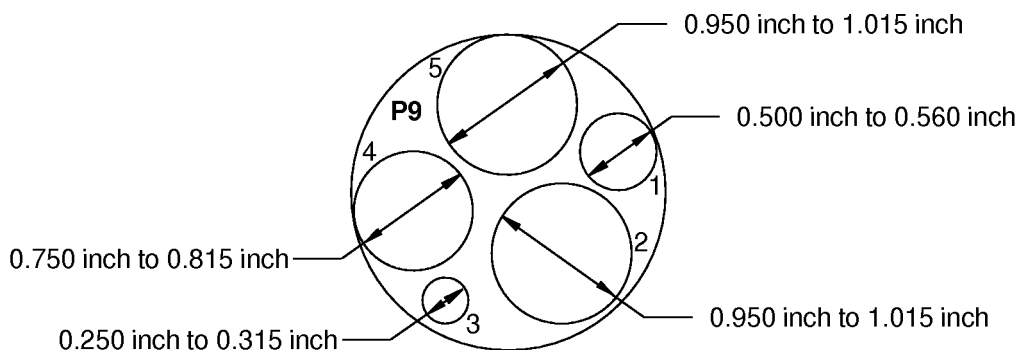
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P7
Figure 23



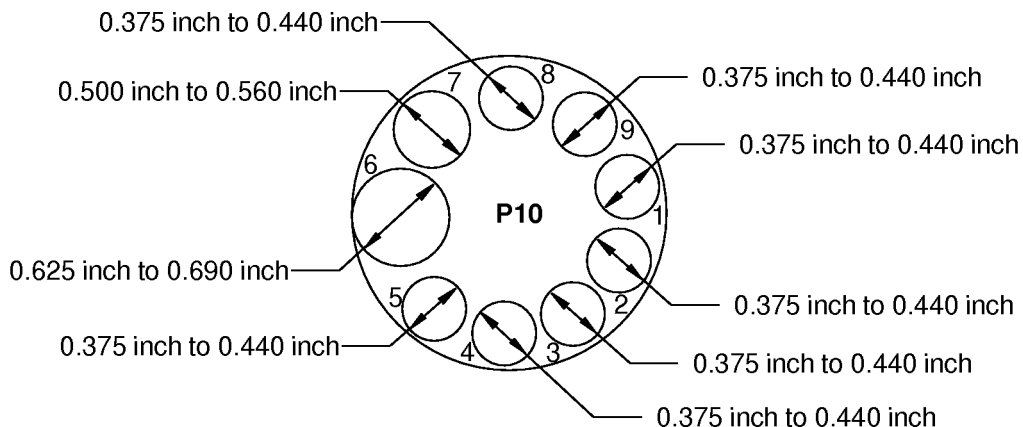
SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P8
Figure 24



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P9
Figure 25

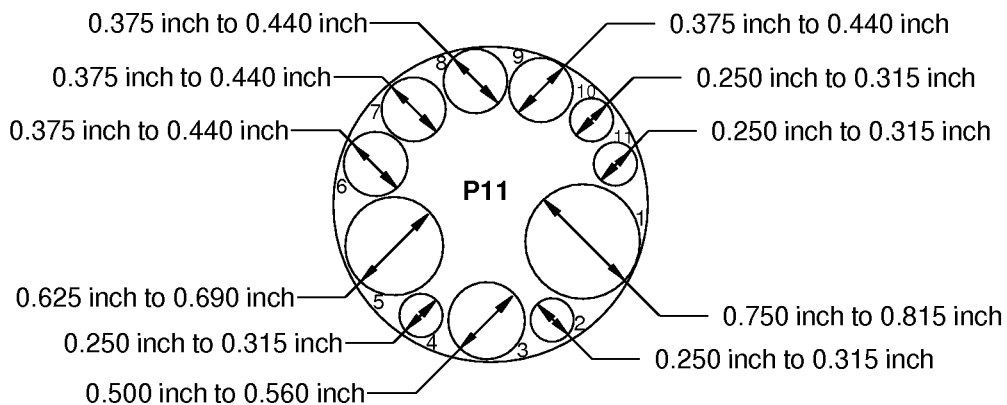
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DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



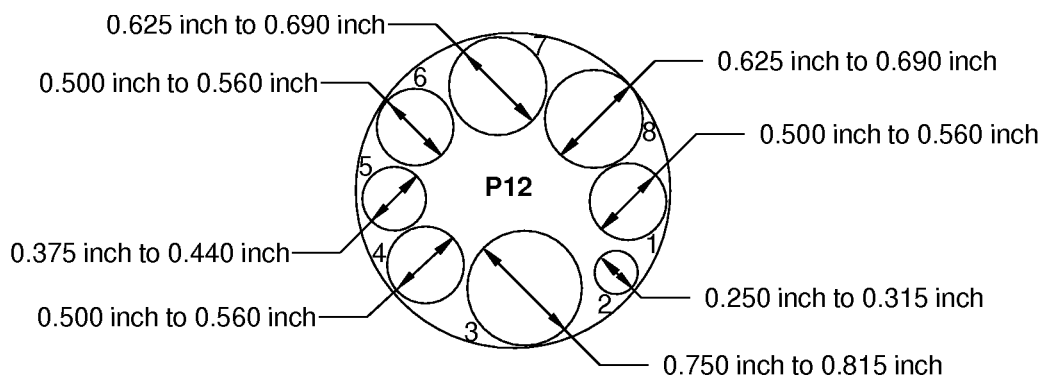
SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P10

Figure 26



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P11

Figure 27

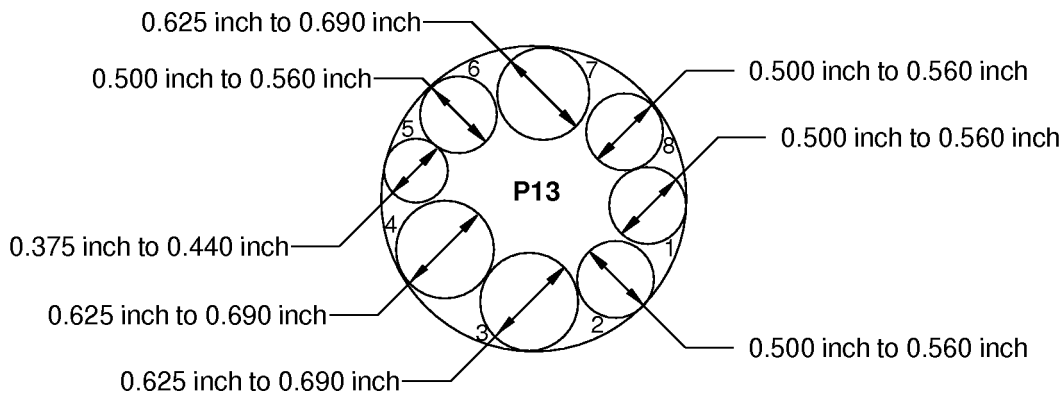


SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P12

Figure 28

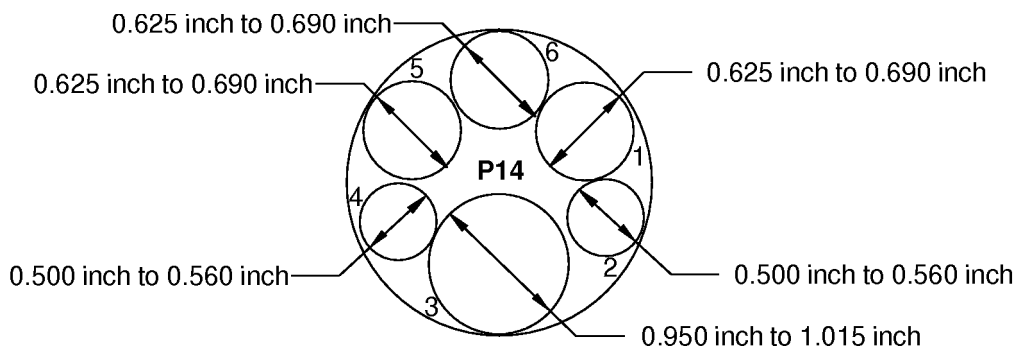
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



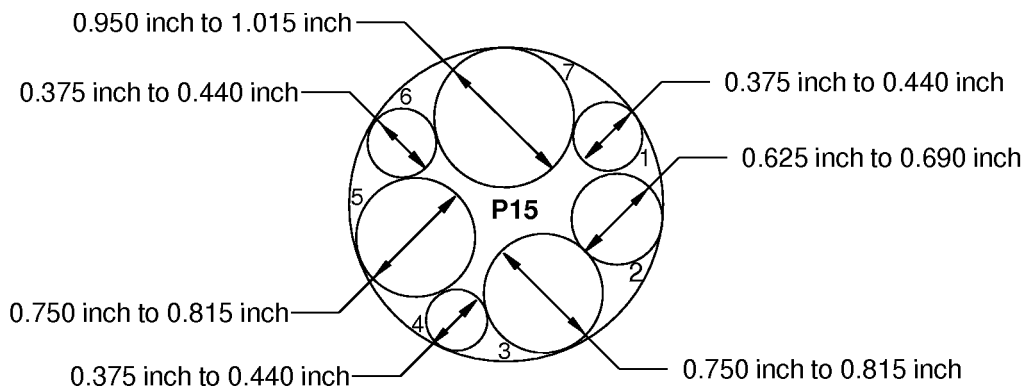
SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P13

Figure 29



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P14

Figure 30

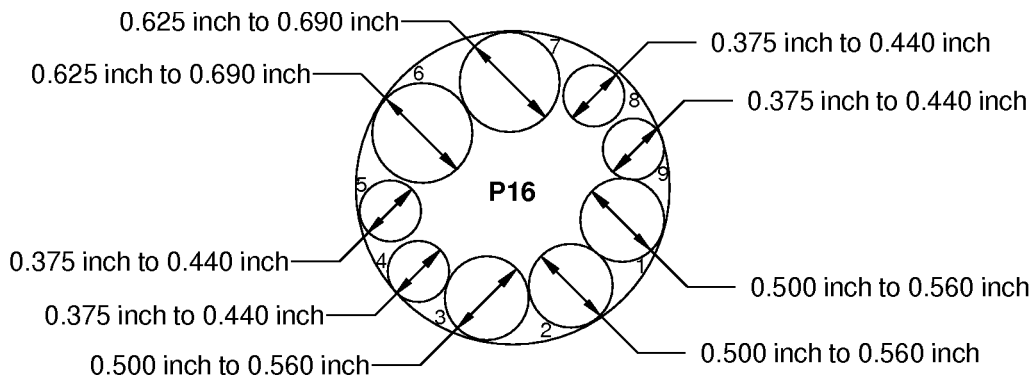


SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P15

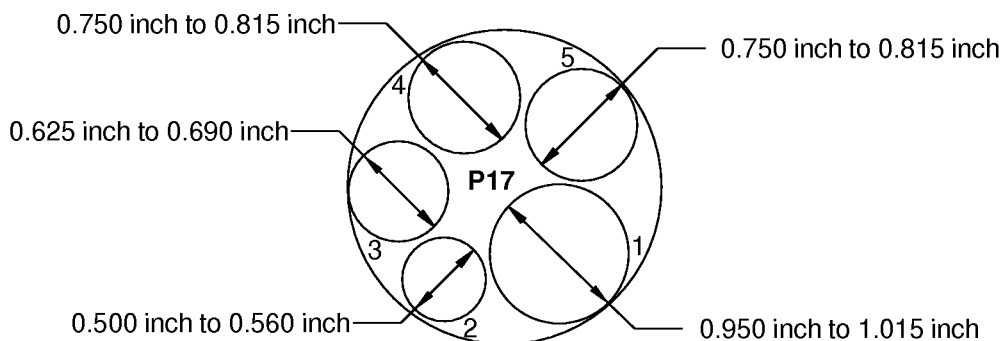
Figure 31

STANDARD WIRING PRACTICES MANUAL

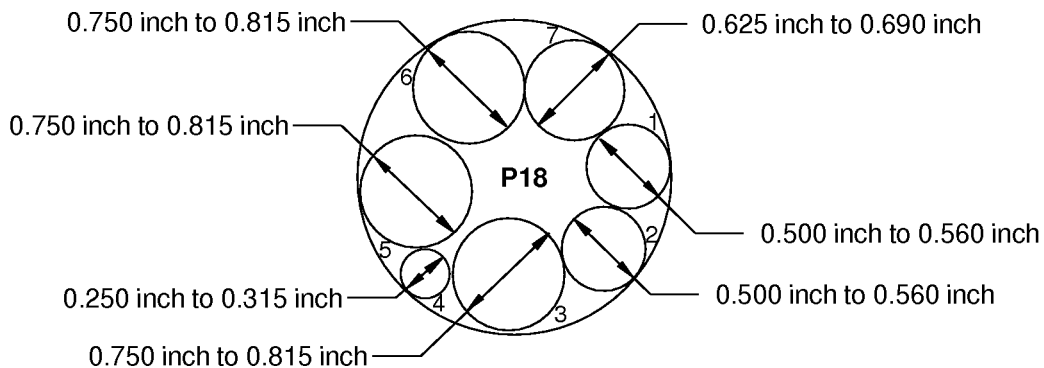
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P16
Figure 32



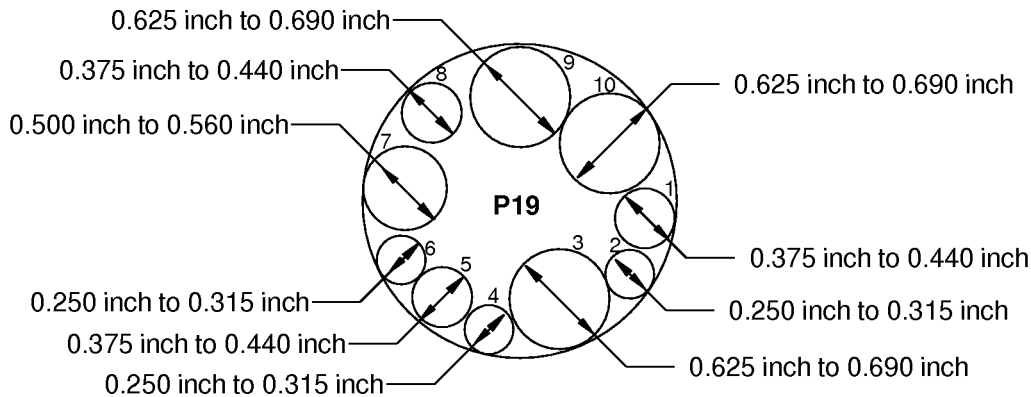
SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P17
Figure 33



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P18
Figure 34

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



SHELL SIZE 48 GROMMET ARRANGEMENT - SEAL DESIGNATOR P19
Figure 35

2. REMOVAL AND DISASSEMBLY OF THE SEAL FITTING

A. Removal of the Seal Fitting from the Structure

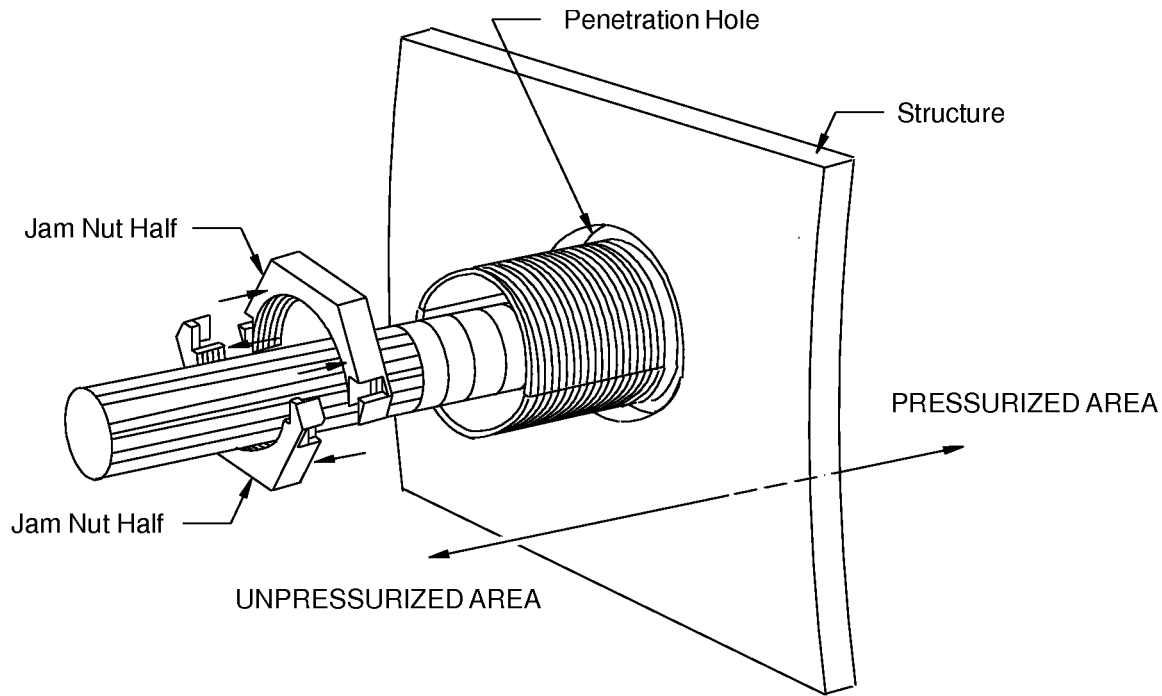
Table 5
Necessary Tools

Tool	Description	Shell Size	Size (inches)	Part Number
Wrench	Crowfoot, Jam Nut	24	2.0	AN850832B
				ST2580-343A-17
		36	2-5/8	AN850842B
				ST2580-343A-15
		48	3-1/2	057-0919-05
Wrench	Socket, Jam nut, Unpressurized Side	48	3-1/2	057-0898-05

- (1) Make a selection of a crowfoot jam nut wrench from Table 5. On the unpressurized side of the structure, turn the jam nut in the counterclockwise direction to loosen it from the seal fitting.
- (2) Push on the two halves of the jam nut to separate the two halves of the jam nut. Refer to Figure 36.

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REMOVAL OF THE JAM NUT AND SEPARATION OF THE JAM NUT HALVES

Figure 36

- (3) On the pressurized side of the structure, pull the seal fitting and the wire harness from the penetration hole.

CAUTION: Do not cause damage to the insulation of the wires.

B. Disassembly of Shell Size 24 and 36 Seal Fittings

**Table 6
Necessary Tools**

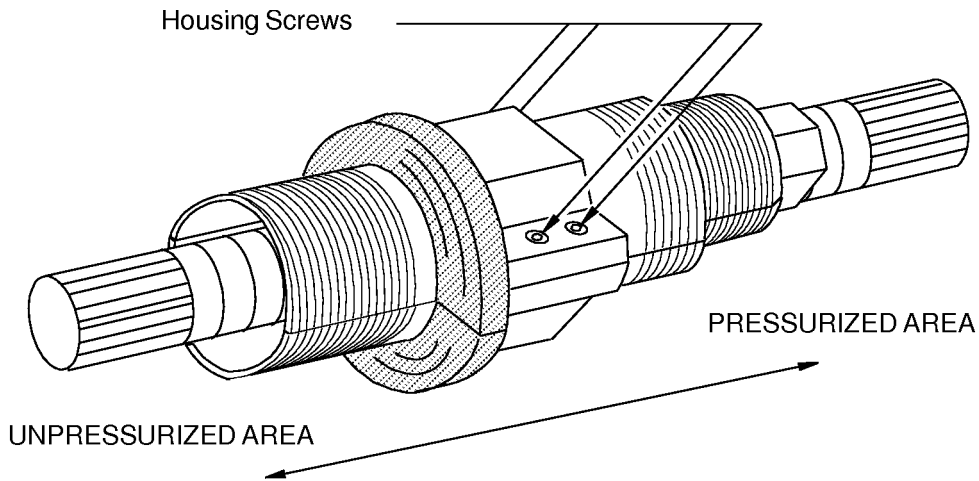
Tool	Description	Shell Size	Size (inch)	Part Number
Wrench	Allen	24	7/64	-
		36	7/64	-
Wrench	Crow Foot, Compression Nut	24	1-1/2	AN850824B ST2580-343A-20
		36	1-5/8	AN850826B ST2580-343A-18
Holding Tool	-	24	2	ST2580-343A-23
		36	2-5/8	ST2580-343A-21

- (1) Make a selection of an allen wrench from table 6.
- (2) Disengage the screws that hold the two housing halves together. Refer to Figure 37.

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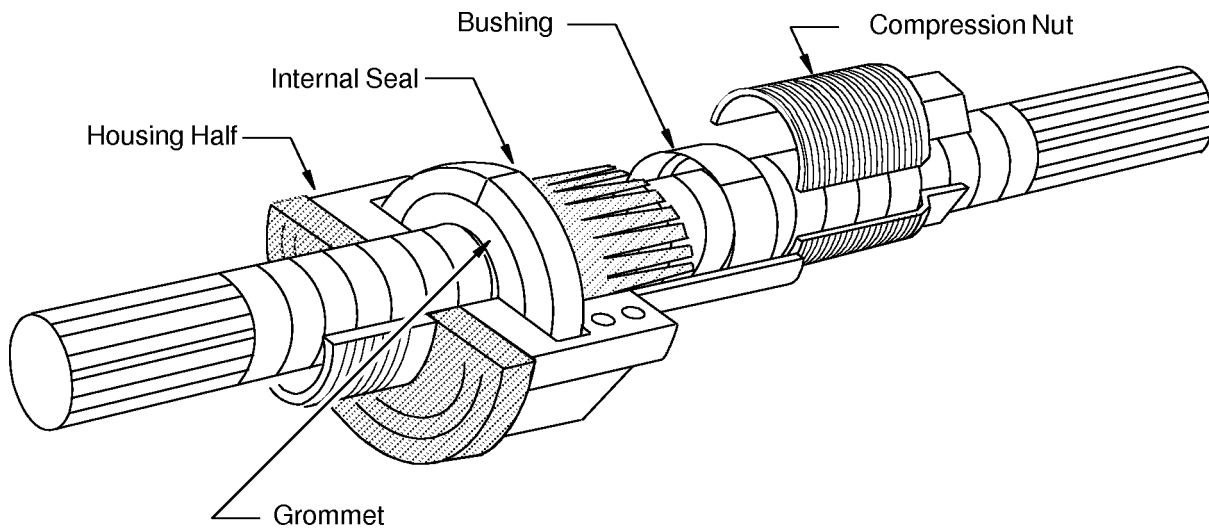
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



LOCATION OF DISENGAGED SCREWS

Figure 37

- (3) Separate the two halves of the housing.
- (4) Make a selection of a crowfoot compression nut wrench from Table 6.
- (5) Pull the wire harness, the internal seal, the bushing, and the compression nut from the housing. Refer to Figure 38.



REMOVAL OF WIRE HARNESS, INTERNAL SEAL, BUSHING, AND COMPRESSION NUT

Figure 38

- (6) If the seal fitting has a grommet:
 - (a) Remove the grommet from the internal seal.
 - (b) Remove the wires from the grommet.
- (7) If the seal fitting does not have a grommet, remove the wire harness from the internal seal.

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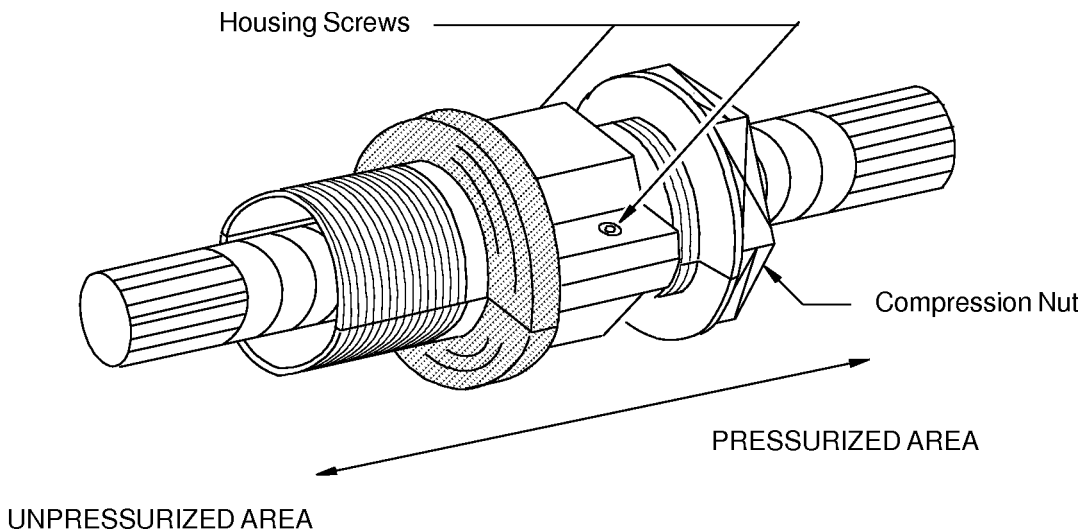
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

C. Disassembly of the Shell Size 48 Seal Fitting

**Table 7
Necessary Tools**

Seal Fitting Shell Size	Tool	Description	Size (inch)	Part Number
48	Wrench	Allen	9/64	-
		Crow Foot, Compression Nut	3-1/2	ST2580-343A-19
	Holding Tool	-	3-1/2	ST2580-343A-22

- (1) Make a selection of crow foot compression nut wrench from Table 7.
- (2) Remove the compression nut from the seal fitting. Refer to Figure 39.



SHELL SIZE 48 SEAL FITTING REMOVED FROM THE STRUCTURE

Figure 39

- (3) Make a selection of allen wrench from Table 6.
- (4) Disengage the screws that hold the two housing halves together. Refer to Figure 39.
- (5) Separate the two halves of the housing.
- (6) Pull the wire harness, the internal seal and grommet, and the bushing from the housing.
- (7) If the seal fitting does not have a grommet, remove the wire harness from the internal seal.
- (8) If the seal fitting has a grommet:
 - (a) Remove the grommet from the internal seal.
 - (b) Remove the wires from the grommet.

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DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

D. Removal of the Sealant Tape from the Harness

**Table 8
Necessary Materials**

Material	Description	Part Number	Supplier
Solvent	Isopropyl Alcohol	TT-I-735	An available source
	Naptha, Aliphatic	TT-N-95 Type I	An available source

**Table 9
Necessary Tools**

Description	Notes	Supplier
Gloves	Powder Free	An available source
Scissors	-	An available source
Wiper	-	An available source

NOTE: Use gloves to touch or move the adhesive sealant tape. Refer to Table 9.

- (1) Make a selection of:
 - A solvent from Table 8
 - A pair of Scissors from Table 9
 - A wiper from Table 9.

- (2) Cut the outer wrap of tape with the scissors.

NOTE: To make the operation easier, the tape can be lifted as it is cut.

CAUTION: DO NOT CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION OF THE WIRE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (3) Use a sealant stick to move the tape apart
- (4) Remove the tape from the harness.
- (5) Put the solvent on the wiper.
- (6) Use the wiper to remove the adhesive sealant from the wire harness.

NOTE: It is not necessary to remove all of the sealant if the sealant does not touch something before the wire harness is taped again.

3. PREPARATION OF A WIRE HARNESS SEAL FITTING

A. Preparation of a Wire Harness for Installation in a Grommet

**Table 10
Necessary Materials**

Material	Description	Part Number	Supplier
Adhesive Sealant Tape	0.50 inch wide, Black	5313	3M
Flag Marker Tape	-	BACT19ET-5	Boeing

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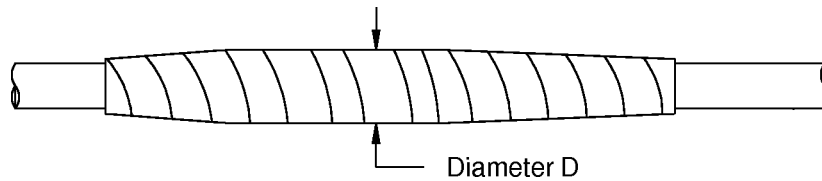
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

Table 10 (continued)

Material	Description	Part Number	Supplier
Silicone Tape	0.57 inch wide, Black	67N	Federal Mogul

**Table 11
Necessary Tools**

Tool	Description	Part Number
Marker	Temporary	-
Wrench, Compression Strap	-	057-0750-00
Wrench, Torque	50 inch-pound	-
Ruler	-	-



DIAMETER D OF THE FINISHED WIRE HARNESS AFTER THE INSTALLATION OF THE SEALANT TAPE

Figure 40

**Table 12
Wire Harness Diameters**

Specified Diameter (inch)	Assembly Diameter D (inch) Refer to Figure 40 .	
	Minimum	Maximum
0.250	0.19	0.250
0.375	0.32	0.375
0.500	0.44	0.500
0.625	0.57	0.625
0.750	0.69	0.750
0.950	0.89	0.950

- (1) Find the Controlled Diameter Area on the wire harness:
 - (a) Put one seal fitting housing half in the penetration hole in the structure.
Make sure that the flange gasket is against the structure on the pressurized area side.
 - (b) Put the wire harness in the housing.
 - (c) Make a selection of a Marker from Table 11.

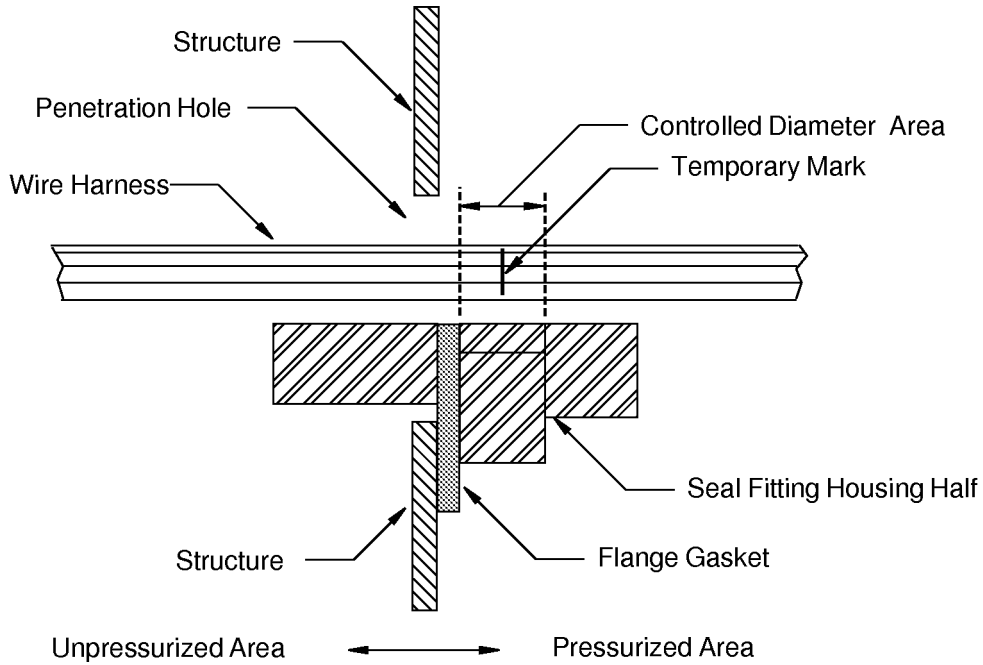
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- (d) Make a temporary mark on the wire harness approximately in the center of the Controlled Diameter Area.

Refer to:

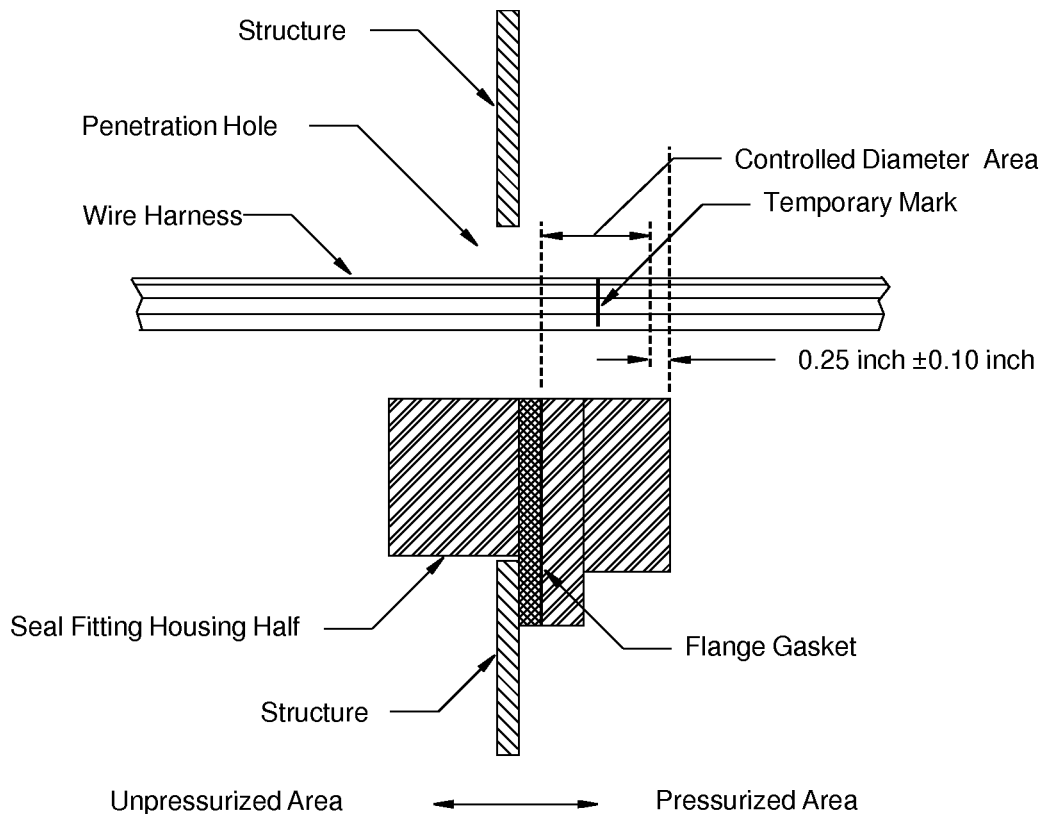
- Figure 41 for shell size 24 and shell size 36 seal fittings
- Figure 42 for shell size 48 seal fittings.



POSITION OF THE TEMPORARY MARK ON THE HARNESS FOR THE SHELL SIZE 24 AND 36 SEAL FITTINGS
Figure 41

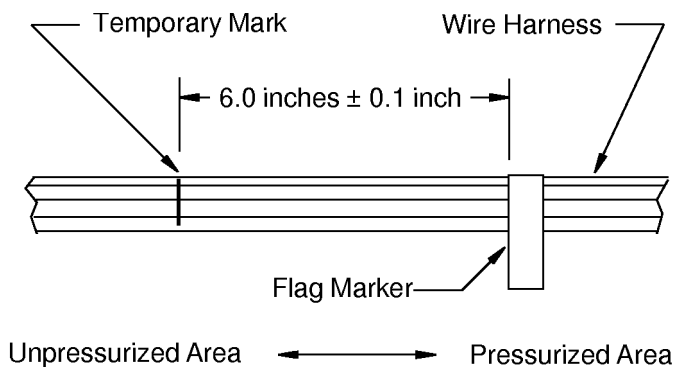
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DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



POSITION OF THE TEMPORARY MARK ON THE HARNESS FOR THE SHELL SIZE 48 SEAL FITTING
Figure 42

- (e) Do Step (b) through Step (d) again for each wire harness that must be installed in the seal fitting.
- (2) Make a selection of a Flag Marker Tape from Table 10 .
- (3) For each wire harness that will be installed in the seal fitting, put a length of Flag Marker Tape on the harness 6.0 inches \pm 0.1 inch from the temporary mark in the direction of the pressurized area. Refer to Figure 43.

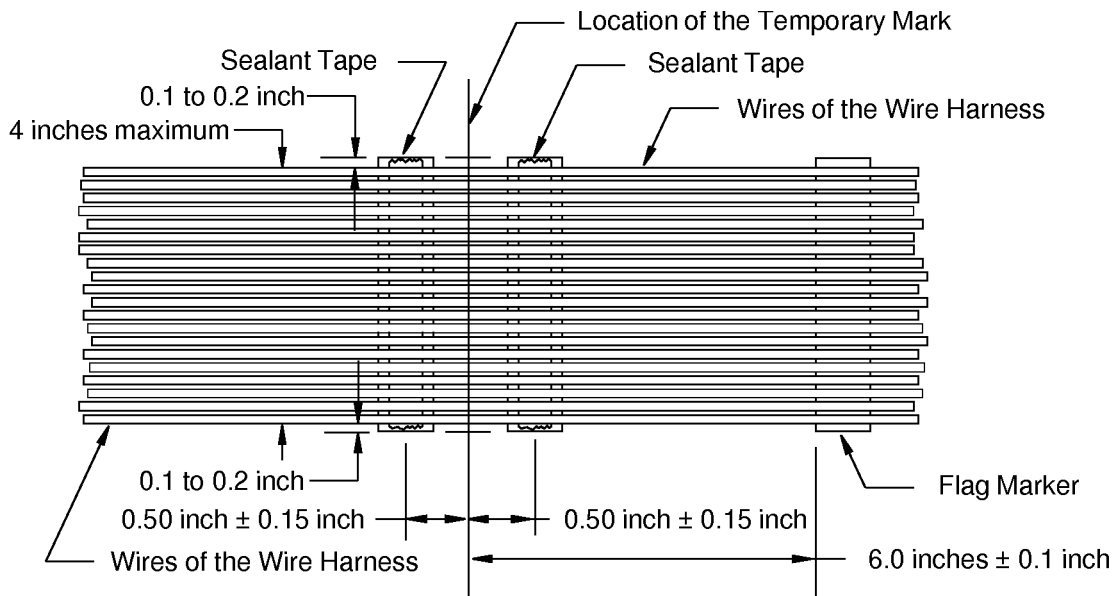


POSITION OF THE FLAG MARKER
Figure 43

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

- (4) Make a selection of an Adhesive Sealant Tape from Table 10.
- (5) Cut two lengths of the Adhesive Sealant Tape.
Make sure that the lengths of the sealant tape are not longer than 4.4 inches. Refer to Figure 44 .
- (6) Move all or some of the wires of the wire harness to make one layer of wires not more than 4 inches wide. Refer to Figure 44 .



CONFIGURATION OF THE WIRES ON THE FIRST LENGTH OF SEALANT TAPE

Figure 44

- (7) Put the layer of the wires on the sealant tapes and push each wire into the sealant. Refer to Figure 44.

Make sure that the position of the temporary mark on the wires is located at half the distance between the lengths of the sealant tape.

Where the wires touch the sealant , make sure that :

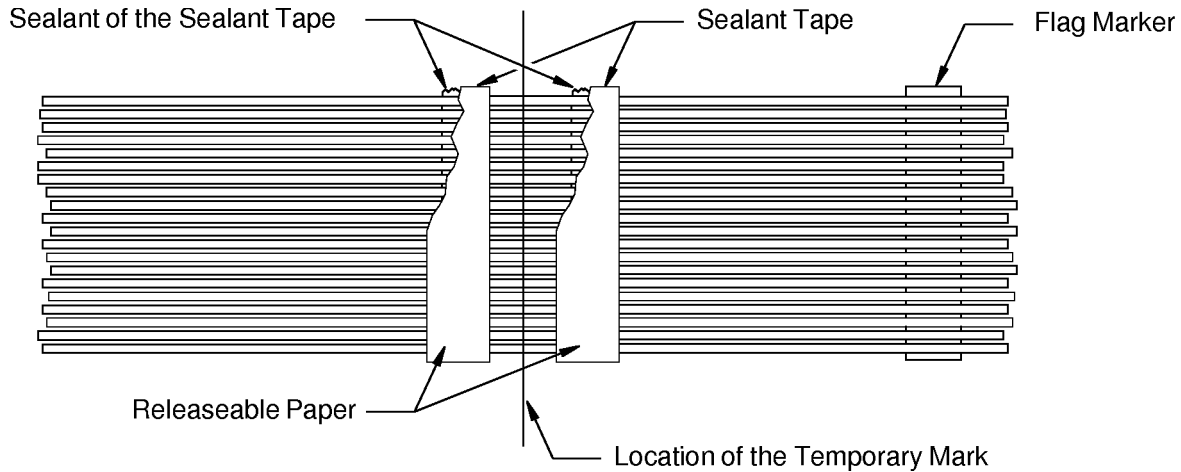
- The width of the layer of wires is 4 inches maximum
- The wires are all adjacent to each other
- One of the wires is not on another wire
- The end of the length of sealant tape extends approximately 0.1 inch to 0.2 inch beyond the wires.

- (8) Put an additional length of the sealant tape on the wires above each layer of sealant tape. Refer to Figure 45 .

Make sure that the sealant on these lengths of sealant tape touches the wires.

STANDARD WIRING PRACTICES MANUAL

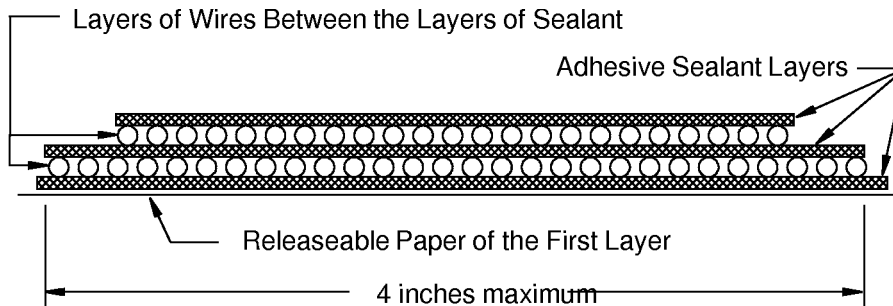
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



THE SECOND LENGTH OF SEALANT TAPE ON THE LAYER OF WIRES
Figure 45

- (9) Remove the releasable paper from these additional layers of sealant tape.
- (10) If more layers of wires are necessary, do Step (6) through Step (9) again for each additional layer of wires. Refer to Figure 46 .

Make sure that no lengths of the releasable paper are between the layers of the wires and the sealant.

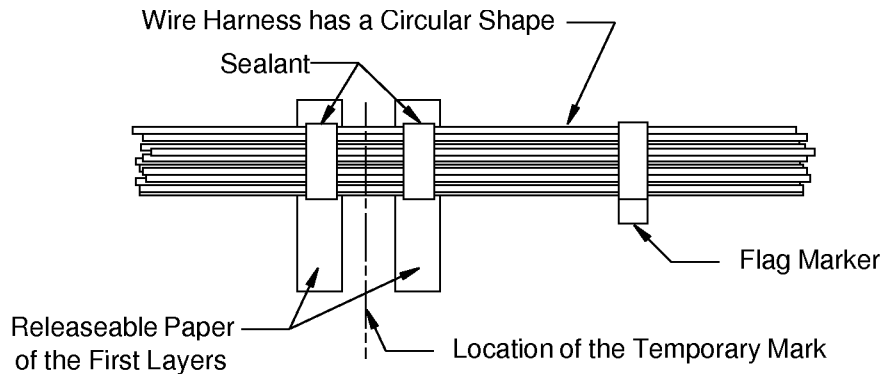


CONFIGURATION OF THE LAYERS OF THE SEALANT TAPE AND THE LAYERS OF THE WIRES
Figure 46

- (11) Wind the layers of sealant and wire on itself, and at the same time, remove the remaining length of releasable paper from the first layer of sealant tape. Refer to Figure 46 and Figure 47.
- Make sure that the wire harness now has a circular shape.

STANDARD WIRING PRACTICES MANUAL

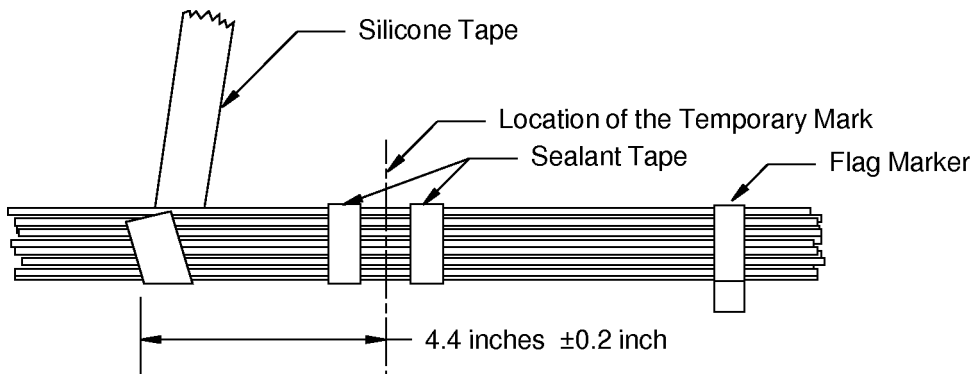
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



CONFIGURATION OF THE WIRE HARNESS AFTER IT IS WOUND
Figure 47

- (12) Make a selection of silicone tape from Table 10 .
- (13) Wrap a minimum of one layer of the silicone tape on the harness at approximately a 60 degree angle from the unpressurized side to the pressurized side. Refer to Figure 48 .

Make sure that the wrap starts at 4.4 inches \pm 0.2 inch from the temporary mark.



POSITION OF THE OUTER LAYER OF TAPE ON THE WIRE HARNESS
Figure 48

- (14) Continue to apply the necessary layers of silicone tape until the wire harness diameter is sufficiently increased.

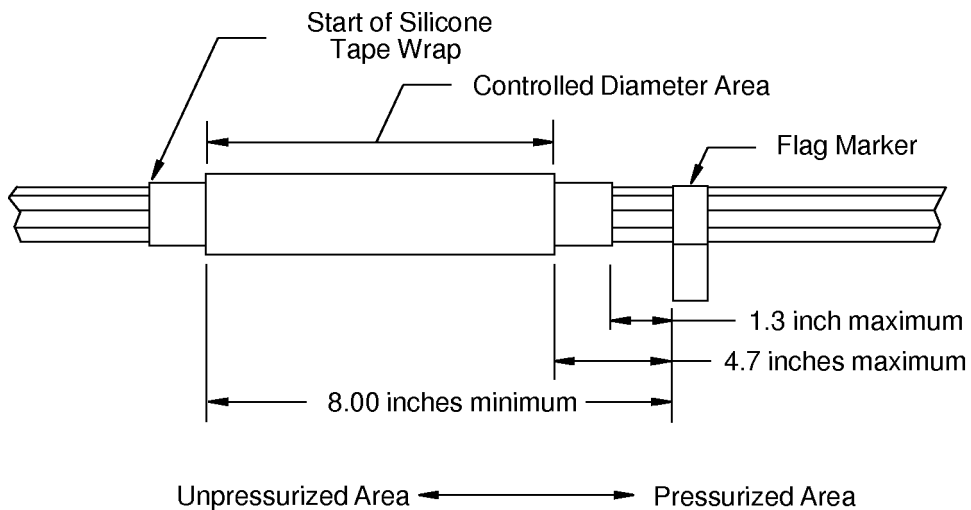
For the length of the wrap, refer to Figure 48 and 49.

For the outer diameter of the wrap, refer to:

- Paragraph 1.B. for the grommet cavity diameter
- Table 12 and Figure 40 for the applicable harness assembly diameter.

Make sure that while the silicone tape is put on:

- Each tape wrap makes a 40 percent to 50 percent overlap
- The tape is stretched
- The sealant is not pushed out
- The tension is smooth and even.

STANDARD WIRING PRACTICES MANUAL**DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS****LOCATION OF THE CONTROLLED DIAMETER AREA OF THE WIRE HARNESS****Figure 49**

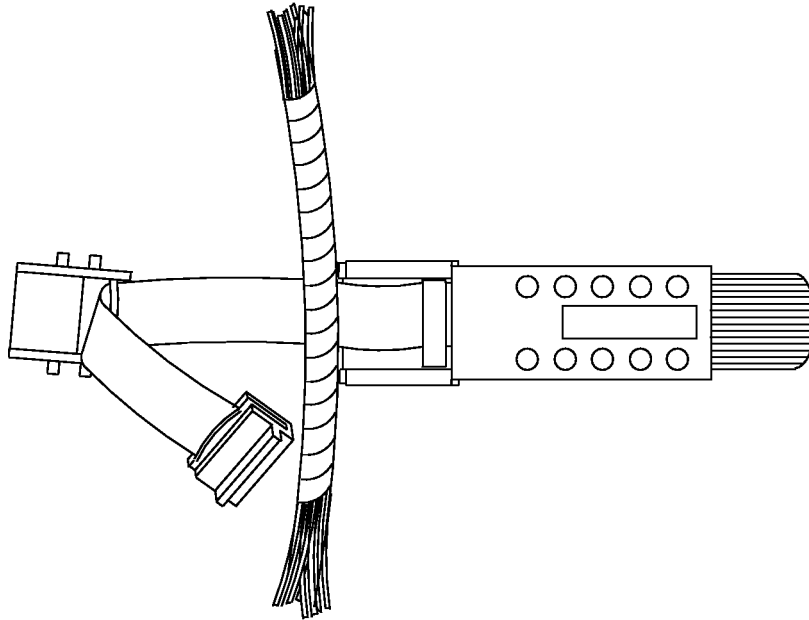
- (15) Make a selection of a compression strap wrench from Table 11.
- (16) Make a selection of a torque tool from Table 11.
- (17) Align one edge of the strap with the approximate center of the taped area.

Refer to:

- Figure 50
- Figure 51
- Figure 52.

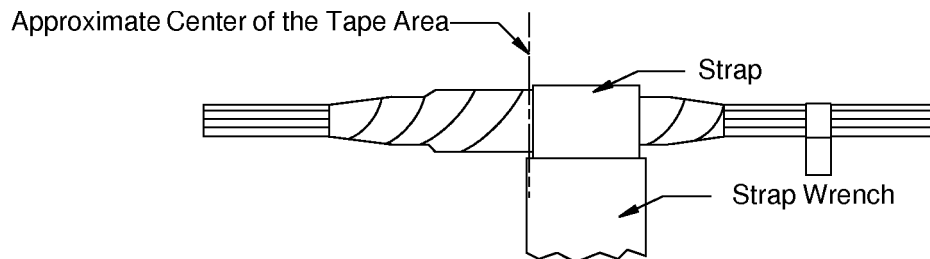
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



POSITION OF THE HARNESS IN THE COMPRESSION STRAP WRENCH

Figure 50

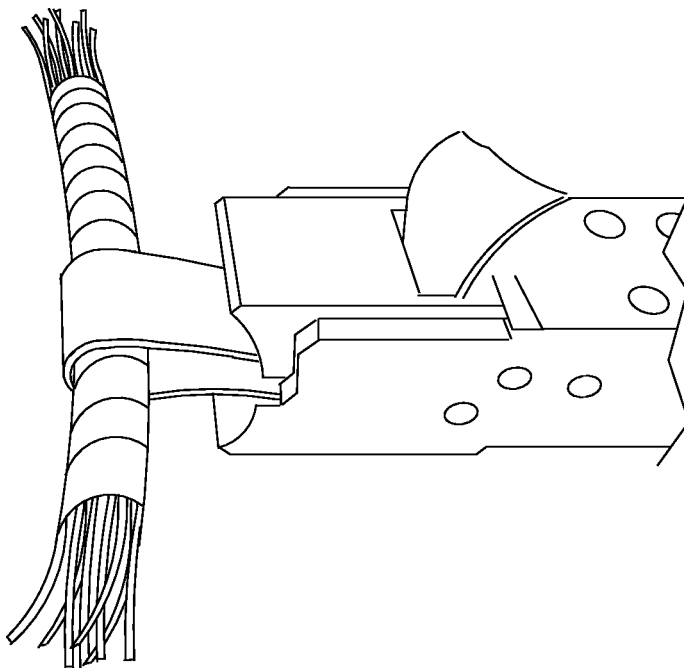


POSITION OF THE COMPRESSION STRAP WRENCH ON THE HARNESS

Figure 51

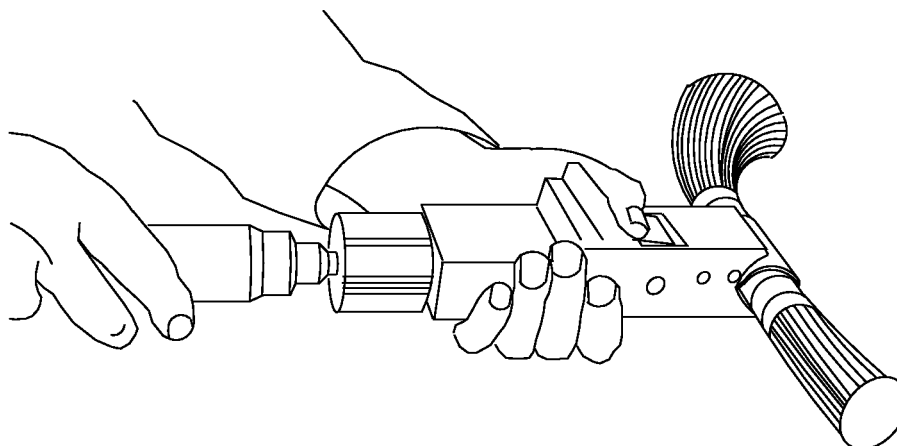
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



STRAP OF THE COMPRESSION STRAP WRENCH AROUND THE WIRE HARNESS
Figure 52

- (18) Put the torque tool on the end of the compression strap wrench. Refer to Figure 53 .



POSITION OF THE TORQUE TOOL ON THE COMPRESSION STRAP WRENCH
Figure 53

- (19) Apply from 16 inch-pounds to 29 inch-pounds of torque to compress the harness in the strap wrench tool.
Refer to Figure 53 and Figure 54.

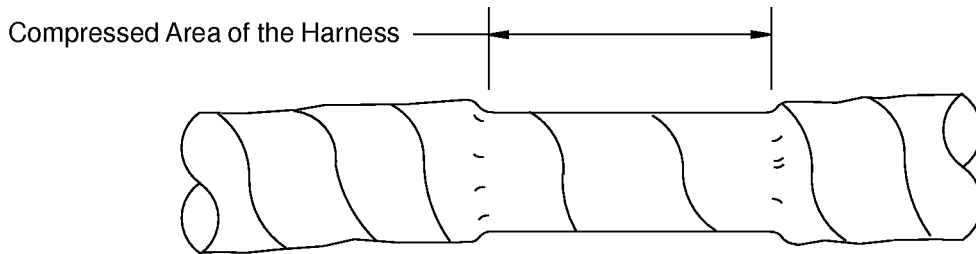
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STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

CAUTION: DO NOT TIGHTEN THE MECHANISM TOO MUCH.

CAUTION: DO NOT TIGHTEN THE MECHANISM FARTHER THAN THE RED REFERENCE MARK ON THE TOOL. IF THE MECHANISM IS TIGHTENED FARTHER THAN THE RED REFERENCE MARK, THE TORQUE INDICATION WILL NOT BE ACCURATE.



A COMPRESSED AREA OF THE HARNESS
Figure 54

- (20) Put the strap on the other side of the center of the tape area.
- (21) Do Step (17) through Step (19) again.
 Make sure that
 - This side of the tape area is compressed to the same diameter as in Step (19)
 - The sealant does come out from between the tape wraps.
- (22) Measure the compressed diameter of the harness.
- (23) If the measured diameter is specified:
 - (a) Get the assembly diameter.
 Refer to :
 - Table 12
 - Figure 40 .
 - (b) If the compressed diameter of the tape area is less than the minimum, add more layers of tape.
 Make sure that, while the tape is put on:
 - Each tape wrap makes a 40 percent to 50 percent overlap
 - The tape is stretched
 - The sealant is not pushed out
 - The tape tension is smooth and even.
 Make sure that the harness diameter is the same throughout the controlled diameter area.
 Refer to:
 - Figure and 49
 - Figure 55
- (24) If the diameter is not specified or not within an assembly diameter range, add layers of tape to meet the first larger assembly diameter.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

Make sure that, while the tape is put on:

- Each tape wrap makes a 40 percent to 50 percent overlap
- The tape is stretched
- The sealant is not pushed out
- The tape tension is smooth and even.

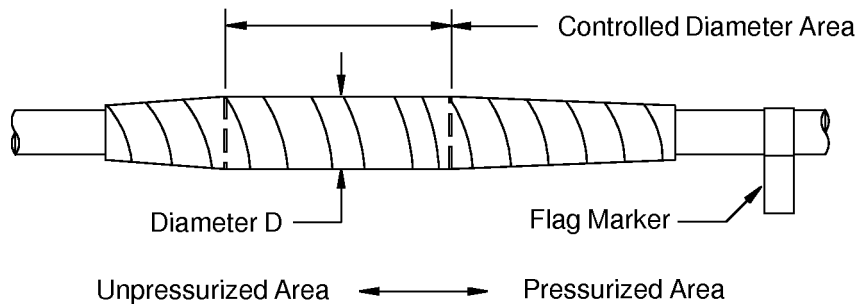
Refer to:

- Table 12
- Figure 40

Make sure the harness diameter is the same throughout the controlled diameter area.

Refer to:

- Figure and 49
- Figure 55 .



CONFIGURATION OF THE COMPRESSED, WRAPPED WIRE HARNESS
Figure 55

(25) Do Step (5) through Step (24) again for each wire harness that will be installed in the seal fitting grommet.

B. Preparation of One Wire or One Cable for Installation in a Grommet Hole

NOTE: This procedure applies to a single wire or cable that will go through the seal fitting in a grommet hole where this wire or cable is the only wire or cable in that hole.

Table 13
Necessary Materials

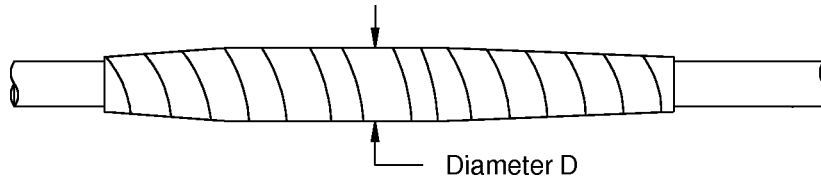
Material	Description	Part Number	Supplier
Flag Marker Tape	-	BACT19ET-5	Boeing
Silicone Tape	0.57 inch wide, Black	67N	Federal Mogul

Table 14
Necessary Tools

Tool	Description	Part Number
Marker	Temporary	-
Ruler	-	-

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DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



DIAMETER D OF THE FINISHED WIRE OR CABLE AFTER THE INSTALLATION OF THE SILICONE TAPE
Figure 56

Table 15
Wire Harness Diameters

Specified Diameter (inch)	Assembly Diameter D (inch) Refer to Figure 56	
	Minimum	Maximum
0.250	0.19	0.250
0.375	0.32	0.375
0.500	0.44	0.500
0.625	0.57	0.625
0.750	0.69	0.750
0.950	0.89	0.950

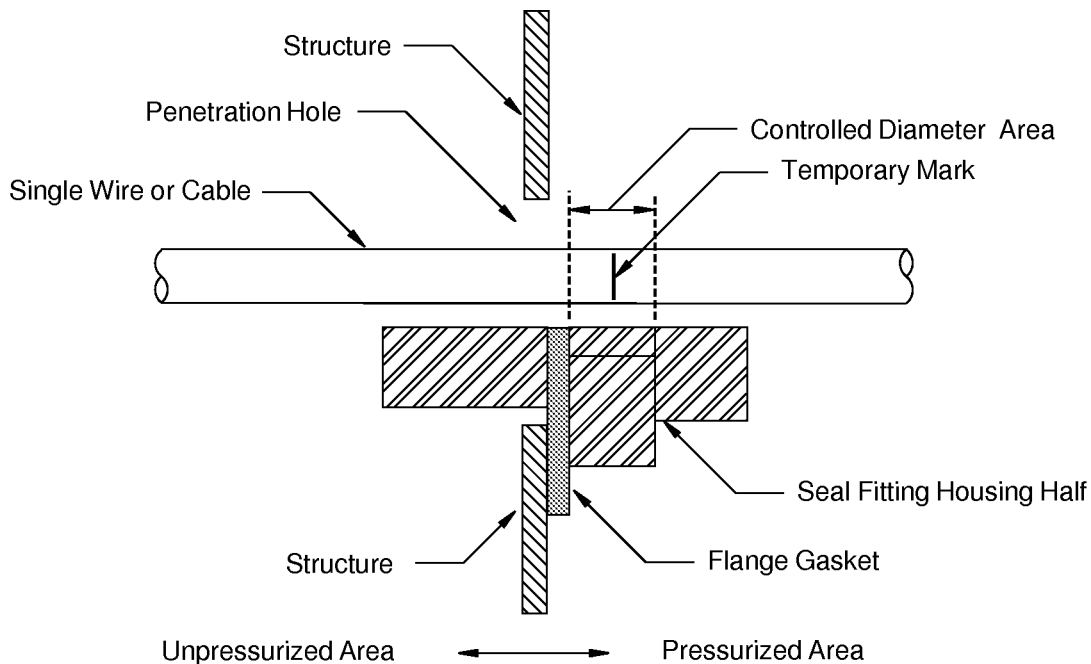
- (1) Find the Controlled Diameter Area on the wire or cable:
 - (a) Put one seal fitting housing half in the penetration hole in the structure.
 Make sure that the flange gasket is against the structure on the pressurized area side.
 - (b) Put the wire or cable in the housing.
 - (c) Make a selection of a Marker from Table 14.
 - (d) Make a temporary mark on the wire or cable approximately in the center of the Controlled Diameter Area.

Refer to:

- Figure 57 for shell size 24 and shell size 36 seal fittings
- Figure 58 for shell size 48 seal fittings.

STANDARD WIRING PRACTICES MANUAL

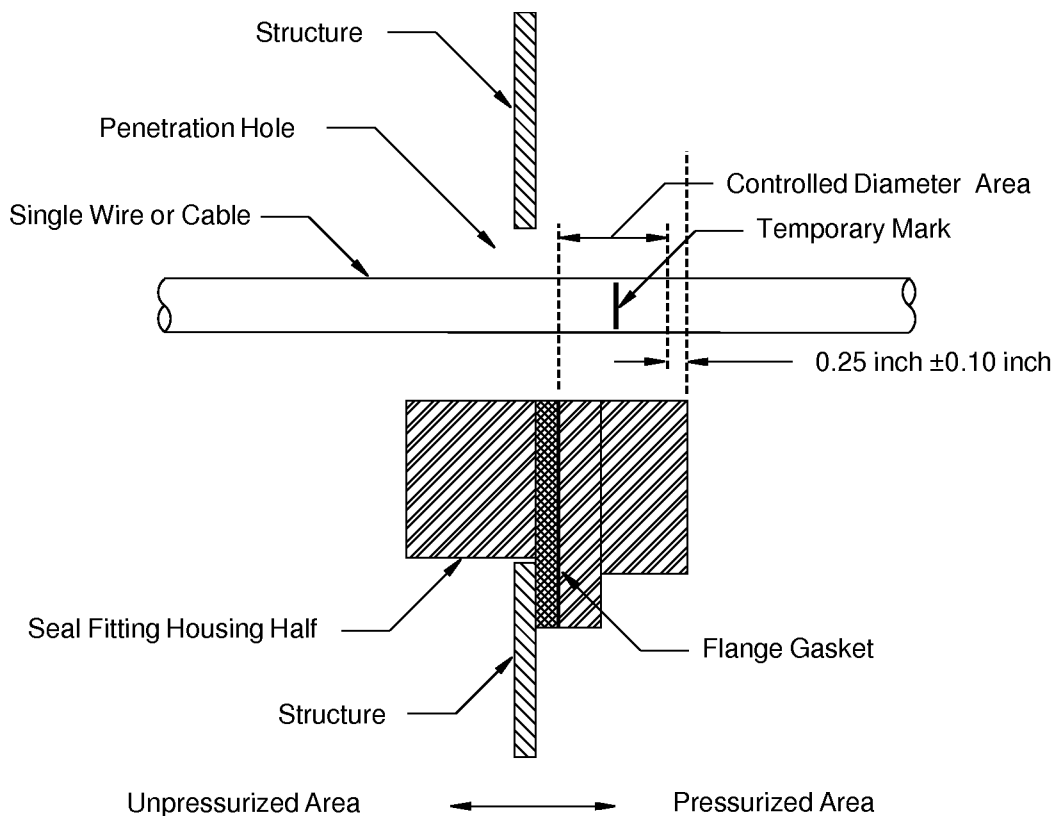
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



POSITION OF THE TEMPORARY MARK ON THE HARNESS FOR THE SHELL SIZE 24 AND 36 SEAL FITTINGS
Figure 57

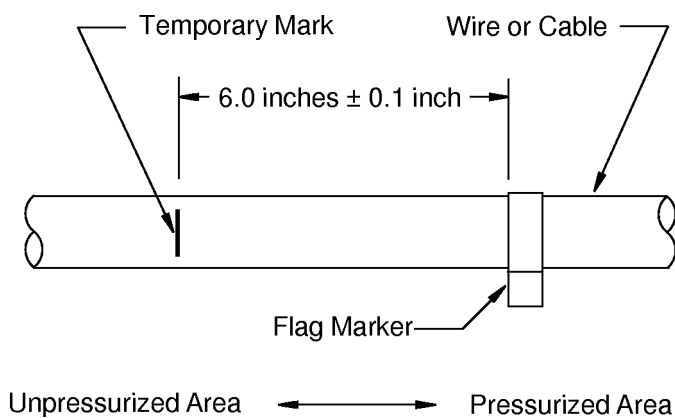
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



POSITION OF THE TEMPORARY MARK ON THE HARNESS FOR THE SHELL SIZE 48 SEAL FITTING
Figure 58

- (e) Do Step (b) through Step (d) again for each wire harness that must be installed in the seal fitting.
- (2) Make a selection of a Flag Marker Tape from Table 13 .
- (3) Put a length of Flag Marker Tape on each wire or cable 6.0 inches \pm 0.1 inch from the temporary mark in the direction of the pressurized area. Refer to Figure 59.

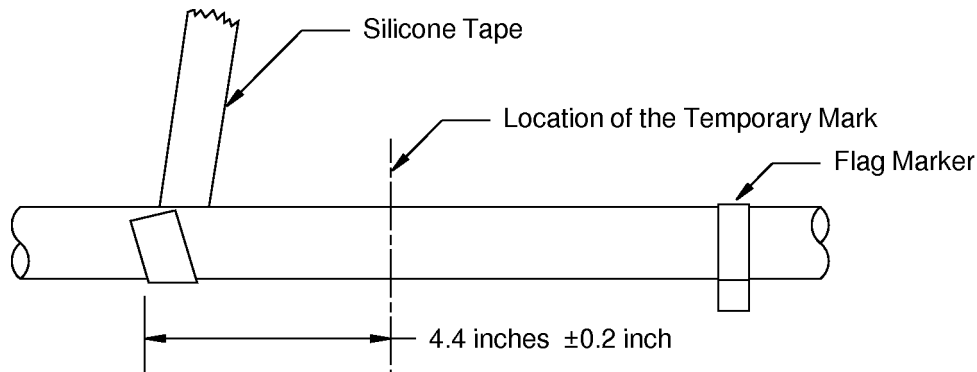


POSITION OF THE FLAG MARKER
Figure 59

STANDARD WIRING PRACTICES MANUAL**DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS**

- (4) Make a selection of silicone tape from Table 13 .
- (5) Wrap the silicone tape on the harness at approximately a 60 degree angle from the unpressurized side to the pressurized side. Refer to Figure 60 .

Make sure that the wrap starts at 4.4 inches \pm 0.2 inch from the temporary mark.

**POSITION OF THE OUTER LAYER OF TAPE ON THE WIRE HARNESS****Figure 60**

- (6) If the diameter is specified, apply the necessary layers of silicone tape until the outer diameter is within the assembly diameter range shown in Table 15.

Make sure that while the silicone tape is put on:

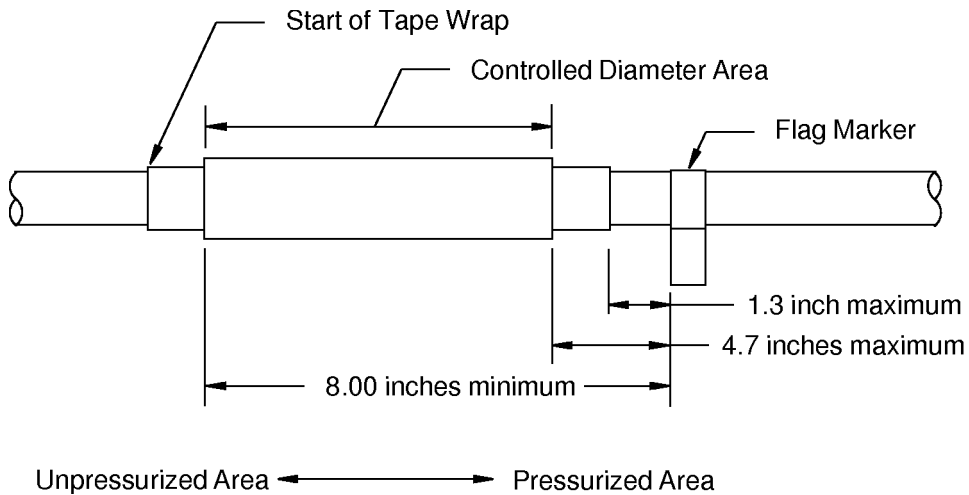
- Each tape wrap makes a 40 percent to 50 percent overlap
- The tape is stretched.
- The tension is smooth and even.
- The harness diameter is the same throughout the controlled diameter area.

For the length of the wrap, refer to:

- Figure and 61
- Figure 62 .

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DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



LOCATION OF THE CONTROLLED DIAMETER AREA OF THE WIRE OR CABLE
Figure 61

- (7) If the diameter is not specified or not within an assembly diameter range, add layers of tape to meet the first larger assembly diameter.

Make sure that, while the tape is put on:

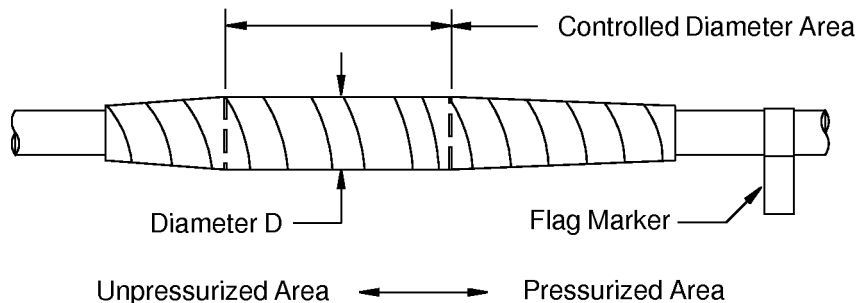
- Each tape wrap makes a 40 percent to 50 percent overlap
- The tape is stretched
- The tape tension is smooth and even
- The harness diameter is the same throughout the controlled diameter area.

For the outer diameter of the wrap, refer to:

- Paragraph 1.B. for the grommet cavity diameter
- Table 15 for the applicable harness assembly diameter range.
- Figure 56 .

For the length of the wrap, refer to:

- Figure and 61
- Figure 62 .



CONFIGURATION OF THE COMPRESSED, WRAPPED WIRE HARNESS
Figure 62

STANDARD WIRING PRACTICES MANUAL**DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS**

- (8) Do Step (1) through Step (7) again for each wire or cable that will go through the seal fitting in a grommet hole and be the only wire or cable in that hole.

C. Preparation of a Wire Harness for Installation in Sealant

Table 16
NECESSARY MATERIALS

Material	Description	Part Number	Supplier
Adhesive Sealant Tape	0.50 inch wide, Black	5313	3M
Silicone Tape	0.57 inch wide, Black	67N	Federal Mogul

Table 17
NECESSARY TOOLS

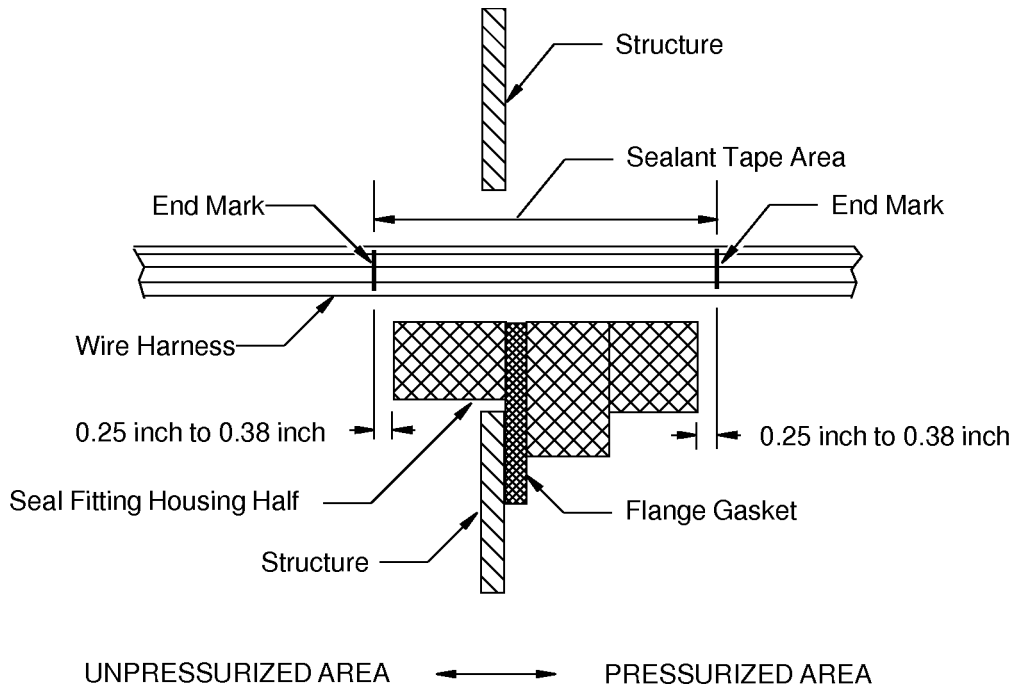
Tool	Description	Part Number
Marker	Temporary	-
Wrench, Compression Strap	-	057-0750-00
Wrench, Torque	50 inch-pound	-

- (1) Find the Sealant Tape Area on the wire harness for the new sealant tape:
- (a) Put one seal fitting housing half in the penetration hole in the structure.
Make sure that the flange gasket is against the structure on the pressurized area side.
 - (b) Put the wire harness in the housing.
 - (c) Make a selection of a Marker from Table 17.
 - (d) Make an End Mark on the wire harness 0.25 inch to 0.38 inch from each end of the housing.
Refer to Figure 63.

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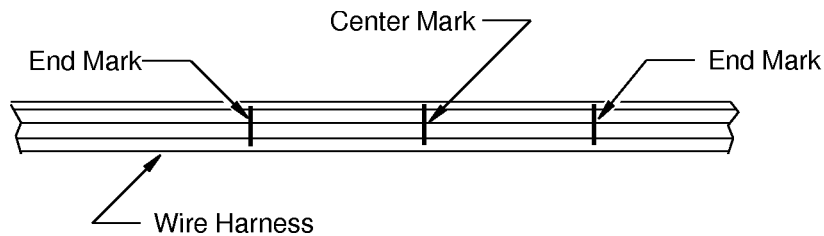
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



POSITION OF THE TEMPORARY MARK ON THE HARNESS FOR THE SHELL SIZE 24 AND 36 SEAL FITTINGS
Figure 63

- (e) Do Step (b) through Step (d) again for each wire harness that must be installed in the seal fitting.
- (2) Make a third temporary mark on the wire harness at a location half the distance between the two End Marks. Refer to Figure 64.



POSITION OF THE TEMPORARY MARKS ON THE HARNESS
Figure 64

- (3) Make a selection of an Adhesive Sealant Tape from Table 16.
- (4) Cut two lengths of the Adhesive Sealant Tape.
 Make sure that the lengths of the sealant tape are not longer than 4.4 inches.
- (5) Move all or some of the wires of the wire harness to make one layer of wires not more than 4 inches wide.
- (6) Put each of the wires of the layer of wires on the sealant of the sealant tapes and push each wire into the sealant. Refer to Figure 65.

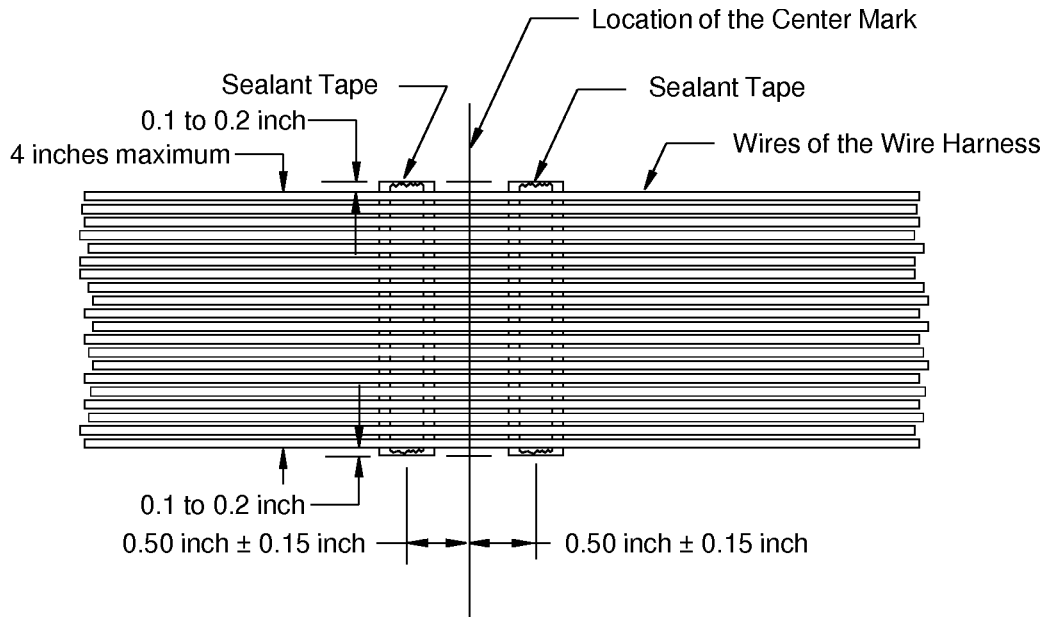
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

Make sure that the position of the center mark on the wires is located at half the distance between the lengths of the sealant tape.

Where the wires touch the sealant, make sure that :

- The width of the layer of wires is 4 inches maximum
- The wires are all adjacent to each other
- One of the wires is not on another wire
- The end of the length of sealant tape extends approximately 0.1 inch to 0.2 inch beyond the wires.



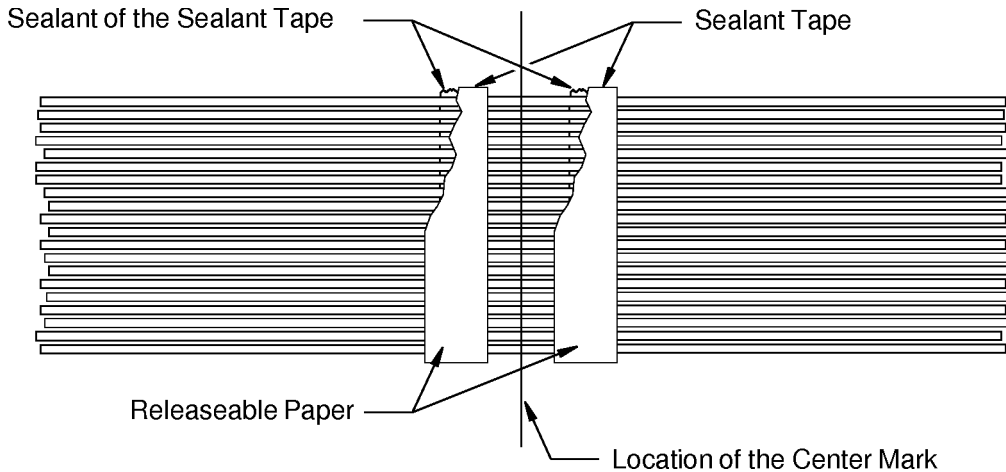
CONFIGURATION OF THE WIRES ON THE FIRST LENGTH OF SEALANT TAPE
Figure 65

- (7) Put an additional length of the sealant tape on the wires above each layer of sealant tape. Refer to Figure 66 .

Make sure that the sealant on these lengths of sealant tape touches the wires.

STANDARD WIRING PRACTICES MANUAL

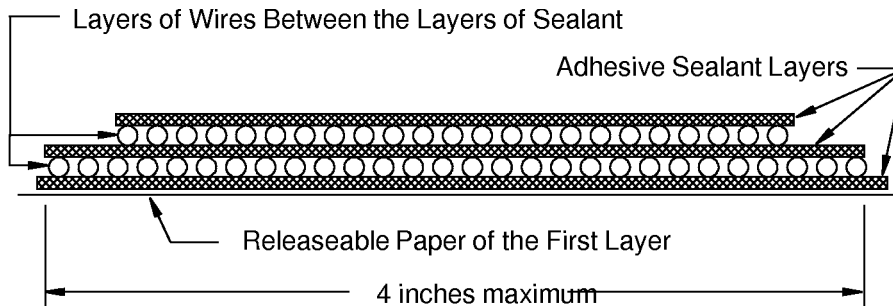
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



THE SECOND LENGTH OF SEALANT TAPE ON THE LAYER OF WIRES
Figure 66

- (8) Remove the releasable paper from these additional layers of sealant tape.
- (9) If more layers of wires are necessary, do Step (6) through Step (8) again for each additional layer of wires. Refer to Figure 67.

Make sure that no lengths of the releasable paper are between the layers of the wires and the sealant.



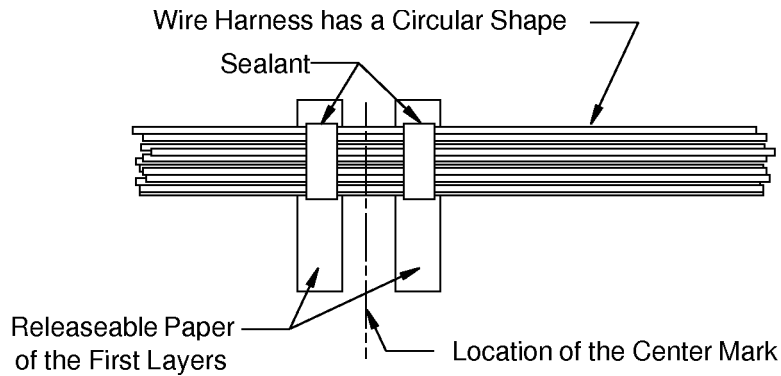
CONFIGURATION OF THE LAYERS OF THE SEALANT TAPE AND THE LAYERS OF THE WIRES
Figure 67

- (10) Wind the layers of sealant and wire on itself, and at the same time, remove the remaining length of releasable paper from the first layer of sealant tape. Refer to Figure 67 and Figure 68.

Make sure that the wire harness bundles now has a circular shape.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



CONFIGURATION OF THE WIRE HARNESS AFTER IT IS WOUND
Figure 68

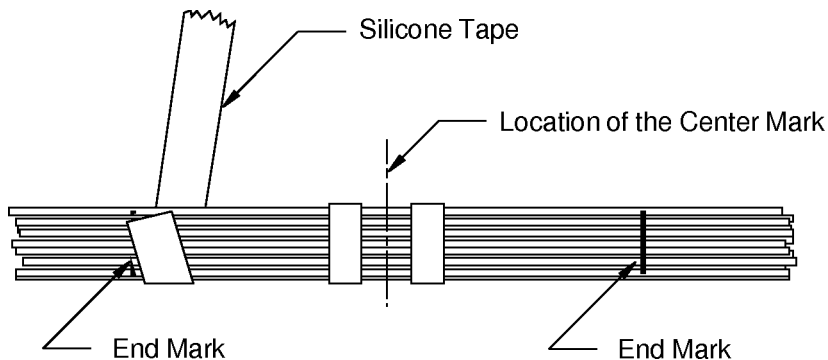
- (11) Make a selection of silicone tape from Table 16 .
- (12) Wrap a minimum of one layer of the silicone tape on the harness at approximately a 60 degree angle from the unpressurized side to the pressurized side. Refer to Figure 69 and Figure and 70.

Make sure that:

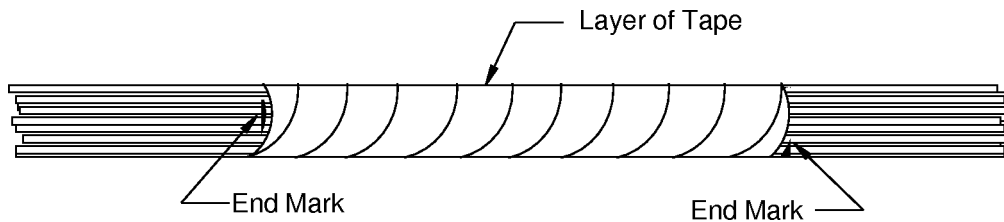
- The wrap starts at an End Mark
- The wrap ends at the other End Mark.

Make sure that while the silicone tape is put on:

- Each tape wrap makes a 40 percent to 50 percent overlap
- The tape is stretched
- The sealant is not pushed out
- The tension is smooth and even.



POSITION OF THE OUTER LAYER OF TAPE ON THE WIRE HARNESS
Figure 69

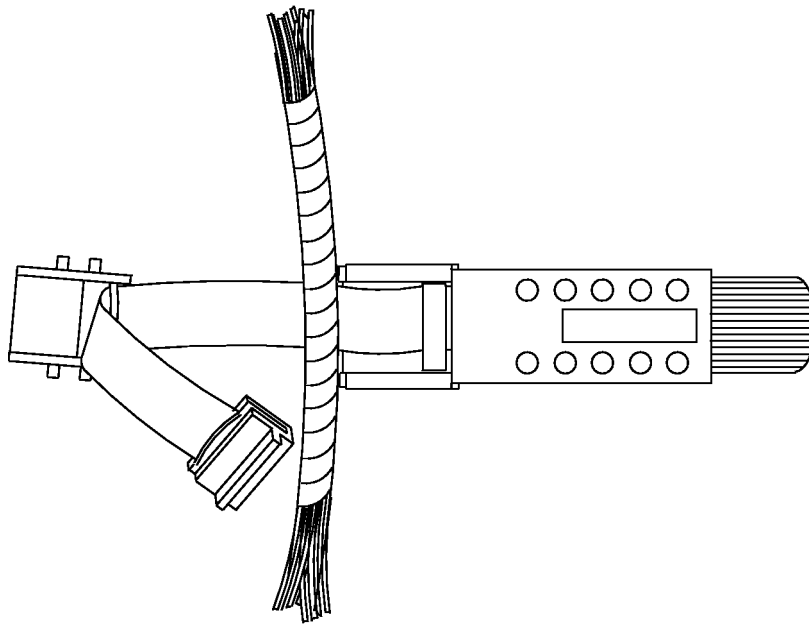
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LOCATION OF THE SEALANT TAPE AREA OF THE WIRE HARNESS
Figure 70

- (13) Make a selection of a compression strap wrench from Table 17.
- (14) Make a selection of a torque tool from Table 17.
- (15) Align one edge of the strap with the approximate center of the taped area.

Refer to:

- Figure 71
- Figure 72
- Figure 73.

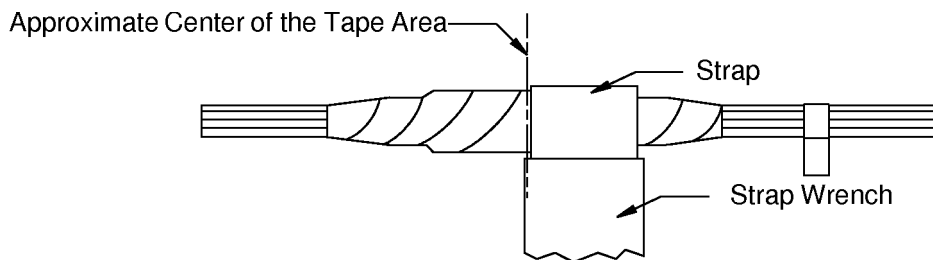


POSITION OF THE HARNESS IN THE COMPRESSION STRAP WRENCH
Figure 71

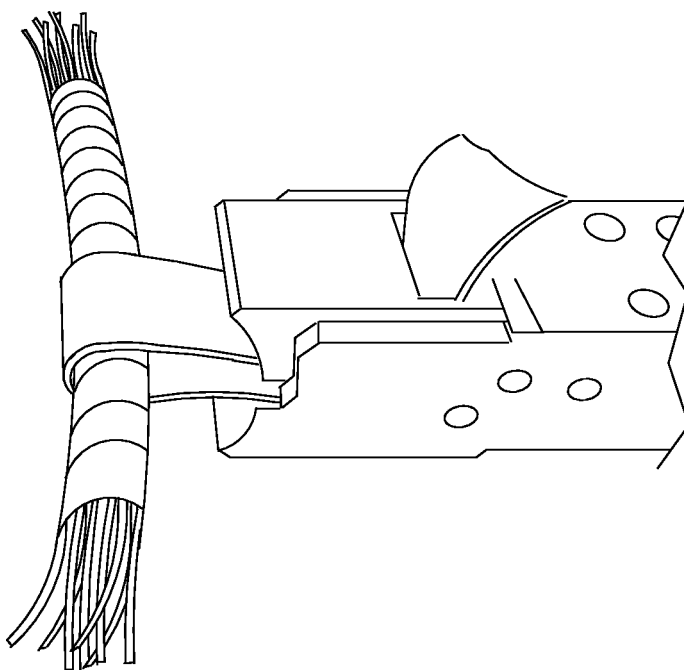
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DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



POSITION OF THE COMPRESSION STRAP WRENCH ON THE HARNESS
Figure 72

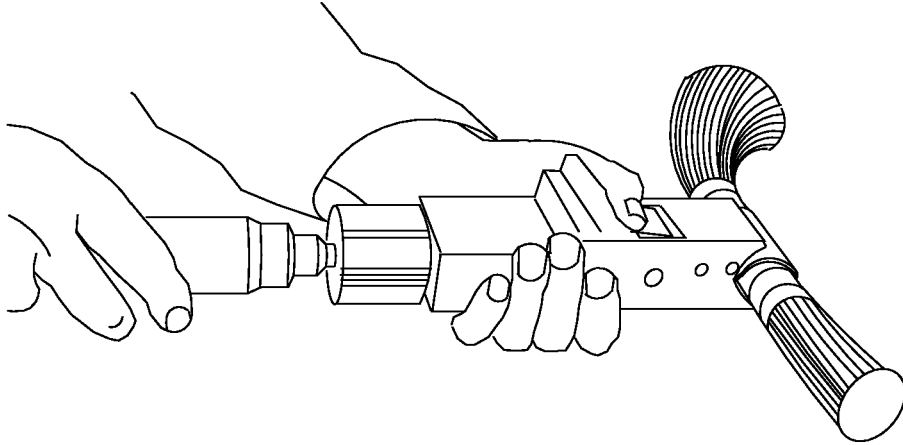


STRAP OF THE COMPRESSION STRAP WRENCH AROUND THE WIRE HARNESS
Figure 73

- (16) Put the torque tool on the end of the compression strap wrench. Refer to Figure 74.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



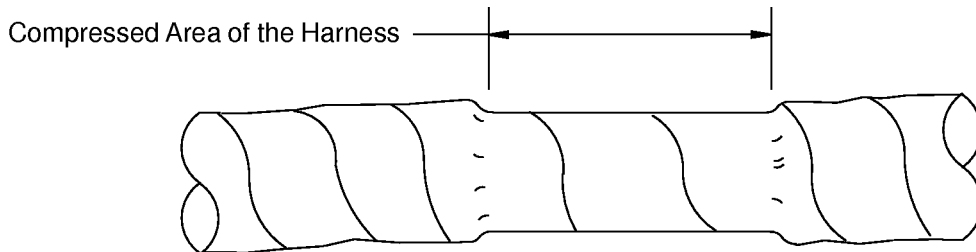
POSITION OF THE TORQUE TOOL ON THE COMPRESSION STRAP WRENCH
Figure 74

- (17) Apply from 16 inch-pounds to 29 inch-pounds of torque to compress the harness in the strap wrench tool.

Refer to Figure 74 and Figure 75.

CAUTION: DO NOT TIGHTEN THE MECHANISM TOO MUCH.

CAUTION: DO NOT TIGHTEN THE MECHANISM FARTHER THAN THE RED REFERENCE MARK ON THE TOOL. IF THE MECHANISM IS TIGHTENED FARTHER THAN THE RED REFERENCE MARK, THE TORQUE INDICATION WILL NOT BE ACCURATE.



A COMPRESSED AREA OF THE HARNESS
Figure 75

- (18) Put the strap on the other side of the center of the tape area.
- (19) Do Step (15) through Step (17) again.

Make sure that the sealant does come out from between the tape wraps.

4. ASSEMBLY OF THE SEAL FITTING

A. Shell Size 24 and 36 Grommet and Internal Seal Assembly

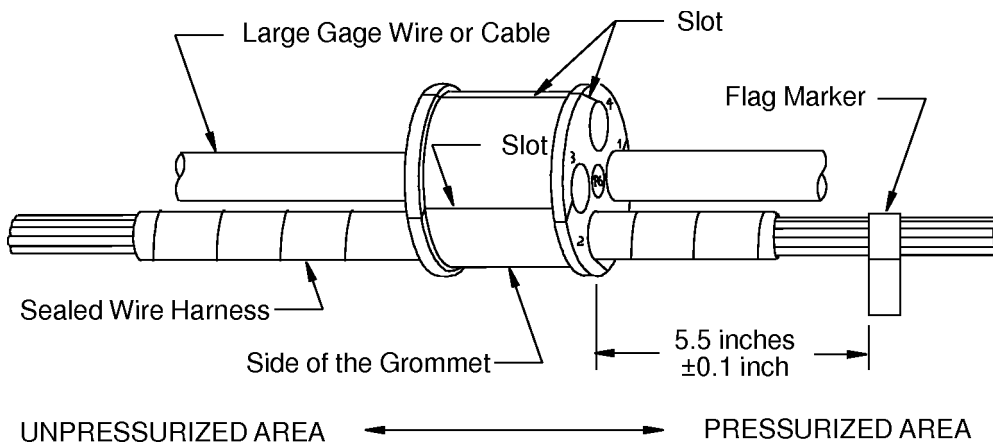
- (1) On the side of the grommet, pull a slot in the grommet to an open position, and at the same time, from the side of the grommet, push a large gage wire or a sealed wire harness into the correct hole in the grommet. Refer to Figure 76 and Figure 77.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

Make sure that:

- The end of the grommet that has the cavity identification points to the pressurized side of the panel
- The wire harness diameter has a close fit in the grommet opening
- The wire harness diameter does not force the slot to remain open
- The wire harness diameter does not have a loose fit
- The wire or wire harness is in the correct grommet hole
- For a sealed wire harness, the distance from the flag marker to the edge of the grommet is 5.5 inches \pm 0.1 inch.



POSITION OF A WIRE HARNESS IN THE GROMMET

Figure 76

NOTE: If the wire harness does not have a good fit, it is possible that the wire harness is not in the correct hole or that more layers of tape are necessary. Refer to Paragraph 3.A. for the procedure to wrap and seal a wire harness.

NOTE: One large gage wire, one large diameter cable, or one sealed wire harness can be installed in each grommet hole.

- (2) Repeat Step (1) for each wire or cable that will go through the seal fitting.
- (3) If a hole in the grommet is not used, push a seal plug into each unused hole until it stops. Refer to Figure 77.

Make sure that:

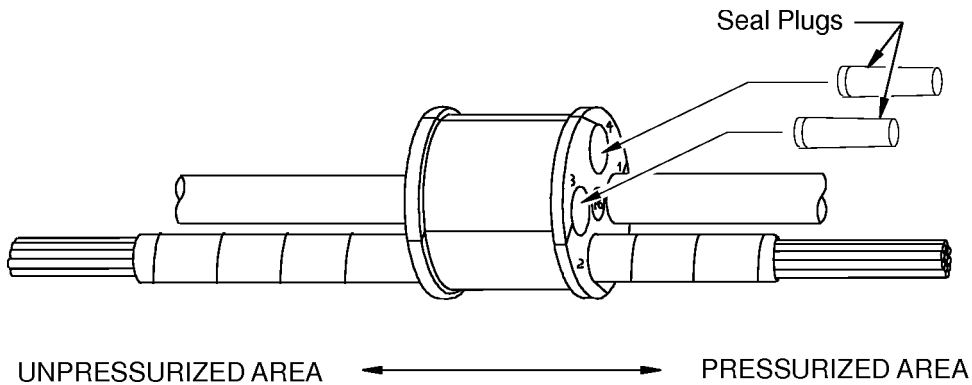
- The end of the seal plug that has the cavity identification points to the pressurized side of the panel
- The seal plugs are in the end of the grommet that points to the pressurized side of the panel
- The end of the seal plug is flush with the end of the grommet.

NOTE: If the grommet cavity has a two digit designator. The second digit is the seal plug designator. For example, if the cavity designator is 2C, the seal plug that has designator C fits that cavity.

NOTE: If the grommet cavity does not have a seal plug designator, a seal plug is not available for that cavity.

STANDARD WIRING PRACTICES MANUAL

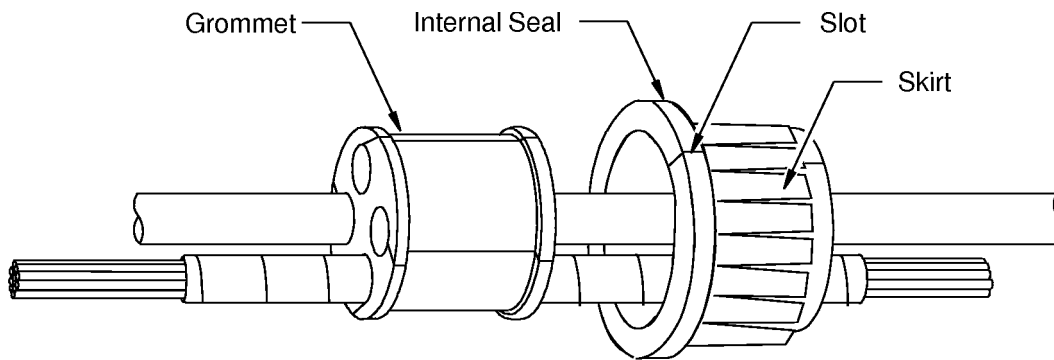
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



INSTALLATION OF THE SEAL PLUGS

Figure 77

- (4) At the slot in the internal seal, pull the internal seal to an open position, and at the same time, put the internal seal on all of the wires and cables that go through the grommet. Refer to Figure 78. Make sure that the skirt of the internal seal points to the pressurized side of the panel.



ALIGNMENT OF THE INTERNAL SEAL AND THE GROMMET

Figure 78

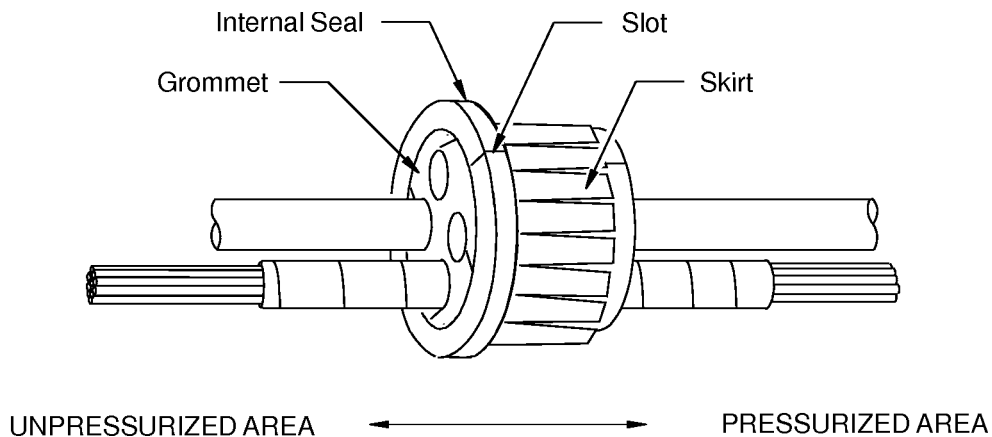
- (5) Push the internal seal on the grommet. Refer to Figure 79.

Make sure that:

- The edges of the grommet and the edges of the internal seal are approximately aligned
- The controlled diameter area of the wire harnesses and the middle of the grommet are aligned.

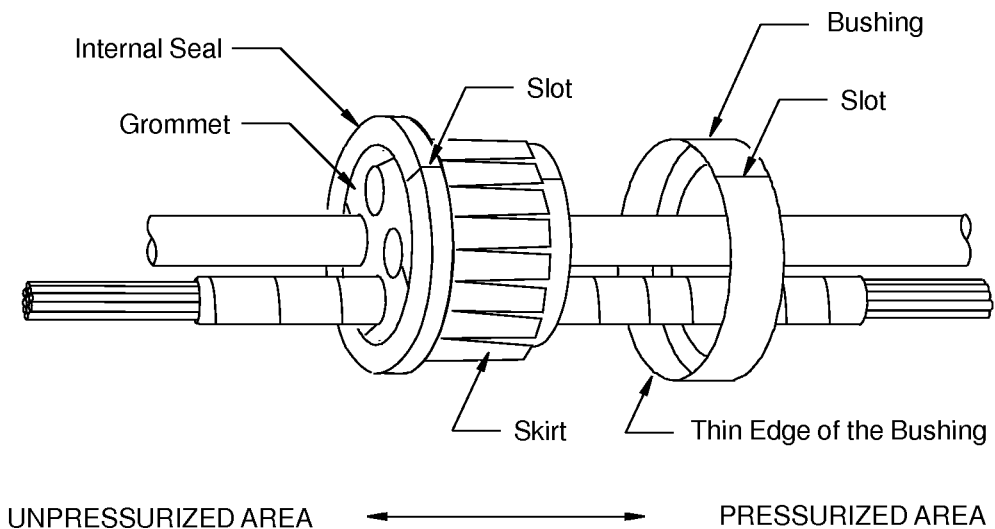
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



ALIGNMENT OF THE BUSHING AND THE INTERNAL SEAL
Figure 79

- (6) At the slot in the bushing, pull the bushing to an open position, and at the same time, put the bushing on all of the wires and cables that go through the grommet. Refer to Figure 80. Make sure that the thin edge of the bushing points toward the skirt of the internal seal.



ALIGNMENT OF THE BUSHING AND THE INTERNAL SEAL
Figure 80

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

B. Shell Size 24 and 36 Housing and Grommet Assembly

**Table 18
Necessary Tools**

Tool	Description	Shell Size	Size (inch)	Part Number	Notes
Holding Tool	-	24	2	ST-2580-343A-23	-
		36	2-5/8	ST-2580-343A-21	
Torque Tool	-	-	-	-	Accuracy of ±6 percent
Wrench	Allen	24	7/64	-	-
		36	7/64	-	-
Wrench	Crowfoot, Compression Nut	24	1-1/8	-	-
		36	1-5/8	-	-

**Table 19
Necessary Materials**

Material	Description	Part Number	Supplier
Silicone Tape	0.57 inch wide, Black	67N	Federal Mogul

**Table 20
Compression Nut Torque Values**

Shell Size	Torque (foot-pounds)
24	15
36	18

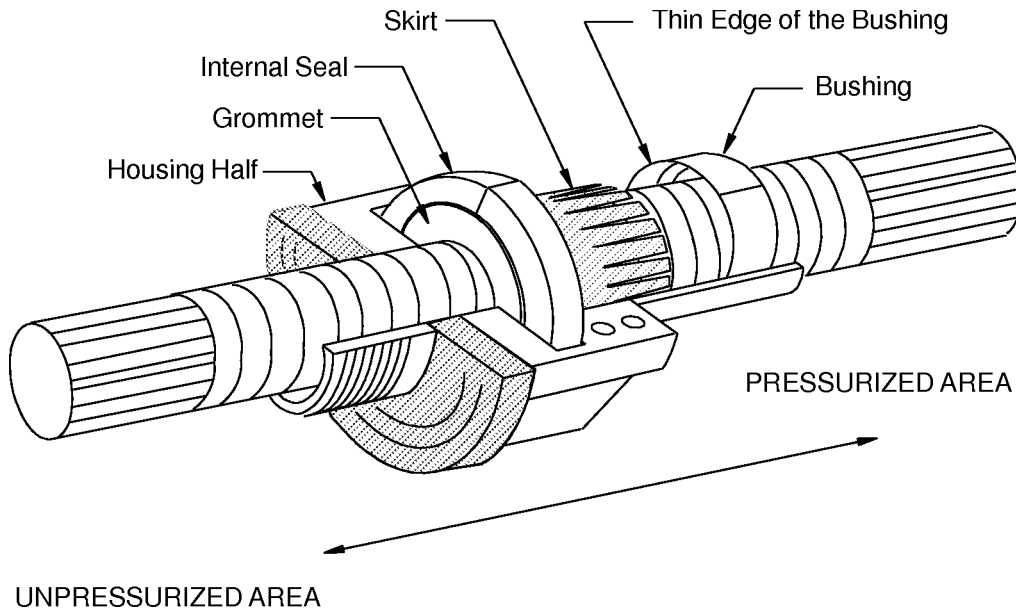
- (1) Put the assembled internal seal, bushing and wire into one of the two housing halves. Refer to Figure 81 and Figure 82.

Make sure that:

- The controlled diameter area of the wire harness and the center of the internal seal area aligned
- The skirt of the internal seal points to the pressurized side of the panel
- The thin edge of the bushing is adjacent to the skirt of the internal seal
- The end of the internal seal with the largest diameter fits tightly against the gasket in the housing.

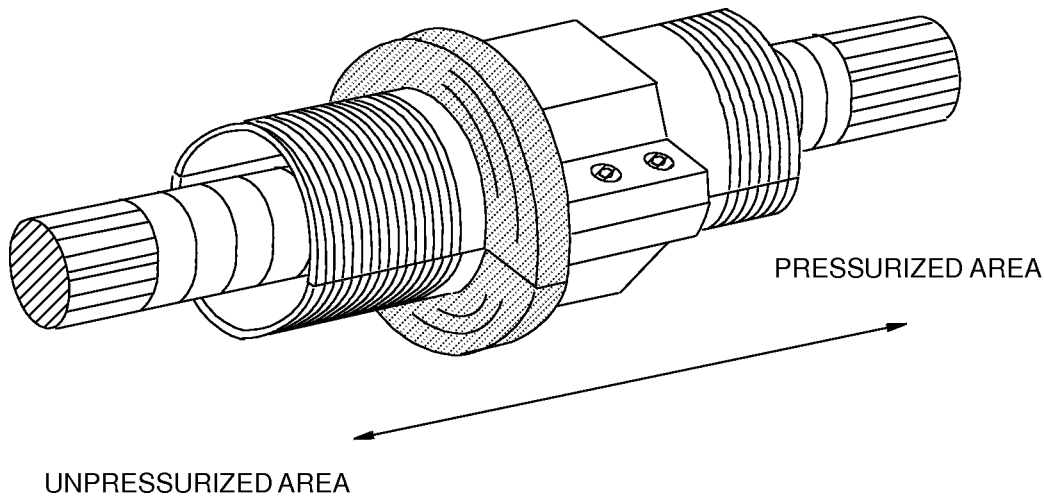
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



ASSEMBLY OF A HOUSING HALF, THE WIRE HARNESS, THE INTERNAL SEAL, AND THE BUSHING
Figure 81

- (2) Put other housing half on the assembly. Refer to Figure 82 .



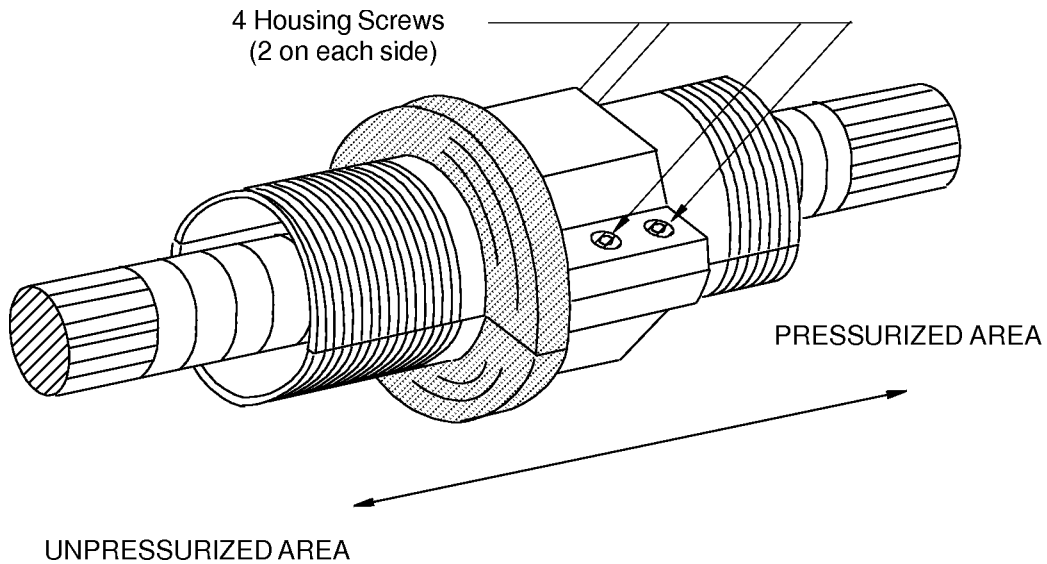
CONFIGURATION OF THE TWO HALVES OF THE HOUSING
Figure 82

- (3) Make a selection of an allen wrench from Table 18.
- (4) Engage the four housing screws in one housing half with the nuts in the other housing half. Refer to Figure 83.

NOTE: The nuts are not removable.

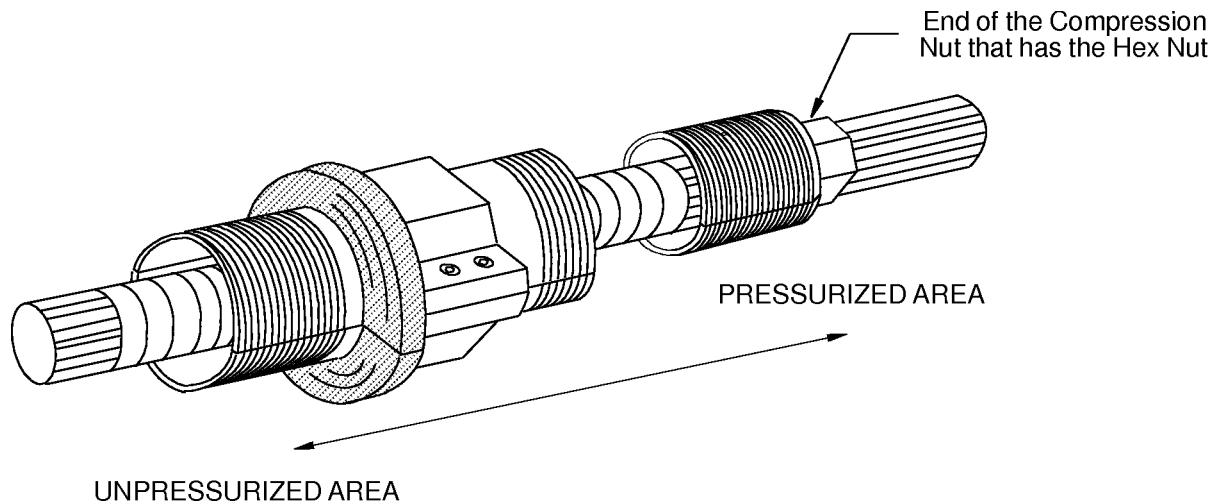
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



LOCATION OF THE HOUSING SCREWS
Figure 83

- (5) Tighten the housing screws to 12 inch-pounds \pm 2 inch-pounds.
 - (6) Put the two halves of the compression nut together on the wire harness on the pressurized side of the assembly. Refer to Figure 84 .
- Make sure that the end of the compression nut that has the hex nut is pointed to the pressurized side of the harness.



POSITION OF THE COMPRESSION NUT
Figure 84

- (7) Engage the outer threads of the compression nut with the inner threads of the housing.

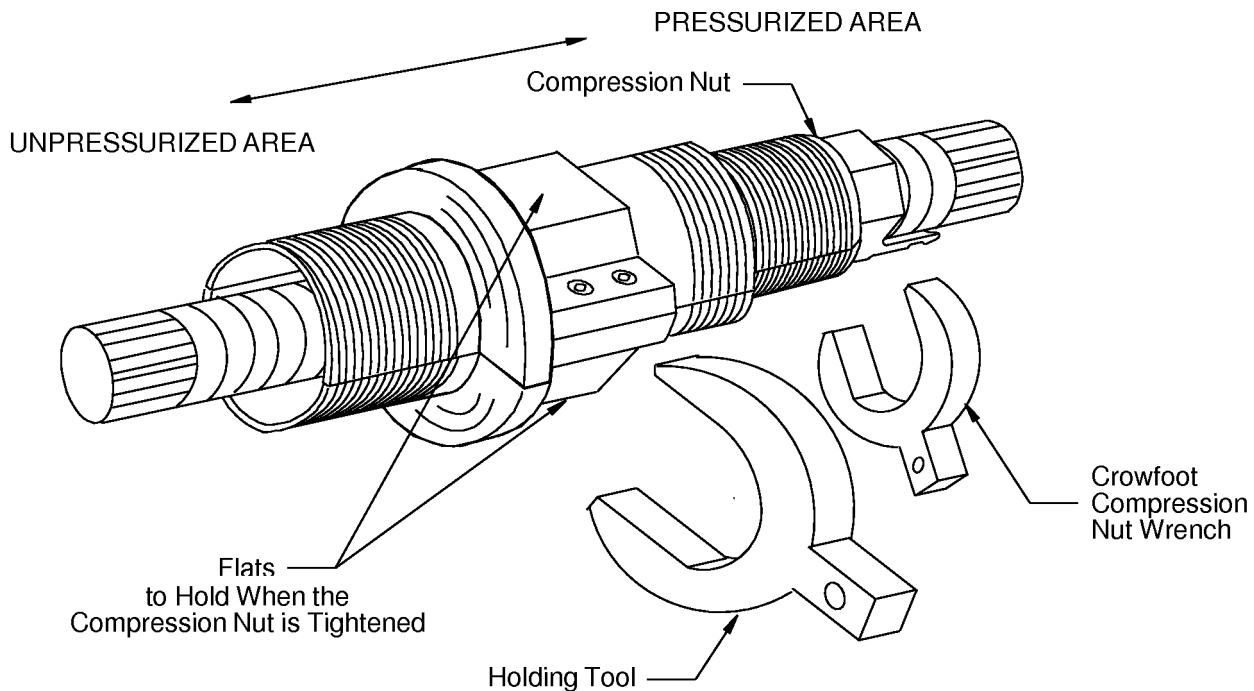
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

- (8) From Table 18, make a selection of :
- A holding tool
 - A torque tool
 - A compression nut crowfoot wrench.
- (9) Hold the assembly by the housing flats and, at the same time, torque the compression nut.
Refer to Table 20 for the torque value.

Make sure that the holding tool:

- Fully spans the width of flats
- Does not squeeze the part
- Has a tight fit
- Does not scratch or dent the housing.



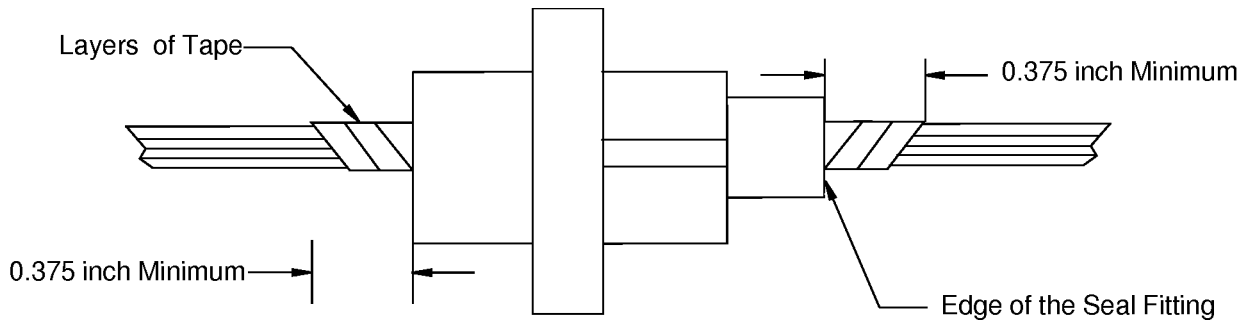
POSITION OF THE HOLDING TOOL ON THE ASSEMBLY

Figure 85

- (10) Examine the assembly. Refer to Figure 86.
Make sure that the tape on the wire harness extends a minimum of 0.375 inch farther than the edge of the seal fitting shell on each side.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



CONFIGURATION OF THE SEAL FITTING AND THE TAPE

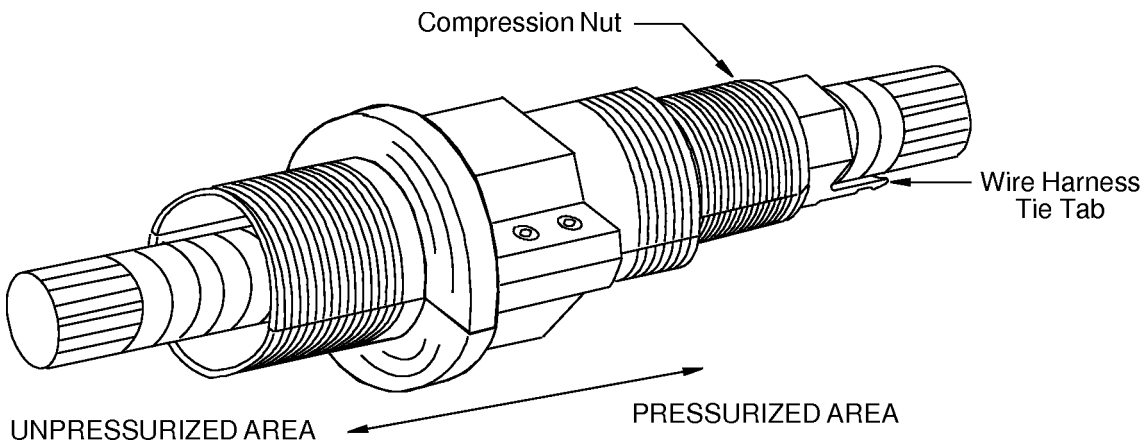
Figure 86

- (11) If the tape does not extend a minimum of 0.375 inch farther than the edges of the seal fitting:
- (a) Make a selection of a silicone tape from Table 19.
 - (b) Wrap two layers of the specified silicone tape around the wire harness with tension on the tape.
- Make sure that:
- The layers of tape have a 50 percent overlap
 - The tape wraps extend more than 0.375 inch beyond each end of the seal fitting.

- (12) Assemble a lacing tape wire harness tie on the wire harness and the wire harness tie tab on the compression nut. Refer to Figure 87 and Subject 20-10-11.

Make sure that the wire harness tie does not put strain on the wires or on the wire harness.

NOTE: If it is necessary, layers of tape can be used to increase the diameter of the wire harness where the wire harness tie is installed to prevent strain on the wire harness.



POSITION OF THE COMPRESSION NUT

Figure 87

C. Shell Size 48 Grommet and Internal Seal Assembly

- (1) Pull a slot in the grommet to an open position and push a large gage wire or a sealed wire harness into the hole in the grommet. Refer to Figure 88.

STANDARD WIRING PRACTICES MANUAL

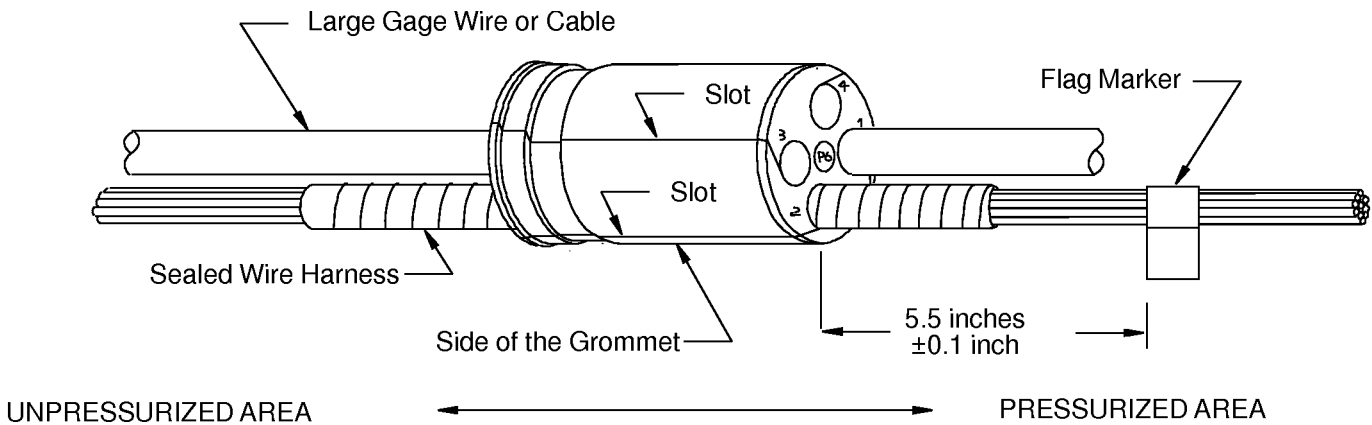
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

Make sure that:

- The edge of the grommet stays aligned with the temporary mark on the sealed length of the wire harness
- The wire harness diameter is a close fit to the grommet cavity
- The wire harness diameter does not force the slot to remain open
- The wire harness diameter does not have a loose fit in the grommet cavity.

NOTE: If the wire harness does not have a good fit, it is possible that the wire harness is not in the correct hole or that more layers of tape are necessary. Refer to Paragraph 3.A. for the procedure to seal and wrap a wire harness.

NOTE: One large gage wire, one large diameter cable, or one sealed wire harness can be installed in each grommet hole.



POSITION OF A WIRE HARNESS IN THE GROMMET

Figure 88

- (2) Do Step (1) again for each wire harness or cable that must go through the seal fitting.
- (3) Push a seal plug in each unused hole until it stops. Refer to Figure 89

Make sure that:

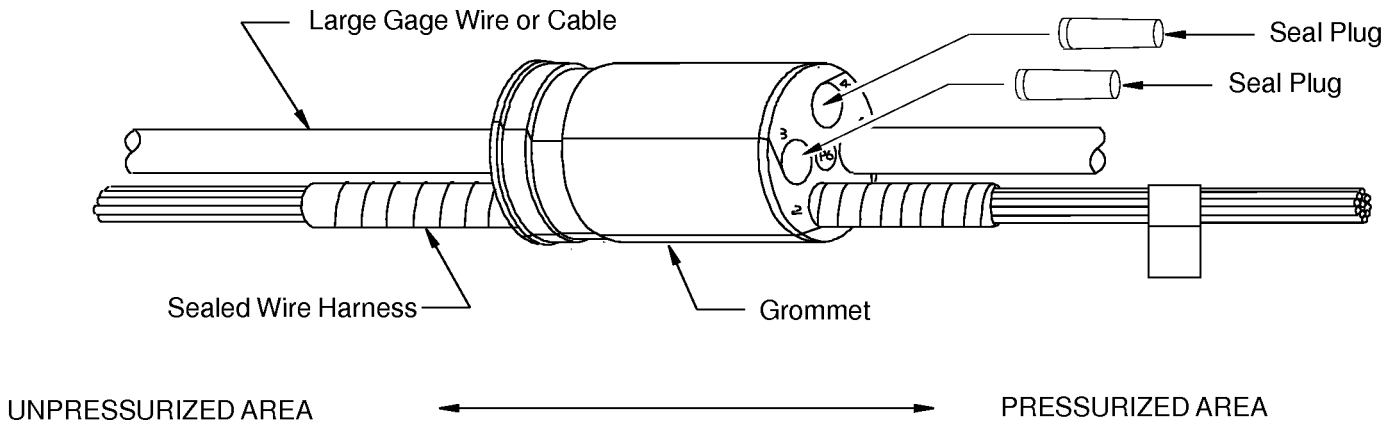
- The end of the seal plug that has the identification mark points to the pressurized side of the panel
- The seal plugs are in the end of the grommet that points to the pressurized side of the panel
- The end of the seal plug is flush with the end of the grommet.

NOTE: If the grommet cavity has a two digit designator. The second digit is the seal plug designator. For example, if the cavity identification is 2C, the seal plug that has designator C fits that cavity.

NOTE: If the grommet cavity does not have a seal plug designator, a seal plug is not available for that cavity.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



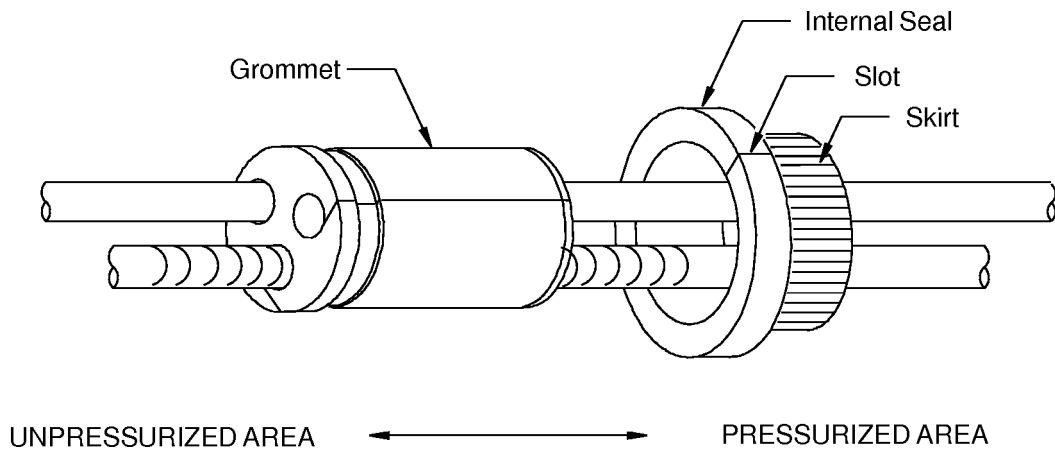
INSTALLATION OF THE SEAL PLUGS

Figure 89

- (4) At the side of the internal seal, pull the slot in the internal seal to an open position, and at the same time, put the internal seal on all of the wires and cables that must go through the seal fitting. Refer to Figure 90

Make sure that:

- The internal seal is adjacent to the end of the grommet that is pointed to the pressurized side of the panel
- The skirt of the internal seal points to the pressurized side of the panel.



ALIGNMENT OF THE INTERNAL SEAL AND THE GROMMET

Figure 90

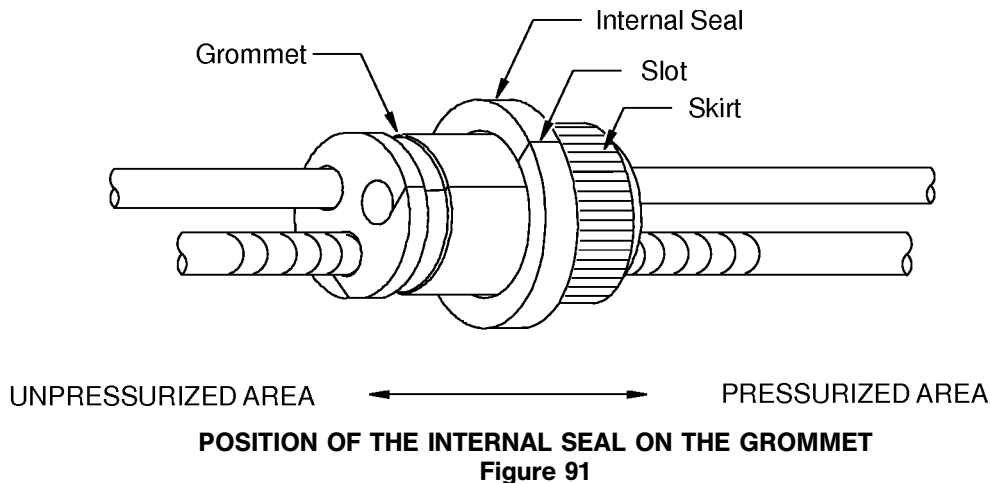
- (5) Push the internal seal on the grommet. Refer to Figure 91.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

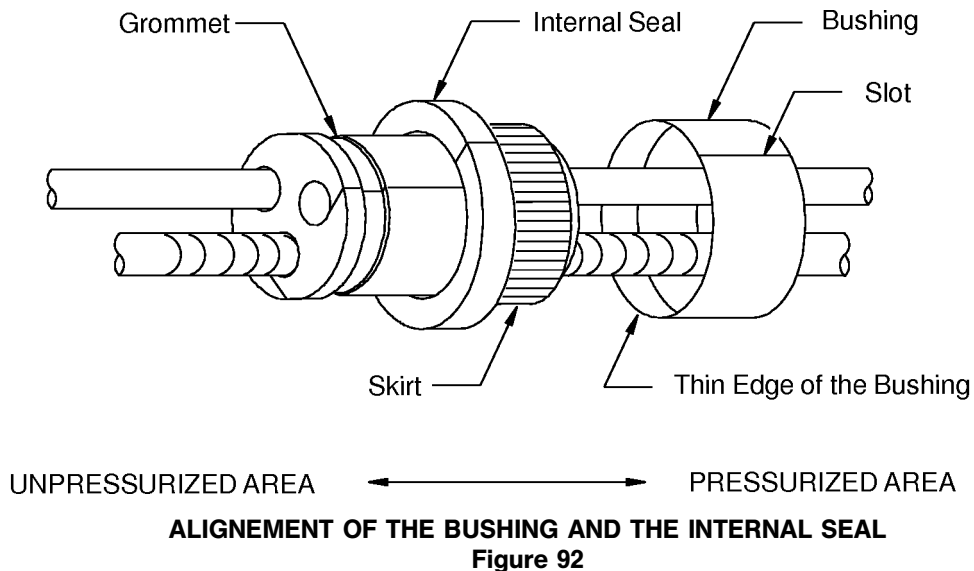
Make sure that:

- The middle of the controlled diameter area of the wire harnesses and the middle of the internal seal are aligned
- The skirt of the internal seal is pointed to the pressurized side of the panel
- The edge of the internal seal adjacent to the skirt and the edge of the grommet are approximately aligned.



- (6) At the slot in the bushing, pull the bushing to an open position, and at the same time, put the bushing on all of the wires and cables that must go through the seal fitting. Refer to Figure R92.

Make sure that the thin edge of the bushing is adjacent to the skirt of the internal seal.



STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

D. Shell Size 48 Housing and Grommet Assembly

**Table 21
Necessary Tools**

Tool	Description	Shell Size	Size (inch)	Part Number	Notes
Holding Tool	-	48	3-1/2	ST2580-343A-22	-
Torque Tool	-	-	-	-	Accuracy of ± 6 percent
Wrench	Allen	48	9/64	-	-
Wrench	Crowfoot, Compression Nut	48	3-1/2	ST2580-343A-19	-

**Table 22
Necessary Materials**

Material	Description	Part Number	Supplier
Silicone Tape	0.57 inch wide, Black	67N	Federal Mogul

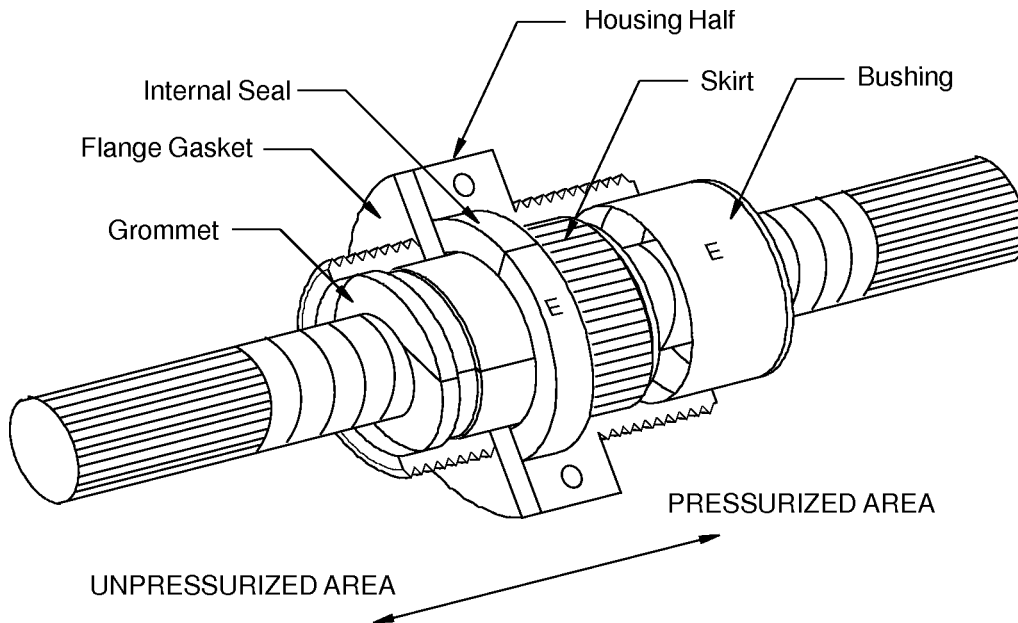
(1) Put the assembled internal seal, bushing and wire into one of the two housing halves. Refer to Figure 93.

Make sure that:

- If there is a grommet, the grommet is in the internal seal
- The controlled diameter area of the wire harness and the center of the internal seal are aligned
- The skirt of the internal seal points to the pressurized side of the panel
- The thin edge of the bushing is adjacent to the skirt of the internal seal.

STANDARD WIRING PRACTICES MANUAL

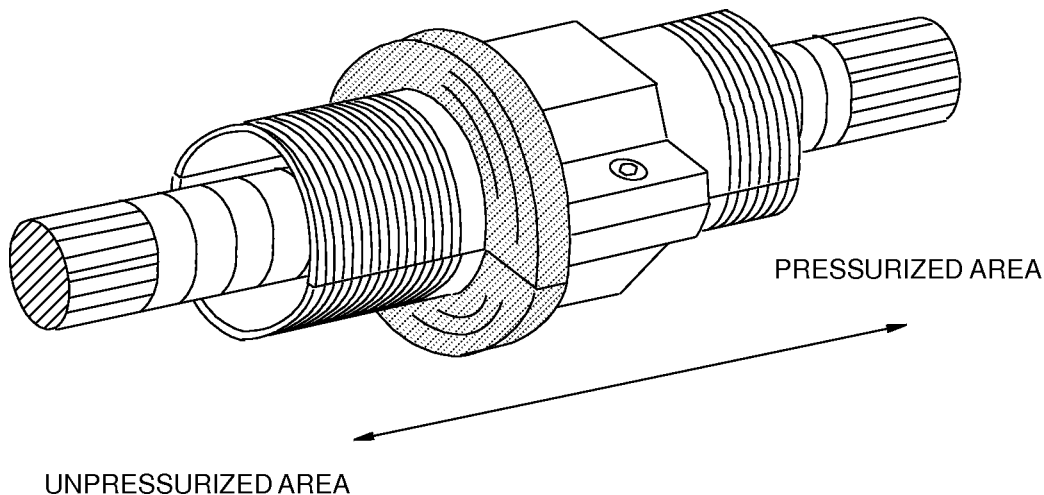
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



ASSEMBLY OF A HOUSING HALF, THE WIRE HARNESS, THE INTERNAL SEAL, AND THE BUSHING
Figure 93

(2) Put the other housing half on the assembly. Refer to Figure 94.

Make sure that the center of the tape wrapped area of the wire harness and the center of the internal seal are aligned.



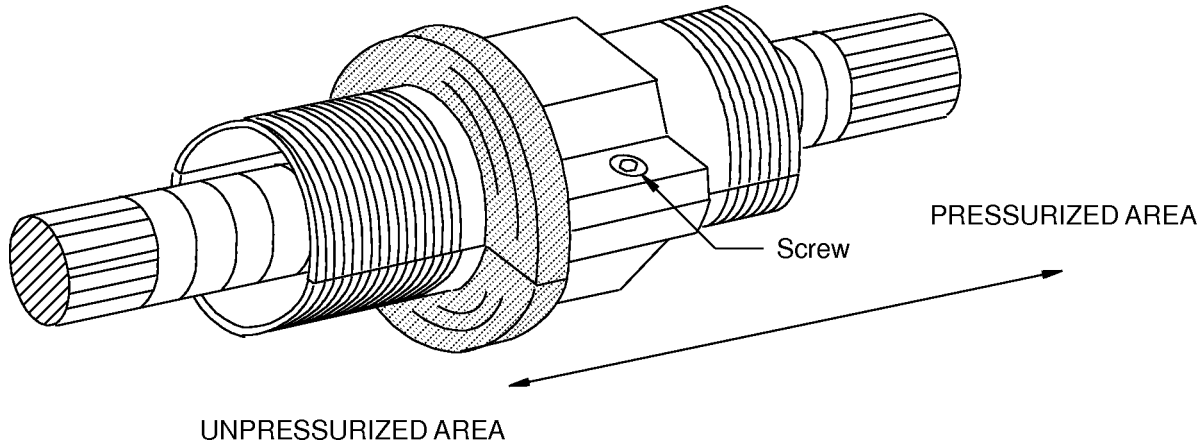
CONFIGURATION OF THE TWO HALVES OF THE HOUSING
Figure 94

(3) Make selection of an allen wrench from Table 21.

(4) Engage the two housing screws in one housing half and the captivated nuts in the other housing half. Refer to Figure 95.

STANDARD WIRING PRACTICES MANUAL

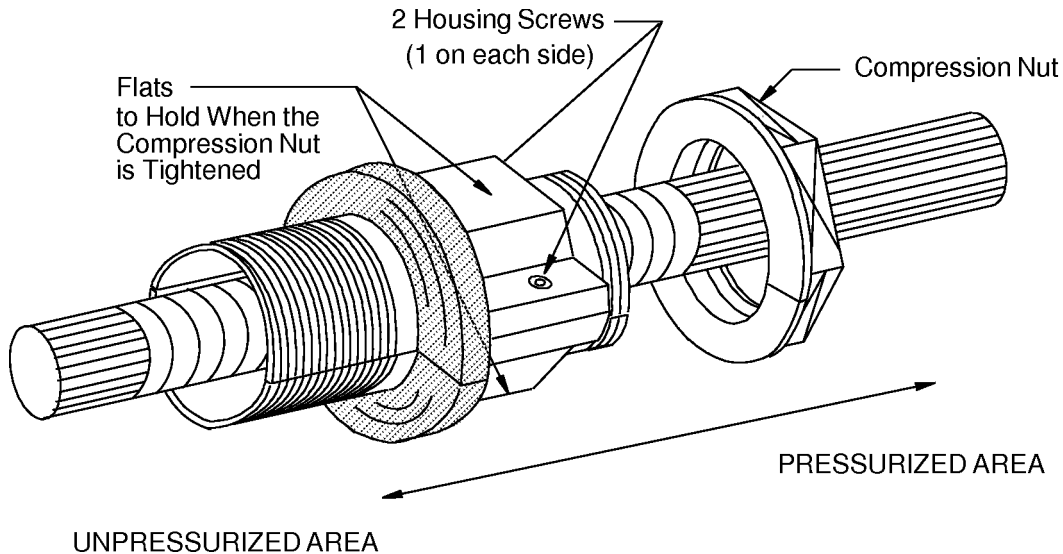
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



LOCATION OF THE HOUSING SCREWS

Figure 95

- (5) Tighten the housing screws to 16 inch-pounds \pm 2 inch-pounds.
- (6) Put the two halves of the compression nut together on the wire harness on the pressurized side of the assembly. Refer to Figure 96.



POSITION OF THE COMPRESSION NUT ON THE WIRE HARNESS

Figure 96

- (7) Engage the inner threads of the compression nut and the outer threads of the housing.

STANDARD WIRING PRACTICES MANUAL

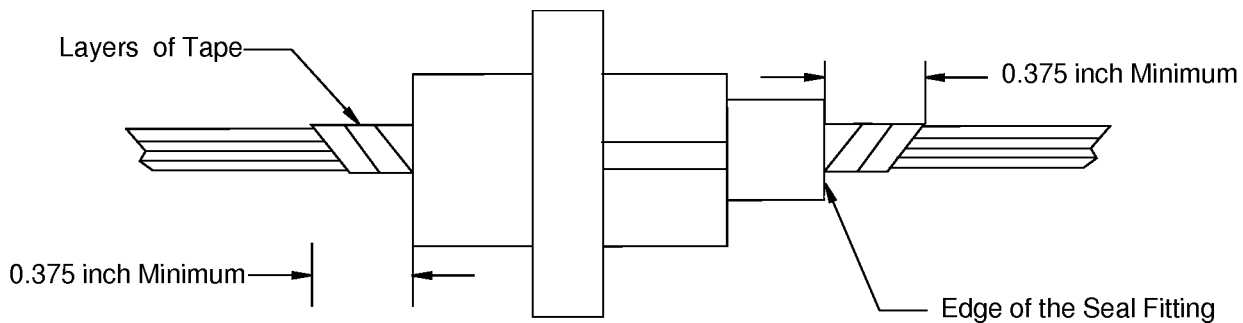
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

- (8) From Table 21 , make a selection of:
 - A holding tool
 - A torque tool
 - A compression nut crowfoot wrench.
- (9) Hold the assembly by the housing flats, and at the same time, torque the compression nut to 22 foot-pounds \pm 1 foot-pound.

Refer to Figure 96.

Make sure that the holding tool:

- Fully spans the width of the flats
 - Does not squeeze the part
 - Has a tight fit
 - Does not scratch or dent the housing.
- (10) Examine the assembly. Refer to Figure 97.
- Make sure that the tape on the wire harness extends a minimum of 0.375 inch farther than the edge of the seal fitting shell on each side.



CONFIGURATION OF THE SEAL FITTING AND THE TAPE
Figure 97

- (11) If the tape does not extend a minimum of 0.375 inch farther than the edge of the shell:
 - (a) Make a selection of a silicone tape from Table 22.
 - (b) Wrap two layers of the tape around the wire harness with tension

Make sure that:

 - The layers of the tape have a 50 percent overlap
 - The tape wraps extend more than 0.375 inch farther than each end of the seal fitting.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

E. Installation of the Seal Fitting in the Panel

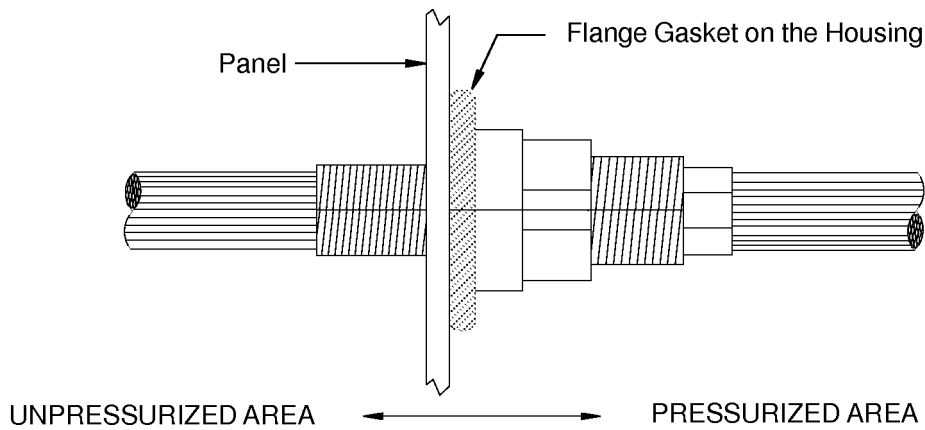
**Table 23
Necessary Tools**

Tool	Description	Shell Size	Size (inch)	Part Number	Notes
Torque Tool	-	-	-	-	Accuracy of ± 6 percent
Wrench	Crowfoot, Jam Nut	24	2.0	AN850832B	-
				ST2580-343A-17	-
		36	2-5/8	AN850842B	-
				ST2580-343A-15	-
48	3-1/2	057-0919-05	-		
Wrench	Socket, Jam Nut, Unpressurized Side	48	3-1/2	057-0898-05	-

**Table 24
Jam Nut Torque Values**

Shell Size	Jam Nut Torque (foot-pounds)
24	15
36	18
48	22

- From the pressurized side of the panel, carefully put the wire harness and the seal fitting in the hole in the panel until the flange gasket on the housing touches the panel. Refer to Figure 98. Make sure that damage to the wire insulation does not occur.



POSITION OF THE SEAL FITTING IN THE HOLE IN THE PANEL

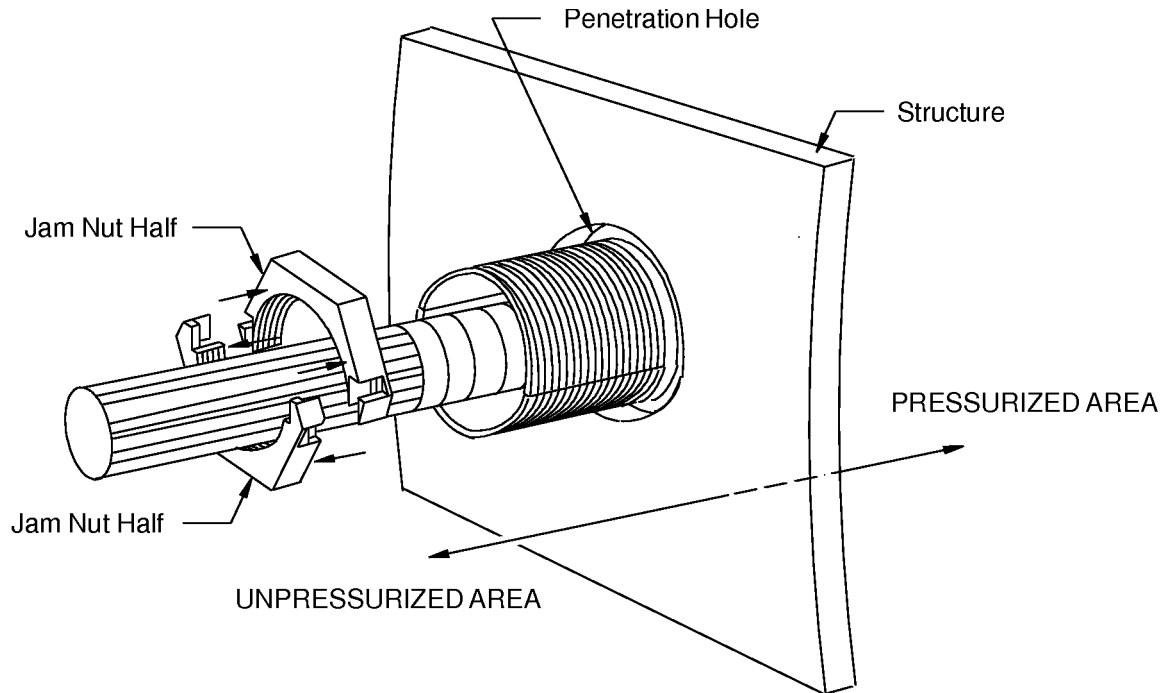
Figure 98

20-10-22

STANDARD WIRING PRACTICES MANUAL

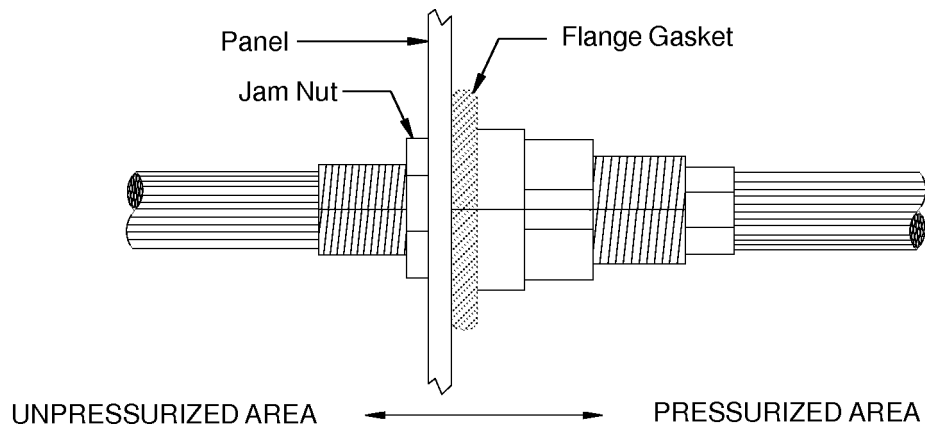
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

- (2) On the un-pressurized side of the panel, put the two jam nut halves together on the wire harness. Refer to Figure 99.



ASSEMBLY OF THE JAM NUT ON THE WIRE HARNESS
Figure 99

- (3) Engage the threads of the assembled jam nut and the threads of the seal fitting that extend through the panel. Refer to Figure 100 .



POSITION OF THE JAM NUT ON THE SEAL FITTING
Figure 100

- (4) Make a selection of a crowfoot wrench. Refer to Table 23.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

- (5) Hold the seal fitting with the hand and, at the same time, use the crowfoot wrench to tighten the jam nut.

Make sure that the seal fitting housing does not turn while the jam nut is tightened.

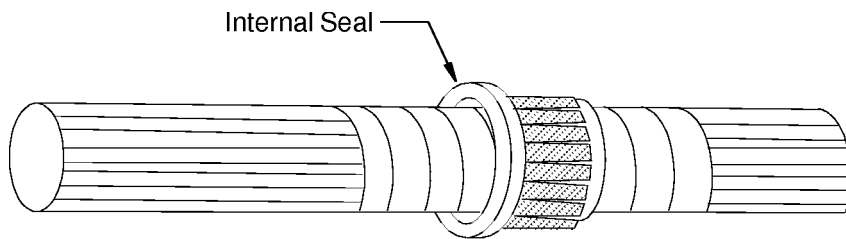
NOTE: If it is necessary, the seal fitting housing on the pressurized side can be held with a holding tool for the pressurized side.

NOTE: if it is necessary, the jam nut on the unpressurized side of a shell size 48 seal fitting can be held with the jam nut socket wrench.

- (6) Torque the jam nut. Refer to Table 24.

F. Internal Seal Assembly without a Grommet

- (1) At the side of the internal seal, pull the slot in the internal seal to an open position and at the same time, put the internal seal on the prepared wire harness or cable that must go through the seal fitting. Refer to Figure 101.



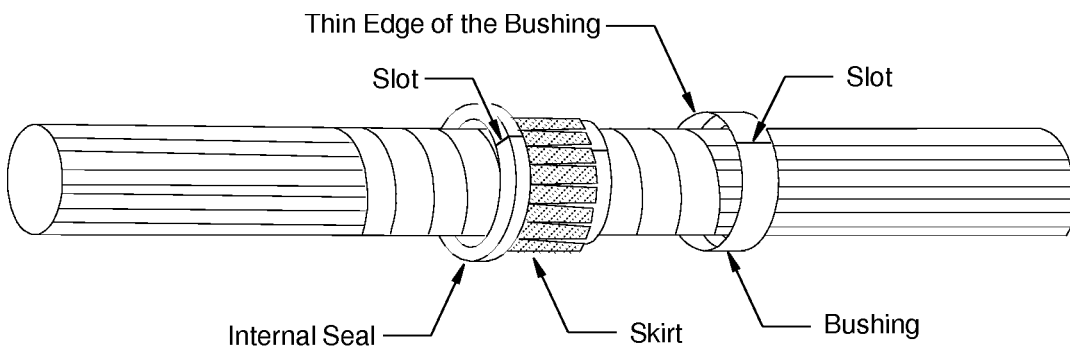
UNPRESSURIZED AREA ← → PRESSURIZED AREA

POSITION OF THE INTERNAL SEAL ON THE SEALED WIRE HARNESS

Figure 101

- (2) At the side of the bushing, pull the slot in the bushing to an open position, and at the same time, put the bushing on the prepared wire harness or cable that must go through the seal fitting. Refer to Figure 102.

Make sure that the thin edge of the bushing is adjacent to the skirt of the internal seal.



UNPRESSURIZED AREA ← → PRESSURIZED AREA

POSITION OF THE BUSHING AND THE INTERNAL SEAL ON THE WIRE HARNESS

Figure 102

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

G. Shell Size 24 and 36 Housing Assembly for a Sealant Filled Seal Fitting

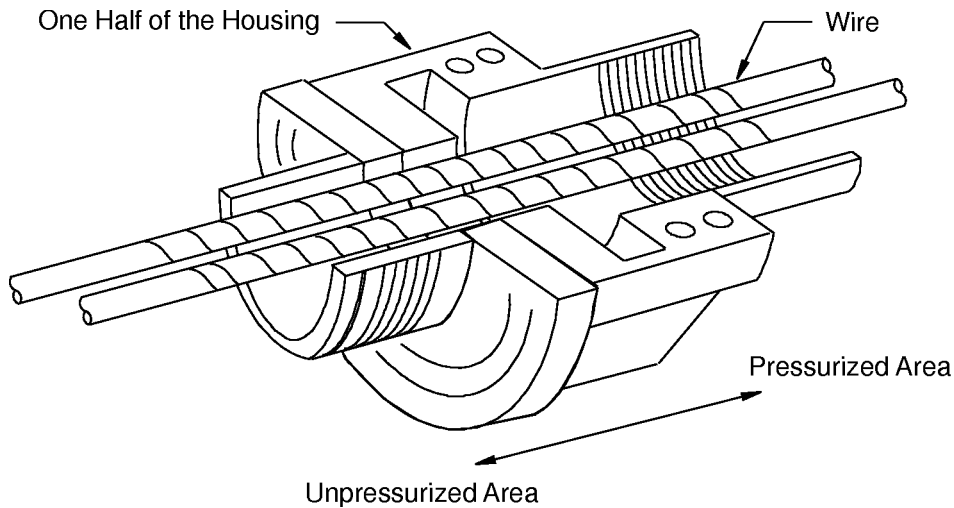
**Table 25
Necessary Tools**

Tool	Description	Shell Size	Size (inch)
Wrench or Driver	Allen	24	7/64
		36	7/64

**Table 26
Necessary Materials**

Material	Description	Part Number	Supplier
Silicone Tape	0.57 inch wide, Black	67N	Federal Mogul

- (1) Put the sealed wires or wire harnesses into one of the two housing halves. Refer to Figure 103.

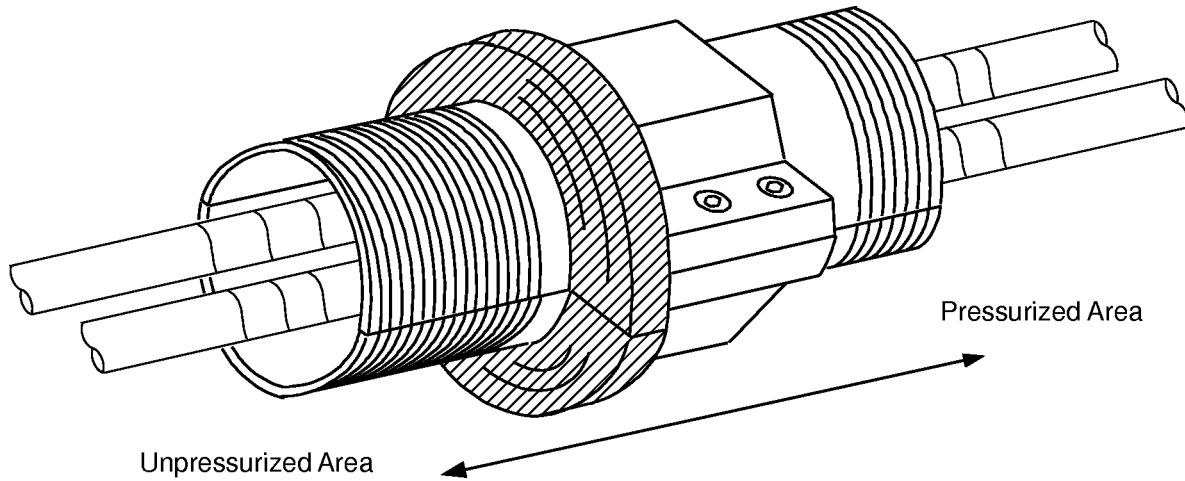


**POSITION OF THE WIRE HARNESSSES IN THE HOUSING HALF
Figure 103**

- (2) Put the other housing half on the assembly. Refer to Figure 104.

STANDARD WIRING PRACTICES MANUAL

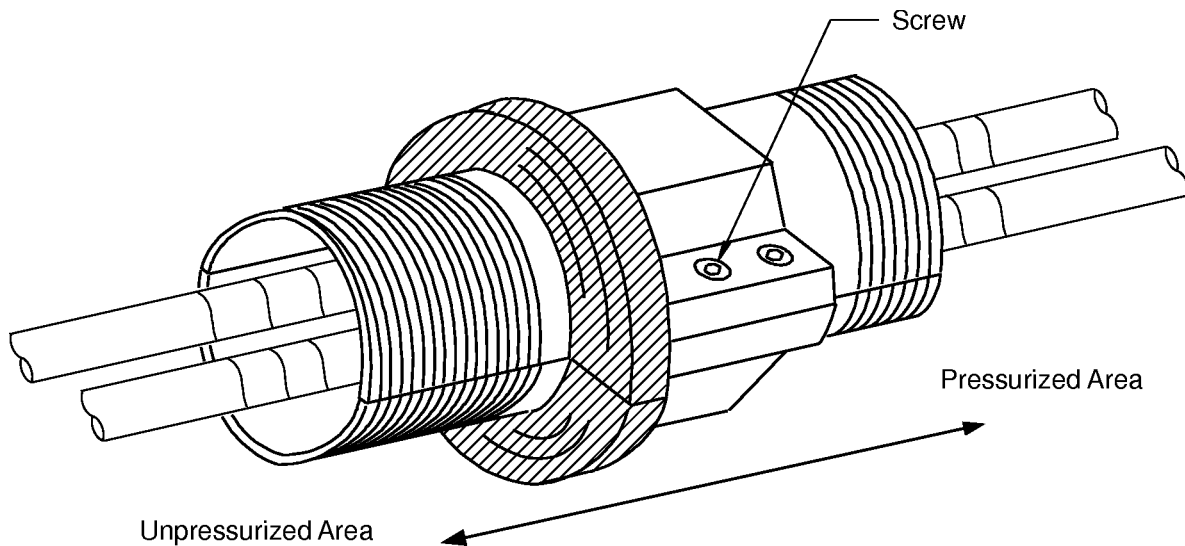
DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



POSITION OF THE TWO HALVES OF THE HOUSING
Figure 104

- (3) Make a selection of an allen wrench from Table 25.
- (4) Engage the four screws in one housing half with nuts in the other housing half. Refer to Figure 105.

NOTE: These nuts cannot be removed from the housing half.



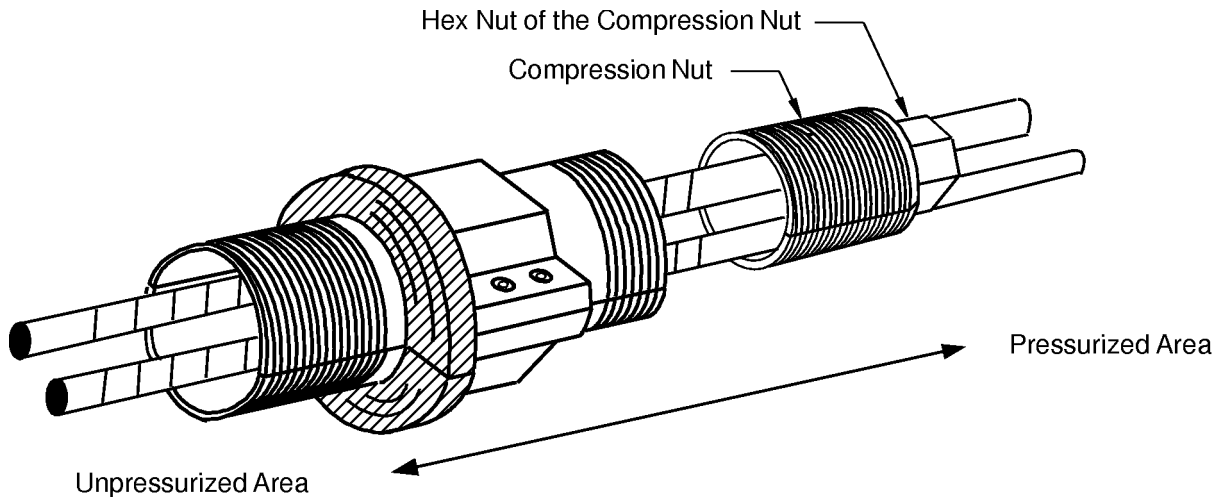
LOCATION OF THE HOUSING SCREWS
Figure 105

- (5) Tighten the housing screws to 12 inch-pounds \pm 2 inch-pounds.
- (6) Put the two halves of the compression nut together on the wire harness on the pressurized side of the seal fitting. Refer to Figure 106.

Make sure that the end of the compression nut that has the hex nut points to the pressurized side.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



POSITION OF THE COMPRESSION NUT ON THE WIRE HARNESS
Figure 106

- (7) Engage the outer threads of the compression nut and the inner threads of the housing.
- (8) Tighten the compression nut with the fingers until it stops.
- (9) Install the seal fitting in the panel. Refer to Paragraph 4.E..
- (10) Examine the wire harness in the seal fitting.
 Make sure that the tape on the wire harness extends an equal distance from each side of the seal fitting.
- (11) If the tape does not extend an equal distance from each end of the seal fitting:
 - (a) Make a selection of silicone tape from Table 26.
 - (b) Wrap more layers of tape on the wire harness at each end of the seal fitting.
 Make sure that the tape extends an equal distance from each end of the seal fitting.
- (12) Assemble a lacing tape wire harness tie around the wire harness and the tie tab on the compression nut. Refer to Subject 20-10-11.
 Make sure that the wire harness tie does not put strain on the wires or on the wire harnesses.
NOTE: If it is necessary, layers of tape can be installed to increase the diameter of the wire harness at the location of the wire harness tie to prevent strain on the wire harnesses.
- (13) Fill the seal fitting with sealant. Refer to Paragraph 4.I..

H. Shell Size 48 Housing Assembly for Sealant

Table 27
Necessary Tools

Tool	Description	Shell Size	Size (inch)
Wrench	Allen	48	9/64

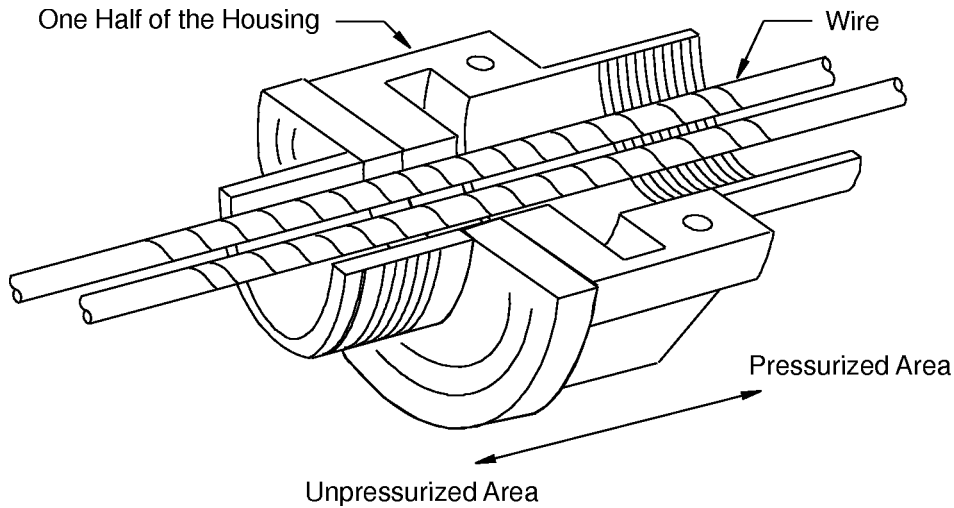
STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

Table 28
Necessary Materials

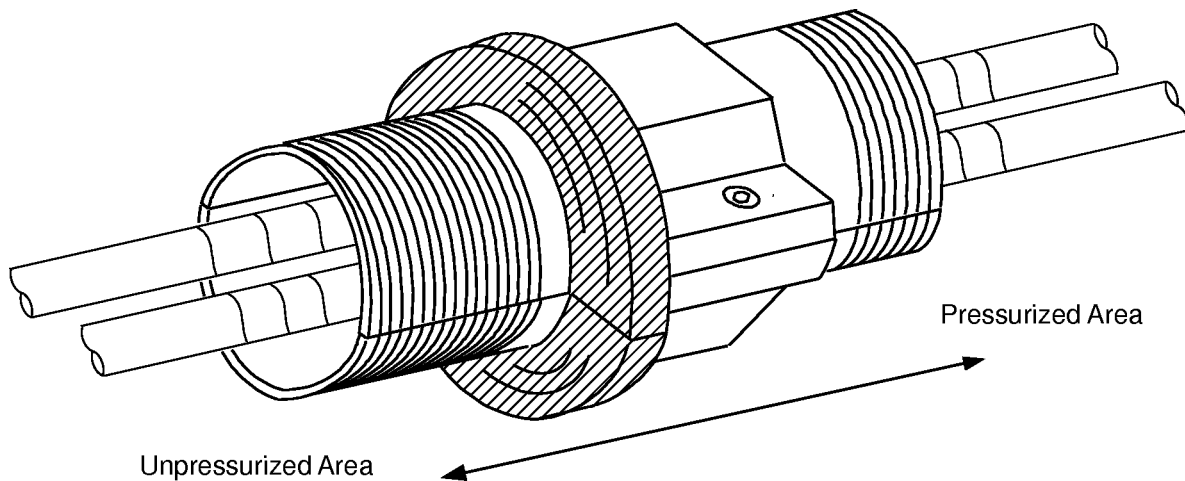
Material	Description	Part Number	Supplier
Silicone Tape	0.57 inch wide, Black	67N	Federal Mogul

(1) Put the sealed wires or wire harnesses into one of the two housing halves. Refer to Figure 107.



POSITION OF THE WIRE HARNESSES IN THE HOUSING HALF
Figure 107

(2) Put the other housing half on the assembly. Refer to Figure 108.



POSITION OF THE TWO HALVES OF THE HOUSING
Figure 108

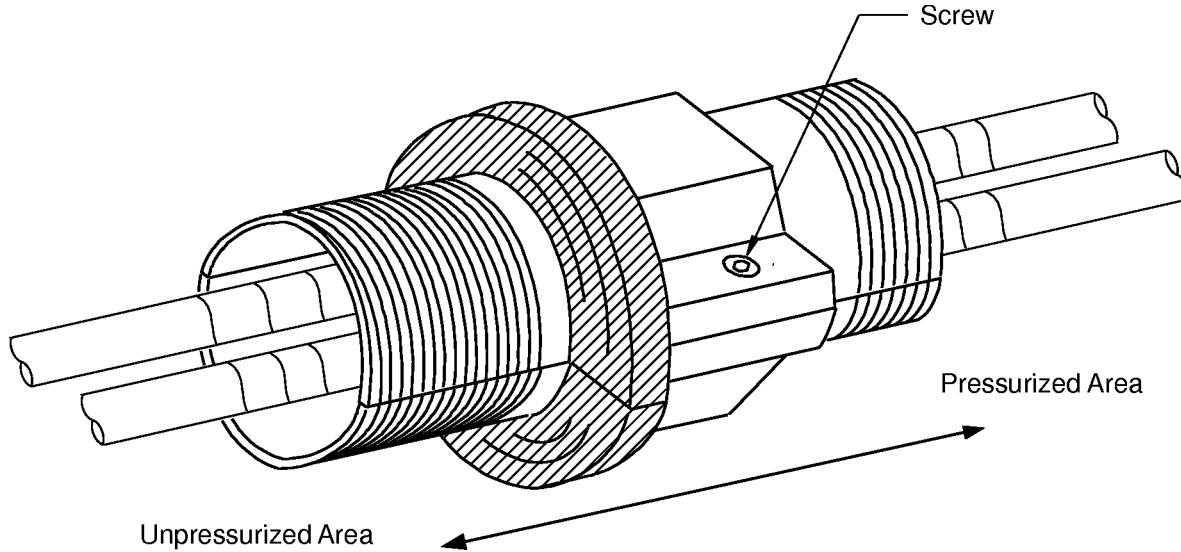
(3) Make a selection of an allen wrench from Table 27 .

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

- (4) Engage the two screws in one housing half with the nuts in another housing half. Refer to Figure 109.

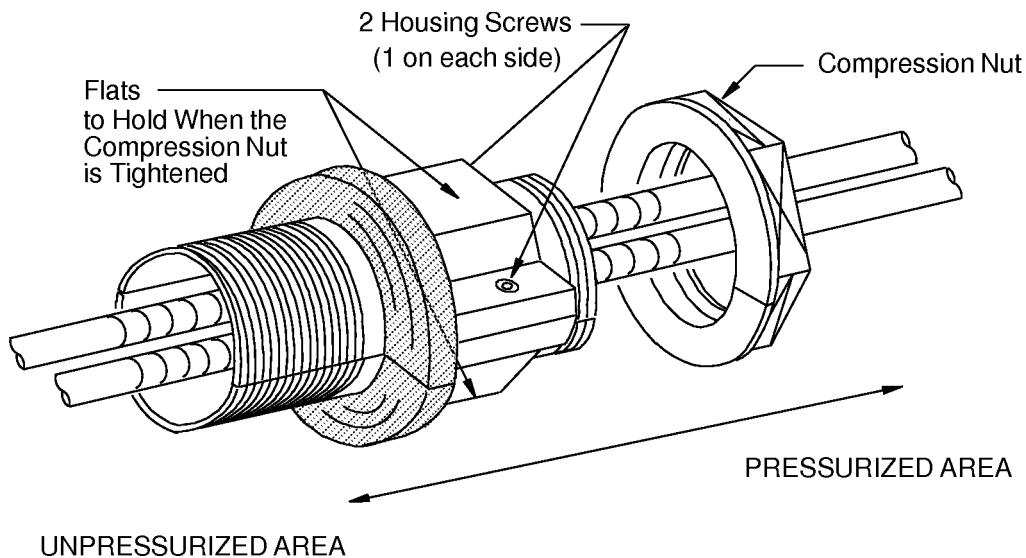
NOTE: The nuts can not be removed from the housing half.



LOCATION OF THE HOUSING SCREWS

Figure 109

- (5) Tighten the housing screws to 16 inch-pounds ± 2 inch-pounds.
- (6) Put the two halves of the compression nut together on the wire harness on the pressurized side of the assembly. Refer to Figure 110.



ALIGNMENT OF THE COMPRESSION NUT AND THE HOUSING

Figure 110

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

- (7) Engage the inner threads of the compression nut and the outer threads of the housing.
- (8) Tighten the compression nut with the fingers until it stops.
- (9) Install the seal fitting in the panel. Refer to Paragraph 4.E..
Make sure that the tape on the wire harness extends an equal distance on each side of the seal fitting.
- (10) If the tape does not extend an equal distance from each end of the seal fitting:
 - (a) Make a selection of a silicone tape from Table 28.
 - (b) Add more layers of tape on the wire harness at each end of the seal fitting until the tape extends an equal distance from each end.
- (11) Fill the seal fitting with sealant. Refer to Paragraph 4.I..

I. Injection of Sealant

NOTE: This process is used when the original installation included sealant.

**Table 29
Necessary Tools**

Tool	Note	Part Number	Supplier
Sealant Injection Tool	-	-	An available source
Wiper	-	BMS15-5 Class A	QPL
		BMS15-5 Class B	QPL
Gloves	Powder Free	-	An available source

**Table 30
Necessary Materials**

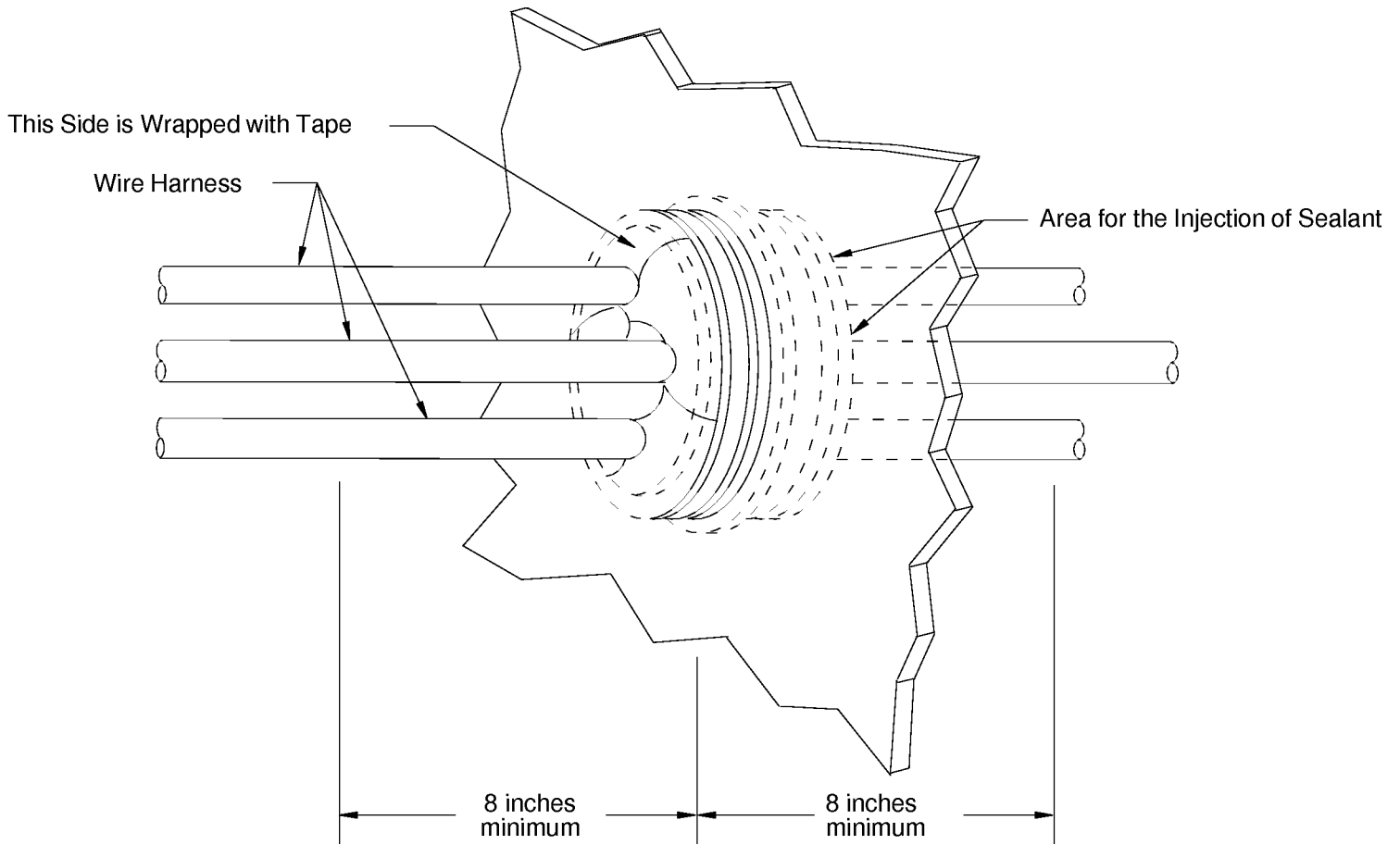
Material	Description	Part Number or Specification	Supplier
Sealant	Any Grade	BMS 5-37	QPL
Solvent	Isopropyl Alcohol	TT-I-735	An available source
	Naptha, Aliphatic	TT-N-95, Type I	An available source
Plastic Tape	2.0 inches wide	P-29	Permacel

NOTE: Use gloves to touch or apply sealant. Refer to Table 29.

- (1) Make a selection of these materials from Table 30:
 - Sealant
 - A plastic tape.
- (2) Make a selection of a sealant injection tool from Table 29.
- (3) Wrap plastic tape on the wire harnesses near the seal fitting.
- (4) Make a hole in the tape on each wire harness on the unpressurized side of the seal fitting. Refer to Figure 111.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

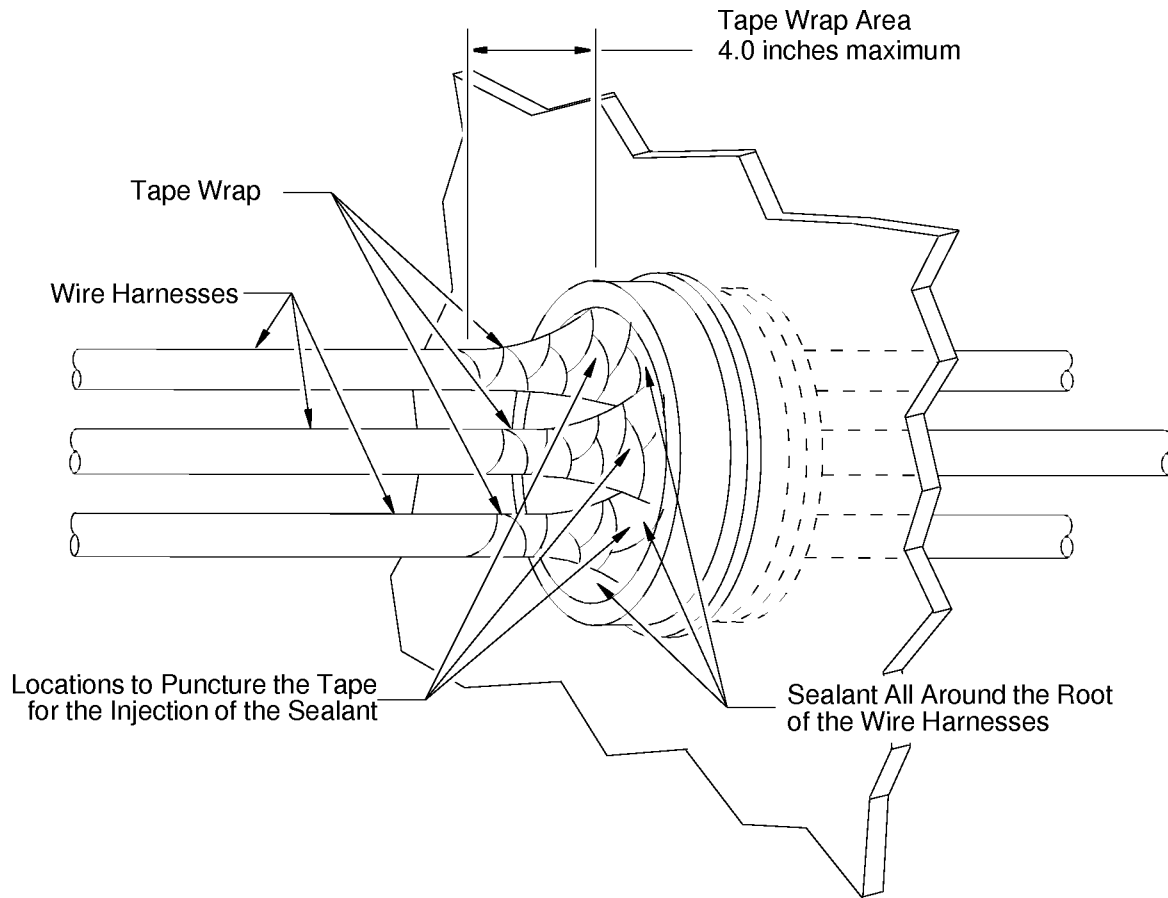


PREPARATION FOR POTTING
Figure 111

- (5) Wrap plastic tape around each wire harness on the pressurized side of the seal fitting.
- (6) Make a hole in the base of the tape on each wire harness with the injection tool. Refer to Figure 112.

STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS



APPLICATION OF THE TAPE AND THE POTTING COMPOUND
Figure 112

- (7) Apply the sealant on all sides of each wire or wire harness from the pressurized side of the seal fitting.
- (8) Apply the sealant to completely cover the each wire harness and the outer surface and edges of the seal fitting.
 Make sure that each of the wire harnesses is separated from each other from the seal fitting to the clamp nearest to the seal fitting.
- (9) If too much sealant is applied:
 - (a) Make a selection of a solvent from Table 30.
 - (b) Make a selection of wiper from Table 29.
 - (c) Remove the unwanted sealant from the assembly.
 - (d) Remove the remaining solvent with a clean wiper.

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STANDARD WIRING PRACTICES MANUAL

DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS

5. APPROVED TOOL SUPPLIERS

A. Approved Tool Suppliers

Table 31
Approved Tool Suppliers

Part Number	Supplier
057-0750-00	Deutsch
057-0898-05	Deutsch
057-0919-05	Deutsch
AN850824B	Snap-On
AN850826B	Snap-On
AN850832B	Snap-On
AN850842B	Snap-On
ST2580-343A-15	Boeing
ST2580-343A-17	Boeing
ST2580-343A-18	Boeing
ST2580-343A-19	Boeing
ST2580-343A-20	Boeing
ST2580-343A-21	Boeing
ST2580-343A-22	Boeing
ST2580-343A-23	Boeing

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STANDARD WIRING PRACTICES MANUAL

REPAIR OF FLEXIBLE ELECTRICAL CONDUITS

<u>Paragraph</u>	<u>Page</u>
1. <u>REPAIR OF A FLEXIBLE CONDUIT</u>	1
A. General Conditions	1
B. Repair of a Convolute Tube	2
2. <u>REPAIR OF A FLEXIBLE CONDUIT WITH A METAL OVERBRAID SHIELD</u>	3
A. General Conditions	3
B. Repair of a Metal Overbraid Shield	4

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STANDARD WIRING PRACTICES MANUAL**REPAIR OF FLEXIBLE ELECTRICAL CONDUITS**

This Subject gives the procedures to repair these configurations of flexible conduits that are not made with metal:

- A convoluted tube
- A convoluted tube with a metal overbraid shield.

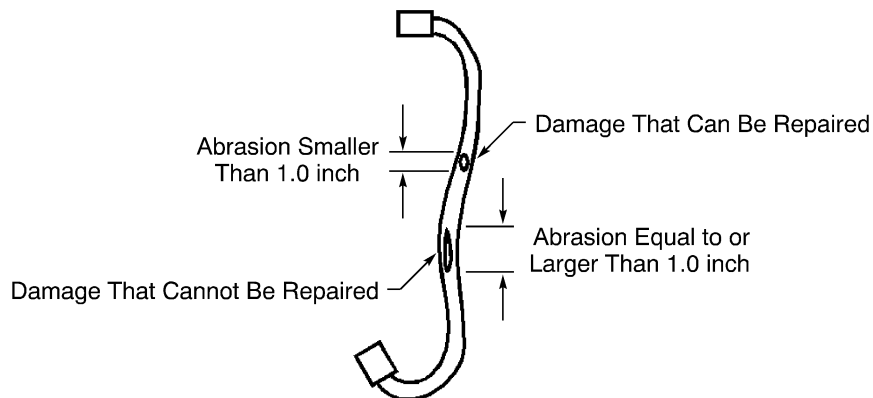
1. REPAIR OF A FLEXIBLE CONDUIT**A. General Conditions**

A conduit assembly must be replaced when:

- A wire in the convoluted tube has damage
- The convoluted tube has a crack
- The convoluted tube has damage that is equal to or larger than 1 inch in length; refer to Figure 1
- The convoluted tube has damage that is equal to or larger than 15 percent of the circumference of the tube; refer to Figure 2
- The inner PTFE or ETFE surface of the convoluted tube is not smooth and continuous
- The inner PTFE or ETFE surface of the convoluted tube has a blockage or a sharp edge.

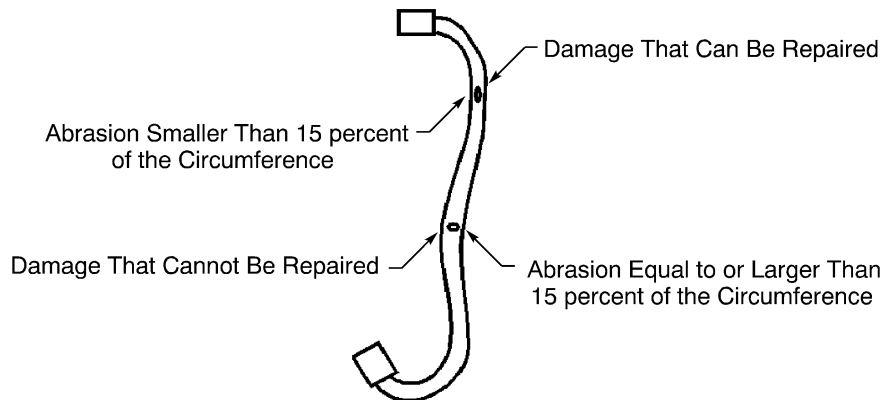
A convoluted tube with abrasive damage can be repaired if:

- The tube has damage that is smaller than 1 inch in length; refer to Figure 1
- The tube has damage that is smaller than 15 percent of the circumference of the tube; refer to Figure 2.

**LONGITUDINAL DAMAGE LIMITS OF A FLEXIBLE CONDUIT****Figure 1****20-10-91**

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FLEXIBLE ELECTRICAL CONDUITS



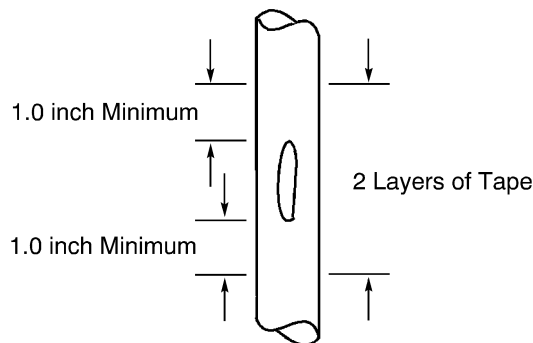
CIRCUMFERENTIAL DAMAGE LIMITS OF A FLEXIBLE CONDUIT
Figure 2

B. Repair of a Convoluted Tube

- (1) Make an inspection of the wires in the convoluted tube.
- (2) If a wire has damage to the insulation, the shield, or the conductor:
 - (a) Remove the wire harness from the conduit assembly.
 - (b) Replace or repair the wire. Refer to Subject 20-10-13 for the applicable conditions.

CAUTION: A SPLICE ON A WIRE IN A CONDUIT IS NOT PERMITTED.

- (c) Replace the conduit assembly.
- (3) If the wires do not have damage, and the damage to the convoluted tube is not greater than the limits specified in Paragraph 1.A., repair the convoluted tube.
 - (a) Make a selection of a Teflon silicone adhesive tape. Refer to Subject 20-00-11.
 Make sure that the tape has the applicable Temperature Grade and Class for the location of the repair.
 - (b) If applicable, remove sharp or rough edges from the damaged area.
 - (c) Clean the area with isopropyl alcohol. Refer to Subject 20-00-11.
 - (d) Put a minimum of 2 layers of tape on the damaged area. Refer to Figure 3.



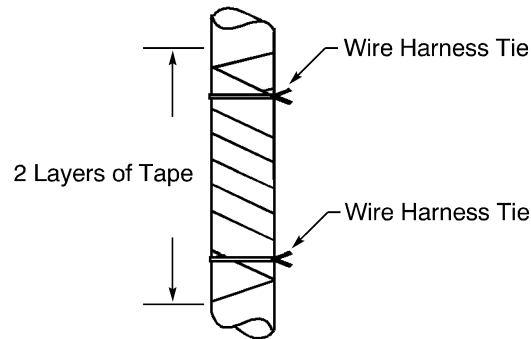
LOCATION OF THE LAYERS OF TAPE
Figure 3

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STANDARD WIRING PRACTICES MANUAL**REPAIR OF FLEXIBLE ELECTRICAL CONDUITS**

Make sure that:

- The end of each layer of tape makes a 1 inch minimum overlap with each end of the damaged area
 - The tape makes 50 percent overlap on each layer
 - The second layer of tape is in the opposite direction of the first layer.
- (e) Assemble a wire harness tie on the tape at each end of the repair area. Refer to:
- Figure 4
 - Subject 20-10-11 for the procedure to assemble a wire harness tie.



POSITION OF THE WIRE HARNESS TIES

Figure 4

- (4) If the damage to the convoluted tube is greater than the limits specified in Paragraph 1.A., replace the damaged convoluted tube with a new convoluted tube. Refer to Subject 20-00-11.

2. REPAIR OF A FLEXIBLE CONDUIT WITH A METAL OVERBRAID SHIELD

A. General Conditions

A conduit assembly must be replaced when:

- A wire in the convoluted tube has damage
- The convoluted tube has damage
- The inner PTFE or ETFE surface of the convoluted tube is not smooth and continuous
- The inner PTFE or ETFE surface of the convoluted tube has a blockage or a sharp edge
- The overbraid shield has damage that is equal to or larger than 1 inch in length; refer to Figure 5
- The overbraid shield has damage that is equal to or larger than 25 percent of the circumference of the conduit; refer to Figure 6
- The electrical bond between the two end fittings has a resistance that is greater than 10 milliohms.

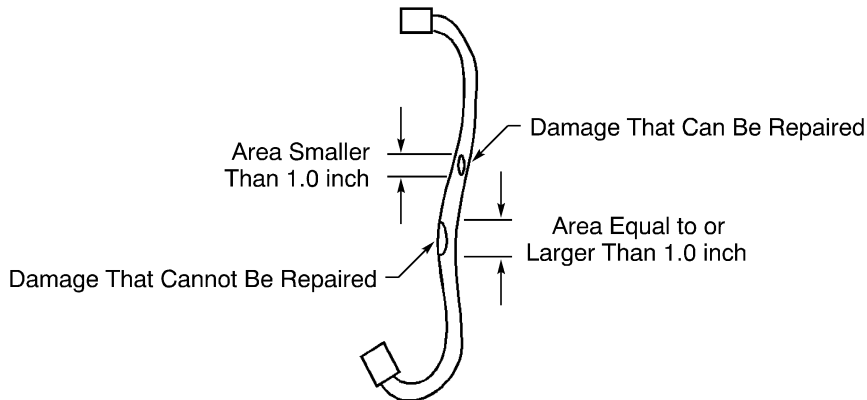
A conduit assembly with abrasive damage of the metal overbraid shield can be repaired if:

- The shield has damage that is smaller than 1 inch in length; refer to Figure 5
- The shield has damage that is smaller than 25 percent of the circumference of the shield; refer to Figure 6
- The electrical bond between the two end fittings has a resistance that is less than or equal to 10 milliohms.

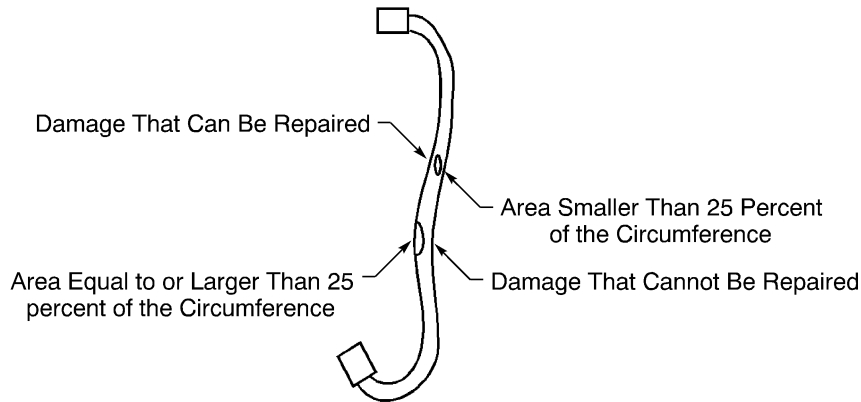
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STANDARD WIRING PRACTICES MANUAL

REPAIR OF FLEXIBLE ELECTRICAL CONDUITS



LONGITUDINAL DAMAGE LIMITS OF A FLEXIBLE CONDUIT WITH A METAL OVERBRAID SHIELD
Figure 5



CIRCUMFERENTIAL DAMAGE LIMITS OF A FLEXIBLE CONDUIT WITH A METAL OVERBRAID SHIELD
Figure 6

B. Repair of a Metal Overbraid Shield

- (1) Make an inspection of the wires in the convoluted tube.
- (2) If a wire has damage to the insulation, the shield, or the conductor:
 - (a) Remove the wire harness from the conduit assembly.
 - (b) Replace or repair the wire. Refer to Subject 20-10-13 for the applicable conditions.
 - (c) Replace the conduit assembly.
- (3) If the convoluted tube has damage:
 - (a) Remove the wire harness from the conduit assembly.
 - (b) Replace the conduit assembly.
- (4) If the wires or the convoluted tube do not have damage, repair the overbraid shield.

Make sure that the damage of the shield is not greater than the limits that are specified in Paragraph 2.A.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FLEXIBLE ELECTRICAL CONDUITS

- (a) Make a selection of a Teflon silicone adhesive tape. Refer to Subject 20-00-11.
Make sure that the tape has the applicable Temperature Grade and Class for the location of the repair.
- (b) If applicable, remove broken strands and rough edges of the shield from the damaged area.
- (c) Clean the area with isopropyl alcohol.
- (d) Put a minimum of 2 layers of tape on the damaged area. Refer to Figure 3.
Make sure that:
 - The end of each layer of tape makes a 1 inch minimum overlap with each end of the damaged area
 - The tape makes 50 percent overlap on each layer
 - The second layer of tape is in the opposite direction of the first layer.
- (e) Assemble a wire harness tie on the tape at each end of the repair area. Refer to:
 - Figure 4
 - Subject 20-10-11 for the procedure to assemble a wire harness tie.

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ARINC 629 WIRING

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ARINC 629 WIRING

1. GENERAL DATA

A. Conditions for Repair or Replacement

Refer to Subject 20-10-13 for the applicable damage conditions and repair conditions for:

- The ARINC 629 S280W651-() data bus cable
- The ARINC 629 S280W502-() stub cable.

2. PART NUMBERS AND DESCRIPTION

A. ARINC 629 Data Bus Components

**Table 1
ARINC 629 DATA BUS COMPONENT PART NUMBERS**

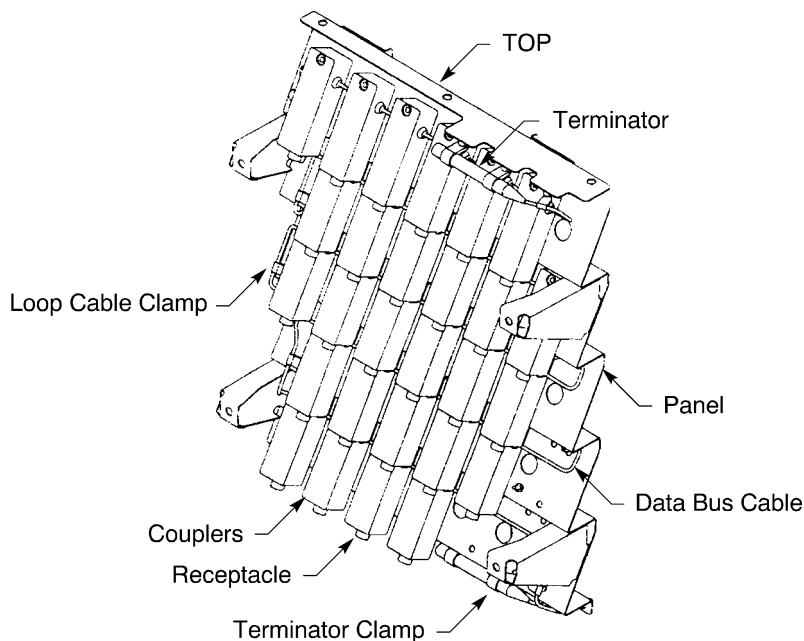
Boeing Specification		Supplier Data	
Part Number	Description	Part Number	Supplier
-	Backshell	S3682-1205-1	Sunbank
BACC10DK()	Clamp for Cable or Terminator	-	Boeing
BACC10GE8A	Clamp for Ferrite Suppressor	-	Boeing
BACC10HF12C	Backshell Clamp, Strain Relief	-	Boeing
BACC63CB12-3()	Plug	-	Boeing
BACC63CC12-3()	Receptacle	-	Boeing
S227W001-1	ARINC 629 Two Piece Coupler	DB110777	Amphenol/Bendix
	ARINC 629 Coupler Base	DB110778	Amphenol/Bendix
	ARINC 629 Coupler Cover	DB110779	Amphenol/Bendix
S227W001-2	ARINC 629 Two Piece Coupler	5242500-100	SCI Technology
	ARINC 629 Coupler Base	5242515-100	SCI Technology
	ARINC 629 Coupler Cover	5242505-100	SCI Technology
S227W001-4	ARINC 629 Two Piece Coupler	5242500-101	SCI Technology
	ARINC 629 Coupler Base	5242515-101	SCI Technology
	ARINC 629 Coupler Cover	5242505-101	SCI Technology
S227W001-6	ARINC 629 Two Piece Coupler	5242500-102	SCI Technology
	ARINC 629 Coupler Base	5242515-102	SCI Technology
	ARINC 629 Coupler Cover	5242505-102	SCI Technology
S227W001-8	ARINC 629 One Piece Coupler	5446500-001	SCI Technology
S280W651-()	ARINC 629 Data Bus Cable Assembly	-	Boeing
S280W752-1	Ferrite Suppressor	-	Boeing

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

**Table 2
NECESSARY MATERIALS**

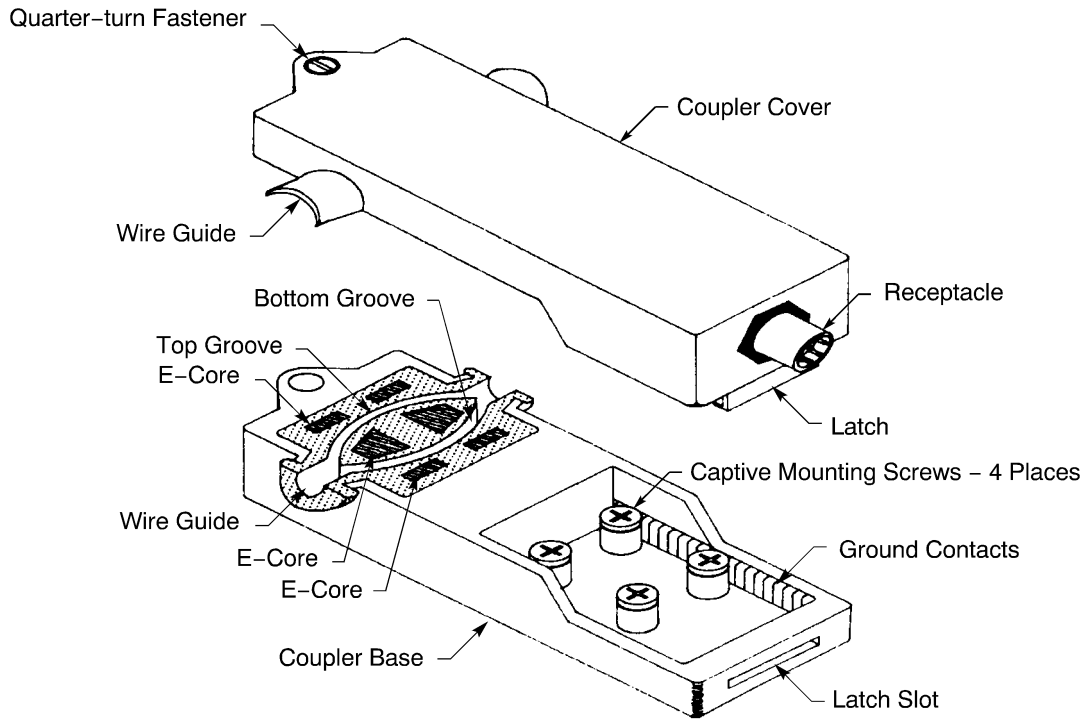
Material	Part Number or Specification	Size	Supplier
Tape, Foil	23-00159	-	Tecknit
Tape, Insulation, High Temperature	MIL-I-23594 Type I Class 4	0.5 inch wide	QPL
Tape, Polyester	No. 850	-	3M
Tape, Silicone	Scotch 70	1.5 inches wide	3M



**USUAL CONFIGURATION OF THE ARINC 629 COUPLERS ON A PANEL
Figure 1**

STANDARD WIRING PRACTICES MANUAL

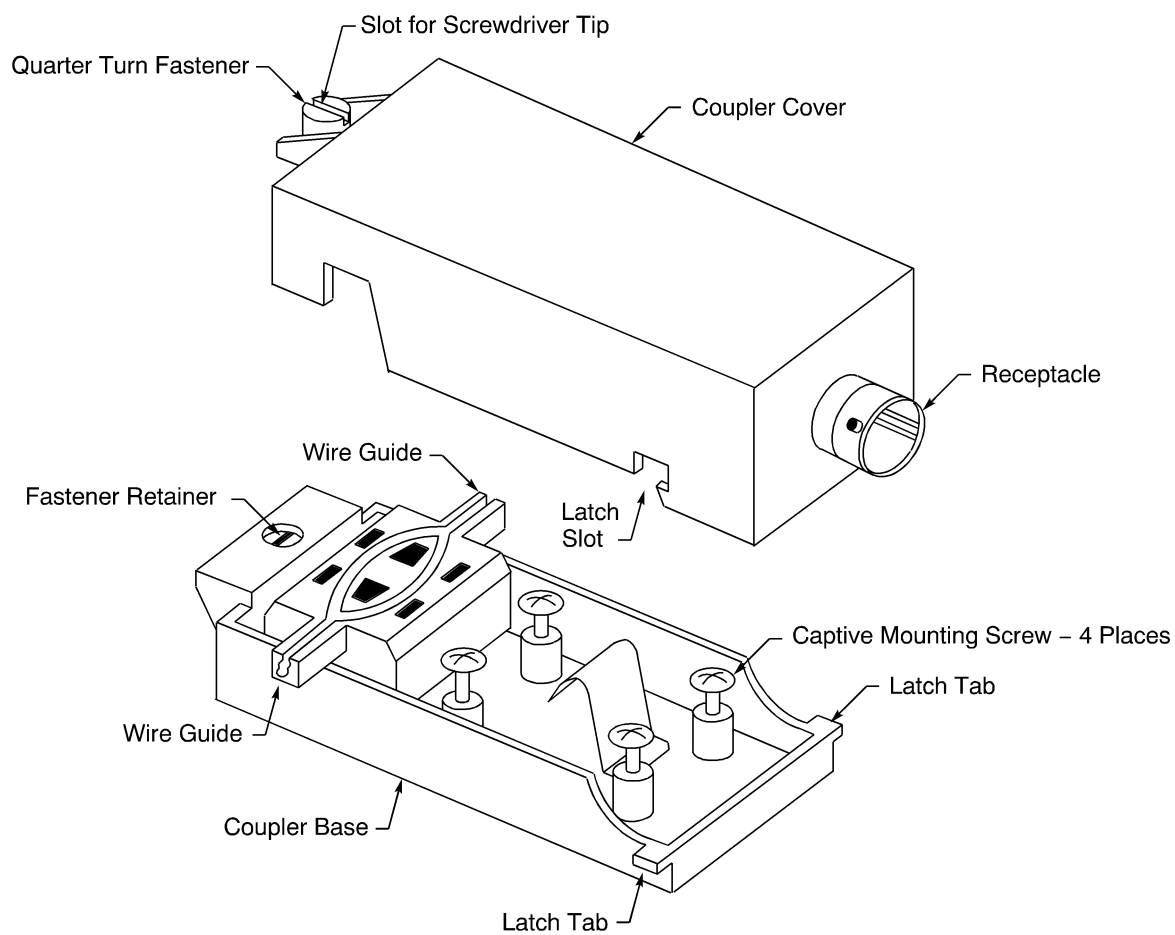
ARINC 629 WIRING



S227W001-1 TWO PIECE COUPLER
Figure 2

STANDARD WIRING PRACTICES MANUAL

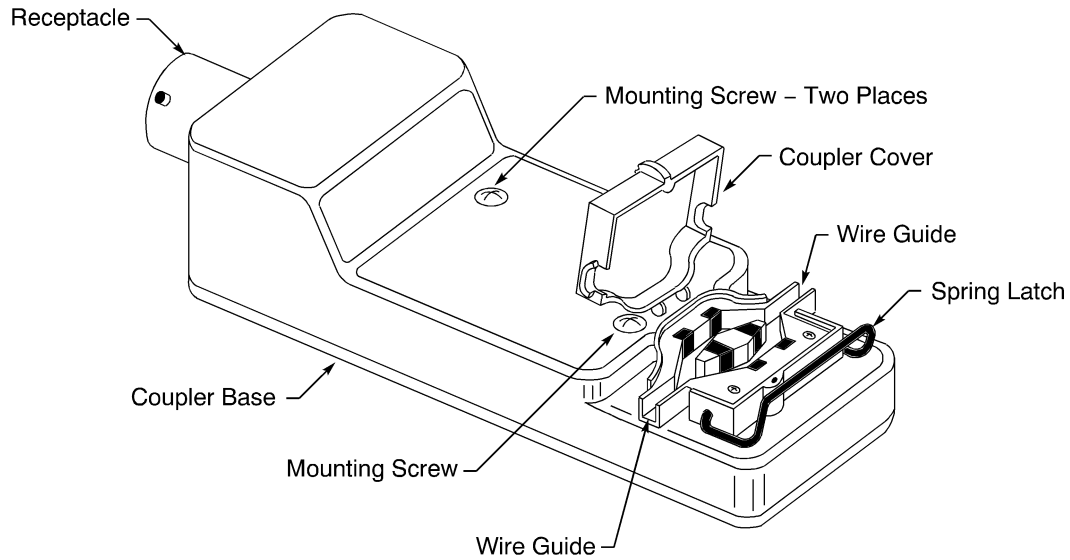
ARINC 629 WIRING



S227W001-2, S227W001-4, S227W001-6 TWO PIECE COUPLERS
Figure 3

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



S227W001-8 ONE PIECE COUPLER
Figure 4

B. ARINC 629 Coupler-to-Stanchion Stub Cable Components

Table 3
COUPLER-TO-STANCHION STUB CABLE COMPONENT PART NUMBERS

Component	Part Number	Supplier
Backshell	S280W603-()	Boeing
	S280W605-()	Boeing
Cable	S280W502-4	Boeing
Plug	BACC63CB()	Boeing
Receptacle	BACC63CC()	Boeing

Table 4
NECESSARY MATERIALS

Material or Part	Part Number or Specification	Supplier	Description
Sleeve, Heat Shrinkable	DR-25	Raychem	-
	MIL-DTL-23053/16	QPL	-
	MIL-LT	Raychem	Blue
Solder Sleeve	BACS13CT()	Boeing	-
Tape, Shield	Scotch 24	3M	1.0 inch wide
Tape, Silicone	Scotch 70	3M	1.5 inches wide

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

C. ARINC 629 Stanchion-to-LRU Stub Cable Components

**Table 5
STANCHION-TO-LRU STUB CABLE COMPONENT PART NUMBERS**

Component	Part Number	Supplier
Backshell	S280W603-()	Boeing
Cable	S280W502-1	Boeing
Contact, Twinax	S280W552-205	Boeing
Plug	BACC63CB()	Boeing
Receptacle	BACC63CC()	Boeing

**Table 6
NECESSARY PARTS AND MATERIALS**

Material or Part	Part Number or Specification	Supplier	Description
Sleeve, Heat Shrinkable	MIL-DTL-23053/16	QPL	-
	MIL-LT	Raychem	Blue
	DR-25	Raychem	-
Tape, Shield	Scotch 24	3M	1.0 inch wide
Tape, Silicone	Scotch 70	3M	1.5 inches wide

3. DATA BUS DISASSEMBLY

A. Removal of a Data Bus Cable for the S227W001-1, -2, -4, and -6 Two Piece Couplers

**Table 7
NECESSARY TOOLS**

Tool	Description
Screwdriver	Flat Head

- (1) Loosen each loop cable clamp on the panel. Refer to Figure 1.
- (2) If the data bus cable has a receptacle at one end, remove the receptacle from the panel.
- (3) Remove the terminator from the terminator clamps.
- (4) Make a selection of a screwdriver from Table 7.
- (5) Turn the quarter turn fasteners on the coupler cover approximately 1/4 turn counter clockwise with the screwdriver. Refer to Figure 2 and Figure 3.
Make sure that you push on the screwdriver while you turn it.
- (6) Remove the coupler cover from the coupler base.
- (7) Carefully pull the data bus cable out of each wire guide of each coupler base.

B. Removal of a data bus cable for the S227W001-8 One Piece Coupler

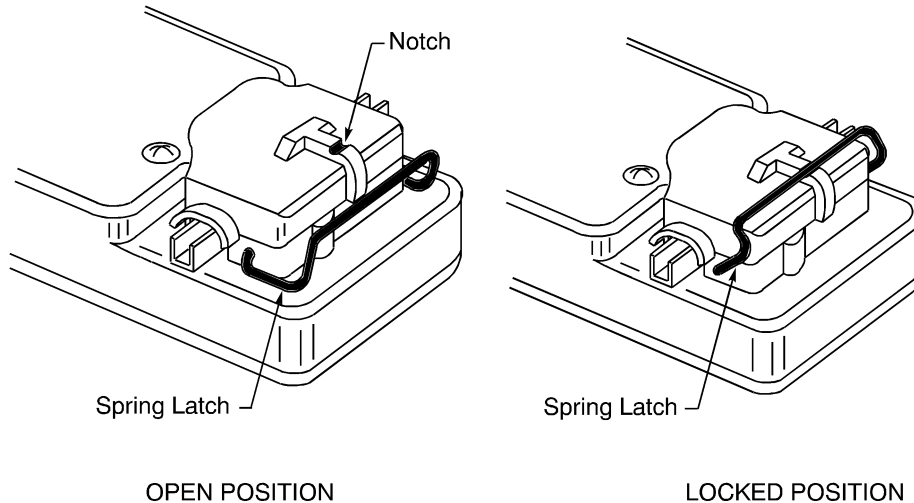
- (1) Loosen each loop cable clamp on the panel. Refer to Figure 1.
- (2) If the data bus cable has a receptacle at one end, remove the receptacle from the panel.

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STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

- (3) Remove the terminator from the terminator clamps.
- (4) Push the spring latch out of the notch to open the coupler lid. Refer to Figure 5.



S227W001-8 COUPLER SPRING LATCH ATTACHMENT
Figure 5

- (5) Carefully pull the data bus cable out of each wire guide of each coupler base.

C. Removal of a Coupler Base from a Panel for the S227W001-1, -2, -4, and -6 Two Piece Couplers

Table 8
NECESSARY TOOLS

Tool	Description
Screwdriver	Flat Head
	Phillips Head

- (1) If necessary, remove the data bus coupler from the wire guide of the coupler base:
 - (a) Make a selection of a flathead screwdriver from Table 8.
 - (b) Turn the quarter turn fastener on the coupler cover approximately turn counter clockwise with the screwdriver. Refer to Figure 2 and Figure 3.
 Make sure that you push on the screwdriver while you turn it.
 - (c) Remove the coupler cover from the coupler base.
 - (d) Carefully pull the data bus cable from the wire guide of the coupler base.
- (2) Make a selection of a phillips head screwdriver from Table 8.
- (3) Disengage the threads of the four captive mounting screws with the screwdriver. Refer to Figure 2 and Figure 3.
- (4) Carefully pull the coupler base from the panel.

STANDARD WIRING PRACTICES MANUAL

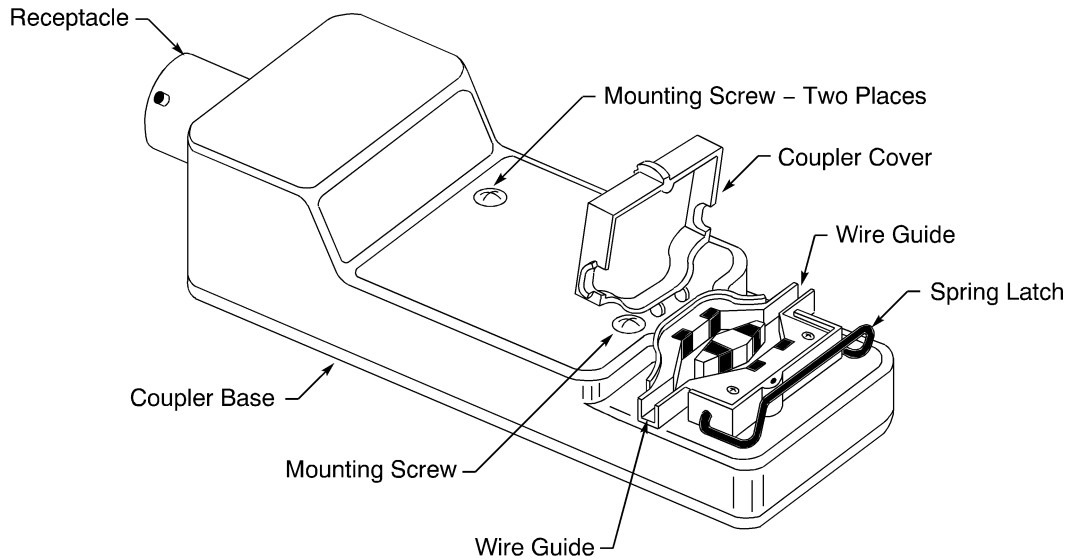
ARINC 629 WIRING

D. Removal of a S227W001-8 One Piece Coupler from a Panel

**Table 9
NECESSARY TOOLS**

Tool	Description
Screwdriver	Phillips Head

- (1) Make a selection of a screwdriver from Table 9.
- (2) Disengage the threads of the two mounting screws with the screwdriver. Refer to Figure 6.



**S227W001-8 ONE PIECE COUPLER
Figure 6**

- (3) Carefully pull the coupler base from the panel.

4. DATA BUS ASSEMBLY

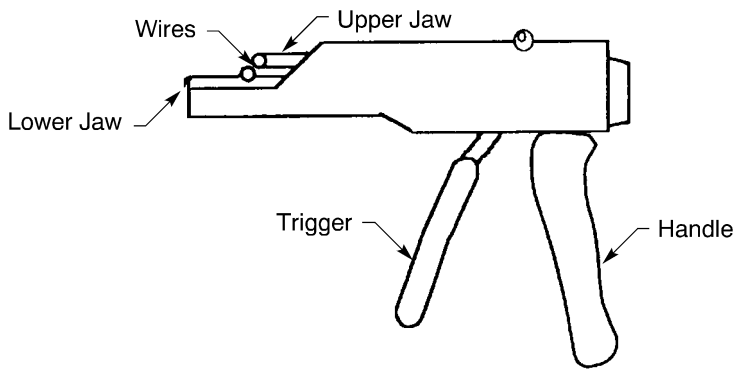
A. Separation of the Data Bus Wires

**Table 10
NECESSARY TOOLS**

Tool	Part Number
Wire Separator	WST8139

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



DANIELS WST8139 WIRE SEPARATOR TOOL

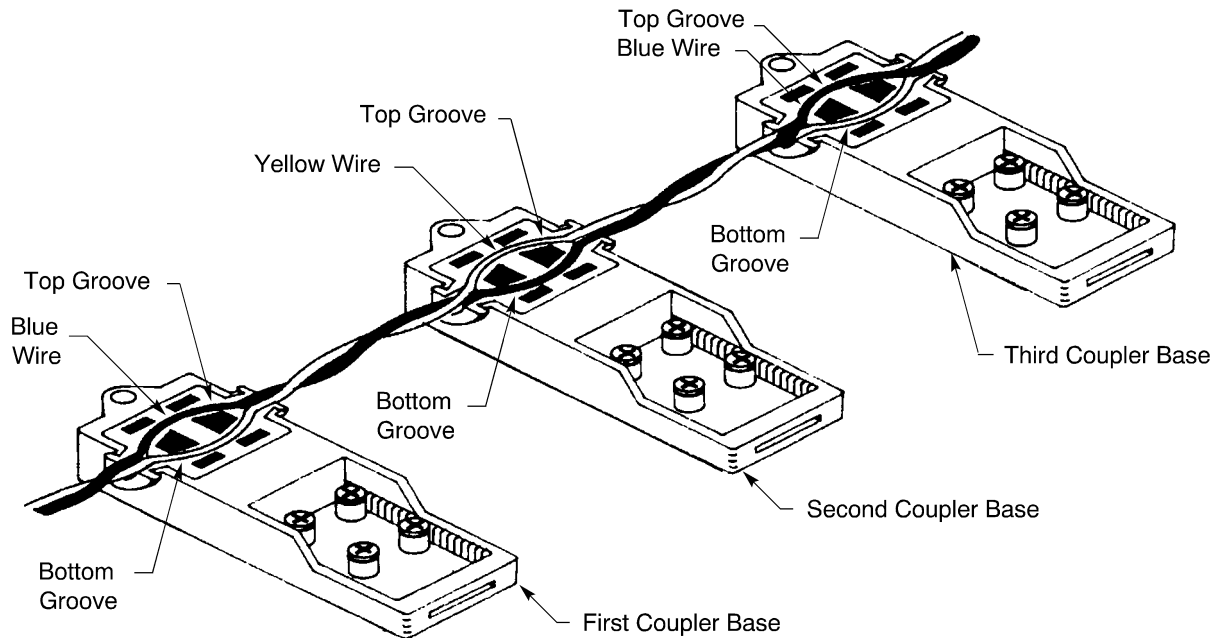
Figure 7

- (1) Make a selection of a wire separator tool from Table 10.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN TABLE 10. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

- (2) Put one wire in the lower jaw and the other wire in the upper jaw of the tool. Refer to Figure 7.
- (3) Pull the trigger until it is against the handle to move the wires apart.
- (4) Remove the wires from the tool.

B. Coupler Installation Configurations



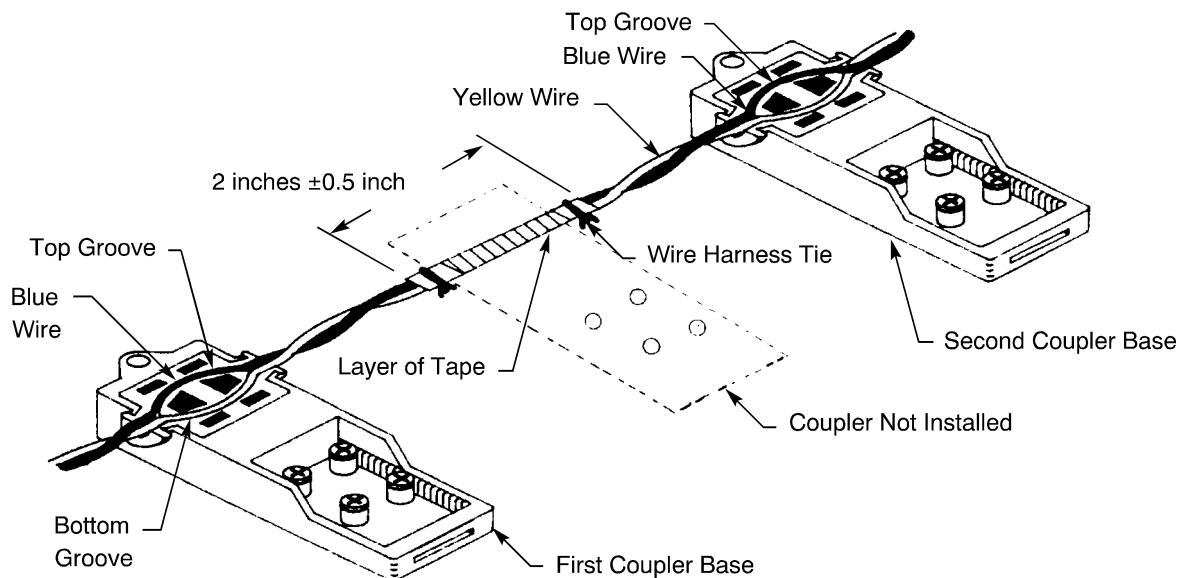
ROUTE OF THE DATA BUS WIRES THROUGH ADJACENT COUPLERS

Figure 8

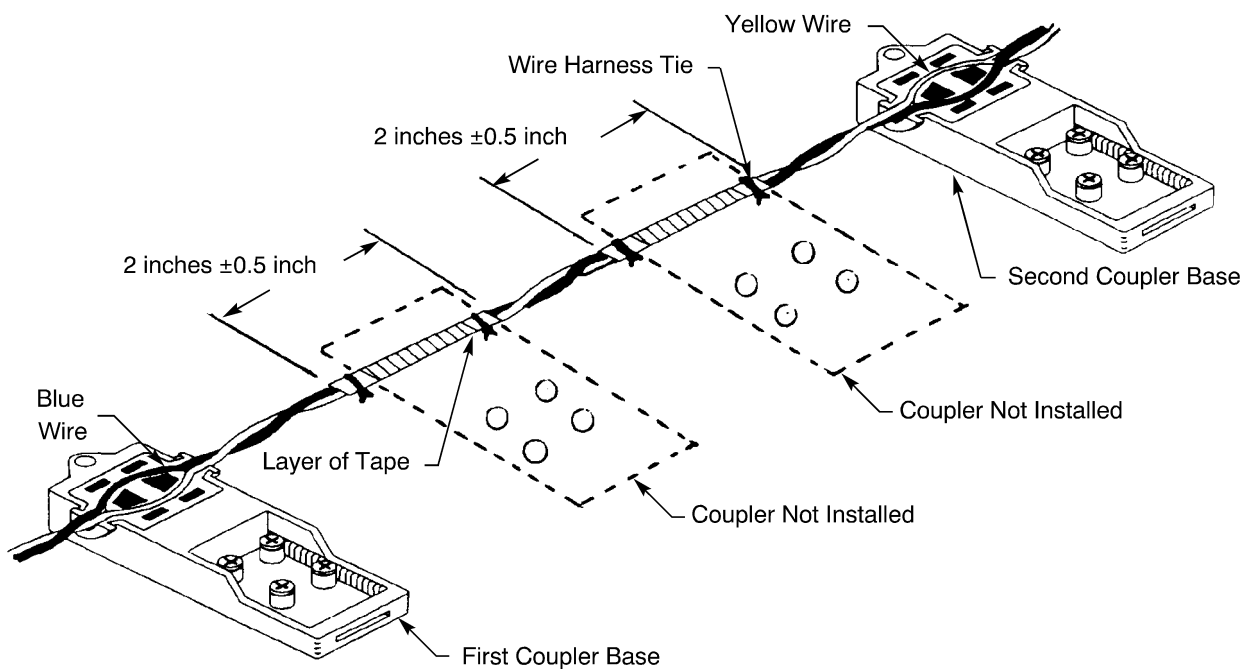
20-11-11

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ARINC 629 WIRING



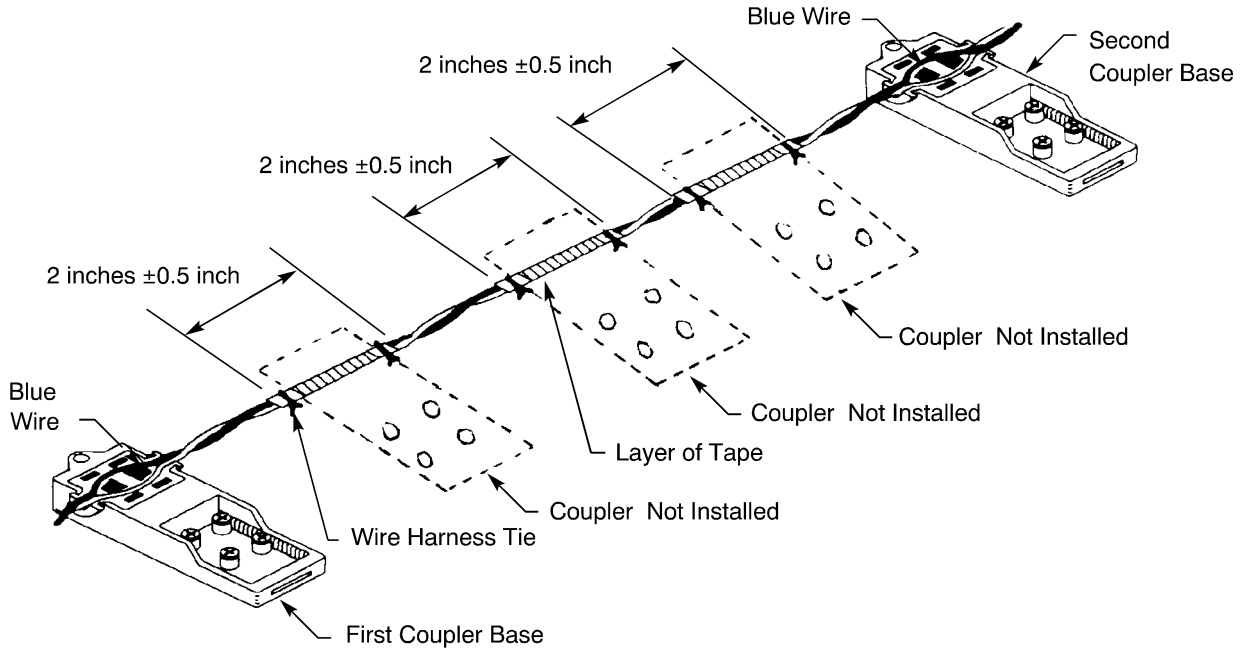
ROUTE OF THE DATA BUS WIRES THROUGH COUPLERS - ONE EMPTY COUPLER POSITION BETWEEN COUPLERS
Figure 9



ROUTE OF THE DATA BUS WIRES THROUGH COUPLERS - TWO EMPTY COUPLER POSITIONS BETWEEN ADJACENT COUPLERS
Figure 10

STANDARD WIRING PRACTICES MANUAL

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ROUTE OF THE DATA BUS WIRES THROUGH COUPLERS - THREE EMPTY COUPLER POSITIONS BETWEEN ADJACENT COUPLERS

Figure 11

C. Installation of the S227W001-1, -2, -4, and -6 Two Piece Coupler Base

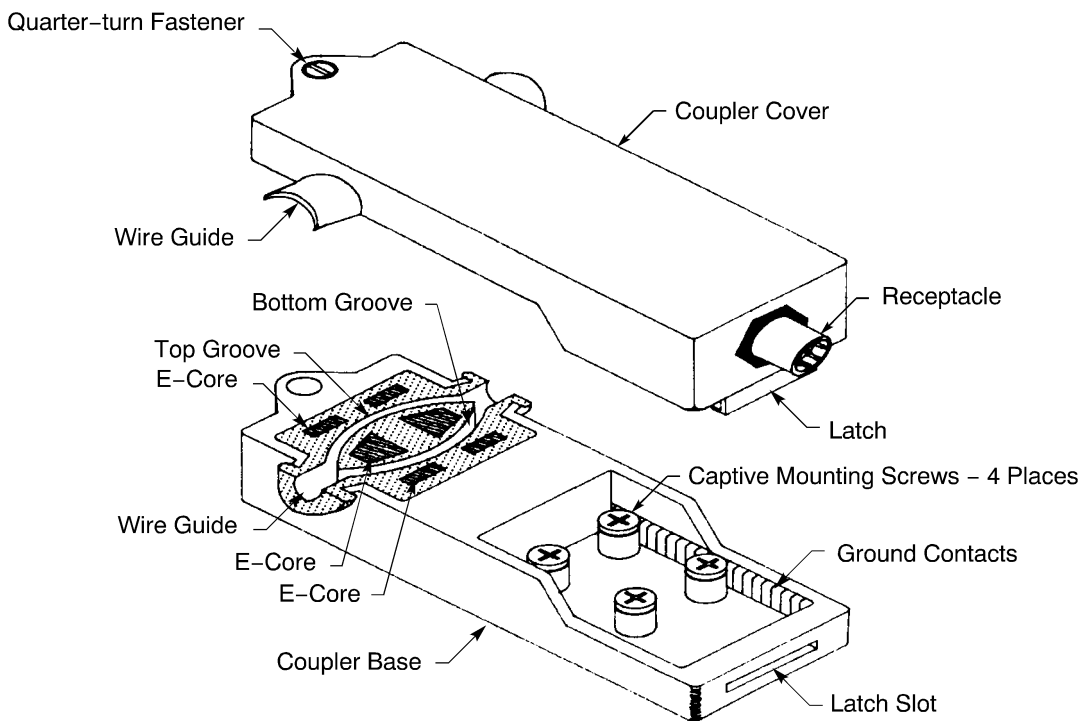
**Table 11
NECESSARY TOOLS**

Tool	Description
Screwdriver	Flat blade
Torque	Phillips head screwdriver

- (1) Make a selection of a solvent. Refer to Subject 20-00-11.
- (2) Clean these surfaces with the solvent:
 - The bottom surface of the coupler base
 - The area of the panel where the coupler is installed.
- (3) Remove the coupler cover from the coupler base. Refer to Figure 12 and Figure 13.

STANDARD WIRING PRACTICES MANUAL

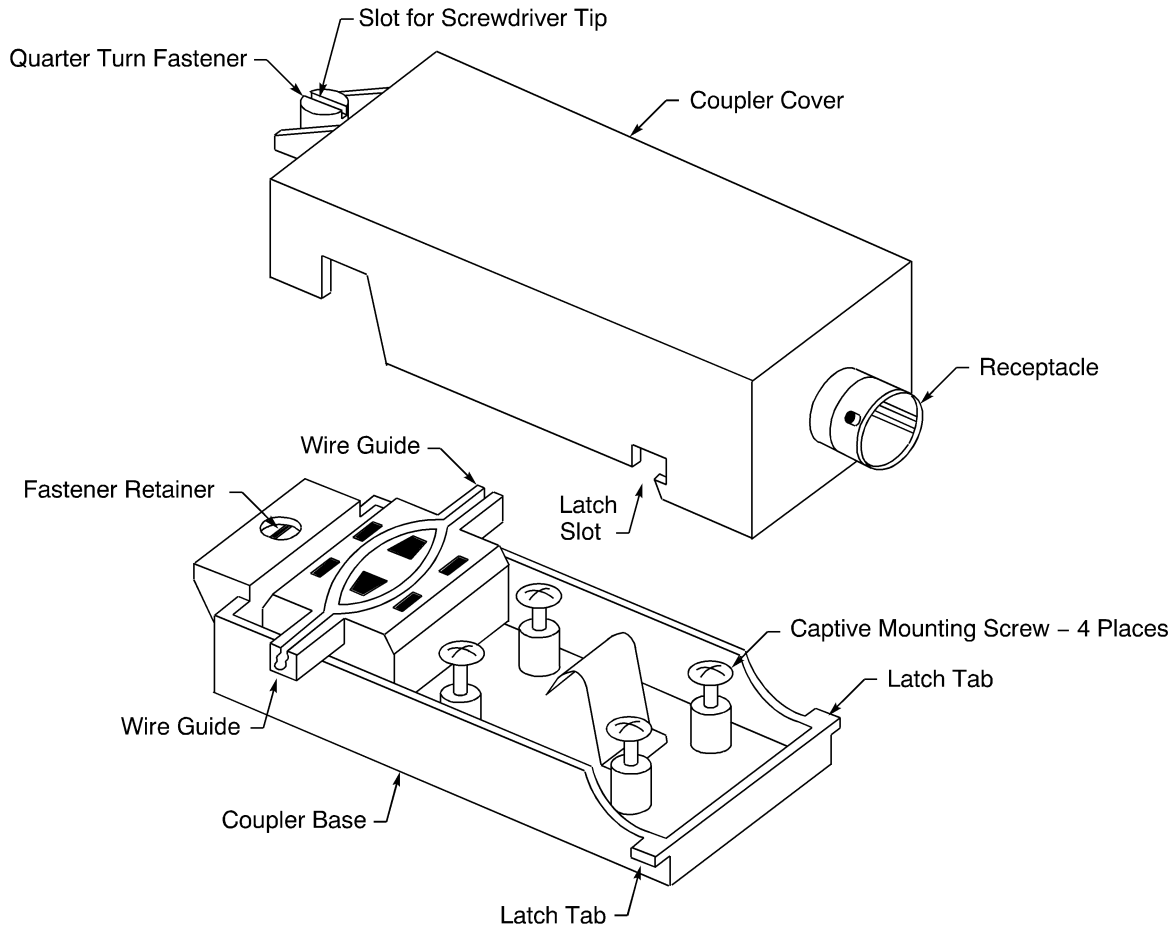
ARINC 629 WIRING



S227W001-1 TWO PIECE COUPLER
Figure 12

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



S227W001-2, -4, -6 TWO PIECE COUPLERS
Figure 13

- (4) Align the ends of the captive screws with the four screw holes in the panel.
- (5) Make a selection of a screwdriver from Table 11.
- (6) Tighten the screws with the screwdriver.
- (7) Make a selection of a torque tool from Table 11.
- (8) Torque the screws 17.0 inch-pounds \pm 3.0 inch-pounds.
- (9) Measure the electrical bond resistance between the coupler base and the panel. Refer to Subject 20-20-00.
- (10) If the electrical resistance between the coupler base and the panel is greater than 5 milliohms, do Step (2) through Step (9) again.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

D. Installation of the S227W001-8 One Piece Coupler

**Table 12
NECESSARY TOOLS**

Tool	Description
Screwdriver	Phillips head
Torque	Phillips head screwdriver

- (1) Make a selection of a solvent. Refer to Subject 20-00-11.
- (2) Clean these surfaces with the solvent:
 - The bottom surface of the coupler
 - The area of the panel where the coupler is installed.
- (3) Align the ends of the two mounting screws with the two screw holes in the panel.
- (4) Make a selection of a screwdriver from Table 12.
- (5) Tighten the screws with the screwdriver.
- (6) Make a selection of a torque tool from Table 12.
- (7) Torque the screws 17.0 inch-pounds \pm 3.0 inch-pounds.
- (8) Measure the electrical bond resistance between the coupler and the panel. Refer to Subject 20-20-00.
- (9) If the electrical resistance between the coupler and the panel is greater than 5 milliohms, do Step (2) thru Step (8) again.

E. Installation of the Data Bus Cable in the Couplers

For the position of the wires in the adjacent couplers, refer to:

- Figure 8 for no empty coupler positions between the couplers
 - Figure 9 for one empty coupler position between the couplers
 - Figure 10 for two empty coupler positions between the couplers
 - Figure 11 for three empty coupler positions between the couplers.
- (1) If it is specified, install the necessary:
 - Foil tape on the data bus cable; refer to Paragraph 4.H.
 - Ferrite suppressor on the data bus cable; refer to Paragraph 4.I.
 - (2) Make a selection of a BACC10DK loop clamp from Table 1.
 - (3) Install the necessary number of BACC10DK clamps for the cable and the terminators on the panel.
 - (4) Put the terminator that is nearest to the top of the panel in two BACC10DK clamps.

NOTE: Do not tighten the clamps on the terminators.
 - (5) Put the data bus cable through all of the loop clamps along the specified route of the cable.
 - (6) Put the cable above the center of the wire guide of the coupler base that is the nearest to the terminator at the top of the panel.
 - (7) Make an estimate of the location to make a separation between the blue and yellow wires where the wires go in the grooves of the coupler base.
 - (8) Make a separation between the blue and yellow wires. Refer to Paragraph 4.A.

STANDARD WIRING PRACTICES MANUAL**ARINC 629 WIRING**

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN TABLE 10. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

- (9) Install the wires in the coupler base. Refer to Figure 8.
Make sure that the insulation of the wire does not have damage.
- (a) Push the blue wire into the top groove of the coupler.
 - (b) Push the yellow wire into the bottom groove of the coupler.
- (10) If the panel has no empty coupler positions between the last coupler and the subsequent coupler. Refer to Figure 8.
- (a) Put the cable above the center of the wire guide of the subsequent coupler base.
 - (b) Make an estimate of the location to make a separation between the blue and yellow wires where the wires go in grooves of the coupler base.
 - (c) Make a separation between the blue and yellow wires. Refer to Paragraph 4.A.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN TABLE 10. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

- (d) Push the yellow wire into the top groove of the coupler.
 - (e) Push the blue wire into the bottom groove of the coupler.
 - (f) Install the coupler cover. Refer to Paragraph 4.F.
- (11) If the panel has one empty coupler position between the last coupler and the subsequent coupler, install the wires in the next coupler. Refer to Figure 9.
- (a) Put the cable above the center of the wire guide of the subsequent coupler base.
 - (b) Make an estimate of the location to make a separation between the blue and yellow wires where the wires go in the grooves of the coupler base.
 - (c) Make a separation between the blue and yellow wires. Refer to Paragraph 4.A.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN TABLE 10. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

- (d) Push the blue wire into the top groove of the coupler.
 - (e) Push the yellow wire into the bottom groove of the coupler.
 - (f) Install the coupler cover. Refer to Paragraph 4.F.
- (12) If the panel has two empty coupler positions between the last coupler and the subsequent coupler, install the wire in the next coupler. Refer to Figure 10.
- (a) Put the cable above the center of the wire guide of the subsequent coupler base.
 - (b) Make an estimate of the location to make a separation between the blue and yellow wires where the wires go in the grooves of the coupler base.
 - (c) Make a separation between the blue and yellow wires. Refer to Paragraph 4.A.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN TABLE 10. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

- (d) Push the yellow wire into the top groove of the coupler.
- (e) Push the blue wire into the bottom groove of the coupler.
- (f) Install the coupler cover.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

Refer to:

- Paragraph 4.F. for the S227W001-1, -2, -4, and -6 Two Piece Couplers
- Paragraph 4.G. for the S227W001-8 One Piece Couplers

- (13) If the panel has three empty coupler positions between the last coupler and the subsequent coupler, install the wires in the next coupler. Refer to Figure 11.
- (a) Put the cable above the center of the wire guide of the subsequent coupler base.
 - (b) Make an estimate of the location to make a separation between the blue and yellow wires where the wires go in the grooves of the coupler base.
 - (c) Make a separation between the blue and yellow wires. Refer to Paragraph 4.A.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN TABLE 10. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

- (d) Push the blue wire into the top groove of the coupler.
- (e) Push the yellow wire into the bottom groove of the coupler.
- (f) Install the coupler cover.

Refer to:

- Paragraph 4.F. for the two piece coupler
- Paragraph 4.G. for the one piece coupler.

- (14) Do Step (10) thru Step (13) again for the remaining length of data bus cable.
- (15) If the data bus cable has a separation between the blue and yellow wires at the location of an empty coupler position, install the necessary layer of tape and wire harness ties at each location.

Refer to:

- Figure 9 for one empty coupler position where the cable has one separation
- Figure 10 for two empty coupler positions where the cable has two separations
- Figure 11 for three empty coupler positions where the cable has three separations.

- (a) Make a selection of a silicone tape from Table 2.
- (b) Put the wires together.
- (c) Put a layer of tape on 2 inches \pm 0.5 inch of the cable.

Make sure that:

- The center of the layer of tape is aligned with the center of the coupler position
 - The tape makes a 50 percent circumferential overlap.
- (d) Assemble a lacing tape wire harness tie on each end of the layer of tape. Refer to Subject 20-10-11.

Make sure that:

- The color of the lacing tape is yellow
- The lacing tape has a Temperature Grade and a Class that are applicable for the cable.

CAUTION: A PLASTIC TIE STRAP MUST NOT BE USED. DAMAGE TO THE INSULATION OF THE DATA BUS CABLE CAN OCCUR.

- (16) Tighten the cable clamps.
- (17) Tighten the terminator clamps.

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STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

F. Installation of the Coupler Cover for the S227W001-1, -2, -4, and -6, Two Piece Couplers

**Table 13
NECESSARY TOOLS**

Tool	Description
Screwdriver	Flat head
Microhmmeter	Bonding meter

CAUTION: DO NOT TRY TO PUT THE COUPLER COVER FROM ONE SUPPLIER ON THE COUPLER BASE FROM A DIFFERENT SUPPLIER. THE COVER AND THE BASE DO NOT HAVE THE CORRECT FIT.

- (1) Make a selection of a microhmmeter from Table 13.
- (2) Examine the coupler bases and the coupler covers for:
 - Damage to the insulation between the E-Core and the wire grooves
 - Separation of the insulation from the E-Core
 - An E-Core that has a crack
 - A piece of the E-Core that is missing.

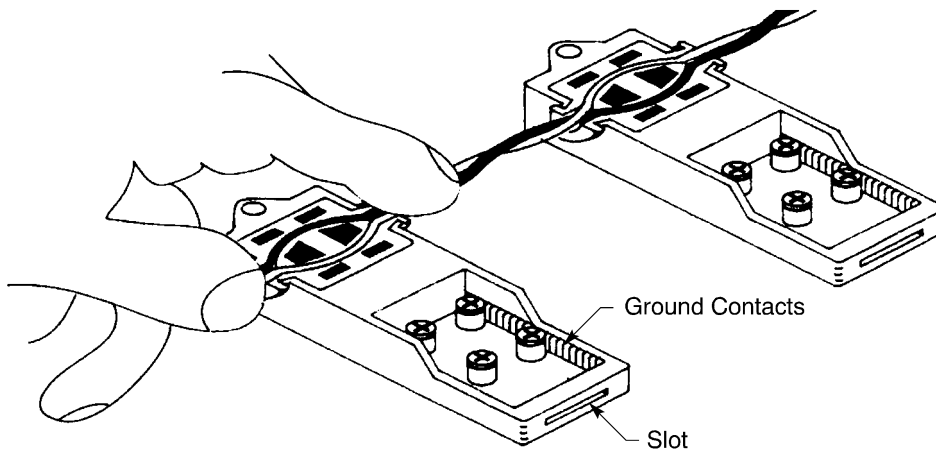
CAUTION: DO NOT USE A COUPLER BASE OR A COUPLER COVER THAT HAS DAMAGE. A COUPLER THAT HAS DAMAGE CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (3) Remove contamination from the coupler covers and the E-Core assemblies of all the coupler bases with a suction hose that has a soft nozzle.

CAUTION: DO NOT USE A SUCTION HOSE THAT HAS A METAL NOZZLE. A METAL NOZZLE CAN CAUSE DAMAGE TO THE E-CORE ASSEMBLY.

NOTE: A coupler cover must be installed on a coupler base a maximum of 5 minutes after the E-Core assembly has been cleaned.

- (4) Hold the wires in position. Refer to Figure 14.

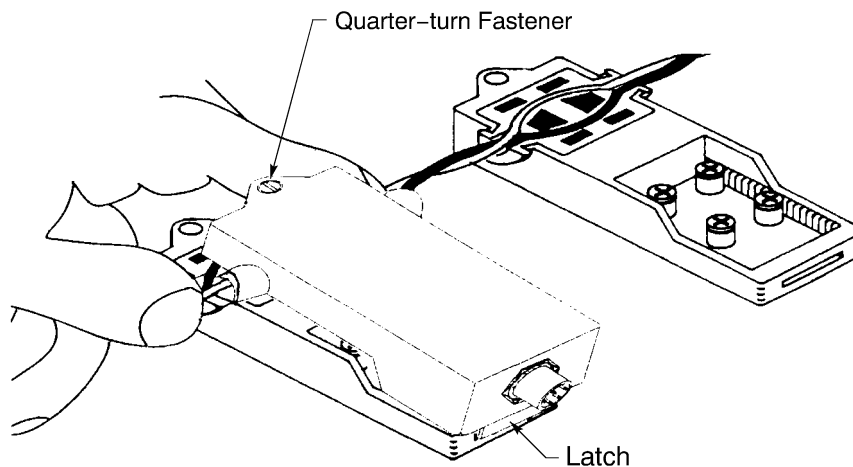


**POSITION OF THE WIRES IN THE COUPLER BASE
Figure 14**

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

- (5) For the S277W001-1 Coupler, align the latch of the coupler cover with the slot of the coupler base. Refer to Figure 15.

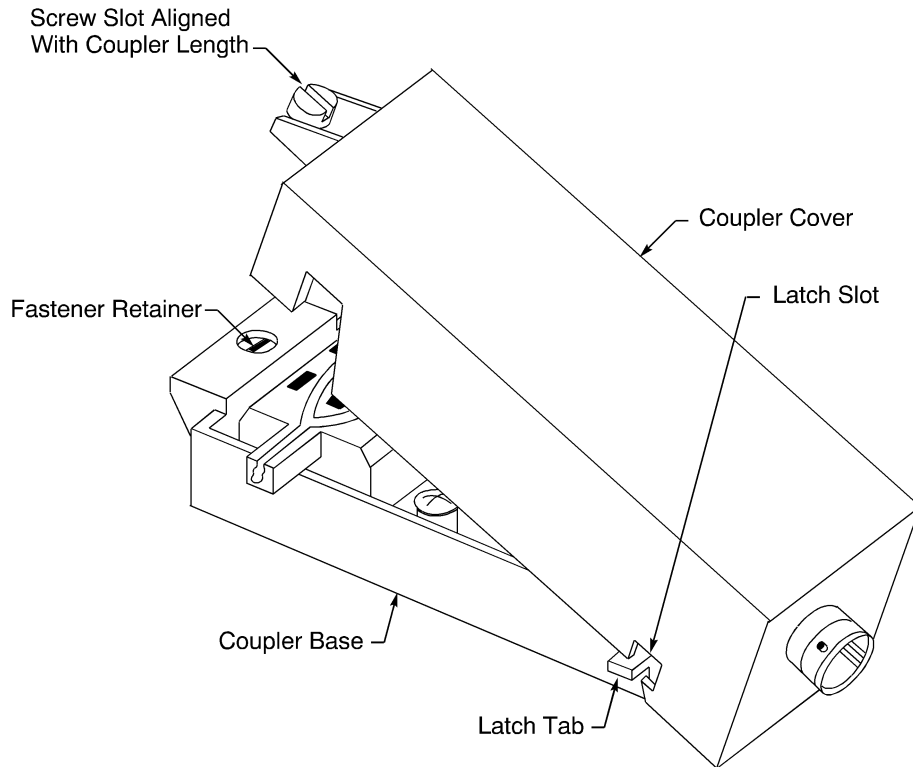


ALIGNMENT OF THE COUPLER COVER AND THE COUPLER BASE FOR THE S277W001-1 COUPLER
Figure 15

- (6) For the S277W001-2, -4, and -6 Couplers, align the latch tabs of the coupler cover with the latch slots of the coupler base. Refer to Figure 16.

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ARINC 629 WIRING



ALIGNMENT OF THE COUPLER COVER AND THE COUPLER BASE FOR THE S227W001-2, -4, AND -6 COUPLERS
Figure 16

- (7) Carefully push the end of the cover that is opposite the latch down until it is engaged with the base.
- (8) Make a selection of a screwdriver from Table 13.
- (9) Install the coupler cover on the coupler base.

CAUTION: DO NOT USE THE SPRING-LOADED CENTER-PUNCH PROBE ON THE COUPLER COVER. THE PROBE CAN CAUSE DAMAGE TO THE COUPLER COVER.

- (a) Align the screwdriver slot in the quarter turn fastener with the coupler length. Refer to Figure 12 and Figure 13.
 Make sure that the fastener is aligned with the fastener retainer.
- (b) Turn the quarter turn fastener clockwise until it is locked.
- (c) Make sure that you push on the screwdriver while you turn it.
- (10) Measure the resistance between the panel and each coupler cover with a microhmmeter. Refer to Subject 20-20-00.
 Make sure that the resistance between the panel and each coupler cover is 1.5 milliohms or less.
- (11) If the resistance between the panel and each coupler cover is more than 1.5 milliohms:
 - (a) Remove the coupler cover.
 - (b) Clean the ground contacts. Refer to Figure 14.
 - (c) Do Step (3) through Step (10) again.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

G. Installation of the coupler cover for the S227W001-8 One Piece Coupler

Table 14
NECESSARY TOOLS

Tool	Description
Screwdriver	Flat head
Microhmmeter	Bonding meter

- (1) Make a selection of a microhmmeter from Table 13.
- (2) Examine the coupler for:
 - Damage to the insulation between the E-Core and the wire grooves
 - Separation of the insulation from the E-Core
 - An E-Core that has a crack
 - A piece of the E-Core that is missing.

CAUTION: DO NOT USE A COUPLER THAT HAS DAMAGE. A COUPLER THAT HAS DAMAGE CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (3) Remove contamination from the coupler E-Core assemblies of all the couplers with a suction hose that has a soft nozzle.

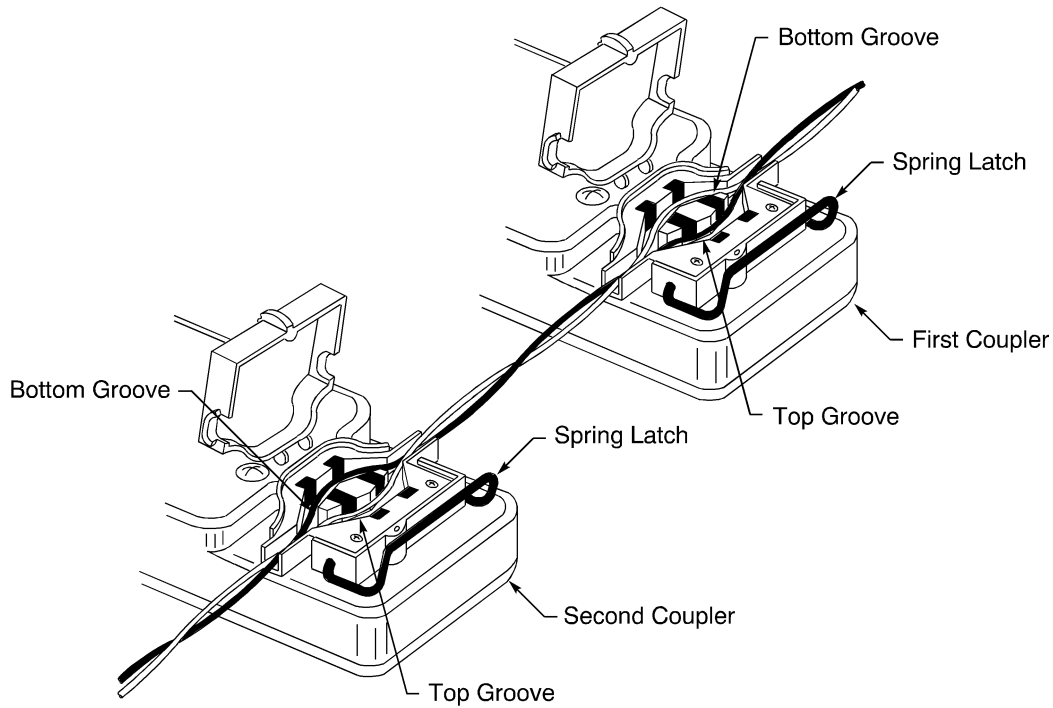
CAUTION: DO NOT USE A SUCTION HOSE THAT HAS A METAL NOZZLE. A METAL NOZZLE CAN CAUSE DAMAGE TO THE E-CORE ASSEMBLY.

NOTE: A coupler lid must be closed on a one piece coupler a maximum of 5 minutes after the E-Core assembly has been cleaned.

- (4) Hold the wires in position. Refer to Figure 17.

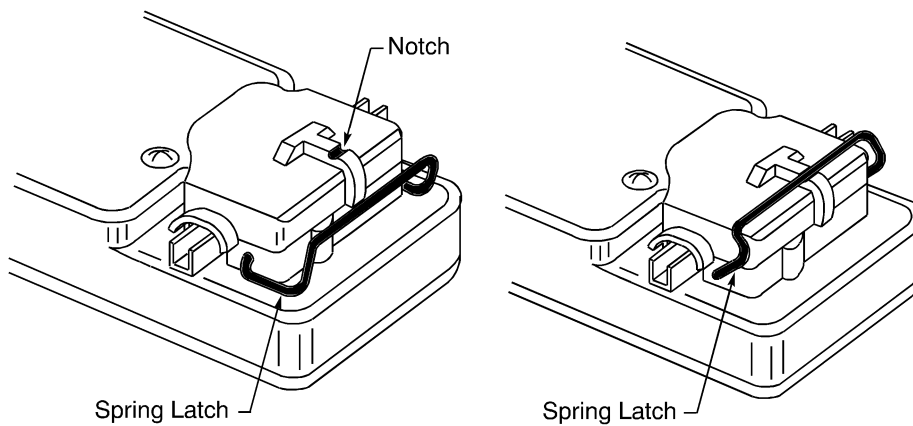
STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



S227W001-8 ONE PIECE COUPLERS WITH DATA CABLE
Figure 17

- (5) Carefully push the coupler lid down until it is engaged with the base.
- (6) Push the spring latch up until it engages the notch. Refer to Figure 18.



OPEN POSITION

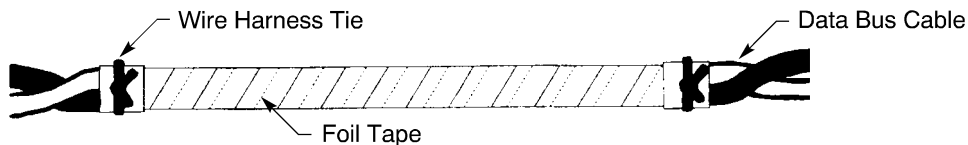
LOCKED POSITION

S227W001-8 COUPLER SPRING LATCH ATTACHMENT
Figure 18

STANDARD WIRING PRACTICES MANUAL**ARINC 629 WIRING****H. Installation of Foil Tape on a Data Bus Cable**

- (1) Make a selection of the foil tape from Table 2.
- (2) Install the foil tape on each specified location of the data bus cable. Refer to Figure 19.

NOTE: If a length of the data bus cable has a bend radius of less than 0.5 inch, a maximum length of 1.5 inches of cable in the bend area can be without foil tape.

**POSITION OF THE FOIL TAPE ON THE DATA BUS CABLE****Figure 19**

- (a) Put one full layer of the foil tape around the cable at the end of the cable clamp that is the nearest to the receptacle.
- (b) Continue to put the layer of the tape along the specified length of the cable. Make sure that the tape makes a 25 percent to 75 percent overlap.
- (c) Put one full layer of the foil tape around the end point.
- (d) Cut the foil tape at the end point.
- (e) Assemble a lacing tape wire harness tie at each end of the foil tape. Refer to Subject 20-10-11. Make sure that:
 - The color of the lacing tape is yellow
 - The lacing tape has a Temperature Grade and a Class that are applicable for the cable.

CAUTION: A PLASTIC TIE STRAP IS NOT PERMITTED. DAMAGE TO THE INSULATION OF THE DATA BUS CABLE CAN OCCUR.

- (3) If the foil tape breaks when the wire harness tie is tightened:
 - (a) Remove the wire harness tie.
 - (b) Put one more full layer of the foil tape on the broken area.
 - (c) Assemble the wire harness tie again.

I. Installation of a Ferrite Suppressor on the Data Bus Cable

CAUTION: IF THE FERRITE SUPPRESSOR IS INSTALLED ON A WIRE THAT DOES NOT HAVE A LAYER OF POLYESTER TAPE FOR PROTECTION, THE WIRE GUIDES CAN CAUSE DAMAGE TO THE INSULATION OF THE WIRE.

- (1) Make a selection of a ferrite suppressor clamp from Table 1.
- (2) Make a selection of a polyester tape from Table 2.
- (3) If it is necessary to install the ferrite suppressor at an empty coupler position:
 - (a) Remove the wire harness ties.
 - (b) Remove the layer of silicone tape.

20-11-11

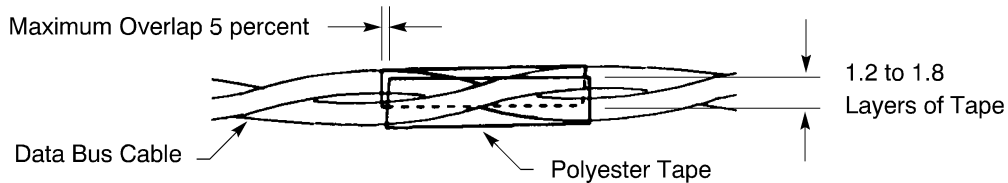
STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

- (4) Install a layer of the polyester tape on the data bus cable at the location of the ferrite suppressor. Refer to Figure 20.

Make sure that the layer of tape makes:

- A 20 percent to 80 percent overlap
- A 5 percent maximum overlap at the each end of the tape.

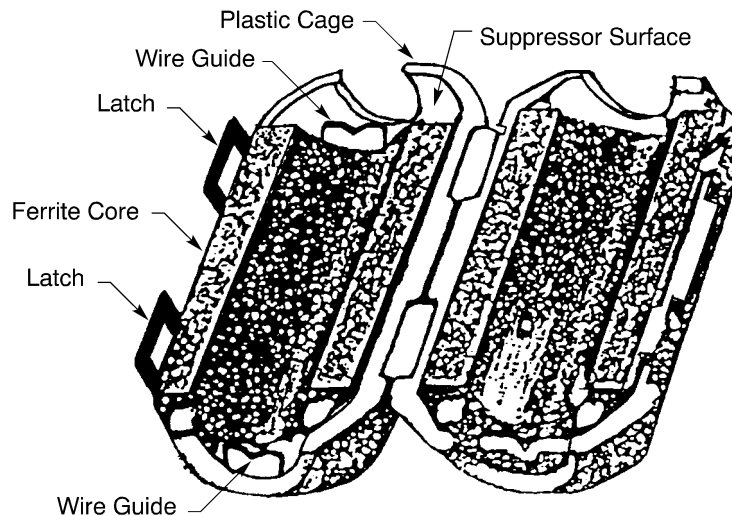


POSITION OF THE POLYESTER TAPE ON THE CABLE

Figure 20

- (5) Carefully open the ferrite suppressor. Refer to Figure 21.

CAUTION: MAKE SURE TO PREVENT DAMAGE TO THE FERRITE SUPPRESSOR AS IT IS OPENED. DAMAGE TO THE FERRITE CORE CAN CAUSE UNSATISFACTORY PERFORMANCE.



S280W752-1 FERRITE SUPPRESSOR

Figure 21

- (6) Remove dust or contamination from the ferrite core and the suppressor surfaces with a suction hose that has a soft nozzle.

CAUTION: DUST OR CONTAMINATION ON THE SURFACES OF THE CORE AND THE SUPPRESSOR CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (7) Put the suppressor on the cable.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

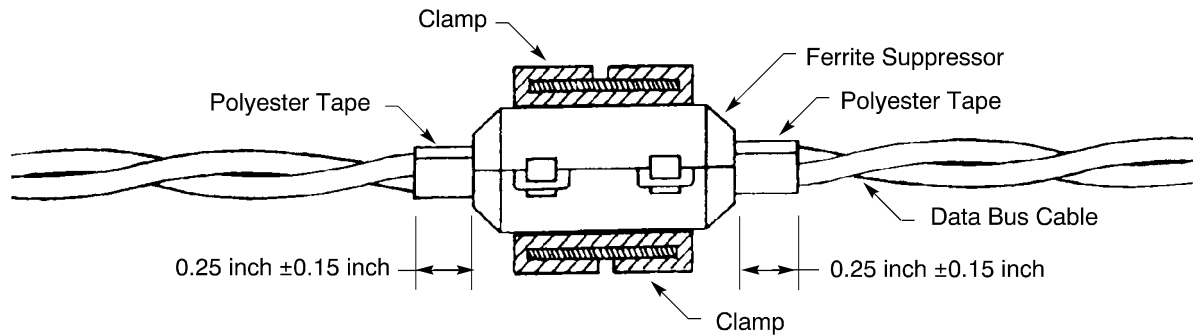
Make sure that:

- The center of the taped area on the cable is approximately aligned with the longitudinal center of the core
 - The wire guides are against the area of the cable that has a layer of polyester tape.
- (8) Carefully push the two halves of the suppressor together until the latches are fully engaged in the latch retainers.

Make sure that the latches and the latch retainers are correctly engaged.

NOTE: The ferrite suppressor does not hold the data bus cable tightly.

- (9) Install a clamp on each ferrite suppressor. Refer to Figure 22.



POSITION OF THE FERRITE SUPPRESSOR IN THE CLAMP

Figure 22

- (a) Put the clamp on the suppressor.

Make sure that each end of the clamp is 0.25 inch \pm 0.15 inch from the end of the tape on the cable.

- (b) Tighten the clamp installation screw.

5. DATA BUS CONNECTOR ASSEMBLY

Refer to Paragraph 2.A. for the Data Bus components.

A. Shielded Cable Preparation

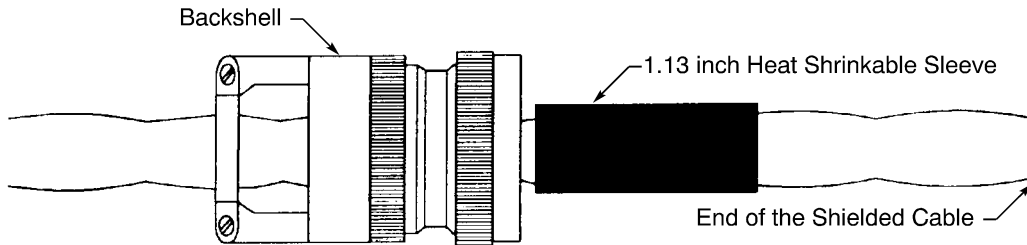
The paragraph gives the procedure to assemble a shield cable with a backshell.

- (1) Put these components on the cable:
- The strain relief backshell; refer to Table 1
 - A 1.13 inch length of 13/16 inch diameter heat shrinkable sleeve.

Refer to Figure 23.

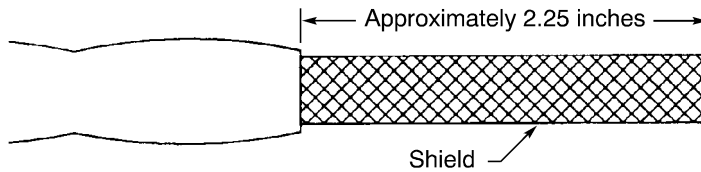
STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



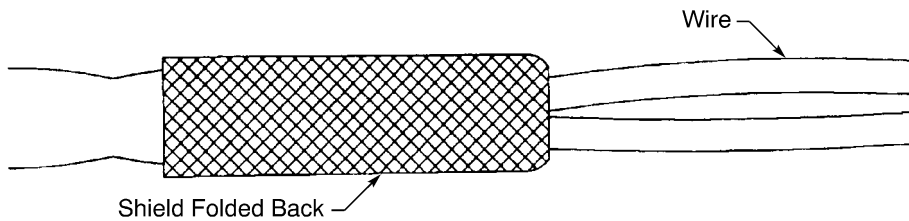
POSITION OF THE BACKSHELL AND HEAT SHRINKABLE SLEEVE ON THE CABLE
Figure 23

- (2) Carefully remove approximately 2.25 inches of the outer jacket from the end of the cable. Refer to Subject 20-00-15.
Refer to Figure 24.



CABLE JACKET REMOVAL LENGTH
Figure 24

- (3) Fold the shield back. Refer to Figure 25.

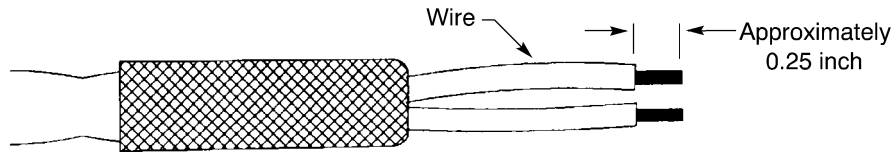


POSITION OF THE SHIELD FOLDED BACK
Figure 25

- (4) Remove approximately 0.25 inch of insulation from the end of each wire.
Refer to:
- Subject 20-00-15 for the insulation removal processes.
 - Figure 26.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



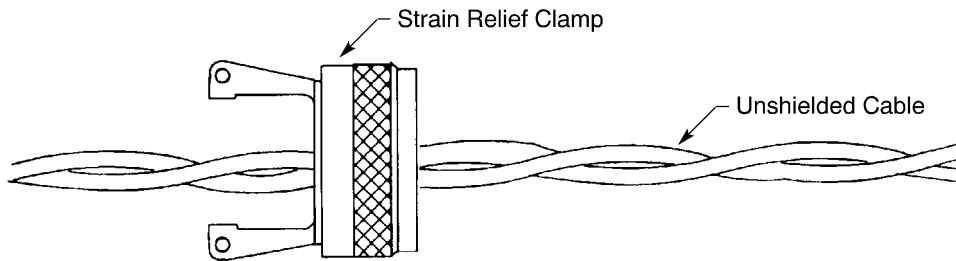
**INSULATION REMOVAL
Figure 26**

B. Unshielded Cable Preparation

**Table 15
NECESSARY MATERIALS**

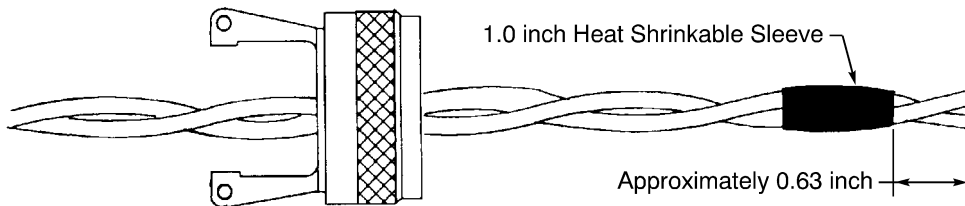
Material	Part Number or Specification	Size	Supplier
Heat Shrinkable Sleeve	DR-25	-	Raychem
	MIL-LT	-	Raychem

- (1) Make a selection of a strain relief clamp from Table 1.
- (2) Put the strain relief clamp on the unshielded cable. Refer to Figure 27.



**POSITION OF THE STRAIN RELIEF CLAMP ON THE CABLE
Figure 27**

- (3) Make a selection of a 1.0 inch length of 1/4 inch diameter shrinkable sleeve from Table 15.
- (4) Put the heat shrinkable sleeve on the cable to make the distance from the forward end of the sleeve to the end of the cable approximately 0.63 inch. Refer to Figure 28.



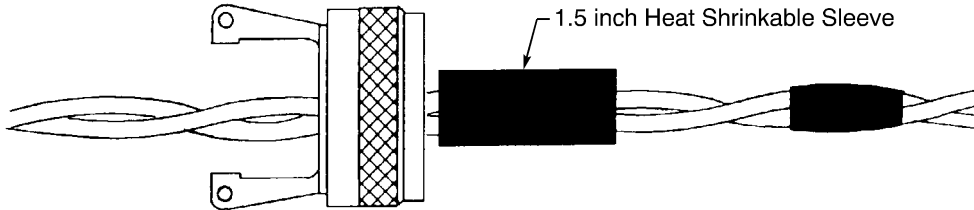
**POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CABLE
Figure 28**

- (5) Shrink the sleeve into its position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

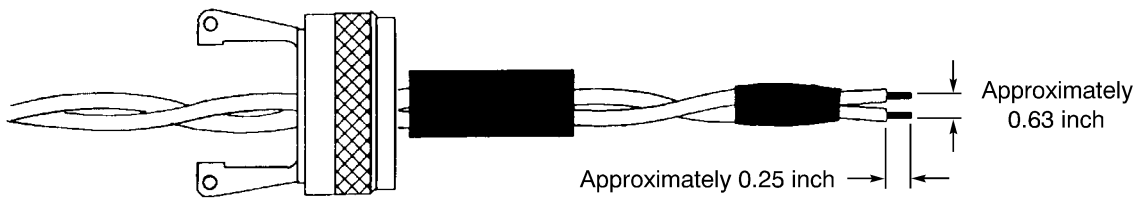
ARINC 629 WIRING

- (6) Make a selection of a 1.5 inch length of 3/8 inch diameter heat shrinkable sleeve from Table 15.
- (7) Put the sleeve on the cable. Refer to Figure 29.



TEMPORARY POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CABLE
Figure 29

- (8) Move the end of the wires apart approximately 0.63 inch. Refer to Figure 30.



INSULATION REMOVAL LENGTH
Figure 30

- (9) Remove approximately 0.25 inch of insulation from the end of each wire.
 Refer to:
 - Subject 20-00-15 for the wire insulation removal process
 - Figure 30 for the insulation removal.

C. Connector Assembly

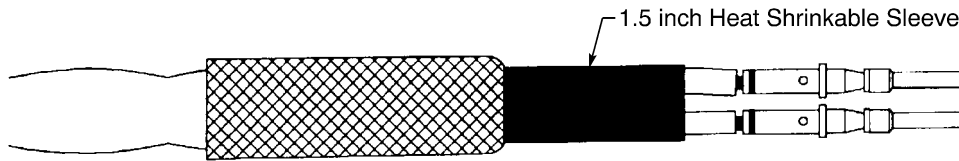
Table 16
NECESSARY MATERIALS

Material	Part Number or Specification	Size	Supplier
Heat Shrinkable Sleeve	DR-25	-	Raychem
	MIL-LT	-	Raychem

- (1) Assemble the contacts. Refer to Subject 20-61-11.
- (2) If the cable has a shield:
 - (a) Make a selection of a 1.5 inch length of 1/4 inch diameter heat shrinkable sleeve from Table 16.
 - (b) Put the heat shrinkable sleeve on the cable.
 - (c) Push the sleeve rearward until the end of the rear end of the sleeve is against the end of the forward end of the shield. Refer to Figure 31.

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POSITION OF THE SLEEVE ON THE CABLE

Figure 31

(3) Install the contacts in the connector. Refer to Subject 20-61-11.

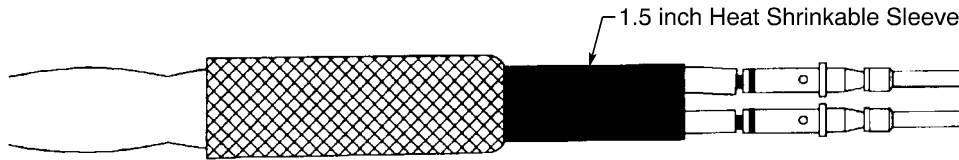
Make sure that:

- The yellow wire is installed in contact cavity 1
- The blue wire is installed in contact cavity 2
- Each contact cavity that does not have a contact has a seal rod or seal plug.

(4) If the cable has a shield, shrink the 1.5 inch sleeve into its position.

Refer to:

- Figure 32
- Subject 20-10-14 to shrink the sleeve in its position.



POSITION OF THE SLEEVE ON THE CABLE

Figure 32

D. Backshell Assembly

**Table 17
NECESSARY TOOLS**

Tool	Description	Part Number
Microhmmeter	Meter	-
Strap Wrench	3/8 inch drive	TG-70
Torque Tool	-	76-101

- (1) Make a selection of a torque tool or a strap wrench from Table 17.
- (2) Engage the threads of the backshell and the connector.
- (3) Torque the backshell 60 inch-pounds minimum.
- (4) Attach the shield to the backshell with a shield termination band. Refer to Subject 20-25-14.
- (5) Measure the electrical resistance from the band to the shield with a microhmmeter. Refer to Subject 20-20-00.

Make sure that the electrical resistance is less than 1.5 milliohms.

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- (6) Push the black heat shrinkable sleeve forward until the forward edge of the sleeve is on the shield terminator band.
- (7) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (8) Install the saddle clamp bars.

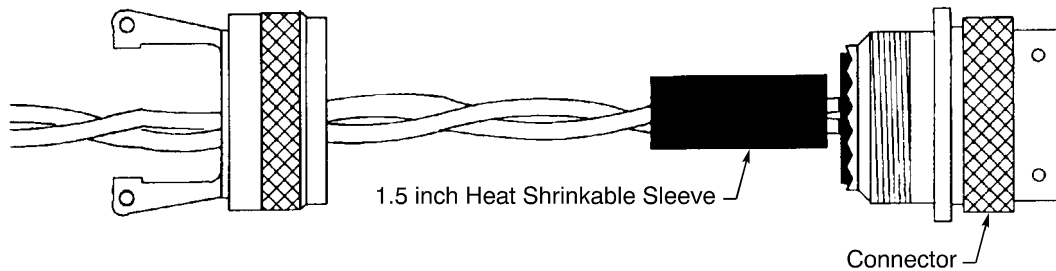
Make sure that the surface of each bar is against the surface of each strain relief arm.

E. Strain Relief Clamp Assembly

**Table 18
NECESSARY TOOLS**

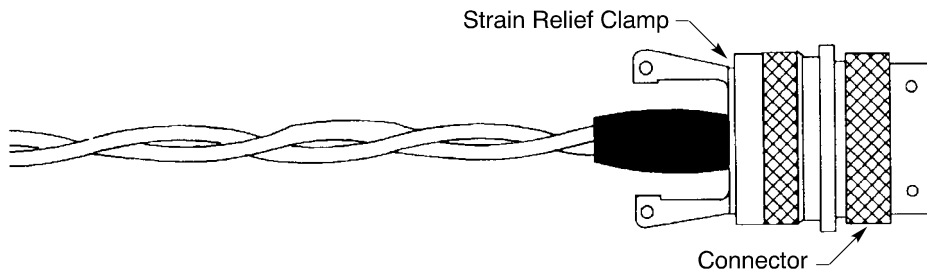
Tool	Part Number
Strap Wrench, 3/8 inch drive	TG-70
Torque Tool	76-101

- (1) Make a selection of a torque tool or a strap wrench from Table 18.
- (2) Push the 1.5 inch sleeve until the forward edge of the sleeve is as near the rear of the connector as possible. Refer to Figure 33.



**POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 33**

- (3) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (4) Engage the threads of the strain relief clamp and the connector.
- (5) Torque the clamp 60 inch-pounds minimum. Refer to Figure 34.

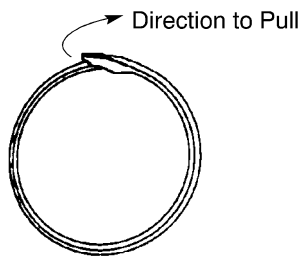


**POSITION OF THE STRAIN RELIEF CLAMP AGAINST THE CONNECTOR
Figure 34**

- (6) Install the saddle clamp.

STANDARD WIRING PRACTICES MANUAL**ARINC 629 WIRING****6. STUB CABLE ASSEMBLY AND DISASSEMBLY****A. Connector Disassembly**

- (1) For a connector with a S280W603 backshell assembly that has a protective sleeve on the assembly:
 - (a) Make a cut in the sleeve along the longitudinal axis of the sleeve.
 - (b) Remove the sleeve.
 - (c) Remove the wire harness tie.
 - (d) Unwind the silicon tape.
 - (e) Discard the tape.
 - (f) Hold the free end of the buckle on the shield terminator band with a pair of needle nose pliers.
 - (g) Pull the free end of the buckle in a direction that is up and away from the band until the end of the band is free from the buckle. Refer to Figure 35.



BUCKLE RELEASE OF THE SHIELD TERMINATOR BAND
Figure 35

- (h) Remove the metal band from the assembly.
 - (i) Discard the shield terminator band.
 - (j) Unwind the shield tape.
- (2) Remove the saddle bars from the cable clamp.
 - (3) Disengage the threads of the connector and the backshell.
 - (4) Push the backshell rearward from the connector.
 - (5) Remove the contacts from the connector. Refer to Subject 20-61-11.

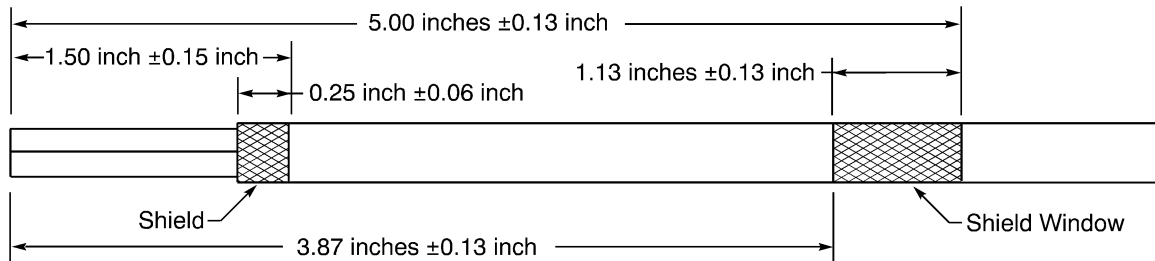
B. Twinax Contact Removal

Refer to Subject 20-71-14.

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ARINC 629 WIRING

C. Preparation of the S280W502-() Cable with a Shield Ground Wire Pointed Rearward



CABLE PREPARATION
Figure 36

Table 19
NECESSARY MATERIALS

Material	Part Number or Description	Color	Supplier
Heat Shrinkable Sleeve	DR-25	-	Raychem
	Grade B, Class 1	Blue	Refer to Subject 20-00-11.
	MIL-LT	-	Raychem

Table 20
FERRULE PART NUMBERS

Position	Ferrule	
	Part Number	Supplier
Inner	BACS13S297B	Boeing
Outer	BACS13S375C	Boeing

Table 21
APPROVED SUPPLERS OF BOEING STANDARD MECHANICAL FERRULES

Ferrule	Supplier
BACS13S()	Thomas & Betts

- (1) Make a selection of a 4.00 inch \pm 0.25 inch length of shrinkable sleeve from Table 19.
- (2) Put the sleeve on the cable.
- (3) Make a mark on the cable 5.00 inches \pm 0.13 inch from the end of the cable. Refer to Figure 36.
- (4) Make a mark on the cable 3.87 inches \pm 0.13 inch from the end of the cable.
- (5) Remove the cable insulation between the two marks.
Make sure that the length of shield window is 1.13 inch \pm 0.13 inch.
- (6) Remove a 1.50 inches \pm 0.15 inch length of insulation from the end of cable.
- (7) Remove the necessary length of shield to make the distance from the end of the cable insulation to the end of the shield equal to 0.25 inch \pm 0.06 inch.

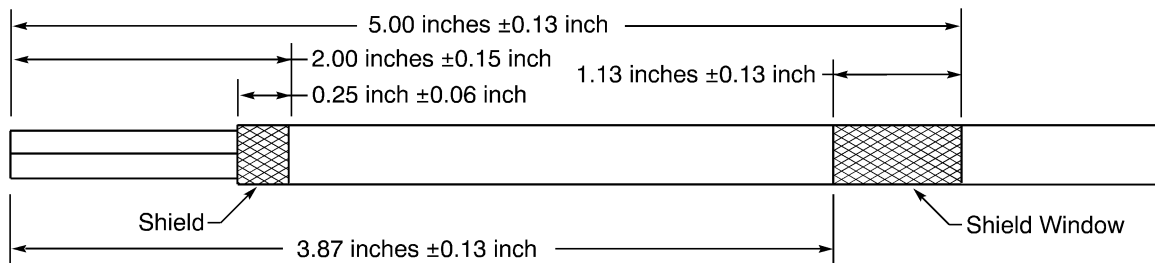
20-11-11

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

- (8) Make a selection of one of these shield ground wire configurations:
 - A shield ground wire with a solder sleeve
 - A shield ground wire with mechanical ferrules.
- (9) If the configuration is a shield ground wire with mechanical ferrules, make a selection of the mechanical ferrules from Table 20.
- (10) Assemble the shield ground wire. Refer to Subject 20-10-15.
 For the assembly of a shield ground wire with a mechanical ferrule, make sure to use the specified mechanical ferrules in Table 20.

D. Preparation of the S280W502-() Cable with a Shield Ground Wire Pointed Forward



CABLE PREPARATION
Figure 37

Table 22
NECESSARY MATERIALS

Material	Part Number or Description	Color	Supplier
Heat Shrinkable Sleeve	DR-25	-	Raychem
	Grade B, Class 1	Blue	Refer to Subject 20-00-11.
	MIL-LT	-	Raychem

Table 23
FERRULE PART NUMBERS

Position	Ferrule	
	Part Number	Supplier
Inner	BACS13S297B	Boeing
Outer	BACS13S375C	Boeing

Table 24
APPROVED SUPPLERS OF BOEING STANDARD MECHANICAL FERRULES

Ferrule	Supplier
BACS13S()	Thomas & Betts

- (1) Make a selection of a 4.00 inch ± 0.25 inch length heat shrinkable sleeve from Table 22.

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ARINC 629 WIRING

- (2) Put the heat shrinkable sleeve on the cable.
- (3) Make a mark on the cable 5.00 inches \pm 0.13 inch from the end of the cable. Refer to Figure 37.
- (4) Make a mark on the cable 3.87 inches \pm 0.13 inch from the end of the cable.
- (5) Remove the cable insulation between the two marks.
Make sure that the length of shield window is 1.13 inch \pm 0.13 inches.
- (6) Remove a 2.0 inch \pm 0.15 inch length of insulation from the end of the wire.
- (7) Remove the necessary length of shield to make the distance from the end of the cable insulation to the end of the shield equal to 0.25 inch \pm 0.06 inch.
- (8) Make a selection of one of these shield ground wire configurations:
 - A shield ground wire with a solder sleeve
 - A shield ground wire with mechanical ferrules.
- (9) If the configuration is a shield ground wire with mechanical ferrules, make a selection of the mechanical ferrules from Table 23.
- (10) Assemble the shield ground wire. Refer to Subject 20-10-15.
For the assembly of a shield ground wire with a mechanical ferrule, make sure to use the specified mechanical ferrules in Table 23.

E. Connector Assembly with a S280W603() Backshell

**Table 25
NECESSARY MATERIALS**

Material	Part Number or Specification	Size	Supplier
Heat Shrinkable Sleeve	DR-25	-	Raychem
	MIL-DTL-23053/16	-	QPL
Protective Tape	Scotch 70	-	3M
Shield Tape	Scotch No. 24	-	3M

- (1) Make a selection of a 4.00 \pm 0.25 inch length of heat shrinkable sleeve from Table 25.
- (2) Put the sleeve on the cable.
- (3) Assemble the contacts. Refer to Subject 20-61-11.
- (4) Installation the contacts. Refer to Subject 20-61-11.
- (5) For the connection of the backshell with the connector refer to Subject 20-61-11.
- (6) Put each shield ground wire through the slot in the backshell.

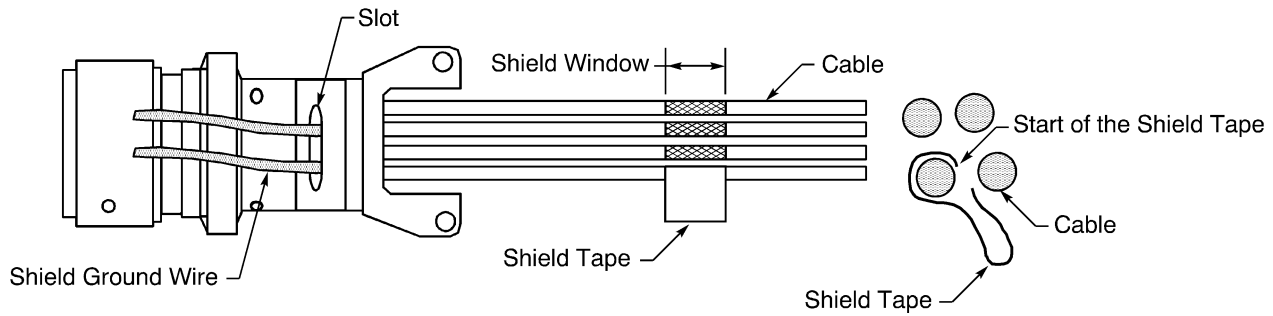
Make sure that:

- The ground wires are equal around the backshell
- The end of the ground wire is pointed to the front of the connector
- Each ground wire has no unwanted length.

Refer to Figure 38.

STANDARD WIRING PRACTICES MANUAL

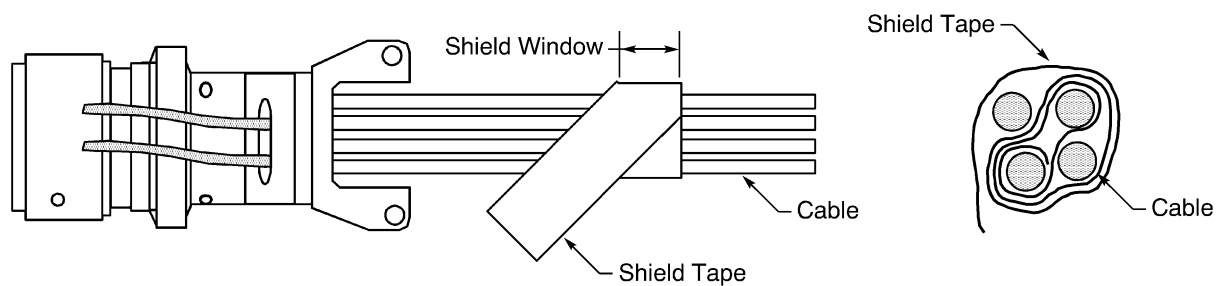
ARINC 629 WIRING



POSITION OF THE SHIELD TAPE ON THE WIRE

Figure 38

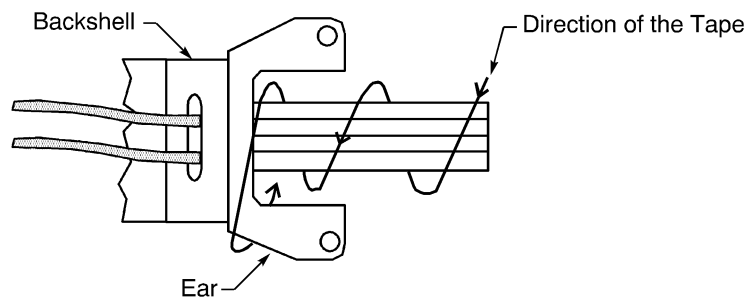
- (7) Put the end of the shield tape on the shield window of one wire. Refer to Figure 38.
Make sure that the center of the shield tape is aligned with the center of the shield window.
- (8) Wind a layer of the shield tape on the shield window of one wire. Refer to Figure 38.
- (9) Continue to wind the shield tape on each shield window on each wire.
Make sure that the surface of the shield tape is against each shield in the shield window.



POSITION OF THE SHIELD TAPE ON EACH SHIELD WINDOW

Figure 39

- (10) Wind one full layer of shield tape on all of the cables at the location of the shield windows.
- (11) Continue to wind the shield tape forward on the cables until the tape is against the rear end of the backshell. Refer to Figure 40.
Make sure that the shield tape makes a 50 percent overlap.



POSITION OF THE SHIELD TAPE AGAINST THE BACKSHELL

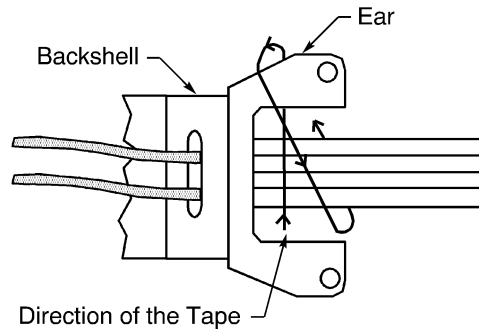
Figure 40

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- (12) Continue to wind the shield tape across one ear of the backshell. Refer to Figure 40.
- (13) Continue to wind the shield tape across the other ear of the backshell. Refer to Figure 41.

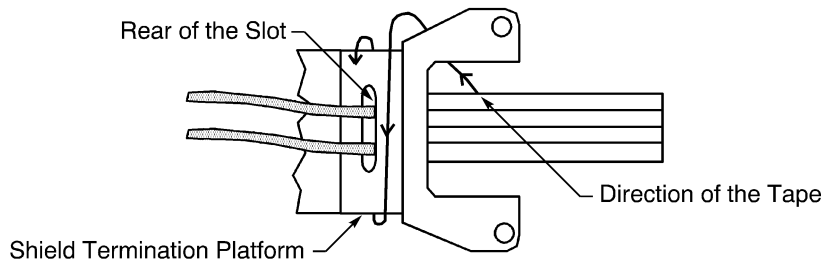


POSITION OF THE SHIELD TAPE ON THE EARS OF THE BACKSHELL
Figure 41

- (14) Continue to wind the shield tape on the rear end of the shield termination band platform. Refer to Figure 42.

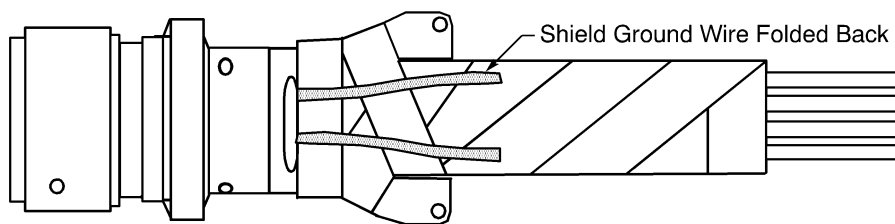
Make sure that:

- The forward edge of the shield tape is aligned with the rear edge of the slot of the backshell
- The shield termination platform has one full layer of shield tape.



POSITION OF THE SHIELD TAPE ON THE SHIELD TERMINATION BACKSHELL PLATFORM
Figure 42

- (15) Fold each shield ground wire back on the layer of shield tape. Refer to Figure 43.



POSITION OF THE SHIELD GROUND WIRES
Figure 43

STANDARD WIRING PRACTICES MANUAL**ARINC 629 WIRING**

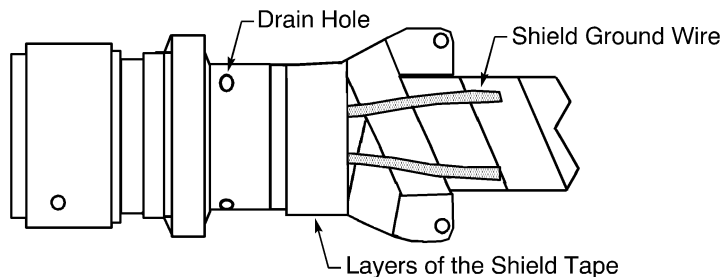
- (16) Continue to wind the shield tape on the shield ground wires on the shield termination backshell platform.

Make sure that the shield ground wires have one full layer shield tape.

- (17) Continue to wind the shield tape forward on the backshell. Refer to Figure 44.

Make sure that:

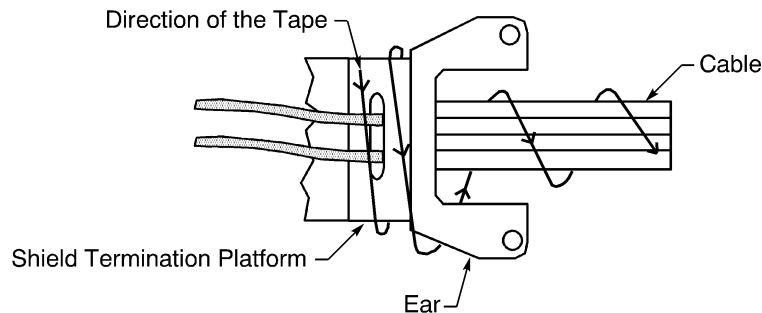
- The backshell slot has one or two layers of the shield tape
- The shield tape does not make an interference with the drain holes of the backshell
- The shield tape holds each ground wire in its position.



POSITION OF THE SHIELD TAPE ON THE SHIELD GROUND WIRES

Figure 44

- (18) Continue to wind the shield tape rearward around the cables. Refer to Figure 45.



POSITION OF THE SHIELD TAPE ON THE CABLES

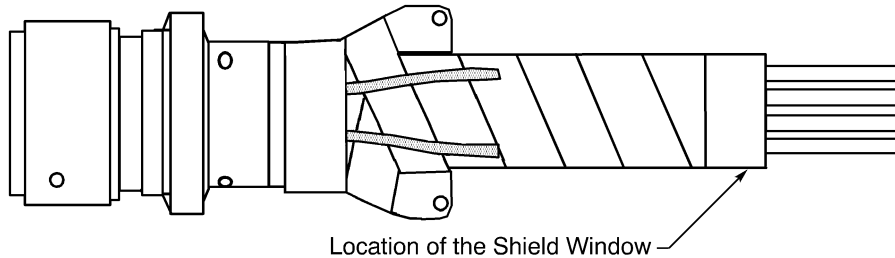
Figure 45

- (19) Continue to wind the shield tape rearward to the location of the shield windows.

- (20) Put one more layer of the shield tape on the cables at the location of the shield windows. Refer to Figure 46.

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ARINC 629 WIRING

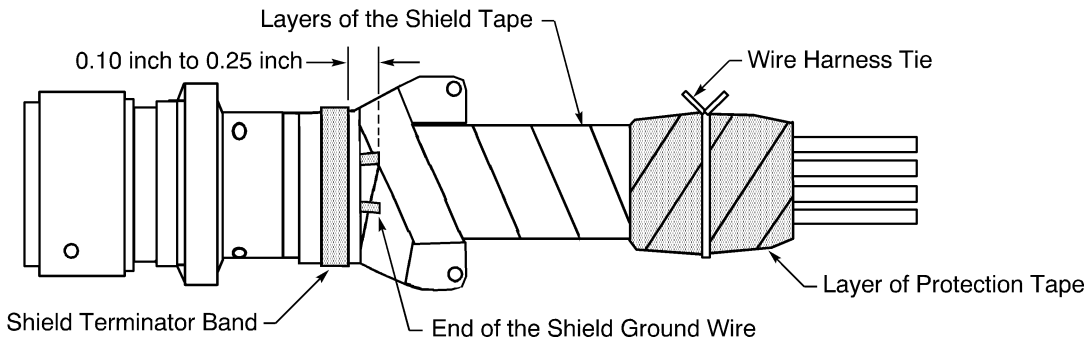


LAYER OF SHIELD TAPE ON THE SHIELD WINDOW
Figure 46

- (21) Cut the shield tape.
- (22) Make a selection of a protective tape. Refer to Table 25.
- (23) Put two layers of protective tape on the shield tape. Refer to Figure 47.

Make sure that:

- The first layer of starts 0.5 inch from the forward end of the location of the shield windows
- The first layer stops at the rear end of the location of the shield windows
- The second layer starts at the forward end of the location of the shield windows
- The second layer stops 0.5 inches from the rear end of the shield tape.



POSITION OF THE LAYERS OF PROTECTIVE TAPE
Figure 47

- (24) Assemble a lacing tape wire harness tie at the center of the protective tape.
- Refer to:
- Figure 47
 - Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie.

Make sure that:

- The color of the lacing tape is yellow
- The lacing tape has a Temperature Grade and a Class that are applicable for the cable.

CAUTION: A PLASTIC TIE STRAP MUST NOT BE USED. DAMAGE TO THE INSULATION OF THE DATA BUS CABLE CAN OCCUR.

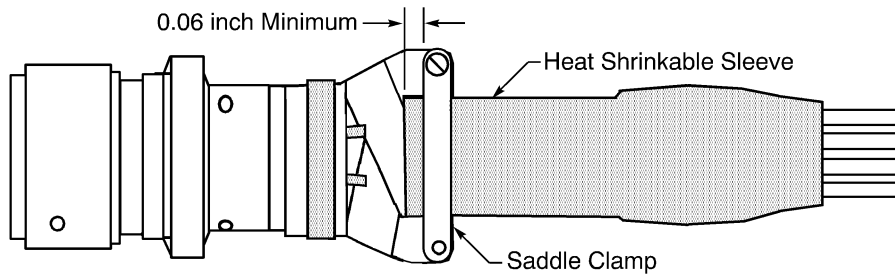
- (25) Install a shield terminator band on the shield termination platform of the backshell. Refer to Subject 20-25-14.

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ARINC 629 WIRING

- (26) Cut each shield ground wire to make the distance from the end of the shield ground wire to the rear edge of the shield terminator band 0.10 inch to 0.25 inches. Refer to Figure 47.
- (27) Push the heat shrinkable sleeve forward until it stops. Refer to Figure 48.
- (28) Align the holes of the saddle clamp with the installation holes in the ears of the backshell.
Make sure that the end of the heat shrinkable sleeve extends a minimum of 0.6 inch from the forward edge of the saddle clamp.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE WIRE HARNESS
Figure 48

- (29) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (30) Install the saddle clamp.

F. Connector Assembly with a S280W605() Backshell

Refer to Subject 20-25-13.

G. Twinax Contact Assembly

Refer to Subject 20-71-14.

H. Twinax Contact Insertion

Refer to Subject 20-71-14.

I. Connection of the Plug and the Receptacle

- (1) Engage the threads of the plug and the receptacle.
- (2) Tighten the plug and receptacle hand tight plus 1/8 turn.

7. REPAIR OF ARINC 629 S280W502-() STUB CABLES

A. Necessary Parts and Materials

Table 26
NECESSARY MATERIALS

Material	Description	Part Number	Supplier
Sealant	Silicone	3145 RTV	Dow Corning
		738	Dow Corning
Shield Material	Braid, Tubular, Tin Plated Copper	8669-50	Belden
		BAC3108-4	Boeing

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Table 26 (continued)

Material	Description	Part Number	Supplier
Sleeve, Cold Shrink	-	8445-7.5	3M
Sleeve Kit, Cold Shrink	-	8443-2F	3M
Tape, Adhesive	-	-	An available source
Tape, Silicone	Self-bonding, 0.02 inch thick	608036-1	AMP
	Self-bonding, 0.012 inch thick	Scotch 70	3M

Table 27

NAS1387-() BUTT SPLICE PART NUMBERS

Part Number	Supplier
NAS1387-4	An available source

Table 28

BUTT SPLICE PART NUMBERS FOR D-150-() SPLICE KITS

Splice Kit	Butt Splice Part Number
D-150-0174	D-609-06
D-150-0179	D-609-06

Table 29

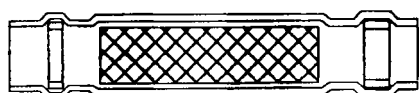
RSK SHIELD-KON PART NUMBERS

Part Number	Supplier
RSK401	Thomas&Betts

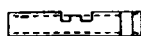
Table 30

SOLDER SHIELD SPLICE KIT PART NUMBERS

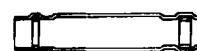
ARINC 629 Stub Cable	Solder Shield Splice Kit	
	Part Number	Supplier
S280W502-1	D-150-0174	Raychem
S280W502-4	D-150-0179	Raychem



Solder Shield Splice Sleeve



Butt Splice



Seal Sleeve

COMPONENTS OF THE RAYCHEM SOLDER SHIELD SPLICE KIT

Figure 49

20-11-11

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

B. Necessary Tools

**Table 31
CRIMP TOOLS FOR NAS1387-() BUTT SPLICES**

Crimp Tool Basic Unit Part Number	Supplier
49935	AMP
ST959A	Boeing

**Table 32
CRIMP TOOLS RAYCHEM D-609-()BUTT SPLICES**

Butt Splice Part Number	Crimp Tool	
	Basic Unit	Supplier
D-609-06	AD-1377	AMP
	ST956C	Boeing
	ST956D	Boeing

**Table 33
CRIMP TOOLS FOR RSK SHIELD-KONS**

Crimp Tool		
Basic Unit Part Number	Type	Die Set
13300	Pneumatic	401K
WT740	Hand	401K

**Table 34
HOT AIR GUNS**

Hot Air Gun		Reflector	
Basic Unit Part Number	Supplier	Part Number	Supplier
CV-5300	Raychem	MG-1	Raychem
CV-5000 Model 500	Raychem	TG-135	Raychem

C. Splice Assembly Configurations

Refer to Subject 20-10-13 for:

- The conditions that are applicable for this procedure
- The general conditions that are applicable for the repair of a wire or a cable
- The general conditions that are applicable for the repair of a wire or a cable with a splice.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

**Table 35
SPLICE CONFIGURATIONS FOR S280W502-() STUB CABLES**

Cable	Applicable Area	Configuration	Reference
S280W502-1	Fuel Vapor	RSK Shield-Kons with Cold Shrink Sleeves	Paragraph 7.D.
	No Fuel Vapor	RSK Shield-Kons with Cold Shrink Sleeves	Paragraph 7.D.
		Solder Splice Kit	Paragraph 7.E.
S280W502-4	Fuel Vapor	RSK Shield-Kons with Cold Shrink Sleeves	Paragraph 7.F.
	No Fuel Vapor	RSK Shield-Kons with Cold Shrink Sleeves	Paragraph 7.F.
		Solder Splice Kit	Paragraph 7.G.

D. Splice Assembly with RSK Shield-Kons and a Cold Shrink Sleeve - S280W502-1 Stub Cables

Refer to Paragraph 7.C. for:

- The conditions that are applicable for this procedure
- More splice configurations.

(1) Make a selection of these materials from Table 26:

- A sealant
- An adhesive tape
- A silicone tape
- A shield material
- A cold shrink sleeve
- A cold shrink sleeve kit.

NOTE: An equivalent shield material is a satisfactory alternative. Refer to Subject 20-00-11.

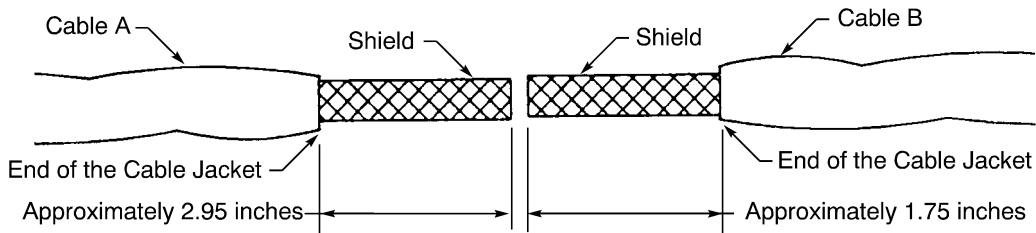
- (2) Make a selection of two butt splices from Table 27.
- (3) Make a selection of two RSK Shield-Kons from Table 29.
- (4) Make a selection of a butt splice crimp tool from Table 31.
- (5) Make a selection of a crimp tool for RSK Shield-Kons from Table 33.
- (6) Cut the cable at each end of the area with damage.
- (7) Put the length of cold shrink sleeve on one end of the cable.
- (8) Put the necessary length of shield material on the end of the cable with the cold shrink sleeve.
Make sure that the length of the shield material is a minimum of 5.25 inches.
- (9) Prepare the ends of the cable.
 - (a) Carefully remove approximately 2.95 inches of the outer jacket from the end of cable A.

Refer to:

- Figure 50
- Subject 20-00-15 for insulation removal procedures.

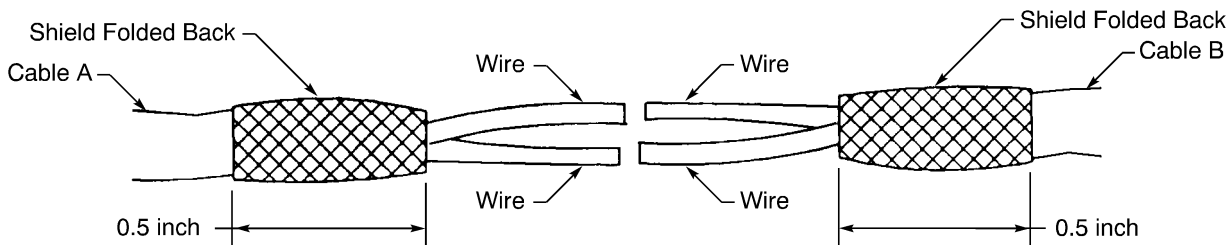
STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



CABLE JACKET REMOVAL LENGTH
Figure 50

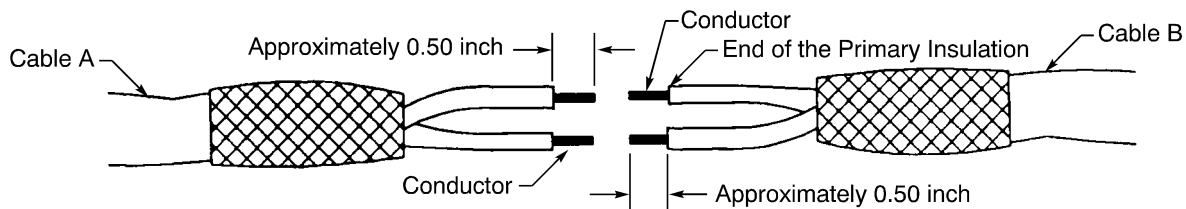
- (b) Carefully remove approximately 1.75 inches of the outer jacket from the end of cable B.
Refer to:
- Figure 50
 - Subject 20-00-15 for insulation removal procedures.
- (c) Fold back the shield on the cable jacket. Refer to Figure 51.



CABLE SHIELDS FOLDED BACK
Figure 51

- (d) Remove the necessary length of shield that makes the distance from the end of the jacket to the end of the shield equal to 0.5 inch. Refer to Figure 51.
- (e) Wind a length of adhesive tape on the end of each shield to temporarily hold the shields in position.
- (f) Make the wires straight.
- (g) Remove approximately 0.50 inch of insulation from the end of each wire.

- Refer to:
- Figure 52
 - Subject 20-00-15 for insulation removal procedures.

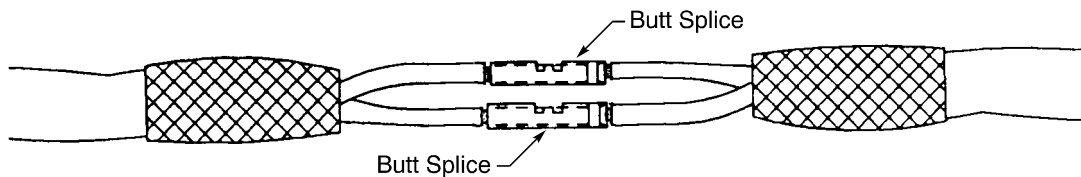


INSULATION REMOVAL LENGTH
Figure 52

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

- (h) Fold the conductor back on itself.
- (10) Put the wire in the splice.
Make sure that the color of the wire in each end of the splice is the same.
- (11) Crimp the splice. Refer to Figure 53.



ASSEMBLY OF THE BUTT SPLICE
Figure 53

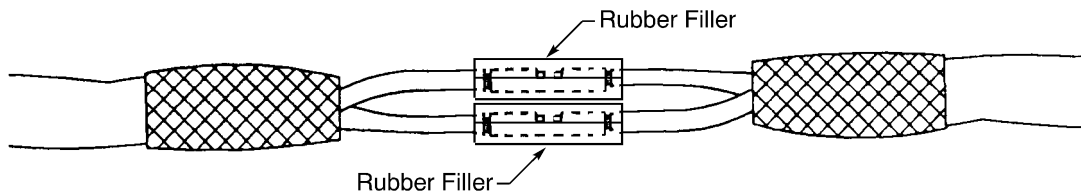
- (12) Wind two layers of 1 inch length of silicone tape on one butt splice.
Make sure that:
 - The distance from one end of the layers of tape to the other end of the layers of tape is 1 inch
 - The center of the layers of tape is aligned with the center of the splice
 - The outer diameter of the layers of tape is equal to approximately 0.184 inch.

NOTE: If the tape is 0.012 inch thick, three layers of tape are necessary.

- (13) Do again Step (12) for the other butt splice.
- (14) Remove the necessary length of the rubber fillers from the cold shrink splice kit to make the length of the filler equal to 1.15 inch.

NOTE: The length of cold shrink sleeve in the cold shrink sleeve kit is not needed and can be discarded.

- (15) Put a filler on each butt splice. Refer to Figure 54.
Make sure that the center of the filler is aligned with the center of the butt splice.



POSITION OF THE RUBBER FILLERS
Figure 54

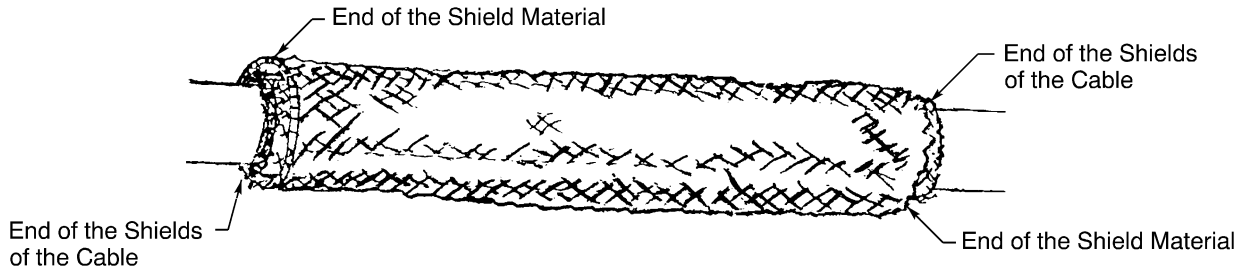
- (16) Push the shield material on the splice assembly. Refer to Figure 55.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

Make sure that:

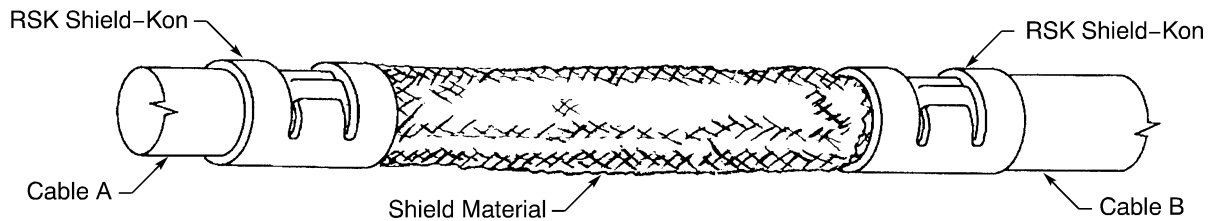
- The shield material goes on the full splice area
- The ends of the shield material are approximately aligned with ends of the folded back shields
- The center of the shield material is approximately aligned with the center of the butt splices.



POSITION OF THE SHIELD MATERIAL

Figure 55

(17) Assemble the splice of the shield. Refer to Figure 56.



ASSEMBLY OF THE SHIELD SPLICE

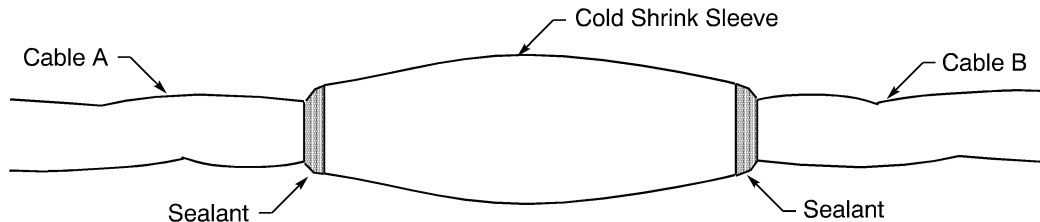
Figure 56

- (a) Remove the temporary layer of tape around the end of each shield.
- (b) Put one of the Shield-Kons into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
- (c) Put the crimp tool and the Shield-Kon on the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
- (d) Crimp the Shield-Kon.
- (e) Put the other Shield-Kon into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
- (f) Make the shield material smooth and tight.
- (g) Put the crimp tool and the Shield-Kon on the other end of the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
- (h) Crimp the Shield-Kon.

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- (i) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice.
- (18) Push the cold shrink sleeve on the splice assembly until one end of the cold shrink is approximately 0.25 inch from the end of shield material.
- (19) Remove the necessary length of cold shrink sleeve to make the distance from each end of the sleeve to the ends of the shield material equal to 0.25 inch.
- (20) Seal each end of the sleeve with sealant. Refer to Figure 57.



SEAL OF THE SLEEVE
Figure 57

E. Splice Assembly with a Solder Shield Splice Kit - S280W502-1 Stub Cables

Refer to Paragraph 7.C. for:

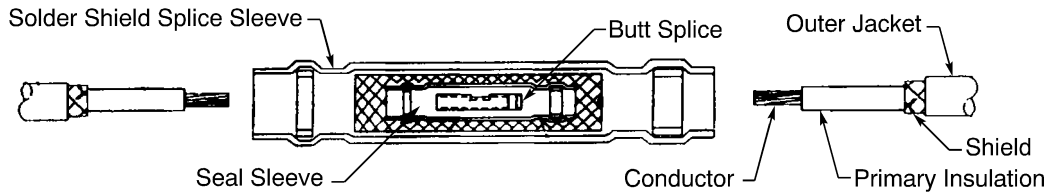
- The conditions that are applicable for this procedure
- More splice configurations.

Table 36
CABLE PREPARATION DIMENSIONS

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



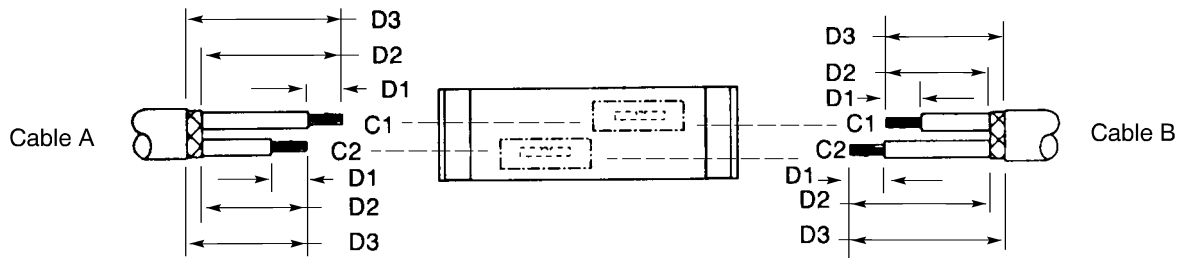
ASSEMBLY CONFIGURATION OF THE SOLDER SHIELD SPLICE

Figure 58

Refer to Figure 69.

- (1) Make a selection of solder shield splice kit from Table 30.
- (2) Find the butt splice part number. Refer to Table 28.
- (3) Make a selection of a crimp tool from Table 28.
- (4) Make a selection of a hot air gun from Table 34.
- (5) Put the solder shield splice sleeve on each of the cables on one side of the splice assembly.
- (6) Remove these specified lengths from the end of the cable or the wire:
 - The outer jacket
 - The shield
 - The primary insulation
 - The conductor.

Refer to Table 36 and Figure 59.



CABLE PREPARATION

Figure 59

- (7) Assemble the splice of each wire.
 - (a) Put the seal sleeve on the wire or wires.
Make sure that the large end of the sleeve is pointed to the end of the cable.
 - (b) Put the necessary conductors in one end of the butt splice.
Make sure that the end of each conductor is against the wire stop at the center of the splice.
 - (c) Crimp the splice.
 - (d) Put the necessary conductors in the other end of the splice.
Make sure that the end of each conductor is against the notch at the center of the splice.
 - (e) Crimp the splice.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

- (f) Align the center of the seal sleeve with the center of the butt splice.
- (g) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (8) Align the center of the shield splice sleeve with the middle of the distance between the ends of the outer jackets of the cable on both sides of the splice assembly.
- (9) Shrink one end of the shield splice sleeve:
 - (a) Apply heat at the center of the sleeve until the solder melts and the sleeve begins to shrink.
 - (b) Continue to apply heat from the center of the sleeve to one end of the sleeve until the solder ring melts and flows.
- (10) Do Step (9) again for the other end of the sleeve.

F. Splice Assembly with RSK Shield-Kons and a Cold Shrink Sleeve - S280W502-4 Stub Cables

Refer to Paragraph 7.C. for:

- The conditions that are applicable for this procedure
- More splice configurations.

**Table 37
CABLE PREPARATION DIMENSIONS**

Cable	Component Wire	
	Color	Necessary Length (inch)
A	Red	3.90
	Blue	3.25
	Red with Black Stripe	2.65
	Blue with Black Stripe	2.00
B	Red	2.00
	Blue	2.65
	Red with Black Stripe	3.25
	Blue with Black Stripe	3.90

- (1) Make a selection of these materials from Table 26:
 - A sealant
 - An adhesive tape
 - A silicone tape
 - A shield material
 - A cold shrink sleeve
 - A cold shrink sleeve kit.

NOTE: An equivalent shield material is a satisfactory alternative. Refer to Subject 20-00-11.

- (2) Make a selection of four butt splices from Table 27.
- (3) Make a selection of two RSK Shield-Kons from Table 29.
- (4) Make a selection of a butt splice crimp tool from Table 31.
- (5) Make a selection of a crimp tool for RSK Shield-Kons from Table 33.

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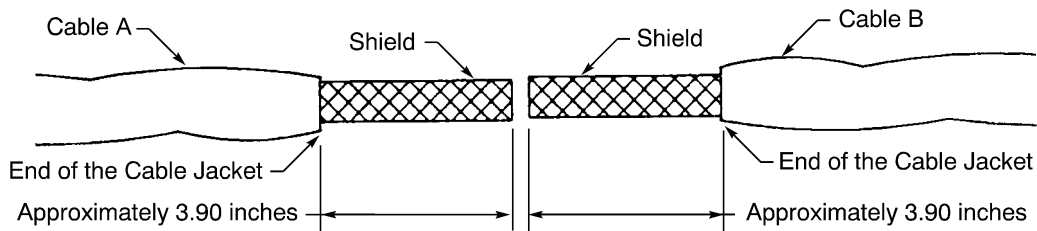
STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

- (6) Cut the cable at each end of the area with damage.
- (7) Put the length of cold shrink sleeve on one end of the cable.
- (8) Put the necessary length of shield material on the end of the cable with the cold shrink sleeve. Make sure that the length of the shield material is a minimum of 7.25 inches.
- (9) Prepare the ends of the cable.
 - (a) Carefully remove approximately 3.90 inches of the outer jacket from the end of cable A.

Refer to:

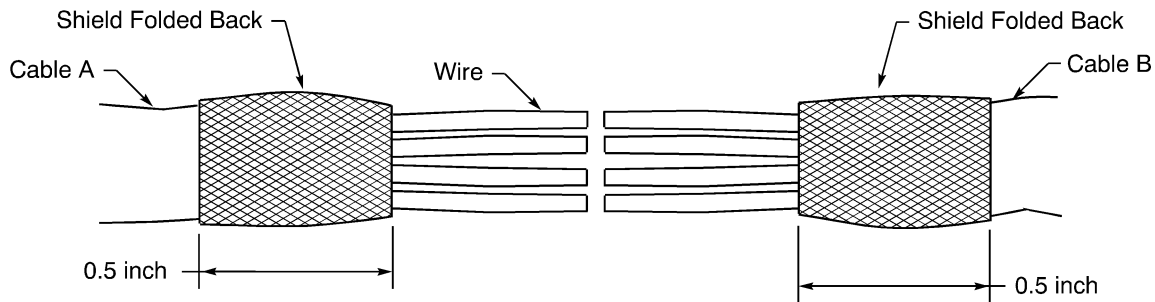
- Figure 60
- Subject 20-00-15 for insulation removal procedures.



CABLE JACKET REMOVAL LENGTH

Figure 60

- (b) Carefully remove approximately 3.90 inches of the outer jacket from the end of cable B.
- Refer to:
- Figure 60
 - Subject 20-00-15 for insulation removal procedures.
- (c) Fold back the shield on the cable jacket. Refer to Figure 61.



CABLE SHIELDS FOLDED BACK

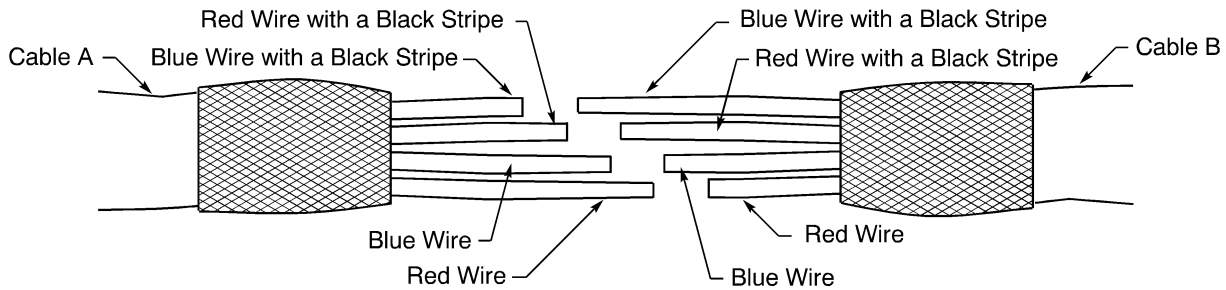
Figure 61

- (d) Remove the necessary length of shield that makes the distance from the end of the jacket to the end of the shield equal to 0.5 inch. Refer to Figure 61.
- (e) Wind a length of adhesive tape on the end of each shield to temporarily hold the shields in position.
- (f) Make the wires straight.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

- (g) Remove the necessary length of wire from the end of each component wire on cable A. Refer to Table 37 and Figure 62.

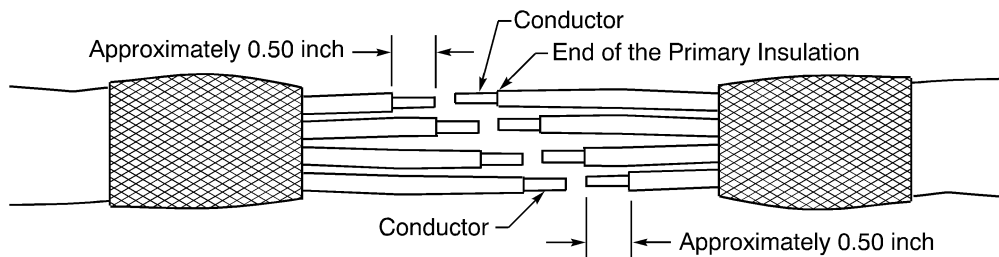


CABLE PREPARATION
Figure 62

- (h) Remove the necessary length of wire from the end of each component wire on cable B. Refer to Table 37 and Figure 62.
- (i) Remove approximately 0.50 inch of insulation from the end of each wire.

Refer to:

- Figure 63
- Subject 20-00-15 for insulation removal procedures.

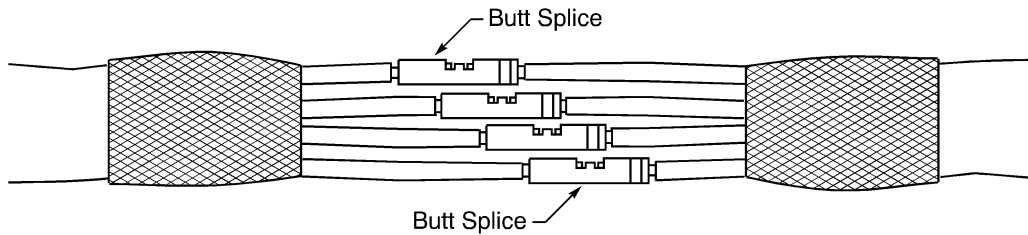


INSULATION REMOVAL LENGTH
Figure 63

- (j) Fold the conductor back on itself.
- (10) Put the wire in the splice.
Make sure that the color of the wire in each end of the splice is the same.
- (11) Crimp the splice. Refer to Figure 64.

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ARINC 629 WIRING



ASSEMBLY OF THE BUTT SPLICE
Figure 64

- (12) Wind two layers of 1 inch length of silicone tape on one butt splice.

Make sure that:

- The distance from one end of the layers of tape to the other end of the layers of tape is 1 inch
- The center of the layers of tape is aligned with the center of the splice
- The outer diameter of the layers of tape is equal to approximately 0.25 inch.

NOTE: If the tape is 0.012 inch thick, three layers of tape are necessary.

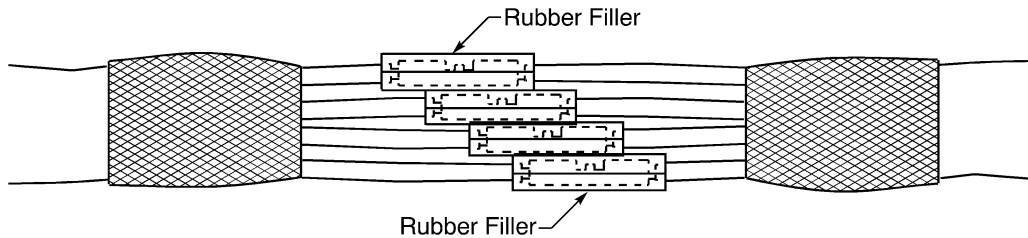
- (13) Do again Step (12) for the other butt splices.

- (14) Remove the necessary length of the rubber fillers from the cold shrink splice kit to make the length of the filler equal to 1.15 inch.

NOTE: The length of cold shrink sleeve in the cold shrink sleeve kit is not needed and can be discarded.

- (15) Put a filler on each butt splice. Refer to Figure 65.

Make sure that the center of the filler is aligned with the center of the butt splice.



POSITION OF THE RUBBER FILLERS
Figure 65

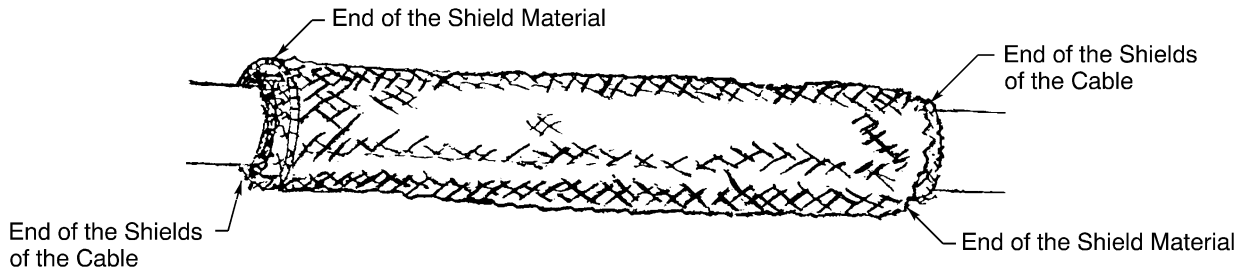
- (16) Push the shield material on the splice assembly. Refer to Figure 67.

Make sure that:

- The shield material goes on the full splice area
- The ends of the shield material are approximately aligned with ends of the folded back shields
- The center of the shield material is approximately aligned with the center of the butt splices.

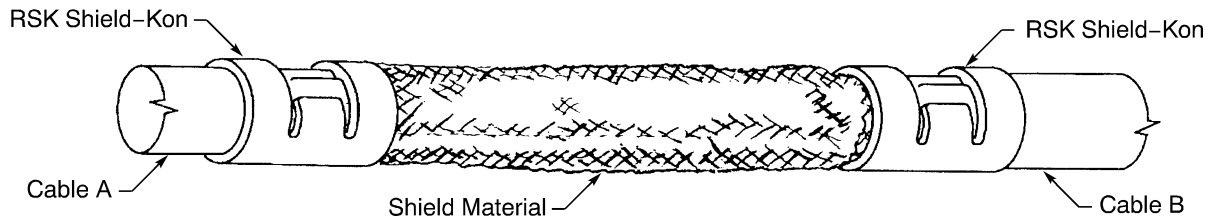
STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



POSITION OF THE SHIELD MATERIAL
Figure 66

(17) Assemble the splice of the shield. Refer to Figure 67.



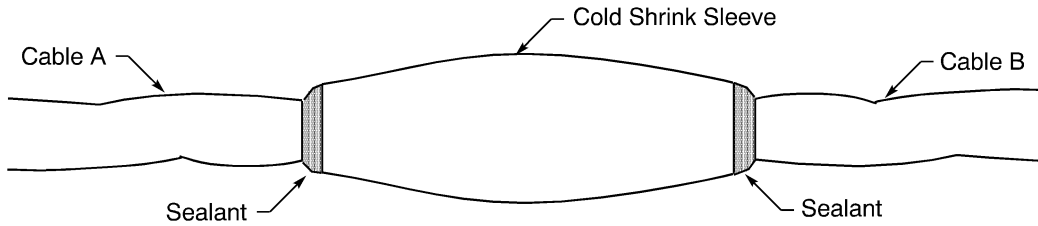
ASSEMBLY OF THE SHIELD SPLICE
Figure 67

- (a) Remove the temporary layer of tape around the end of each shield.
 - (b) Put one of the Shield-Kons into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (c) Put the crimp tool and the Shield-Kon on the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (d) Crimp the Shield-Kon.
 - (e) Put the other Shield-Kon into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (f) Make the shield material smooth and tight.
 - (g) Put the crimp tool and the Shield-Kon on the other end of the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (h) Crimp the Shield-Kon.
 - (i) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice.
- (18) Push the cold shrink sleeve on the splice assembly until one end of the cold shrink is approximately 0.25 inch from the end of shield material.
- (19) Remove the necessary length of cold shrink sleeve to make the distance from each end of the sleeve to the ends of the shield material equal to 0.25 inch.
- (20) Seal each end of the sleeve with sealant. Refer to Figure 68.

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SEAL OF THE SLEEVE
Figure 68

G. Splice Assembly with a Solder Shield Splice Kit - S280W502-4 Stub Cables

Refer to Paragraph 7.C. for:

- The conditions that are applicable for this procedure
- More splice configurations.

Table 38
CABLE PREPARATION DIMENSIONS

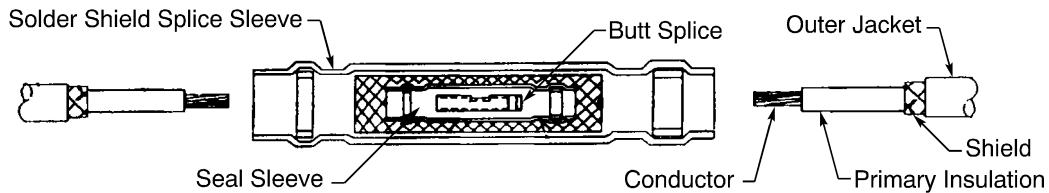
Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C4	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	

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Table 38 (continued)

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
B	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C4	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	



ASSEMBLY CONFIGURATION OF THE SOLDER SHIELD SPLICE
Figure 69

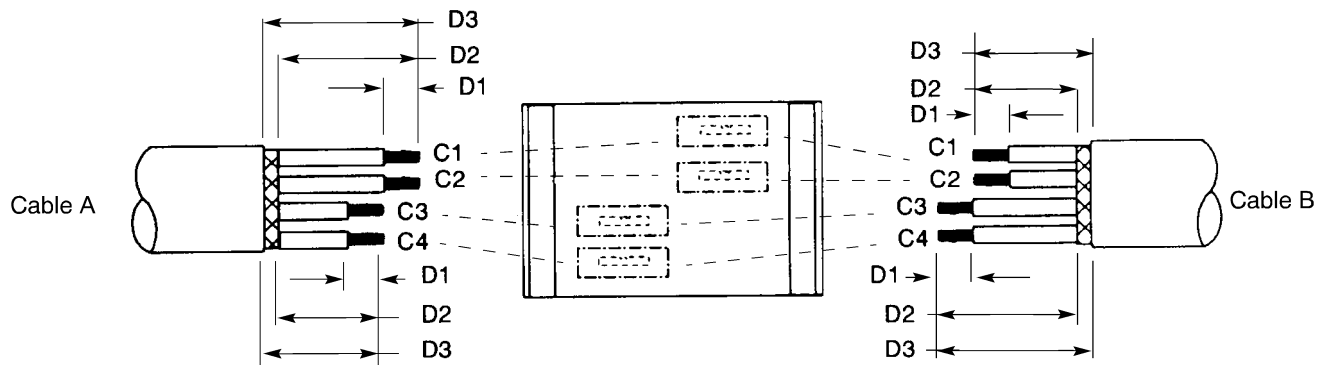
Refer to Figure 69.

- (1) Make a selection of solder shield splice kit from Table 30.
- (2) Find the butt splice part number. Refer to Table 28.
- (3) Make a selection of a crimp tool from Table 32.
- (4) Make a selection of a hot air gun from Table 34.
- (5) Put the solder shield splice sleeve on each of the cables on one side of the splice assembly.
- (6) Remove these specified lengths from the end of the cable or the wire:
 - The outer jacket
 - The shield
 - The primary insulation
 - The conductor.

Refer to Table 38 and Figure 70.

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ARINC 629 WIRING



CABLE PREPARATION
Figure 70

- (7) Assemble the splice of each wire.
 - (a) Put the seal sleeve on the wire or wires.
Make sure that the large end of the sleeve is pointed to the end of the cable.
 - (b) Put the necessary conductors in one end of the butt splice.
Make sure that the end of each conductor is against the wire stop at the center of the splice.
 - (c) Crimp the splice.
 - (d) Put the necessary conductors in the other end of the splice.
Make sure that the end of each conductor is against the notch at the center of the splice.
 - (e) Crimp the splice.
 - (f) Align the center of the seal sleeve with the center of the butt splice.
 - (g) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (8) Align the center of the shield splice sleeve with the middle of the distance between the ends of the outer jackets of the cable on both sides of the splice assembly.
- (9) Shrink one end of the shield splice sleeve:
 - (a) Apply heat at the center of the sleeve until the solder melts and the sleeve begins to shrink.
 - (b) Continue to apply heat from the center of the sleeve to one end of the sleeve until the solder ring melts and flows.
- (10) Do Step (9) again for the other end of the sleeve.

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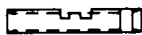
ARINC 629 WIRING

8. REPAIR OF ARINC 629 S280W651-() DATA BUS CABLE

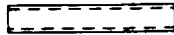
A. Necessary Parts and Materials

**Table 39
SPLICE ASSEMBLY COMPONENTS**

Cable Type	Component	Part Number	Supplier
Unshielded	Butt Splice	D-609-06	Raychem
	Splice Seal Sleeve	D-436-0097	Raychem
	Inner Sleeve	RT-375	Raychem
	Kynar Outer Sleeve	TAK	Raychem
Shielded	Butt Splice	D-609-06	Raychem
	Inner Sleeve	RT-375	Raychem
	Splice Seal Sleeve	D-436-0097	Raychem
	Seal Sleeve	D-436-10	Raychem
	Solder Shield Splice Sleeve	D-155-0975	Raychem
	Kynar Outer Sleeve	TAK	Raychem
	Protection Sleeve	RT-375	Raychem



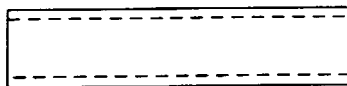
Butt Splice



Heat Shrinkable Inner Sleeve



Splice Seal Sleeve



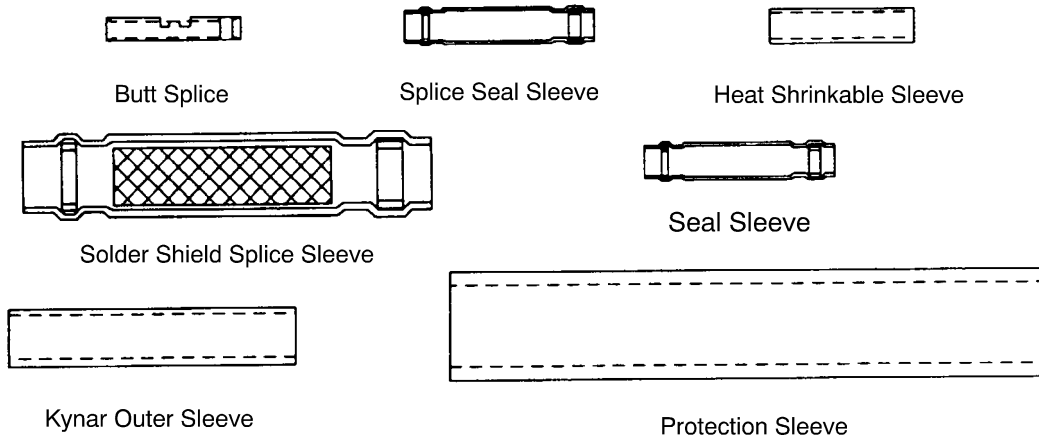
Kynar Outer Sleeve

SPLICE ASSEMBLY COMPONENTS FOR AN UNSHIELDED CABLE

Figure 71

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SPLICE ASSEMBLY COMPONENTS FOR A SHIELDED CABLE

Figure 72

**Table 40
INSULATION MATERIALS**

Material	Temperature Grade	Class	Part Number	Supplier
Film Strip	D	1	E125-2	Fluorglas
			E125-2	Saint-Gobain Performance Plastics
			E125-3	Fluorglas
			E125-3	Saint-Gobain Performance Plastics
			P-412	Permacel
			Scotch 48	3M
			Scotch 3082	3M
			Scotch 4202	3M
Tape, Silicone	D	2	Scotch 70	3M

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ARINC 629 WIRING

Table 40 (continued)

Material	Temperature Grade	Class	Part Number	Supplier
Tape, TFE	B	1	Scotch 63	3M
			2242-2	Fluorglas
			2242-2	Saint-Gobain Performance Plastics
	C	2	Mystick 7505	Fluorglas
			Mystick 7505	Saint-Gobain Performance Plastics
			Scotch 61	3M
	D	2	P-421	Permacel
			2045-5	Fluorglas
			2045-5	Saint-Gobain Performance Plastics
			2245-5	Fluorglas
			2245-5	Saint-Gobain Performance Plastics
	Mil-I-23594, Type 1, Class 4	QPL		

B. Necessary Tools

Table 41

CRIMP TOOLS FOR RAYCHEM D-609-06 BUTT SPLICES

Crimp Barrel Size	Crimp Tool	
	Basic Unit	Nest
26-20	AD-1377	20-26
	ST956C	20-26
	ST956D	20-26

**Table 42
HOT AIR GUNS**

Type	Temperature Range (Degrees C)		Hot Air Gun	
	Minimum	Maximum	Basic Unit	Reflector
Standard Temperature	232	371	CV-5300	MG-1
	260	371	CV-5000 Model 500	TG-135
High Temperature	399	538	CV-5000 Model 750	TG-33

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STANDARD WIRING PRACTICES MANUAL**ARINC 629 WIRING****C. Repair of a Broken Bond Between the Component Wires**

Table 43
NECESSARY MATERIALS

Material	Description	Part Number	Supplier
Tape	Polyester, Acrylic adhesive	850	3M

- (1) Make a selection of a tape from Table 43.

NOTE: An equivalent tape is a satisfactory alternative. Refer to Subject 20-00-11.

- (2) At the location of the broken bond, wind two layers of tape around the two component wires. Make sure to keep the initial configuration of the twists in the wires.

D. Repair of a Broken Bond Between Overlaps in the Primary Insulation of a Wire

Refer to Subject 20-10-13 for:

- The conditions that are applicable for this procedure
- The general conditions that are applicable for the repair of a wire or a cable.

- (1) Make a selection of one of these insulation materials from Table 40:

- Temperature Grade D TFE tape
- Temperature Grade D film strip
- Temperature Grade C silicone tape.

Make sure that the insulation material has a Temperature Grade that is applicable for the wire.

- (2) Remove the rough edges of the insulation.
(3) Clean the insulation with isopropyl alcohol.

Make sure to:

- Clean the damaged area of the insulation
- Clean the insulation approximately 3 inches on each side of damage.

- (4) Let the clean areas dry.
(5) Wind two layers of the insulation material on the cable.

Make sure that:

- The two wires are together
- Each end of the insulation material extends a minimum of 1 inch farther than each end of the damaged area
- Each layer has a minimum 50 percent overlap of the tape
- Each layer is wound a minimum of two times on the cable
- The second layer is wound in the opposite direction of the first layer.

- (6) Assemble a lacing tape wire harness tie on each end of the insulation material approximately 0.25 inch from the end of the insulation material.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

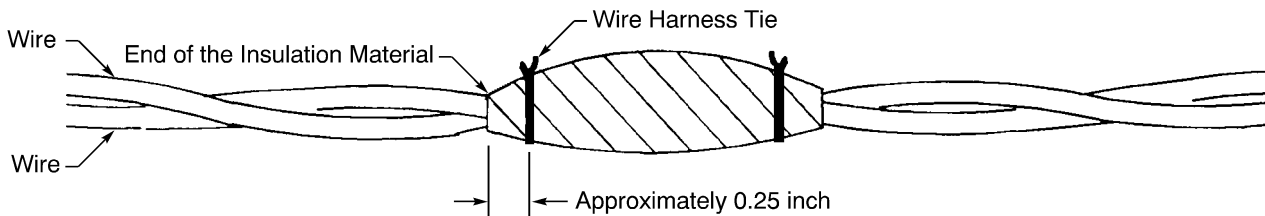
Refer to:

- Figure 73
- Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie.

Make sure that:

- The color of the lacing tape is yellow
- The lacing tape has a Temperature Grade and a Class that are applicable for the cable.

CAUTION: A PLASTIC TIE STRAP MUST NOT BE USED. DAMAGE TO THE INSULATION OF THE DATA BUS CABLE CAN OCCUR.



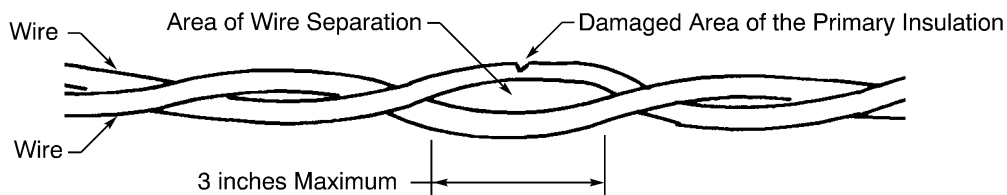
POSITION OF THE WIRE HARNESS TIES ON THE LAYERS OF INSULATION MATERIAL
Figure 73

E. Repair of the Primary Insulation of a Wire in an Unshielded Cable

Refer to Subject 20-10-13 for:

- The conditions that are applicable for this procedure
 - The general conditions that are applicable for the repair of a wire or a cable.
- (1) Make a separation between the blue and yellow wires that has a maximum length of 1.5 inches from each end of the damaged area. Refer to Paragraph 4.A.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN Paragraph 4.A. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.



SEPARATION OF THE WIRES
Figure 74

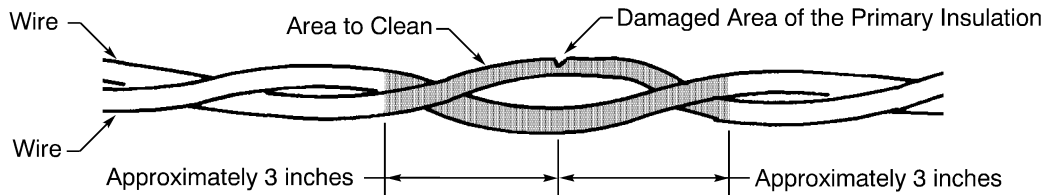
- (2) Clean the insulation of each wire with isopropyl alcohol. Refer to Figure 75.

Make sure to:

- Clean the damaged area of the insulation
- Clean the insulation of each wire approximately 3 inches on each side of the damage.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



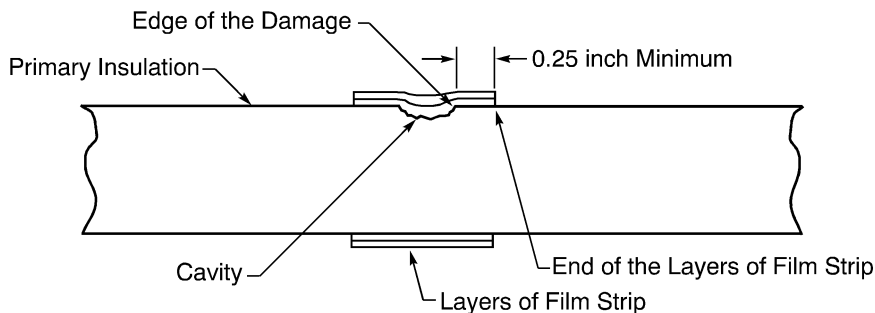
CLEAN AREAS OF THE WIRES
Figure 75

- (3) Let the clean areas dry.
- (4) If the damage is a cavity in the insulation, fill in the cavity.
 - (a) Make a selection of a Temperature Grade D film strip from Table 40.

NOTE: A Temperature Grade D TFE tape from Table 40 is a satisfactory alternative to the film strip.
 - (b) Wind the necessary layers of film strip on the wire with damage to fill the cavity and make a smooth surface. Refer to Figure 76.

Make sure that each layer of film strip:

- Extends a minimum of 0.25 inch farther than each end of the damaged area
- Has a 50 percent minimum overlap of the tape
- Is wound a minimum of two times on the insulation
- Is wound in the opposite direction of the layer before.



CAVITY FILLED WITH FILM STRIP
Figure 76

- (5) Make a selection of one of these tapes from Table 40:
 - Temperature Grade D TFE tape
 - Temperature Grade C silicone tape.

Make sure that the tape has a Temperature Grade that is applicable for the cable.

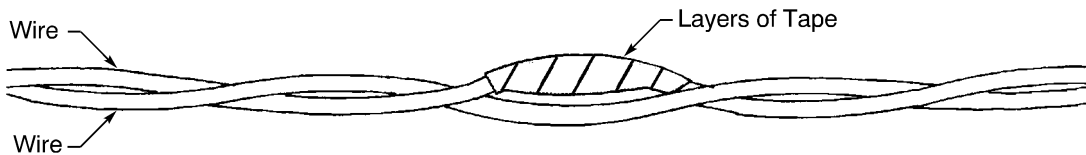
- (6) Wind two layers of the tape on the damaged area of the wire. Refer to Figure 77.

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

Make sure that:

- If a cavity is filled with film strip, each end of the tape extends a minimum of 0.75 inch farther than the end of the film strip
- If a cavity is not filled with film strip, each end of the tape extends a minimum of 1 inch farther than end of the damaged area
- Each layer has a 50 percent minimum overlap of the tape
- Each layer of tape is wound a minimum of two times on the wire
- The second layer of tape is wound in the opposite direction of the first layer.



POSITION OF THE LAYERS OF TAPE
Figure 77

- (7) Put the two wires together.
- (8) Tightly wind a layer of tape around the two wires.

Make sure that the layer of tape:

- Extends 0.5 inch minimum farther than each end of the layers of tape on the wire or wires with damage
 - Makes a 50 percent overlap.
- (9) Assemble a lacing tape wire harness tie approximately 0.25 inch from each end of the tape.

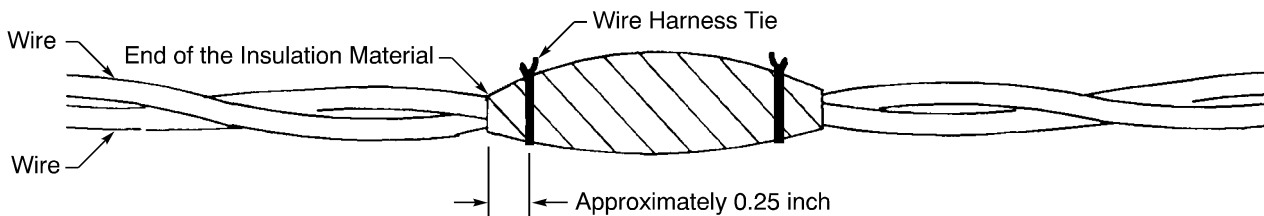
Refer to:

- Figure 78
- Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie.

Make sure that:

- The color of the lacing tape is yellow
- The lacing tape has a Temperature Grade and a Class that are applicable for the cable.

CAUTION: A PLASTIC TIE STRAP MUST NOT BE USED. DAMAGE TO THE INSULATION OF THE DATA BUS CABLE CAN OCCUR.



POSITION OF THE WIRE HARNESS TIE ON THE LAYER OF TAPE
Figure 78

STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

F. Splice Assembly on One Wire of an Unshielded Cable

Refer to Subject 20-10-13 for:

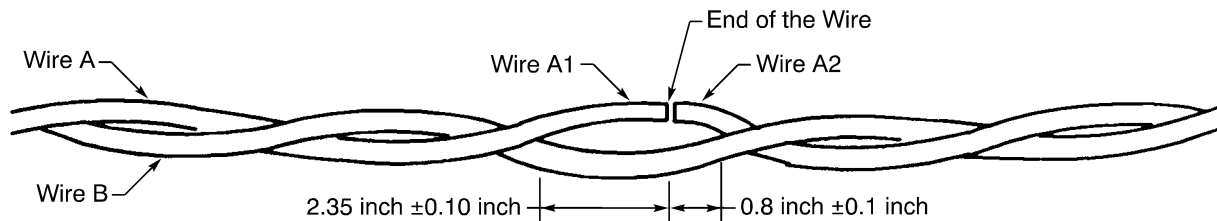
- The conditions that are applicable for this procedure
- The general conditions that are applicable for the repair of a wire or a cable
- The general conditions that are applicable for the repair of a wire or a cable with a splice.

(1) Make a selection of these splice assembly components from Table 39:

- One butt splice
- One splice seal sleeve
- One 0.55 inch \pm 0.05 inch length of inner sleeve
- One 2.0 inch \pm 0.1 inch length of Kynar outer sleeve.

Refer to Figure 71.

- (2) Make a selection of a crimp tool from Table 41.
- (3) Make a selection of a standard temperature hot air gun from Table 42.
- (4) Prepare the cable. Refer to Figure 79.



SEPARATION OF THE WIRES
Figure 79

- (a) Remove the damaged area from the wire.
- (b) Make a separation between Wire A1 and Wire B that has a maximum length of 2.35 inches \pm 0.10 inch from the end of Wire A1. Refer to Paragraph 4.A.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN Paragraph 4.A. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

- (c) Make a separation between Wire A2 and Wire B that has a maximum length of 0.8 inch \pm 0.1 inch from the end of Wire A2. Refer to Paragraph 4.A.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN Paragraph 4.A. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

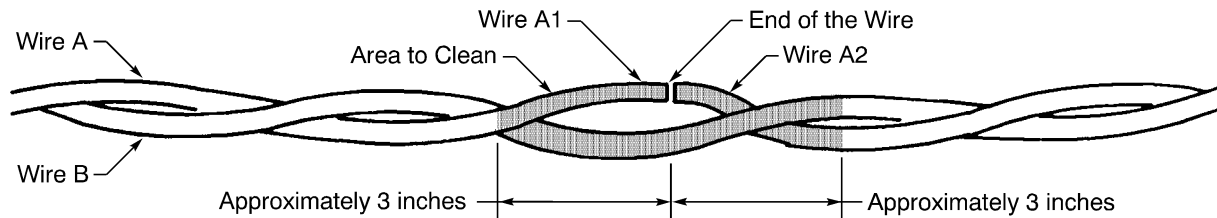
- (d) Remove a 0.25 inch \pm 0.03 inch of insulation from each end of Wire A. Refer to Subject 20-00-15.
- (e) Clean the insulation of each wire with isopropyl alcohol. Refer to Figure 80.

Make sure to:

- Clean the insulation of Wire A1 and Wire A2 approximately 3 inches from the end of each wire
- Clean the length of Wire B that is parallel to the clean lengths of Wire A.

STANDARD WIRING PRACTICES MANUAL

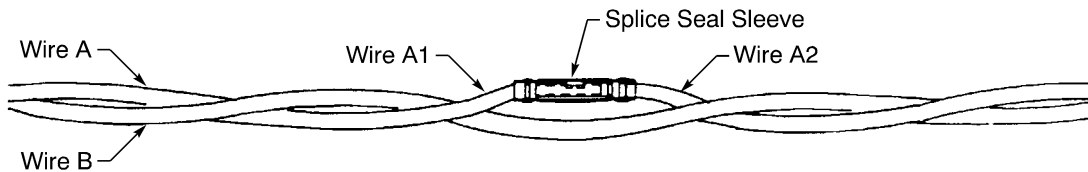
ARINC 629 WIRING



CLEAN AREAS OF THE WIRES

Figure 80

- (f) Let the clean areas dry.
 - (g) Put the inner sleeve on Wire A2.
 - (h) Put the seal splice sleeve on Wire A1.
 - (i) Put the Kynar outer sleeve on Wire A1.
- (5) Assemble one end of the butt splice:
- (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the conductor of one of the wires in the crimp barrel of one end of the splice.
- Make sure that:
- The end of the conductor can be seen in the inspection hole of the splice
 - The end of the conductor does not make an overlap with the wire stop in the splice
 - The insulation of the wire is not in the crimp barrel
 - The end of the wire insulation is a maximum of 0.13 inch from the end of the splice.
- (d) Crimp the splice.
- (6) Do Step (5) again for the other end of the splice.
- (7) Align the center of the inner sleeve with the center of the butt splice.
- (8) Shrink the inner sleeve into its position. Refer to Subject 20-10-14.
- (9) Align the center of the splice seal sleeve with the center of the inner sleeve. Refer to Figure 81.



POSITION OF THE SPLICE SEAL SLEEVE

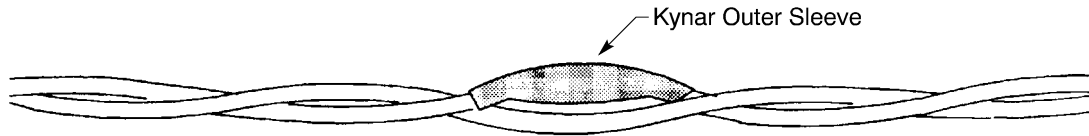
Figure 81

- (10) Shrink the splice seal sleeve into its position:
 - (a) Apply heat from the center of the sleeve to one end of the sleeve.
 - (b) Apply heat from the center of the sleeve to the other end of the sleeve.
- (11) Align the center of the Kynar outer sleeve with the center of the splice seal sleeve. Refer to Figure 82.

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STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING



POSITION OF THE KYNAR OUTER SLEEVE

Figure 82

- (12) Shrink the Kynar outer sleeve into its position:
 - (a) Apply heat from the center of the sleeve to one end of the sleeve.
 - (b) Apply heat from the center of the sleeve to the other end of the sleeve.

- (13) Make a selection of one of these tapes from Table 40:

- Temperature Grade D TFE tape
- Temperature Grade C silicone tape

Make sure that the tape has a Temperature Grade that is applicable for the cable.

- (14) Put the two wires together.
- (15) Tightly wind a layer of tape on the two wires.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch farther than the end of the outer sleeve on the Wire A2 side of the splice assembly
- Stops a minimum of 0.5 inch farther than the end of the outer sleeve on the Wire A1 side of the splice assembly
- Has a 50 percent overlap of tape.

- (16) Assemble a wire harness tie approximately 0.25 inch from the end of the tape on the Wire A1 side of the splice assembly.

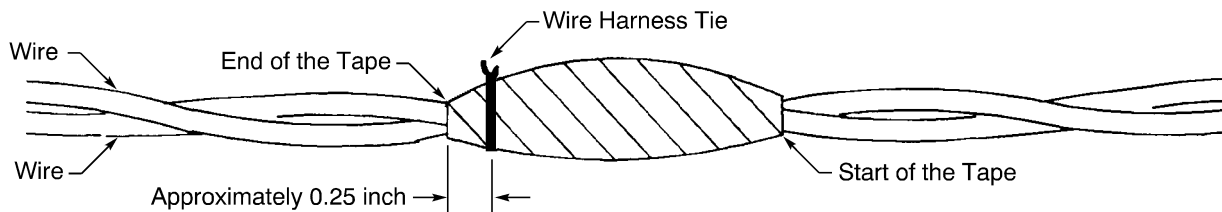
Refer to:

- Figure 83
- Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie.

Make sure that:

- The color of the lacing tape is yellow
- The lacing tape has a Temperature Grade and a Class that are applicable for the cable.

CAUTION: A PLASTIC TIE STRAP MUST NOT BE USED. DAMAGE TO THE INSULATION OF THE DATA BUS CABLE CAN OCCUR.



POSITION OF THE WIRE HARNESS TIE ON LAYER OF TAPE

Figure 83

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STANDARD WIRING PRACTICES MANUAL

ARINC 629 WIRING

G. Splice Assembly on Each Wire of an Unshielded Cable

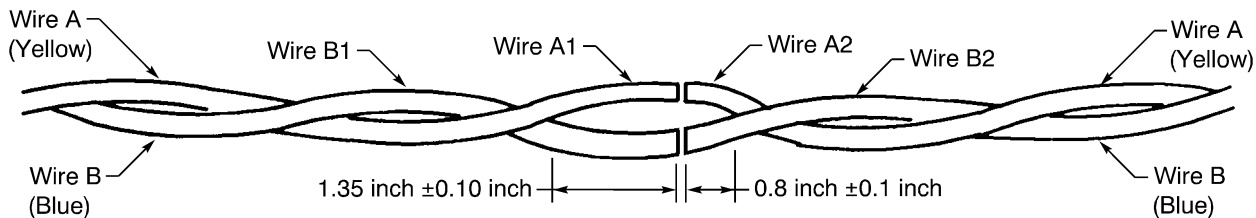
Refer to Subject 20-10-13 for:

- The conditions that are applicable for this procedure
- The general conditions that are applicable for the repair of a wire or a cable
- The general conditions that are applicable for the repair of a wire or a cable with a splice.

- (1) Make a selection of these splice assembly components from Table 39:
- Two butt splices
 - Two 0.55 inch \pm 0.05 inch lengths of heat shrinkable inner sleeves
 - Two splice seal sleeves
 - One 2.0 inch \pm 0.1 inch length of Kynar outer sleeve.

Refer to Figure 71.

- (2) Make a selection of a crimp tool from Table 41.
 (3) Make a selection of a standard temperature hot air gun from Table 42.
 (4) Prepare the cable. Refer to Figure 84.



SEPARATION OF THE WIRES
Figure 84

- (a) Remove the damaged area from each wire.
 (b) Make a separation between the Wire A1 and Wire B1 that has a maximum length of 1.35 inches \pm 0.10 inch from the end of Wire A1. Refer to Paragraph 4.A.

CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN Paragraph 4.A. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

- (c) Make a separation between the Wire A2 and Wire B2 that has a maximum length of 0.8 inch \pm 0.1 inch from the end of Wire A2. Refer to Paragraph 4.A.

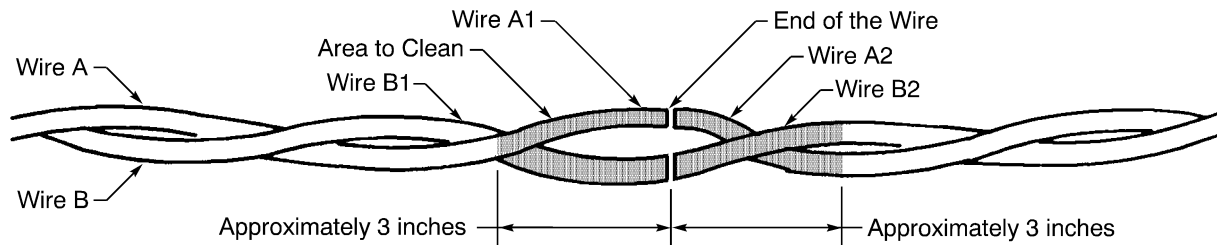
CAUTION: ONLY USE A TOOL THAT IS SPECIFIED IN Paragraph 4.A. OTHER TOOLS CAN CAUSE DAMAGE TO THE WIRES.

Make sure that the distance from the end of each wire to the location where the wires are against each other is 0.8 inch \pm 0.1 inch

- (d) Remove a 0.25 inch \pm 0.03 inch of insulation from each end of Wire A and Wire B. Refer to Subject 20-00-15.
 (e) Clean the insulation of each wire with isopropyl alcohol. Refer to Figure 85.
 Make sure to the length of insulation approximately 3 inches from the end of each wire.

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ARINC 629 WIRING



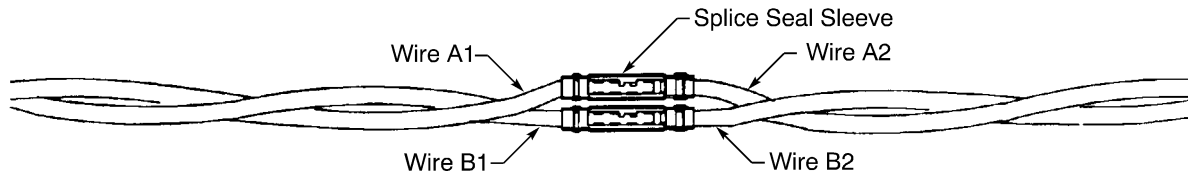
CLEAN AREAS OF THE WIRES

Figure 85

- (f) Let the clean areas dry.
 - (g) Put an inner sleeve on the end of:
 - Wire A2
 - Wire B2.
 - (h) Put a splice seal sleeve on the end of:
 - Wire A1
 - Wire B1.
 - (i) Put Wire A2 and Wire B2 together.
 - (j) Put the Kynar outer sleeve on wires.
Make sure that Wire A2 and Wire B2 are together.
- (5) Assemble the butt splice on Wire A:
- (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the conductor of one end of the wire in the crimp barrel of one end of the splice.
Make sure that:
 - The end of the conductor can be seen in the inspection hole of the splice
 - The end of the conductor does not make an overlap with the wire stop in the splice
 - The insulation of the wire is not in the crimp barrel
 - The end of the wire insulation is a maximum of 0.13 inch from the end of the splice.
 - (d) Crimp the splice.
 - (e) Do Step (a) through Step (d) for the other end of the splice.
Make sure that the wire has the same color of insulation as the wire in the opposite end of the splice.
- (6) Do Step (5) again for Wire B.
- (7) On one of the wires, align the center of the inner sleeve with the center of the splice.
- (8) Shrink the inner sleeve into its position. Refer to Subject 20-10-14.
- (9) Do Step (7) and Step (8) again for the other wire.
- (10) On Wire A, align the center of the splice seal sleeve with the center of the inner sleeve. Refer to Figure 86.

STANDARD WIRING PRACTICES MANUAL

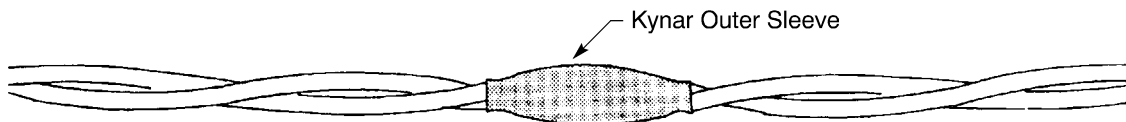
ARINC 629 WIRING



POSITION OF THE SPLICE SEAL SLEEVES ON THE WIRES

Figure 86

- (11) Shrink the splice seal sleeve into position:
 - (a) Apply heat from the center of the sleeve to one end of the sleeve.
 - (b) Apply heat from the center of the sleeve to the other end of the sleeve.
- (12) Do Step (10) and Step (11) again for Wire B.
- (13) Align the center of the Kynar outer sleeve with the centers of the splice seal sleeves. Refer to Figure 87.



POSITION OF THE KYNAR OUTER SLEEVE ON THE CABLE

Figure 87

- (14) Shrink the Kynar outer sleeve into position:
 - (a) Apply heat from the center of the sleeve to one end of the sleeve.
 - (b) Apply heat from the center of the sleeve to the other end of the sleeve.

H. Splice Assembly on Each Wire of a Shielded Cable

Refer to Subject 20-10-13 for:

- The conditions that are applicable for this procedure
- The general conditions that are applicable for the repair of a wire or a cable
- The general conditions that are applicable for the repair of a wire or a cable with a splice.

- (1) Make a selection of these splice assembly components from Table 39:
 - Two butt splices
 - Two 0.55 inch \pm 0.05 inch lengths of inner sleeve
 - Two splice seal sleeves
 - One 3.0 inch \pm 0.1 inch length of Kynar outer sleeve
 - Two seal sleeves
 - One solder shield splice sleeve
 - One 6.0 inch \pm 0.1 inch length of protection sleeve.

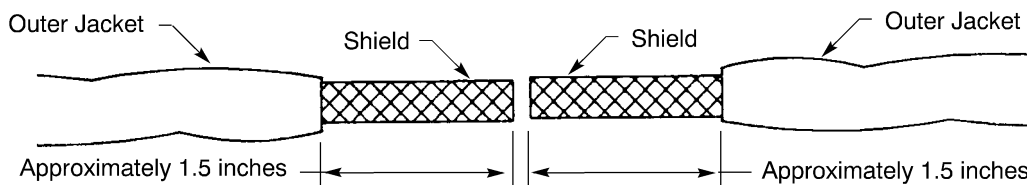
Refer to Figure 72.

- (2) Make a selection of a crimp tool from Table 41.
- (3) Make a selection of a standard temperature hot air gun from Table 42.
- (4) Prepare each end of the cable:

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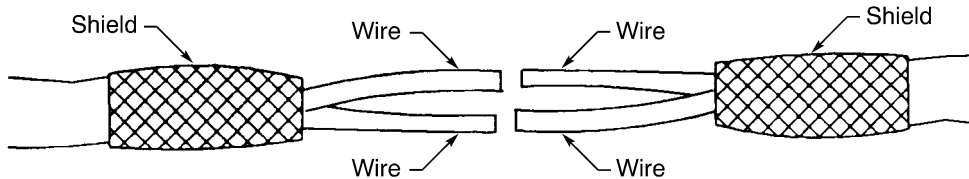
ARINC 629 WIRING

- (a) Remove the damaged area from the cable.
- (b) Put these components on one end of the cable:
 - The protection sleeve
 - One seal sleeve with the large end pointed to the end of the cable.
- (c) Put these components on the other end of the cable:
 - One seal sleeve with the large end pointed to the end of the cable
 - The solder shield splice sleeve
 - The Kynar outer sleeve.
- (d) Remove approximately 1.5 inches of the outer jacket from each end of the cable. Refer to Figure 88 and Subject 20-00-15.



CABLE JACKET REMOVAL
Figure 88

- (e) Clean the jacket of each cable with isopropyl alcohol.
Make sure clean the length of jacket approximately 3 inches from the end of the jacket.
- (f) Let the clean areas dry.
- (g) Fold each shield back. Refer to Figure 89.



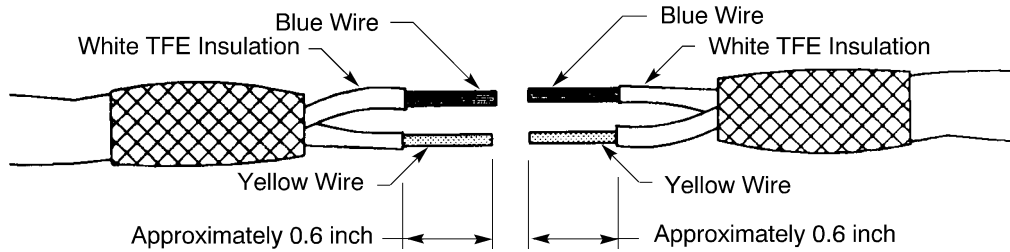
POSITION OF THE SHIELDS FOLDED BACK
Figure 89

- (h) Put a temporary layer of tape around the end of each shield to prevent movement of the shields.
- (i) Move the wires apart on each end of the cable.
- (j) Remove approximately 0.6 inch of the white TFE insulation from each wire. Refer to Figure 90 and Subject 20-00-15.

CAUTION: DO NOT CUT THE PRIMARY INSULATION OF THE WIRES. DAMAGE TO THE BLUE INSULATION OR THE YELLOW INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE CABLE.

STANDARD WIRING PRACTICES MANUAL

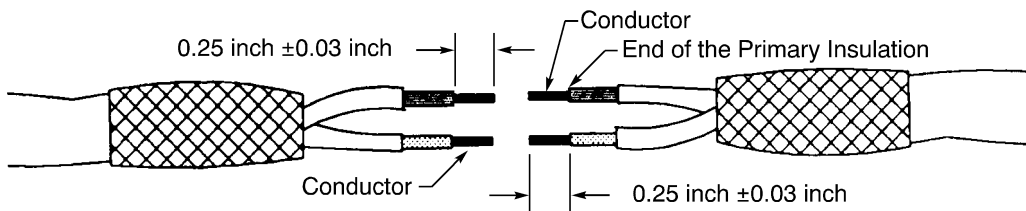
ARINC 629 WIRING



TFE INSULATION REMOVAL

Figure 90

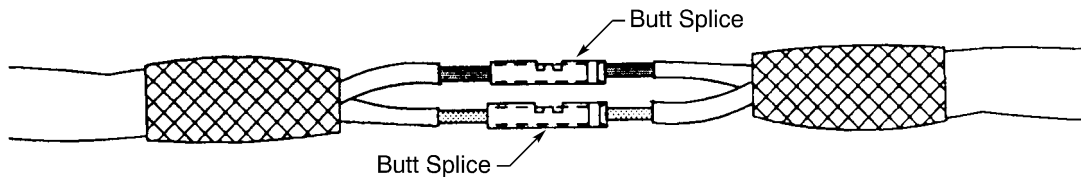
- (k) Remove a 0.25 inch \pm 0.03 inch of insulation from the end of each wire. Refer to Figure 91.



PRIMARY INSULATION REMOVAL

Figure 91

- (5) Put one splice seal sleeve on each wire of one of the cables.
- (6) Put one inner sleeve on each wire of the other cable.
- (7) Assemble the splice of the wires with the blue insulation. Refer to Figure 92.



POSITION OF THE BUTT SPLICE

Figure 92

- (a) Put the splice in the crimp tool.
- (b) Hold the splice in position with light pressure.
- (c) Put the conductor of one of the wires into the crimp barrel of splice.

Make sure that:

- The end of the conductor can be seen in the inspection hole of the splice
- The end of the conductor does not make an overlap with the wire stop in the splice
- The insulation of the wire is not in the crimp barrel
- The end of the wire insulation is a maximum of 0.13 inch from the end of the splice.

- (d) Crimp the splice.
- (e) Do Step (a) through Step (d) again for the other end of the splice.

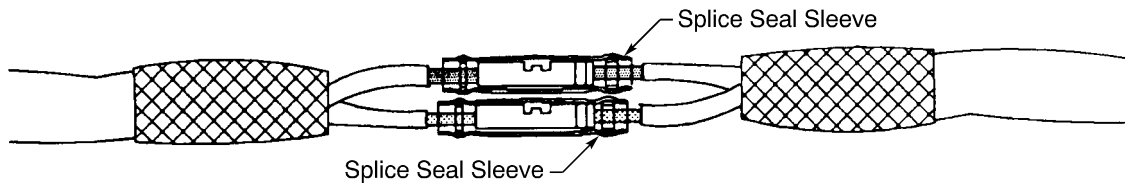
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ARINC 629 WIRING

Make sure that the wire has the same color of insulation as the wire in the opposite end of the splice.

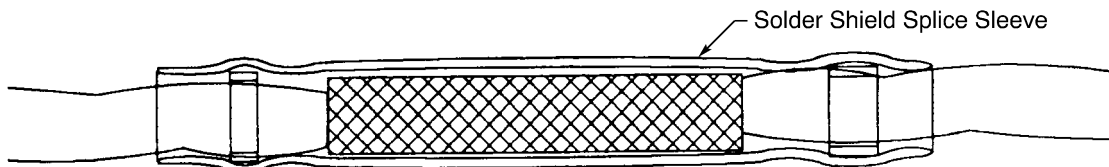
- (8) Do Step (7) again for the wires with the yellow insulation.
- (9) Install the inner sleeve on the splice of the wires with the blue insulation:
 - (a) Align the center of the inner sleeve with the center of the butt splice.
 - (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (10) Do Step (9) again for the wires with the yellow insulation.
- (11) Align the center of the splice seal sleeve with the center of the inner sleeve on the wire with blue insulation. Refer to Figure 93.



POSITION OF THE SPLICE SEAL SLEEVE

Figure 93

- (12) Shrink the splice seal sleeve into position:
 - (a) Apply heat from the center of the sleeve to one end of the sleeve.
 - (b) Apply heat from the center of the sleeve to the other end of the sleeve.
- (13) Do Step (11) and Step (12) again for the wires with the yellow insulation.
- (14) Align the center of the Kynar outer sleeve with the center of the splice seal sleeves.
- (15) Align one end of the Kynar outer sleeve with the nearest folded edge of the shield.
- (16) If it is necessary, remove the necessary length from the other end of the Kynar outer sleeve it align the end of the sleeve with the other folded edge of the shield.
- (17) Shrink the Kynar outer sleeve into position:
 - (a) Apply heat from the center of the sleeve to one end of the sleeve.
 - (b) Apply heat from the center of the sleeve to the other end of the sleeve.
- (18) Remove the temporary tape from the end of the shield on each side of the splice assembly.
- (19) Fold each length of shield forward on the Kynar sleeve.
- (20) Align the center of the solder shield splice sleeve with the center of the Kynar outer sleeve. Refer to Figure 94.



POSITION OF THE SOLDER SHIELD SPLICE SLEEVE

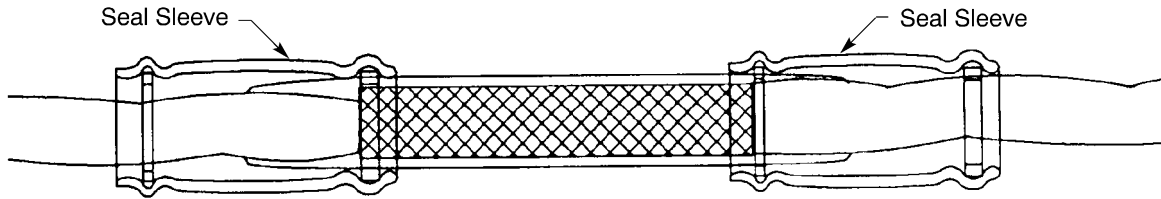
Figure 94

20-11-11

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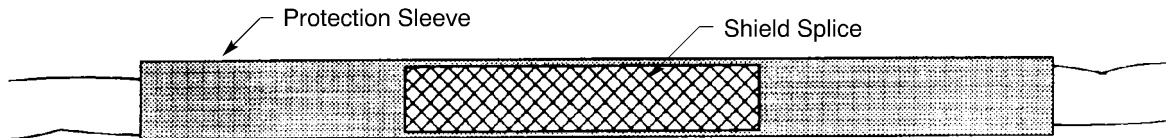
ARINC 629 WIRING

- (21) Shrink one end of the solder shield splice sleeve:
 - (a) Apply heat at the center of the sleeve until the solder melts and the sleeve starts to shrink.
 - (b) Continue to apply heat from the center of the sleeve to one end of the sleeve until the solder melts and flows.
- (22) Do Step (21) again for the other end of the sleeve.
- (23) Install the seal sleeve on one end of the splice assembly. Refer to Figure 95.



POSITION OF THE SEAL SLEEVE
Figure 95

- (a) Push the sleeve to the center of the splice until the forward edge of the sleeve makes an overlap with the end of the shield splice sleeve.
- (b) Shrink sleeve into its position.
- (24) Do Step (23) again for the other end of the splice assembly.
- (25) Align the center of the protection sleeve with the center of the solder shield splice sleeve. Refer to Figure 96.



POSITION OF THE PROTECTION SLEEVE
Figure 96

- (26) Shrink the protection sleeve into its position:
 - (a) Apply heat from the center of the sleeve to one end of the sleeve.
 - (b) Apply heat from the center of the sleeve to the other end of the sleeve.

9. REPAIR OF THE STUB CABLE ASSEMBLY

A. Replacement of the Protective Sleeve on a S280W603() Backshell Assembly

Table 44
NECESSARY MATERIALS

Material	Part Number or Specification	Size	Supplier
Heat Shrinkable Sleeve	DR-25	-	Raychem
	MIL-DTL-23053/16	-	QPL

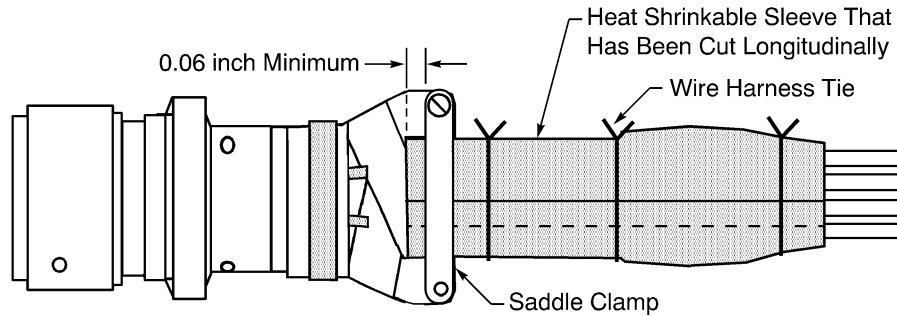
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ARINC 629 WIRING

- (1) Remove the heat shrinkable sleeve from the cable assembly.
- (2) Remove the saddle clamp from the connector.
- (3) If it is necessary to replace the heat shrinkable sleeve, make a selection of a 4.00 inch \pm 0.25 inch length of sleeve from Table 44.

Make sure that the sleeve has sufficient diameter that it can make a 0.5 inch overlap with its self when it is cut longitudinally. Refer to Figure 97.



LOCATION OF THE WIRE HARNESS TIES ON THE SLEEVE
Figure 97

- (4) Cut the sleeve along the longitudinal axis of the sleeve.
- (5) Put the sleeve on the shield tape.
 Make sure that the sleeve makes a tight fit on the cable assembly.
- (6) Assemble three lacing tape wire harness ties on the sleeve. Refer to Subject 20-10-11.

Put one wire harness tie at:

- Each end of the sleeve
- The center of the sleeve.

Make sure that:

- The color of the lacing tape is yellow
- The lacing tape has a Temperature Grade and a Class that are applicable for the cable.

CAUTION: A PLASTIC TIE STRAP MUST NOT BE USED. DAMAGE TO THE INSULATION OF THE DATA BUS CABLE CAN OCCUR.

- (7) Assemble the saddle clamp.

10. APPROVED TOOL SUPPLIERS

A. Tool Suppliers

Table 45
APPROVED TOOL SUPPLIERS

Tool	Supplier
13300	Thomas&Betts
401K	Thomas&Betts
49935	AMP

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Table 45 (continued)

Tool	Supplier
76-101	Balmar
AD-1377	Raychem
CV-5000 Model 500	Raychem
CV-5000 Model 750	Raychem
CV-5300	Raychem
MG-1	Raychem
ST959A	Boeing
ST956C	Boeing
ST956D	Boeing
TG-135	Raychem
TG-33	Raychem
TG-70	Glenair
WST8139	Raychem
WT740	Thomas&Betts

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S280W701-() FIBER OPTIC CABLE ASSEMBLIES

This Subject gives the procedures to disassemble, disconnect, assemble, and install Boeing S280W701-() fiber optic cable assemblies.

1. PART NUMBERS AND DESCRIPTION

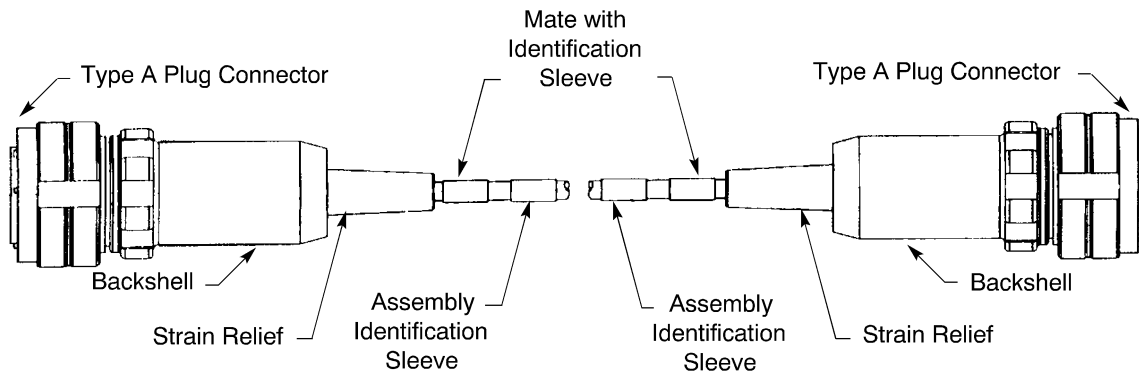
A. Fiber Optic Cable Assembly Part Numbers

The configurations of the S280W701-() fiber optic cable assembly are:

- The trunk cable; refer to Table 1 and Figure 1
- The stub cable; refer to Table 2 and Figure 2
- The gatelink cable; refer to Table 3 and Figure 3
- The gatelink inline cable; refer to Table 3 and Figure 4.

**Table 1
3-CHANNEL TRUNK CABLE ASSEMBLY PART NUMBERS**

Boeing Specification	Length (inch)		Connectors	
	Minimum	Maximum	First End	Second End
S280W701-101	202.0	214.0	S280W701-602	S280W701-601
S280W701-102	434.0	446.0	S280W701-601	S280W701-602
S280W701-114	480.0	492.0	S280W701-601	S280W701-602
S280W701-115	860.0	877.0	S280W701-602	S280W701-601



**S280W701-() TRUNK CABLE ASSEMBLY
Figure 1**

**Table 2
5-CHANNEL STUB CABLE ASSEMBLY PART NUMBERS**

Boeing Specification	Length (inch)		Connectors	
	Minimum	Maximum	First End	Second End
S280W701-106	170.0	182.0	S280W701-613	S280W701-641
S280W701-107	114.0	126.0	S280W701-613	S280W701-641

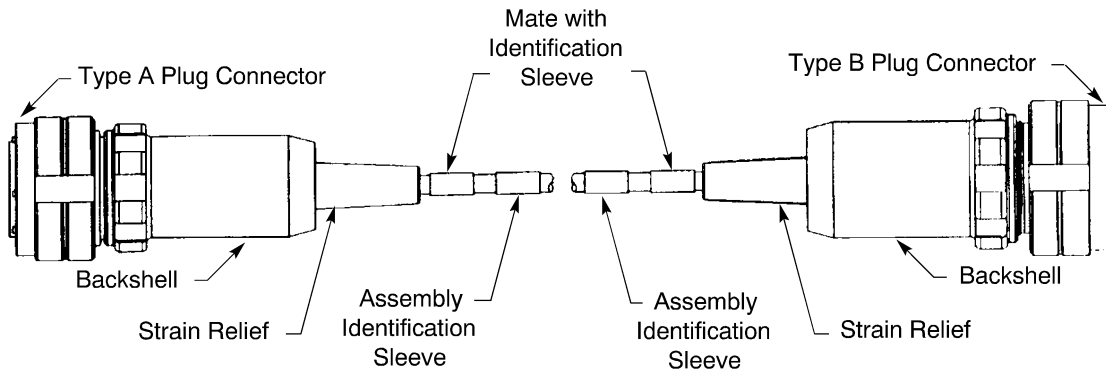
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S280W701-() FIBER OPTIC CABLE ASSEMBLIES

Table 2 (continued)

Boeing Specification	Length (inch)		Connectors	
	Minimum	Maximum	First End	Second End
S280W701-108	100.0	112.0	S280W701-614	S280W701-641
S280W701-110	496.0	508.0	S280W701-615	S280W701-641
S280W701-111	614.0	626.0	S280W701-615	S280W701-643
S280W701-116	70.0	82.0	S280W701-613	S280W701-641
S280W701-117	100.0	112.0	S280W701-614	S280W701-641
S280W701-118	890.0	902.0	S280W701-613	S280W701-641
S280W701-112	1110.0	1132.0	S280W701-615	S280W701-643
S280W701-113	460.0	472.0	S280W701-614	S280W701-641
S280W701-122	258.0	270.0	S280W701-616	S280W701-641
S280W701-123	232.0	243.0	S280W701-616	S280W701-641
S280W701-124	172.0	184.0	S280W701-614	S280W701-641



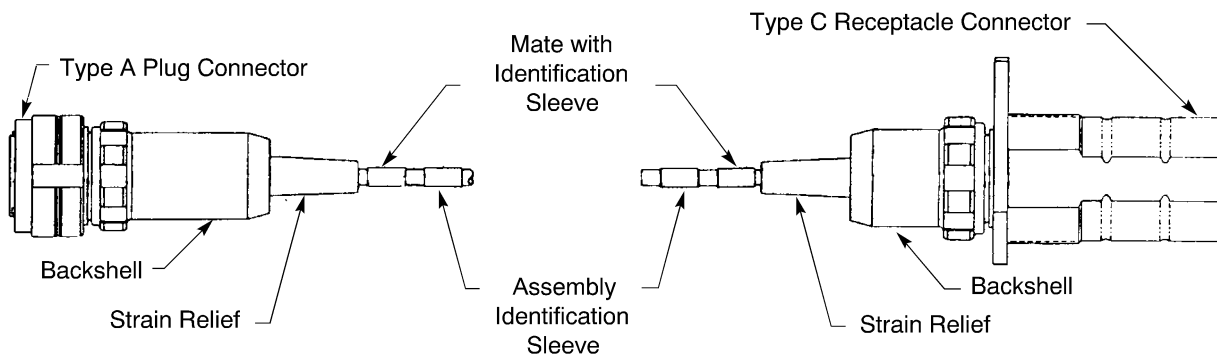
S280W701-() STUB CABLE ASSEMBLY
Figure 2

Table 3
5-CHANNEL GATELINK CABLE ASSEMBLY PART NUMBERS

Boeing Specification	Length (inch)		Connectors	
	Minimum	Maximum	First End	Second End
S280W701-119	275.0	287.0	S280W701-642	S280W701-631
S280W701-120	30.0	36.0	S280W701-611	S280W701-661

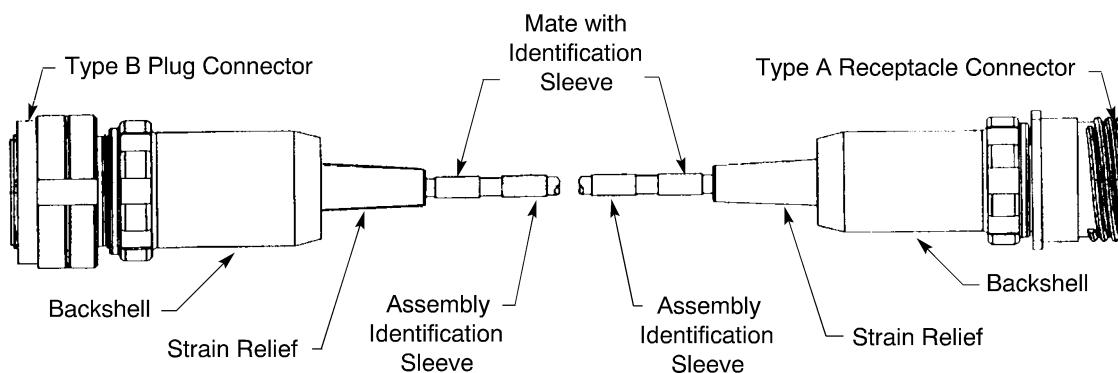
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S280W701-() FIBER OPTIC CABLE ASSEMBLIES



S280W701-() GATELINK CABLE ASSEMBLY

Figure 3



S280W701-() GATELINK INLINE CABLE ASSEMBLY

Figure 4

**Table 4
SUPPLIER PART NUMBERS FOR FIBER OPTIC CABLE ASSEMBLIES**

Boeing Specification	Part Number	Supplier
S280W701-101	140125-0000	ITT Cannon
S280W701-102	140125-0001	ITT Cannon
S280W701-106	140127-0003	ITT Cannon
S280W701-107	140127-0004	ITT Cannon
S280W701-108	140127-0005	ITT Cannon
S280W701-110	140127-0006	ITT Cannon
S280W701-111	140127-0007	ITT Cannon
S280W701-112	140127-0011	ITT Cannon
S280W701-113	140127-0012	ITT Cannon
S280W701-114	140125-0002	ITT Cannon
S280W701-115	140125-0003	ITT Cannon

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S280W701-() FIBER OPTIC CABLE ASSEMBLIES

Table 4 (continued)

Boeing Specification	Part Number	Supplier
S280W701-116	140127-0008	ITT Cannon
S280W701-117	140127-0009	ITT Cannon
S280W701-118	140127-0010	ITT Cannon
S280W701-119	140126-0002	ITT Cannon
S280W701-120	140126-0003	ITT Cannon
S280W701-122	140127-0020	ITT Cannon
S280W701-123	140127-0021	ITT Cannon
S280W701-124	140127-0022	ITT Cannon

B. Fiber Optic Connector Part Numbers

The S280W701-() fiber optic cable assemblies have these types of connectors:

- Type A; refer to Figure 5
- Type B; refer to Figure 6
- Type C; refer to Figure 7.

**Table 5
FIBER OPTIC CONNECTOR PART NUMBERS**

Boeing Specification	Connector Type	Number of Channels	Polarization
S280W701-601	Type A Plug	3	N
S280W701-602	Type A Plug	3	A
S280W701-611	Type A Plug	5	N
S280W701-613	Type A Plug	5	B
S280W701-614	Type A Plug	5	C
S280W701-615	Type A Plug	5	D
S280W701-616	Type A Plug	5	E
S280W701-631	Type A Receptacle	5	N
S280W701-641	Type B Plug	5	N
S280W701-642	Type B Plug	5	A
S280W701-643	Type B Plug	5	B
S280W701-661	Type C Receptacle	5	-



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S280W701-() FIBER OPTIC CABLE ASSEMBLIES

Table 6
SUPPLIER PART NUMBERS FOR FIBER OPTIC CONNECTORS

Boeing Specification	Part Number	Supplier
S280W701-601	140124-0022	ITT Cannon
S280W701-602	140124-0032	ITT Cannon
S280W701-611	140124-0024	ITT Cannon
S280W701-613	140124-0039	ITT Cannon
S280W701-614	140124-0040	ITT Cannon
S280W701-615	140124-0041	ITT Cannon
S280W701-616	140124-0042	ITT Cannon
S280W701-631	140124-0028	ITT Cannon
S280W701-641	140143-0000	ITT Cannon
S280W701-642	140143-0007	ITT Cannon
S280W701-643	140143-0008	ITT Cannon
S280W701-661	140126-0005	ITT Cannon

Table 7
DUST CAPS PART NUMBERS

Connector	Shell Size	Part Number	Supplier
Plug, Threaded	17	204-9520-000	ITT Cannon
	19	204-9520-001	ITT Cannon
Receptacle, Threaded	17	204-9519-000	ITT Cannon
	19	204-9519-001	ITT Cannon

NOTE: A MIL-C-38999 Series III style dust cap is an acceptable alternative to a 024-95() dust cap. These dust caps do not have threads.

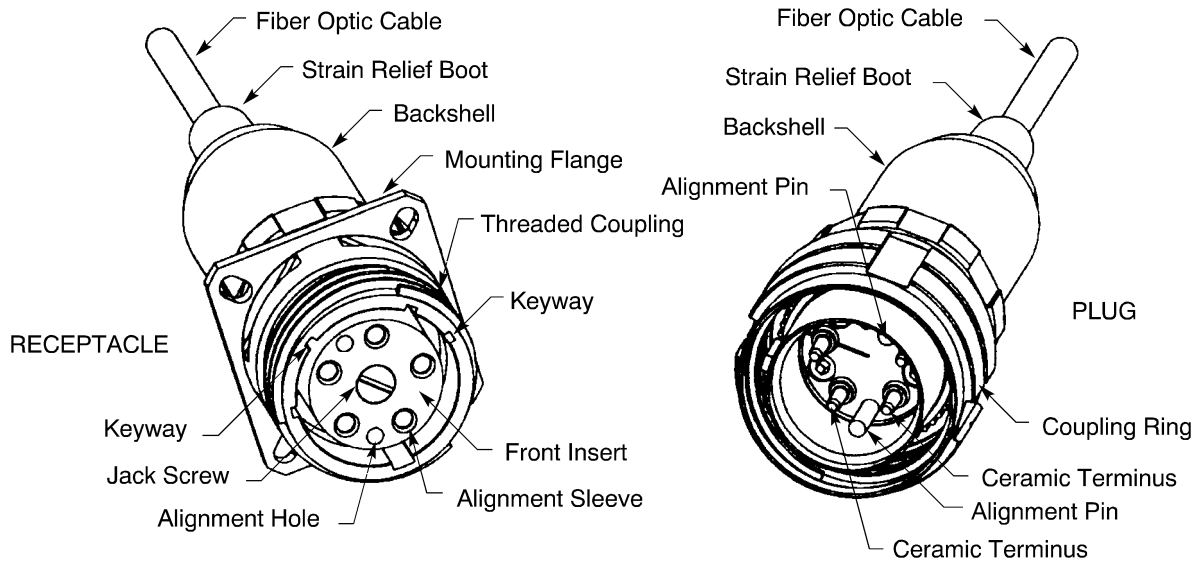
A Type A connector has these technical qualities:

- A threaded coupling mechanism
- A butt type connector with ceramic terminuses
- The transmission of a light beam from the end of one optical fiber into the end of another optical fiber.

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S280W701-() FIBER OPTIC CABLE ASSEMBLIES

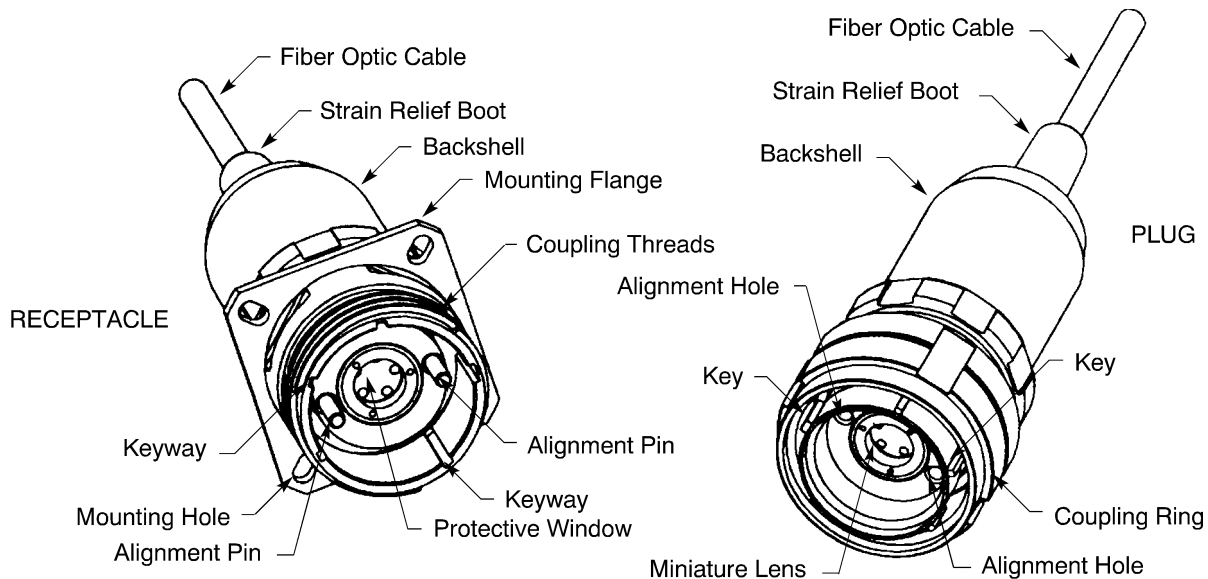


TYPE A RECEPTACLE AND PLUG CONNECTORS

Figure 5

A Type B connector has these technical qualities:

- A threaded coupling mechanism
- An expanded beam connector that has a miniature lens behind a protective window
- The transmission of a light beam by the miniature lens from an optical fiber through the protective windows to the opposite miniature lens into the opposite optical fiber.



TYPE B RECEPTACLE AND PLUG CONNECTORS

Figure 6

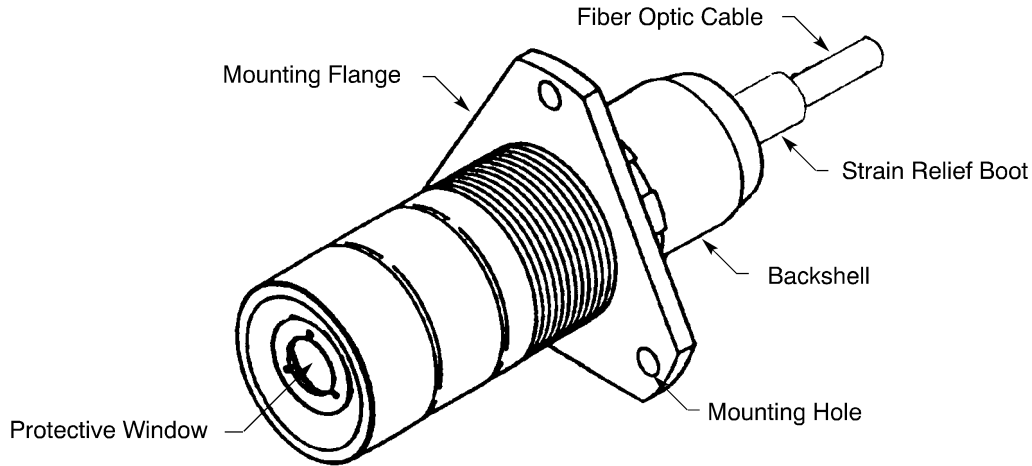
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S280W701-() FIBER OPTIC CABLE ASSEMBLIES

A Type C connector has these technical qualities:

- A push-pull coupling mechanism
- An expanded beam connector that contains a miniature lens behind a protective window
- The transmission of a light beam by the miniature lens from an optical fiber through the protective windows to the opposite miniature lens into the opposite optical fiber.



TYPE C RECEPTACLE CONNECTOR

Figure 7

C. Necessary Tools

**Table 8
NECESSARY TOOLS**

Tool	Part Number	Supplier
Adapter, Connector, Shell Size 17	CM-389TR-17	Daniels
Adapter, Connector, Shell Size 19	CM-389TR-19	Daniels
Allen Wrench, Ball Point	5/64 inch	Any source
Flashlight, LED	720	Edmund Scientific
	A38	Edmund Scientific
Insertion Tool, Lens	600135	ITT Cannon
Microscope, Connector Inspection	320-7037-000	ITT Cannon
Microscope, Test Equipment Inspection	OFS-300	Noyes
Removal Tool, Connector	BT-ST-701	Daniels
Removal Tool, Protective Glass	Pen Vac 847PR010	Techni-Tool
Retainer Ring Tool	323-7519-000	ITT Cannon
Trigger Assembly	ES710V	Chemtronics
Tweezers, Plastic	758TW064	Techni-Tool

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S280W701-() FIBER OPTIC CABLE ASSEMBLIES

D. Necessary Materials

**Table 9
NECESSARY MATERIALS**

Material	Part Number	Supplier
Dry Wipe	805	Berkshire, Surex
Finger Cots	Commercial	Commercial source
Swab	TX785B	Texwipe
Swab, Foam	740	Texwipe
Swab, Polyester Woven	762	Texwipe
Swab, Tapered	LT001163	Berkshire, Surex
Tape, Fiberglass, 1 inch	P212	Permacel
	P213	Permacel
Tape, Polyester	850	3M

**Table 10
NECESSARY MATERIALS FOR REPAIR AND CLEANING OF AN FIBER OPTIC CONNECTOR**

Material	Part Number	Supplier
Canned Air	ES1020	Chemtronics
Alcohol, Ethyl	O-E-760	QPL
Alcohol, Isopropyl	MIL-F-5566	QPL
Lubricant	RTV 160	GE
	Super-O-lube	Parker
Thread Lock	410	Loctite
	222	Loctite

2. REMOVAL OF A FIBER OPTIC CABLE ASSEMBLY

A. General Instructions

WARNING: IF THE EQUIPMENT IS ENERGIZED, THE INVISIBLE LIGHT FROM AN OPTICAL FIBER CAN BE SUFFICIENTLY INTENSE TO CAUSE DAMAGE TO THE EYES. BEFORE THE FACE OF THE CONNECTOR OR THE TERMINUSES ARE EXAMINED, EITHER OF THESE CONDITIONS MUST OCCUR:

- THE CONNECTORS MUST BE DISCONNECTED FROM THE EQUIPMENT AT BOTH ENDS OF THE CABLE ASSEMBLY
- THE POWER TO THE EQUIPMENT MUST BE SET TO THE OFF CONDITION.

(1) Set the power to all the interface equipment to the off condition.

B. Separation of Type A or Type B Plugs and Receptacles

(1) Turn the coupling ring of the plug counterclockwise until it is disengaged from the threads of the receptacle.

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STANDARD WIRING PRACTICES MANUAL**S280W701-() FIBER OPTIC CABLE ASSEMBLIES**

- (2) Carefully pull the plug from the receptacle.
Make sure that the plug and the receptacle stay axially aligned during the separation.
- (3) Put a dust cap or a plastic bag over the plug and the receptacle.

C. Separation of a Type C Receptacle from a Plug

- (1) Carefully pull the plug straight from the receptacle.
Make sure that the plug and the receptacle stay axially aligned during the separation.

CAUTION: DO NOT PULL THE FIBER OPTIC CABLE. DAMAGE TO THE CABLE OR THE CONNECTOR, OR BOTH CAN OCCUR.

- (2) Examine the dust caps on both the plug and the receptacle.
Make sure that the dust caps return to the closed position.

D. Removal of a Fiber Optic Cable Assembly

- (1) Disconnect the connectors from the equipment. Refer to Paragraph 2.B. and Paragraph 2.C.
- (2) Carefully cut the plastic tie straps on the cable clamps.
- (3) If it is necessary, remove:
 - The raceway clamps
 - The cable from the elastomeric inserts.
- (4) Remove the cable from the clamps.
Make sure that the bend radius of the cable is always more than 1.5 inches.

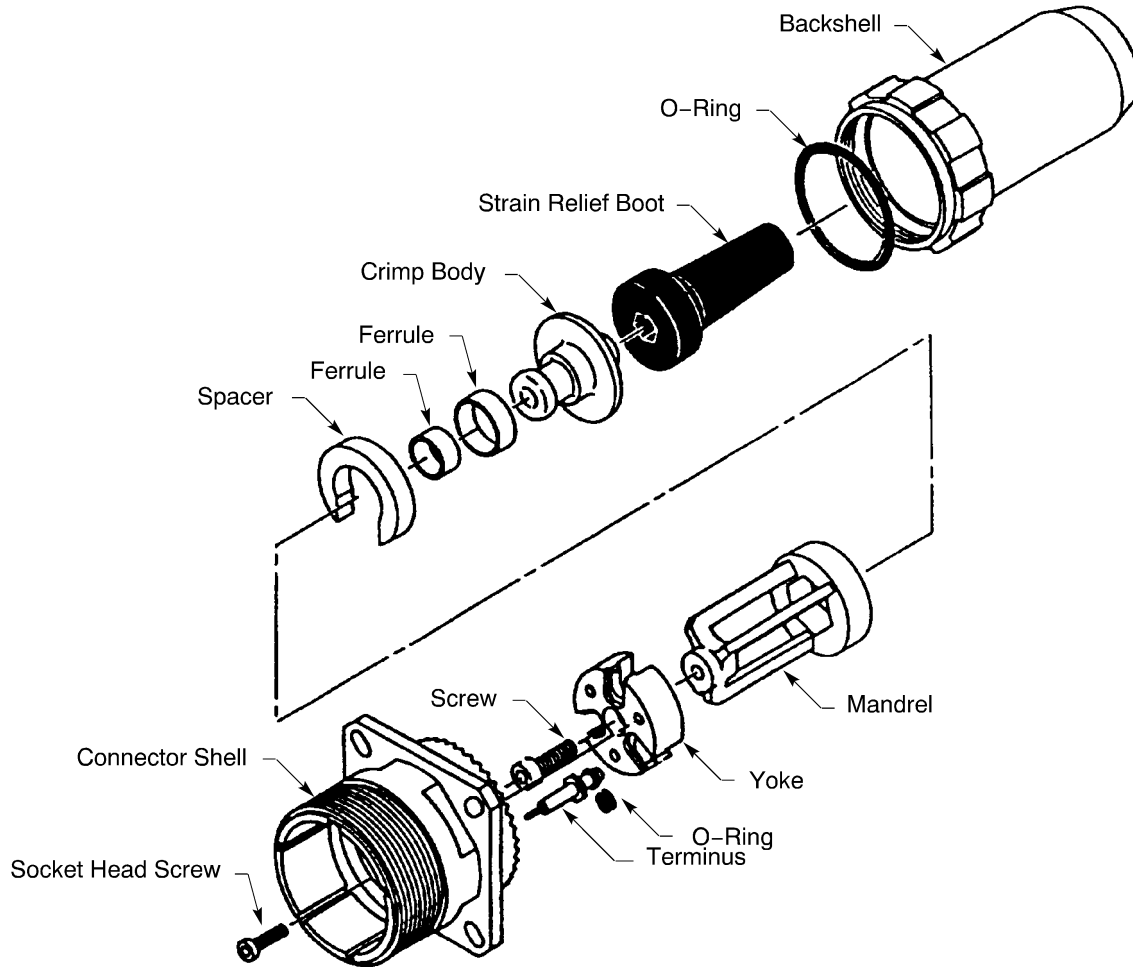
3. FIBER OPTIC CONNECTOR DISASSEMBLY**A. General Instructions**

- (1) Put the finger cots on before any disassembly work is done.
- (2) During the connector disassembly, make sure that:
 - The bend radius of any optical fiber is always more than 0.5 inch
 - The bend radius of the optical cable is always more than 1.5 inches.
- (3) Remove the fiber optic cable assembly. Refer to Paragraph 2.

STANDARD WIRING PRACTICES MANUAL

S280W701-() FIBER OPTIC CABLE ASSEMBLIES

B. Disassembly of a Type A Plug Connector



COMPONENTS OF THE TYPE A PLUG CONNECTOR
Figure 8

Refer to Figure 8.

- (1) Make a selection of a connector adapter and a backshell removal tool from Table 8.

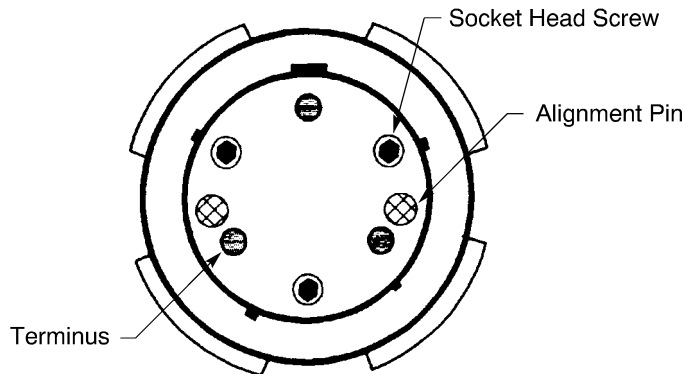
NOTE: A vise and a connector adapter are satisfactory alternatives for the Daniels tools.

- (2) Put the adapter in the backshell removal tool.
- (3) Put the connector in the connector adapter.
- (4) With a syringe, put small quantity isopropyl alcohol into the area between the rear of the backshell and the strain relief boot as a lubricant.
- (5) Manually hold the strain relief boot and the cable.
- (6) Push the strain relief boot and the cable against the connector.

STANDARD WIRING PRACTICES MANUAL**S280W701-() FIBER OPTIC CABLE ASSEMBLIES**

CAUTION: DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS LOOSENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

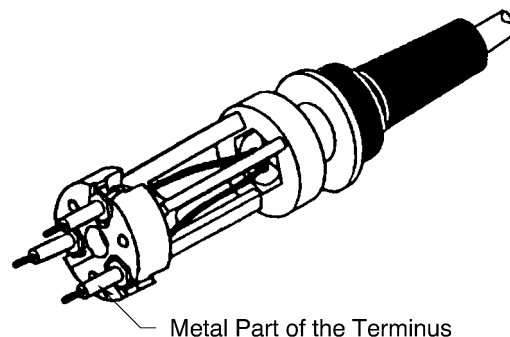
- (7) Loosen the backshell with a pair of adjustable, soft jaw pliers.
- (8) Move the backshell and the backshell O-ring away from the connector.
- (9) Remove the spacer from the mandrel.
- (10) Remove the three socket head screws, that attach the yoke to the connector shell, with an allen wrench. Refer to Figure 9.

**SOCKET HEAD SCREW REMOVAL****Figure 9**

- (11) Carefully pull the plug assembly from of the connector shell.

CAUTION: DO NOT APPLY TOO MUCH PRESSURE ON THE CRIMP BODY AS THE TERMINUSES ARE REMOVED FROM THE MANDREL AND THE YOKE. DAMAGE TO THE OPTICAL FIBERS CAN OCCUR.

- (12) Push the crimp body against the mandrel so that the tension on the optical fibers is released.
- (13) Put the jaws of the plastic pliers on the metal part of the terminus. Refer to Figure 10.

**LOCATION OF THE JAWS OF THE PLASTIC PLIERS ON THE TERMINUS****Figure 10**

- (14) Carefully pull each terminus sideways out of the channel of the yoke.

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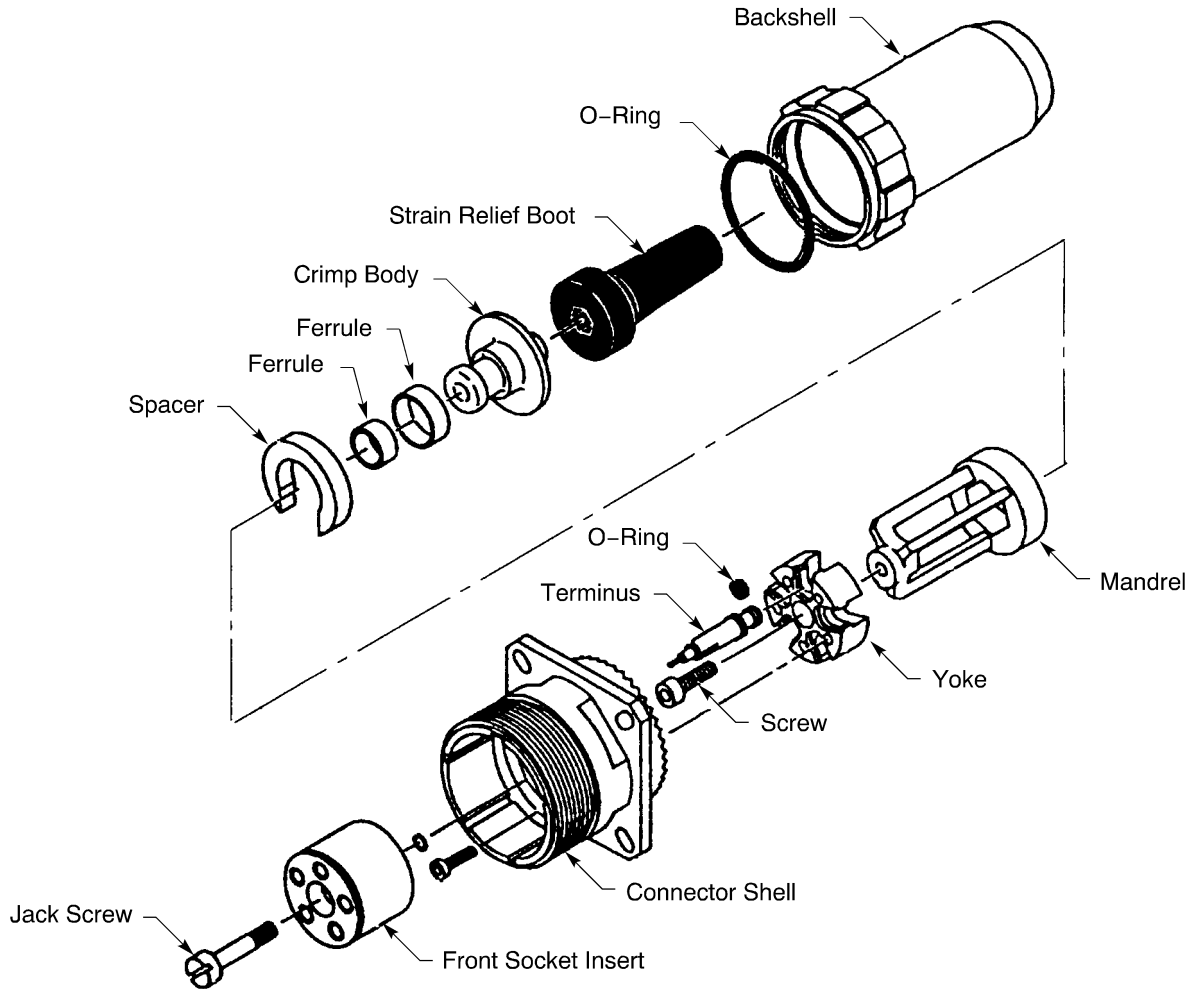
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- (15) Remove the yoke and the mandrel from the cable.
- (16) If it is necessary, remove the socket head screw that attaches the yoke to the mandrel.

CAUTION: THERE IS LOCTITE ADHESIVE BETWEEN THE SURFACES OF THE YOKE AND THE MANDREL. THE YOKE AND THE MANDREL MUST BE SEPARATED CAREFULLY TO PREVENT ANY DAMAGE.

C. Disassembly of a Type A Receptacle Connector



COMPONENTS OF THE TYPE A RECEPTACLE CONNECTOR

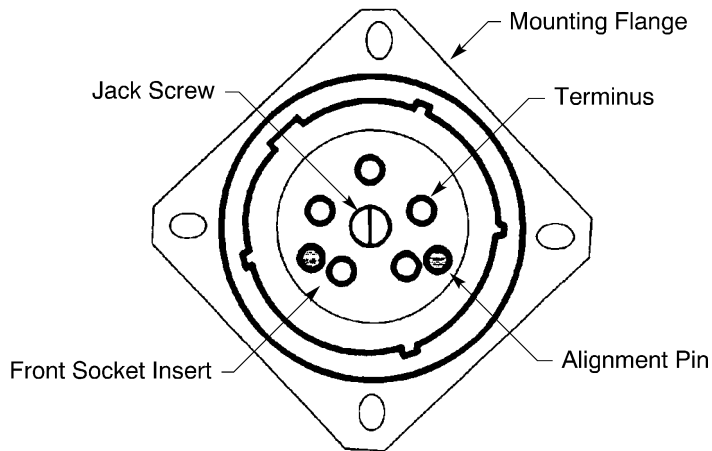
Figure 11

Refer to Figure 11.

- (1) Turn the jack screw in the center of the front socket insert counterclockwise until it is free from the threads in the connector shell. Refer to Figure 12.

STANDARD WIRING PRACTICES MANUAL

S280W701-() FIBER OPTIC CABLE ASSEMBLIES



JACK SCREW REMOVAL

Figure 12

- (2) Carefully pull the insert straight out of the connector shell.
Make sure that the retainer ring and the jack screw are not removed from the insert.
- (3) Make a selection of a connector adapter and a backshell removal tool from Table 8.
NOTE: A vise and a connector adapter are satisfactory alternatives for the Daniels tools.
- (4) Put the connector adapter in the backshell removal tool.
- (5) Put the connector in the connector adapter.
- (6) With a syringe, put small quantity isopropyl alcohol into the area between the rear of the backshell and the strain relief boot as a lubricant.
- (7) Manually hold the strain relief boot and the cable.
- (8) Push the strain relief boot and the cable against the connector.
- (9) Loosen the backshell with a pair of adjustable, soft jaw pliers.

CAUTION: DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS LOOSENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

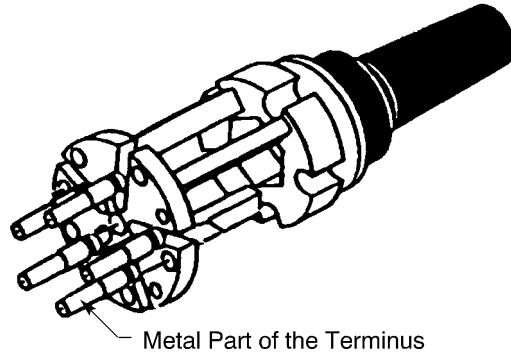
- (10) Move the backshell and the backshell O-ring away from the connector.
- (11) Remove the spacer from the mandrel.
- (12) Remove the three socket head screws, that attach the yoke to the connector, with an allen wrench.
- (13) Carefully pull the receptacle assembly from the connector shell.

CAUTION: DO NOT APPLY TOO MUCH PRESSURE ON THE CRIMP BODY AS THE TERMINUSES ARE REMOVED FROM THE MANDREL AND THE YOKE. DAMAGE TO THE OPTICAL FIBERS CAN OCCUR.

- (14) Push the crimp body against the mandrel so that the tension on the optical fibers is released.
- (15) Put the jaws of the plastic pliers on the metal part of the terminus. Refer to Figure 13.

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S280W701-() FIBER OPTIC CABLE ASSEMBLIES



LOCATION OF THE JAWS OF THE PLASTIC PLIERS ON THE TERMINUS
Figure 13

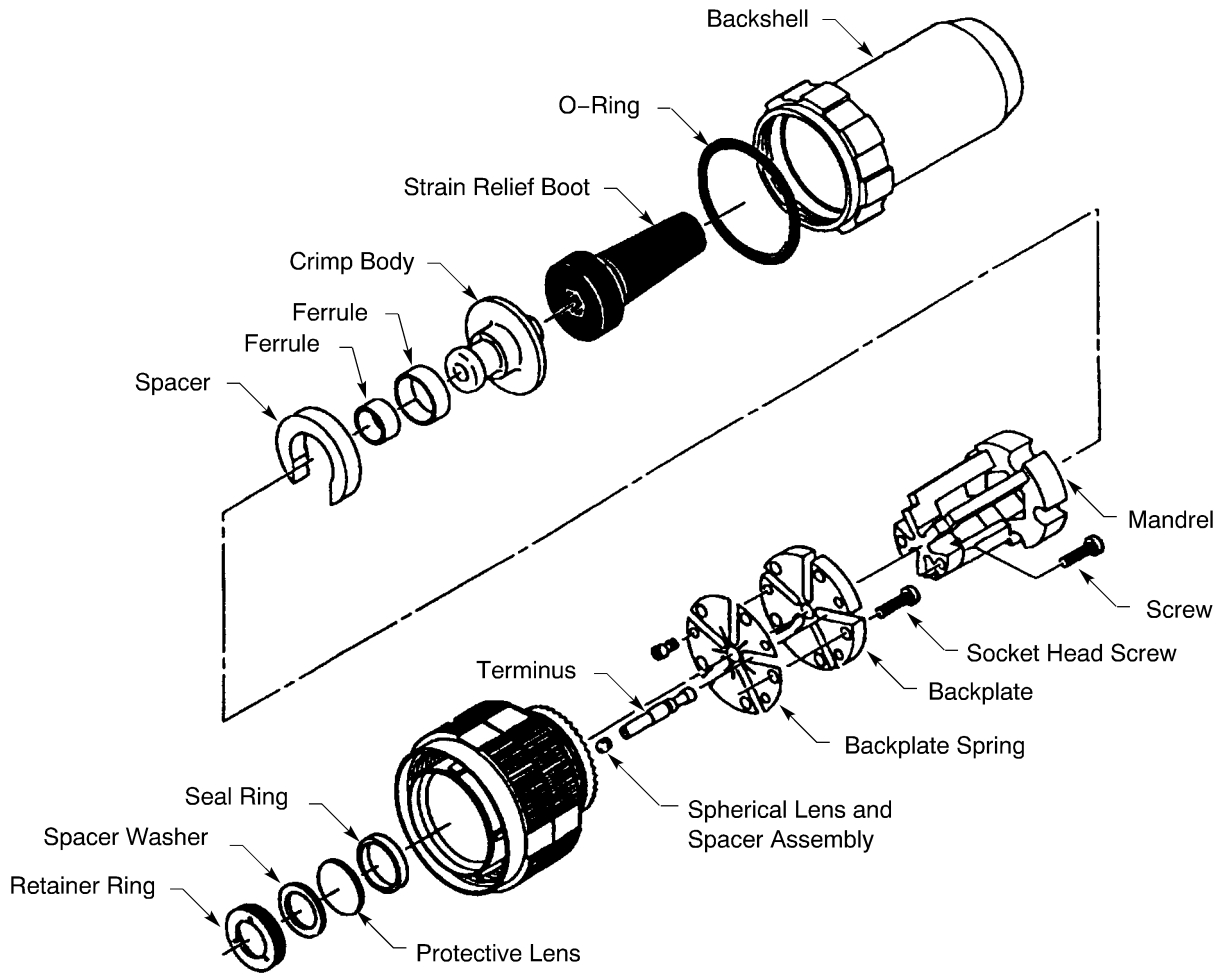
- (16) Carefully pull each terminus sideways out of the channel of the yoke.
- (17) Remove the yoke and the mandrel from the cable.
- (18) If it is necessary, remove the socket head screw that attaches the yoke to the mandrel.

CAUTION: THERE IS LOCTITE ADHESIVE BETWEEN THE SURFACES OF THE YOKE AND THE MANDREL. THE YOKE AND THE MANDREL MUST BE SEPARATED CAREFULLY TO PREVENT ANY DAMAGE.

STANDARD WIRING PRACTICES MANUAL

S280W701-() FIBER OPTIC CABLE ASSEMBLIES

D. Disassembly of a Type B Plug Connector



COMPONENTS OF THE TYPE B PLUG CONNECTOR

Figure 14

Refer to Figure 14.

- (1) Make a selection of a connector adapter and a backshell removal tool from Table 8.

NOTE: A vise and a connector adapter are satisfactory alternatives for the Daniels tools.

- (2) Put the connector adapter in the backshell removal tool.
- (3) Put the connector in the connector adapter.
- (4) With a syringe, put small quantity isopropyl alcohol into the area between the rear of the backshell and the strain relief boot as a lubricant.
- (5) Manually hold the strain relief boot and the cable.
- (6) Push the strain relief boot and the cable against the connector.
- (7) Loosen the backshell with a pair of adjustable, soft jaw pliers.

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CAUTION: DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS LOOSENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

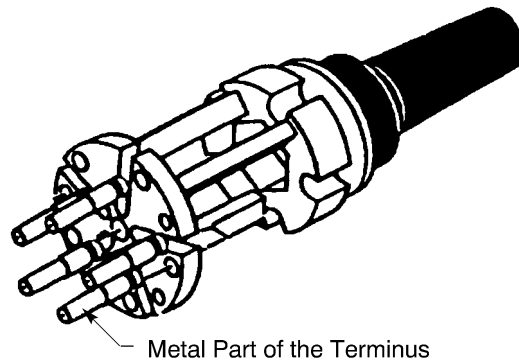
- (8) Move the backshell and the backshell O-ring away from the connector.
- (9) Remove the spacer from the mandrel.

CAUTION: TO PREVENT DAMAGE TO THE CONNECTOR ASSEMBLY, DO NOT REMOVE THE TWO SOCKET HEAD SCREWS THAT ATTACH THE BACKPLATE ASSEMBLY TO THE MANDREL.

- (10) Remove the three socket head screws, that attach the backplate to the connector shell, with an allen wrench.
- (11) Carefully pull the mandrel, the backplate, and the terminuses from of the connector insert.

CAUTION: DO NOT APPLY TOO MUCH PRESSURE ON THE CRIMP BODY AS THE TERMINUSES ARE REMOVED FROM THE MANDREL AND THE YOKE. DAMAGE TO THE OPTICAL FIBERS CAN OCCUR.

- (12) Push the crimp body against the mandrel so that the tension on the optical fibers is released.
- (13) Put the jaws of the plastic pliers on the metal part of the terminus.



LOCATION OF THE JAWS OF THE PLASTIC PLIERS ON THE TERMINUS
Figure 15

- (14) Carefully pull each terminus sideways out of the channel of the backplate.
- (15) Remove the backplate and the mandrel from the cable.
- (16) Examine the backplate spring.
- (17) If there is a crack or a bent edge on the backplate spring:
 - (a) Remove the three screws.
 - (b) Replace the backplate spring.
- (18) If it is necessary, remove the screws that attach the backplate to the mandrel.

CAUTION: THERE IS LOCTITE ADHESIVE BETWEEN THE SURFACES OF THE BACKPLATE AND THE MANDREL. THE BACKPLATE AND THE MANDREL MUST BE SEPARATED CAREFULLY TO PREVENT ANY DAMAGE.

- (19) If more disassembly is necessary:

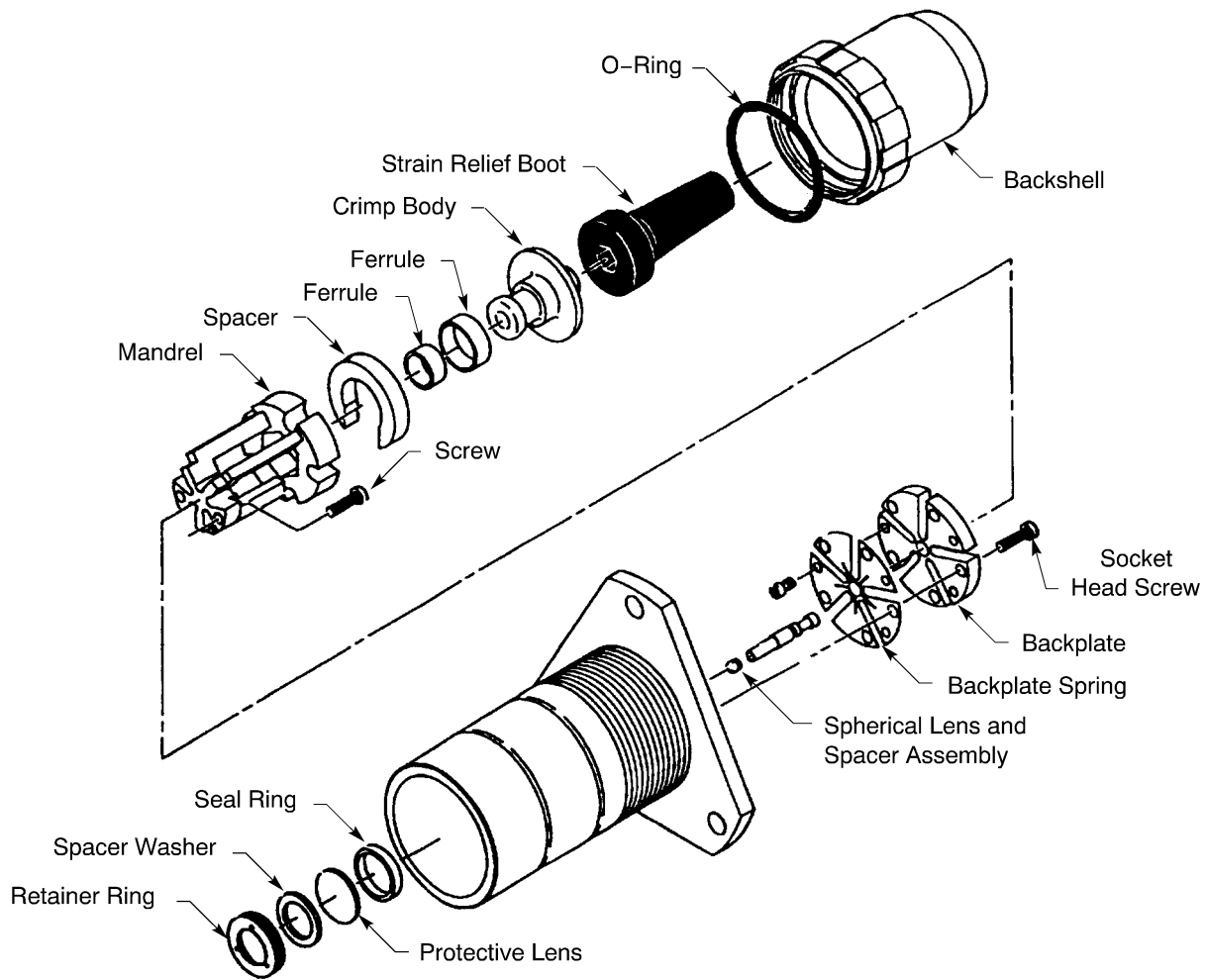
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- (a) Make a selection of necessary tools from Table 8.
- (b) Remove the retainer ring with a retainer ring tool.
- (c) Remove the seal ring with a pair of plastic tweezers.
- (d) Remove the protective glass with a pen vacuum.
- (e) Push the spherical lens and the spacer assemblies from the connector insert with a 0.125 inch diameter, cone shaped plastic rod or an equivalent plastic tool.

E. Disassembly of a Type C Receptacle Connector



COMPONENTS OF THE TYPE C RECEPTACLE CONNECTOR

Figure 16

Refer to Figure 16.

- (1) Make a selection of a connector adapter and a backshell removal tool from Table 8.

NOTE: A vise and a connector adapter are satisfactory alternatives for the Daniels tools.

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- (2) Put the connector adapter in the backshell removal tool.
- (3) Put the connector in the connector adapter.
- (4) With a syringe, put small quantity isopropyl alcohol into the area between the rear of the backshell and the strain relief boot as a lubricant.
- (5) Manually hold the strain relief boot and the cable.
- (6) Push the strain relief boot and the cable against the connector.
- (7) Loosen the backshell with a pair of adjustable, soft jaw pliers.

CAUTION: DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS LOOSENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

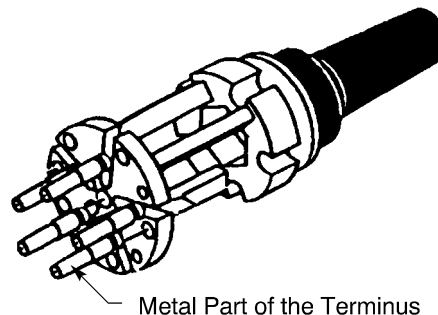
- (8) Move backshell and the backshell O-ring away from the connector.
- (9) Remove the spacer from the mandrel.

CAUTION: TO PREVENT DAMAGE TO THE CONNECTOR ASSEMBLY, DO NOT REMOVE THE TWO SOCKET HEAD SCREWS THAT ATTACH THE BACKPLATE ASSEMBLY TO THE MANDREL.

- (10) Remove the three socket head screws, that attach the mandrel and the backplate assembly to the connector insert, with an allen wrench.
- (11) Carefully pull the mandrel, the backplate, and the terminuses from of the connector insert.

CAUTION: DO NOT APPLY TOO MUCH PRESSURE ON THE CRIMP BODY AS THE TERMINUSES ARE REMOVED FROM THE MANDREL AND THE YOKE. DAMAGE TO THE OPTICAL FIBERS CAN OCCUR.

- (12) Push the crimp body against the mandrel so that the tension on the optical fibers is released.
- (13) Put the jaws of the plastic pliers on the metal part of the terminus.

**LOCATION OF THE JAWS OF THE PLASTIC PLIERS ON THE TERMINUS****Figure 17**

- (14) Carefully pull each terminus sideways out of the channel of the backplate.
- (15) Remove the backplate and the mandrel from the cable.
- (16) Examine the backplate spring.
- (17) If there is a crack or a bent edge on the backplate spring:
 - (a) Remove the three screws.

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- (b) Replace the backplate spring.
- (18) If it is necessary, remove the screws that attach the backplate to the mandrel.

CAUTION: THERE IS LOCTITE ADHESIVE BETWEEN THE SURFACES OF THE BACKPLATE AND THE MANDREL. THE BACKPLATE AND THE MANDREL MUST BE SEPARATED CAREFULLY TO PREVENT ANY DAMAGE.

- (19) If more disassembly is necessary:
 - (a) Make a selection of necessary tools from Table 8.
 - (b) Remove the retainer ring with a retainer ring tool.
 - (c) Remove the seal ring with a pair of plastic tweezers.
 - (d) Remove the protective glass with a pen vacuum.
 - (e) Push the spherical lens and the spacer assemblies from the connector insert with a 0.125 inch diameter, cone shaped plastic rod or an equivalent plastic tool.

4. FIBER OPTIC CONNECTOR ASSEMBLY**A. Assembly of a Type A Plug or Receptacle Connector**

Refer to:

- Figure 8 for the Type A plug connector
- Figure 11 for the Type A receptacle connector.

- (1) Assemble the yoke and mandrel:
 - (a) If it is necessary, install one O-Ring on each terminus.
Make sure that the O-Ring does not have any cracks or contamination.
 - (b) Clean the yoke and the mandrel with isopropyl alcohol.
 - (c) Let the yoke and the mandrel fully dry.
 - (d) Apply a layer of Loctite 410 on the surfaces of the yoke and the mandrel that make an interface.
 - (e) Put the yoke on the mandrel.
 - (f) Put a small quantity of Loctite 222 on the threads of the screws that attach the yoke to the mandrel.
 - (g) Tighten the screws.
- (2) Put each terminus through the hexagonal holes of the mandrel.
- (3) Put each terminus in the applicable channel of the yoke.

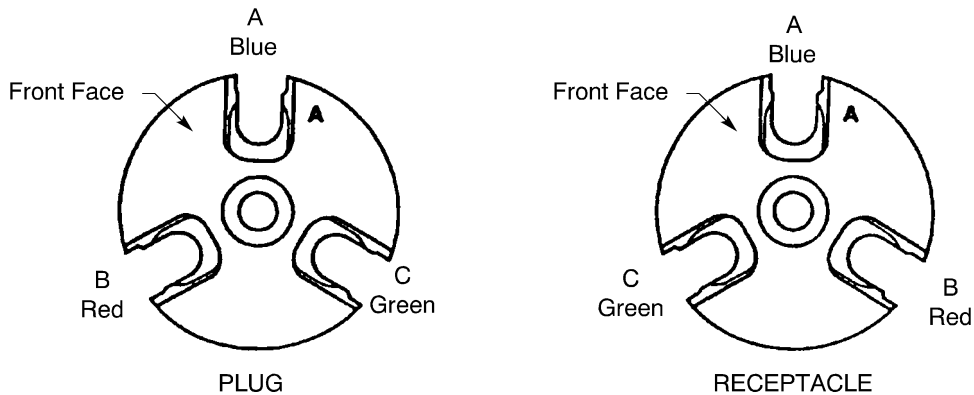
Make sure that the optical fibers do not make an overlap.

Refer to:

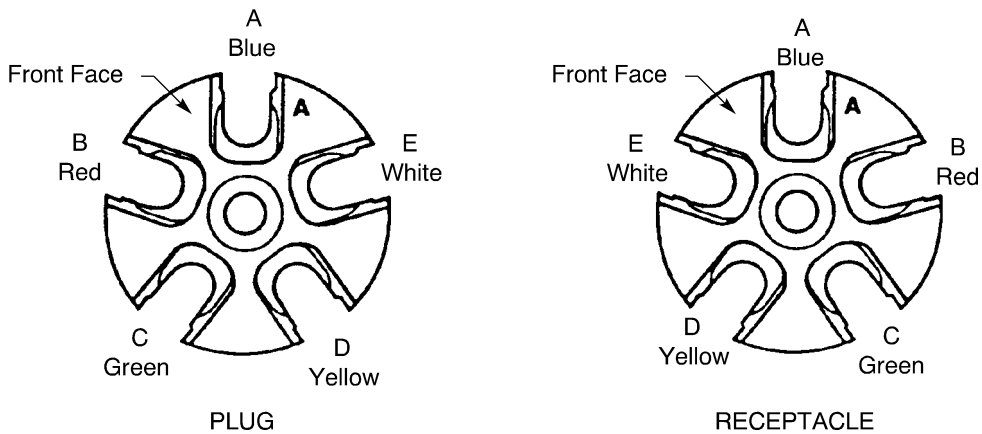
- Figure 18 for the position of the terminuses in a 3-channel yoke
- Figure 19 for the position of the terminuses in a 5-channel yoke.

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S280W701-() FIBER OPTIC CABLE ASSEMBLIES



POSITION OF THE TERMINUSES IN THE 3-CHANNEL YOKE
Figure 18



POSITION OF THE TERMINUSES IN THE 5-CHANNEL YOKE
Figure 19

- (4) Put a small quantity of silicone lubricant or isopropyl alcohol on the cable jacket near the crimp body.
- (5) Push the strain relief boot until it is against the shoulder of the crimp body.
- (6) Put the spacer between the shoulder of the crimp body and the mandrel.
- (7) Manually hold the mandrel.
- (8) Align the terminuses with the applicable holes in the connector shell.
 Make sure that the terminuses are in the correct holes.
- (9) Carefully push the terminuses and the yoke into the connector shell.
- (10) Install the socket head screw that attaches the yoke to the connector shell:
 - (a) Tighten the screw with an allen wrench.
 - (b) Torque the screw 5.0 inch-pounds \pm 0.1 inch-pound.
- (11) Assemble the backshell:

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- (a) Make a selection of a connector adapter and backshell removal tool from Table 8.

NOTE: A vise and a connector adapter are satisfactory alternatives for the Daniels tools.

- (b) Put the connector adapter in the backshell removal tool.
(c) Put the connector shell in the connector adapter.
(d) Push the strain relief boot and the cable against the connector.
(e) Manually tighten the backshell.

CAUTION: DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS TIGHTENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

- (f) Torque the backshell 70.0 inch-pounds \pm 5.0 inch-pounds.

- (12) If the connector is a Type A receptacle:

- (a) Align the holes of the front socket insert with the applicable terminuses.
(b) Carefully push the insert into the receptacle.

NOTE: If it is necessary, carefully turn the insert back and forth when it is pushed into the connector shell.

- (c) Engage the threads the jack screw and the connector shell.
(d) Torque the jack screw 5.0 inch-pounds \pm 0.1 inch-pound.

B. Assembly of a Type B Plug Connector or Type C Receptacle Connector

Refer to:

- Figure 14 for the Type B plug connector
- Figure 16 for the Type C receptacle connector.

- (1) Assemble the backplate, backplate spring, and mandrel:

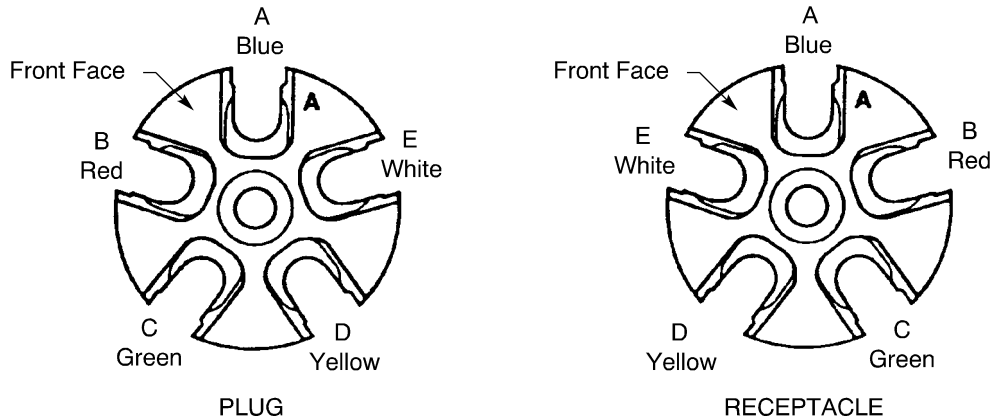
- (a) Install one O-ring on each terminus.
Make sure that the O-ring does not have any cracks or contamination.
- (b) Clean the backplate and the mandrel with isopropyl alcohol.
- (c) Let the backplate and the mandrel fully dry.
- (d) Apply a layer of Loctite 410 on the surfaces of the backplate and the mandrel that make an interface.
- (e) Put the backplate on the mandrel.
- (f) Put a small quantity of Loctite 222 on the threads of the socket head screws.
- (g) Torque each screw 10 ± 12 ounce-inches.
- (h) Examine the backplate spring.
- (i) If the backplate spring has a bent edge, a crack, or a burr on the edge, discard the spring and use one that does not have any damage.
- (j) Clean the three screws that attach the backplate spring to the backplate with isopropyl alcohol.
- (k) Align the three small holes in the backplate spring with the three threaded holes in the backplate.

NOTE: There is only one correct position for the backplate spring on the backplate.

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- (l) Put a small quantity of Loctite 222 on the threads of the screws.
- (m) Engage the threads of the three screws and the backplate spring.
- (n) Tighten the screws with a screw driver.
- (2) Put each terminus through the hexagonal holes of the mandrel.
- (3) Put each terminus in the applicable channel of the backplate. Refer to Figure 20. Make sure that the optical fibers do not make an overlap.



POSITION OF THE TERMINUSES IN THE 5-CHANNEL BACKPLATE

Figure 20

- (4) Put a small quantity of silicone lubricant or isopropyl alcohol on the cable jacket near the crimp body.
- (5) Push the strain relief boot until it is against the shoulder of the crimp body.
- (6) Put the spacer between the shoulder of the crimp body and the mandrel.
- (7) Examine all of the holes in the connector insert for contamination with a microscope.
- (8) If it is necessary, clean the connector insert. Refer to Paragraph 7.
- (9) Install each spherical lens and spacer assembly:
 - (a) Remove the lens and spacer from the storage container with a pair of plastic tweezers.

CAUTION: DO NOT TOUCH THE SPHERICAL LENS AND THE SPACER ASSEMBLY WITH THE FINGERS. THE FINGERS CAN MAKE SCRATCHES OR PUT CONTAMINATION ON THE LENS AND THE SPACER ASSEMBLY.

- (b) Put the lens and spacer in the lens insertion tool.
Make sure that the lens is put into the insertion tool first.
- (c) Hold the lens and spacer vertically.
- (d) Align the lens and spacer with the lens position in the connector shell.
- (e) Put the lens and spacer in the lens position in the connector shell.
- (f) Examine the lens for contamination with a microscope.
- (g) If it is necessary, clean the spherical lens. Refer to Paragraph 7.

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- (10) In this order put these components in each hole in the connector insert:
 - A seal ring
 - The protective lens
 - The spacer washer
 - The retainer ring.
- (11) Torque each retainer ring with the retainer ring tool 6.5 inch-pounds to 7.0 inch-pounds.
- (12) Manually hold the mandrel.
- (13) Align the terminuses with the applicable holes in the connector shell.
Make sure that the terminuses are in the correct holes.
- (14) Carefully push the terminuses and the backplate into the connector shell.
- (15) Install the three socket head screws to attach the backplate to the connector shell.
 - (a) Tighten the screws with an allen wrench.
 - (b) Torque the screws 5.0 inch-pounds ± 0.1 inch-pound.
- (16) Assemble the backshell:
 - (a) Make a selection of a connector adapter and backshell removal tool from Table 8.
NOTE: A vise and a connector adapter are satisfactory alternatives for the Daniels tools.
 - (b) Put the connector adapter in the backshell removal tool.
 - (c) Put the connector shell in the connector adapter.
 - (d) Push and hold the strain relief boot against the connector.
 - (e) Manually tighten the backshell.

CAUTION: DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS TIGHTENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.
 - (f) Torque the backshell 70.0 inch-pounds ± 5.0 inch-pounds.

5. INSTALLATION OF A FIBER OPTIC CABLE ASSEMBLY**A. General Installation Instructions**

CAUTION: STRESS MUST NOT BE APPLIED TO THE AREA WHERE THE CABLE IS ATTACHED TO THE CONNECTOR. THE STRESS CAN CAUSE DAMAGE TO THE CABLE OR THE CONNECTOR, OR BOTH.

CAUTION: BEFORE, DURING, AND AFTER THE INSTALLATION, A FIBER OPTIC CABLE MUST NOT BE BENT SO THAT THE BEND RADIUS IS LESS THAN 1.5 INCHES. DAMAGE TO THE CABLE OR AN OPTICAL FIBER CAN OCCUR.

- (1) Before or during the installation:
 - (a) Do not let the cable stay on the floor so that damage to the cable, by the feet or by any objects that can fall on the cable, is prevented.
 - (b) If only a portion of a cable is installed, hang the remaining part of the cable with a plastic tie strap so that it is off the floor.
Make sure that the plastic tie strap is not tightened against the cable.

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- (2) If it is possible, try to install the cable directly into the correct position so that the cable is not pulled or pushed.
- (3) If a direct installation is not possible and the cable moves freely:
 - (a) Pull or push the cable in the direction that is aligned with the cable.

CAUTION: IF THE CABLE DOES NOT MOVE FREELY, DO NOT TRY TO PULL OR PUSH THE CABLE. DAMAGE TO THE CABLE CAN OCCUR.

- (b) Pull or push the cable into an area where the cable cannot be seen only if it can be made sure that the bend radius is not less than 1.5 inches.
- (4) During the installation, obey these precautions:
 - Gloves must not be worn to hold the cable better when it is pulled or pushed
 - The cable must not be wound around the hand to hold the cable better
 - The cable must not touch or rub against any sharp surfaces or corners
 - The cable must not have any loops except the drip loops
 - The connector or the backshell must not be used as a handle when the cable is pushed or pulled
 - The connector must not rub or move against the aircraft structure
 - The cable must not be installed with any other parts or materials other than those that are specified in this procedure; for example, a plastic tie strap or wire harness tie are not permitted
 - The cable must be separated from a fluid line, an oxygen line, or a water line a distance of 1.0 inch minimum unless it is specified differently.
- (5) Install the fiber optic cable in the cable clamps so that there is sufficient slack:
 - To connect and disconnect the connector
 - For the movement of the aircraft structure.

Refer to Paragraph 5.B.

- (6) Make a drip loop on the cable near the connector so that:
 - Any fluids do not go into the connectors, the junction boxes, and other closed equipment
 - Any fluids do not fall on the electrical equipment below the drip loop
 - The bend radius of the drip loop is more than 1.5 inches.

Refer to Paragraph 5.C.

B. Configuration of Cable Slack for an Installed Fiber Optic Cable

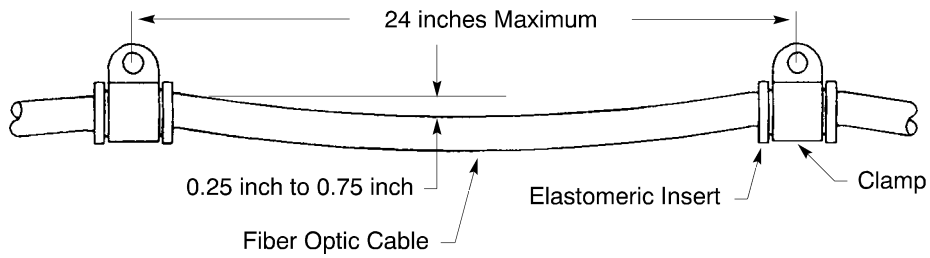
Refer to:

- Figure 21 for the usual configuration of fiber optic cable slack
- Figure 22 for the configuration of fiber optic cable slack in a high vibration area.

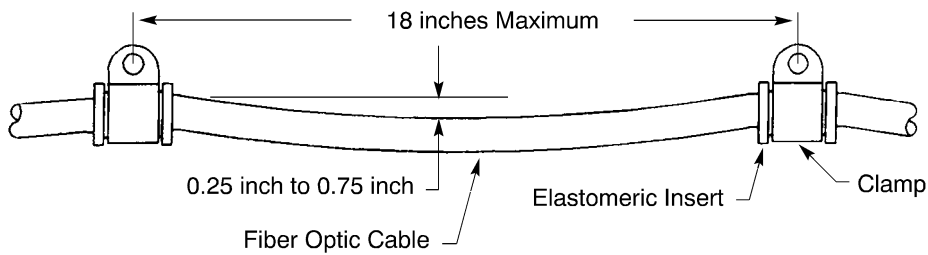
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USUAL SLACK OF AN INSTALLED FIBER OPTIC CABLE
Figure 21

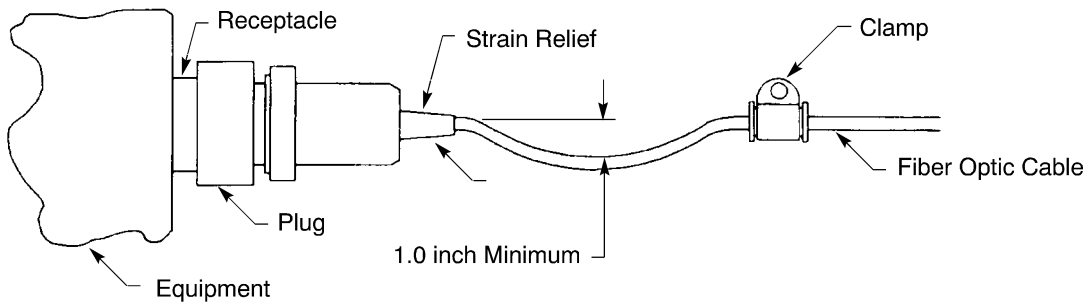


SLACK OF AN INSTALLED FIBER OPTIC CABLE IN A HIGH VIBRATION AREA
Figure 22

C. Configuration of a Drip Loop for an Installed Fiber Optic Cable

Refer to:

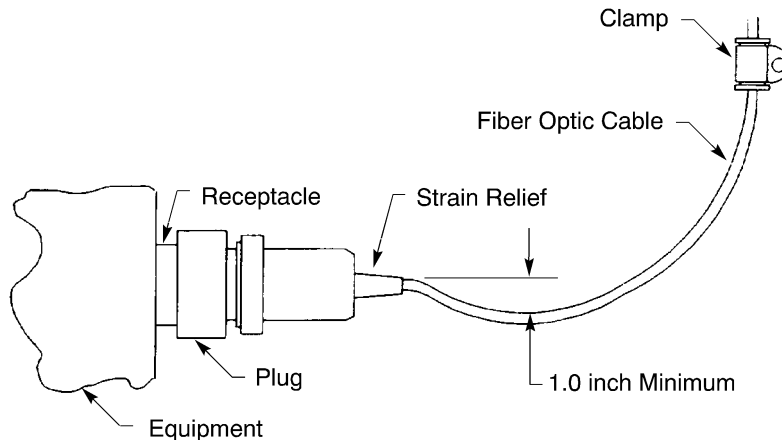
- Figure 23 and Figure 24 for the usual configurations of a drip loop
- Figure 25 and Figure 26 for the configurations of a drip loop in a high vibration area.



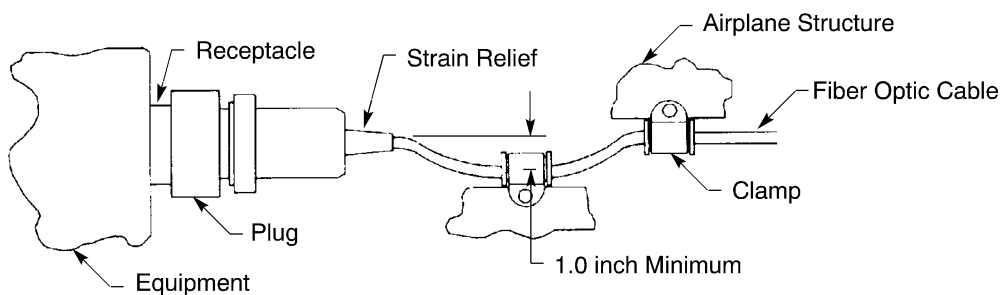
USUAL CONFIGURATION OF A DRIP LOOP ON A HORIZONTAL CABLE
Figure 23

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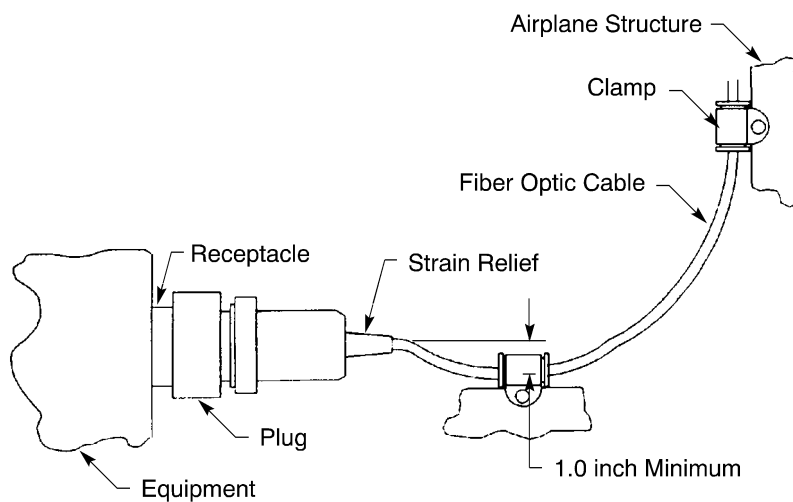
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USUAL CONFIGURATION OF A DRIP LOOP ON A VERTICAL CABLE
Figure 24



CONFIGURATION OF A DRIP LOOP ON A HORIZONTAL CABLE IN HIGH VIBRATION AREAS
Figure 25



CONFIGURATION OF A DRIP LOOP ON A VERTICAL CABLE IN HIGH VIBRATION AREAS
Figure 26

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D. Installation of a Fiber Optic Cable in a Loop Clamp

**Table 11
FIBER OPTIC CABLE CLAMPS**

Number of Cables		Boeing Specification	Insert	
Minimum	Maximum		Part Number	Supplier
1	1	287T0011-1	94A10391	Elastomeric Silicone Products, Inc.
2	6	287T0011-4	93A10375	Elastomeric Silicone Products, Inc.

CAUTION: STRESS MUST NOT BE APPLIED TO THE AREA WHERE THE CABLE IS ATTACHED TO THE CONNECTOR. THE STRESS CAN CAUSE DAMAGE TO THE CABLE OR THE CONNECTOR, OR BOTH.

- (1) Open the slot in the elastomeric insert.
- (2) Put the cable inside the cable cavity of the insert.
If the insert has multiple cable cavities, make sure that only one cable is put into each cavity.
- (3) Push the insert along the cable until the center of the insert is aligned with the center of the cable clamp.
- (4) Open the cable clamp.
- (5) Push the cable and the insert into the clamp.
Make sure that the center of insert stays approximately aligned with the center of the clamp.
- (6) Put a plastic tie strap in the slots at the opening of the clamp.
- (7) Tighten the plastic tie strap with a tie gun.
Make sure that the cable clamp is fully closed.

E. Installation of a Fiber Optic Cable in a Wire Harness Channel

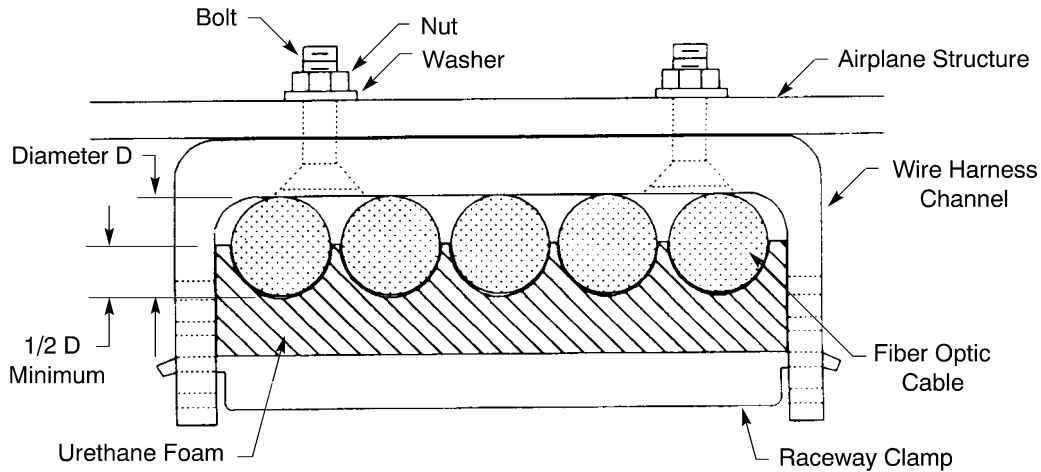
**Table 12
NECESSARY PARTS FOR CABLE INSTALLATION**

Boeing Standard	Description
BACC10DR()	Wire Harness Channel
BACC10DS3	Raceway Clamp

- (1) Put the fiber optic cables inside the wire harness channel so that:
 - The cables do not go across each other in the channel
 - The cables do not go between any two channels
 - No more than one layer of fiber optic cables are put in a channel.
- (2) Install the raceway clamp on the channel so that the urethane foam of the clamp is compressed a minimum of 1/2 the outside diameter D of the smallest cable. Refer to Figure 27.
Make sure that none of the cables stay between the end of the urethane foam and the side of the channel. Refer to Figure 28.

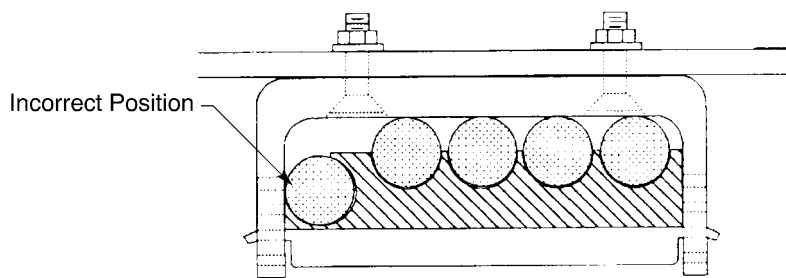
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POSITION OF THE FIBER OPTIC CABLES IN THE RACEWAY CLAMP

Figure 27



INCORRECT POSITION OF A CABLE IN A RACEWAY CLAMP

Figure 28

F. Installation of a Type A or a Type B Connector

- (1) Remove the dust cap or the plastic bag from the connector.
- (2) Align the keys of the plug with the keyways of the receptacle.

NOTE: The plug can be turned a small amount against the receptacle until the keys and the keyways are aligned.

CAUTION: DO NOT TURN THE PLUG MORE THAN A HALF TURN IN EITHER DIRECTION. DAMAGE TO THE CABLE ASSEMBLY CAN OCCUR.

- (3) Push the plug into the receptacle until it stops.
- (4) Manually turn the coupling ring of the plug clockwise, in relation to the rear of the plug, until it is tight. Make sure that a torque wrench is not used to tighten the coupling ring.
- (5) Examine the red line painted around the circumference of the external surface of the receptacle shell.
- (6) If the coupling ring does not make an overlap with part of the red line, try to tighten the coupling ring manually until the ring and the line make an overlap.

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- (7) If an overlap of the coupling ring and the red line cannot be made:
 - (a) Turn the coupling ring counterclockwise until it is disengaged from the threads of the receptacle.
 - (b) Do Step (2) through Step (6) again.

G. Installation of a Type C Connector

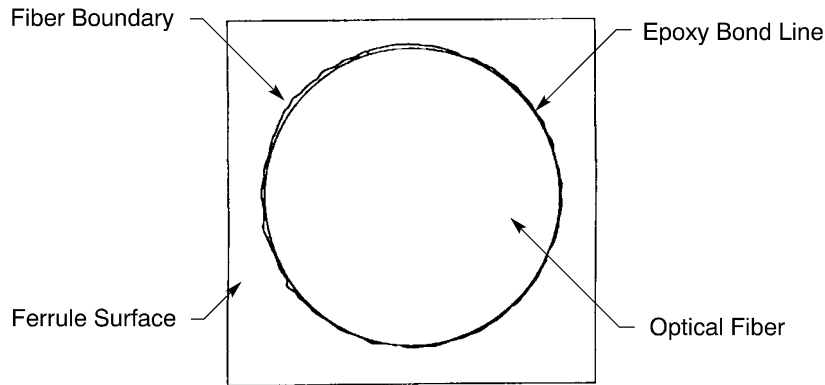
- (1) Turn the dust caps on the plug and the receptacle until the dust caps are locked in the open position.
- (2) Align the keys of the plug with the keyways of the receptacle.

NOTE: The plug can be turned a small amount against the receptacle until the keys and the keyways are aligned.

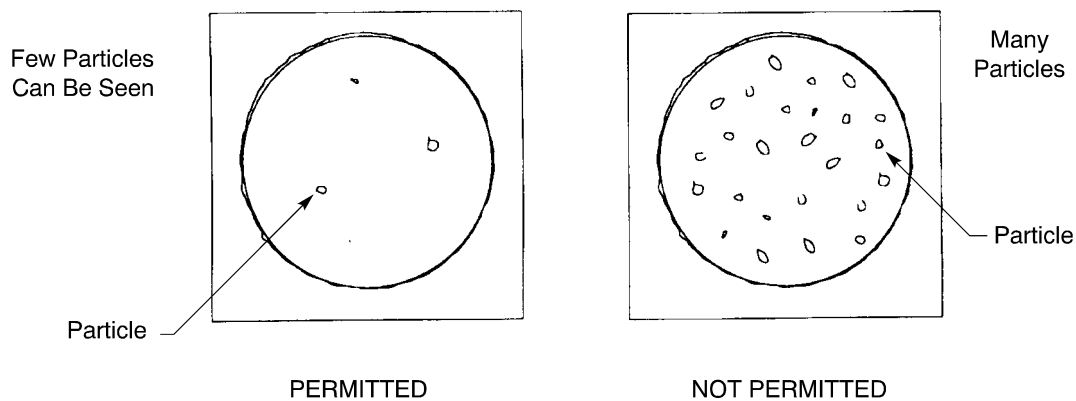
- (3) Push the plug into the receptacle until the plug and the receptacle are locked.

6. INSPECTION AND CLEANING OF A TYPE A FIBER OPTIC CONNECTOR

A. General Data



USUAL END FACE OF AN OPTICAL FIBER
Figure 29

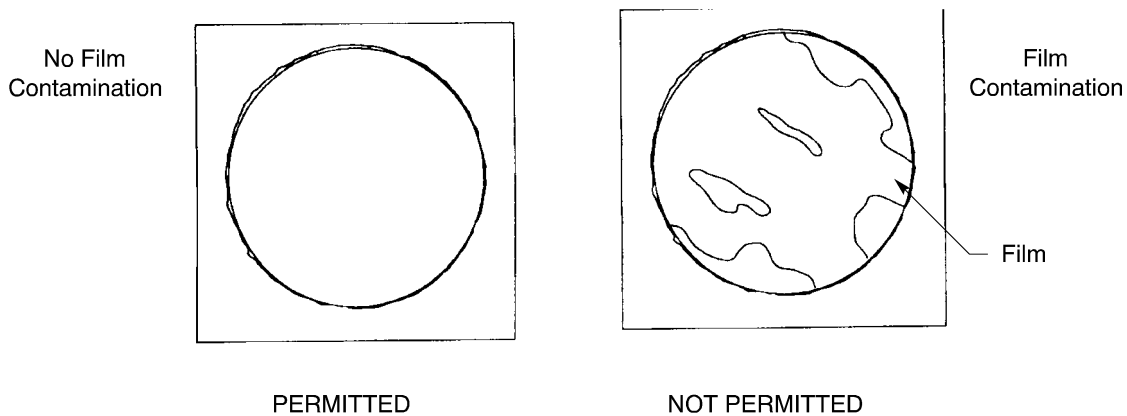


PARTICLE CONTAMINATION ON THE END FACE OF AN OPTICAL FIBER
Figure 30

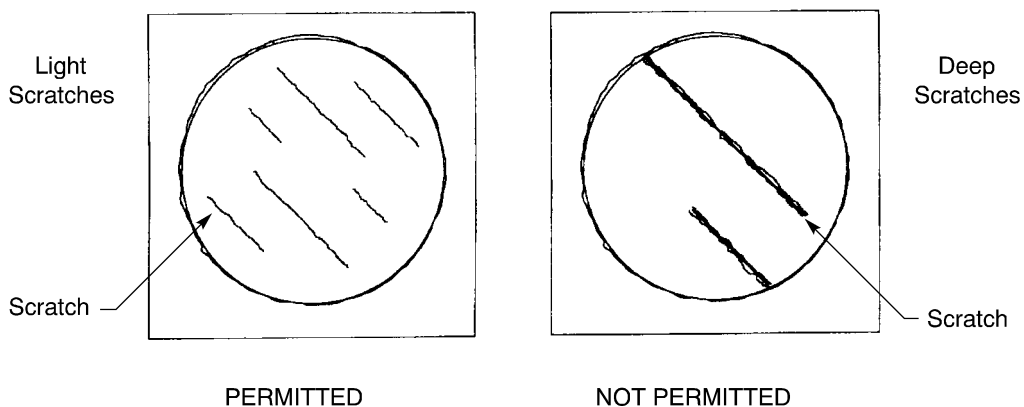
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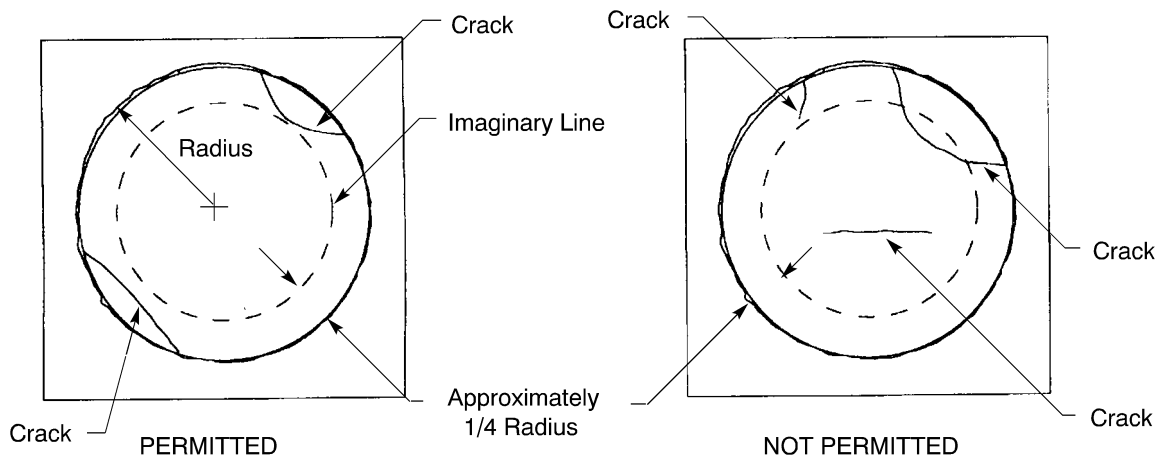
FILM CONTAMINATION ON THE END FACE OF AN OPTICAL FIBER
Figure 31



SCRATCHES ON THE END FACE OF AN OPTICAL FIBER
Figure 32

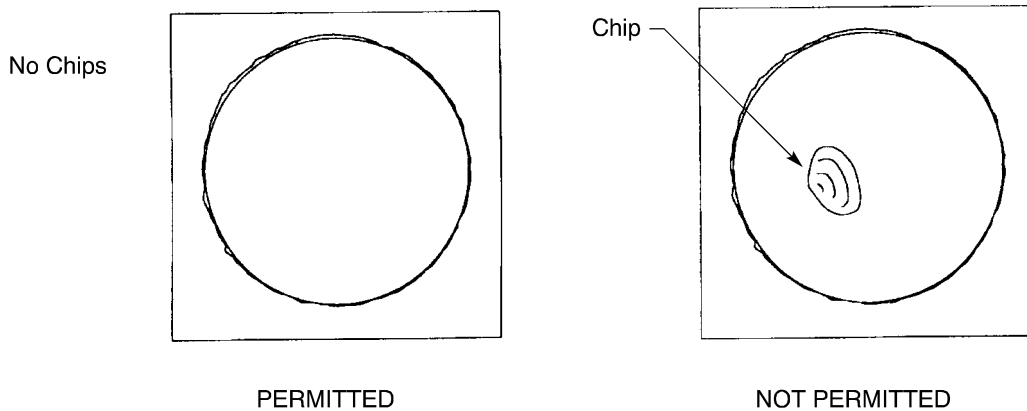
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CRACKS ON THE END FACE OF AN OPTICAL FIBER

Figure 33

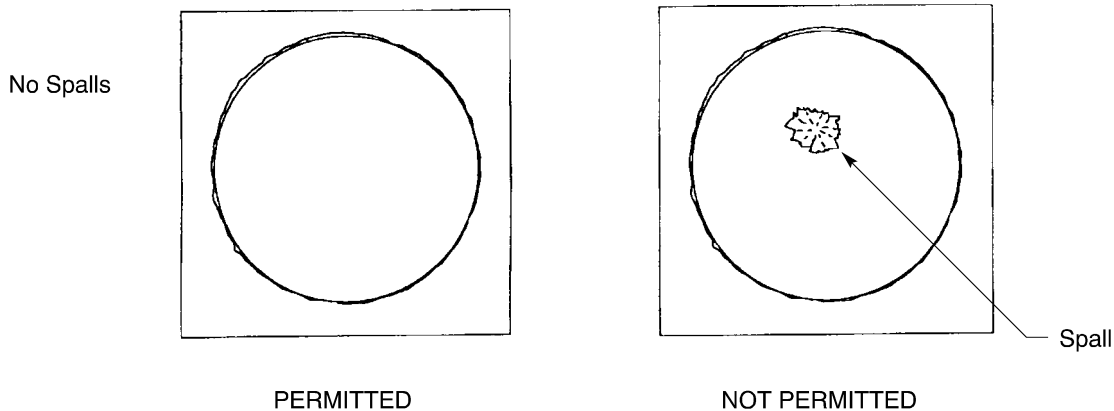


CHIPS ON THE END FACE OF AN OPTICAL FIBER

Figure 34

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SPALLS ON THE END FACE OF AN OPTICAL FIBER
Figure 35

B. Inspection of a Type A Connector

Refer to Figure 29.

- (1) Put the plug or receptacle adapter on the connector inspection microscope. Refer to Table 8.
- (2) Attach the microscope to the connector.
- (3) Set the magnification power of the microscope between 200X and 250X.
- (4) Examine the end face of each terminus for these types of contamination or damage:
 - Particle contamination; refer to Figure 30
 - Film contamination; refer to Figure 31
 - Scratches; refer to Figure 32
 - Cracks; refer to Figure 33
 - Chips; refer to Figure 34
 - Spalls; refer to Figure 35.
- (5) Reject the cable assembly if the end face of the optical fiber has:
 - Any cracks that are located within 1/4 the radius of the optical fiber
 - Any deep scratches
 - Any chips
 - Any spalls.
- (6) If the connector is a plug and the end faces of the terminuses are clean, install the plug on the equipment immediately.

NOTE: If the plug is not installed immediately, put a dust cap or a plastic bag on the connector.
- (7) If the connector is a receptacle and the end faces of the terminuses are clean, put a dust cap or a plastic bag on the connector.
- (8) If an end face of a terminus has a quantity of particle contamination that is not permitted, remove the contamination. Refer to Paragraph 6.C.
- (9) If the end face of a terminus has any film contamination, remove the contamination. Refer to Paragraph 6.D.

STANDARD WIRING PRACTICES MANUAL**S280W701-() FIBER OPTIC CABLE ASSEMBLIES****C. Removal of Particle Contamination**

Refer to Table 9 or Table 10 for the necessary materials that are used to clean the connector.

(1) Get these materials:

- Isopropyl or ethyl alcohol
- Swabs
- Tape
- Canned air and trigger assembly.

(2) If the connector is a receptacle, remove the front socket insert.

CAUTION: DO NOT SHAKE OR TWIST THE FRONT SOCKET INSERT TO REMOVE IT FROM THE CONNECTOR SHELL. DAMAGE TO THE CERAMIC TERMINUSES CAN OCCUR.

(a) Turn the jack screw in the center of the insert counterclockwise until it is free from the threads in the connector shell. Refer to Figure 12.

(b) Carefully pull the insert straight out of the connector shell.

Make sure that the retainer ring and the jack screw are not removed from the insert.

(c) Without magnification, examine the alignment sleeves of the insert for contamination.

(d) If any of the alignment sleeves has any contamination, clean the insert. Refer to Paragraph 6.E.

(3) Put on a pair of powder free gloves or finger cots.

NOTE: A satisfactory alternative is to clean the hands.

(4) Remove the particles from the end face of the terminus with a swab or a length of tape.

(5) If a swab is used, roll the swab on the end face of a terminus to remove the particles.

(6) If a piece of tape is used:

(a) Slowly put the tape on the end face of a terminus

(b) Lift the tape up to remove the particles.

(7) Examine the terminuses again with the microscope to make sure that all the particles have been removed.

(8) If the particle contamination cannot be removed with a swab or tape, clean the end face with solvent. Refer to Paragraph 6.D.

(9) If the connector is a plug and the terminuses are clean, install the plug on the equipment immediately.

NOTE: If the connector is not installed immediately, put a dust cap or a plastic bag on the plug.

(10) If the connector is a receptacle and the terminuses are clean:

(a) Align the holes of the front socket insert with the applicable terminuses.

(b) Carefully push the insert into the receptacle.

NOTE: If it is necessary, carefully turn the insert back and forth when it is pushed into the connector shell.

(c) Engage the threads of the jack screw and the connector shell.

(d) Torque the jack screw 5.0 inch-pounds \pm 0.1 inch-pound.

(e) Put a dust cap or a plastic bag on the connector.

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STANDARD WIRING PRACTICES MANUAL**S280W701-() FIBER OPTIC CABLE ASSEMBLIES****D. Removal of Film Contamination**

Refer to Table 9 or Table 10 for the necessary materials used to clean the connector.

(1) Get these materials:

- Isopropyl or ethyl alcohol
- Foam swabs
- Woven polyester swabs
- Canned air and trigger assembly.

(2) If the connector is a receptacle, remove the front socket insert.

CAUTION: DO NOT SHAKE OR TWIST THE FRONT SOCKET INSERT TO REMOVE IT FROM THE CONNECTOR SHELL. DAMAGE TO THE CERAMIC TERMINUSES CAN OCCUR.

(a) Turn the jack screw in the center of the insert counterclockwise until it is free from the threads in the connector shell. Refer to Figure 12.

(b) Carefully pull the insert straight out of the connector shell.

Make sure that the retainer ring and the jack screw are not removed from the insert.

(c) Without magnification, examine the alignment sleeves of the insert for contamination.

(d) If any of the alignment sleeves has any contamination, clean the insert. Refer to Paragraph 6.E.

(3) Put on a pair of powder free gloves or finger cots.

NOTE: A satisfactory alternative is to clean the hands.

(4) Put the tip of a foam swab in the alcohol so that the swab becomes moist.

Make sure the swab is not soaked in the alcohol.

(5) With a circular movement, carefully rub the swab on the end face of the terminus.

CAUTION: DO NOT USE MORE THAN THE NECESSARY FORCE WHEN THE SWAB IS ON THE END FACE OF THE TERMINUS. DAMAGE FROM SCRATCHES CAN OCCUR.

(6) If the end face is still wet, dry the end face with either of these materials:

- A woven polyester swab
- Canned air.

(7) Examine the terminuses again with the microscope to make sure that all the contamination has been removed.

(8) If the terminus is not clean, do Step (4) through Step (7) again.

(9) If the connector is a plug and the terminuses are clean, install the plug on the equipment immediately.

NOTE: If the connector is not installed immediately, put a dust cap or a plastic bag on the plug.

(10) If the connector is a receptacle and the terminuses are clean:

(a) Align the holes of the front socket insert with the applicable terminuses.

(b) Carefully push the insert into the receptacle.

NOTE: If it is necessary, carefully turn the insert back and forth when it is pushed into the connector shell.

(c) Engage the threads of the jack screw and the connector shell.

(d) Torque the jack screw 5.0 inch-pounds \pm 0.1 inch-pound.

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- (e) Put a dust cap or a plastic bag on the connector.

E. Cleaning of the Front Socket Insert

Refer to Table 9 or Table 10 for the necessary materials used to clean the front socket insert.

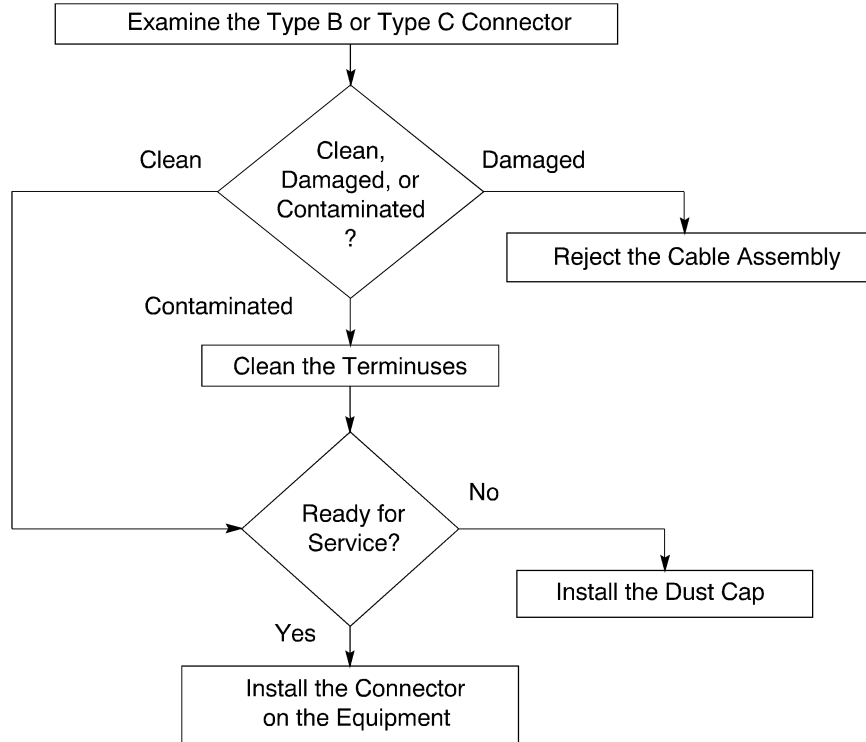
- (1) Get these materials:
 - Isopropyl or ethyl alcohol
 - Tapered swabs
 - Canned air and trigger assembly.
- (2) Remove the contamination from the alignment sleeve with canned air.
- (3) Examine the alignment sleeve again for contamination.
- (4) If the contamination in the sleeve cannot be removed with canned air:
 - (a) Put the tip of a tapered swab into alcohol until it is moist.
 - (b) Push the swab into the alignment sleeve.
 - (c) Twist the swab for 2 or 3 turns.
 - (d) Remove the swab from the sleeve.
 - (e) Dry the insert with canned air.
- (5) Examine the alignment sleeve again for contamination.
- (6) If the contamination in the sleeve cannot be removed with the swab:
 - (a) Get two clean containers to soak the front insert.
 - (b) Put a sufficient quantity of alcohol in one container.
 - (c) Put the insert in the other container.
 - (d) Put a sufficient quantity of distilled water into the container so that the insert is fully under the surface of the distilled water.
 - (e) Shake the container lightly for 1 to 3 minutes.
 - (f) Remove the insert from the container.
 - (g) Dry the insert with canned air.
 - (h) Put the insert in the container with the alcohol for 30 seconds minimum.
 - (i) If it is necessary, clean the insert with the tapered swab.
 - (j) Remove the insert from the container.
 - (k) Let insert dry at room temperature or dry it with canned air.
- (7) Examine the alignment sleeve again.
- (8) If the alignment sleeve still has the contamination, do Step (6) and Step (7) again.

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S280W701-() FIBER OPTIC CABLE ASSEMBLIES

7. INSPECTION AND CLEANING OF A TYPE B OR A TYPE C FIBER OPTIC CONNECTOR

A. General Data



INSPECTION AND CLEANING PROCEDURES FOR A TYPE B OR TYPE C FIBER OPTIC CONNECTOR

Figure 36

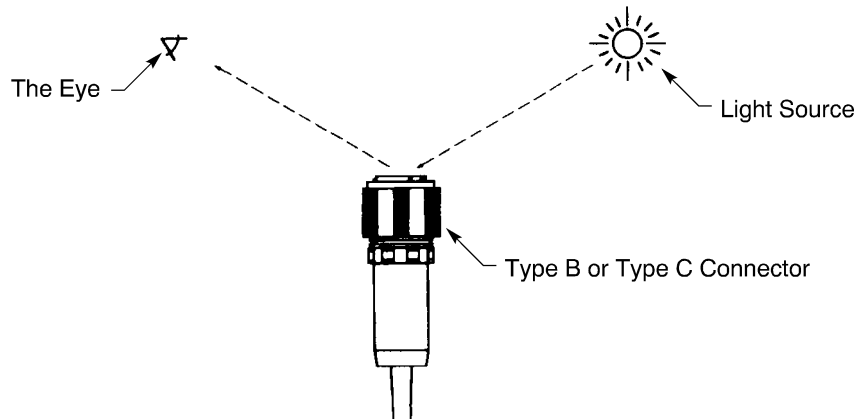
B. Inspection of a Type B Connector or a Type C Connector

Refer to Figure 36.

- (1) Hold the connector so that the protective lens is pointed up towards a light source. Refer to Figure 37.

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INSPECTION OF THE ENGAGING FACE OF A TYPE B OR TYPE C CONNECTOR
Figure 37

- (2) Examine the surface of the protective lens for any contamination.
- (3) If any contamination can be seen on the protective lens, clean the connector. Refer to Paragraph 7.C.

C. Removal of Particle Contamination

Refer to Table 9 or Table 10 for the necessary materials that are used to clean the connector.

- (1) Get these materials:
 - Swabs
 - Tape
 - Canned air and trigger assembly.
- (2) Blow the canned air across the protective lens at an angle.

NOTE: As an alternative, a staticmaster brush can be used to remove the contamination.

CAUTION: DO NOT USE THE STATICMASTER WITH A BARE HAND. THE OIL AND DIRT FROM THE HAND CAN MAKE THE BRUSH LESS EFFECTIVE.

- (3) Examine the protective lens again.
- (4) If the protective lens is clean, install the connector on the equipment immediately.

NOTE: If the connector is not installed immediately, put a dust cap or a plastic bag on the connector.
- (5) If the protective lens has any contamination, do Step (2) and Step (3) again.
- (6) If the contamination cannot be removed with the canned air or a staticmaster brush, remove the particles from the surface of the protective lens with either of these:
 - A swab
 - A length of tape.

Refer to Paragraph 6.C.

- (7) Examine the protective lens again.
- (8) If the contamination cannot be removed with either the swab or the tape, clean the protective lens with solvent. Refer to Paragraph 7.D.

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Refer to Table 9 or Table 10 for the necessary materials used to clean the connector.

(1) Get these materials:

- Isopropyl or ethyl alcohol
- Dry wipes
- Foam swabs
- Woven polyester swabs
- Canned air and trigger assembly.

(2) Put on a pair of powder free gloves or finger cots.

NOTE: A satisfactory alternative is to clean the hands.

(3) Put the tip of a foam or woven polyester swab in the alcohol so that the swab becomes moist. Make sure the swab is not soaked in the alcohol.

(4) With a circular movement, carefully rub the swab on the protective lens.

CAUTION: DO NOT USE MORE THAN THE NECESSARY FORCE WHEN THE SWAB IS ON THE PROTECTIVE LENS. DAMAGE FROM SCRATCHES CAN OCCUR.

(5) If the lens is still wet, dry the lens with any of these materials:

- A dry wipe
- A woven polyester swab
- Canned air.

(6) Examine the protective lens again.

(7) If the protective lens has any contamination, do Step (3) through Step (5) again.

(8) If the protective lens is clean, install the connector on the equipment immediately.

NOTE: If the connector is not installed immediately, put a dust cap or a plastic bag on the connector.

8. REPAIR OF A FIBER OPTIC CABLE ASSEMBLY**A. Replacement of an Optical Fiber**

NOTE: Each new fiber optic cable assembly has one unused or spare optical fiber that can be used to replace an optical fiber that has damage.

(1) Find the optical fiber that has the damage:

- (a) Disconnect the two connectors at each end of the cable. Refer to Paragraph 2.
- (b) Put a low intensity, red or white light on the front face of the connector on one end of the cable.
- (c) Look at the front face of the connector on the other end of the cable.

If the light cannot be seen at the terminus, then that optical fiber is the one that has the damage.

(2) Disassemble both connectors. Refer to Paragraph 3.

(3) On both ends of the cable assembly:

- (a) Remove the terminus of the unused optical fiber from the yoke. Refer to Figure 10.
- (b) Put the terminus of the damaged optical fiber in the old position of the terminus of the unused optical fiber.

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- (c) Put the terminus of the unused optical fiber in the old location of the terminus of the damaged optical fiber.
- (4) Assemble the connectors. Refer to Paragraph 4.
- (5) Put the low intensity, red or white light on the front face of the connector on one end of the cable.
- (6) Look at the front face of the connector on the other end of the cable.
Make sure that the light can be seen at each terminus except the one at the end of the optical fiber with the damage.

B. Repair of a Cable Jacket

- (1) Make a selection of fiberglass tape from Table 9.
- (2) Put a layer of the tape on the cable so that:
 - The ends of the layer of tape are approximately 1 inch from the ends of the damage
 - The layer of tape makes a 50 percent overlap.

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BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES

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STANDARD WIRING PRACTICES MANUAL**BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES****1. GENERAL DATA****A. Damage Conditions and Repair Conditions**

Replacement of the cable assembly is necessary when these types of damage occur:

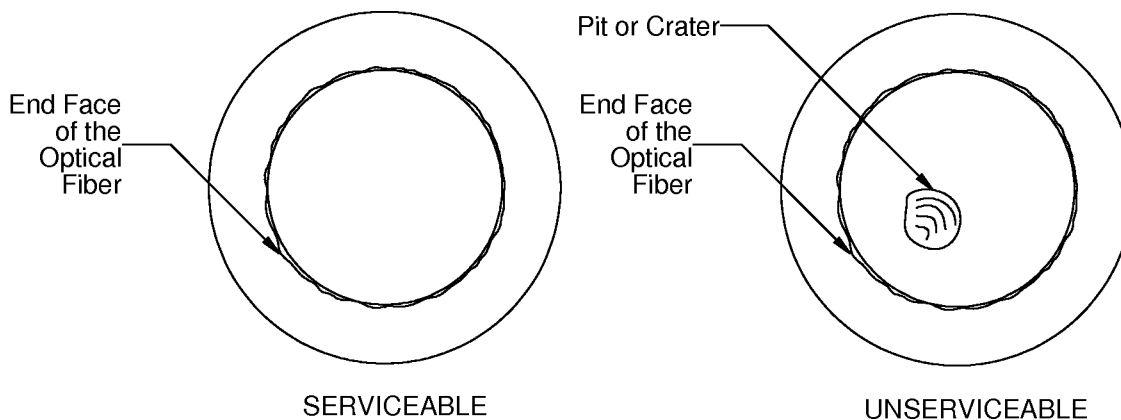
- The end face of the optical fiber has a pit or a crater; refer to Figure 1
- The end face of the optical fiber has a crack that extends more than 1/4 of the radius of the optical fiber from the circumference of the optical fiber; refer to Figure 2
- The end face of the optical fiber has a scratch that has a width that is equal to or more than 1 micrometer; refer to Figure 3
- The cable has a permanent deformation that is caused by a bend to a point where the bend radius is much less than 0.75 inch for BACC69A() cable assemblies or to a point where the bend radius is much less than 2.1 inches for BACC69C() cable assemblies; refer to Subject 20-10-11
- The cable has damage that goes through the jacket.

Repair is not necessary when these types of damage occur:

- A small scratch on the surface of the cable jacket
- Abrasion that makes the surface of the cable jacket rough.

For the conditions that are applicable during the assembly or installation of a wire harness that has a fiber optic cable assembly, refer to:

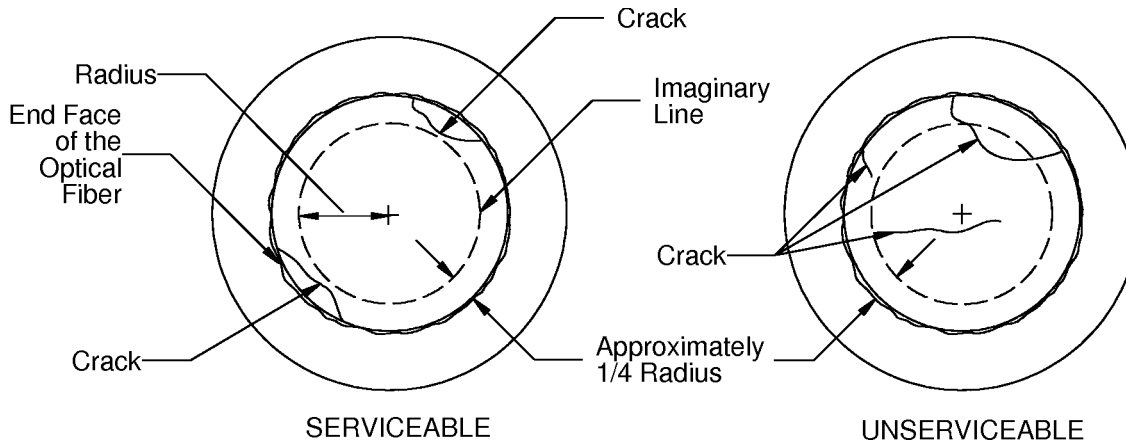
- Subject 20-10-11
- The Subject that is applicable for the assembly of the connector.



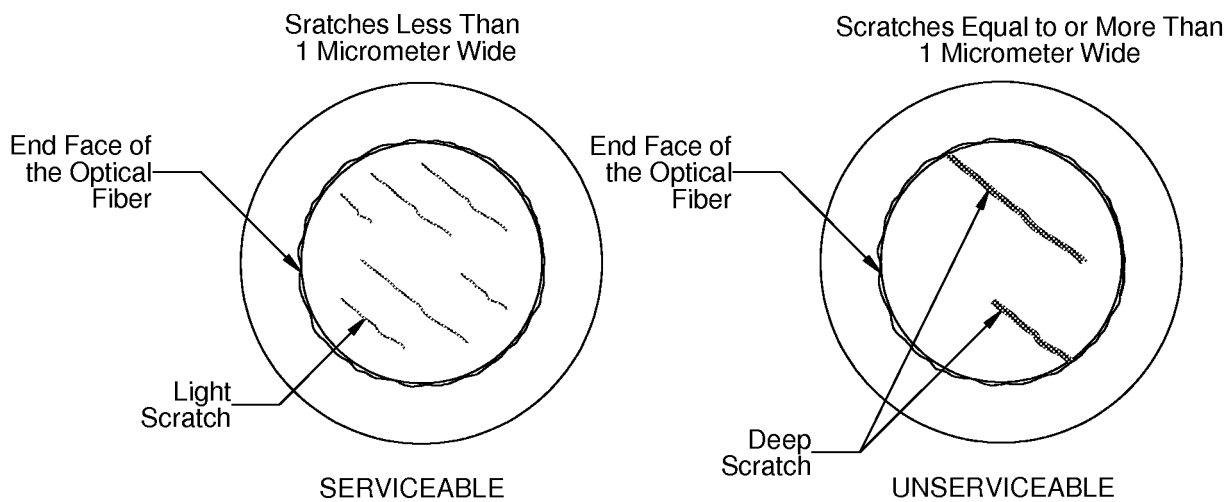
DAMAGE OF THE END FACE OF AN OPTICAL FIBER UNDER 200X MAGNIFICATION - PITS OR CRATERS
Figure 1

STANDARD WIRING PRACTICES MANUAL

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DAMAGE OF THE END FACE OF AN OPTICAL FIBER UNDER 200X MAGNIFICATION - CRACKS
Figure 2



DAMAGE OF THE END FACE OF AN OPTICAL FIBER UNDER 200X MAGNIFICATION- SCRATCHES
Figure 3

B. Protection from Damage

These conditions are applicable:

- The weight from a foot, a tool, or other objects must not be put on the cable assembly
- A length of the fiber optic cable must not be pushed or pulled if it does not move freely
- The BACC69A() Cable Assembly must not be bent to a point where the bend radius is less than 0.75 inch
- The BACC69C() Cable Assembly must not be bent to a point where the bend radius is less than 2.1 inches.

CAUTION: DO NOT BEND FIBER OPTIC CABLE TOO MUCH. THE RISK OF DAMAGE TO THE CABLE INCREASES AS BEND RADIUS DECREASES.

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BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES

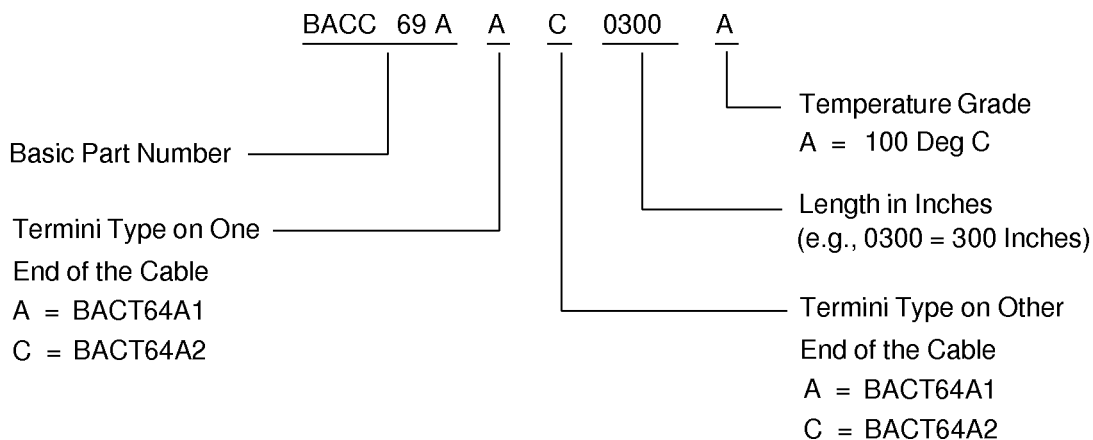
C. Protection from Contamination

These conditions are applicable:

- The engaging end of the contact terminus must not be touched with a finger or tool
- When the contact terminus is not installed in a connector, a clean protection cap must be installed on the contact terminus or the contact terminus must be put in a clean plastic bag.

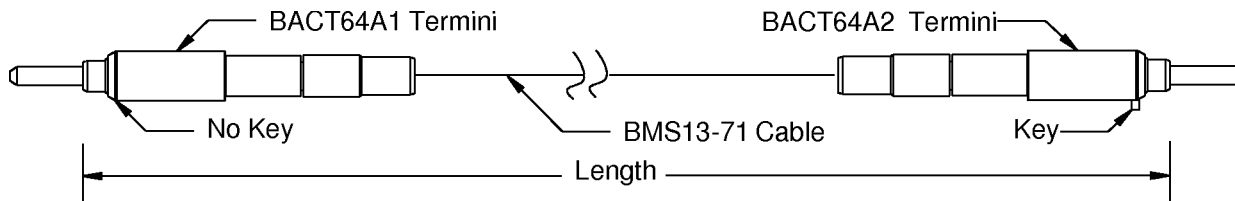
2. PART NUMBERS AND DESCRIPTION

A. Fiber Optic Cable Assembly Part Numbers



BACC69A FIBER OPTIC CABLE ASSEMBLY PART NUMBER STRUCTURE

Figure 4

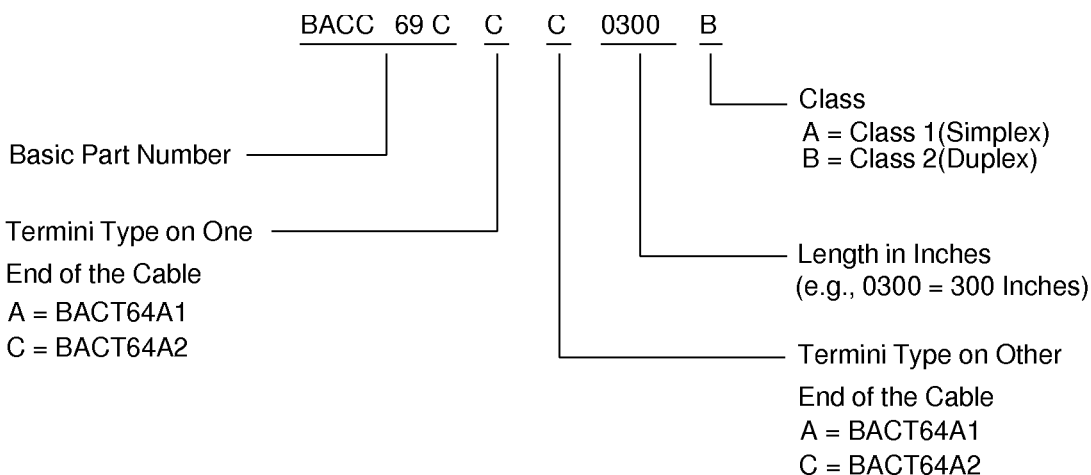


BACC69A FIBER OPTIC CABLE ASSEMBLY

Figure 5

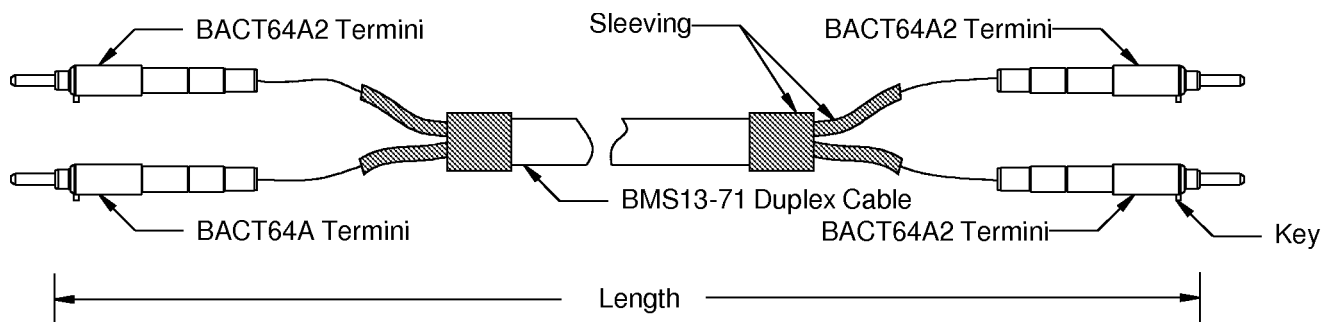
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BACC69C FIBER OPTIC CABLE ASSEMBLY PART NUMBER STRUCTURE

Figure 6



BACC69C FIBER OPTIC CABLE ASSEMBLY

Figure 7

**Table 1
FIBER OPTIC CONTACT TERMINUS PART NUMBERS**

Terminus Type	Size	Part Number
A	16	BACT64A1
C	16	BACT64A2

NOTE: The BACT64A() contact terminus is part of the fiber optic cable assembly and cannot be removed and replaced. If it is necessary to replace a contact terminus, the cable assembly must be replaced.

**Table 2
APPROVED SUPPLIERS OF BACC69A() AND BACC69C() CABLE ASSEMBLIES**

Cable Assembly	Supplier
BACC69A()	Radiall
BACC69C()	Radiall

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BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES

**Table 3
CONTACT TERMINUS PROTECTION CAP PART NUMBERS**

Part Number	Supplier
F718176201	Radiall

3. INSPECTION AND CLEANING OF A FIBER OPTIC CONTACT TERMINUS

A. Necessary Tools and Materials

**Table 4
NECESSARY TOOLS**

Tool	Description	Part Number	Supplier
Air, Canned	Tetrafluoroethane	ES1520	Chemtronics
Swab	Foam	TX740	Texwipe
	Polyester, Woven	TX762	Texwipe
	Polypropylene	TX785B	Texwipe
Tape, Adhesive	Acrylic	850	3M

**Table 5
SOLVENTS**

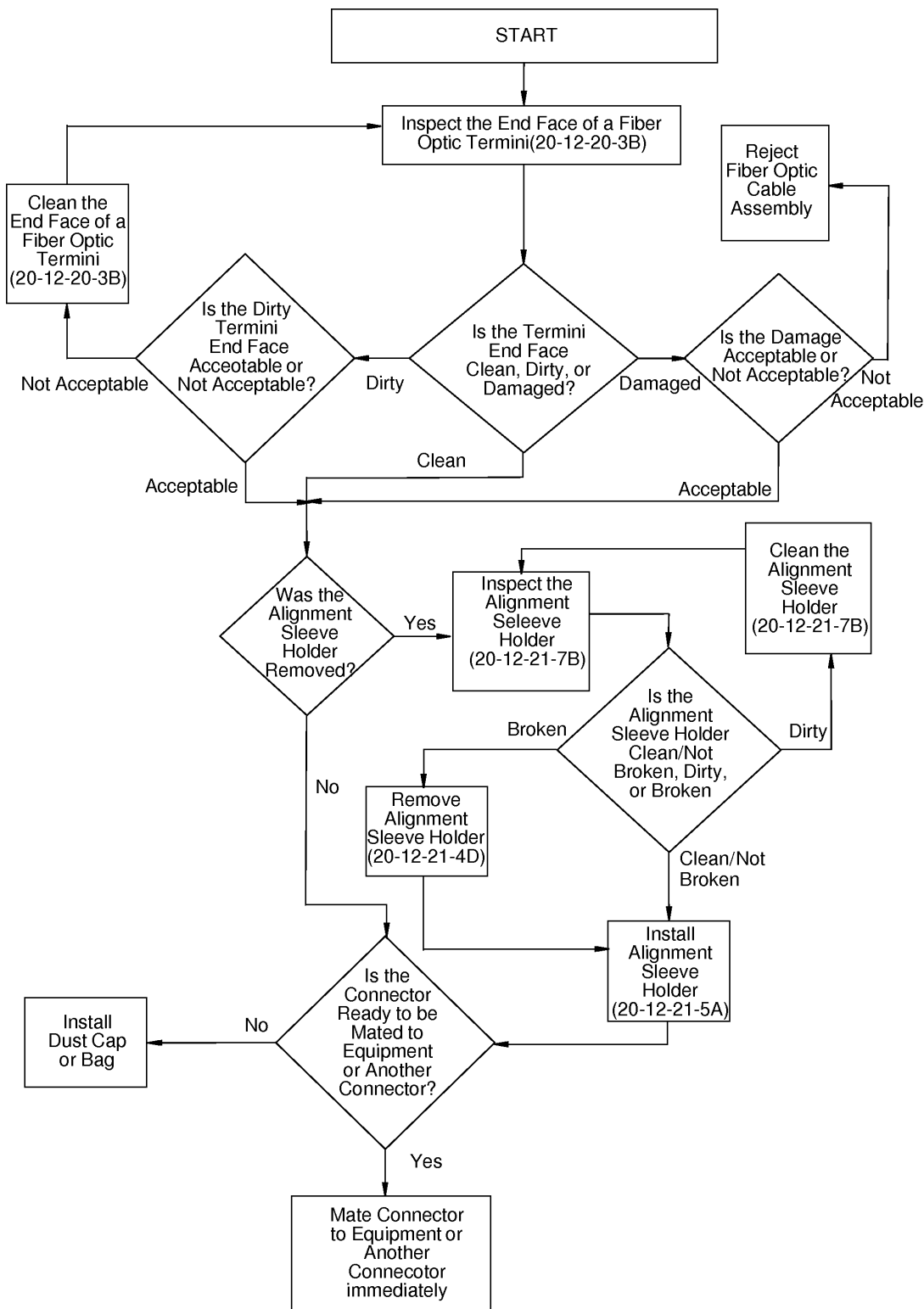
Solvent	Specification	Supplier
Alcohol, Ethyl	O-E-760	Available source
Alcohol, Isopropyl	TT-I-735	Available source

B. Inspection and Cleaning Procedures

Figure 8 shows the process to inspect and clean a fiber optic terminus and/or insert alignment sleeve holder.

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BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES

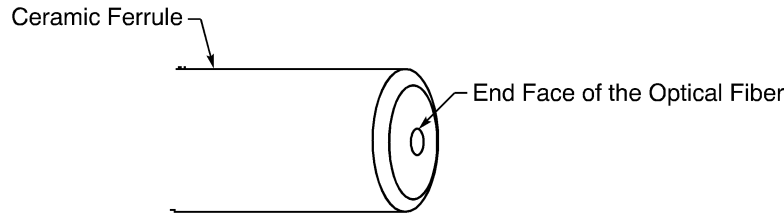


**Inspection and Cleaning Procedure Flowchart
Figure 8**

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BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES

C. Inspection and Cleaning



END FACE OF A CONTACT TERMINUS
Figure 9

Refer to Figure 9.

- (1) Select an Inspection Kit from Table 6.

Table 6
FIBER OPTIC INSPECTION AND CLEANING KITS

Part Number	Description
FBP-ARINC-01	Fiber Optic Termini Inspection Kit with Hand held Video Display
FCL-ARINT-01	Fiber Optic Termini Inspection Kit with a Portable CleanBlast System (Video Display is integrated with the CleanBlast System)
E-250K	Fiber Optic cleaning Kit (Swabs, Alcohol Wipes, Cotton Wipes, Isopropyl Alcohol, Canned Air)

- (2) Select the appropriate adapter from Table 7 for the connector to be examined.

NOTE: The Inspection Kits have the adapters included. The adapters are used so the probe does not come in contact with the ceramic ferrules of the termini and cause damage.

Table 7
FIBER OPTIC ADAPTERS INCLUDED IN INSPECTION KITS

Part Number	Connectors Used With	Description
FBPT-A801-1-002-P FBPT-A801-1-002-P	BACC68D15()06(), BACC68F15()06()	Use with circular plug connectors with the 15-06 insert arrangement
	BACC68C15()06(), BACC68E15()06()	Use with circular receptacle connectors with the 15-06 insert arrangement
FBPT-A801-2-001-P FBPT-A801-2-001-P	BACC65AA() or BACC65AN() with a BAC110AL12F()P Insert	Use with dual and single insert general purpose rectangular plug connectors with the 12F or 12FK pin insert arrangement (no alignment sleeve holder)
	BACC65AB() or BACC65AP() with a BAC110AL12F()S Insert	Use with dual and single insert general purpose rectangular receptacle connectors with the 12F or 12FK socket insert arrangement (with alignment sleeve holder)

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Table 7 (continued)

Part Number	Connectors Used With	Description
FBPT-A801-2-002-P FBPT-A801-2-002-P	BACC65AA() or BACC65AN() with a BACI10AL12F()S Insert	Use with dual and single insert general purpose rectangular plug connectors with the 12F or 12FK socket insert arrangement (with alignment sleeve holder)
	BACC65AB() or BACC65AP() with a BACI10AL12F()P Insert	Use with dual and single insert general purpose rectangular receptacle connectors with the 12F or 12FK pin insert arrangement (without alignment sleeve holder)
FBPT-A801-1-002-P FBPT-A801-1-002-P	BACC66H(), BACC66K()	Use with ARINC 600 Size 2 or Size 3 plug connectors with the 12F insert arrangement (without alignment sleeve holder)
	BACC66G(), BACC66J()	Use with ARINC 600 Size 2 or Size 3 receptacle connectors with the 12F insert arrangement (with alignment sleeve holder)

- (3) Have an appropriate inspection kit and adapter ready.

Steps to exam the contact terminus:

- (a) Align the cavities of the adapter with the cavities of the connector insert.
 - (b) Insert the adapter into the connector.
 - (c) Use a video scope and probe from the inspection kit to examine the termini end face.
 - (d) Use 200X magnification for an multi-mode fiber optic termini or use 400X magnification for a single-mode fiber optical termini.
 - (e) Insert the probe into the appropriate terminus cavity in the adapter.
- (4) If the end face of the optical fiber has unserviceable damage, replace the cable assembly.

Refer to:

- Figure 1, Figure 2, and Figure 3 for damage conditions
- The Subjects that are applicable for the disassembly and assembly of the connectors
- Subject 20-10-11 for the conditions that are applicable for wire harness assembly and installation.

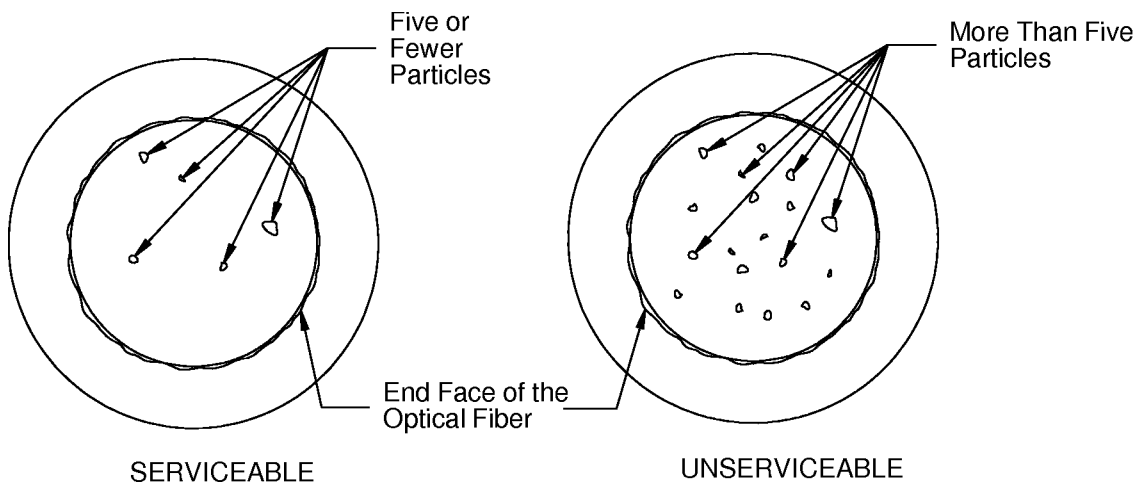
- (5) If the end face of the optical fiber has contamination from particles, remove the contamination.

Refer to:

- Figure 10
- Paragraph 3.D. for the procedure to remove particle contamination.

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BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES

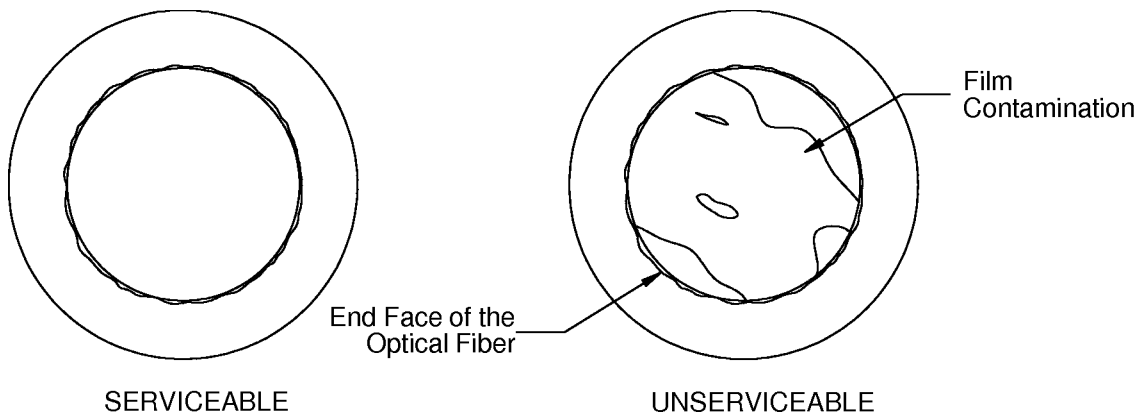


CONTAMINATION OF THE END FACE OF AN OPTICAL FIBER - PARTICLES
Figure 10

(6) If the end face of the optical fiber has contamination from a film, remove the contamination.

Refer to:

- Figure 11
- Paragraph 3.E. for the procedure to remove film contamination.



CONTAMINATION OF THE END FACE OF AN OPTICAL FIBER - FILM
Figure 11

STANDARD WIRING PRACTICES MANUAL**BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES**

- (7) If the end face of the termini are clean, follow these procedures:
- If the connector insert had an alignment sleeve holder installed, examine and clean it if necessary. Refer to Subject. 20-12-21 for inspection and cleaning of a fiber optic alignment sleeve insert. After examining and/or cleaning the alignment sleeve holder, install it . Refer to Subject 20-12-21
 - If the connector is a plug, install the plug on the equipment immediately or put a dust cap or a plastic bag over it. Refer to Table 3
 - If the connector is a receptacle, install the plug or equipment to it immediately or put a dust cap on the connector. Refer to Table 3.

CAUTION: A CLEAN FIBER OPTIC CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: A clean plastic bag is a satisfactory alternative for the protection cap.

D. Particle Contamination Removal

For the conditions that are applicable for this procedure, refer to Paragraph 3.C.

- (1) If the connector insert has a BACI10AU() insert alignment sleeve holder installed, remove it to gain access to the termini. Refer to Subject 20-12-11 for removal of the alignment sleeve insert.
- (2) Remove the particle contamination from the end face of the optical fiber with method 1. Refer to Paragraph 3.G..

NOTE: The CleanBlast System may not always clean termini to an acceptable condition when termini have particles and dirt.

- (3) Examine the end face of the termini again using inspection kit from Table 6
Make sure that the microscope is set at 200X magnification.
- (4) If the end face of the optical fiber has unserviceable damage, replace the cable assembly.
Refer to:
 - Figure 1, Figure 2, and Figure 3 for damage conditions
 - The Subjects that are applicable for the disassembly and assembly of the connectors
 - Subject 20-10-11 for the conditions that are applicable for wire harness assembly and installation.
- (5) If the end face of the optical fiber has remaining particle or film contamination:
 - (a) Remove the contamination with method 2 and/or method 3. Refer to Paragraph 3.H. and/or 3.G..
 - (b) Examine the end face of the termini again using inspection kit from Table 6
Make sure that the microscope is set at 200X magnification.
 - (c) If the end face of the optical fiber has remaining, unserviceable contamination, replace the cable assembly.

STANDARD WIRING PRACTICES MANUAL**BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES**

Refer to:

- The Subjects that are applicable for the disassembly and assembly of the connectors
- Subject 20-10-11 for the conditions that are applicable for wire harness assembly and installation.

(6) If the end face of the termini are clean, follow these procedures:

- If the connector insert had an alignment sleeve holder installed, examine and clean it if necessary. Refer to Subject. 20-12-21 for inspection and cleaning of a fiber optic alignment sleeve insert. After examining and/or cleaning the alignment sleeve holder, install it . Refer to Subject 20-12-21
- If the connector is a plug, install the plug on the equipment immediately or put a dust cap or a plastic bag over it. Refer to Table 3
- If the connector is a receptacle, install the plug or equipment to it immediately or put a dust cap on the connector. Refer to Table 3.

CAUTION: A CLEAN FIBER OPTIC CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: A clean plastic bag is a satisfactory alternative for the protection cap.

E. Film Contamination Removal

For the conditions that are applicable for this procedure, refer to Paragraph 3.C.

- (1) If the connector insert has a BACI10AU() insert alignment sleeve holder installed, remove it to gain access to the termini. Refer to Subject 20-12-11 for removal of the alignment sleeve insert.
- (2) Remove the film contamination from the end face of the optical fiber with method 1. Refer to Paragraph 3.F.

NOTE: The CleanBlast System may not always clean termini to an acceptable condition when termini have particle and dirt.

- (3) Examine the end face of the termini again using inspection kit from Table 6
Make sure that the microscope is set at 200X magnification.
- (4) If the end face of the optical fiber has unserviceable damage, replace the cable assembly.

Refer to:

- Figure 1, Figure 2, and Figure 3 for damage conditions
- The Subjects that are applicable for the disassembly and assembly of the connectors
- Subject 20-10-11 for the conditions that are applicable for wire harness assembly and installation.

(5) If the end face of the optical fiber has remaining, unserviceable film contamination:

- (a) Remove the film contamination with method 3. Refer to Paragraph 3.H..
- (b) With the microscope, examine the end face of the optical fiber again.
Make sure that the microscope is set at 200X magnification.
- (c) If the end face of the optical fiber has remaining, unserviceable film contamination, replace the cable assembly.

STANDARD WIRING PRACTICES MANUAL**BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES**

Refer to:

- The Subjects that are applicable for the disassembly and assembly of the connectors
 - Subject 20-10-11 for the conditions that are applicable for wire harness assembly and installation.
- (6) If the end face of the termini are clean, follow these procedures:
- If the connector insert had an alignment sleeve holder installed, examine and clean it if necessary. Refer to Subject. 20-12-21 for inspection and cleaning of a fiber optic alignment sleeve insert. After examining and/or cleaning the alignment sleeve holder, install it . Refer to Subject 20-12-21
 - If the connector is a plug, install the plug on the equipment immediately or put a dust cap or a plastic bag over it. Refer to Table 3
 - If the connector is a receptacle, install the plug or equipment to it immediately or put a dust cap on the connector. Refer to Table 3.

CAUTION: A CLEAN FIBER OPTIC CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: A clean plastic bag is a satisfactory alternative for the protection cap.

F. Removal of Contamination: Method 1 - With the Westover CleanBlast Fiber Optic Cleaning System

For the conditions that are applicable for this procedure, refer to Paragraph 3.D. or 3.E.

- (1) Select the appropriate adapter from Table 20-12-20 for the connector with the termini to be cleaned.
- (2) Align the cavities of the adapter with the cavities of the connector insert.
- (3) Insert the adapter into the connector.
- (4) Follow the Westover CleanBlast Fiber Optic Cleaning System operating instructions to insert the cleaning probe tip into the appropriate termini cavity in the adapter and clean the end face of the termini.

G. Removal of Contamination: Method 2 - With Texwipe Swab or #850 Tape

For the conditions that are applicable for this procedure, refer to Paragraph 3.D.

- (1) Make a selection of a polypropylene swab from Table 4.

NOTE: An acrylic adhesive tape from Table 4 or an equivalent tape is a satisfactory alternative.

- (2) To remove the particles with a swab, roll the swab on the end face of the contact terminus.
- (3) To remove the particles with a length of tape:
 - (a) Carefully apply the adhesive side of the tape against the end face of the contact terminus.
 - (b) Remove the length of tape from the end face of the contact terminus.

H. Removal of Contamination: Method 3 - With E-250K Fiber Optic Cleaning Kit

For the conditions that are applicable for this procedure, refer to Paragraph 3.D. or Paragraph 3.E.

- (1) Make a selection of a solvent from Table 5.

STANDARD WIRING PRACTICES MANUAL**BACC69A AND BACC69C FIBER OPTIC CABLE ASSEMBLIES**

- (2) Make a selection of these tools from Table 4:
- Canned air or a woven polyester swab
 - A foam swab
 - Swab from E-250K Fiber Optic Cleaning Kit.

NOTE: An equivalent canned air is a satisfactory alternative.

- (3) Put a small amount of solvent on the end of the swab to make the swab moist.
Make sure that the swab is not too wet.
- (4) Carefully clean the end face of the contact terminus with the swab.

CAUTION: DO NOT USE MORE THAN THE FORCE NECESSARY TO REMOVE THE CONTAMINATION FROM THE END FACE OF THE OPTICAL FIBER. DAMAGE TO THE OPTICAL FIBER CAN OCCUR.

- (5) Dry the terminus with canned air or a woven polyester swab.

4. APPROVED TOOL SUPPLIERS**A. Inspection and Cleaning Kit Suppliers**

Buy the inspection and cleaning kits only from approved suppliers; refer to Table 8

Table 8
Inspection and Cleaning Kit Suppliers

Tool	Supplier
FBP-ARINC-01	Westover Scientific
FCL-ARINC-01	Westover Scientific
E-250K	The Light Brigade



707, 727-787

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BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS

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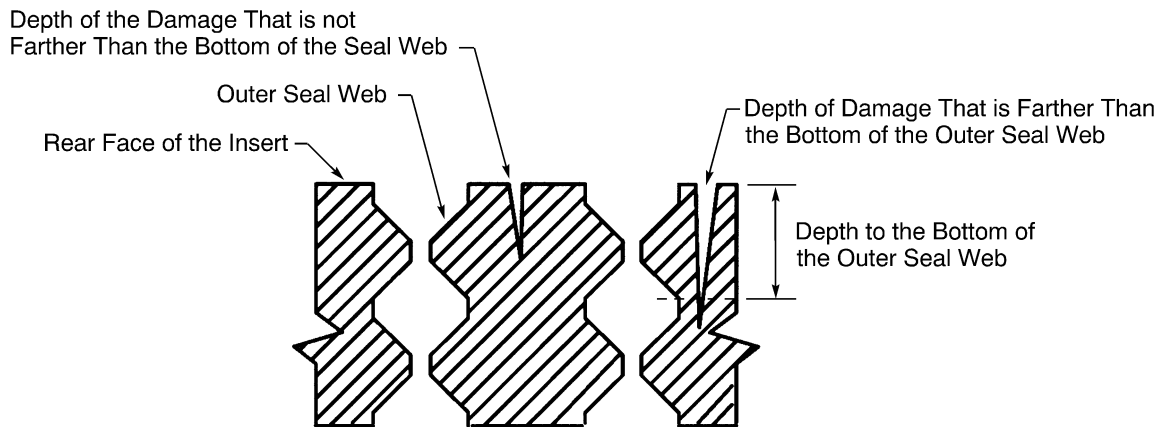
BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS

1. GENERAL DATA

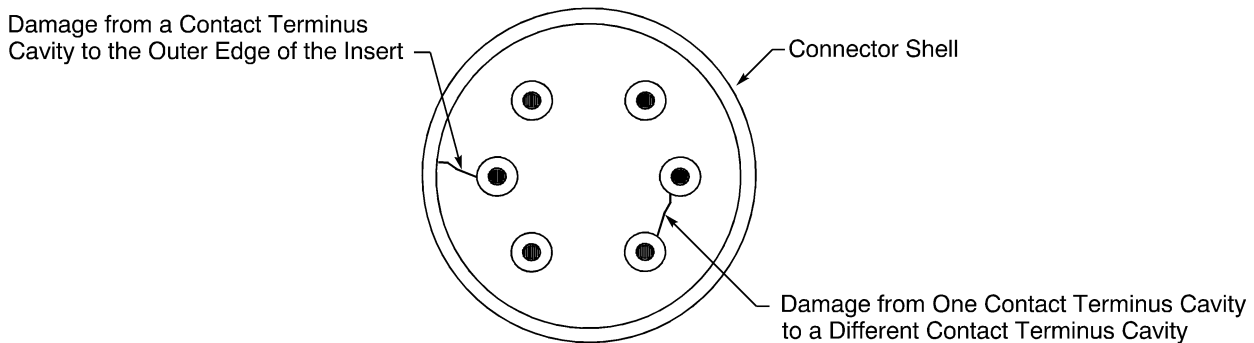
A. Damage Conditions - Rear Face of the Insert

The connector must be replaced when one or more of these conditions occur:

- The depth of the damage extends farther than the bottom of the outer seal web. Refer to Figure 1.
- The damage extends from one contact terminus cavity to a different contact terminus cavity. Refer to Figure 2.
- The damage extends from one contact terminus cavity to the outer edge of the insert. Refer to Figure 2.



REAR FACE OF THE INSERT - DEPTH OF DAMAGE
Figure 1



REAR FACE OF THE INSERT - LENGTH OF DAMAGE
Figure 2

B. Damage Conditions - Fiber Optic Cable Assembly

The cable assembly must be replaced when one or more of these conditions occur:

- The fiber optic cable has damage that makes the cable assembly unserviceable. Refer to Subject 20-12-20
- The contact terminus has damage. Refer to Subject 20-12-20.

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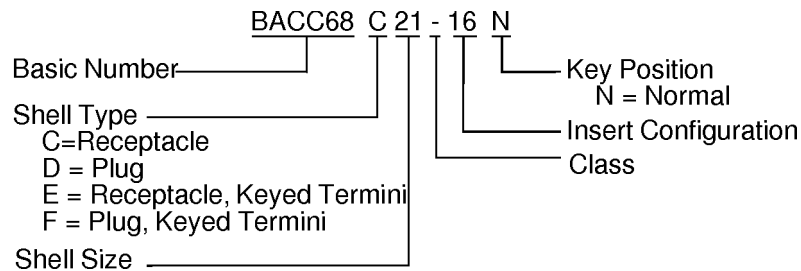
BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Boeing Standard	Type	Accepts Cable Type
BACC68C()	Receptacle	BACC69AAA()
BACC68D()	Plug	BACC69AAA()
BACC68E()	Receptacle	BACC69A(), BACC69C()
BACC68F()	Plug	BACC69A(), BACC69C()



**BACC68C(), BACC68D(), BACC68E(), AND BACC68F() CONNECTOR PART NUMBER STRUCTURE
Figure 3**

**Table 2
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTORS**

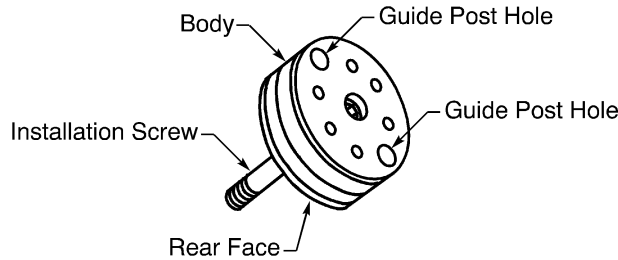
Connector	Supplier
BACC68C()	Radiall
BACC68D()	Radiall
BACC68E()	Radiall
BACC68F()	Radiall

**Table 3
ALIGNMENT SLEEVE INSERT PART NUMBERS**

Boeing Standard	Configuration
BACI10AU06C	Circular

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BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS



ALIGNMENT SLEEVE INSERT
Figure 4

Table 4
APPROVED SUPPLIERS OF BOEING STANDARD ALIGNMENT SLEEVE INSERTS

Alignment Sleeve Insert	Supplier
BACI10AU06C	Radiall

B. Connector Description

The BACC68C, BACC68D, BACC68E, and BACC68F connectors have these technical features:

- A metal, M38999 type circular connector shell
- Size 16 contact terminus cavities
- Rear release and rear removal of contact termini.

The BACC68D and BACC68F connectors have these extra features:

- A removable alignment sleeve insert
- Two guide posts for the alignment sleeve insert
- A self-locking threaded coupling ring.

The BACC68E and BACC68F connectors have this extra feature:

- The inserts have terminus contact cavities with terminus keyway mark.

C. Fiber Optic Contact Terminus Part Numbers

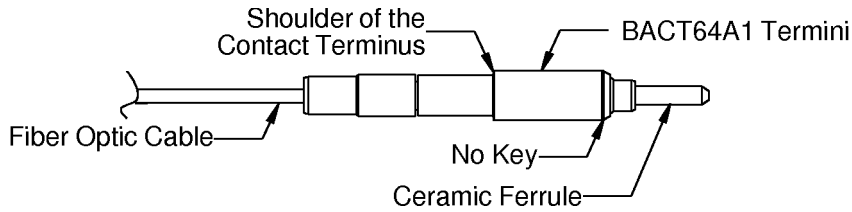
Table 5
FIBER OPTIC CONTACT TERMINUS PART NUMBERS

Cable Assembly	Contact Terminus		
	Type	Size	Part Number
BACC69()AA	A(Non-keyed)	16	BACT64A1
BACC69()CC	C(Keyed)	16	BACT64A2
BACC69()AC	A(Non-keyed),C(Keyed)	16	BACT64A1,BACT64A2

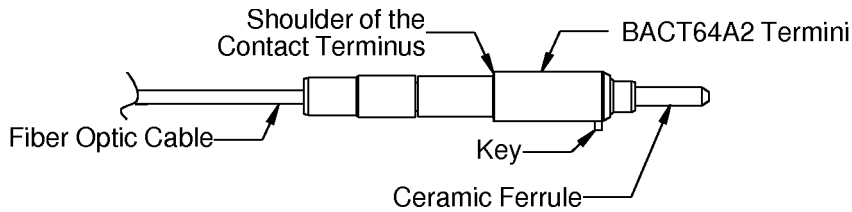
NOTE: The BACT64A() terminus is part of the cable assembly and cannot be removed. If it is necessary to replace a terminus, the cable assembly must be replaced. Refer to Subject 20-12-20 for the cable assembly part numbers.

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BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS



FIBER OPTIC CONTACT TERMINUS FOR BACC68C AND BACC68D CONNECTORS
Figure 5



FIBER OPTIC CONTACT TERMINUS FOR BACC68E AND BACC68F CONNECTORS
Figure 6

D. Backshell Part Numbers

Table 6
BACKSHELL PART NUMBERS

Part Number	Supplier
M85049-38S15W	QPL

3. INSERT CONFIGURATIONS

A. BACC68C and BACC68D Connectors

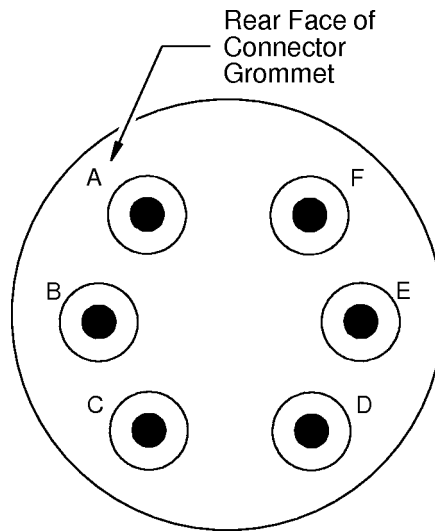
NOTE: Figure 7 shows the rear face of the insert for the plug connector. The view of the rear face of the insert for the receptacle connector is a mirror image of this view.

Table 7
CONNECTOR INSERT CONFIGURATIONS

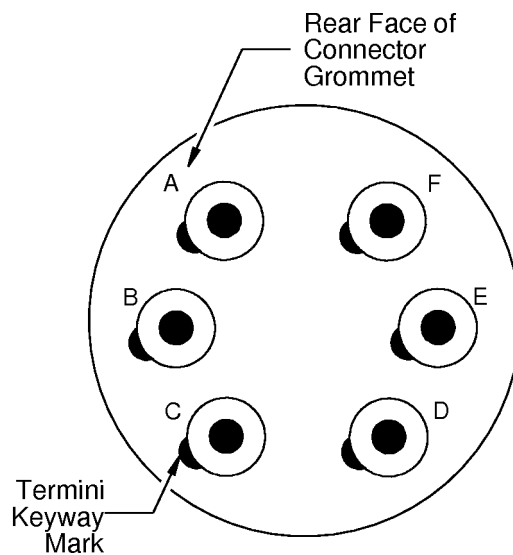
Insert Configuration	Contact Terminus Cavity		Reference
	Count	Size	
15-06	6	16	Figure 7 (Non-keyed)
15-06	6	16	Figure 8(Keyed)

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BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS



15-06 INSERT CONFIGURATION FOR BACC68C (MIRROR IMAGE) AND BACC68D CONNECTORS
Figure 7



15-06 INSERT CONFIGURATION FOR BACC68E (MIRROR IMAGE) AND BACC68F CONNECTORS
Figure 8

4. CONNECTOR DISASSEMBLY

A. Backshell Removal

- (1) Loosen the screws of the strain relief clamp.
- (2) Turn the coupling ring of the backshell in counterclockwise direction until the backshell is disengaged from the connector shell.
- (3) Move the backshell rearward away from the connector.

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BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS

B. Contact Terminus Removal for BACC69AA() and BACC69AC() Fiber Optic Cable Assemblies

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A SEALED CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**Table 8
CONTACT TERMINUS REMOVAL TOOLS**

Terminus Size	Removal Tool	
	Part Number	Color
16	M81969/14-03	White
16	DRK83-16	Blue with White Dot

(1) Make a selection of a contact terminus removal tool from Table 8.

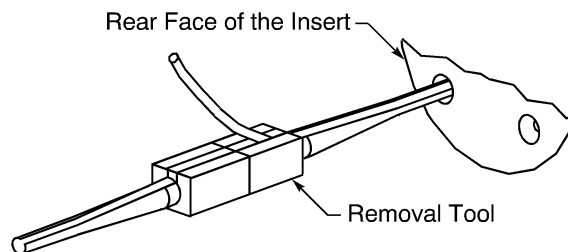
CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) Remove the wire harness ties that are less than 6 inches from the connector.
- (3) At the rear of the connector, put the tip of the removal tool on the cable.
- (4) Axially align the removal tool and contact terminus cavity.
- (5) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL UNTIL IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.



**POSITION OF THE REMOVAL TOOL IN THE CONTACT TERMINUS CAVITY
Figure 9**

(6) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out of the terminus cavity from the rear of the insert.

STANDARD WIRING PRACTICES MANUAL**BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS**

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

CAUTION: MAKE SURE NOT TO TOUCH THE FRONT FACE OF THE TERMINUS WITH FINGER OR ANY OTHER ITEMS DURING THE REMOVAL PROCESS. CONTAMINATION CAN OCCUR TO THE FRONT FACE OF THE TERMINUS.

- (7) If the contact terminus is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees on the cable assembly.
 - (c) Do Step (3) through Step (6) again.
- (8) If it is necessary, examine the contact terminus. Refer to Subject 20-12-20.
- (9) If the inspection is not necessary, put a clean protection cap on the contact terminus.
Refer to Subject 20-12-20 for the protection cap part numbers.

NOTE: A clean plastic bag is a satisfactory alternative for the protection cap.

- (10) Put the connector in a clean plastic bag.

CAUTION: THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

C. Contact Terminus Removal for BACC69C() Fiber Optic Cable Assemblies

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A SEALED CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (1) Make a selection of a contact terminus removal tool from Table 8.

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) Remove the wire harness ties that are less than 6 inches from the connector.

NOTE: IF IT IS NECESSARY TO REMOVE A FIBER OPTIC TERMINUS, THEN YOU MUST REMOVE ALL OF THE TERMINI IN THE CONNECTOR

- (3) Pull out all the contact termini half way through the cavities one by one:

CAUTION: FULLY REMOVING ONE TERMINUS OF A BACC69CCC FIBER OPTIC CABLE ASSEMBLY WITHOUT HAVING THE OTHER TERMINI HALF WAY PULLED OUT CAN DAMAGE THE FIBER OPTIC CABLE.

- (a) At the rear of the connector, put the tip of the removal tool on one of the cables.
- (b) Axially align the removal tool and contact terminus cavity.

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- (c) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (d) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out towards the rear connector insert just until the rear of the terminus is approximately even with the rear face of the connector insert.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

CAUTION: MAKE SURE NOT TO TOUCH THE FRONT FACE OF THE TERMINUS WITH FINGER OR ANY OTHER ITEMS DURING THE REMOVAL PROCESS. CONTAMINATION CAN OCCUR TO THE FRONT FACE OF THE TERMINUS.

- (e) If the contact terminus is not released, remove the tool and turn it approximately 90 degrees on the cable assembly. Do Step (3a) through Step (3d) again.
- (f) Pull the removal tool fully out of the terminus cavity without removing the terminus.
- (g) Repeat Step (3a) through Step (3d) for all other termini until all the termini are half way pulled out.

- (4) Remove the identified contact termini fully:

- (a) At rear of the connector, put the tip of the removal tool on the identified cable.
- (b) Axially align the removal tool and contact terminus cavity.
- (c) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (d) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out towards the rear connector insert until the terminus is fully out of the connector insert.

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Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

CAUTION: MAKE SURE NOT TO TOUCH THE FRONT FACE OF THE TERMINUS WITH FINGER OR ANY OTHER ITEMS DURING THE REMOVAL PROCESS. CONTAMINATION CAN OCCUR TO THE FRONT FACE OF THE TERMINUS.

- (e) If the contact terminus is not released, remove the tool and turn it approximately 90 degrees on the cable assembly. Do Step (4a) through Step (4d) again.
 - (f) Pull the removal tool fully out of the terminus cavity without removing the terminus.
- (5) Fully remove all other contact termini one by one:
- (a) At rear of the connector, put the tip of the removal tool on one of the cables.
 - (b) Axially align the removal tool and contact terminus cavity.
 - (c) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (d) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out towards the rear connector insert until the terminus is fully out of the connector insert.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

CAUTION: MAKE SURE NOT TO TOUCH THE FRONT FACE OF THE TERMINUS WITH FINGER OR ANY OTHER ITEMS DURING THE REMOVAL PROCESS. CONTAMINATION CAN OCCUR TO THE FRONT FACE OF THE TERMINUS.

- (e) If the contact terminus is not released, remove the tool and turn it approximately 90 degrees on the cable assembly. Do Step (5a) through Step (5d) again.
 - (f) Repeat Step (5a) through Step (5d) for all other termini until all the termini are fully removed.
- (6) If it is necessary, examine the contact termini. Refer to Subject 20-12-20.
- (7) If the inspection is not necessary, put a clean protection cap on the contact termini.

20-12-21

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Refer to Subject 20-12-20 for the protection cap part numbers.

NOTE: A clean plastic bag is a satisfactory alternative for the protection cap.

- (8) Put the connector in a clean plastic bag.

CAUTION: THE CONNECTORS MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

D. Seal Plug and Seal Rod Removal

**Table 9
NECESSARY TOOLS**

Tool	Type
Pliers	Needle Nose

- (1) Make a selection of pliers from Table 9.

CAUTION: MAKE SURE THAT THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) Remove the wire harness ties, that are less than 6 inches from the connector, from the wire harness.
- (3) Tightly hold the end of the seal plug or the seal rod in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod out of the contact cavity.

E. Removal of the Alignment Sleeve Insert

CAUTION: DO NOT PULL, SHAKE, OR TWIST THE ALIGNMENT SLEEVE INSERT FROM THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

**Table 10
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64

- (1) Make a selection of a driver from Table 10.

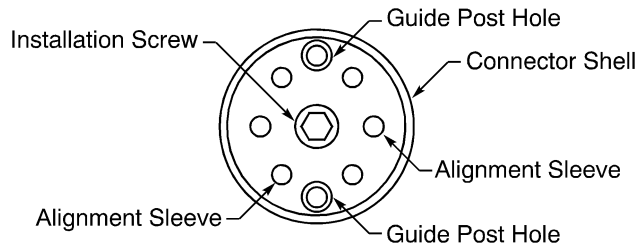
NOTE: The driver can have a ball type end.

- (2) Turn the installation screw in a counterclockwise direction until the screw is disengaged from the face of the connector.

CAUTION: DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT TO REMOVE IT FROM THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

STANDARD WIRING PRACTICES MANUAL

BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS



FRONT FACE OF THE ALIGNMENT SLEEVE INSERT
Figure 10

- (3) Put the alignment sleeve insert in a clean plastic bag.

CAUTION: KEEP THE ALIGNMENT SLEEVE INSERT IN A CLEAN PLASTIC BAG UNTIL IT IS INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

5. CONNECTOR ASSEMBLY

A. Installation of the Alignment Sleeve Insert

NOTE: The alignment sleeve insert can be installed before or after the contact termini are installed in the connector.

Table 11
NECESSARY TOOLS

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Allen Wrench	5/64
	Screwdriver, Hex	5/64

- (1) Examine the alignment sleeve insert. Refer to Paragraph 7.B..
- (2) Make a selection of these tools from Table 11:
 - A driver
 - A torque tool.

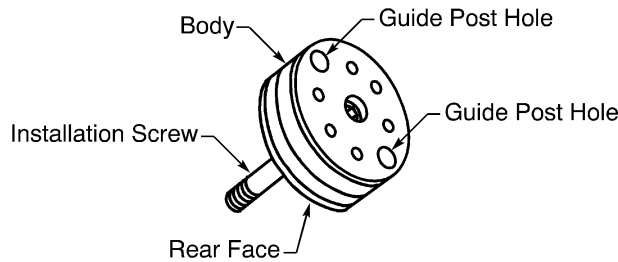
NOTE: The driver can have a ball type end.

- (3) Align the guide post holes in the rear face of the alignment sleeve insert with the two guide posts in the engaging face of the connector.

CAUTION: DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT WHEN IT IS INSTALLED IN THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

STANDARD WIRING PRACTICES MANUAL

BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS



ALIGNMENT SLEEVE INSERT
Figure 11

- (4) Fully engage the threads of the installation screw and the screw hole in the connector.
- (5) Torque the screw 8 inch-pounds ± 1 inch-pound.

B. Contact Terminus Insertion for BACC69AA() and BACC69AC() Fiber Optic Cable Assemblies

NOTE: A contact terminus can be installed before or after the alignment sleeve insert is installed in the connector.

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

Table 12
CONTACT TERMINUS INSERTION TOOLS

Terminus Size	Insertion Tool	
	Part Number	Color
16	M81969/14-03	Blue
16	DAK83-16	Blue

- (1) Make a selection of a contact terminus insertion tool from Table 12.

CAUTION: DO NOT USE AN INSERTION TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) If the contact terminus does not have a protection cap or is not in a plastic bag, examine the contact terminus. Refer to Subject 20-12-20.
- (3) Remove the protection from the contact terminus.
- (4) Carefully put the insertion tool on the cable and the contact terminus.

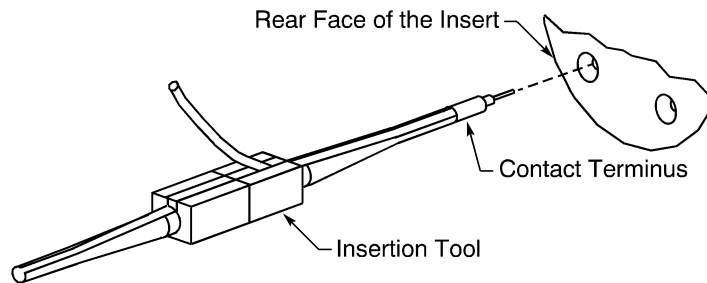
CAUTION: THE CONTACT TERMINUS MUST BE INSTALLED IN THE CONNECTOR IF IT DOES NOT HAVE PROTECTION FROM CONTAMINATION. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

CAUTION: DO NOT TOUCH THE FRONT FACE OF THE TERMINUS. CONTAMINATION ON THE TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (5) At the rear of the connector, axially align the insertion tool and the terminus with the contact terminus cavity. Refer to Figure 12

STANDARD WIRING PRACTICES MANUAL

BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS



ALIGNMENT OF THE CONTACT TERMINUS, THE INSERTION TOOL, AND THE CONTACT TERMINUS CAVITY
Figure 12

- (6) When installing a BACT64A2 Terminus, align the key on the terminus (refer to Figure 6) with the keyway orientation mark on the rear face of the connector insert. Refer to Figure 8
- (7) Carefully push the insertion tool and the contact terminus into the terminus cavity to until it stops.
Make sure that:
 - The tool stays aligned with the cavity
 - The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE INSERTION TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

CAUTION: DO NOT PUSH THE CABLE. DAMAGE TO THE FIBER OPTIC CABLE CAN OCCUR.

- (8) Carefully pull the insertion tool out of the terminus cavity.
Make sure that:
 - The tool stays aligned with the cavity
 - The tool is not turned in the cavity.
- (9) Lightly pull the cable to make sure that the terminus is locked in the terminus cavity.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OF A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINUS, THE CABLE, OR THE CONNECTOR.

CAUTION: DO NOT MAKE A DENT IN THE CABLE JACKET WITH THE FINGERNAILS. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (10) If the terminus is not locked in the cavity:
 - (a) Pull the terminus out of the cavity.
 - (b) Do Step (4) through Step (9) again.
- (11) If the connector is not connected immediately, put the connector in a clean plastic bag.

CAUTION: THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

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STANDARD WIRING PRACTICES MANUAL**BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS****C. Contact Terminus Removal for BACC69C() Fiber Optic Cable Assemblies**

NOTE: A contact terminus can be installed before or after the alignment sleeve insert is installed in the connector.

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (1) Align the key on the terminus with the keyway orientation mark on the rear face of the insert. Refer to Figure 6
- (2) Carefully insert each terminus of a BACC69CCC fiber optic cable assembly by hand into the appropriate terminus cavity until the rear of the terminus is just inside the insert.

NOTE: To prevent the terminus from rotating during installation, the terminus must be partially inserted by hand to ensure the key on the terminus is in the keyway of the terminus cavity of the insert.

NOTE: Pushing too hard on the fiber can damage the fiber optic cables.

- (3) Make a selection of a contact terminus insertion tool from Table 12.

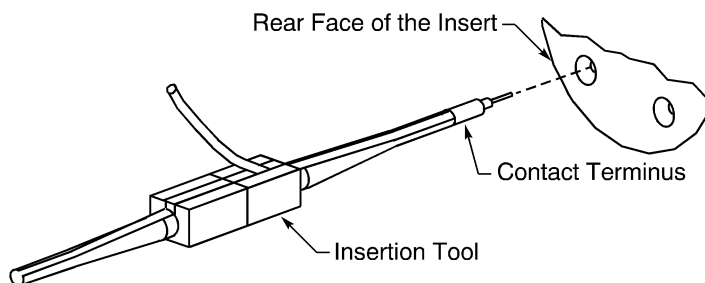
CAUTION: DO NOT USE AN INSERTION TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (4) If the contact terminus does not have a protection cap or is not in a plastic bag, examine the contact terminus. Refer to Subject 20-12-20.
- (5) Remove the protection from the contact terminus.
- (6) Carefully put the insertion tool on the cable and the contact terminus.

CAUTION: THE CONTACT TERMINUS MUST BE INSTALLED IN THE CONNECTOR IF IT DOES NOT HAVE PROTECTION FROM CONTAMINATION. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

CAUTION: DO NOT TOUCH THE FRONT FACE OF THE TERMINUS. CONTAMINATION ON THE TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (7) At the rear of the connector, axially align the insertion tool and the terminus with the contact terminus cavity. Refer to Figure 12.



ALIGNMENT OF THE CONTACT TERMINUS, THE INSERTION TOOL, AND THE CONTACT TERMINUS CAVITY
Figure 13

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STANDARD WIRING PRACTICES MANUAL**BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS**

- (8) Carefully push the insertion tool and the contact terminus into the terminus cavity to until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE INSERTION TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

CAUTION: DO NOT PUSH THE CABLE. DAMAGE TO THE FIBER OPTIC CABLE CAN OCCUR.

- (9) Carefully pull the insertion tool out of the terminus cavity.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

- (10) Lightly pull the cable to make sure that the terminus is locked in the terminus cavity.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OF A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINUS, THE CABLE, OR THE CONNECTOR.

CAUTION: DO NOT MAKE A DENT IN THE CABLE JACKET WITH THE FINGERNAILS. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (11) If the terminus is not locked in the cavity:

- (a) Pull the terminus out of the cavity.
- (b) Do Step (4) through Step (9) again.

- (12) Carefully pull the insertion tool out of the termini cavity. Remove the insertion tool from the cable.

- (13) Repeat Step (6) through Step (11) for other cables with termini need to be inserted into connectors

- (14) If the connector is not connected immediately, put the connector in a clean plastic bag.

CAUTION: THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

D. Seal of an Empty Contact Terminus Cavity

An empty contact terminus cavity must be sealed with a seal plug or a seal rod. Refer to Subject 20-60-08.

NOTE: The size of the contact terminus cavity is equivalent to a size 16 contact cavity.

E. Backshell Assembly

Refer to Subject 20-60-09.

6. CONNECTOR INSTALLATION**A. Plug and Receptacle Connection**

Refer to Subject 20-60-06.

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STANDARD WIRING PRACTICES MANUAL

BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS

7. INSPECTION AND CLEANING OF A FIBER OPTIC ALIGNMENT SLEEVE INSERT

A. Necessary Tools and Materials

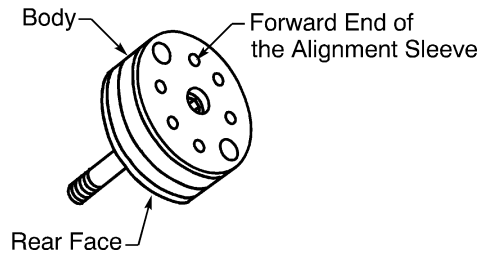
**Table 13
NECESSARY TOOLS**

Tool	Description	Part Number	Supplier
Air, Canned	Tetrafluoroethane	ES1620	Chemtronics

**Table 14
SOLVENTS**

Solvent	Specification	Supplier
Alcohol, Ethyl	O-E-760	Available source
Alcohol, Isopropyl	TT-I-735	Available source
Water, Distilled	-	Available source

B. Inspection and Cleaning



**ALIGNMENT SLEEVE INSERT
Figure 14**

Refer to Figure 14.

- (1) Without magnification, examine each end of the alignment sleeves of the insert.

NOTE: If the alignment sleeve insert is clean, it can be installed in the connector.

CAUTION: A CLEAN ALIGNMENT SLEEVE INSERT MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: A clean plastic bag is a satisfactory protection from contamination.

- (2) If an alignment sleeve has contamination, clean the sleeve without solvent. Refer to Paragraph 7.C..
- (3) If an alignment sleeve is broken, replace the BACI10AU() alignment sleeve holder with an equivalent BACI10AU() alignment sleeve holder and install it. Refer to Paragraph 5.A..

STANDARD WIRING PRACTICES MANUAL**BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS**

- (4) Without magnification, examine each end of the alignment sleeves again.

NOTE: If the alignment sleeve insert is clean, it can be installed in the connector.

CAUTION: A CLEAN ALIGNMENT SLEEVE INSERT MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: A clean plastic bag is a satisfactory protection from contamination.

- (5) If an alignment sleeve has remaining contamination, clean the sleeve with solvent. Refer to Paragraph 7.D..
- (6) Without magnification, examine each end of the alignment sleeves again.

NOTE: If the alignment sleeve insert is clean, it can be installed in the connector.

CAUTION: A CLEAN ALIGNMENT SLEEVE INSERT MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: A clean plastic bag is a satisfactory protection from contamination.

- (7) If an alignment sleeve has remaining contamination, clean the sleeve with solvent again. Refer to Paragraph 7.D..
- (8) Without magnification, examine the alignment sleeves again.

NOTE: If the alignment sleeve insert is clean, it can be installed in the connector.

CAUTION: A CLEAN ALIGNMENT SLEEVE INSERT MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: A clean plastic bag is a satisfactory protection from contamination.

- (9) If an alignment sleeve has remaining contamination, replace the alignment sleeve insert. Refer to Paragraph 5.A..

C. Contamination Removal - Without Solvent

For the conditions that are applicable for this procedure, refer to Paragraph 7.B.

Refer to Figure 14.

- (1) Make a selection of canned air from Table 13.

NOTE: An equivalent canned air is a satisfactory alternative.

- (2) Apply the canned air in each alignment sleeve that has contamination.

D. Contamination Removal - With Solvent

For the conditions that are applicable for this procedure, refer to Paragraph 7.B.

STANDARD WIRING PRACTICES MANUAL**BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS**

WARNING: SOME SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF A FLAMMABLE SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE ALIGNMENT SLEEVE INSERT.

Refer to Figure 14.

- (1) Make a selection of a canned air from Table 13.

NOTE: An equivalent canned air is a satisfactory alternative.

- (2) Make a selection of these solvents from Table 14:

- An alcohol
- Distilled water.

- (3) Put a quantity of alcohol in a small container that can be sealed with a lid.

Make sure that:

- The container is clean
- The size of the container is sufficient to hold the alignment sleeve insert
- The quantity of alcohol is sufficient to put the body of the alignment sleeve insert below the surface of the alcohol.

- (4) Put a quantity of distilled water in a small container that can be sealed with a lid.

Make sure that:

- The container is clean
- The size of the container is sufficient to hold the alignment sleeve insert
- The quantity of distilled water is sufficient to put the body of the alignment sleeve insert below the surface of the alcohol.

- (5) Put the alignment sleeve insert in the container that has alcohol for 30 seconds minimum.

Make sure that the body of the alignment sleeve insert is below the surface of the alcohol.

- (6) Remove the alignment sleeve insert from the alcohol.

- (7) Seal the alignment sleeve insert in the container that has distilled water.

Make sure that the body of the alignment sleeve insert is below the surface of the distilled water.

- (8) Lightly shake the container for 1 to 3 minutes.

- (9) Remove the alignment sleeve insert from the water.

- (10) Dry the alignment sleeve insert with the canned air.

- (11) Put the alignment sleeve insert in the container that has alcohol for 30 seconds minimum.

Make sure that the body of the alignment sleeve insert is below the surface of the alcohol.

- (12) Remove the alignment sleeve insert from the alcohol.

- (13) Dry the alignment sleeve insert with the canned air.



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STANDARD WIRING PRACTICES MANUAL

BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS

8. APPROVED TOOL SUPPLIERS

A. Contact Terminus Removal Tools

Table 15
CONTACT TERMINUS REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
M81969/14-03	QPL
DRK83-16	Daniels Manufacturing Corporation(DMC)

B. Contact Terminus Insertion Tools

Table 16
CONTACT TERMINUS INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
M81969/14-03	QPL
DAK83-16	Daniels Manufacturing Corporation (DMC)

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STANDARD WIRING PRACTICES MANUAL

REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

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STANDARD WIRING PRACTICES MANUAL**REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES**

This Subject gives the conditions and the procedures for the repair or replacement of these Primary Flight Control System (PFCS) components:

- The S280W501-() cable
- The S280W654-() jumper cable assemblies
- The S280W655-() cable assemblies
- The S280W657-() jumper cable assemblies.

1. CONDITIONS FOR REPAIR OR REPLACEMENT OF A CABLE ASSEMBLY**A. General Conditions**

A PFCS wire harness repair can be:

- A splice assembled on a cable
- The replacement of a connector
- A layer of tape to repair the damage of a cable jacket
- A layer of tape to repair the damage of a cable shield.

These conditions are applicable:

- A cable must be replaced if a necessary repair makes the total number of repairs greater than 3
- The location of repair must not be under a clamp or any other support
- The location of repair must not be inside a connector backshell
- Any repair of a cable jacket with damage that does not go through the jacket is a permanent repair.

B. S280W501-() Cables and S280W655-() Cable Assemblies

Repair of the cable is necessary if:

- The cable jacket has damage that goes through the jacket
- Either shield of the cable has damage
- A connector has any damage.

A cable with any repair must be replaced in less than 6000 flight hours. If it is necessary to install a new wire harness with a 287W1619-() vapor seal assembly, refer to Paragraph 7.

C. S280W654-() and S280W657-() Jumper Cable Assemblies

These repairs are not permitted:

- A splice assembled on a cable
- The replacement of a connector.

Repair of the cable is necessary if:

- The cable jacket has damage that goes through the jacket
- Either shield of the cable has damage.

A cable with any repair must be replaced in less than 100 flight hours. If it is necessary to install a new wire harness with a 287W1619-() vapor seal assembly, refer to Paragraph 7.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES****2. CABLE PART NUMBERS AND DESCRIPTION****A. Cable Configurations**

The S280W501-() cable has:

- A yellow, extruded ETFE jacket
- Two nickel-plated copper shields
- BMS 13-48 conductors
- 5 cable configurations; refer to Figure 1 through Figure 5.

The S280W655-() cable assembly has:

- An S280W501-() cable
- An overmolded connector and backshell.

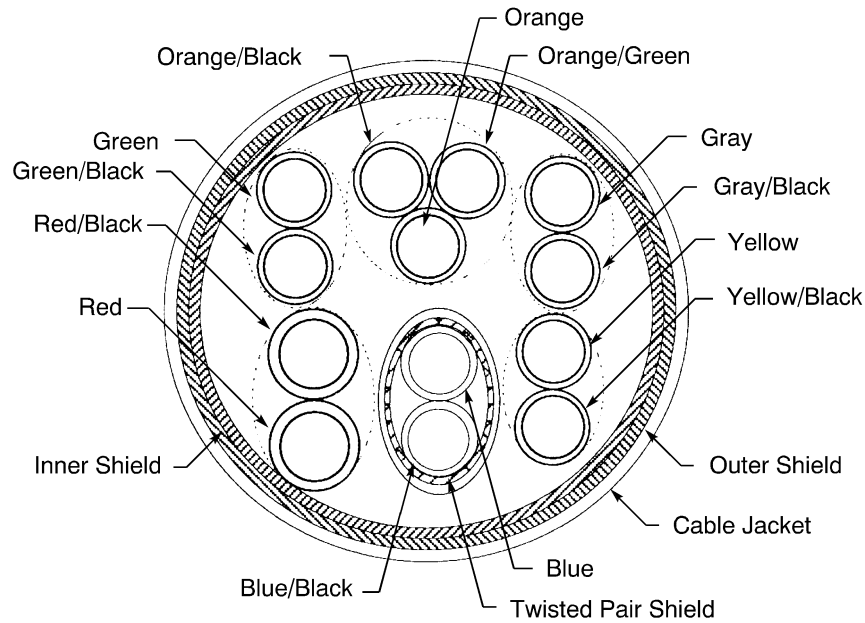
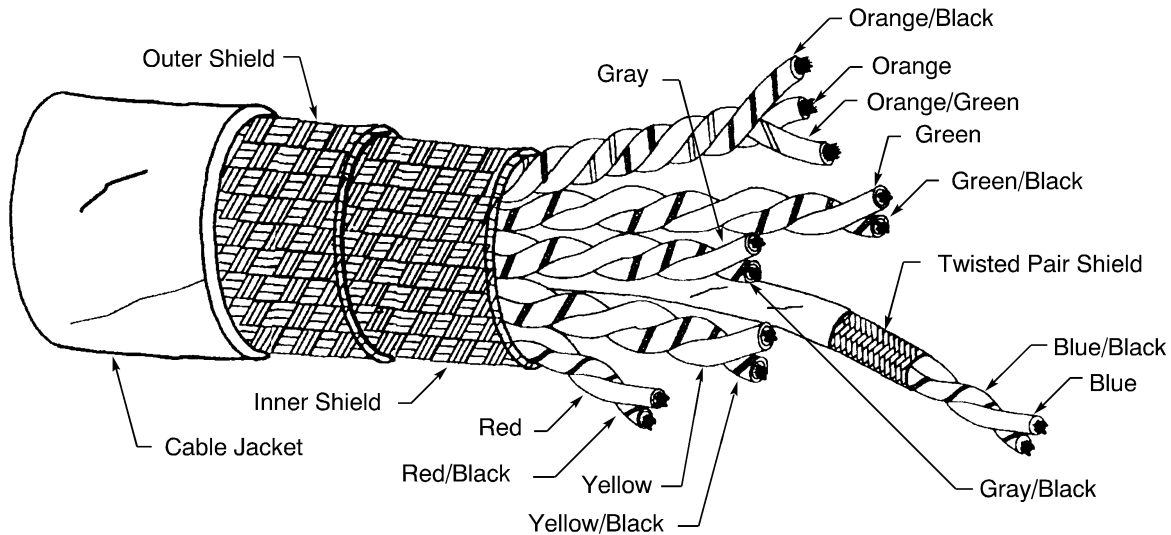
The cable of the S280W654-() and S280W657-() jumper cable assemblies have:

- A yellow, PTFE wrapped tape jacket
- Two nickel-plated shields
- Nickel plated 65 strand copper conductors
- An overmolded connector and backshell
- 7 cable configurations.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

B. S280W501-11 Cable

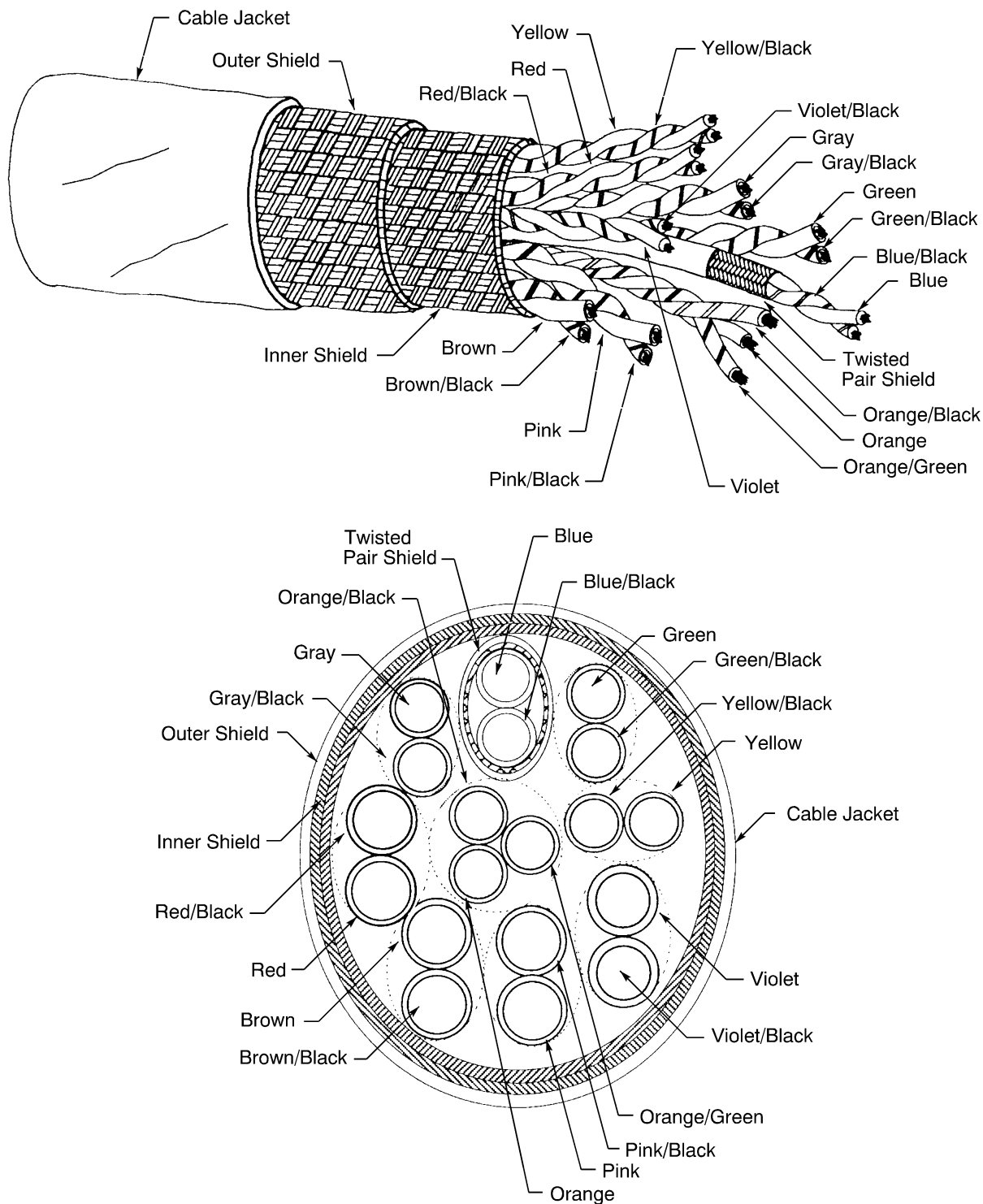


CONFIGURATION OF THE S280W501-11 CABLE
Figure 1

STANDARD WIRING PRACTICES MANUAL

REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESES

C. S280W501-12 Cable



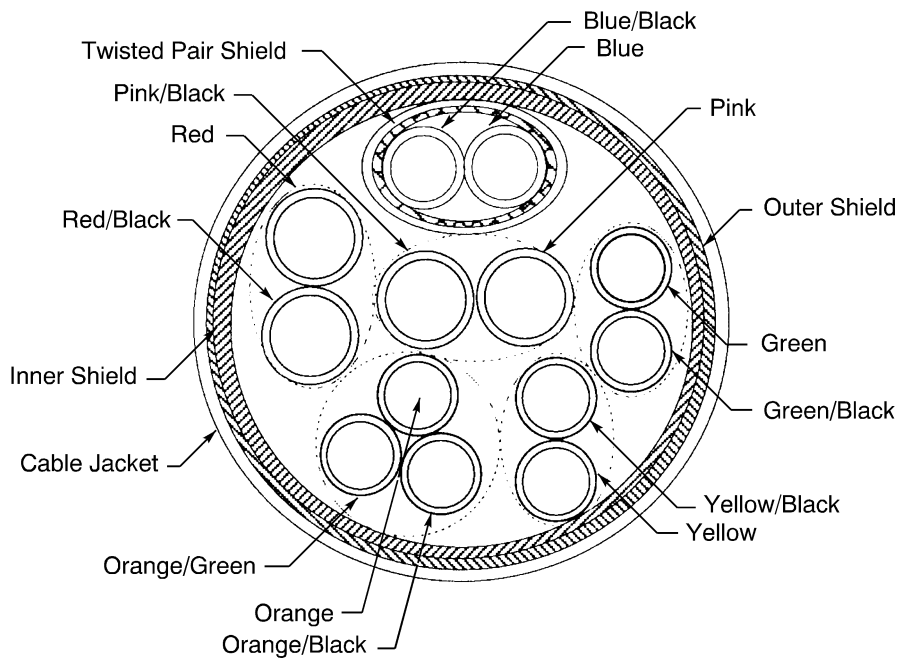
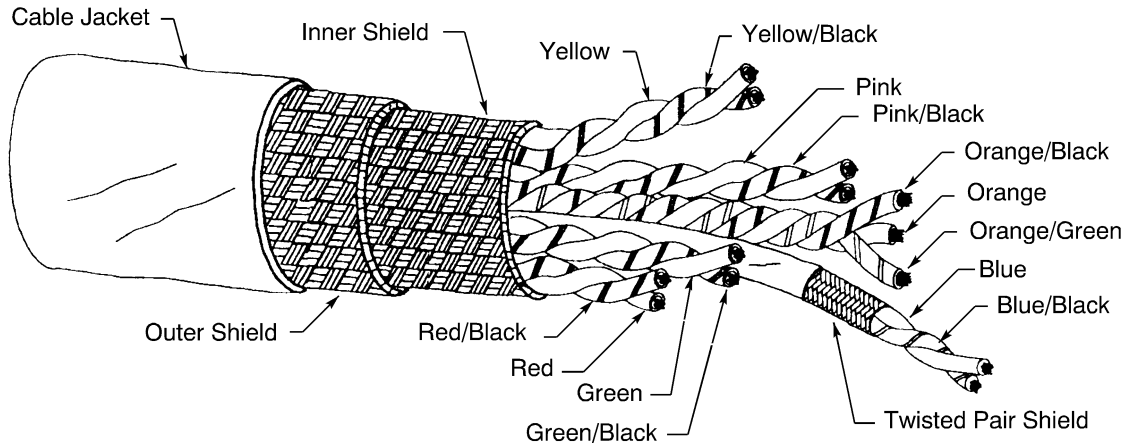
CONFIGURATION OF THE S280W501-12 CABLE
Figure 2

20-14-11

STANDARD WIRING PRACTICES MANUAL

REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESES

D. S280W501-13 Cable



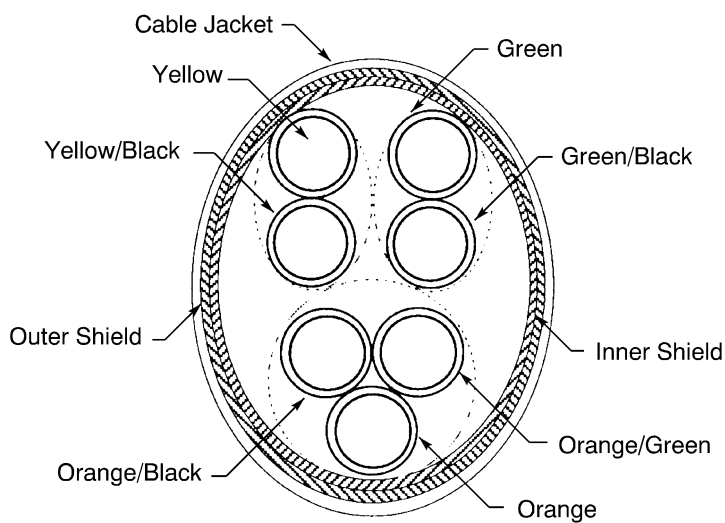
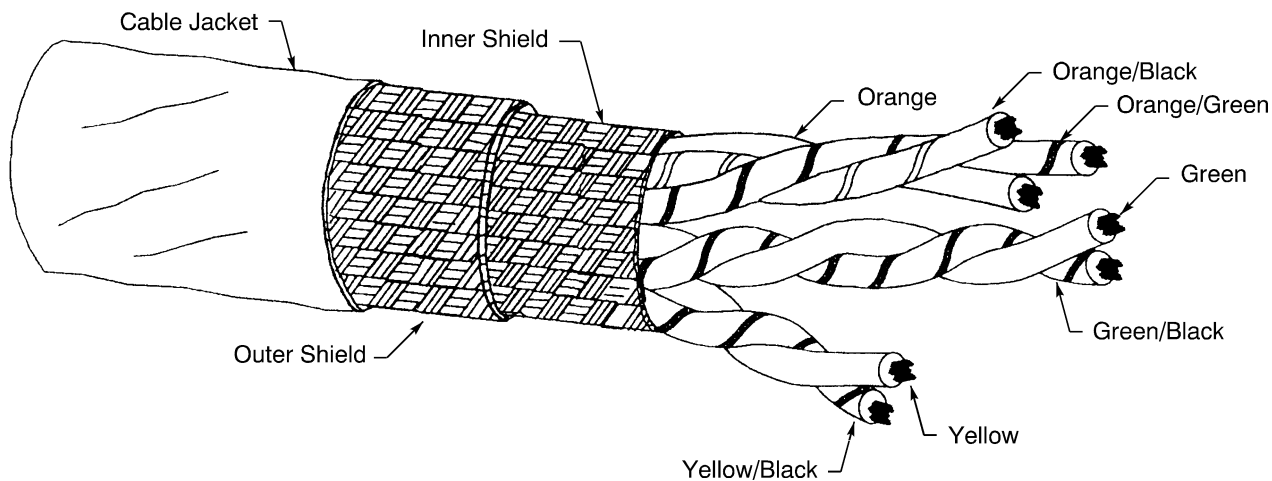
CONFIGURATION OF THE S280W501-13 CABLE

Figure 3

STANDARD WIRING PRACTICES MANUAL

REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

E. S280W501-14 Cable

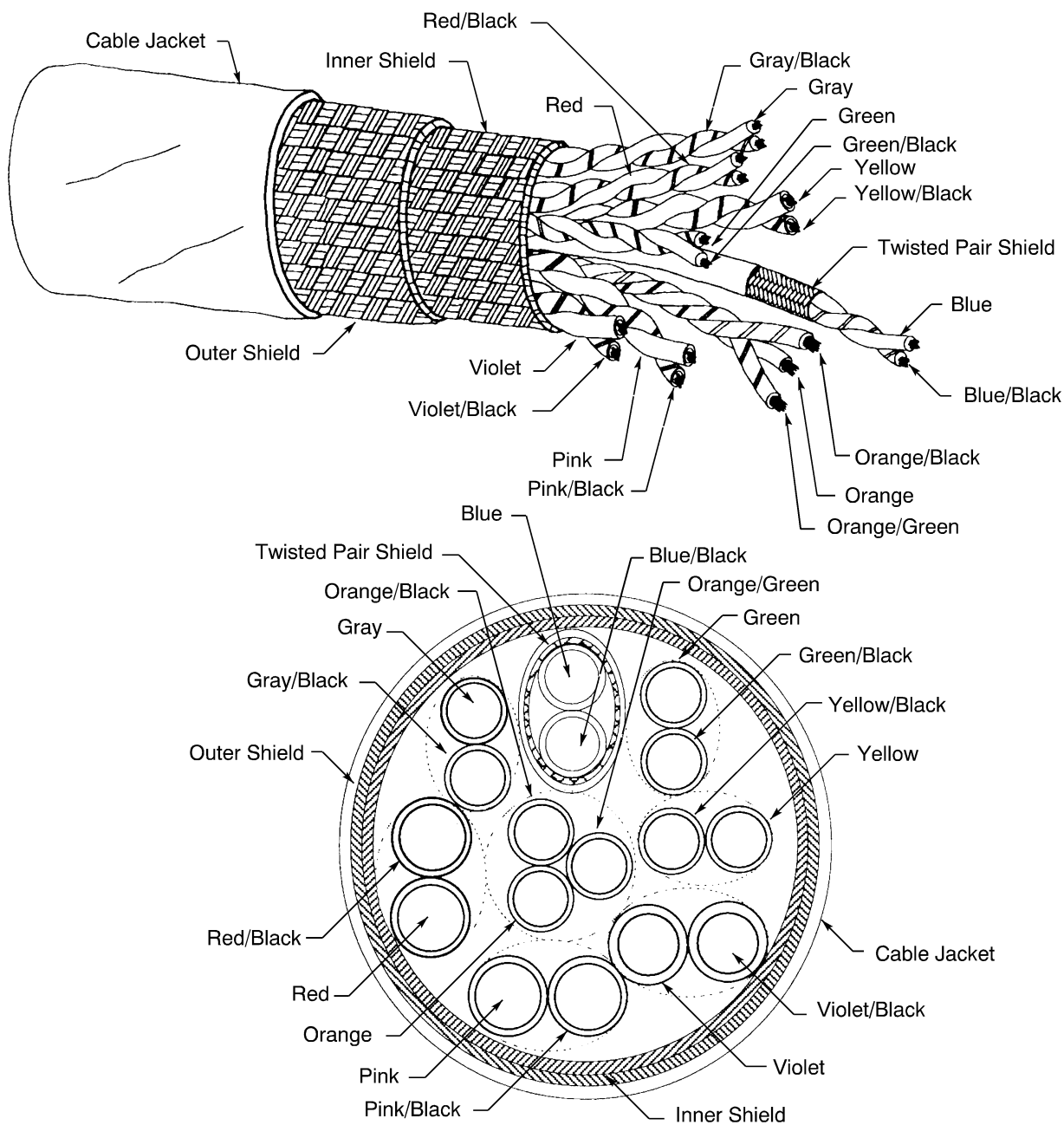


CONFIGURATION OF THE S280W501-14 CABLE
Figure 4

STANDARD WIRING PRACTICES MANUAL

REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESES

F. S280W501-15 Cable



CONFIGURATION OF THE S280W501-15 CABLE

Figure 5

STANDARD WIRING PRACTICES MANUAL**REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES****3. PFCS WIRE HARNESS REPAIR****A. Selection of a Repair Procedure**

(1) Repair the cable jacket if all of these conditions are applicable:

- The jacket of the cable is damaged
- Both of the shields of the cable are not damaged.

Refer to the procedure to repair the insulation of a wire or cable in Subject 20-10-13.

(2) Repair the cable jacket and the shields if all of these conditions are applicable:

- Either of the shields of the cable is damaged
- The damage of the shield or shields is less than 1 inch in length and less than 25 percent of the circumference of the shield
- The wires of the cable are not damaged.

Refer to the procedure to repair the shield of a wire or cable in Subject 20-10-13.

(3) Repair the cable with a splice if all of these conditions are applicable:

- Either of the shields of the cable is damaged
- The damage of the shield or shields is greater than 1 inch in length or greater than 25 percent of the circumference of the shield
- The wires of the cable are not damaged.

Refer to Paragraph 4.

(4) Repair the cable with a splice if any of the wires of a cable are damaged.

Refer to Paragraph 4.

(5) Repair the connector if all of these conditions are applicable:

- The connector is damaged
- The connector has a backshell that is not potted.

Refer to:

- Subject 20-61-11 for the connector disassembly and assembly procedures
- Paragraph 6. for the backshell assembly procedure.

(6) Replace the connector if any of these conditions are applicable:

- The connector of an overmolded cable assembly is damaged
- A connector with a potted backshell is damaged and the cable has the sufficient length for the replacement.

Refer to:

- Paragraph 5. for the connector replacement procedure
- Paragraph 6. for the backshell assembly procedure.

4. SPLICE ASSEMBLY FOR PFCS WIRE HARNESS CABLES**A. Conditions for Repair with a Splice**

NOTE: The replacement of a cable assembly is recommended over the repair of that cable with a splice.

NOTE: The maximum number of splices that a cable can have is 3.

20-14-11

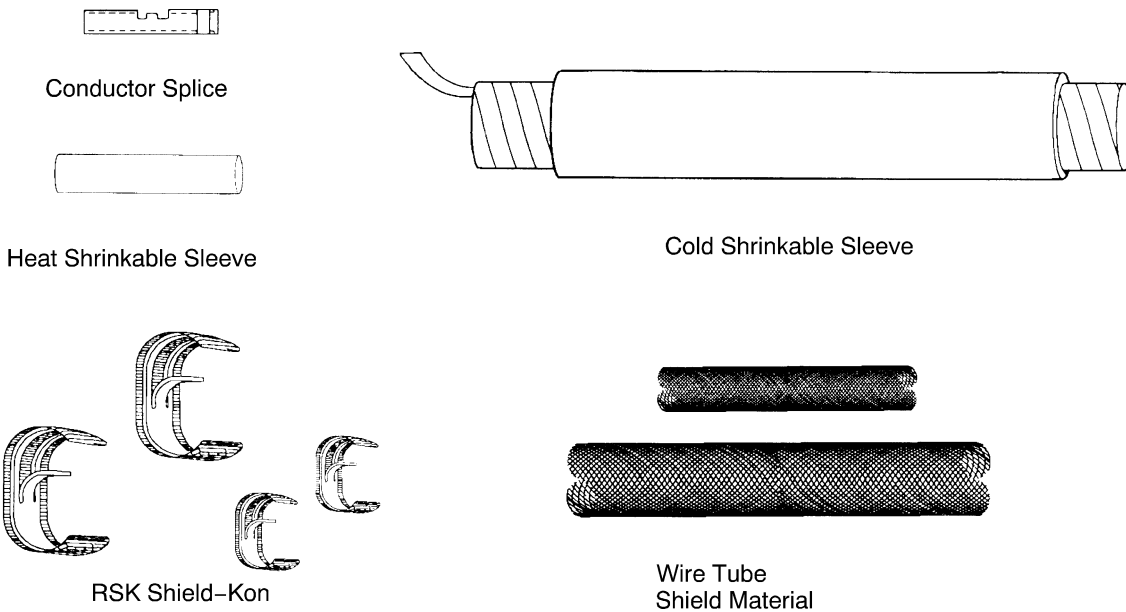
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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESES

A splice must not be assembled or installed:

- Under a clamp or other support
- Inside a connector backshell or adapter
- On the wire harness where the wire harness is frequently bent.

B. Cable and Splice Configurations



NECESSARY COMPONENTS FOR SPLICE ASSEMBLY

Figure 6

**Table 1
SPLICE ASSEMBLY DATA**

Cable	Reference
S280W501-11	Paragraph 4.F.
S280W501-12	Paragraph 4.G.
S280W501-13	Paragraph 4.H.
S280W501-14	Paragraph 4.I.
S280W501-15	Paragraph 4.J.

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C. Necessary Materials

**Table 2
NECESSARY MATERIALS**

Material	Part Number	Supplier	Size
Sealant	DC3145	Dow Corning	-
Sleeve, Heat Shrinkable	TFE2-X	Zeus	Size 12, 1.15 inch lengths
Tape, Insulation	Scotch 70	3M	0.5 inch width

D. Splice Assembly

**Table 3
SPLICE CRIMP TOOLS**

Splice	Crimp Tool	
	Part Number	Supplier
D-609-06	49935	AMP
	AD-1377	Raychem
	ST959-A	Boeing

**Table 4
RSK SHIELD-KON CRIMP TOOLS**

RSK Shield-Kon	Crimp Tool			
	Basic Unit		Die	
	Part Number	Supplier	Part Number	Supplier
RSK-301	WT740	Thomas & Betts	301G	Thomas & Betts
SK501HT	HX4	Daniels	501P	Thomas & Betts
	M22520/5-01	QPL		
SK601HT	HX4	Daniels	601Q	Thomas & Betts
	M22520/5-01	QLP		

- (1) Find the cable in Table 1.
- (2) Find the splice assembly data for the cable. Refer to the applicable paragraph for the cable configuration.
- (3) Remove the length of cable that is damaged:
 - (a) On one side of the damage, cut the cable so that the end of the cable is perpendicular to the longitudinal axis of the cable.
 - (b) On the other side of the damage, cut the cable so that the end of the cable is perpendicular to the longitudinal axis of cable.
- (4) Put a temporary identification label on each cable:

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- (a) Identify one cable as Cable A.
- (b) Identify the other cable as Cable B.
- (5) Put these components on Cable A:
 - The cold shrinkable sleeve
 - The specified length of the large wire tube.
- (6) Remove the necessary length of cable jacket from the end of each cable. Refer to Table 5.

CAUTION: DO NOT CUT THE SHIELD OF THE CABLE. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE.

**Table 5
REMOVAL LENGTH OF THE CABLE JACKET**

Cable	Removal Length (inch)
S280W501-11	4
S280W501-12	5
S280W501-13	6
S280W501-14	2.25
S280W501-15	5

- (7) Fold the end of the shield back over each cable jacket
- (8) Remove the necessary length of each shield so that the distance from the end of the shield to the end of the cable jacket is 0.5 inch

CAUTION: DO NOT CUT THE CABLE JACKET. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (9) Put a temporary layer of tape around the end of each shield so that the shields do not move.
- (10) Move the wires apart on each cable.
- (11) Cut the end of each wire so that the distance from the end of the cable jacket to the end of the wire is the specified length in the splice assembly data.

Refer to:

- Table 8 and Figure 11 for the S280W501-11 cable
- Table 10 and Figure 12 for the S280W501-12 cable
- Table 12 and Figure 13 for the S280W501-13 cable
- Table 14 and Figure 14 for the S280W501-14 cable
- Table 16 and Figure 15 for the S280W501-15 cable.
- (12) If the cable has a twisted pair, assemble a splice of the shield and the two wires of the twisted pair. Refer to Paragraph 4.E.
- (13) Remove 0.25 inch of insulation from the end of each wire in Cable A and Cable B.

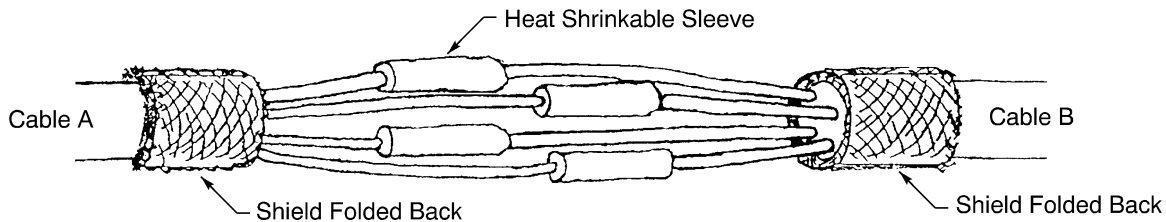
CAUTION: DO NOT CUT THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (14) Make a selection of a splice crimp tool from Table 3.
- (15) For each wire in Cable A and Cable B:

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- (a) Put the end of the Cable A wire in one end of the conductor splice.
 - (b) Crimp the splice
 - (c) Put the 1.15 inch length of heat shrinkable sleeve on the longer of the Cable A wire or the Cable B wire with the same color.
 - (d) Put the end of the Cable B wire with the same color as the Cable A wire in the other end of the conductor splice.
- Make sure the same color wire is in both ends of the splice.
- (e) Crimp the splice
 - (f) Wind a 0.75 inch to 1.0 inch length of tape around the conductor splice assembly so that:
 - The tape is smooth and symmetrical around the circumference of the splice assembly
 - The center of the layer of tape is aligned with the center of the conductor splice
 - The splice assembly has a minimum of two layers of tape.
- (16) Align the center of each heat shrinkable sleeve with the center of the each conductor splice assembly. Refer to Figure 7.



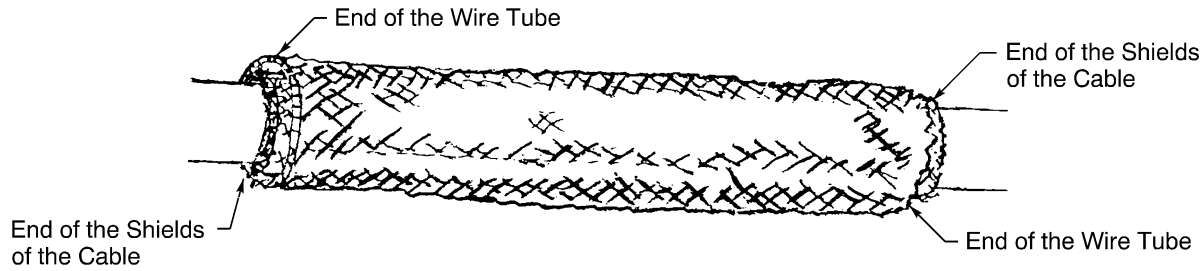
POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONDUCTOR SPLICE ASSEMBLY
Figure 7

- (17) If a sleeve cannot be moved over the tape
 - (a) Remove the necessary amount of tape.
 - (b) Make the tape smooth.
 - (c) Do Step (16) again.
- (18) Assemble the splice of the shield:
 - (a) Make a selection of a Shield-Kon crimp tool for the larger Shield-Kon from Table 4.
 - (b) Remove the temporary layer of tape around the end of each shield.
 - (c) Align one end of the wire tube with the end of the cable shield. Refer to Figure 8.

Make sure that the heat shrinkable sleeves on the conductor splice assemblies are not moved.

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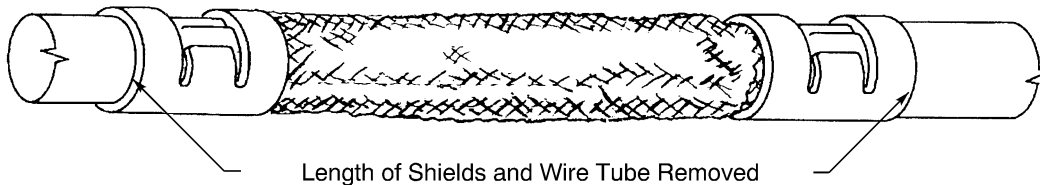
REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES



POSITION OF THE WIRE TUBE ON THE CABLE

Figure 8

- (d) Put one of the large Shield-Kons into the die of the crimp tool so that the center of the Shield-Kon is aligned with the center of the die.
- (e) Put crimp tool and the large Shield-Kon on the cable so that the edge of the Shield-Kon is approximately aligned with the end of the wire tube and shields of the cable.
- (f) Crimp the Shield-Kon.
- (g) Make the tube smooth and tight.
- (h) Put the other large Shield-Kons into the die of the crimp tool so that the center of the Shield-Kon is aligned with the center of the die.
- (i) Put the crimp tool and the large Shield-Kon on the other end of the cable so that the edge of the Shield-Kon is approximately aligned with the end of the wire tube and shields of the cable.
- (j) Crimp the Shield-Kon.
- (k) Remove the unwanted ends of the shield and wire tube so that each end is aligned with the outside edge of each Shield-Kon. Refer to Figure 9.



SHIELD SPLICE ASSEMBLY

Figure 9

- (19) Align the center of the cold shrinkable sleeve with the center of the shield splice assembly. Make sure that the Shield-Kons are fully under the sleeve.
- (20) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (21) On each end of the sleeve, apply a layer of sealant around the circumference of the sleeve and cable. Make sure that the layer of sealant makes an overlap with the end of the sleeve and the cable jacket.
- (22) Remove the temporary identification label from each cable. Refer to Step (4).
- (23) Do a loop impedance test of the cable.

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Refer to Subject 05-55-41 of the 777 Aircraft Maintenance Manual.

NOTE: A satisfactory alternative to a loop impedance test is an electrical continuity test from one Shield-Kon to the other Shield-Kon.

E. Splice Assembly on a Twisted Pair Cable

- (1) Remove the necessary length of cable jacket from the end of each twisted pair cable. Refer to Table 6.

CAUTION: DO NOT CUT THE SHIELD OF THE CABLE. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE.

**Table 6
REMOVAL LENGTH OF THE TWISTED PAIR CABLE JACKET**

Cable	Cable A Twisted Pair Removal Length (inch)	Cable B Twisted Pair Removal Length (inch)
S280W501-11	3	3
S280W501-12	4	3.25
S280W501-13	3	3
S280W501-15	4	3.25

- (2) Fold the end of the shield back over each cable jacket.
- (3) Remove the necessary length of each shield so that the distance from the end of the shield to the end of the cable jacket is 0.5 inch.

CAUTION: DO NOT CUT THE CABLE JACKET. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (4) Move the wires apart on each twisted pair.
- (5) Cut the end of each wire so that the distance from the end of the jacket of the twisted pair cable to the end of the wire is the specified length in the splice assembly data.

Refer to:

- Table 8 and Figure 11 for the S280W501-11 cable
- Table 10 and Figure 12 for the S280W501-12 cable
- Table 12 and Figure 13 for the S280W501-13 cable
- Table 16 and Figure 15 for the S280W501-15 cable.

- (6) Put the specified length of the small wire tube on the Cable B twisted pair.
- (7) Remove 0.25 inch of insulation from the end of each wire in the Cable A and Cable B twisted pairs.

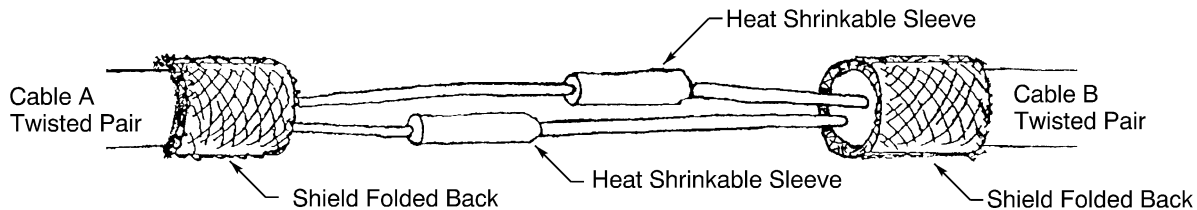
CAUTION: DO NOT CUT THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE

- (8) Assemble a splice of each of the twisted pair wires:
 - (a) Put the end of the shorter Cable A wire in one end of the conductor splice.
 - (b) Crimp the splice.
 - (c) Put the end of the shorter Cable B wire in one end of another conductor splice.
 - (d) Crimp the splice.

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- (e) Put a 1.15 inch length of heat shrinkable sleeve on the longer wire in the Cable B twisted pair.
- (f) Put the end of the longer Cable B wire in the other end of the conductor splice with the shorter Cable A wire.
Make sure the same color wire is in both ends of the splice.
- (g) Crimp the splice.
- (h) Put a 1.15 inch length of heat shrinkable sleeve on the longer wire in the Cable A twisted pair.
- (i) Put the end of the longer Cable A wire in the other end of the conductor splice with the shorter Cable B wire.
Make sure the same color wire is in both ends of the splice.
- (j) Crimp the splice.
- (9) Wind a 0.75 inch to 1.0 inch length of tape around each conductor splice assembly so that:
 - The tape is smooth and symmetrical around the circumference of the splice assembly
 - The center of the layer of tape is aligned with the center of the conductor splice
 - The splice assembly has a minimum of two layers of tape.
- (10) Align the center of each heat shrinkable sleeve with the center of the each conductor splice assembly. Refer to Figure 10.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONDUCTOR SPLICE ASSEMBLY
Figure 10

- (11) If a sleeve cannot be moved over the tape:
 - (a) Remove the necessary amount of tape.
 - (b) Make the tape smooth
 - (c) Do Step (10) again.
- (12) Assemble the splice of the shield:
 - (a) Make a selection of a Shield-Kon crimp tool for the smaller Shield-Kon from Table 4.
 - (b) Align one end of the wire tube with the end of the cable shield. Refer to Figure 8.
Make sure that the heat shrinkable sleeves on the conductor splice assemblies are not moved
 - (c) Put one of the small Shield-Kons on the cable so that the edge of the Shield-Kon is approximately aligned with the end of the wire tube and shields of the cable.
 - (d) Crimp the Shield-Kon.
 - (e) Make the tube smooth and tight
 - (f) Put the other small Shield-Kon on the other end of the cable so that the edge of the Shield-Kon is approximately aligned with the end of the wire tube and shields of the cable.
 - (g) Crimp the Shield-Kon.

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSES

- (h) Remove the unwanted ends of the shield and wire tube so that the ends are aligned with the outside edges of each Shield-Kon. Refer to Figure 9.
- (13) Wind a minimum of two layers of tape around the shield splice assembly so that:
 - The end of the tape is a minimum of 1/2 inch beyond each end of the outside edges of each Shield-Kon
 - The tape makes a 50 percent overlap on each layer.
- (14) Make the tape smooth.

F. S280W501-11 Cable Splice Data

**Table 7
SPLICE ASSEMBLY COMPONENTS FOR AN S280W501-11**

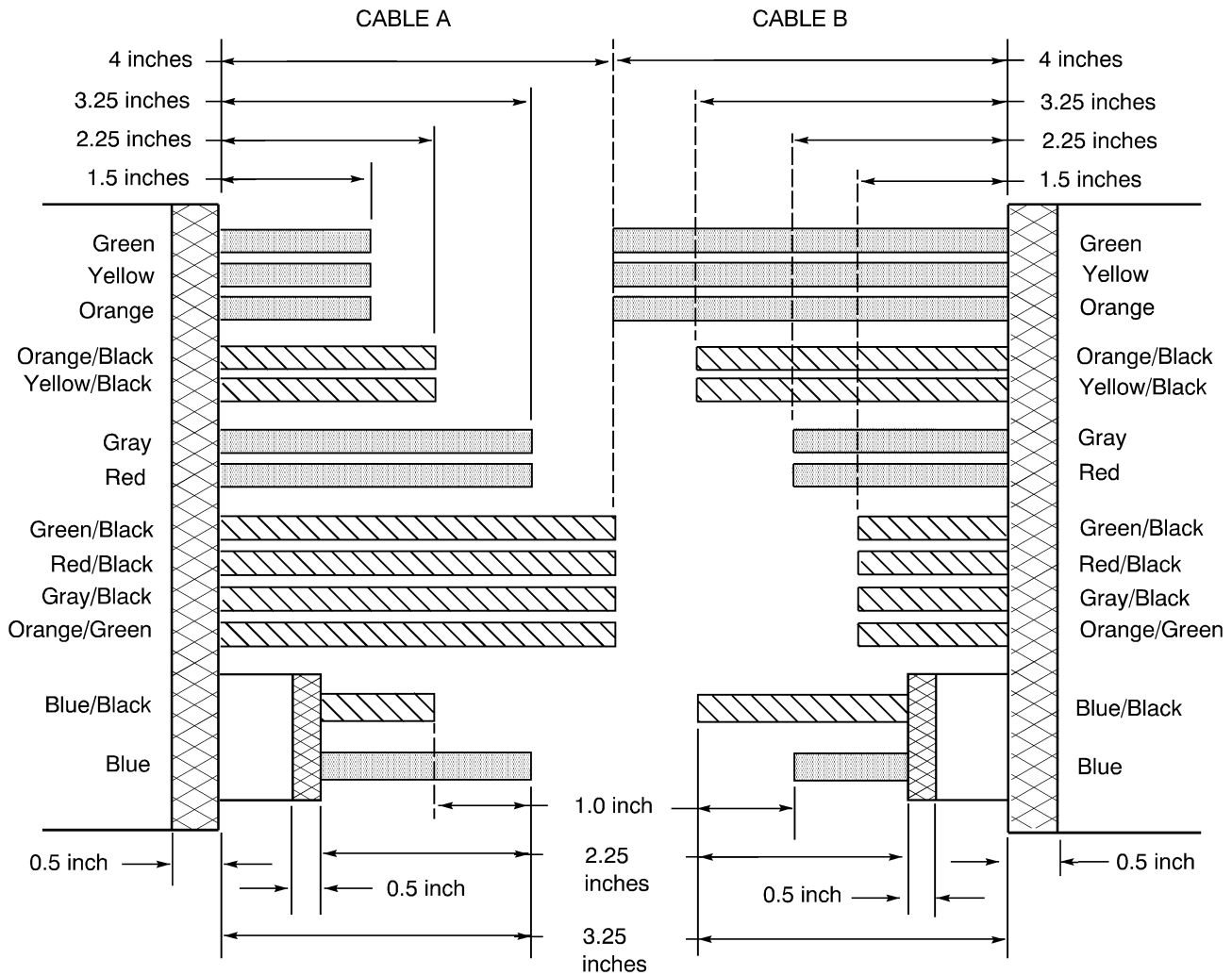
Component	Part Number	Supplier	Quantity	Length (inch)
Shield-Kon	RSK301	Thomas & Betts	2	-
	SK601HT	Thomas & Betts	2	-
Sleeve, Cold Shrinkable	8447-8	3M	1	8
Splice, Butt	D-609-06	Raychem	13	-
Wire Tube, Braided, Nickel Coated	BAC3106-6	QPL	1	12
Wire Tube, Braided, Tin Coated	BAC3108-1G	QPL	1	6

**Table 8
S280W501-11 CABLE PREPARATION**

Wire	Cable A Wire Length (inch)	Cable B Wire Length (inch)
Green/Black	4.00	1.50
Orange/Green	4.00	1.50
Gray/Black	4.00	1.50
Red/Black	4.00	1.50
Gray	3.25	2.25
Red	3.25	2.25
Yellow/Black	2.25	3.25
Orange/Black	2.25	3.25
Green	1.50	4.00
Yellow	1.50	4.00
Orange	1.50	4.00

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES



S280W501-11 CABLE PREPARATION
Figure 11

G. S280W501-12 Cable Splice Data

Table 9
SPLICE ASSEMBLY COMPONENTS FOR AN S280W501-12

Component	Part Number	Supplier	Quantity	Length (inch)
Shield-Kon	RSK301	Thomas & Betts	2	-
	SK601HT	Thomas & Betts	2	-
Sleeve, Cold Shrinkable	8447-8	3M	1	8
Splice, Conductor	D-609-06	Raychem	19	-
Wire Tube, Braided, Nickel Coated	BAC3106-6	QPL	1	12

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Table 9 (continued)

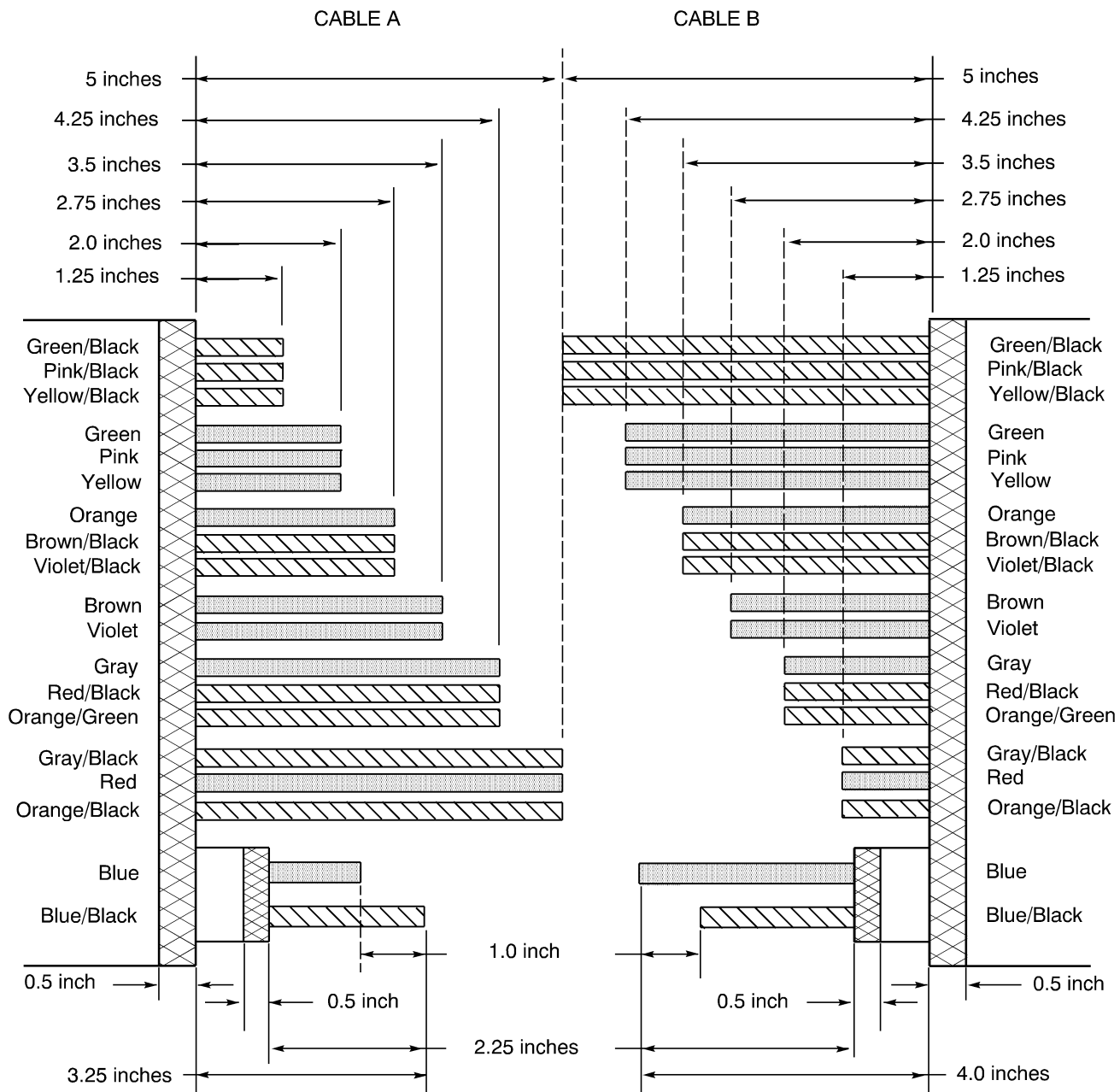
Component	Part Number	Supplier	Quantity	Length (inch)
Wire Tube, Braided, Tin Coated	BAC3108-1G	QPL	1	6

**Table 10
S280W501-12 CABLE PREPARATION**

Wire	Cable A Wire Length (inch)	Cable B Wire Length (inch)
Orange/Black	5.00	1.25
Gray/Black	5.00	1.25
Red	5.00	1.25
Orange/Green	4.25	2.00
Gray	4.25	2.00
Red/Black	4.25	2.00
Violet	3.50	2.75
Brown	3.50	2.75
Orange	2.75	3.50
Brown/Black	2.75	3.50
Violet/Black	2.75	3.50
Green	2.00	4.25
Yellow	2.00	4.25
Pink	2.00	4.25
Pink/Black	1.25	5.00
Green/Black	1.25	5.00
Yellow/Black	1.25	5.00

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S280W501-12 CABLE PREPARATION
Figure 12

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H. S280W501-13 Cable Splice Data

**Table 11
SPLICE ASSEMBLY COMPONENTS FOR AN S280W501-13**

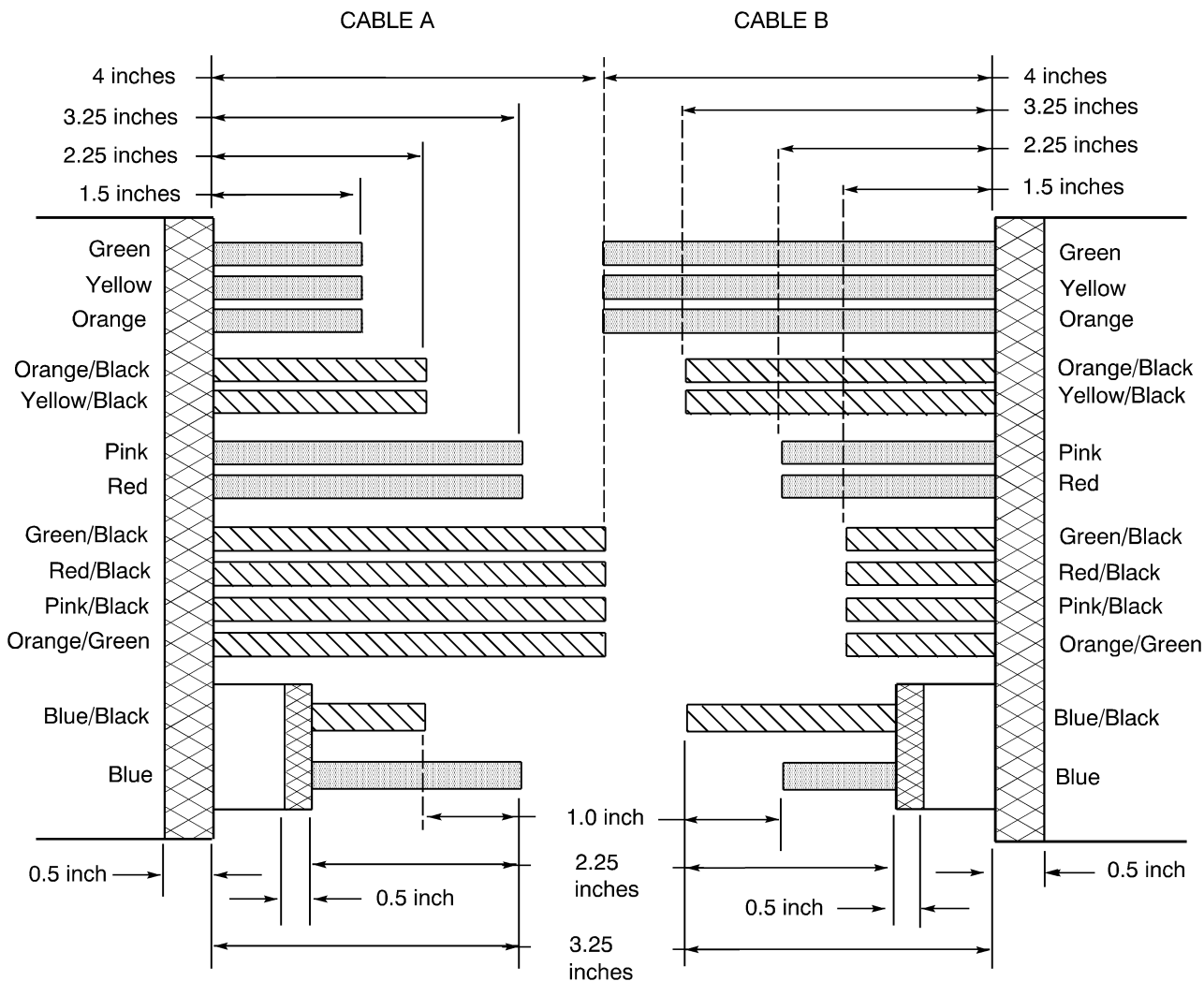
Component	Part Number	Supplier	Quantity	Length (inch)
Shield-Kon	RSK301	Thomas & Betts	2	-
	SK601HT	Thomas & Betts	2	-
Sleeve, Cold Shrinkable	8447-8	3M	1	8
Splice, Conductor	D-609-06	Raychem	13	-
Wire Tube, Braided, Nickel Coated	BAC3106-6	QPL	1	12
Wire Tube, Braided, Tin Coated	BAC3108-1G	QPL	1	6

**Table 12
S280W501-13 CABLE PREPARATION**

Wire	Cable A Wire Length (inch)	Cable B Wire Length (inch)
Green/Black	4.00	1.50
Orange/Green	4.00	1.50
Pink/Black	4.00	1.50
Red/Black	4.00	1.50
Red	3.25	2.25
Pink	3.25	2.25
Yellow/Black	2.25	3.25
Orange/Black	2.25	3.25
Green	1.50	4.00
Yellow	1.50	4.00
Orange	1.50	4.00

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES



S280W501-13 CABLE PREPARATION
Figure 13

I. S280W501-14 Cable Splice Data

Table 13
SPLICE ASSEMBLY COMPONENTS FOR AN S280W501-14

Component	Part Number	Supplier	Quantity	Length (inch)
Shield-Kon	SK501HT	Thomas & Betts	2	-
Sleeve, Cold Shrinkable	8443-6.5	3M	1	6.5
Splice, Conductor	D-609-06	Raychem	7	-
Wire Tube, Braided, Nickel Coated	BAC3106-6	QPL	1	9

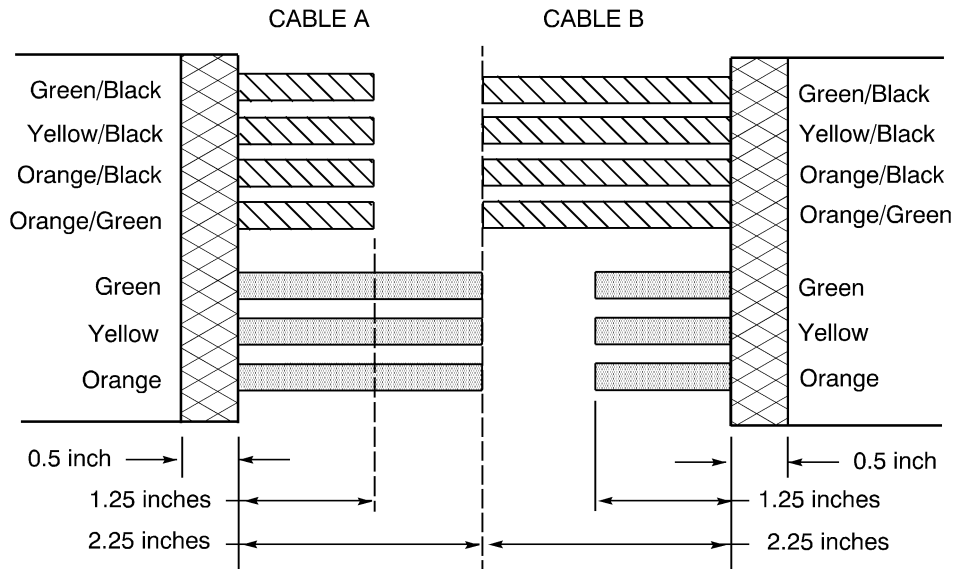
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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

Table 14
S280W501-14 CABLE PREPARATION

Wire	Cable A Wire Length (inch)	Cable B Wire Length (inch)
Green	2.25	1.25
Yellow	2.25	1.25
Orange	2.25	1.25
Green/Black	1.25	2.25
Yellow/Black	1.25	2.25
Orange/Black	1.25	2.25
Orange/Green	1.25	2.25



S280W501-14 CABLE PREPARATION
Figure 14

J. S280W501-15 Cable Splice Data

Table 15
SPLICE ASSEMBLY COMPONENTS FOR AN S280W501-15

Component	Part Number	Supplier	Quantity	Length (inch)
Shield-Kon	RSK301	Thomas & Betts	2	-
	SK601HT	Thomas & Betts	2	-
Sleeve, Cold Shrinkable	8447-8	3M	1	-
Splice, Conductor	D-609-06	Raychem	17	-

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

Table 15 (continued)

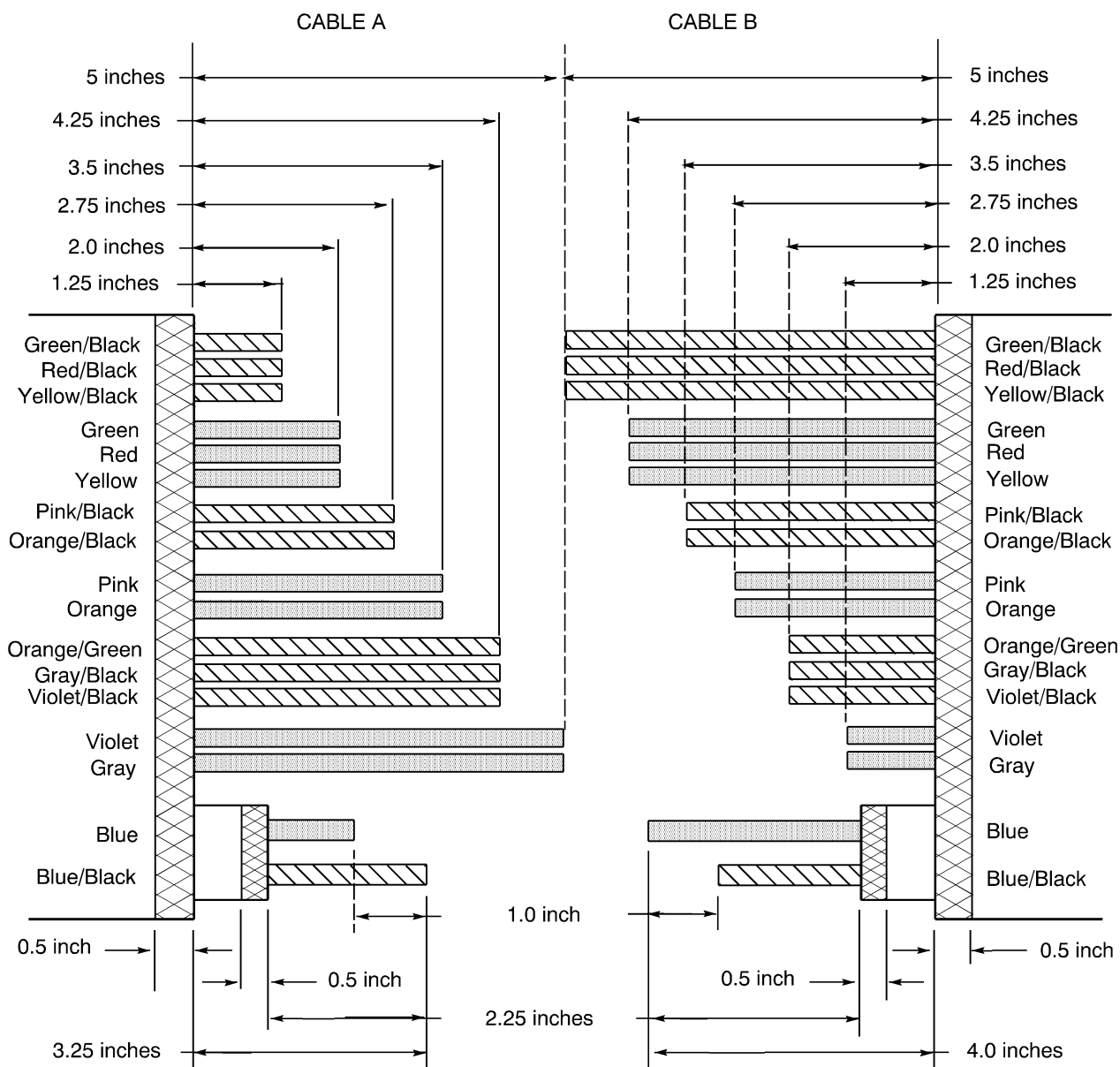
Component	Part Number	Supplier	Quantity	Length (inch)
Wire Tube, Braided, Nickel Coated	BAC3106-6	QPL	1	12
Wire Tube, Braided, Tin Coated	BAC3108-1G	QPL	1	6

**Table 16
S280W501-15 CABLE PREPARATION**

Wire	Cable A Wire Length (inch)	Cable B Wire Length (inch)
Gray	5.00	1.25
Violet	5.00	1.25
Orange/Green	4.25	2.00
Gray/Black	4.25	2.00
Violet/Black	4.25	2.00
Orange	3.50	2.75
Pink	3.50	2.75
Orange/Black	2.75	3.50
Pink/Black	2.75	3.50
Green	2.00	4.25
Yellow	2.00	4.25
Red	2.00	4.25
Green/Black	1.25	5.00
Yellow/Black	1.25	5.00
Red/Black	1.25	5.00

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESES



S280W501-15 CABLE PREPARATION

Figure 15

20-14-11

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSES

5. CONNECTOR REPLACEMENT

A. Connector Selection

CAUTION: FOR THIS REPAIR PROCEDURE, THE SPECIFIED CONNECTORS DO NOT HAVE ACCEPTABLE ALTERNATIVE PART NUMBERS. IF THE SPECIFIED CONNECTOR IS NOT USED, THE SYSTEM CAN GIVE UNSATISFACTORY PERFORMANCE.

Refer to Subject 20-61-11 for:

- The part number structures
- The insert configurations
- The contact part numbers
- The acceptable alternative contact part numbers.

**Table 17
REPLACEMENT CONNECTOR PART NUMBERS**

Connector	Description
1167A18G14SN	Modified BACC63BV Receptacle
BACC63CB12-12P9	Bayonet Coupled, Vibration Resistant Plug with Ground Spring
BACC63CB12-12PN	Bayonet Coupled, Vibration Resistant Plug with Ground Spring
BACC63CB16-24P6	Bayonet Coupled, Vibration Resistant Plug with Ground Spring
BACC63CB16-24P7	Bayonet Coupled, Vibration Resistant Plug with Ground Spring
BACC63CB16-24P8	Bayonet Coupled, Vibration Resistant Plug with Ground Spring
BACC63CB16-24P9	Bayonet Coupled, Vibration Resistant Plug with Ground Spring
BACC63CB16-24PN	Bayonet Coupled, Vibration Resistant Plug with Ground Spring
BACC63BP12C12P6	Self Locking, Thread Coupled, Vibration Resistant Plug
BACC63BP12C12P7	Self Locking, Thread Coupled, Vibration Resistant Plug
BACC63BP12C12PN	Self Locking, Thread Coupled, Vibration Resistant Plug
BACC63BP16C24PN	Self Locking, Thread Coupled, Vibration Resistant Plug
BACC63BP16C24P6	Self Locking, Thread Coupled, Vibration Resistant Plug
BACC63BP16C24P7	Self Locking, Thread Coupled, Vibration Resistant Plug
BACC63BV14F7S7	Self Locking, Thread Coupled, Vibration Resistant Receptacle
BACC63BV20F16SN	Self Locking, Thread Coupled, Vibration Resistant Receptacle
BACC63BV22F19PN	Self Locking, Thread Coupled, Vibration Resistant Receptacle
BACC63BV22F19S6	Self Locking, Thread Coupled, Vibration Resistant Receptacle
BACC63BV22F19S8	Self Locking, Thread Coupled, Vibration Resistant Receptacle
BACC63BV22F19SN	Self Locking, Thread Coupled, Vibration Resistant Receptacle



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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

B. Backshell Selection

**Table 18
REPLACEMENT BACKSHELL PART NUMBERS**

Overmolded Backshell	Repair Backshell			
	Configuration	Shell Size	Part Number	Supplier
23414-001	Straight	12	S280W604-10	QPL
	45 degrees	12	S280W604-20	QPL
23414-002	Straight	14	S280W604-11	QPL
	90 degrees	14	S280W604-31	QPL
23414-003	Straight	16	S280W604-12	QPL
			S280W604-13	QPL
		20	S280W604-16	QPL
			S280W604-17	QPL
	22	S280W604-18	QPL	
		S280W604-19	QPL	
	45 degrees	16	S280W604-22	QPL
			S280W604-23	QPL
23414-005	45 degrees	14	S280W604-21	QPL
	90 degrees	14	S280W604-31	QPL
23414-006	Straight	16	S280W604-12	QPL
			S280W604-13	QPL
	45 degrees	20	S280W604-26	QPL
			S280W604-27	QPL
23414-007	Straight	22	S280W604-18	QPL
			S280W604-19	QPL
	90 degrees	22	S280W604-38	QPL
			S280W604-39	QPL

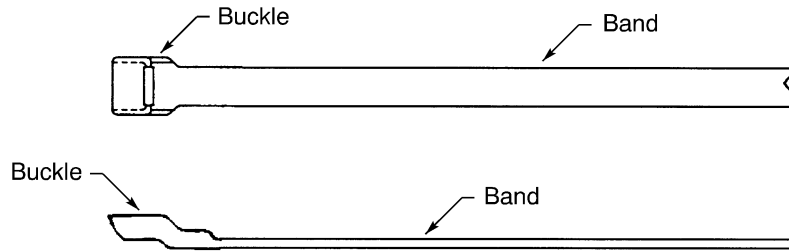
**Table 19
SHIELD TERMINATOR BAND PART NUMBERS**

Boeing Standard	Shield Terminator Band	
	Part Number	Supplier
BACB42F3	A10086	Band-it Idex
	5B0001C	Sigmaform
	600-052	Glenair

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SHIELD TERMINATOR BAND
Figure 16

C. Necessary Parts and Materials

Table 20
NECESSARY PARTS AND MATERIALS

Material	Specification or Part Number	Supplier	Size
Shield-Kon	RSK301	Thomas & Betts	-
Sleeve, Solder	BACS13CT-2-B	QPL	-
	SO63-2-9030	Raychem	-

D. Connector Removal

- (1) Find the location where the overmold starts on the cable.
- (2) Cut the cable at that location so that the end of the cable is perpendicular to the longitudinal axis of the cable.
- (3) Examine the end of the cable.
- (4) If it is necessary, remove the necessary length of cable so that the cable has no remaining overmolded material inside the outer diameter of the cable.

E. Cable Preparation

Table 21
REMOVAL LENGTH OF THE CABLE JACKET

Backshell		Removal Length (inch)	
Shell Size	Configuration	Target	Tolerance
12	Straight	2.00	± 0.05
	45 degrees	2.30	± 0.05
14	Straight	2.00	± 0.05
	45 degrees	2.30	± 0.05
	90 degrees	3.00	± 0.05

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Table 21 (continued)

Backshell		Removal Length (inch)	
Shell Size	Configuration	Target	Tolerance
16	Straight	2.00	± 0.05
	45 degrees	2.30	± 0.05
20	Straight	2.00	± 0.05
	45 degrees	2.30	± 0.05
22	Straight	2.00	± 0.05
	90 degrees	3.20	± 0.05

(1) If it is necessary, put a permanent label on the cable to show:

- The equipment number
- The hookup number

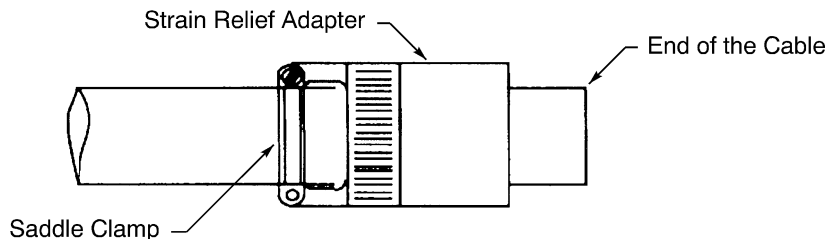
(2) Make a selection of the connector. Refer to Table 17.

CAUTION: THE SPECIFIED CONNECTORS DO NOT HAVE ACCEPTABLE ALTERNATIVE PART NUMBERS. IF THE SPECIFIED CONNECTOR IS NOT USED, THE SYSTEM CAN GIVE UNSATISFACTORY PERFORMANCE

(3) Make a selection of a backshell. Refer to Table 18.

(4) Put the strain relief adapter of the backshell on the cable. Refer to Figure 17.

Make sure that the end with the saddle clamp is pointed away from the end of the cable.



POSITION OF THE STRAIN RELIEF ADAPTER ON THE CABLE

Figure 17

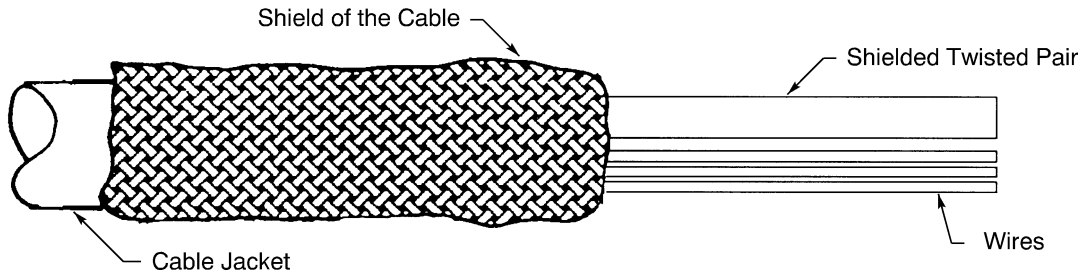
(5) Remove the necessary length of the jacket from the end of the cable. Refer to Table 21.

CAUTION: DO NOT CUT THE SHIELD OF THE CABLE. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE.

(6) Fold the shield back over the cable jacket. Refer to Figure 18.

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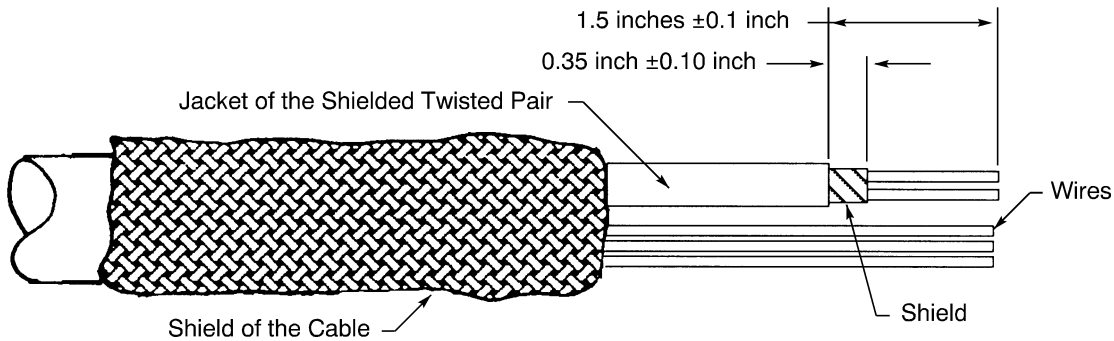


SHIELD FOLDED BACK OVER THE JACKET OF THE CABLE

Figure 18

- (7) Prepare the shielded twisted pair. Refer to Figure 19.

NOTE: If it is permitted to use a heat source, the assembly of a shield ground wire with a solder sleeve is a satisfactory alternative to the assembly of a shield ground wire with an RSK Shield-Kon. Refer to Subject 20-10-15.



PREPARATION OF THE SHIELDED TWISTED PAIR

Figure 19

- (a) Remove 1.5 inches ± 0.1 inch of jacket from the end of the shielded twisted pair.

CAUTION: DO NOT CUT THE SHIELD OF THE CABLE. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE.

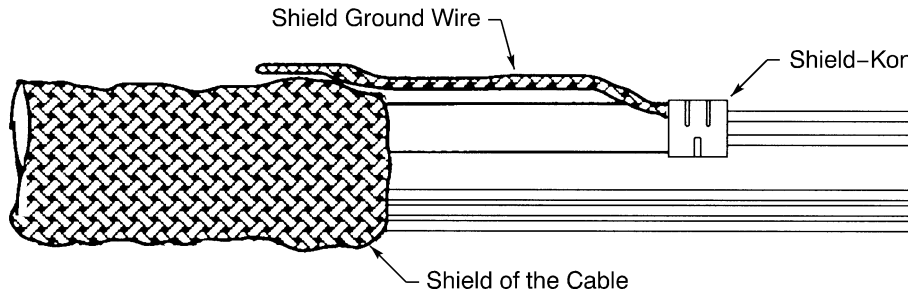
- (b) Remove the necessary length of shield so that the distance from the end of the shield to the end of the jacket is 0.35 inch ± 0.10 inch.
- (c) Make a selection of these components from Table 20:
- A solder sleeve with a shield ground wire
 - A Shield-Kon.
- (d) Remove the ground wire from the solder sleeve.
- (e) Discard the solder sleeve.
- (f) Assemble the shield ground wire.

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Refer to:

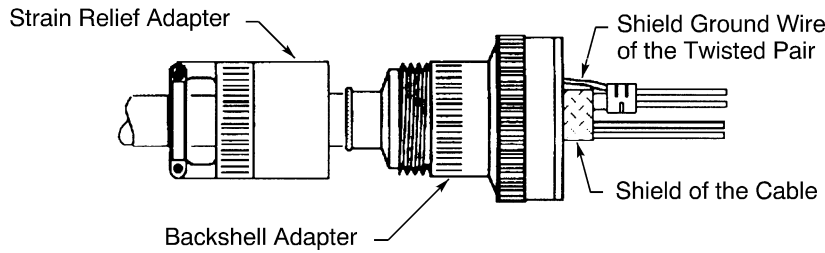
- Figure 20
- Subject 20-10-15 for the procedure to assemble a shield ground wire with an RSK Shield-Kon.



SHIELD GROUND WIRE OF THE TWISTED PAIR
Figure 20

F. Connector Assembly

- (1) Put the backshell adapter on the cable so that the forward end of the adapter is pointed toward the end of the cable. Refer to Figure 21.



POSITION OF THE BACKSHELL ADAPTER ON THE CABLE
Figure 21

- (2) Assemble the connector. Refer to Subject 20-61-11.

6. BACKSHELL ASSEMBLY

A. Necessary Materials

Table 22
NECESSARY MATERIALS

Material	Specification or Part Number	Supplier	Description
Alcohol, Isopropyl	-	Any source	-
Lacquer, Marking	F925 Yellow	Organic Products	-

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Table 22 (continued)

Material	Specification or Part Number	Supplier	Description
Sealant, Standard Cure	BMS 5-95 Class B	QPL	-
	Pro-Seal 870 B-1/2	Courtaulds Aerospace	-
	Pro-Seal 870 B-2		-
Sealant, Fast Cure	PR-1826 Class B	Courtaulds Aerospace	-
	PR-1828 Class B	Courtaulds Aerospace	-
Tape, Adhesive	-	Any source	-
Tape, Protective	P-440	Permacel	0.50 inch width
Tape, Insulation	Scotch 70	3M	0.75 inch width

B. Installation of the Backshell Adapter

**Table 23
BACKSHELL INSTALLATION TORQUE VALUES**

Shell Size	Torque (inch-pound)	
	Minimum	Maximum
12	55	65
14	70	80
16	80	90
20	115	125
22	115	125

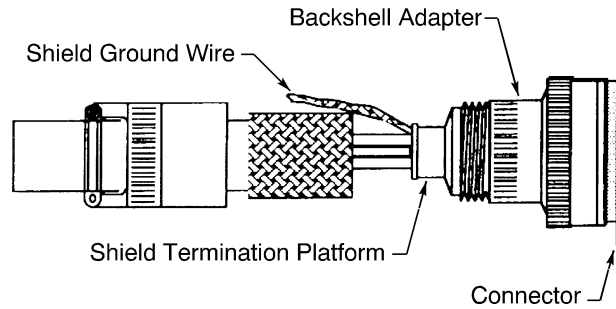
NOTE: It is not necessary to install safety wire to hold the backshell adapter in position on the connector.

- (1) Push the backshell adapter toward the connector until the forward end of the adapter is against the rear of the connector. Refer to Figure 22.

Make sure that the end of each shield ground wire goes through the backshell adapter.

STANDARD WIRING PRACTICES MANUAL

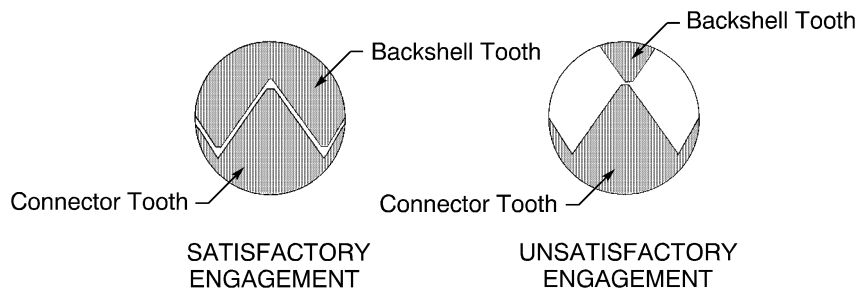
REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES



POSITION OF THE BACKSHELL ADAPTER AND SHIELD GROUND WIRE

Figure 22

- (2) Engage the threads of the backshell adapter and the connector.
- (3) Turn the backshell adapter until the teeth of the adapter are fully engaged with the teeth of the connector.
- (4) Look in the inspection hole of the backshell adapter. Refer to Figure 23.
Make sure that the teeth of the backshell adapter are fully engaged with the teeth of the MIL-C-26500 connector.



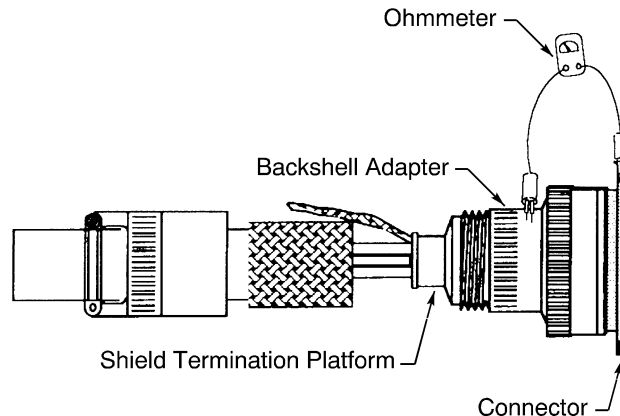
POSITION OF THE MIL-C-26500 TEETH AND THE BACKSHELL TEETH

Figure 23

- (5) Tighten the backshell to the specified value in Table 23 with a torque wrench.
- (6) Make a selection of an electrical bond meter. Refer to Subject 20-20-00.
- (7) Measure the resistance between the backshell adapter and the connector. Refer to Figure 24.
Make sure that resistance between the backshell adapter and the connector is not greater than 0.5 milliohms.

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RESISTANCE MEASUREMENT BETWEEN THE BACKSHELL ADAPTER AND THE CONNECTOR SHELL

Figure 24

C. Installation of the Shield Terminator Band

CAUTION: THE INCORRECT INSTALLATION OF THE SHIELD TERMINATOR BAND, THE SHIELD OF THE CABLE, AND THE SHIELD GROUND WIRE ON THE SHIELD TERMINATION PLATFORM CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

**Table 24
SHIELD TERMINATOR BAND INSTALLATION TOOLS**

Shield Band	Installation Tool		
	Type	Part Number	Supplier
BACB42F3	Manual	600-058	Glenair
		A40199	Band-It Idex
	Pneumatic	600-051	Glenair
		A75099	Band-It Idex

(1) Make a selection of a shield terminator band from Table 19.

CAUTION: IF A SHIELD TERMINATOR BAND HAS BEEN USED, IT MUST NOT BE USED AGAIN. THE INSTALLATION OF A USED BAND CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

(2) Make a selection of a shield terminator band installation tool from Table 24.

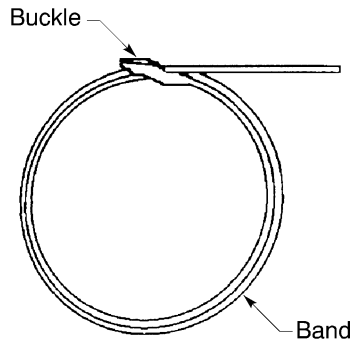
(3) Clean these components with isopropyl alcohol and a brush:

- The band
- The shield of the cable
- The shield ground wire.

(4) Fold the shield ground wire back over the shield termination platform of the backshell adapter.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESES**

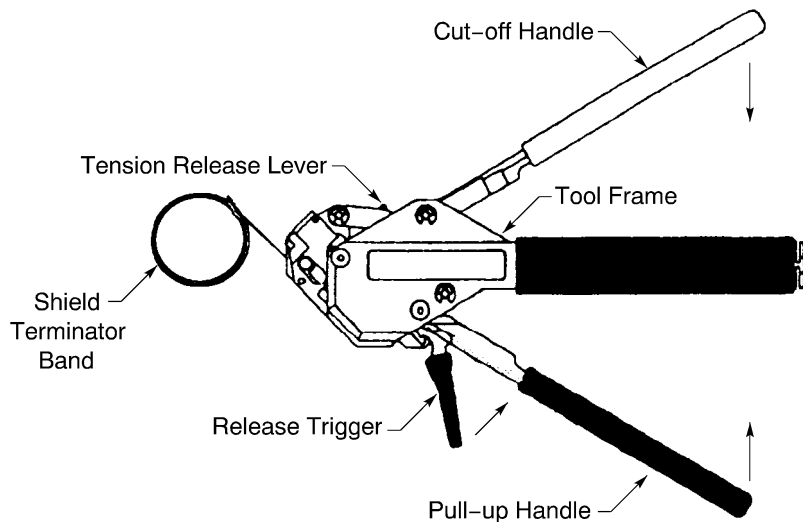
- (5) Fold the shield of the cable back over the termination platform so that the end of the shield is:
 - Aligned with the forward edge of the termination platform
 - Over the shield ground wire
 - Smooth and tight.
- (6) If the band is flat, make a coil. Refer to Figure 25.

**COIL CONFIGURATION OF THE SHIELD TERMINATOR BAND****Figure 25**

- (a) Put the free end of the band through the thin slot in the buckle.
 - (b) Pull the free end through the buckle until the diameter of the loop is smallest size that can freely move over the flange of the connector.
 - (c) Put the free end of the band through the thin slot in the buckle again.
 - (d) Pull the free end through the buckle until the inner surface of the second loop touches the surface of the first loop.
- (7) Pull the release trigger of the installation tool in the direction of the pull-up handle.
 - (8) Put a minimum of 2.5 inches of the free end of the band into the tool. Refer to Figure 26.

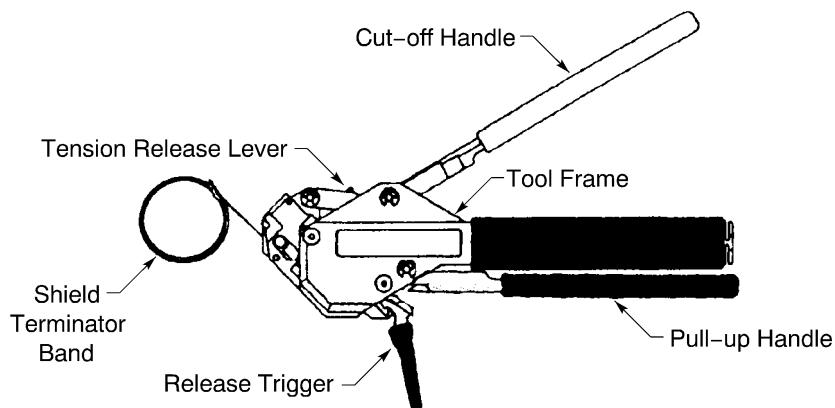
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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES



POSITION OF THE SHIELD TERMINATOR BAND IN THE INSTALLATION TOOL
Figure 26

- (9) Pull the pull-up handle toward the tool frame so that the band is held in the internal grip mechanism of the tool. Refer to Figure 27.



POSITION OF THE PULL-UP HANDLE TO PULL THE BAND
Figure 27

- (10) Put the connector and backshell adapter assembly through the coil of the band.
- (11) Put the band against the connector shell.
- (12) Pull the pull-up handle through the necessary cycles until the band is almost tight on the knurled or ribbed area of the termination platform.

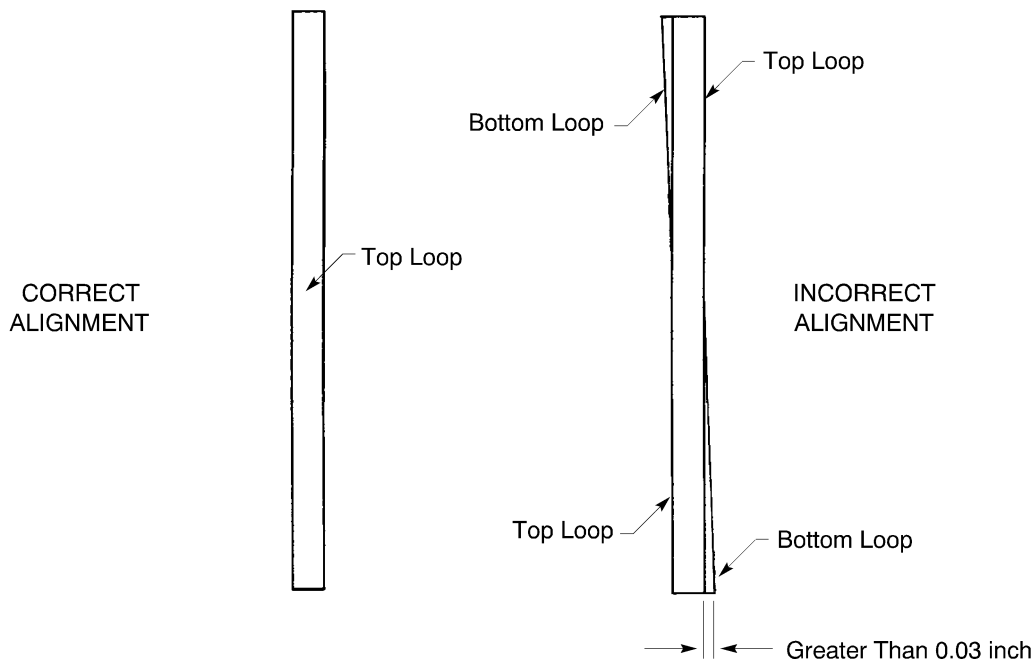
STANDARD WIRING PRACTICES MANUAL**REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES**

Make sure that the buckle of the band does not make an overlap with the shield ground wire.

NOTE: Always let the pull-up handle return to the initial open position before the handle is pulled again. If the handle stops in a cycle, push the handle down to the initial open position. Refer to Figure 26.

- (13) Align the edges of the two loops of the band so that the edge of either loop is not more than 0.03 inch beyond the edge of the other.

Refer to Figure 28.

**ALIGNMENT OF THE LOOPS OF THE SHIELD TERMINATOR BAND****Figure 28**

- (14) Pull the pull-up handle through the necessary cycles until the band is tight on the knurled or ribbed area of the termination platform. Refer to Figure 29.

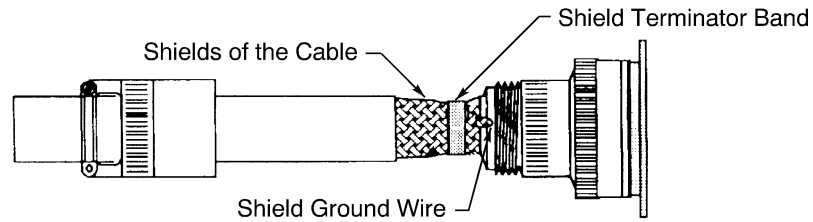
Make sure that pull-up handle is locked against the tool frame. Refer to Figure 27.

CAUTION: DO NOT USE FORCE TO OPEN THE PULL-UP HANDLE AFTER IT IS LOCKED IN POSITION. IF FORCE IS USED, DAMAGE TO THE TOOL OCCURS.

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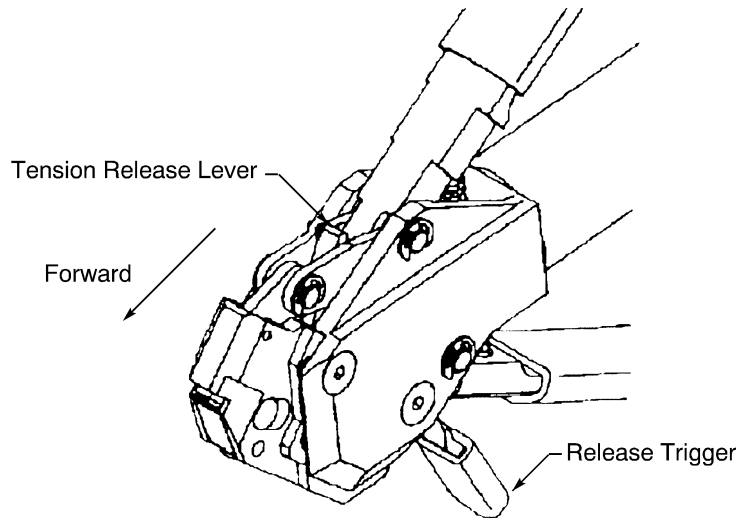
REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES



POSITION OF THE SHIELD TERMINATOR BAND ON THE BACKSHELL ADAPTER

Figure 29

- (15) Examine the alignment of the loops of the band. Refer to Figure 28.
- (16) If the alignment is incorrect, loosen the band. Refer to Figure 30.



OPERATION OF THE TENSION RELEASE LEVER

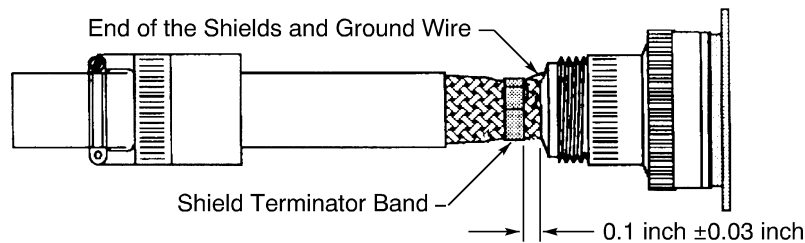
Figure 30

- (a) Hold the pull-up handle tightly.
 - (b) Push the tension release lever forward.
 - (c) Release the pull-up handle.
- NOTE: The pull-up handle opens automatically.
- (d) Pull the release trigger toward the tool frame.
 - (e) Loosen the band.
 - (f) Do the installation again from Step (7).
- (17) Pull the cut-off handle until it is fully closed against the tool frame.
 - (18) Pull the release trigger in the direction of the pull-up handle to remove the unwanted length of band from the tool.
 - (19) Cut the end of the shields and the shield ground wire so that the distance from the forward edge of the band to the end of the shields and ground wire is 0.1 inch \pm 0.03 inch.

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Refer to Figure 31.

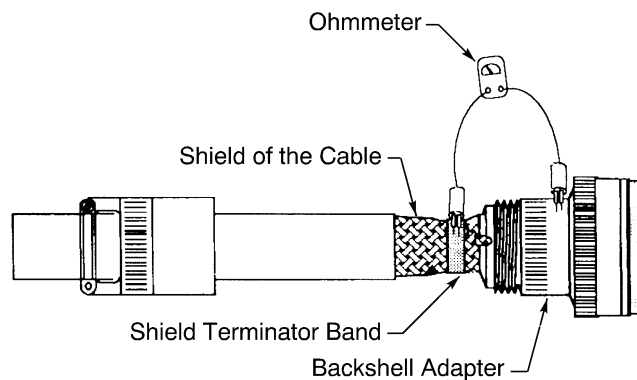


LOCATION OF THE END OF THE SHIELDS AND SHIELD GROUND WIRE
Figure 31

- (20) Make a selection of an electrical bond meter. Refer to Subject 20-20-00.
- (21) Measure the resistance between the buckle of the shield terminator band and the backshell adapter. Refer to Figure 32.

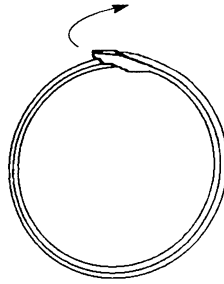
CAUTION: DO NOT LET THE TEST PROBE OF THE METER TOUCH THE SHIELD. IF THE PROBE OF THE METER TOUCHES THE SHIELD, DAMAGE TO THE SHIELD CAN OCCUR WHICH CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

Make sure that resistance between the buckle of the band and the backshell adapter is not greater than 2 milliohms.



RESISTANCE MEASUREMENT BETWEEN THE BUCKLE OF THE SHIELD TERMINATOR BAND AND THE BACKSHELL ADAPTER
Figure 32

- (22) If the installation of the shield terminator band is incorrect, remove the band. Refer to Figure 33.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES****REMOVAL OF THE SHIELD TERMINATOR BAND****Figure 33**

- (a) Hold the end of the band at the buckle with pliers or wire cutters.
 - (b) Bend the buckle back in the direction of the top loop of the coil until the loop is released.
 - (c) Discard the used band.
 - (d) Do the installation again from Step (6) with an unused band.
- (23) Put a stripe of yellow marking lacquer so that the stripe:
- Is approximately 0.125 inch wide
 - Is on the joint between the backshell adapter and the coupling ring of the backshell adapter
 - Goes 0.25 inch beyond on each side of the joint.

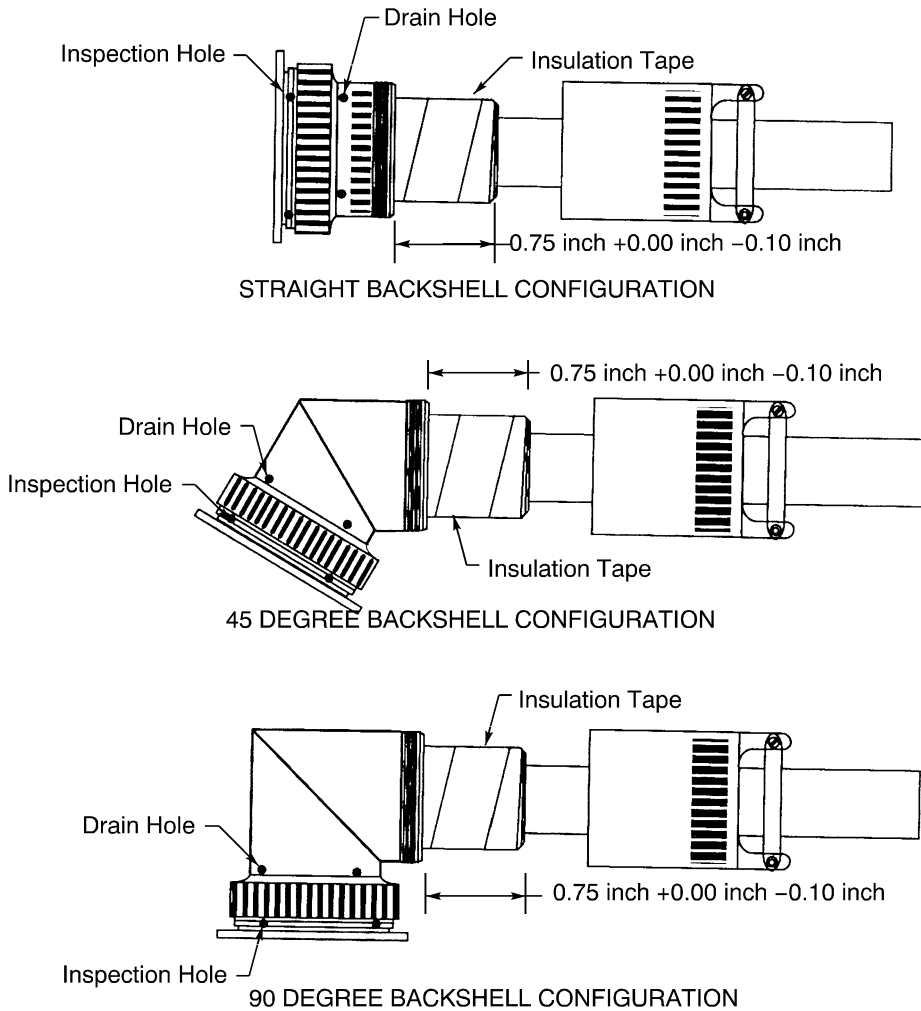
D. Assembly of the Backshell Adapter Seal

- (1) Make a selection of these materials from Table 22:
 - An adhesive tape
 - An insulation tape
 - A standard cure time sealant or a fast cure sealant.
- (2) Clean these components with isopropyl alcohol and a brush:
 - The jacket of the cable
 - The shield of the cable
 - The shield terminator band
 - The shoulder of the backshell adapter.
- (3) Put a layer of 0.75 inch wide insulation tape on the shield so that the layer of tape:
 - Starts on the shoulder of the backshell adapter
 - Stops on the jacket of the cable
 - Does not prevent the installation of the strain relief adapter.

Refer to Figure 34.

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LOCATION OF THE LAYER OF INSULATION TAPE
Figure 34

- (4) Put a piece of adhesive tape over one of the three inspection holes in the backshell adapter.
 - (5) Put the sealant into the second inspection hole until the sealant comes out of the third inspection hole.
- NOTE:** It is not necessary to use a primer for this assembly.
- (6) Remove the adhesive tape from the first inspection hole.
 - (7) Continue to put the sealant into the second inspection hole until the sealant starts to come out of the first inspection hole.
 - (8) Remove all of the sealant from the outer surface of the backshell adapter.
 - (9) Do Step (4) through Step (8) again for the drain holes of the backshell adapter. Refer to Figure 34.
 - (10) Let the sealant cure:

NOTE: The strain relief adapter can be installed and the seal of the strain relief adapter can assembled before the sealant is fully cured. Refer to Paragraph 6.E. and Paragraph 6.F.

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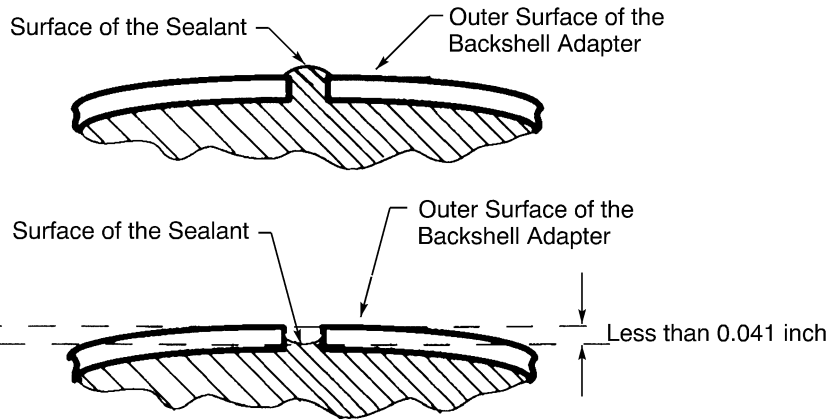
REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

- (a) If the sealant has a standard cure time, let the sealant cure for approximately 8 hours.
 - (b) If the sealant has a fast cure time, let the sealant cure for approximately 1 hour.
- (11) Examine the sealant.

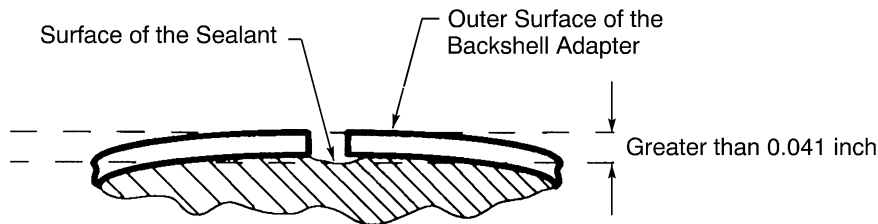
Make sure that the distance from the surface of the sealant in the inspection and drain holes to the outer surface of the backshell adapter is less than 0.041 inch.

Refer to:

- Figure 35 for satisfactory levels of sealant
- Figure 36 for an unsatisfactory level of sealant.



SATISFACTORY LEVELS OF SEALANT IN THE BACKSHELL ADAPTER
Figure 35



UNSATISFACTORY LEVEL OF SEALANT IN THE BACKSHELL ADAPTER
Figure 36

- (12) If the level of sealant in any inspection hole or drain hole is unsatisfactory:
- (a) Put more sealant in the hole.
NOTE: Use the same sealant as in Step (1).
 - (b) Remove all of the sealant from the outer surface of the backshell adapter.
 - (c) Let the sealant cure.
 For the correct cure time, refer to Step (10).

STANDARD WIRING PRACTICES MANUAL**REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES****E. Installation of the Strain Relief Adapter**

- (1) Make a selection of these materials from Table 22:
 - A protective tape
 - A standard cure time sealant or a fast cure sealant.
- (2) Push the strain relief adapter toward the connector until the end of the strain relief adapter is against the backshell adapter.
- (3) Make a mark on the cable under the center of the saddle clamp
- (4) Move the strain relief adapter away from the backshell adapter and the shield.
- (5) Put the necessary layers of tape around the circumference of the cable at the mark to sufficiently increase the diameter of the cable for the saddle clamp.

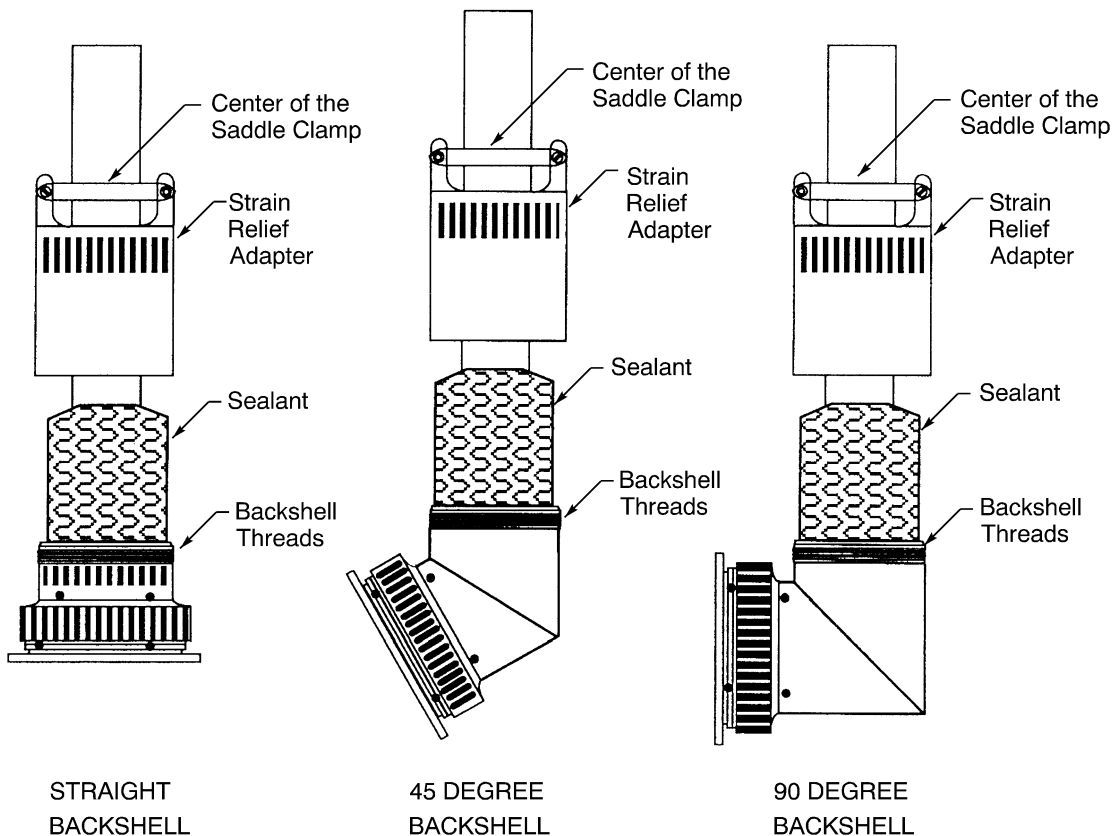
Make sure that:

- The center of the tape is aligned with the mark
 - Each layer makes a 100 percent overlap.
- (6) Apply a layer of sealant layer on the layer of insulation tape so that the layer of sealant:
 - Makes an overlap with the cable jacket
 - Makes an overlap with the shoulder of the backshell adapter
 - Has a smaller diameter than the diameter of the strain relief adapter.

Refer to Figure 37.

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

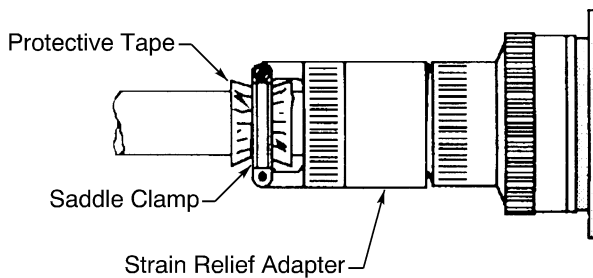


LAYER OF SEALANT ON THE LAYER OF INSULATION TAPE
Figure 37

- (7) Engage the threads of the strain relief adapter and the backshell adapter.
- (8) Tighten the strain relief adapter with a strap wrench or an equivalent tool.
- (9) Tighten the screws of the saddle clamp. Refer to Figure 38.

Make sure that the saddle clamp is tight against:

- The surface of the strain relief adapter
- The layers of protective tape on the cable.



POSITION OF THE SADDLE CLAMP ON THE CABLE
Figure 38

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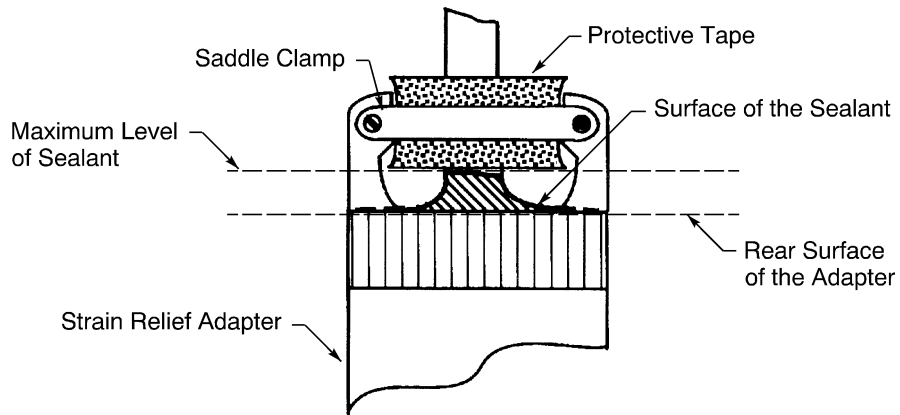
REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESES

F. Assembly of the Strain Relief Adapter Seal

- (1) Put the cable and connector assembly in the position where the face of the connector is pointed down.
- (2) Fill the inner cavity of the strain relief adapter with sealant so that:
 - The lowest level of the surface of the sealant is equal to or higher than the level of the rear surface of the adapter
 - The highest level of the surface of the sealant is lower than the lower edge of the protective tape under the saddle clamp.

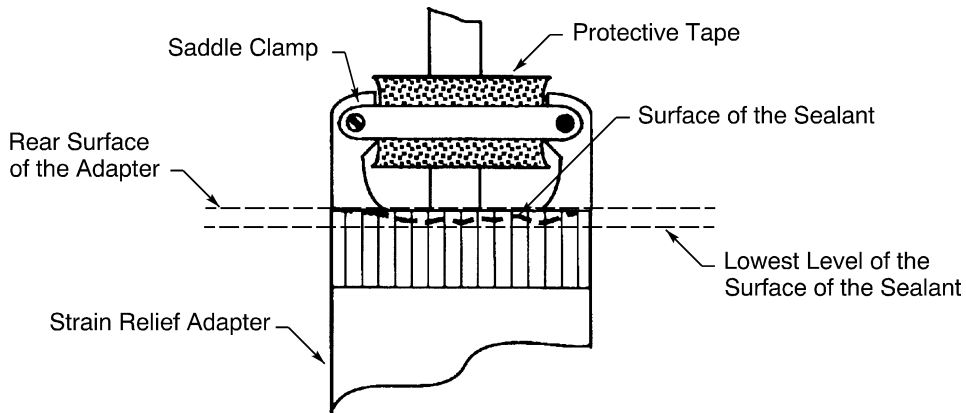
Refer to:

- Figure 39 for a satisfactory level of sealant
- Figure 40 for an unsatisfactory level of sealant.



SATISFACTORY LEVEL OF SEALANT IN THE STRAIN RELIEF ADAPTER

Figure 39



UNSATISFACTORY LEVEL OF SEALANT IN THE STRAIN RELIEF ADAPTER

Figure 40

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

- (3) Remove all of the sealant from the outer surface of the strain relief adapter.
- (4) Let the sealant cure for approximately 8 hours.
- (5) After eight hours, examine the seal.

Make sure that:

- The lowest level of the surface of the sealant is equal to or higher than the level of the rear surface of the adapter
- The highest level of the surface of the sealant is lower than the lower edge of the protective tape under the saddle clamp.

Refer to Figure 39 and Figure 40.

- (6) If the level of sealant is unsatisfactory:
 - (a) Put more sealant in the strain relief adapter.
 - (b) Remove all of the sealant from the outer surface of the strain relief adapter.
 - (c) Let the sealant cure for approximately 8 hours.

7. INSTALLATION OF A 287W1619 VAPOR SEAL

A. Vapor Seal Part Numbers

**Table 25
VAPOR SEAL ASSEMBLY PART NUMBERS**

Boeing Standard	Supplier
287W1619-()	QPL

B. Necessary Materials

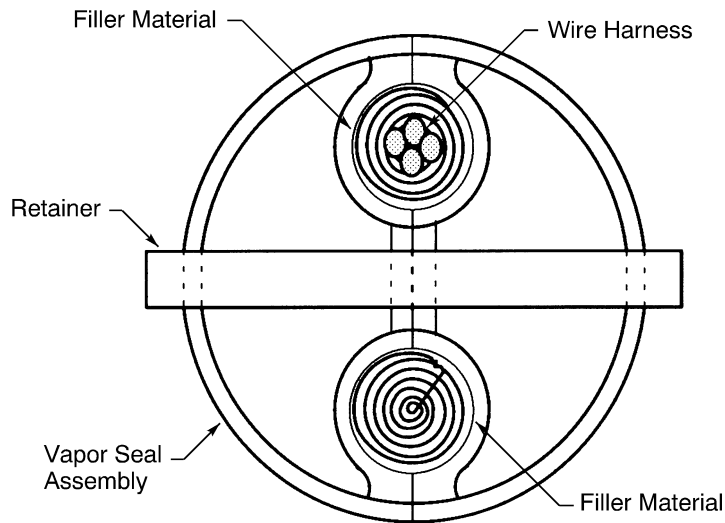
**Table 26
NECESSARY MATERIALS**

Material	Boeing Specification	Part Number	Supplier
Filler Material	BMS 8-300 Type I Grade 0.06	Solimide AC-406	Imi-Tech
Sealant	BMS 5-95 Class B-2	Pro-Seal 870 B-2	Courtaulds Aerospace

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REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES

C. Vapor Seal Installation



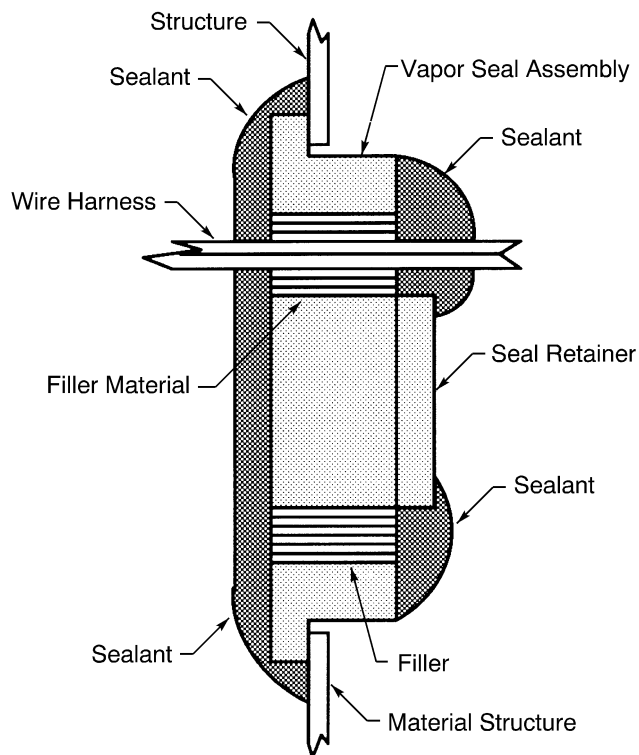
VAPOR SEAL INSTALLATION
Figure 41

- (1) Assemble the components of the seal in the structure so that the wire harness is in one of the holes of the seal. Refer to Figure 41.
- (2) If the wire harness does not have a tight fit in the hole of the seal assembly:
 - (a) Make a selection of a filler material from Table 26.
 - (b) Cut the sufficient length of the material so that the width is 0.625 ± 0.125 inch.
 - (c) Remove one half of the seal assembly.
 - (d) Wind the necessary length of the material around the wire harness at the location of the seal to increase the diameter of the wire harness.
 - (e) Install the half of the seal assembly again.
 Make sure that the wire harness has a tight fit in the hole of the seal.
- (3) If the seal assembly has a hole that is not used:
 - (a) Make a selection of a filler material from Table 26.
 - (b) Cut the sufficient length of the material so that the width is 0.625 ± 0.125 inch.
 - (c) Make a coil with the length of the material.
 - (d) Compress the coil.
 - (e) Put the coil in the hole.
 Make sure that the coil has a tight fit in the hole of the seal.
- (4) Make a selection of a sealant from Table 26.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF PRIMARY FLIGHT CONTROL SYSTEM WIRE HARNESSSES**

- (5) Put a layer of sealant on both sides of the seal assembly so that:
- The flat side of the seal has a layer of sealant that makes an overlap with the structure
 - The holes of the other side of the seal has a layer of sealant that makes an overlap with the seal retainer.

Refer to Figure 42.



LOCATION OF THE SEALANT ON THE VAPOR SEAL ASSEMBLY
Figure 42



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REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

1. GENERAL DATA

A. General Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-10-13.

B. Airworthiness Limitations

The configuration and repair of Fuel Quantity Indicator System wiring are specified as Critical Design Configuration Control Limitations (CDCCL).

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

To find more data about CDCCL wiring, refer to Table 1 for the document that is applicable for the airplane model.

**Table 1
BOEING DOCUMENTS FOR AIRWORTHINESS LIMITATIONS**

Boeing Document	Airplane Model
D6-7552-AWL	707
D6-8766-AWL	727
D6-38278-CMR	737-100,-200,-200C,-300,-500
D6-13747-CMR	747-100,-200,-300,-SP
Maintenance Planning Document, Section 9	737-600,-700,-800 and later 737 models
	747-400 and later 747 models
	757
	767
	777

C. Applicable Repair Conditions

These conditions are applicable:

- The condition that is the cause of the damage must be removed to prevent more damage.
- A repair must be done with clean hands and clean tools to prevent contamination that can cause a bad seal of the insulation materials.
- If an FQIS wire bundle is replaced or repaired, do not change the initial FQIS bundle to airplane wiring separation. The sleeving installed on the initial FQIS wire bundle can be used again.
- Tape is not permitted in the fuel tank.
- The maximum number of splices that a wire or a cable can have is three.
- The end of the splice assembly must be a minimum distance of 1 inch and a maximum distance of 1.5 inches from a clamp.
- The repair with a splice is permanent.

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REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

2. NECESSARY PARTS AND MATERIALS

A. Splice Part Numbers

Table 2
SPLICE PART NUMBERS

Part Number	Supplier
31818	AMP
NAS1387-4	QPL

B. Shielded Contact Part Numbers

Table 3
SHIELDED CONTACT PART NUMBERS

Configuration	Part Number	Supplier
Pin	10-60479-41	Boeing
	CN0940-41	Cinch
Socket	10-60479-44	Boeing
	CN0940-44	Cinch

Table 4
APPROVED SUPPLIERS OF BOEING STANDARD SHIELDED CONTACTS

Boeing Standard	Approved Supplier
10-60479-41	Boeing
10-60479-44	Boeing

C. Ferrule Part Numbers

Table 5
FERRULE PART NUMBERS

Part Number	Boeing Standard	Supplier
BACS13S156C	BACS13S	Boeing

Table 6
APPROVED SUPPLIERS OF BOEING STANDARD FERRULES

Boeing Standard	Approved Supplier
BACS13S	Thomas & Betts Corporation

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REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

D. Necessary Materials and Tools

**Table 7
NECESSARY MATERIALS**

Material	Part Number or Boeing Specification	Class	Supplier
Sealant, Polysulfide	Pro-Seal 860	-	PRC Desoto International
	BMS 5-45	B	Boeing
Sleeve, Transparent Standard Wall	TFE 2X	-	Zeus Industrial Products
		-	Chemplast

**Table 8
APPROVED SUPPLIERS OF BOEING STANDARD SEALANTS**

Boeing Material Standard	Approved Supplier
BMS 5-45	PRC Desoto International
	La Joint Francais
	Yokohama Rubber Company Ltd.

**Table 9
SOLVENTS**

Solvent	Specification	Supplier
Alcohol, Isopropyl	TT-I-735 Grade A	An available source
	TT-I-735 Grade B	An available source
Alcohol, Denatured, Ethyl	O-E-760	An available source

**Table 10
NECESSARY TOOLS**

Material or Tool	Description	Boeing Specification	Class	Supplier
Injection Tool	Sealant injection tool with a small tip	-	-	An available source
Wiper	Absorbent	BMS 15-5	A	Boeing

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REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

**Table 11
APPROVED SUPPLIERS OF BOEING STANDARD WIPERS**

Boeing Material Standard	Approved Supplier
BMS 15-5	American Fiber & Finishing Incorporated
	BBA Nonwovens Walpole
	DeRoyal Textiles
	Ho Chang Medical Company
	Nippon Weston Company

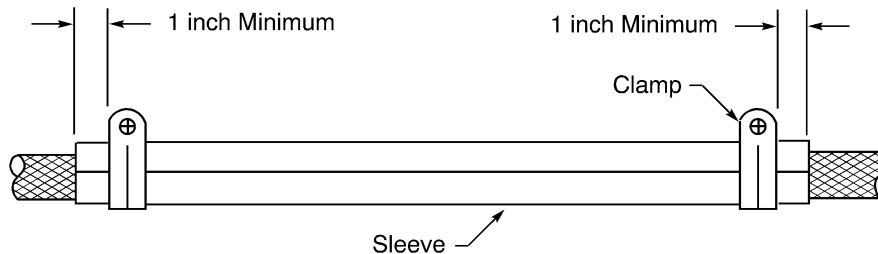
3. REPAIR OF A LOW-Z OR A HIGH-Z WIRE WITH GREEN OUTER BRAID

A. Repair of the Green Braid - Temporary

CAUTION: REPLACEMENT OF A WIRE WITH TEMPORARY REPAIR IS NECESSARY. THE WIRE MUST BE REPLACED AT A MAXIMUM OF 4000 FLIGHT HOURS.

**Table 12
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12-234	An available source



**CONFIGURATION OF THE SLEEVE ON WIRE
Figure 1**

- (1) Measure the distance from the outer edge of one clamp to the outer edge of the other clamp.
- (2) Make a selection of a 1.5 inch diameter sleeve from Table 12.

Make sure that the length of the sleeve is a minimum of two inches greater that the distance from outer edge of the clamp to the outer edge of the other clamp.

- (3) Make a cut along the longitudinal axis of the sleeve.
- (4) Loosen the clamp on each side of the damage.
- (5) Put the sleeve on the wire.

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REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

Make sure that:

- The longitudinal edges of the sleeve make an overlap of not less than 50 percent of the circumference of the wire harness
- The sleeve goes through each clamp
- The end of the sleeve extends a minimum of 1 inch farther than the outer edge of each clamp.

(6) Tighten each clamp.

B. Repair of the Green Braid - Permanent Repair

**Table 13
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Transparent Heat Shrinkable	AMS-DTL-23053/12-228	An available source
	TFE 2X	Chemplast
		Zeus Industrial Products

**Table 14
NECESSARY TOOLS**

Tool	Supplier
Brush, Soft Bristle	An available source

(1) Make a selection of a solvent from Table 9.

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE OR CABLE.

CAUTION: A SOLVENT THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A WIRE OR CABLE MUST NOT BE APPLIED. DAMAGE TO THE WIRE OR CABLE CAN OCCUR.

(2) Make a selection of a brush from Table 14.

(3) Make a selection of a wiper from Table 10.

(4) Make a selection of an injection tool from Table 10.

(5) Make a selection of a 2 inch length of 3/8 inch diameter transparent heat shrinkable sleeve from Table 13.

NOTE: An equivalent transparent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

(6) Cut the loose outer braid strands at the area of damage.

CAUTION: DO NOT MAKE A CUT OR A NICK IN THE WIRE JACKET. DAMAGE TO THE WIRE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

(7) Clean the outer braid with a brush moist with alcohol.

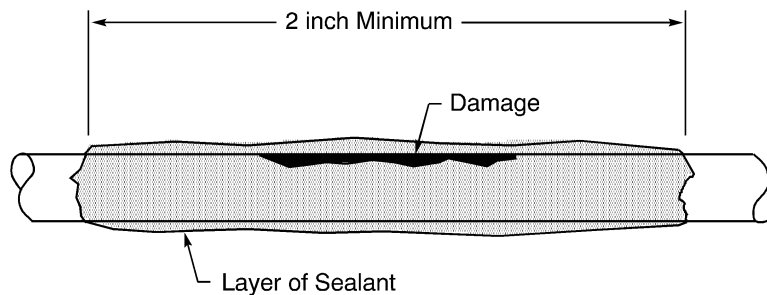
Make sure that the cleaned area extends a minimum of 2 inches from the end of the area with damage.

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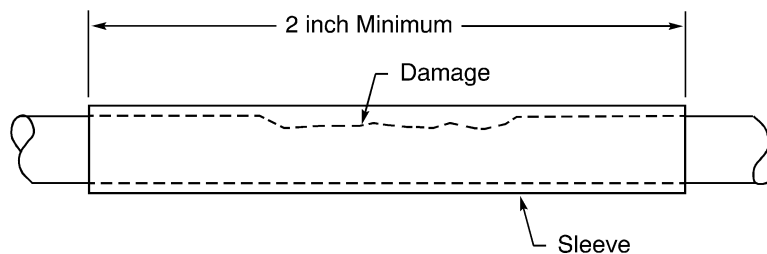
REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

- (8) Dry the cleaned area with a wiper.
- (9) Disconnect one end of the wire.
- (10) Put the end of the wire through the sleeve.
- (11) Apply a continuous layer of sealant on the area of braid with damage. Refer to Figure 2.



LAYER OF SEALANT ON THE DAMAGED GREEN OUTER BRAID
Figure 2

- (12) Align the center of the sleeve with the center of the area with damage. Refer to Figure 3.

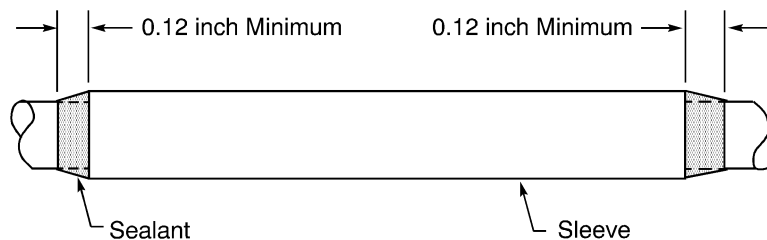


POSITION OF THE SLEEVE ON THE CABLE
Figure 3

- (13) Put a layer of sealant between each end of the sleeve and wire. Refer to Figure 4.

Make sure that:

- The layer is continuous around the circumference of the wire
- The distance from the end of the sleeve to the end of the sealant is 0.5 inch minimum
- The area between the outer braid and the sleeve is full of sealant.



CONFIGURATION OF THE SLEEVE AND THE SEALANT
Figure 4

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

(14) Let the sealant cure for the specified cure time. Refer to Table 15.

**Table 15
SEALANT CURE TIME**

Sealant	Minimum Cure Time (Hours)
BMS 5-45 Class B	48
Proseal 860	8

(15) Put the wire harness in its initial installed configuration.

4. REPAIR OF AN UNSHIELDED LOW-Z WIRE

A. Wire Preparation

(1) Cut the wire.

Make sure that the area of the wire with damage is removed.

(2) Make a selection of a solvent from Table 9.

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE OR CABLE.

CAUTION: A SOLVENT THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A WIRE OR CABLE MUST NOT BE APPLIED. DAMAGE TO THE WIRE OR CABLE CAN OCCUR.

(3) Make a selection of a wiper from Table 10.

(4) Clean each end of the wire:

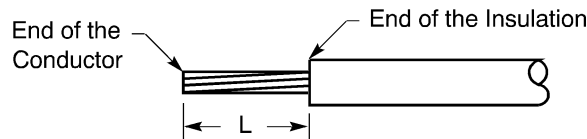
- With a wiper moist with alcohol
- From the end of the wire to a minimum of 2 inches from the end of the wire.

(5) Dry the cleaned area with a new wiper.

(6) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 5
- Table 16 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH

Figure 5

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

**Table 16
INSULATION REMOVAL LENGTH**

Splice	Removal Length L (inch)	
	Target	Tolerance
31818	0.28	± 0.03
NAS1387-4	0.28	± 0.03

- (7) Remove the contamination from the end of the conductor and the cable jacket a minimum of 1.5 inch from the end of the wire.
- (8) Dry the cleaned area with a new wiper.

B. Assembly of a Splice

**Table 17
CRIMP TOOLS**

Crimp Barrel Size	Crimp Tool			
	Basic Unit	Head	Die	Nest (AWG)
22-18	314590-()	-	314656-1	-
	314700-()	-	314656-1	-
	46673	-	-	-
	49900	-	-	22-18
	49935	-	-	22-18
	69005	300454	-	-
	M22520/5-01	-	Y641	22-18
	PHRPU2	PHMT1005	-	-

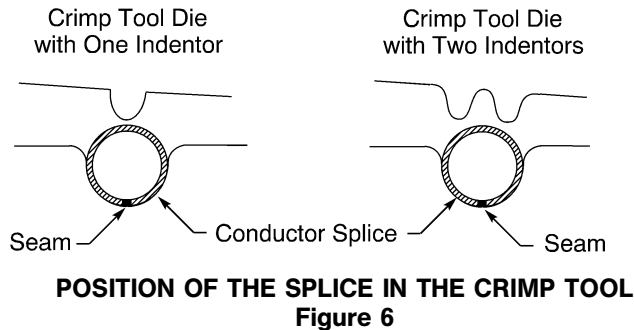
- (1) Make a selection of a splice from Table 2.
- (2) Make a selection of a crimp tool from Table 17.
- (3) Make a selection of a 1.5 ± 0.1 inch length of 3/8 inch diameter transparent heat shrinkable sleeve from Table 7.

NOTE: An equivalent transparent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

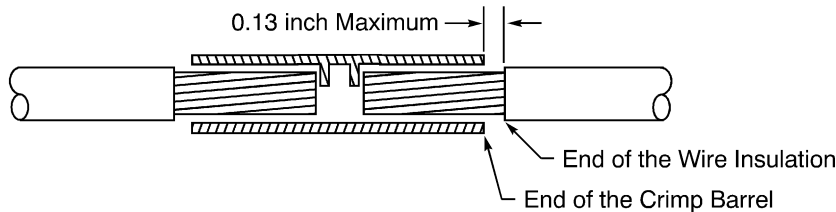
- (4) Put the sleeve on the end of one wire.
- (5) Assemble one end of the splice:
 - (a) Put the splice in the crimp tool.
 - (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES



- (c) Hold the splice in position with light pressure.
- (d) Put the wire in the end of the splice. Refer to Figure 7.



Make sure that:

- The end of the conductor does not make an overlap with the wire stop
- The wire insulation is not in the crimp barrel
- The end of the wire insulation is not more than 0.13 inch from the end of the crimp barrel.

- (e) Crimp the splice.
- (6) Do Step (5) again to assemble the other end of the splice.

C. Seal of a Splice Assembly

- (1) Make a selection of a solvent from Table 9.

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE WIRE.

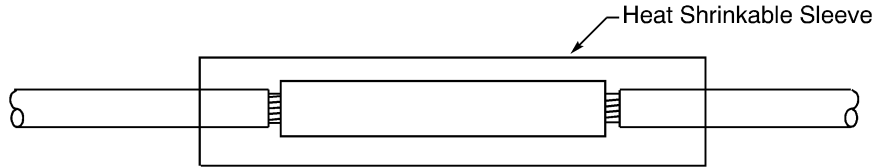
CAUTION: A SOLVENT THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A WIRE MUST NOT BE APPLIED. DAMAGE TO THE WIRE CAN OCCUR.

- (2) Make a selection of an injection tool from Table 10.
- (3) Make a selection of a wiper from Table 10.
- (4) Remove the contamination with a wiper moist with alcohol from:
 - The splice
 - The splice to a minimum of 2 inches from each end of the splice.
- (5) Dry the cleaned area with a new wiper.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

- (6) Make a selection of a sealant from Table 7.
- (7) Align the center of the sleeve with the center of the splice. Refer to Figure 8.



POSITION OF THE SLEEVE ON THE SPLICE ASSEMBLY
Figure 8

- (8) Put a layer of sealant between the sleeve and the splice. Refer to Figure 9.
- Make sure that:
- The layer is continuous
 - The distance from the end of the sleeve to the end of the sealant is 0.5 inch minimum
 - The area between the splice and the sleeve is full of sealant.



AREA OF SEALANT
Figure 9

- (9) Let the sealant cure for the specified cure time. Refer to Table 18.

Table 18
SEALANT CURE TIME

Sealant	Minimum Cure Time (Hours)
BMS 5-45 Class B	48
Proseal 860	8

5. REPAIR OF A SHIELDED HI-Z WIRE

A. Cable Preparation

- (1) Cut the cable at each edge of the area of damage.
Make sure that the area of the cable with damage is removed.
- (2) Make a selection of a solvent from Table 9.

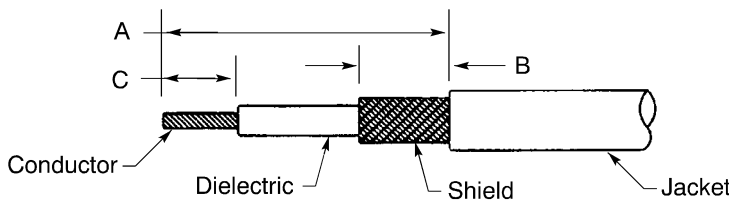
STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE CABLE.

CAUTION: A SOLVENT THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A CABLE MUST NOT BE APPLIED. DAMAGE TO THE CABLE CAN OCCUR.

- (3) Make a selection of a wiper from Table 10.
- (4) Clean each end of the cable:
 - With a wiper moist with alcohol
 - From the end of the cable to a minimum of 2 inches from the end of the cable.
- (5) Dry the cleaned area with a new wiper.
- (6) Prepare the cable. Refer to:
 - Figure 10
 - Table 19 for the removal lengths
 - Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 10

Table 19
INSULATION REMOVAL LENGTH

Contact	Removal Length L		
	Dimension	Target (inch)	Tolerance (inch)
10-60479-41	A	0.50	± 0.03
	B	0.22	± 0.03
	C	0.18	± 0.03
10-60479-44	A	0.50	± 0.03
	B	0.22	± 0.03
	C	0.18	± 0.03
CN0940-41	A	0.50	± 0.03
	B	0.22	± 0.03
	C	0.18	± 0.03

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REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

Table 19 (continued)

Contact	Removal Length L		
	Dimension	Target (inch)	Tolerance (inch)
CN0940-44	A	0.50	± 0.03
	B	0.22	± 0.03
	C	0.18	± 0.03

- (a) Remove the necessary length of jacket from the end of the cable to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE AND RELIABILITY OF THE CABLE.

- (b) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to Dimension B.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE CABLE.

- (c) Remove the necessary length of the dielectric to make the distance from the end of the conductor to the end of the dielectric equal to Dimension C.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE CABLE.

- (7) Clean each end of the cable again:
- With a wiper moist with alcohol
 - From the end of the cable to a minimum of 2 inches from the end of the cable.
- (8) Dry the cleaned area with a new wiper.

B. Contact Assembly

**Table 20
CENTER CONTACT CRIMP TOOLS**

Wire Size (AWG)	Center Contact Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
24	20	M22520/1-01	2	M22520-1-02
		M22520/2-01	5	M22520/2-02
		ST2220-1-Y	-	ST2220-1-15A
		WA22	5	M22520/2-02
		WA27F	2	M22520-1-02

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STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

Table 20 (continued)

Wire Size (AWG)	Center Contact Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
22	20	M22520/1-01	3	M22520-1-02
		M22520/2-01	6	M22520/2-02
		ST2220-1-Y	-	ST2220-1-15A
		WA22	6	M22520/2-02
		WA27F	3	M22520-1-02
20	20	M22520/1-01	4	M22520-1-02
		M22520/2-01	7	M22520/2-02
		ST2220-1-Y	-	ST2220-1-15A
		WA22	7	M22520/2-02
		WA27F	4	M22520-1-02

**Table 21
FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
M22520/5-01	M22520/5-10	-
	M22520/5-39	-
ST965-1	-	-
WT-202	-	-
WT-202-06-08	-	S

- (1) Make a selection of a socket contact and a pin contact from Table 3.
- (2) Discard these items from the contact kit:
 - The seal boot
 - The outer ferrule.
- (3) Make a selection of an outer ferrule from Table 5.
- (4) Make a selection of one 2.5 inch ± 0.1 inch length of 3/8 inch diameter transparent heat shrinkable sleeve from Table 7.

NOTE: An equivalent transparent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

- (5) Make a selection of a center contact crimp tool from Table 20.
- (6) Make a selection of a ferrule crimp tool from Table 21.
- (7) Put the sleeve on the end of one cable.

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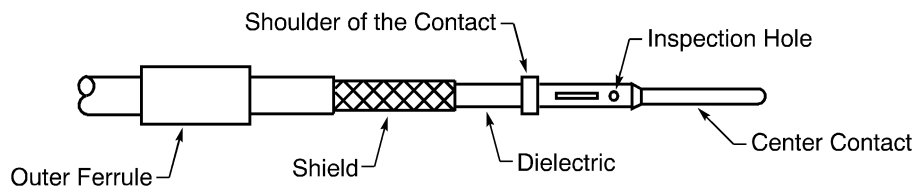
REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

- (8) Assemble the contact:
 - (a) Put the outer ferrule on the end of the cable.
 - (b) If the strands of the center conductor are apart, twist the strands together in their initial direction.
 - (c) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

Refer to Figure 11.

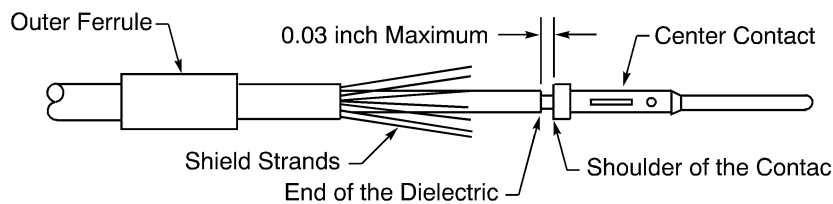


POSITION OF THE CENTER CONTACT ON THE CABLE

Figure 11

- (d) Crimp the center contact.
Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.

- (9) Move the strands of the shield apart. Refer to Figure 12.



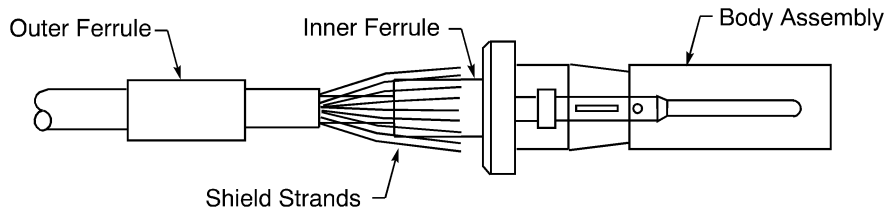
CONFIGURATION OF THE SHIELD STRANDS

Figure 12

- (10) Put the body assembly on the center contact. Refer to Figure 13.
Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES



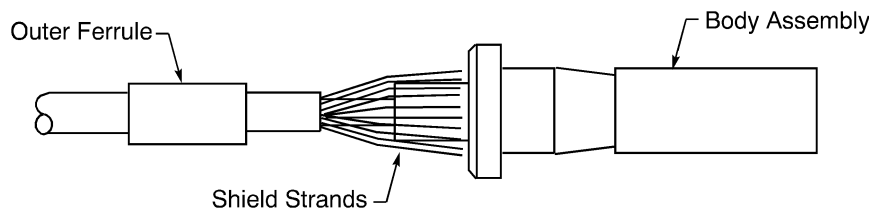
POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT
Figure 13

- (11) Push the center contact into the body assembly until it is locked in the body assembly.
- (12) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

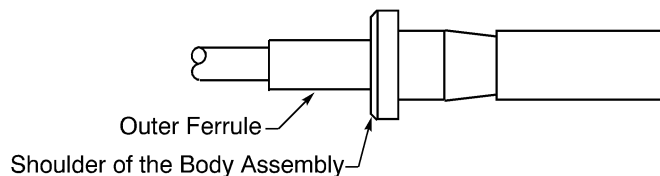
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (13) If the center contact moves out of the body assembly, do Step (11) and Step (12) again.
- (14) Put the strands of the shield on the inner ferrule. Refer to Figure 14.
 Make sure that the strands of the shield are symmetrical around the inner ferrule.



POSITION OF THE SHIELD ON THE INNER FERRULE
Figure 14

- (15) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 15.



POSITION OF THE OUTER FERRULE
Figure 15

- (16) Crimp the outer ferrule.

C. Seal of Engaged Contacts

- (1) Make a selection of a solvent from Table 9.

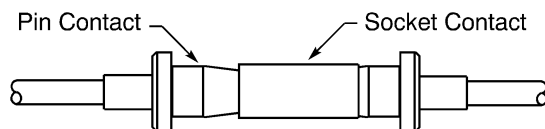
STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

WARNING: SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE CABLE ASSEMBLY.

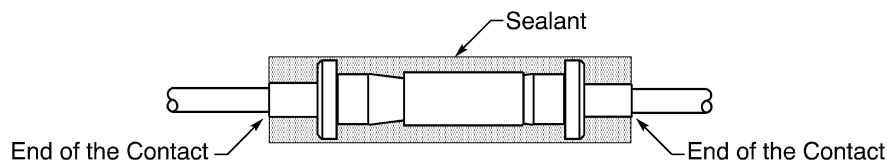
CAUTION: A SOLVENT THAT IS NOT SPECIFIED FOR THE MATERIALS AND THE COMPONENTS IN A CABLE ASSEMBLY MUST NOT BE APPLIED. DAMAGE TO THE CABLE ASSEMBLY CAN OCCUR.

- (2) Make a selection of a wiper from Table 10.
- (3) Clean the cable from the forward end of the contact to a minimum of 2 inches from the end of the contact.
- (4) Dry the cleaned area with a new wiper.
- (5) Engage the pin and socket contact. Refer to Figure 16.



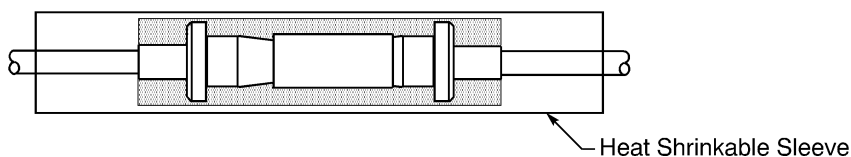
ENGAGED PIN AND SOCKET CONTACTS
Figure 16

- (6) Apply a continuous layer of sealant on the area of the engaged contacts. Refer to Figure 17.



LAYER OF SEALANT ON THE ENGAGED CONTACTS
Figure 17

- (7) Slowly push the sleeve until the center of the sleeve is aligned with the center of the engaging contacts. Refer to Figure 18.



POSITION OF THE SLEEVE ON THE ENGAGED CONTACTS
Figure 18

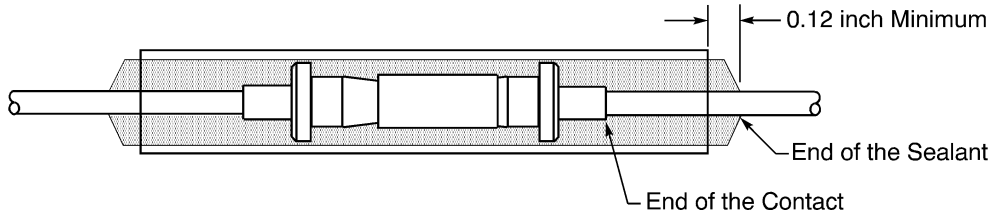
- (8) Apply a continuous layer of sealant between the sleeve and the engaged contacts. Refer to Figure 19.

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

Make sure that:

- The engaged contacts has a full layer of sealant on the length and circumference of the contact surface
- The sealant extends a minimum of 0.12 inch farther than each end of the sleeve.



AREA OF SEALANT
Figure 19

- (9) Apply pressure with the fingers to the sleeve to push the air bubbles out.
- (10) Let the sealant cure for the specified time. Refer to Table 22.

Table 22
SEALANT CURE TIME

Sealant	Minimum Cure Time (Hours)
BMS 5-45 Class B	48
Proseal 860	8

6. APPROVED TOOL SUPPLIERS

A. Crimp Tools

Table 23
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
300454	AMP
314590-()	AMP
314656-1	AMP
314700-()	AMP
46673	AMP
49900	AMP
49935	AMP
69005	AMP
M22520-1-02	QPL
M22520/1-01	QPL
M22520/2-01	QPL

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STANDARD WIRING PRACTICES MANUAL

REPAIR OF FUEL QUANTITY INDICATOR SYSTEM (FQIS) WIRE HARNESSSES

Table 23 (continued)

Crimp Tool	Supplier
M22520/2-02	QPL
M22520/5-01	QPL
M22520/5-10	QPL
M22520/5-39	QPL
PHMT1005	Daniels
PHRPU2	Daniels
ST2220-1-15A	Boeing
ST2220-1-Y	Boeing
ST965-1	Boeing
WA22	Daniels
WA27F	Daniels
WT-202	Daniels
WT-202-06-08	Daniels
Y641	Daniels

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE FLIGHT RECORDER-AIDS WIRE HARNESS WITH A BACC63AF() FIREWALL CONNECTOR

<u>Paragraph</u>		<u>Page</u>
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	B. Necessary Materials	1
	C. Necessary Tools	1
2.	<u>CONNECTOR DISSASSEMBLY</u>	1
3.	<u>CONNECTOR ASSEMBLY</u>	1
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	B. Contact Insertion	2
	C. Backshell Assembly	2

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE FLIGHT RECORDER-AIDS WIRE HARNESS WITH A BACC63AF() FIREWALL CONNECTOR

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Boeing Standard	Type
BACC63AF24-30P10	Receptacle

B. Necessary Materials

**Table 2
NECESSARY MATERIALS**

Material	Specification	Size	Supplier
Alcohol, Isopropyl	-	-	Any Source
Rod, Filler	69B47961-3	3/8 inch diameter	Boeing
Sleeve, Heat Shrinkable	MIL-LT	3/4 inch diameter	Raychem
Tape, Filler	10-62034-1	0.5 inch width, 0.1 inch thickness	Kirkhill Rubber Co.
	10-62034-2	0.4 inch width, 0.06 inch thickness	Kirkhill Rubber Co.

**Table 3
ALTERNATIVE THREAD LOCK COMPOUNDS**

Material	Part Number	Supplier
Thread Lock Compound	Vibratite	The Oakland Corporation
	222	Locktite

C. Necessary Tools

**Table 4
NECESSARY TOOLS**

Tool	Part Number	Supplier
Strap Wrench	TG-70	Glenair

2. CONNECTOR DISSASSEMBLY

Refer to Subject 20-61-11.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

- (1) Assemble each contact. Refer to Subject 20-61-11.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE FLIGHT RECORDER-AIDS WIRE HARNESS WITH A BACC63AF() FIREWALL CONNECTOR

B. Contact Insertion

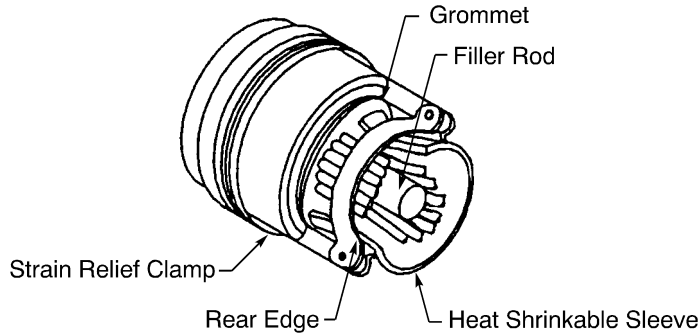
- (1) Put the strain relief clamp on the wire harness.
- (2) Make a selection of a heat shrinkable sleeve from Table 2.
- (3) Put a 3.0 inch \pm 0.10 inch length of heat shrinkable sleeve on the wire harness.
- (4) Install each contact. Refer to Subject 20-61-11.

C. Backshell Assembly

- (1) Make a selection of these materials from Table 2:
 - A filler rod
 - A filler tape.

- (2) Put a 2.75 inch length of the filler rod in the center of the wires at the rear of the connector. Refer to Figure 1.

Make sure that the forward end of the rod is between 0.25 inch and 0.34 inch from the grommet.



POSITION OF THE FILLER ROD AND THE HEAT SHRINKABLE SLEEVE

Figure 1

- (3) Push the heat shrinkable sleeve forward until the forward end of the sleeve is 0.34 inch \pm 0.03 inch from the rear end of the connector grommet.
- (4) Shrink the sleeve in position. Refer to Subject 20-10-14.
- (5) Make a selection of a thread lock compound. Refer to Subject 20-00-11.
Refer to Table 3 for satisfactory alternative thread lock compounds.
- (6) Put a thin layer of the compound on one or two threads of the clamp around the circumference of the clamp.
- (7) Put a thin layer of the compound on one or two threads of the connector around the circumference of the connector.
- (8) Engage the threads of the clamp and the connector.
Make sure that the threads of the connector and the clamp are fully engaged.

NOTE: Isopropyl alcohol can be put on the connector grommet to make the installation easier. Refer to Table 1.

- (9) Manually tighten the coupling nut of the clamp.
- (10) Make a selection of a strap wrench from Table 2.
- (11) Tighten the clamp and the connector with the strap wrench.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF THE FLIGHT RECORDER-AIDS WIRE HARNESS WITH A BACC63AF() FIREWALL CONNECTOR**

Make sure that the clamp does not make more than 1/8 turn with the strap wrench.

CAUTION: DO NOT TIGHTEN THE CLAMP MORE THAN NECESSARY. DAMAGE OF THE CONDUCTOR OR THE WIRED CONTACT CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (12) Try to loosen the clamp manually.

NOTE: The clamp is installed correctly when the clamp does not move in relation to the connector.

- (13) If the clamp is loose, do Step (11) and Step (12) again.

- (14) Put the necessary layers of tape on the wire harness to make a tight fit in the saddle clamp.

Make sure that:

- Each layer of tape makes a 100 percent overlap
- The center of the layers of tape is aligned with the center of the saddle clamp
- The forward edge of the tape extends a minimum of 0.06 inch farther than the forward edge of the clamp
- The rear edge of the tape extends a minimum of 0.06 inch farther than the rear edge of the clamp.

- (15) Tighten the saddle clamp screws.

Make sure that the wire harness has a tight fit in the clamp.

- (16) Assemble the a wire harness tie 0.5 inch \pm 0.06 inch from the rear end of the layers of filler tape.

- (17) Assemble the necessary wire harness ties every two inches on the remaining length of the wire harness.

- (18) Put the wire identification sleeve 4 inches from the rear of the connector.



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STANDARD WIRING PRACTICES MANUAL

AIRBORN RM342() CABLE ASSEMBLIES

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STANDARD WIRING PRACTICES MANUAL

AIRBORN RM342() CABLE ASSEMBLIES

1. GENERAL DATA

A. Conditions for Repair or Replacement

The cable assembly must be replaced or repaired when one or more of these conditions occur:

- The connector has a crack
- The connector has damage that causes a short circuit between two or more contact cavities
- A contact has damage
- A contact retention mechanism does not lock a contact in a contact cavity
- The jackscrew hardware does not tightly hold the receptacle and the plug together
- A wire has damage; refer to Subject 20-10-13 for damage conditions of wire.

A cable assembly repair can be:

- The replacement of a damaged connector with a new connector
- The replacement of a damaged connector with a connector of a new cable assembly
- The repair or replacement of a damaged wire; refer to Subject 20-10-13 for applicable wire repair procedure.

B. Necessary Conditions for the Connection of the Plug and the Receptacle

The interfacial seal of the plug connector on the equipment must be replaced when one or more of these conditions occur:

- The interfacial seal is missing
- The interfacial seal has damage that extends from one contact cavity to a different contact cavity
- The interfacial seal has damage that extends from the outer edge of the seal to a contact cavity
- The interfacial seal has damage that extends from a jackscrew hole to a contact cavity.

2. PART NUMBERS AND DESCRIPTION

A. Cable Assembly Part Numbers

NOTE: The contacts in the connectors of the cable assemblies that are specified in Table 1 cannot be replaced.

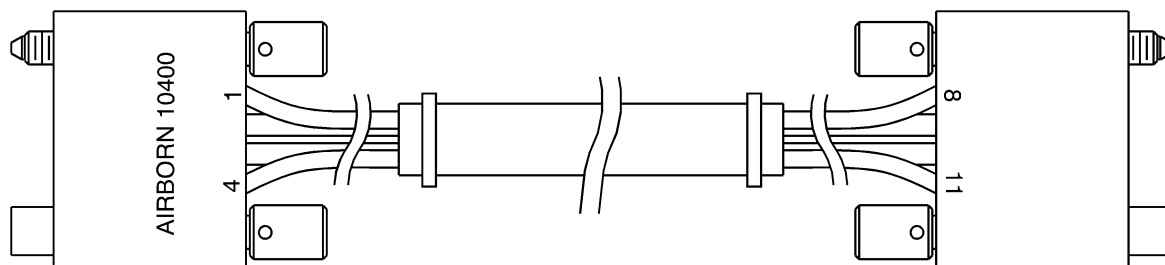
**Table 1
CABLE ASSEMBLY PART NUMBERS**

Part Number	Description	Wire		Supplier
		Specification	Size (AWG)	
RM342-011-581-5900-E47	Jumper Assembly	BMS13-48 Type 9 Class 1	24	AirBorn
RM342-023-581-5900-E58	Harness Assembly	BMS13-48 Type 9 Class 1	24	AirBorn

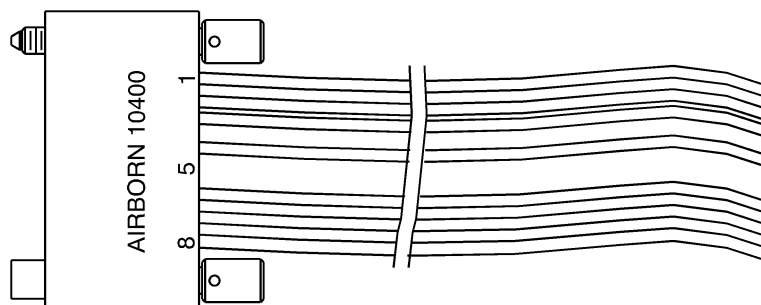
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AIRBORN RM342() CABLE ASSEMBLIES

B. Cable Assembly Description



JUMPER ASSEMBLY CONFIGURATION
Figure 1



HARNESS ASSEMBLY CONFIGURATION
Figure 2

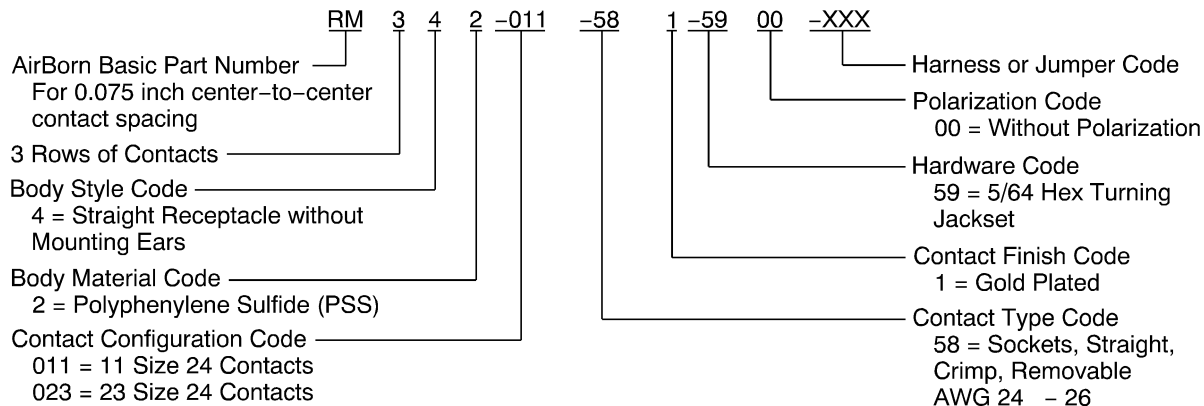
C. Connector Part Numbers

Table 2
CONNECTOR PART NUMBERS

Part Number	Type	Supplier
RM342-011-581-5900	Receptacle	AirBorn
RM342-023-581-5900	Receptacle	AirBorn

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CONNECTOR PART NUMBER STRUCTURE

Figure 3

Table 3

CONNECTOR INTERFACIAL SEAL PART NUMBERS

Part Number	Connector Type	Contact Configuration	Supplier
CDG11195	Plug	011	Airborn
CDG11196	Plug	023	Airborn

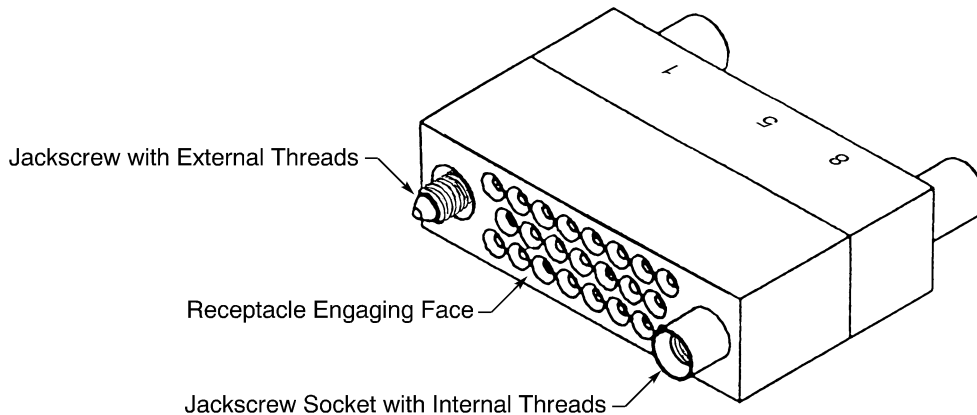
D. Connector Description

The connectors have these technical features:

- Rectangular shape
- 3 rows of contacts
- 0.075 inch center-to-center contact spacing
- Two jackscrew coupling devices
- Size 24 crimp socket contacts
- Contacts installed from the connector rear.

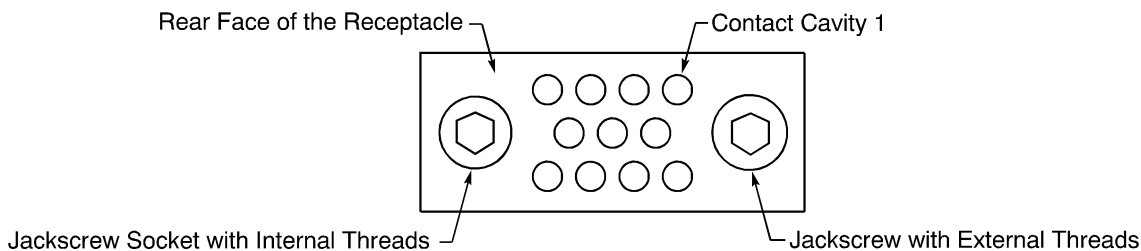
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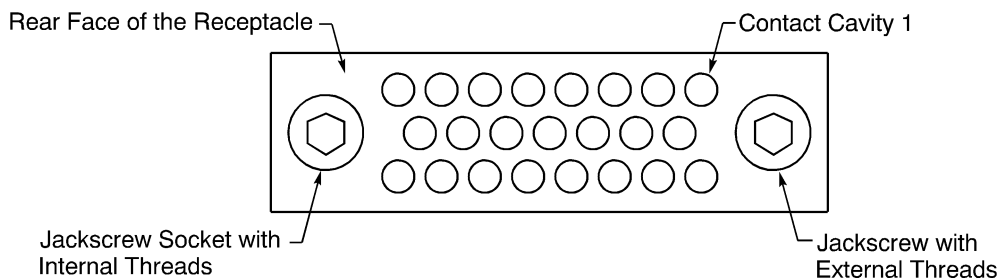
AIRBORN RM 342-() CONNECTOR

Figure 4



RM342-011-581-5900 RECEPTACLE

Figure 5



RM342-023-581-5900 RECEPTACLE

Figure 6

E. Contact Part Numbers

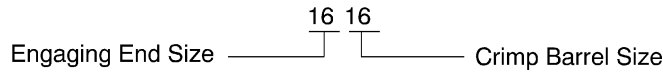
**Table 4
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
24	24	Socket	RM300-000-581-0000	AirBorn

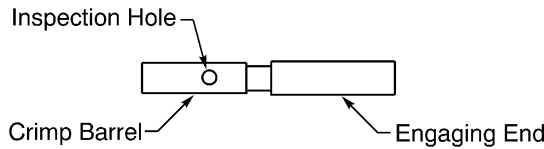
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EXAMPLE OF CONTACT SIZE
Figure 7



SOCKET CONTACT
Figure 8

F. Alternative Wires

Table 5
ALTERNATIVE WIRES

Specified Wire		Alternative Wire	
Specification	Size (AWG)	Specification	Supplier
BMS 13-48 Type 9 Class 1	24	MIL-W-22759/35-24	QPL

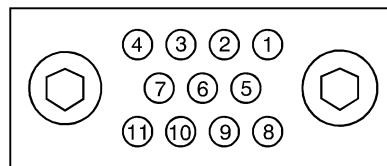
3. CONTACT CONFIGURATIONS

A. AirBorn RM342() Connectors

Table 6
CONTACT CONFIGURATIONS

Contact Configuration	Contact		Cavity	Reference
	Count	Size		
011	11	24	1 through 11	Figure 9
023	23	24	1 through 23	Figure 10

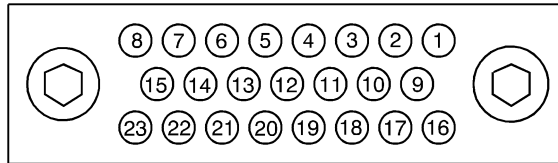
NOTE: Figure 9 and Figure 10 show the rear side of the receptacle with socket contacts. The view of a plug for pin contacts is a mirror image of this view.



011 CONTACT CONFIGURATION
Figure 9

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AIRBORN RM342() CABLE ASSEMBLIES



023 CONTACT CONFIGURATION

Figure 10

4. CABLE ASSEMBLY REPAIR

A. Replacement of a Connector with a New Connector

**Table 7
NECESSARY TOOLS**

Tool	Type
Cutter	Diagonal Cutter

- (1) Make a selection of the applicable connector from Table 2.
- (2) Make a selection of a cutter from Table 7.
- (3) Disconnect the receptacle from the plug. Refer to Paragraph 5.A.
- (4) Cut one of the wires on the old connector as close as possible to the rear of the connector.
- (5) Assemble a contact with the wire. Refer to Paragraph 6.A.
- (6) Install the contact in the new connector. Refer to Paragraph 6.B.
- (7) Do Step (4) through Step (6) for each wire in the old connector.
- (8) Seal the new connector. Refer to Paragraph 6.C.

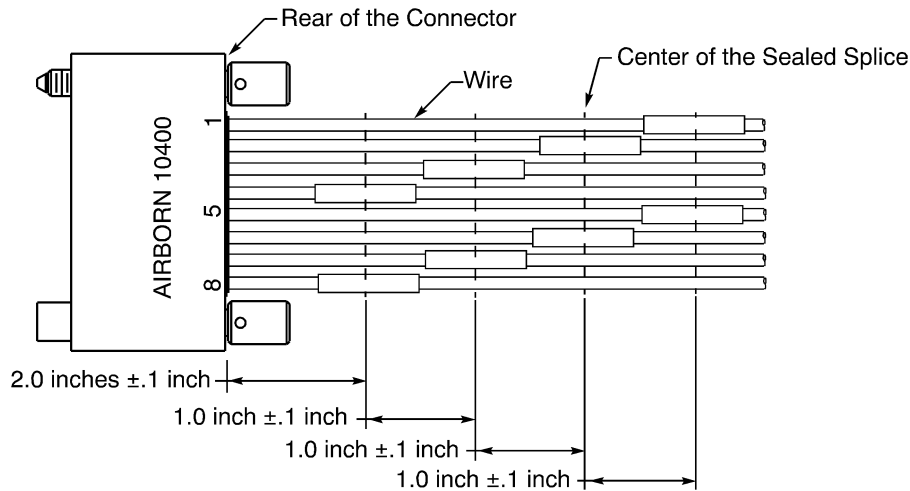
B. Replacement of a Connector with the Connector of a New Cable Assembly

**Table 8
NECESSARY TOOLS**

Tool	Type
Cutter	Diagonal Cutter

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AIRBORN RM342() CABLE ASSEMBLIES



LOCATION OF SPLICE ASSEMBLIES

Figure 11

Refer to Figure 11.

- (1) Make a selection of the applicable cable assembly from Table 1.
- (2) Make a selection of a cutter from Table 8.
- (3) Disconnect the receptacle from the plug. Refer to Paragraph 5.A.
- (4) Cut one of the wires that is nearest to one of the ends of the old connector 2.0 inches \pm 0.1 inch from the rear of the connector.
- (5) Cut the wire in the same contact position of the new connector 2.0 inches \pm 0.1 inch from the rear of the new connector.
- (6) Assemble a sealed butt splice with the wire of the new connector and the wire of the harness.
Refer to Subject 20-30-12 for the selection of a sealed splice configuration.
- (7) Cut the next wire of the old connector at the location that is the same distance from the rear of the connector as the last wire plus 1.0 inch \pm 0.1 inch.
- (8) Cut the wire in the same contact position of the new connector at the location that is the same distance from the connector as the last wire plus 1.0 inch \pm 0.1 inch.
- (9) Assemble a sealed butt splice with the wire of the new connector and the wire of the harness.
Refer to Subject 20-30-12 for the selection of a sealed splice.
- (10) Do Step (7) through Step (9) again until approximately half of the wires of the harness have a splice.
- (11) Do Step (4) through Step (9) again for each of the remaining wires of the old connector.
Make sure to start with the next wire on the old connector.

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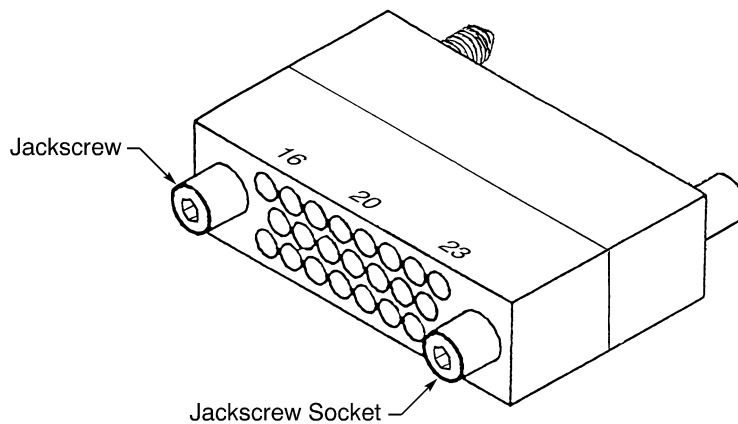
AIRBORN RM342() CABLE ASSEMBLIES

5. CONNECTOR DISASSEMBLY

A. Separation of the Plug and the Receptacle

**Table 9
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64



**LOCATION OF THE JACKSCREW HARDWARE
Figure 12**

Refer to Figure 12.

- (1) Make a selection of a driver from Table 9.

NOTE: The driver can have a ball style end.

- (2) On one end of the receptacle, loosen the jackscrew hardware a small amount.
- (3) On the other end of the receptacle, loosen the jackscrew hardware a small amount.
- (4) Do Step (2) and Step (3) again until the jackscrews and the jackscrew sockets are fully disengaged.
- (5) Pull the receptacle from the plug.

B. Contact Removal

NOTE: If the connector is sealed, the contacts cannot be removed.

**Table 10
CONTACT REMOVAL TOOLS**

Engaging End Size	Removal Tool
24	CDG8161

- (1) Make a selection of a removal tool from Table 10.

STANDARD WIRING PRACTICES MANUAL

AIRBORN RM342() CABLE ASSEMBLIES

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE RETENTION CLIP.

- (2) Put the tip of the removal tool on the wire near the rear of the connector.
- (3) Axially align the removal tool and the contact cavity.
- (4) Carefully push the removal tool straight into the contact cavity until it stops.
- (5) Carefully pull the wire and the removal tool straight out of the contact cavity at the same time.
- (6) If the contact is not released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (2) through Step (5) again.

6. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 11
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
24	24	0.15	±0.03

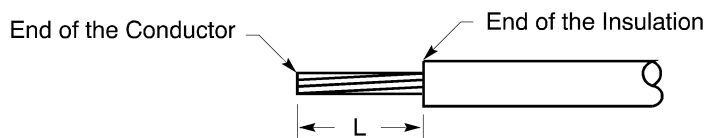
**Table 12
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool	
		Basic Unit	Locator
24	24	M22520/2-01	CDG4602

- (1) Make a selection of a crimp tool from Table 12.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 13
- Table 11 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



**INSULATION REMOVAL LENGTH
Figure 13**

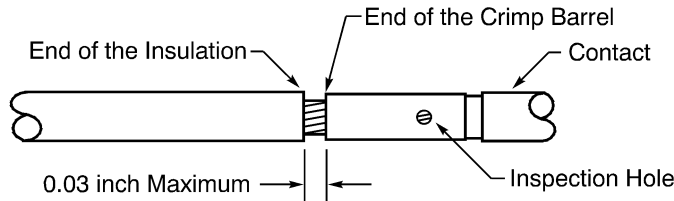
- (3) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 14.

STANDARD WIRING PRACTICES MANUAL

AIRBORN RM342() CABLE ASSEMBLIES

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 14

(4) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

B. Contact Insertion

- (1) Carefully push the contact assembly straight into the contact cavity until it stops.
- (2) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (3) If the contact assembly is not locked in the contact cavity:
 - (a) Pull the contact assembly from the contact cavity.
 - (b) Do Step (1) and Step (2) again.

C. Seal of the Connector

NOTE: After the connector is sealed, the contacts cannot be removed.

Table 13
NECESSARY MATERIALS

Material	Specification	Part Number	Supplier
Sealant	BMS 5-92 Type 1	EC-2216	3M

- (1) Make a selection of a sealant from Table 13.
- (2) Make a selection of a contact from Table 4.

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- (3) Install an unwired contact in each empty contact cavity.
Make sure that each unwired contact is locked in the contact cavity.
- (4) Apply a layer of sealant on the rear surface of the connector:
 - Around each wire
 - On each contact cavity with an unwired contact.

Make sure that the sealant is not applied on the jackscrew hardware.

NOTE: A piece of tape or paper can be used as a temporary barrier to keep the sealant away from the jackscrew hardware.

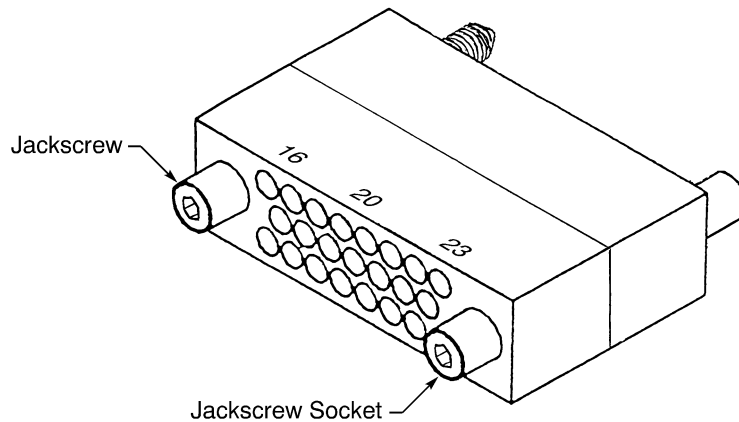
CAUTION: THE SEALANT MUST NOT BE APPLIED ON THE JACKSCREW HARDWARE. THE SEALANT PREVENTS THE CORRECT OPERATION OF THE JACKSCREWS.

- (5) Let the sealant cure for 120 minutes ± 10 minutes.

D. Plug and Receptacle Connection

**Table 14
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Allen Wrench	5/64
	Screwdriver, Hex	5/64



**LOCATION OF THE JACKSCREW HARDWARE
Figure 15**

Refer to Figure 15.

- (1) Make a selection of a driver from Figure 15.

NOTE: The driver can have a ball style end.

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- (2) If the plug connector does not have an interfacial seal:
 - (a) Make a selection of an interfacial seal from Table 3.
 - (b) Install the seal on the engaging face of the plug.

Make sure that:

- The engaging end of each pin contact in the plug goes through the applicable hole in the seal.
 - The jackscrew hardware on each end of the plug goes through the applicable hole in the seal.
- (3) Align the jackscrew and the jackscrew socket of the receptacle with the jackscrew socket and the jackscrew of the plug.

CAUTION: IF THE INTERFACIAL SEAL IS NOT INSTALLED ON THE ENGAGING FACE OF THE PLUG CONNECTOR, DAMAGE TO THE PLUG CONNECTOR CAN OCCUR.

- (4) Push the receptacle straight against the plug.
- (5) On one end of the receptacle, engage the threads of the jackscrew and the jackscrew socket a small amount.
- (6) On the other end of the receptacle, engage the threads of the jackscrew socket and the jackscrew a small amount.
- (7) Tighten the jackscrew a small amount.
- (8) Tighten the jackscrew socket a small amount.
- (9) Do Step (7) and Step (8) again until the receptacle is against the interfacial seal of the plug connector.
- (10) Torque the jackscrew and jackscrew socket 3.75 inch-pounds ± 0.25 inch-pound.

CAUTION: DO NOT APPLY MORE THAN THE SPECIFIED TORQUE. DAMAGE TO THE PLUG CONNECTOR CAN OCCUR.

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 15
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
CDG8161	AirBorn

B. Contact Crimp Tools

**Table 16
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/2-01	QPL
CDG4602	AirBorn



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777 ELMS PANEL REPAIR: WIRE INSULATION REMOVAL

1. GENERAL DATA

A. Necessary Conditions

Refer to Subject 20-00-15 for the necessary conditions that are applicable for:

- The removal of an outer jacket from the end of a shielded wire
- The removal of the primary insulation from the end of a wire.

2. SHIELDED WIRE JACKET AND WIRE INSULATION REMOVAL

A. Jacket and Insulation Removal Tools

CAUTION: THE TOOLS SPECIFIED IN TABLE 1 AND TABLE 2 MUST NOT BE USED TO REMOVE THE OUTER JACKET FROM A SHIELDED CABLE OR A SHIELDED WIRE THAT DOES NOT HAVE A CIRCULAR CROSS SECTION. DAMAGE TO THE SHIELD AND THE WIRES OF THE CABLE CAN OCCUR.

**Table 1
WIRE INSULATION REMOVAL TOOLS**

Wire Size (AWG)	Insulation Removal Tool
22	45-1513
20	45-1513
18	45-1513
16	45-1513
14	45-1611
12	45-1611
10	45-1611
8	45-163
6	45-165
4	45-164
2	45-164

**Table 2
SHIELDED WIRE JACKET REMOVAL TOOLS**

Wire Size (AWG)	Jacket Removal Tool
22	45-162
20	45-162
18	45-162
16	45-162
14	45-162
12	45-163

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Table 2 (continued)

Wire Size (AWG)	Jacket Removal Tool
10	45-163
8	45-163
6	45-165
4	45-164
2	45-164

Table 3

REMOVAL TOOL REPLACEMENT BLADES

Removal Tool	Replacement Blade
45-1513	45-1513-1
45-1611	45-1611-1
45-162	L-9225
45-163	L-9225
45-164	L-9226
45-165	L-9225

B. Insulation Removal for AWG 10 and Smaller Wire

This Paragraph gives the procedure to remove the primary insulation from the end of a wire.

For the procedure to remove the outer jacket from the end of a shielded wire, refer to Paragraph 2.D.

NOTE: It is recommended that a test of the tool with a sample of the wire is done before the operation is done on a wire that is installed or must be installed on the airplane.

- (1) Make a selection of a wire insulation removal tool from Table 1.
- (2) Put the wire in the correct hole in the tool.
- (3) Close the handles of the tool until the tool makes a click.
Make sure the handles stay closed.
- (4) Remove the wire from the tool.
- (5) Release the handles of the tool.
- (6) Examine the wire for damage. Refer to Paragraph 1.A.

C. Insulation Removal for AWG 8 and Larger Wire

This Paragraph gives the procedure to remove the primary insulation from the end of a wire.

For the procedure to remove the outer jacket from the end of a shielded wire, refer to Paragraph 2.D.

NOTE: It is recommended that a test of the tool with a sample of the wire is done before the operation is done on a wire that is installed or must be installed on the airplane.

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777 ELMS PANEL REPAIR: WIRE INSULATION REMOVAL

- (1) Make a selection of a wire insulation removal tool from Table 1.
- (2) Adjust the blades of the tool for the correct depth that is applicable for the wire.
- (3) Put the wire in the hole in the tool.
- (4) Close the handles of the tool until the tool makes a click.
Make sure the handles stay closed.
- (5) Remove the wire from the tool.
- (6) Release the handles of the tool.
- (7) Examine the wire for damage. Refer to Paragraph 1.A.

D. Shielded Wire Jacket Removal

This Paragraph gives the procedure to remove the outer jacket from the end of a shielded wire.

For the procedure to remove the primary insulation from the end of:

- An AWG 10 or smaller wire, refer to Paragraph 2.B.
- An AWG 8 or larger wire, refer to Paragraph 2.C.

NOTE: It is recommended that a test of the tool with a sample of the wire is done before the operation is done on a wire that is installed or must be installed on the airplane.

- (1) Make a selection of a wire insulation removal tool from Table 2.
- (2) Adjust the blades of the tool for the correct depth that is applicable for the wire.
- (3) Put the wire in the hole in the tool.
- (4) Close the handles of the tool until the tool makes a click.
Make sure the handles stay closed.
- (5) Remove the wire from the tool.
- (6) Release the handles of the tool.
- (7) Examine the wire for damage. Refer to Paragraph 1.A.

3. APPROVED TOOL SUPPLIERS

A. Jacket and Insulation Removal Tools

**Table 4
JACKET AND INSULATION REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
45-1513	Ideal Industries
45-1513-1	Ideal Industries
45-1611	Ideal Industries
45-1611-1	Ideal Industries
45-162	Ideal Industries
45-163	Ideal Industries
45-163	Ideal Industries
45-164	Ideal Industries
45-165	Ideal Industries

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Table 4 (continued)

Removal Tool	Supplier
L-9225	Ideal Industries
L-9226	Ideal Industries

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777 ELMS PANEL REPAIR: TERMINAL LUGS

1. PART NUMBERS AND DESCRIPTION

A. Terminal Lug Part Numbers

**Table 1
RESTRICTIVE ENTRY TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	Stud Size	Part Number	Insulation Color		Supplier
			Sleeve	Band	
22	4	40-716-1155	Red	Green	Smiths Industries
	6	40-716-1175	Red	Green	Smiths Industries
	8	40-716-1167	Red	Green	Smiths Industries
	10	40-716-1160	Red	Green	Smiths Industries
	1/4	40-716-1162	Red	Green	Smiths Industries
20	4	40-716-1178	Red	Red	Smiths Industries
	6	40-716-1174	Red	Red	Smiths Industries
	8	40-716-1165	Red	Red	Smiths Industries
	10	40-716-1159	Red	Red	Smiths Industries
	1/4	40-716-1161	Red	Red	Smiths Industries
	5/16	40-716-1177	Red	Red	Smiths Industries
18	4	40-716-1179	Red	White	Smiths Industries
	6	40-716-1181	Red	White	Smiths Industries
	8	40-716-1166	Red	White	Smiths Industries
	10	40-716-1158	Red	White	Smiths Industries
	1/4	40-716-1180	Red	White	Smiths Industries
16	6	40-716-1173	Blue	Blue	Smiths Industries
	8	40-716-1169	Blue	Blue	Smiths Industries
	10	40-716-1172	Blue	Blue	Smiths Industries
14	6	40-716-1140	Blue	Green	Smiths Industries
	8	40-716-1168	Blue	Green	Smiths Industries
	10	40-716-1170	Blue	Green	Smiths Industries
12	8	40-716-1164	Yellow	Yellow	Smiths Industries
	10	40-716-1157	Yellow	Yellow	Smiths Industries
10	8	40-716-1163	Yellow	Brown	Smiths Industries
	10	40-716-1156	Yellow	Brown	Smiths Industries



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Table 2
EQUIVALENT RESTRICTIVE ENTRY TERMINAL LUG PART NUMBERS

Terminal Lug	Equivalent Terminal Lug	
	Part Number	Supplier
40-716-1140	51864-8	AMP
40-716-1155	52273	AMP
40-716-1156	2-36161-4	AMP
40-716-1157	2-36161-3	AMP
40-716-1158	2-36153-5	AMP
40-716-1159	2-36153-4	AMP
40-716-1160	2-36153-3	AMP
40-716-1161	2-320571-4	AMP
40-716-1162	2-320571-3	AMP
40-716-1163	2-320568-3	AMP
40-716-1164	2-320568-2	AMP
40-716-1165	1-320551-3	AMP
40-716-1166	1-320551-4	AMP
40-716-1167	1-320551-2	AMP
40-716-1168	1-51864-1	AMP
40-716-1169	1-51864-0	AMP
40-716-1170	51864-9	AMP
40-716-1172	51864-7	AMP
40-716-1173	51864-6	AMP
40-716-1174	51863-3	AMP
40-716-1175	51863-2	AMP
40-716-1177	2-320572-3	AMP
40-716-1178	52273-1	AMP
40-716-1179	52273-2	AMP
40-716-1180	2-320571-5	AMP
40-716-1181	51863-4	AMP

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**Table 3
GENERAL PURPOSE TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	Stud Size	Part Number	Insulation Color	Supplier
8	8	51408-016	Red	Smiths Industries
	10	40-716-6120	Red	Smiths Industries
		40-716-6120U	Red	Smiths Industries
	1/4	40-716-6121U	Red	Smiths Industries
	3/8	40-716-6123	Red	Smiths Industries
		40-716-6123U	Red	Smiths Industries
6	8	51408-017	Blue	Smiths Industries
	10	40-716-6199	Blue	Smiths Industries
	1/4	40-716-6201	Blue	Smiths Industries
4	1/4	40-716-6128U	Yellow	Smiths Industries
	3/8	40-716-6130U	Yellow	Smiths Industries
2	1/4	40-716-6131U	Red	Smiths Industries
	3/8	40-416-6132U	Red	Smiths Industries

CAUTION: MS25036-() TERMINAL LUGS THAT ARE MADE FROM TUBE STOCK MUST NOT BE USED.

**Table 4
EQUIVALENT GENERAL PURPOSE TERMINAL LUG PART NUMBERS**

Terminal Lug	Equivalent Terminal Lug	
	Part Number	Supplier
40-416-6132U	MS25036-127 Flat Stock	QPL
40-716-6120	324043	AMP
40-716-6120U	MS25036-115 Flat Stock	QPL
40-716-6121U	MS25036-116 Flat Stock	QPL
40-716-6123	324045	AMP
40-716-6123U	MS25036-118 Flat Stock	QPL
40-716-6128U	MS25036-123 Flat Stock	QPL
40-716-6130U	MS25036-125 Flat Stock	QPL
40-716-6131U	MS25036-126 Flat Stock	QPL
40-716-6199	324046	AMP
40-716-6201	324047	AMP
51408-016	D-756-08	Molex
51408-017	E-760-08	Molex

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2. ASSEMBLY OF TERMINAL LUGS

A. Assembly of Restrictive Entry Terminal Lugs

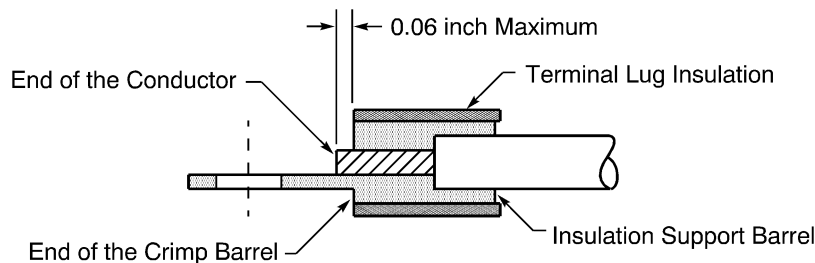
**Table 5
RESTRICTIVE ENTRY TERMINAL LUG CRIMP TOOLS**

Terminal Lug		Crimp Tool	
Crimp Barrel Size	Insulation Color	Basic Unit	Insulation Grip Support Setting
22	Red	525690	1
20	Red	525690	1
18	Red	525690	1
16	Blue	525691	1
14	Blue	525691	1
12	Yellow	525692	1
10	Yellow	525692	1

- (1) Make a selection of a crimp tool from Table 5.
- (2) Remove the necessary length of insulation from the end of the wire. Refer to Subject 20-15-04.
- (3) Put the terminal lug in the crimp tool.
- (4) Put the wire in the crimp barrel of the terminal lug. Refer to Figure 1.

Make sure that:

- The end of the conductor can be seen
- The maximum distance from the end of the conductor to the forward end of the crimp barrel is 0.06 inch.



**POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 1**

- (5) Crimp the terminal lug.

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B. Assembly of General Purpose Terminal Lugs

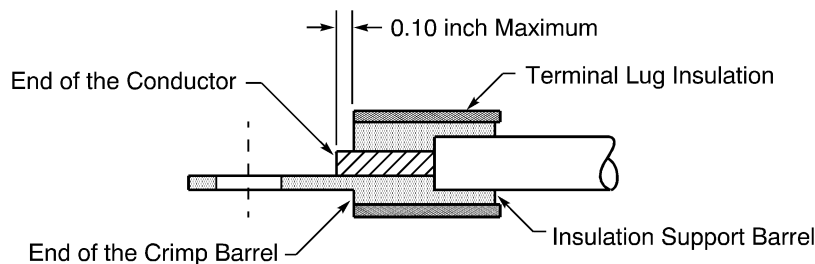
**Table 6
GENERAL PURPOSE TERMINAL LUG CRIMP TOOLS**

Terminal Lug		Crimp Tool		
Crimp Barrel Size	Insulation Color	Basic Unit	Die	Locator
8	Red	400B-HD	414DA-8IT	5008-1
6	Blue	400B-HD	414DA-6IT	5006-1
4	Yellow	400B-HD	414DA-4IT	5007
2	Red	400B-HD	414DA-2IT	5007-1
1/0	Blue	400B-HD	414DA-1/0IT	5039-1
2/0	-	69099	45439	-

- (1) Make a selection of a crimp tool from Table 6.
- (2) Remove the necessary length of insulation from the end of the wire. Refer to Subject 20-15-04.
- (3) Put the terminal lug in the tool.
- (4) Put the wire in the crimp barrel the of terminal lug. Refer to Figure 2.

Make sure that:

- The end of the conductor can be seen
- The maximum distance from the end of the conductor to the forward end of the crimp barrel is 0.10 inch.



**POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 2**

- (5) Crimp the terminal lug.

3. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 7
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
400B-HD	Pico
414DA-1/0IT	Pico

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Table 7 (continued)

Crimp Tool	Supplier
414DA-2IT	Pico
414DA-4IT	Pico
414DA-6IT	Pico
414DA-8IT	Pico
45439	AMP
5006-1	Pico
5007	Pico
5007-1	Pico
5008-1	Pico
5039-1	Pico
525690	AMP
525691	AMP
525692	AMP
69099	AMP

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1. PART NUMBERS AND DESCRIPTION

A. Butt Splice Kit Part Numbers

**Table 1
BUTT SPLICE KIT PART NUMBERS**

CAU Range		Crimp Barrel Size	Part Number	Color Stripe	Supplier
Minimum	Maximum				
3	15	26-20	40-716-6079	Red	Smiths Industries
8	27	20-16	40-716-6080	Blue	Smiths Industries
19	67	16-12	40-716-6096	Yellow	Smiths Industries

**Table 2
EQUIVALENT BUTT SPLICE KIT PART NUMBERS**

Splice Kit	Equivalent Splice Kit	
	Part Number	Supplier
40-716-6079	D-436-36	Raychem
40-716-6080	D-436-37	Raychem
40-716-6096	D-436-38	Raychem

B. Parallel Splice Part Numbers

**Table 3
PARALLEL SPLICE PART NUMBERS**

CAU Range		Crimp Barrel Size	Part Number	Supplier
Minimum	Maximum			
20	52	16-14	40-716-6157-02	Smiths Industries
52	131	12-10	40-716-6157-03	Smiths Industries
131	208	8	40-716-6157-04	Smiths Industries

**Table 4
EQUIVALENT PARALLEL SPLICE PART NUMBERS**

Parallel Splice	Equivalent Parallel Splice	
	Part Number	Supplier
40-716-6157-02	34137	AMP
40-716-6157-03	34138	AMP
40-716-6157-04	34318	AMP

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**Table 5
HEAT SHRINKABLE END CAP PART NUMBERS**

Parallel Splice	Heat Shrinkable End Cap	
	Part Number	Supplier
40-716-6157-02	40-716-6183-03	Smiths Industries
40-716-6157-03	40-716-6183-04	Smiths Industries
40-716-6157-04	40-716-6183-05	Smiths Industries

**Table 6
EQUIVALENT HEAT SHRINKABLE END CAP PART NUMBERS**

Heat Shrinkable End Cap	Equivalent Heat Shrinkable End Cap	
	Part Number	Supplier
40-716-6183-03	PD-CAP-1/4	Raychem
40-716-6183-04	PD-CAP-3/8	Raychem
40-716-6183-05	PD-CAP-1/2	Raychem

2. ASSEMBLY OF SPLICES

A. Selection of the Correct Size of Splice

If the splice configuration is not specified, refer to Subject 20-30-22.

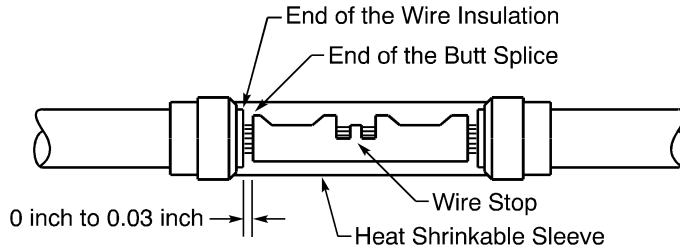
B. Assembly of Butt Splices

**Table 7
BUTT SPLICE CRIMP TOOLS**

Crimp Barrel Size	Crimp Tool	
	Part Number	Nest
26-20	AD-1377	26-20
	GMT 232	26-20
20-16	AD-1377	20-16
	GMT 232	20-16
18-12	AD-1377	16-12
	GMT 232	16-12

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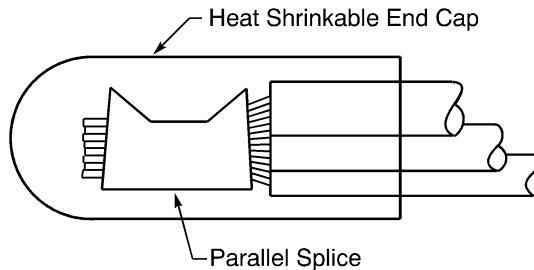
CONFIGURATION OF THE SEALED BUTT SPLICE ASSEMBLY
Figure 1

- (1) Make a selection of a crimp tool from Table 7.
- (2) Put the heat shrinkable sleeve on one wire of the wires.
- (3) Remove 0.28 inch \pm 0.03 inch of insulation from the end of the wires. Refer to Subject 20-15-04.
- (4) Put the splice in the crimp tool.
- (5) If the splice has a seam, align the seam opposite the indenter.
- (6) Hold the splice in the tool with light pressure.
- (7) Put the end of one wire in the splice.
- (8) Crimp the splice.
- (9) Do Step (4) through Step (8) again for the other end of the splice.
- (10) Align the center of the heat shrinkable sleeve with the center of the splice.
- (11) Shrink the sleeve in position. Refer to Subject 20-10-14.

C. Assembly of Parallel Splices

Table 8
PARALLEL SPLICE CRIMP TOOLS

Crimp Barrel Size	Crimp Tool	
	Part Number	Nest
16-14	525693	16-14
12-10	525693	12-10
8	69355	-



CONFIGURATION OF THE PARALLEL SPLICE ASSEMBLY
Figure 2

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- (1) Make a selection of a heat shrinkable end cap from Table 5.
- (2) Make a selection of a crimp tool from Table 8.
- (3) Remove the 0.34 inch \pm 0.03 inch from the end of the wires. Refer to Subject 20-15-04.
- (4) Put the splice in the crimp tool.
- (5) If the splice has a seam, align the seam opposite the indenter.
- (6) Hold the splice in the tool with light pressure.
- (7) Put the wires in the splice.
- (8) Crimp the splice.
- (9) Put the end cap on the splice
- (10) Shrink the end cap in position. Refer to Subject 20-10-14.

3. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 9
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
525693	AMP
69355	AMP
AD-1377	Raychem
GMT 232	Daniels



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777 ELMS PANEL REPAIR: MIL-C-26500 TYPE CONNECTORS

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1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Table with 4 columns: Part Number, Supplier, Equivalent Connector Part Number, and Supplier. It lists various connector part numbers and their equivalents, all supplied by Smiths Industries.

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Table 1 (continued)

Part Number	Supplier	Equivalent Connector	
		Part Number	Supplier
40-743-4773-26	Smiths Industries	BACC63CC16-24P6	Boeing
40-743-5103-26	Smiths Industries	BACC45FN20-25S6	Boeing
40-743-5120-00	Smiths Industries	BACC63CC20-25P	Boeing
40-743-6213-26	Smiths Industries	BACC63CC24-30S6	Boeing
40-743-6213-27	Smiths Industries	BACC63CC24-30S7	Boeing
40-743-6217-28	Smiths Industries	BACC63CC24-30P8	Boeing
40-743-6347-00	Smiths Industries	BACC63CC18-31P	Boeing
40-743-6347-26	Smiths Industries	BACC63CC18-31P6	Boeing
40-743-6348-00	Smiths Industries	BACC45FN18-31S	Boeing
40-743-7396-00	Smiths Industries	BACC45FN24-43S	Boeing
40-743-7396-26	Smiths Industries	BACC45FN24-43S6	Boeing
40-743-7396-27	Smiths Industries	BACC45FN24-43S7	Boeing
40-743-7396-28	Smiths Industries	BACC45FN24-43S8	Boeing
40-743-7396-29	Smiths Industries	BACC45FN24-43S9	Boeing
40-743-7399-00	Smiths Industries	BACC45FN24-43P	Boeing
40-743-7399-26	Smiths Industries	BACC45FN24-43P6	Boeing
40-743-7413-26	Smiths Industries	BACC45FN20-41P6	Boeing
40-743-7416-00	Smiths Industries	BACC63CC24-43S	Boeing
40-743-7416-28	Smiths Industries	BACC63CC24-43S8	Boeing
40-743-7419-00	Smiths Industries	BACC63CC28-42S	Boeing
40-743-8581-29	Smiths Industries	BACC45FN22-88S9	Boeing
40-743-9136-29	Smiths Industries	BACC45FN24-61S9	Boeing
40-743-9137-26	Smiths Industries	BACC45FN24-61P6	Boeing
40-743-9137-27	Smiths Industries	BACC45FN24-61P7	Boeing
40-743-9142-00	Smiths Industries	BACC63CC24-61S	Boeing
40-743-9142-29	Smiths Industries	BACC63CC24-61S9	Boeing

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B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	30-867-6750-01	Smiths Industries
			30-867-6753-01	Smiths Industries
		Socket	30-867-6751-01	Smiths Industries
			30-867-6752-01	Smiths Industries
16	16	Pin	30-867-6750-02	Smiths Industries
		Socket	30-867-6751-02	Smiths Industries
	14	Socket	30-867-6826	Smiths Industries
12	12	Pin	30-867-6750-03	Smiths Industries
		Socket	30-867-6751-03	Smiths Industries

**Table 3
EQUIVALENT CONTACT PART NUMBERS**

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6750-01	BACC47CN1A	Boeing
30-867-6750-02	BACC47CN2A	Boeing
30-867-6750-03	BACC47CN3A	Boeing
30-867-6751-01	BACC47CP1A	Boeing
30-867-6751-02	BACC47CP2A	Boeing
30-867-6751-03	BACC47CP3A	Boeing
30-867-6752-01	BACC47CP1S	Boeing
30-867-6753-01	BACC47CN1S	Boeing
30-867-6826	10-807155-16T	Amphenol

2. INSERT CONFIGURATIONS

Refer to Subject 20-61-11.

3. CONNECTOR DISASSEMBLY

Refer to Subject 20-61-11.

4. CONNECTOR ASSEMBLY

A. Necessary Conditions

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

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B. Connector Assembly

Refer to Subject 20-61-11.

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1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Supplied	Supplier
40-743-3196-00U	Without Contacts	Smiths Industries
40-743-6821-00U	Without Contacts	Smiths Industries
40-743-9445-00U	Without Contacts	Smiths Industries
40-743-9445-05U	Without Contacts	Smiths Industries
40-743-9445-06U	Without Contacts	Smiths Industries
40-743-9445-07U	Without Contacts	Smiths Industries
40-743-9744-00U	Without Contacts	Smiths Industries
40-743-9744-05U	Without Contacts	Smiths Industries
40-743-9744-06U	Without Contacts	Smiths Industries
40-743-9744-07U	Without Contacts	Smiths Industries

Table 2
EQUIVALENT CONNECTORS SUPPLIED WITH CONTACTS

Connector	Equivalent Connectors Supplied With Contacts	
	Part Number	Supplier
40-743-3196-00U	40-743-3189-00U	Smiths Industries
40-743-6821-00U	40-743-6987-00U	Smiths Industries
40-743-9445-00U	40-743-9414-00U	Smiths Industries
40-743-9445-05U	40-743-9414-05U	Smiths Industries
40-743-9445-06U	40-743-9414-06U	Smiths Industries
40-743-9445-07U	40-743-9414-07U	Smiths Industries
40-743-9744-00U	40-743-9734-00U	Smiths Industries
40-743-9744-05U	40-743-9734-05U	Smiths Industries
40-743-9744-06U	40-743-9734-06U	Smiths Industries
40-743-9744-07U	40-743-9734-07U	Smiths Industries

Table 3
EQUIVALENT CONNECTOR PART NUMBERS

Connector	Equivalent Connector	
	Part Number	Supplier
40-743-3189-00U	MS27467T15B19SN	QPL

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Table 3 (continued)

Connector	Equivalent Connector	
	Part Number	Supplier
40-743-3196-00U	MS27467T15B19BN	QPL
40-743-6821-00U	MS27467T15B35BN	QPL
40-743-6987-00U	MS27467T15B35SN	QPL
40-743-9414-00U	MS27467T23B35SN	QPL
40-743-9414-05U	MS27467T23B35SB	QPL
40-743-9414-06U	MS27467T23B35SC	QPL
40-743-9414-07U	MS27467T23B35SA	QPL
40-743-9445-00U	MS27467T23B35BN	QPL
40-743-9445-05U	MS27467T23B35BB	QPL
40-743-9445-06U	MS27467T23B35BC	QPL
40-743-9445-07U	MS27467T23B35BA	QPL
40-743-9734-00U	MS27467T25B35SN	QPL
40-743-9734-05U	MS27467T25B35SB	QPL
40-743-9734-06U	MS27467T25B35SC	QPL
40-743-9734-07U	MS27467T25B35SA	QPL
40-743-9744-00U	MS27467T25B35BN	QPL
40-743-9744-05U	MS27467T25B35BB	QPL
40-743-9744-06U	MS27467T25B35BC	QPL
40-743-9744-07U	MS27467T25B35BA	QPL

B. Contact Part Numbers

**Table 4
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Color Code		Supplier
Engaging End	Crimp Barrel			Band	Color	
22D	22D	Socket	30-867-6654U	1	Orange	Smiths Industries
				2	Yellow	
				3	Grey	
20	20	Socket	30-867-6656U	1	Orange	Smiths Industries
				2	Brown	
				3	Green	

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**Table 5
EQUIVALENT CONTACT PART NUMBERS**

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6654	M39029/56-348	QPL
30-867-6656U	M39029/56-351	QPL

C. Connector Backshell Part Numbers

**Table 6
BACKSHELL PART NUMBERS**

Part Number	Supplier
40-741-1632	Smiths Industries

**Table 7
EQUIVALENT BACKSHELL PART NUMBERS**

Backshell	Equivalent Backshell	
	Part Number	Supplier
40-741-1632	340FS001N-14-2F12B	Glenair

D. Strain Relief Clamp Part Numbers

**Table 8
STRAIN RELIEF CLAMP PART NUMBERS**

Part Number	Configuration	Supplier
40-741-1603-08U	45 degrees	Smiths Industries
40-741-1603-09U	45 degrees	Smiths Industries
40-741-1604-04U	90 degrees	Smiths Industries
40-741-1604-08U	90 degrees	Smiths Industries
40-741-1604-09U	90 degrees	Smiths Industries

**Table 9
EQUIVALENT STRAIN RELIEF CLAMP PART NUMBERS**

Clamp	Equivalent Clamp	
	Part Number	Supplier
40-741-1603-08U	M85049/57-22W	QPL
40-741-1603-09U	M85049/57-24W	QPL

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Table 9 (continued)

Clamp	Equivalent Clamp	
	Part Number	Supplier
40-741-1604-04U	M85049/63-14W	QPL
40-741-1604-08U	M85049/63-22W	QPL
40-741-1604-09U	M85049/63-24W	QPL

Table 10

APPROVED SUPPLIERS OF M85049 STRAIN RELIEF CLAMPS

Clamp	Supplier
M85049/57-22W	Glenair
M85049/57-24W	Glenair
M85049/63-14W	Glenair
M85049/63-22W	Glenair
M85049/63-24W	Glenair

2. INSERT CONFIGURATIONS

Refer to Subject 20-63-19.

3. CONNECTOR DISASSEMBLY

Refer to Subject 20-63-19.

4. CONNECTOR ASSEMBLY

A. Contact Assembly

Refer to Subject 20-63-19.

B. Contact Insertion

Refer to Subject 20-63-19.

C. Strain Relief Clamp Installation

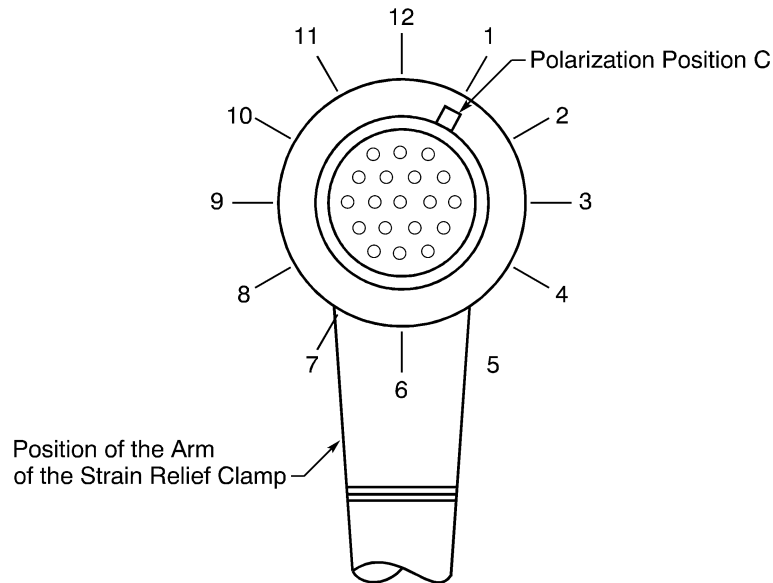
Table 11

STRAIN RELIEF CLAMP TORQUE VALUES

Shell Size		Torque (inch-pounds)		
Connector	Clamp	Target	Minumum	Maximum
15	14	30	30	35
23	22	69	69	74
25	24	83	83	88

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POSITION OF THE STRAIN RELIEF CLAMP
Figure 1

- (1) Engage the threads of the clamp and the connector.
- (2) Set the angle of the clamp. Refer to Figure 1.
- (3) Tighten the threads until the teeth on the connector shell are fully engaged with the teeth on the clamp.
- (4) Torque the clamp. Refer to Table 11.

D. Backshell Installation

- (1) Engage the threads of the backshell and the connector.
- (2) Tighten the threads until the teeth on the connector shell are fully engaged with the teeth on the backshell.
- (3) Torque the backshell 30 inch-pounds +5 inch-pounds, -0 inch-pounds.



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3. <u>CONNECTOR DISASSEMBLY</u>	2
4. <u>CONNECTOR ASSEMBLY</u>	2
A. Necessary Conditions	2
B. Connector Assembly	2

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1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

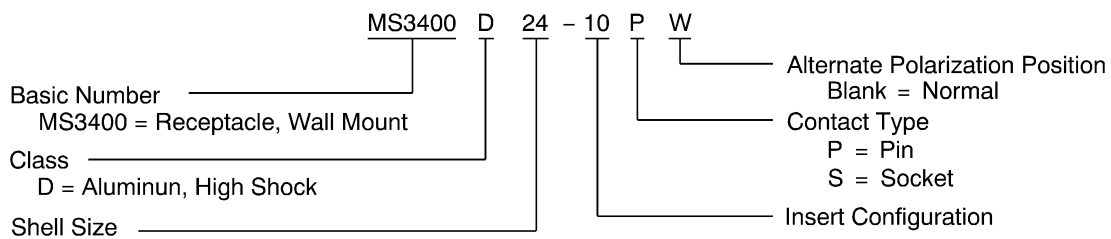
NOTE: If the replacement of a connector is necessary, the Boeing BACC63D connector with an equivalent configuration is a satisfactory alternative. Refer to Subject 20-61-19.

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
40-742-3211-00U	Smiths Industries
40-742-4026-00U	Smiths Industries
40-742-4026-01U	Smiths Industries
40-742-4030-00U	Smiths Industries
40-742-7044-01U	Smiths Industries
40-742-7045-01U	Smiths Industries

**Table 2
EQUIVALENT CONNECTOR PART NUMBERS**

Connector	Equivalent Connector	
	Part Number	Supplier
40-742-3211-00U	MS3400D28-22PN	QPL
40-742-4026-00U	MS3400D24-10P	QPL
40-742-4026-01U	MS3400D24-10PW	QPL
40-742-4030-00U	MS3400D24-10S	QPL
40-742-7044-01U	MS3400D24-11SW	QPL
40-742-7045-01U	MS3400D24-11PW	QPL



**MS3400() PART NUMBER STRUCTURE
Figure 1**



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B. Contact Part Numbers

Table 3
CONTACT PART NUMBERS

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
16	16	Pin	30-867-6700U	Smiths Industries
		Socket	30-867-6704U	Smiths Industries
12	12	Pin	30-867-6702U	Smiths Industries
		Socket	30-867-6706U	Smiths Industries
8	8	Pin	30-867-6703U	Smiths Industries
		Socket	30-867-6707U	Smiths Industries
4	4	Pin	30-867-6816U	Smiths Industries
		Socket	30-867-6815U	Smiths Industries

Table 4
EQUIVALENT CONTACT PART NUMBERS

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6700U	M39029/44-288	QPL
30-867-6702U	M39029/44-290	QPL
30-867-6703U	M39029/44-291	QPL
30-867-6704U	M39029/44-295	QPL
30-867-6706U	M39029/44-297	QPL
30-867-6707U	M39029/44-298	QPL
30-867-6815U	M39029/44-299	QPL
30-867-6816U	M39029/44-292	QPL

2. INSERT CONFIGURATIONS

Refer to Subject 20-61-19.

3. CONNECTOR DISASSEMBLY

Refer to Subject 20-61-19.

4. CONNECTOR ASSEMBLY

A. Necessary Conditions

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

B. Connector Assembly

Refer to Subject 20-61-19.

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1. PART NUMBERS AND DESCRIPTION

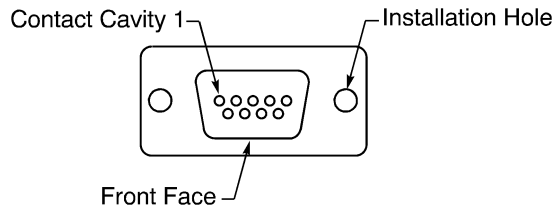
A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
40-742-7056	Plug	Smiths Industries
M24308/2-1F	Plug	QPL

**Table 2
EQUIVALENT CONNECTOR PART NUMBERS**

Connector	Equivalent Connector	
	Part Number	Supplier
40-742-7056	EVD9F00000	Positronic Industries



**D SUBMINIATURE PLUG
Figure 1**

B. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Socket	30-867-6742U	Smiths Industries

**Table 4
EQUIVALENT CONTACT PART NUMBERS**

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6742U	M39029/63-368	QPL

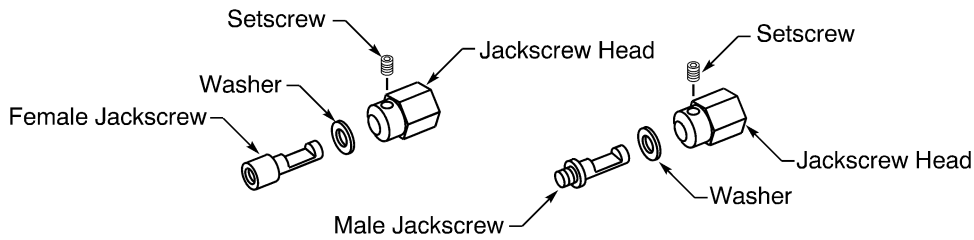
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C. Jackscrew Part Numbers

**Table 5
JACKSCREW PART NUMBERS**

Part Number	Type	Supplier
40-741-1759	Male	Smiths Industries
40-741-1760	Female	Smiths Industries



**MALE AND FEMALE JACKSCREWS
Figure 2**

2. CONNECTOR DISASSEMBLY

A. Separation of the Plug and the Receptacle

**Table 6
NECESSARY TOOLS**

Tool	Size (inch)
Screwdriver, Flat	-
Nut Driver	1/4

- (1) Make a selection of a tool from Table 6.
- (2) Turn one jackscrew counterclockwise two or three turns.
- (3) Turn the other jackscrew counterclockwise two or three turns.
- (4) Do Step (2) through Step (3) again until the jackscrews are fully disengaged.
- (5) Pull the connector away from the contactor.

B. Removal of the Plug from a Panel

**Table 7
NECESSARY TOOLS**

Tool	Description
Screwdriver	Phillips

- (1) Make a selection of a tool from Table 7.
- (2) Remove the two connector installation screws.

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- (3) Pull the connector out of the slot in the panel.

C. Contact Removal

**Table 8
CONTACT REMOVAL TOOLS**

Contact Size	Removal Tool	
	Part Number	Color
20	M81969/1-02	White

- (1) Make a selection of a contact removal tool from Table 8.
- (2) Examine the removal tool.

WARNING: DO NOT USE A REMOVAL TOOL THAT HAS A BENT TIP OR BIT. AN INJURY CAN OCCUR.

- (3) Put the tip of the removal tool on the wire near the grommet.
- (4) Axially align the removal tool and the contact cavity.
- (5) Carefully push the removal tool into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHILE IT IS IN THE CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the wire and the removal tool out of the contact cavity at the same time.
- (7) If the contact cannot be released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (3) through Step (6) again.

3. CONNECTOR ASSEMBLY

A. Assembly of the Connector Installation Hardware

**Table 9
JACKSCREWS PART NUMBERS AND POSITIONS**

Contactor	Position Code	Jackscrew Position	Jackscrew
ELM1057-1	B	1	40-741-1759
		2	40-741-1759
ELM1058-1	C	1	40-741-1759
		2	40-741-1760
ELM1059-1	A	1	40-741-1760
		2	40-741-1759

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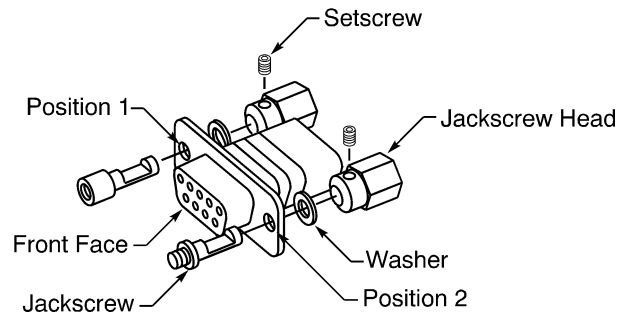
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**Table 10
NECESSARY MATERIALS**

Material	Part Number	Supplier
Thread Locking Compound	221	Loctite Corporation

**Table 11
NECESSARY TOOLS**

Tool	Size (inch)
Allen Wrench	0.05



**ASSEMBLY OF THE JACKSCREW
Figure 3**

Refer to Figure 3.

- (1) Make a selection of a thread locking compound from Table 10.
- (2) Make a selection of an Allen wrench from Table 11.
- (3) Make a selection of the necessary jackscrews from Table 9.
- (4) From the front face of the connector, put a jackscrew through the installation hole in the specified position. Refer to Table 9.
- (5) Put the washer on the jackscrew.
- (6) Put the jackscrew head on the jackscrew.
- (7) Put a drop of thread locking compound on the first two threads of the setscrew.
- (8) Engage the threads of the setscrew with the threads in the jackscrew head.
- (9) Tighten the setscrew.
- (10) Do Step (4) through Step (9) again for the other jackscrew.

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B. Contact Assembly

**Table 12
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
22	20	0.15	0.03
20	20	0.15	0.03

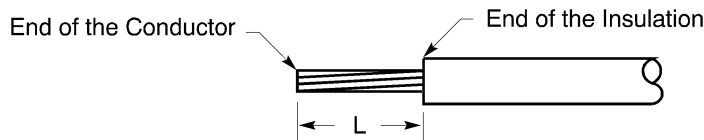
**Table 13
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
22	20	M22520/2-01	6	M22520/2-08
20	20	M22520/2-01	7	M22520/2-08

- (1) Make a selection of a crimp tool from Table 13.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 4
- Table 12 for the insulation removal length
- Subject 20-15-04 for the insulation removal procedures.



**WIRE PREPARATION
Figure 4**

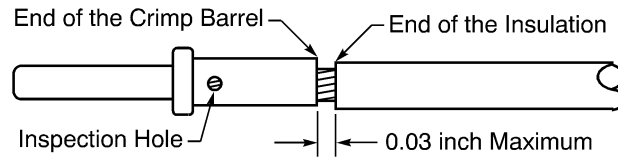
- (3) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 5.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

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POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 5

- (4) Crimp the contact.
- (5) Examine the contact assembly for these types of damage:
 - A strand of the conductor is broken
 - The base metal of a strand of the conductor can be seen
 - The crimp barrel of the contact has a crack.
- (6) If the contact or the wire has damage, replace the contact.

C. Contact Insertion

Table 14
CONTACT INSERTION TOOLS

Contact Size	Insertion Tool	
	Part Number	Color
20	M81969/1-02	Red

- (1) Make a selection of a contact insertion tool from Table 14.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT:

- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

NOTE: As an alternative, the contacts can be inserted with the hand.

- (2) Put the contact assembly into the applicable end of the insertion tool.
- (3) At the rear face of the connector, axially align the contact and the tool with the contact cavity.
- (4) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHILE IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully remove the tool from the contact cavity.
 Make sure to keep the tool perpendicular to the rear face of the connector.
- (6) Lightly pull the wire to make sure that the contact is locked in position.

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CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact out of the cavity.
 - (b) Do Step (2) through Step (6) again.

4. CONNECTOR INSTALLATION

A. Connection of the Plug and the Receptacle

**Table 15
NECESSARY TOOLS**

Tool	Size (inch)
Screwdriver, Flat	-
Nut Driver	1/4

- (1) Make a selection of a tool from Table 15.
- (2) Push the plug into the receptacle in the contactor.
- (3) Engage the threads of each jackscrew with the threads in the contactor.
- (4) Turn one jackscrew clockwise two or three turns.
- (5) Turn the other jackscrew clockwise two or three turns.
- (6) Do Step (4) through Step (5) again until the jackscrews are fully engaged.

B. Installation of the Connector in the Panel

- (1) Push the connector into the slot in panel until the connector flange is against the panel.
- (2) Engage the threads of the connector installation screws with the threads of the panel.
- (3) Tighten each screw.

5. APPROVED TOOL SUPPLIERS

A. Contact Insertion and Removal Tools

**Table 16
CONTACT INSERTION AND REMOVAL TOOL SUPPLIERS**

Tool	Supplier
M81969/1-02	QPL



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B. Contact Crimp Tools

**Table 17
CONTACT CRIMP TOOL SUPPLIERS**

Tool	Supplier
M22520/2-01	QPL
M22520/2-08	QPL

20-15-41



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1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

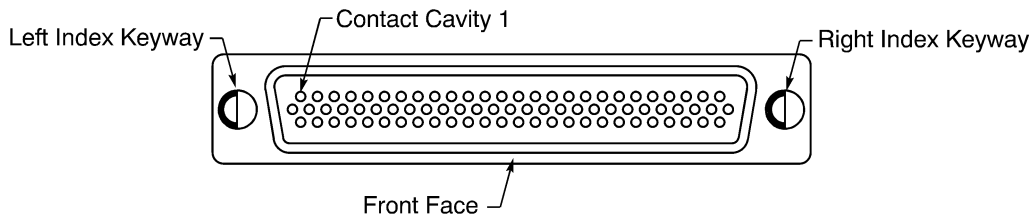
Part Number	Type	Supplier
40-743-862	Plug	Smiths Industries

**Table 2
EQUIVALENT CONNECTORS**

Connector	Equivalent Connector Supplied With Contacts	
	Part Number	Supplier
40-743-862	40-743-927	Smiths Industries
MRM8439	MRM7935	Miles Roystone

**Table 3
EQUIVALENT CONNECTOR PART NUMBERS**

Connector	Equivalent Connector	
	Part Number	Supplier
40-743-862	MRM8439	Miles Roystone
40-743-927	MRM7935	Miles Roystone



**HIGH DENSITY D SUBMINIATURE PLUG
Figure 1**

B. Contact Part Numbers

**Table 4
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
22	22	Pin	30-867-6757	Smiths Industries

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**Table 5
EQUIVALENT CONTACT PART NUMBERS**

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6757	MR22P	Miles Roystone

C. Backshell Part Numbers

**Table 6
BACKSHELL PART NUMBERS**

Part Number	Supplier
ELM655-1	Smiths Industries

D. Connector Installation Hardware Part Numbers

**Table 7
CONNECTOR INSTALLATION HARDWARE**

Hardware	Part Number	Supplier
Dowel Pin	40-741-1741	Smiths Industries
End Cap	40-741-1793	Smiths Industries
Index Keyway, Long	MRM8401-2	Miles Roystone
Index Keyway, Short	MRM8401-1	Miles Roystone
Index Keyway Kit	40-741-1738	Smiths Industries
Jackscrew	MRM8396	Miles Roystone
Jackscrew Assembly Kit	40-741-1740	Smiths Industries

**Table 8
INSTALLATION HARDWARE KIT COMPONENTS**

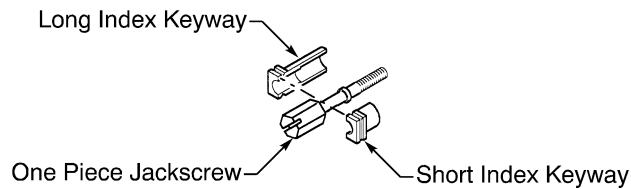
Kit	Kit Components
Index Keyway	Index Keyway, Long
	Index Keyway, Short
Jackscrew Assembly	Index Keyway, Long
	Index Keyway, Short
	Jackscrew

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**Table 9
EQUIVALENT CONNECTOR INSTALLATION HARDWARE**

Hardware	Equivalent Hardware	
	Part Number	Supplier
40-741-1741	MRM5951	Miles Roystone
40-741-1793	MRM8526	Miles Roystone



**JACKSCREW ASSEMBLY
Figure 2**



**OBsolete JACKSCREW ASSEMBLY
Figure 3**

2. CONNECTOR DISASSEMBLY

A. Separation of the Plug and the Receptacle

**Table 10
NECESSARY TOOLS**

Tool	Size (inch)
Flat screwdriver	-
Nut Driver	1/8

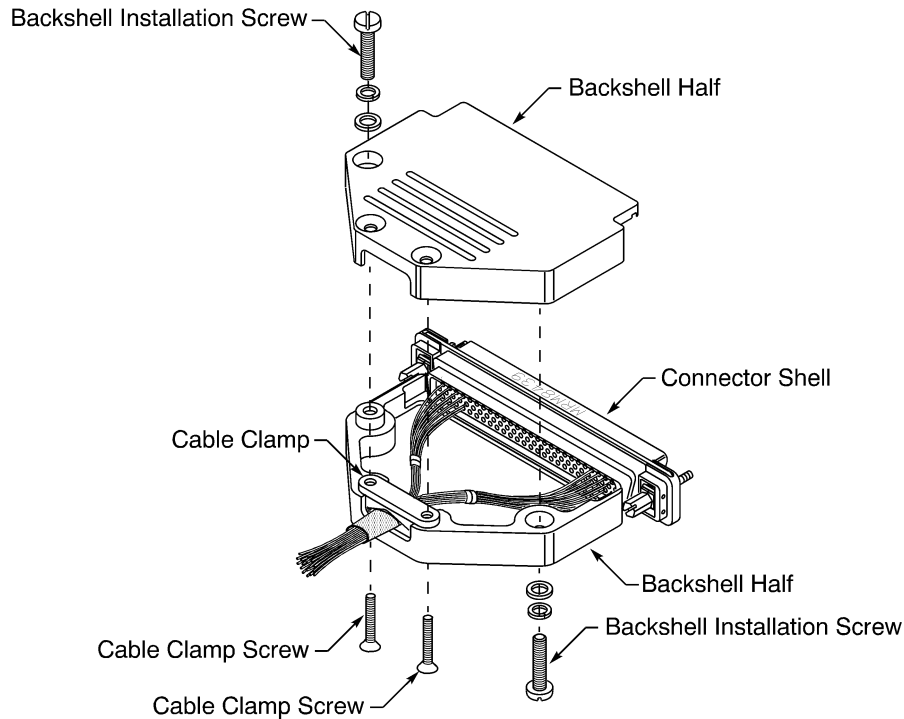
Refer to Figure 2 and Figure 3 for the different configurations of the jackscrews.

- (1) Make a selection of a tool from Table 10.
- (2) Turn one jackscrew counterclockwise two or three turns.
- (3) Turn the other jackscrew counterclockwise two or three turns.
- (4) Do Step (2) through Step (3) again until the jackscrews are fully disengaged.
- (5) Pull the plug away from the receptacle.

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B. Backshell Removal



BACKSHELL REMOVAL
Figure 4

Refer to Figure 4.

- (1) Remove the backshell installation screws.
- (2) Lift the free backshell half off the wire harness and the connector shell.
- (3) Remove the cable clamp installation screws.
- (4) Remove the cable clamp.
- (5) Pull the other backshell half off the wire harness and the connector shell.

C. Contact Removal

Table 11
CONTACT REMOVAL TOOLS

Engaging End Size	Removal Tool	
	Basic Unit	Tip
22	DHK 160	DHK160-PR-2

- (1) Make a selection of a contact removal tool from Table 11.
- (2) Examine the removal tool.

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WARNING: DO NOT USE A REMOVAL TOOL THAT HAS A BENT TIP OR BIT. AN INJURY CAN OCCUR.

- (3) At the front face of the connector, axially align the tool and the contact cavity.

CAUTION: DO NOT INSERT THE TOOL INTO THE REAR GROMMET OF THE CONNECTOR. DAMAGE TO THE CONNECTOR WILL OCCUR.

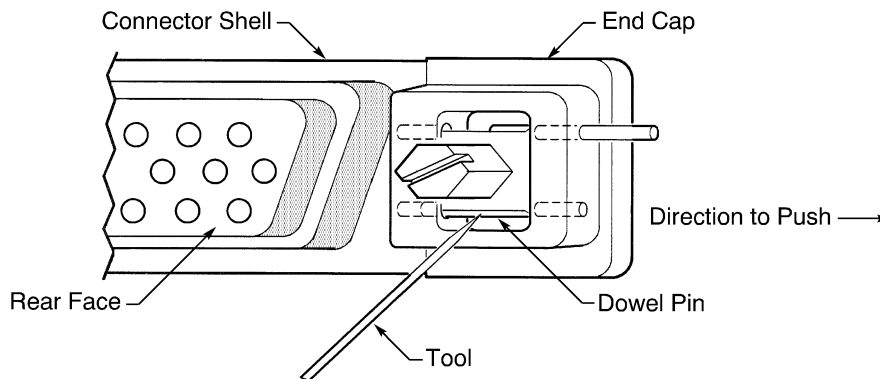
- (4) Push the tool until the shoulder of the contact is pushed out farther than the retention clips.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out of the contact cavity.
- (6) Pull the contact out of the rear of the connector.

D. Connector Installation Hardware Removal

- (1) Remove the two dowel pins in the endcap. Refer to Figure 5.



**DOWEL PIN REMOVAL
Figure 5**

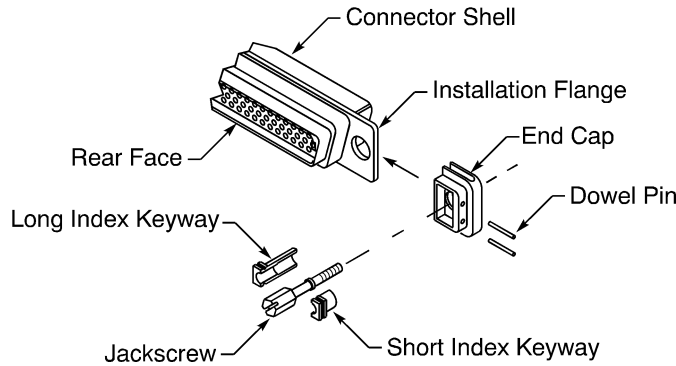
- (a) Put the point of a pointed metal tool on the side of the dowel pin.
 - (b) Push the dowel pin out of the end cap until the dowel pin can be held with pliers.
 - (c) Pull the dowel pin out of the end cap with pliers.
 - (d) Do Step (a) through Step (c) again for the other dowel pin.
- (2) Pull the jackscrew and the index keyway out of the installation hole.
 - (3) Do Step (1) through Step (2) again to remove the other index keyway and jackscrew.
 - (4) Put the connector installation hardware in a safe location, they are necessary to install the connector again.
 - (5) If new connector installation hardware is necessary, refer to Table 7 for replacement hardware.

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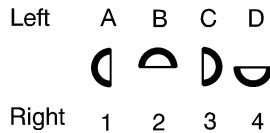
3. CONNECTOR ASSEMBLY

A. Assembly of the Connector Installation Hardware



CONNECTOR INSTALLATION HARDWARE ASSEMBLY

Figure 6



INDEX KEYWAY POLARIZATION POSITIONS

Figure 7

Refer to Figure 6 and Figure 7.

- (1) Put an end cap on installation flange of the connector.
Make sure the dowel pin holes are on the rear side of the connector.
- (2) Align the hole in the end cap with the hole of the flange.
- (3) For an index keyway with two halves, put each half of the index keyway around the jackscrew.
- (4) From the rear of the connector, put the jackscrew assembly in the installation hole with the long index keyway in the specified polarization position.

Refer to:

- Figure 1 for the location of the index keyways at the front face of the connector
- Figure 2 and Figure 3 for the different configurations of the jackscrews
- Figure 7 for the index keyway polarization positions.

- (5) Push a dowel pin into each hole from the outer edge of the end cap through the groove in the index keyway.

Make sure that the dowel pins are fully installed.

- (6) Do Step (1) through Step (5) again for the connector installation hardware on the other side of the connector.

Make sure that from the front face of the connector, the left and right index keyways are in the specified polarization position.

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Refer to:

- Figure 1 for the location of the index keyways at the front face of the connector
- Figure 7 for the polarization positions.

B. Contact Assembly

**Table 12
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
22	22	0.125	0.03

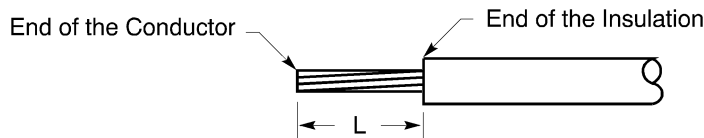
**Table 13
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Part Number
		Part Number	Setting	
22	22	M22520/2-01	5	K154

- (1) Make a selection of a crimp tool from Table 13.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 8
- Table 12 for the insulation removal length
- Subject 20-15-04 for the insulation removal procedures.



**WIRE PREPARATION
Figure 8**

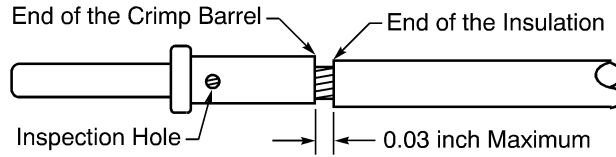
- (3) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 9.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

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POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 9

- (4) Crimp the contact.
- (5) Examine the contact assembly for these types of damage:
 - A strand of the conductor is broken
 - The base metal of a strand of the conductor can be seen
 - The crimp barrel of the contact has a crack.
- (6) If the contact or the wire has damage, replace the contact.

C. Contact Insertion

Table 14
CONTACT INSERTION TOOLS

Crimp Barrel Size	Removal Tool	
	Basic Unit	Tip
22	DHK 160	DHK160-26-2

- (1) Make a selection of a contact insertion tool from Table 14.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT:

- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (2) Put the contact in the applicable end of the insertion tool.
- (3) At the rear face of the connector, axially align the contact and the tool with the contact cavity.
- (4) Carefully push the tool into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in its position.

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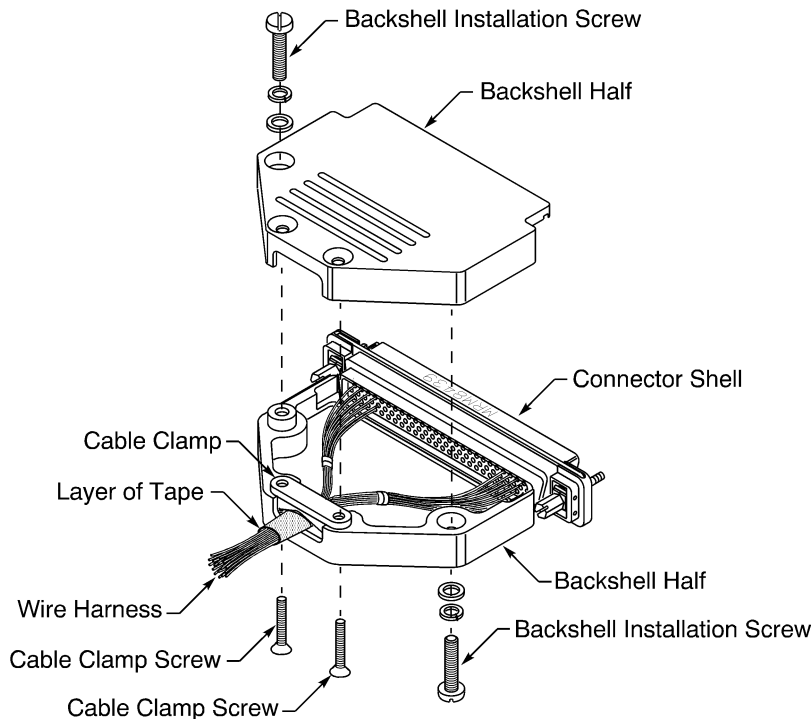
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CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact out of the cavity.
 - (b) Do Step (2) through Step (6) again.

D. Backshell Assembly



BACKSHELL ASSEMBLY
Figure 10

Refer to Figure 10.

Table 15
NECESSARY MATERIALS

Material	Part Number	Supplier
Tape	Scotch 70	3M

- (1) Make a selection of a tape from Table 15.
- (2) Increase the O.D. of the wire harness with tape:
 - (a) Put a backshell half on the connector.

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- (b) Make a mark on the wire harness at the location of the center of the cable clamp.
 - (c) Remove the backshell.
 - (d) Wind the necessary layers of tape around the wire harness at the mark to make a tight fit in the cable clamp.
- (3) Put a backshell half on the connector shell and the wire harness.
- (4) Put the cable clamp on the wire harness.
- (5) Install each cable clamp screw.
- Make sure that:
- The screws are tight
 - The clamp holds the wire harness tightly.
- (6) Put the other half of the backshell on the connector shell and the wire harness.
- (7) Install each backshell installation screw.
- Make sure that the screws are tight.

4. CONNECTOR INSTALLATION

A. Connection of the Plug and the Receptacle

**Table 16
NECESSARY TOOLS**

Tool	Size (inch)
Flat screwdriver	-
Nut Driver	1/8

- (1) Make a selection of a tool from Table 16.
- (2) Align the plug and the receptacle.
- (3) Push the plug into the receptacle.
- (4) Engage the threads of each jackscrew with the threads in the nut.
- (5) Turn one jackscrew on the plug clockwise two or three turns.
- (6) Turn the other jackscrew on the plug clockwise two or three turns.
- (7) Do Step (5) through Step (6) again until the jackscrews are fully engaged.
- (8) Torque each screw 1.3 inch-pounds.

5. APPROVED TOOL SUPPLIERS

A. Contact Insertion and Removal Tools

**Table 17
CONTACT INSERTION AND REMOVAL TOOL SUPPLIERS**

Tool	Supplier
DHK 160	Daniels
DHK160-26-2	Daniels
DHK160-PR-2	Daniels

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B. Contact Crimp Tools

**Table 18
CONTACT CRIMP TOOL SUPPLIERS**

Tool	Supplier
M22520/2-01	QPL
K154	Daniels

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1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Contact Configuration			Supplier
		Count	Size	Type	
40-743-9525	Receptacle	77	22	Socket	Smiths Industries
		30	16	Socket	
40-743-9698	Plug	46	22	Pin	Smiths Industries
		46	16	Pin	
40-743-9699	Receptacle	46	22	Socket	Smiths Industries
		46	16	Socket	

**Table 2
EQUIVALENT CONNECTOR PART NUMBERS**

Connector	Equivalent Connector	
	Part Number	Supplier
40-743-9525	HPW1070F0CA004	Hypertac
40-743-9698	HPW0920M0TA004	Hypertac
40-743-9699	HPW0920F0CA004	Hypertac

B. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
22	22	Pin	30-867-6819	Smiths Industries
		Socket	30-867-6820	Smiths Industries
16	16	Pin	30-867-6818	Smiths Industries
		Socket	30-867-6821	Smiths Industries

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**Table 4
EQUIVALENT CONTACT PART NUMBERS**

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6818	HPW-208-7	Hypertac
30-867-6819	HPW-200-7	Hypertac
30-867-6820	HPW-210-9	Hypertac
30-867-6821	HPW-213-9	Hypertac

C. Necessary Materials

**Table 5
NECESSARY MATERIALS**

Material	Part Number	Supplier
Lockwire	DTD189A	Alloy Wire International
Sleeve, Heat Shrinkable	AMS-DTL-23053/5 Class 1	Available source
	Versafit	Raychem

2. CONNECTOR DISASSEMBLY

A. Connector Separation

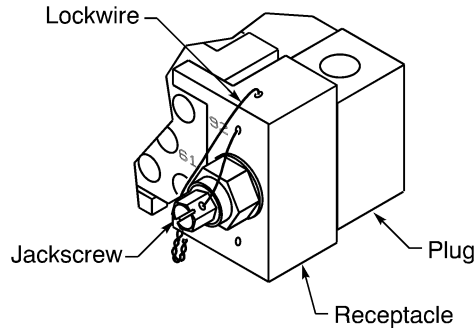
**Table 6
NECESSARY TOOLS**

Tool	Type	Size
Cutter	Diagonal Cutters	-
	Knife	-
Driver	Nutdriver, Hex	1/8 inch
	Screwdriver, Flat Blade	Small

- (1) Make a selection of these tools from Table 6:
 - A cutter
 - A driver.
- (2) Cut the lockwire on the jackscrew assembly on the receptacle. Refer to Figure 1.

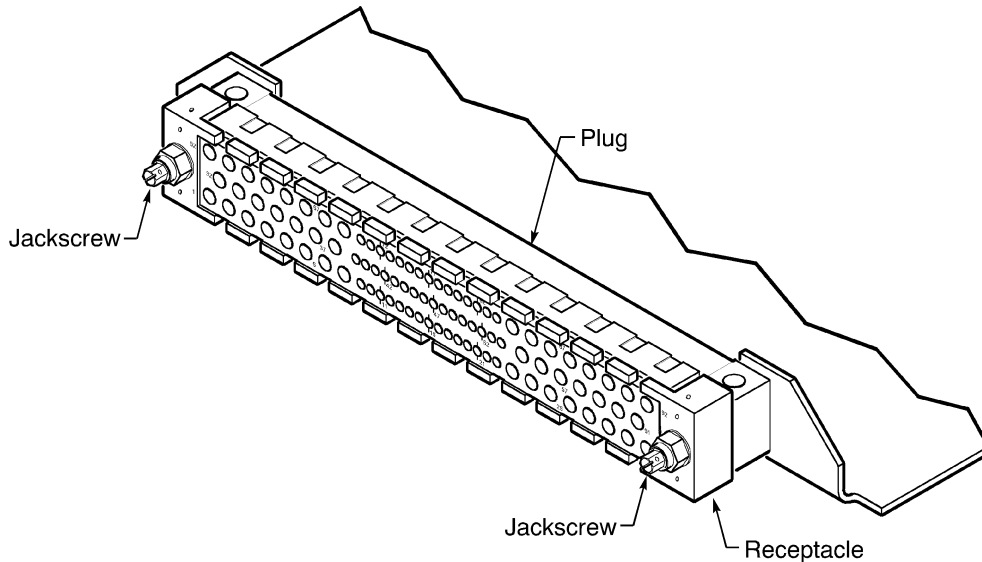
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LOCKWIRE REMOVAL
Figure 1

- (3) Remove the lockwire from the receptacle and the jackscrew.
- (4) Disengage the jackscrews:
 - (a) On one end of the receptacle, loosen the jackscrew a small amount.
 - (b) On the other end of the receptacle, loosen the jackscrew a small amount.
 - (c) Do Step (a) and Step (b) again until the jackscrews are fully disengaged.
- (5) Pull the receptacle from the plug. Refer to Figure 1.



RECEPTACLE AND PLUG SEPARATION
Figure 2

STANDARD WIRING PRACTICES MANUAL

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B. Contact Removal

**Table 7
CONTACT REMOVAL TOOLS**

Contact Engaging End Size	Removal Tool
22	HPW521
16	HPW512

- (1) Make a selection of a contact removal tool from Table 4.
- (2) At the front face of the connector, axially align the removal tool and the contact cavity.
- (3) Carefully push the removal tool into the contact cavity until it stops.
- (4) From the rear of the connector, pull the contact out of the contact cavity.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 8
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Target	Tolerance	
22	22	0.16	± 0.03	-
	16	0.56	± 0.03	Fold the conductor back
20	16	0.29	± 0.03	-
18	16	0.29	± 0.03	-
16	16	0.29	± 0.03	-

**Table 9
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
22	22	M22520/7-01	3	86-263
	16	M22520/1-01	4	TP1177
20	16	M22520/1-01	4	TP1177
18	16	M22520/1-01	5	TP1177
16	16	M22520/1-01	6	TP1177

- (1) Make a selection of a heat shrinkable sleeve from Table 5.

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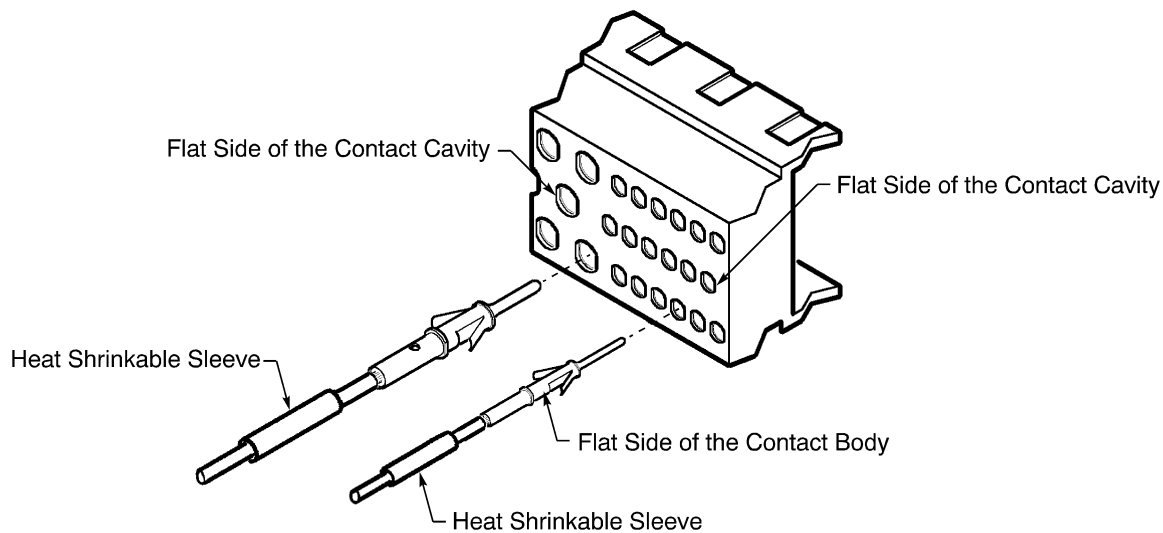
Make sure that the sleeve has the smallest diameter that can move easily on the wire.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (2) Make a selection of a crimp tool from Table 9.
- (3) Put a 1 inch length of the heat shrinkable sleeve on the wire.
- (4) Remove the necessary length of insulation from the end of the wire. Refer to Table 8.
- (5) Put the end of the wire in the crimp barrel of the contact.
- (6) Crimp the contact.

B. Contact Insertion

- (1) Align the flat sides of the body of the contact with the flat sides of the contact cavity. Refer to Figure 3.



ALIGNMENT OF THE CONTACT AND CONTACT CAVITY
Figure 3

- (2) Carefully push the contact into the contact cavity until it stops.
- (3) Lightly pull the wire to make sure the contact is locked in the contact cavity.
- (4) If the contact is not locked in the contact cavity, do Step (1) through Step (3) again.
- (5) Push the heat shrinkable sleeve forward until the forward end of the sleeve is against the rear surface of the connector.
- (6) Shrink the sleeve into position. Refer to Subject 20-10-14.

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4. CONNECTOR INSTALLATION

A. Assembly of the Plug Jackscrew Socket

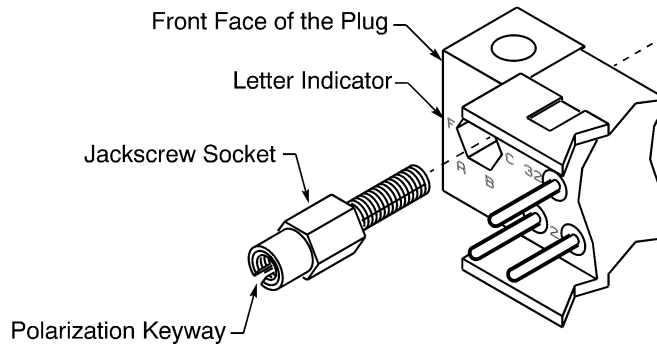
**Table 10
NECESSARY MATERIALS**

Material	Part Number	Supplier
Activator	Loctite 7471	Loctite
Sealant	Loctite 221	Loctite

**Table 11
NECESSARY TOOLS**

Tool	Type	Size
Driver	Nutdriver, Hex	1/4 inch

- (1) Make a selection of these materials from Table 10:
 - A sealant
 - An activator.
- (2) Make a selection of a driver from Table 11.
- (3) Put the jackscrew socket in the hole in the left side of the front face of the plug. Refer to Figure 4. Make sure that the polarization keyway is aligned with the correct letter indicator.

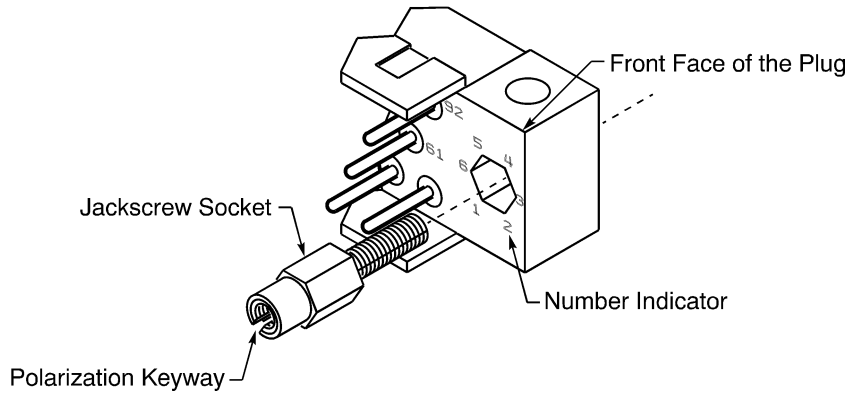


**LEFT JACKSCREW SOCKET POLARIZATION
Figure 4**

- (4) Put the jackscrew socket in the hole in the right side of the front face of the plug. Refer to Figure 5. Make sure that the polarization keyway is aligned with the correct number indicator.

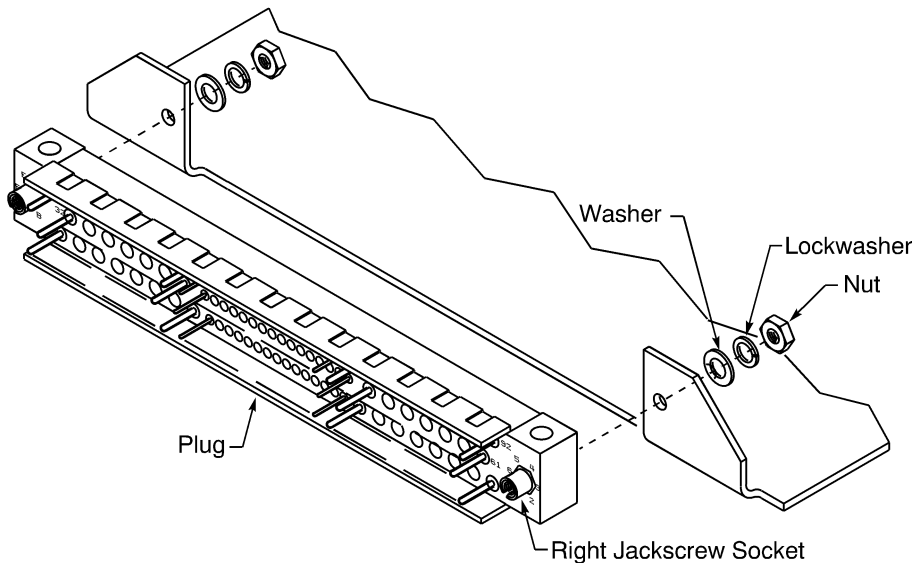
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RIGHT JACKSCREW SOCKET POLARIZATION
Figure 5

- (5) Prepare the installation nuts:
 - (a) Put a small amount of the activator on the threads of each installation nut.
 - (b) Let the activator dry for 10 minutes minimum.
 - (c) Put a small amount of sealant on the threads of each nut.
- (6) Install the plug. Refer to Figure 6.



PLUG INSTALLATION
Figure 6

- (a) Put the threads of the jackscrew socket in the installation holes of the structure.
- (b) Put a washer on each of the jackscrew sockets.
- (c) Put a lock washer on each of the jackscrew sockets.
- (d) Fully engage the threads of each nut with the threads of the applicable jackscrew socket.

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(e) Torque each nut 4 inch-pounds \pm 0.4 inch-pounds.

B. Assembly of the Receptacle Jackscrew

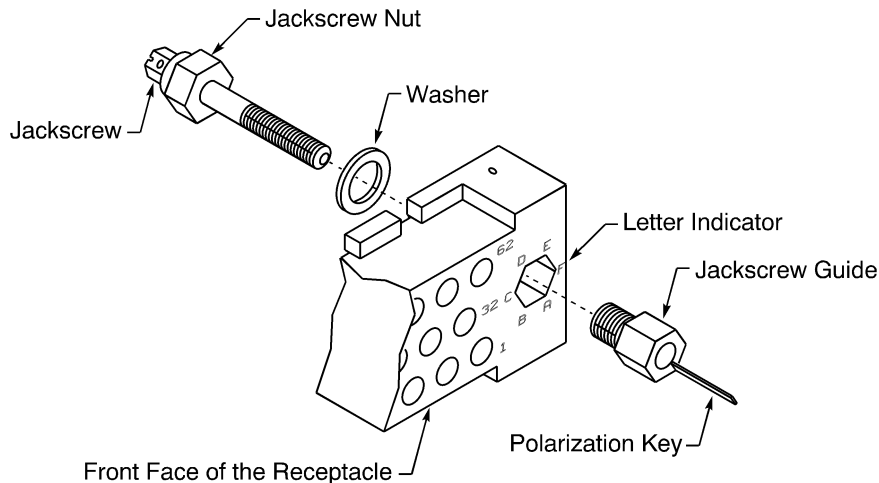
**Table 12
NECESSARY TOOLS**

Tool	Type	Size
Driver	Nutdriver, Hex	1/4 inch

- (1) Make a selection of a driver from Table 12.
- (2) Put one of the jackscrew guides in the hole in the right side of the front face of the receptacle. Refer to Figure 7.

Make sure that the polarization key:

- Is aligned with the correct letter indicator
- Is pointed away from the connector.



**RIGHT JACKSCREW POLARIZATION
Figure 7**

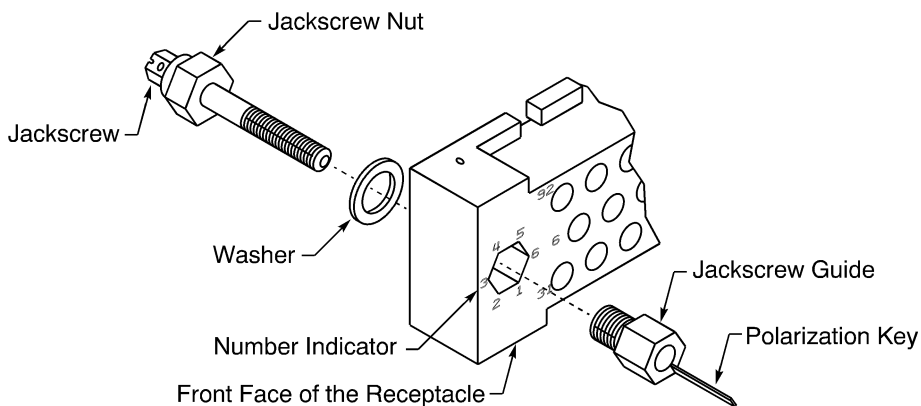
- (3) Put a washer on the end of one of the jackscrews.
- (4) From the rear of the connector, fully engage the threads of the jackscrew and the jackscrew guide.
- (5) Put the other jackscrew guide in the hole in the left side of the front face of the receptacle.

Make sure that the polarization key:

- Is aligned with the correct number indicator
- Is pointed away from the connector.

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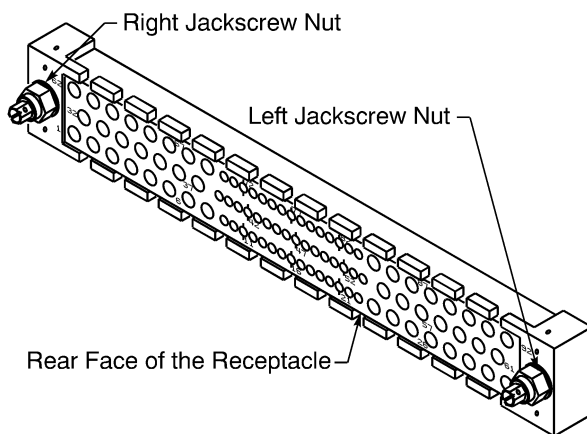
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LEFT JACKSCREW POLARIZATION

Figure 8

- (6) Put a washer on the end of the other jackscrew.
- (7) From the rear of the connector, fully engage the threads of the jackscrew and the jackscrew guide.
- (8) From the rear of the connector, torque each jackscrew nut 4 inch-pounds \pm 0.4 inch-pounds. Refer to Figure 9.



RECEPTACLE JACKSCREW ASSEMBLY

Figure 9

C. Plug and Receptacle Connection

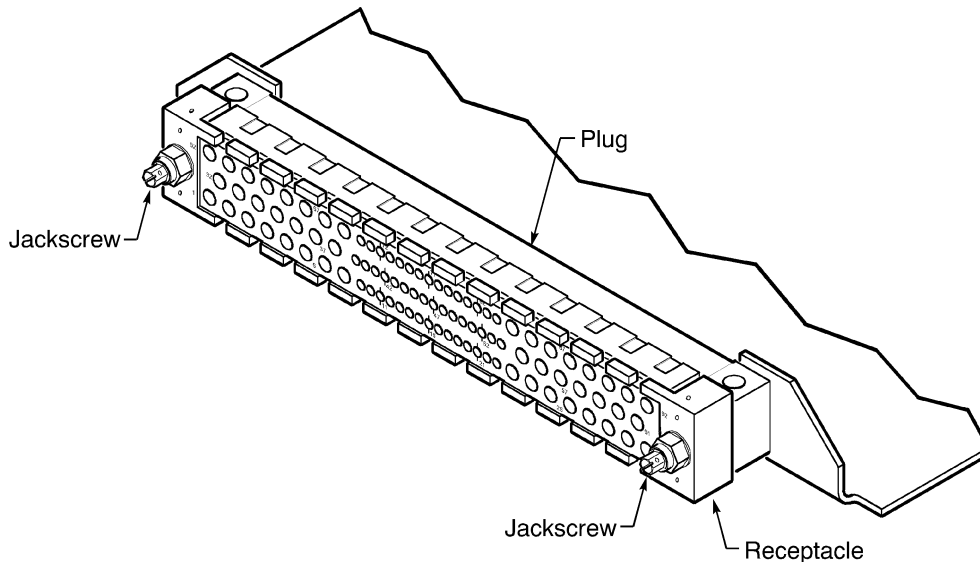
**Table 13
NECESSARY TOOLS**

Tool	Type	Size
Driver	Nutdriver, Hex	1/8 inch
	Screwdriver, Flat Blade	Small
Pliers	Lock	-
	Wire Twister	-

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RECEPTACLE AND PLUG CONNECTION

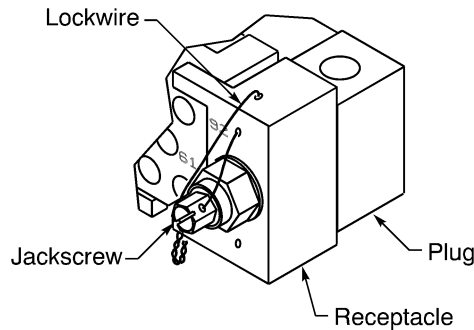
Figure 10

Refer to Figure 10.

- (1) Make a selection of a driver from Table 13.
- (2) Align the engaging face of the receptacle with the engaging face of the plug.
- (3) Push the receptacle straight against the plug.
- (4) On one end of the receptacle, engage the threads of the jackscrew and the jackscrew a small amount.
- (5) On the other end of the receptacle, engage the threads of the jackscrew and the jackscrew a small amount.
- (6) Tighten one of the jackscrews a small amount.
- (7) Tighten the other jackscrew a small amount.
- (8) Do Step (6) and Step (7) again until the jackscrews are fully tightened.
- (9) Torque each jackscrew 1.3 inch-pounds \pm 0.1 inch-pounds.
- (10) Install the necessary length of lockwire on one end of the receptacle. Refer to Figure 11.

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LOCKWIRE INSTALLATION
Figure 11

- (a) Make a selection of lockwire from Table 5.
- (b) Make a selection of pliers from Table 13.
- (c) Push one end of the lockwire through the hole in the jackscrew.
- (d) Push the same end of the lockwire into the hole on the rear surface of the receptacle.
- (e) Pull the end of the lockwire from the hole on the top surface of the receptacle.
- (f) Twist the ends of the lockwire together.
- (g) Remove the necessary length of the twisted lockwire to make the distance from the end of the lockwire to the jackscrew equal to approximately 0.25 inch.
- (h) Fold the end of the twisted lockwire:
 - Back against the rear surface of the receptacle
 - Away from the nearest contact cavities.

5. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

Table 14
CONTACT REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
HPW512	Hypertac
HPW521	Hypertac

B. Contact Crimp Tools

Table 15
CONTACT CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
86-263	Daniels
M22520/1-01	QPL
M22520/7-01	QPL



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Table 15 (continued)

Crimp Tool	Supplier
TP1177	Daniels

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1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

Part Number	Installation Configuration	Relay Configuration	Supplied	Supplier	Reference
40-617-286	Type 2	4 Pole	Without Contacts	Smiths Industries	Figure 4
40-617-287	Type 2	2 Pole	Without Contacts	Smiths Industries	Figure 2
40-617-288	Type 2	3 Pole	Without Contacts	Smiths Industries	Figure 3
40-617-289	Type 2	4 Pole	Without Contacts	Smiths Industries	Figure 4
40-617-290	Type 2	4 Pole	Without Contacts	Smiths Industries	Figure 4
40-617-291	Type 2	2 Pole	Without Contacts	Smiths Industries	Figure 2
40-617-292	Type 2	2 Pole	Without Contacts	Smiths Industries	Figure 2
40-617-293	Type 2	1 Pole	Without Contacts	Smiths Industries	Figure 1
40-617-294	Type 2	3 Pole	Without Contacts	Smiths Industries	Figure 3
40-617-295	Type 2	3 Pole	Without Contacts	Smiths Industries	Figure 3
40-617-296	Type 2	1 Pole	Without Contacts	Smiths Industries	Figure 1
40-617-298	Type 3	2 Pole	With Contacts	Smiths Industries	Figure 2
40-617-2010	Type 1	4 Pole	With Contacts	Smiths Industries	Figure 4

**Table 2
EQUIVALENT RELAY SOCKETS SUPPLIED WITH CONTACTS**

Relay Socket	Equivalent Relay Socket Supplied With Contacts	
	Part Number	Supplier
40-617-286	40-617-269	Smiths Industries
40-617-287	40-617-270	Smiths Industries
40-617-288	40-617-271	Smiths Industries
40-617-289	40-617-272	Smiths Industries

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Table 2 (continued)

Relay Socket	Equivalent Relay Socket Supplied With Contacts	
	Part Number	Supplier
40-617-290	40-617-274	Smiths Industries
40-617-291	40-617-275	Smiths Industries
40-617-292	40-617-282	Smiths Industries
40-617-293	40-617-276	Smiths Industries
40-617-294	40-617-277	Smiths Industries
40-617-295	40-617-278	Smiths Industries
40-617-296	40-617-279	Smiths Industries
40-617-2010	RSE120049	PCD
RSE120025	RSE120028	PCD
RSE500211	RSE500201	PCD
RSE500212	RSE500202	PCD
RSE500311	RSE500301	PCD
RSE500312	RSE500302	PCD
RSE500314	RSE500304	PCD
RSE500315	RSE500305	PCD
RSE500316	RSE500306	PCD
RSE500411	RSE500401	PCD
RSE500412	RSE500402	PCD
RSE500413	RSE500403	PCD
RSE500414	RSE500404	PCD

Table 3

EQUIVALENT RELAY SOCKET PART NUMBERS

Relay Socket	Equivalent Relay Socket	
	Part Number	Supplier
40-617-269	RSE500201	PCD
40-617-270	RSE500202	PCD
40-617-271	RSE500301	PCD
40-617-272	RSE500302	PCD
40-617-273	RSE500303	PCD
40-617-274	RSE500304	PCD
40-617-275	RSE500305	PCD

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Table 3 (continued)

Relay Socket	Equivalent Relay Socket	
	Part Number	Supplier
40-617-276	RSE500401	PCD
40-617-277	RSE500402	PCD
40-617-278	RSE500403	PCD
40-617-279	RSE500404	PCD
40-617-282	RSE500306	PCD
40-617-286	RSE500211	PCD
40-617-287	RSE500212	PCD
40-617-288	RSE500311	PCD
40-617-289	RSE500312	PCD
40-617-290	RSE500314	PCD
40-617-291	RSE500315	PCD
40-617-292	RSE500316	PCD
40-617-293	RSE500411	PCD
40-617-294	RSE500412	PCD
40-617-295	RSE500413	PCD
40-617-296	RSE500414	PCD
40-617-298	RSE120028	PCD
40-617-2010	RSE120049	PCD

B. Contact Part Numbers

**Table 4
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
22	22	Socket	30-867-6709-01U	Smiths Industries
	20	Socket	30-867-6797	Smiths Industries
20	20	Socket	30-867-6710-02U	Smiths Industries
16	20	Socket	30-867-6709-04U	Smiths Industries
	16	Socket	30-867-6709-03U	Smiths Industries
12	16	Socket	30-867-6709-06U	Smiths Industries
	12	Socket	30-867-6709-05U	Smiths Industries

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**Table 5
EQUIVALENT CONTACT PART NUMBERS**

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6709-01U	M39029/92-531	QPL
30-867-6797	CNS109900	PCD
30-867-6710-02U	M39029/101-553	QPL
30-867-6709-03U	M39029/92-533	QPL
30-867-6709-04U	M39029/92-534	QPL
30-867-6709-05U	M39029/92-535	QPL
30-867-6709-06U	M39029/92-536	QPL

C. Relay Socket Installation Hardware Part Numbers

**Table 6
RELAY SOCKET INSTALLATION HARDWARE PART NUMBERS**

Installation Configuration	Hardware	Part Number	Supplier	Size	Outer Dimension (inch)	Note
Type 1	Hex Lock Nut	200007201	PCD	8-32	7/32	-
	Spacer	ELM359	Smiths Industries	-	-	Not supplied with relay socket
Type 2	Mounting Stud	200500111	PCD	-	-	-
	Flat Washer	200500401	PCD	4	0.281 O.D. 0.030 Thick	-
	Hex Lock Nut	NAS679C04MW	QPL	4-40	1/4	-
Type 3	Mounting Stud	200006601	PCD	-	-	-
	Lock Washer	NAS1676C4	QPL	4	-	-
	Flat Washer	30-298-116-03	Smiths Industries	-	-	Not supplied with relay socket
	Hex Nut	200006901	PCD	4-40	3/16	-

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**Table 7
RELAY INSTALLATION HARDWARE PART NUMBERS**

Installation Configuration	Hardware	Part Number	Supplier	Size	Outer Dimension (inch)	Notes
Type 1	Hex Lock Nut	200003801	PCD	4-40	5/32	-
	Flat Washer	200000401	PCD	4	-	-
Type 2	Phillips Pan Head Screw	MS51957-12	QPL	4-40	-	-
	Lock Washer	NAS1676C4	QPL	4	-	-
	Flat Washer	30-298-116-03	Smiths Industries	-	-	-
Type 3	Phillips Pan Head Screw	MS51957-12	QPL	4-40	-	-
	Flat Washer	30-298-116-03	Smiths Industries	-	-	-
	Lock Washer	NAS1676C4	QPL	4	-	-
	Spacer	ELM1019-1	Smiths Industries	-	-	Not supplied with relay socket

**Table 8
EQUIVALENT INSTALLATION HARDWARE PART NUMBERS**

Hardware	Equivalent Hardware	
	Part Number	Supplier
MS51957-12	200006701	PCD
NAS1676C4	200006301	PCD
200003801	MS21042-04	QPL
200000401	NAS620-4L	QPL
200007201	MS21042-08	QPL

2. RELAY SOCKET CONTACT CONFIGURATIONS

A. Relay Sockets

NOTE: The contact cavity size specified in Table 9 is equivalent to the engaging end size of the contact.

**Table 9
RELAY SOCKET CONTACT CONFIGURATIONS**

Relay Socket	Contact Cavity	
	Quantity	Size
40-617-269	14	20
40-617-270	8	20

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Table 9 (continued)

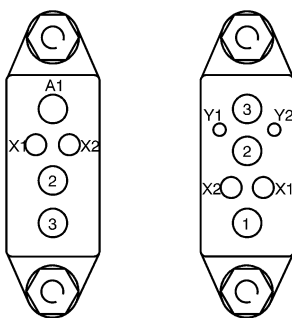
Relay Socket	Contact Cavity	
	Quantity	Size
40-617-271	5	16
	6	12
40-617-272	14	16
40-617-274	16	16
	8	16
40-617-275	8	16
40-617-276	3	12
	2	16
40-617-277	2	16
	9	12
40-617-278	2	16
	9	12
40-617-279	2	22
	2	16
	3	12
40-617-282	8	16
40-617-286	14	20
40-617-287	8	20
40-617-288	5	16
	6	12
40-617-289	14	16
40-617-290	16	16
40-617-291	8	16
40-617-292	8	16
40-617-293	2	16
	3	12
40-617-294	2	16
	9	12
40-617-295	2	16
	9	12

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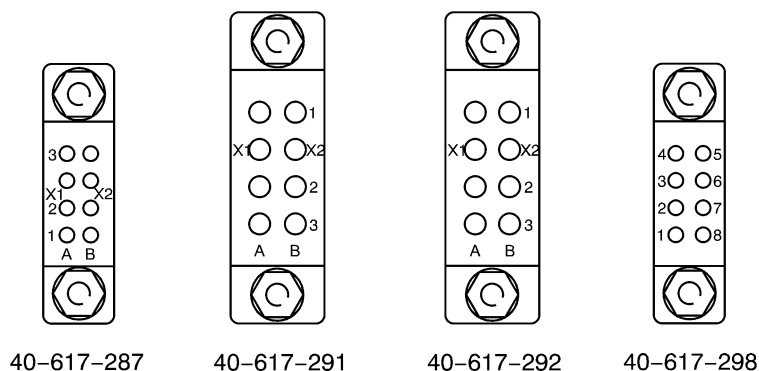
Table 9 (continued)

Relay Socket	Contact Cavity	
	Quantity	Size
40-617-296	2	22
	2	16
	3	12
40-617-298	8	22
40-617-2010	14	20



40-617-293 40-617-296

ONE POLE CONTACT CONFIGURATIONS
Figure 1

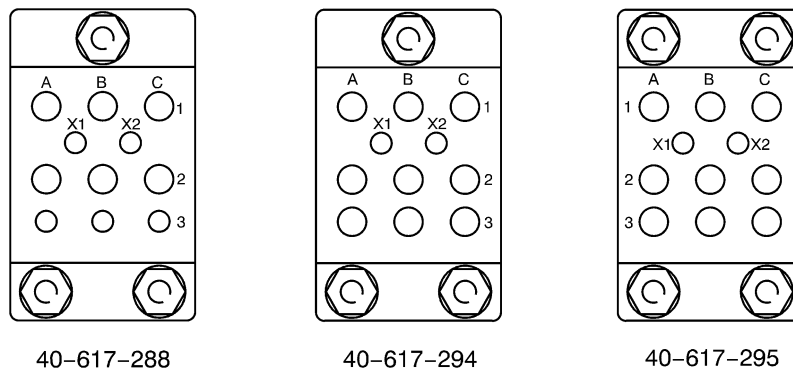


40-617-287 40-617-291 40-617-292 40-617-298

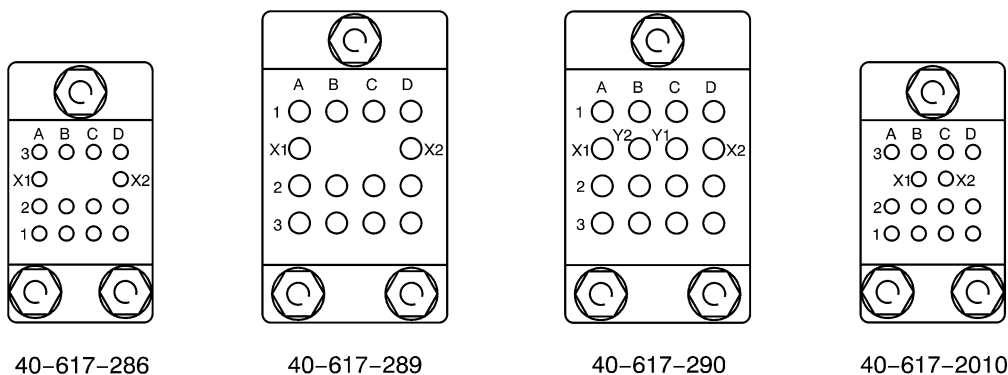
TWO POLE CONTACT CONFIGURATIONS
Figure 2

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THREE POLE CONTACT CONFIGURATIONS
Figure 3



FOUR POLE CONTACT CONFIGURATIONS
Figure 4

3. RELAY SOCKET DISASSEMBLY

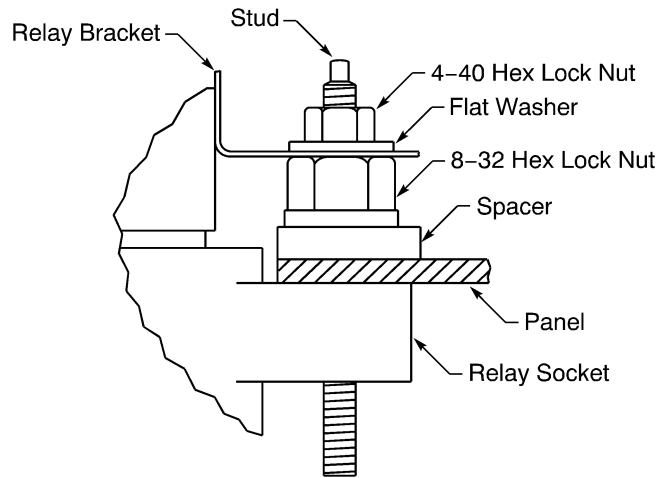
A. Relay Removal - Type 1 Installation Configuration

Table 10
NECESSARY TOOLS

Tool	Size (inch)
Hex Nut Driver	5/32

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RELAY REMOVAL - TYPE 1 INSTALLATION CONFIGURATION
Figure 5

Refer to Figure 5.

- (1) Make a selection of a hex nut driver from Table 10.
- (2) Remove the 4-40 hex lock nut.
- (3) Remove the flat washer.
- (4) Do Step (2) and Step (3) again for each remaining relay installation hardware.
- (5) Pull the relay from the relay socket.

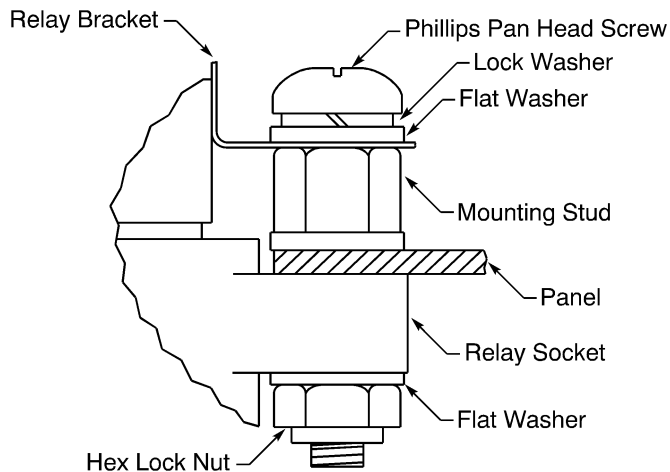
B. Relay Removal - Type 2 and Type 3 Installation Configurations

Table 11
NECESSARY TOOLS

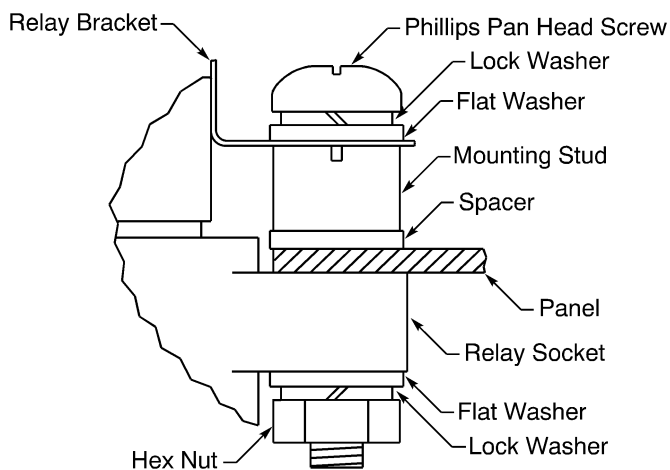
Tool	Type
Screwdriver	Phillips

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RELAY REMOVAL - TYPE 2 INSTALLATION CONFIGURATION
Figure 6



RELAY REMOVAL - TYPE 3 INSTALLATION CONFIGURATION
Figure 7

Refer to:

- Figure 6 for a Type 2 installation configuration
- Figure 7 for a Type 3 installation configuration.

- (1) Make a selection of a screwdriver from Table 11.
- (2) Remove the Phillips screw.
- (3) Remove the lock washer.
- (4) Remove the flat washer.
- (5) Do Step (2) through Step (4) again for each relay installation hardware.
- (6) Pull the relay from the relay socket.

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C. Contact Removal

**Table 12
CONTACT REMOVAL TOOLS**

Contact Size		Part Number
Engaging End	Crimp Barrel	
22	22	M81969/8-04
		M81969/14-01
	20	M81969/8-06
		M81969/14-02
20	20	M81969/8-06
		M81969/14-02
16	20	M81969/8-08
		M81969/14-03
	16	M81969/8-08
		M81969/14-03
12	16	M81969/8-10
		M81969/14-04
	12	M81969/8-10
		M81969/14-04

- (1) Make a selection of a contact removal tool from Table 12.
- (2) Examine the removal tool.

WARNING: DO NOT USE A REMOVAL TOOL THAT HAS A BENT TIP OR BIT. AN INJURY CAN OCCUR.

- (3) Put the tip of the removal tool on the wire near the grommet.
- (4) Axially align the removal tool and the contact cavity.
- (5) Carefully push the removal tool straight into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHILE IT IS IN THE CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the wire and the removal tool straight out of the contact cavity at the same time.
- (7) If the contact cannot be released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (3) through Step (6) again.

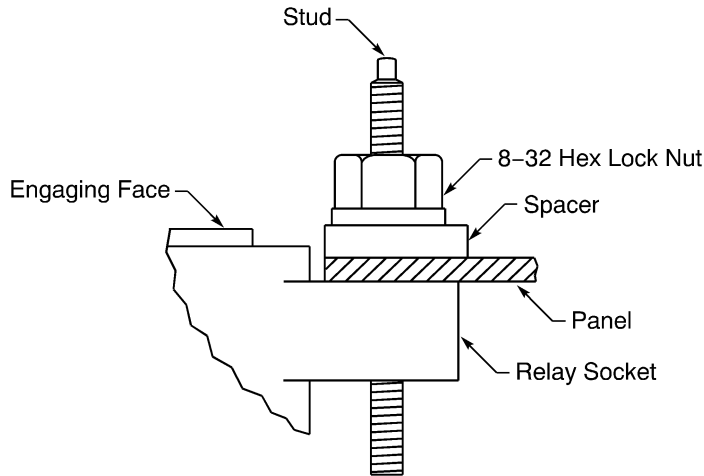
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D. Relay Socket Removal - Type 1 Installation Configuration

**Table 13
NECESSARY TOOLS**

Tool	Size (inch)
Hex Nut Driver	7/32



**RELAY SOCKET REMOVAL - TYPE 1 INSTALLATION CONFIGURATION
Figure 8**

Refer to Figure 8.

- (1) Remove the relay. Refer to Paragraph 3.A.
- (2) Make a selection of a hex nut driver from Table 13.
- (3) Remove the 8-32 hex lock nut.
- (4) Remove the spacer.
- (5) Do Step (3) and Step (4) again for each remaining installation hardware for the relay socket.
- (6) Pull the relay socket from the panel.

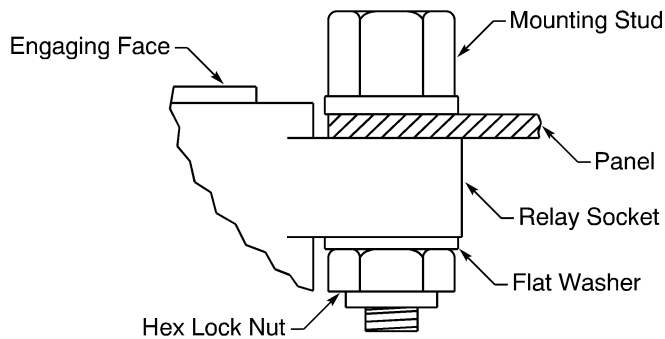
E. Relay Socket Removal - Type 2 Installation Configuration

**Table 14
NECESSARY TOOLS**

Tool	Size (inch)
Hex Nut Driver	1/4

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RELAY SOCKET REMOVAL - TYPE 2 INSTALLATION CONFIGURATION
Figure 9

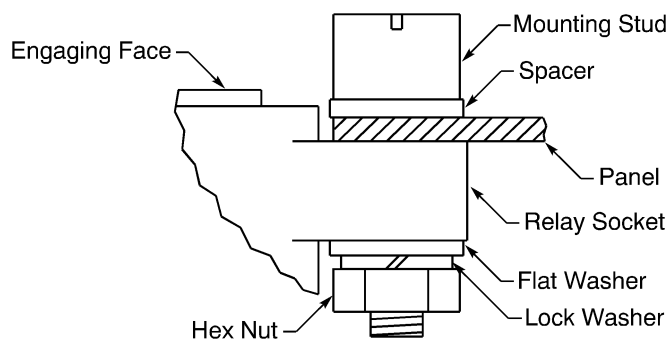
Refer to Figure 9.

- (1) Remove the relay. Refer to Paragraph 3.B.
- (2) Make a selection of a hex nut driver from Table 14.
- (3) Remove the 4-40 hex lock nut.
- (4) Remove the flat washer.
- (5) Remove the mounting stud.
- (6) Do Step (3) through Step (5) again for each remaining installation hardware for the relay socket.
- (7) Pull the relay socket from the panel.

F. Relay Socket Removal - Type 3 Installation Configuration

Table 15
NECESSARY TOOLS

Tool	Size (inch)
Hex Nut Driver	3/16



RELAY SOCKET REMOVAL - TYPE 3 INSTALLATION CONFIGURATION
Figure 10

Refer to Figure 10.

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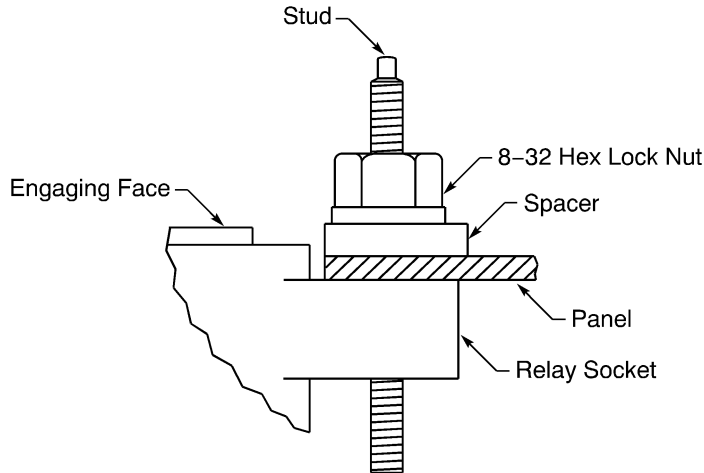
- (1) Remove the relay. Refer to Paragraph 3.B.
- (2) Make a selection of a hex nut driver from Table 15.
- (3) Remove the 4-40 hex nut.
- (4) Remove the lock washer.
- (5) Remove the flat washer.
- (6) Remove the mounting stud.
- (7) Remove the spacer.
- (8) Do Step (3) through Step (7) again for each remaining installation hardware for the relay socket.
- (9) Pull the relay socket from the panel.

4. RELAY SOCKET ASSEMBLY

A. Relay Socket Installation - Type 1 Installation Configuration

**Table 16
NECESSARY TOOLS**

Tool	Size (inch)	Special Instructions
Torque	-	Tool must measure 9 inch-pounds minimum
Socket	7/32	-



**RELAY SOCKET INSTALLATION - TYPE 1 INSTALLATION CONFIGURATION
Figure 11**

Refer to Figure 11.

- (1) Make a selection of a torque tool from Table 16.
- (2) Make a selection of a spacer for a Type 1 installation configuration from Table 6.
- (3) Make a selection of a 8-32 hex lock nut for a Type 1 installation configuration from Table 6.
- (4) Align the studs on the relay socket with the holes in the panel.

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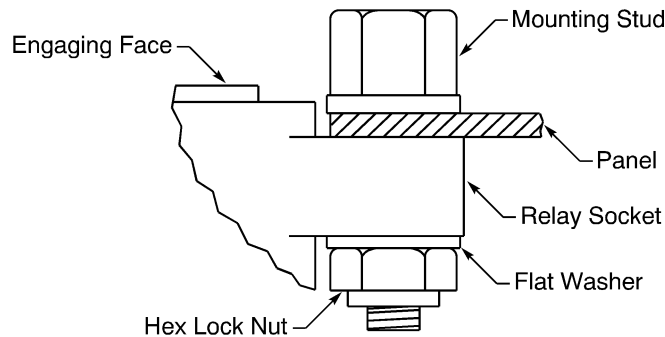
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- (5) Put the relay socket against the panel.
- (6) Put the spacer on the stud.
- (7) Engage the threads of the 8-32 hex lock nut with the threads of the stud.
- (8) Torque the lock nut to 10 inch-pounds \pm 1 inch-pound.
- (9) Do Step (2) through Step (8) again for each remaining installation hardware for the relay socket.

B. Relay Socket Installation - Type 2 Installation Configuration

**Table 17
NECESSARY TOOLS**

Tool	Size (inch)	Special Instructions
Torque	-	Tool must measure 6 inch-pounds minimum
Socket	1/4	-



**RELAY SOCKET INSTALLATION - TYPE 2 INSTALLATION CONFIGURATION
Figure 12**

Refer to Figure 12.

- (1) Make a selection of a torque tool from Table 17.
- (2) Make a selection of a socket from Table 17.
- (3) Make a selection of a mounting stud for a Type 2 installation configuration from Table 6.
- (4) Make a selection of a flat washer for a Type 2 installation configuration from Table 6.
- (5) Make a selection of a 4-40 hex lock nut for a Type 2 installation configuration from Table 6.
- (6) Put the relay socket against the panel.
- (7) Install the mounting stud through the panel and the relay socket.
- (8) Put the flat washer on the mounting stud.
- (9) Engage the threads of the 4-40 hex lock nut with the threads of the mounting stud.
- (10) Torque the hex lock nut to 6.5 inch-pounds \pm 0.5 inch-pound.
- (11) Do Step (3) through Step (10) again for each remaining installation hardware for the relay socket.

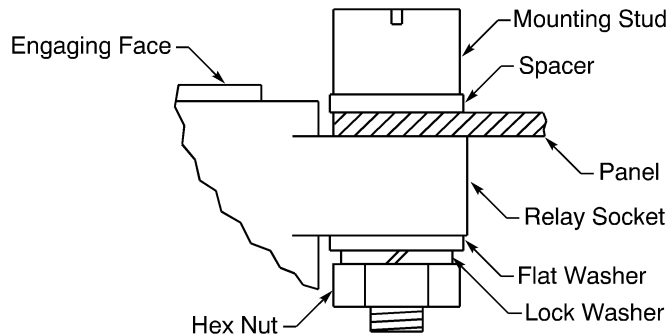
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C. Relay Socket Installation - Type 3 Installation Configuration

**Table 18
NECESSARY TOOLS**

Tool	Size (inch)	Special Instructions
Torque	-	Tool must measure 6 inch-pounds minimum
Socket	3/16	-



**RELAY SOCKET INSTALLATION - TYPE 3 INSTALLATION CONFIGURATION
Figure 13**

Refer to Figure 13.

- (1) Make a selection of a torque tool from Table 18.
- (2) Make a selection of a socket from Table 18.
- (3) Make a selection of a mounting stud for a Type 3 installation configuration from Table 6.
- (4) Make a selection of a 4-40 hex nut for a Type 3 installation configuration from Table 6.
- (5) Make a selection of a lock washer for a Type 3 installation configuration from Table 6.
- (6) Make a selection of a flat washer for a Type 3 installation configuration from Table 6.
- (7) Put the relay socket against the panel.
- (8) Install the mounting stud through the panel and the relay socket.
- (9) Put the flat washer on the mounting stud.
- (10) Put the lock washer on the flat washer.
- (11) Engage the threads of the 4-40 hex nut with the threads of the mounting stud.
- (12) Torque the hex nut to 6.5 inch-pounds ± 0.5 inch-pound.
- (13) Do Step (3) through Step (12) again for each remaining installation hardware for the relay socket.

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D. Contact Assembly

**Table 19
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Size		Crimp Tool		
	Engaging End	Crimp Barrel	Basic Unit		Locator
			Part Number	Setting	
22	22	22	M22520/2-01	3	M22520/2-23
		20	M22520/2-01	6	M22520/2-11
	20	20	M22520/2-01	6	M22520/2-02
			M22520/1-01	3	M22520/1-02
	16	20	M22520/1-01	3	M22520/1-02
		16	M22520/1-01	4	M22520/1-02
20	22	20	M22520/2-01	7	M22520/2-11
	20	20	M22520/2-01	7	M22520/2-02
			M22520/1-01	4	M22520/1-02
	16	20	M22520/1-01	4	M22520/1-02
		16	M22520/1-01	4	M22520/1-02
	12	16	M22520/1-01	4	M22520/1-02
18	16	20	M22520/1-01	5	M22520/1-02
		16	M22520/1-01	5	M22520/1-02
	12	16	M22520/1-01	5	M22520/1-02
16	16	16	M22520/1-01	6	M22520/1-02
	12	16	M22520/1-01	6	M22520/1-02
14	12	12	M22520/1-01	7	M22520/1-02
12	12	12	M22520/1-01	8	M22520/1-02

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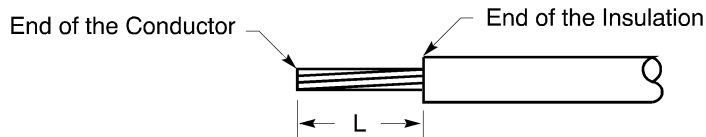
**Table 20
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact Size		Removal Length L (inch)		Special Instructions
	Engaging End	Crimp Barrel	Target	Tolerance	
22	22	22	0.13	0.03	-
		20	0.18	0.03	-
	20	20	0.18	0.03	-
		16	0.50	0.03	Fold Back Conductor
	16	20	0.18	0.03	-
12	16	0.50	0.03	Fold Back Conductor	
20	22	20	0.18	0.03	-
	20	20	0.18	0.03	-
	16	16	0.25	0.03	-
		20	0.18	0.03	-
	12	16	0.25	0.03	-
18	16	16	0.25	0.03	-
	12	16	0.25	0.03	-
16	16	16	0.25	0.03	-
	12	16	0.25	0.03	-
14	12	12	0.25	0.03	-
12	12	12	0.25	0.03	-

- (1) Make a selection of a crimp tool from Table 19.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 14
- Table 20 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

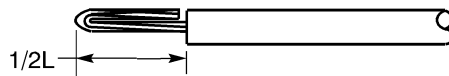


**WIRE PREPARATION
Figure 14**

- (3) If it is specified, fold the conductor back. Refer to Figure 15.

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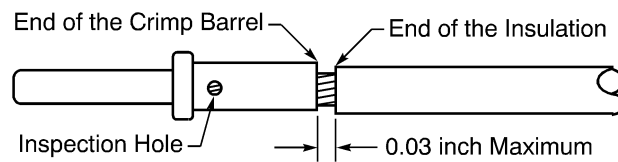
CONDUCTOR FOLDED BACK

Figure 15

(4) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 16.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL

Figure 16

(5) Crimp the contact.

(6) Examine the wired contact for these types of damage:

- A strand of the conductor is broken
- The base metal of a strand of the conductor can be seen
- The crimp barrel of the contact has a crack.

(7) If the contact or the wire has damage, replace the contact.

E. Contact Insertion

**Table 21
CONTACT INSERTION TOOLS**

Contact Size		Part Number
Engaging End	Crimp Barrel	
22	22	M81969/8-03
		M81969/14-01
	20	M81969/8-05
		M81969/14-02
20	20	M81969/8-05
		M81969/14-02
16	20	M81969/8-07
		M81969/14-03
	16	M81969/8-07
		M81969/14-03

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Table 21 (continued)

Contact Size		Part Number
Engaging End	Crimp Barrel	
12	16	M81969/8-09
		M81969/14-04
	12	M81969/8-09
		M81969/14-04

- (1) Make a selection of a contact insertion tool from Table 21.

NOTE: As an alternative, the contacts can be inserted with the hand.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT:

- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

- (2) Put the contact assembly into the applicable end of the insertion tool.
 (3) At the rear face of the relay socket, axially align the contact and the tool with the contact cavity.
 (4) Push the tool into the contact cavity until the tool stops.

CAUTION: DO NOT TURN THE TOOL WHILE IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully remove the tool from the contact cavity.
 Make sure to keep the tool perpendicular to the face of the relay socket.
 (6) Lightly pull the wire to make sure that the contact is locked in position.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE RELAY SOCKET OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 (a) Pull the contact out of the cavity.
 (b) Do Step (2) through Step (6) again.

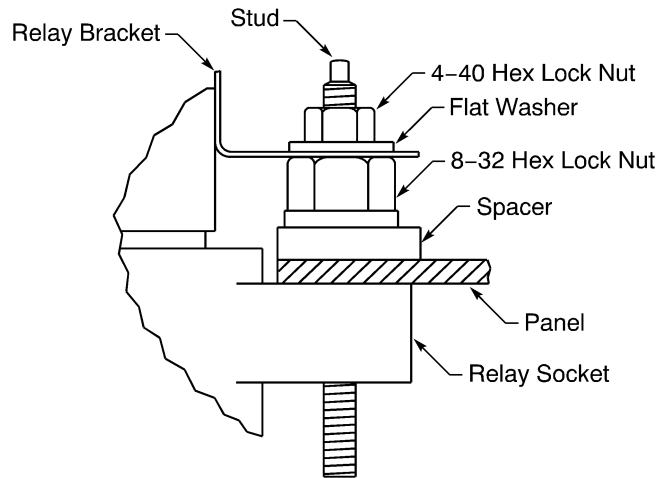
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F. Relay Installation - Type 1 Installation Configuration

**Table 22
NECESSARY TOOLS**

Tool	Size (inch)	Special Instructions
Torque	-	Tool must measure 3 inch-pounds minimum
Socket	3/32	-



**RELAY INSTALLATION - TYPE 1 INSTALLATION CONFIGURATION
Figure 17**

Refer to Figure 17.

- (1) Make a selection of a torque tool from Table 22.
- (2) Make a selection of a socket from Table 22.
- (3) Make a selection of a flat washer for a Type 1 installation configuration from Table 6.
- (4) Make a selection of 4-40 hex lock nut for a Type 1 installation configuration from Table 6.
- (5) Align the relay with the relay socket.
- (6) Push the relay into the relay socket.
- (7) Put the flat washer on the stud.
- (8) Engage threads of the lock nut with the threads of the stud.
- (9) Torque the lock nut to 4 inch-pounds \pm 1 inch-pound.
- (10) Do Step (3) through Step (9) again for each remaining relay installation hardware.

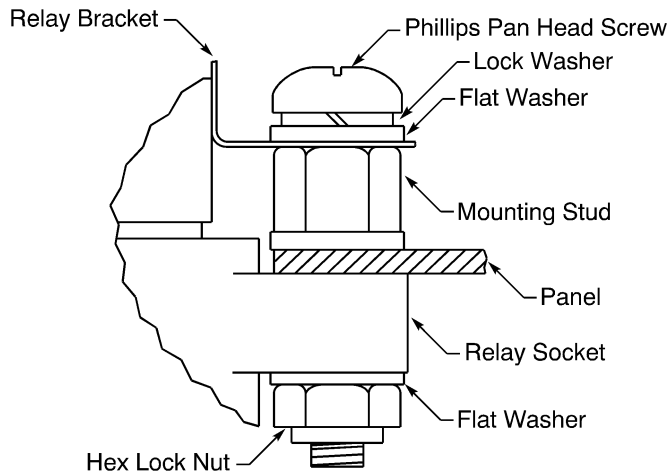
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G. Relay Installation - Type 2 Installation Configuration

**Table 23
NECESSARY TOOLS**

Tool	Special Instructions
Torque	Tool must measure 3 inch-pounds minimum
Phillips Bit	-



**RELAY INSTALLATION - TYPE 2 INSTALLATION CONFIGURATION
Figure 18**

Refer to Figure 18.

- (1) Make a selection of a torque tool from Table 23.
- (2) Make a selection of a Phillips bit from Table 23.
- (3) Make a selection of a lock washer for a Type 2 installation configuration from Table 6.
- (4) Make a selection of a flat washer for a Type 2 installation configuration from Table 6.
- (5) Make a selection of a Phillips pan head screw for a Type 2 installation configuration from Table 6.
- (6) Align the relay with the relay socket.
- (7) Push the relay into the relay socket.
- (8) Put the lock washer on the screw.
- (9) Put the flat washer on the screw.
- (10) Engage the threads of the screw with the threads of the mounting stud.
- (11) Torque the screw to 4 inch-pounds \pm 1 inch-pound.
- (12) Do Step (3) through Step (11) again for each remaining relay installation hardware.

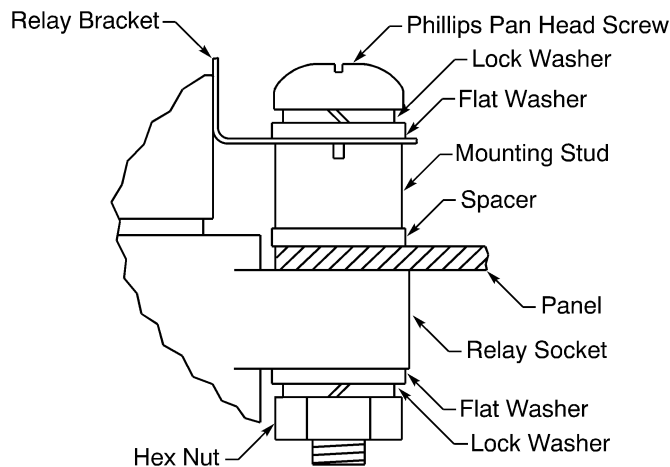
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H. Relay Installation - Type 3 Installation Configuration

**Table 24
NECESSARY TOOLS**

Tool	Special Instructions
Torque	Tool must measure 3 inch-pounds minimum
Phillips Bit	-



**RELAY INSTALLATION - TYPE 3 INSTALLATION CONFIGURATION
Figure 19**

Refer to Figure 19.

- (1) Make a selection of a torque tool from Table 24.
- (2) Make a selection of a Phillips bit from Table 24.
- (3) Make a selection of a lock washer for a Type 3 installation configuration from Table 6.
- (4) Make a selection of a flat washer for a Type 3 installation configuration from Table 6.
- (5) Make a selection of a Phillips pan head screw for a Type 3 installation configuration from Table 6.
- (6) Align the relay with the relay socket.
- (7) Push the relay into the relay socket.
- (8) Put the lock washer on the screw.
- (9) Put the flat washer on the screw.
- (10) Engage the threads of the screw with the threads of the mounting stud.
- (11) Torque the screw to 4 inch-pounds \pm 1 inch-pound.
- (12) Do Step (3) through Step (11) again for each remaining relay installation hardware.

STANDARD WIRING PRACTICES MANUAL**777 ELMS PANEL REPAIR: RELAY SOCKETS AND RELAYS****5. APPROVED TOOL SUPPLIERS****A. Contact Insertion and Removal Tools**

Table 25

CONTACT INSERTION AND REMOVAL TOOL SUPPLIERS

Tool	Supplier
M81969/8-03	QPL
M81969/8-04	QPL
M81969/8-05	QPL
M81969/8-06	QPL
M81969/8-07	QPL
M81969/8-08	QPL
M81969/8-09	QPL
M81969/8-10	QPL
M81969/14-01	QPL
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL

B. Contact Crimp Tools

Table 26

CONTACT CRIMP TOOL SUPPLIERS

Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
M22520/2-11	QPL
M22520/2-23	QPL

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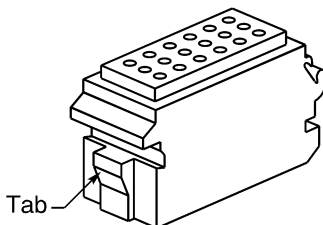
777 ELMS PANEL REPAIR: AIR LB TERMINAL JUNCTION SYSTEM

1. PART NUMBERS AND DESCRIPTION

A. Terminal Junction System Description

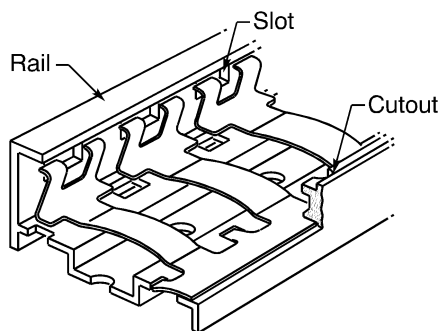
The terminal junction system has these components:

- Terminal modules
- Tracks
- Ground modules.



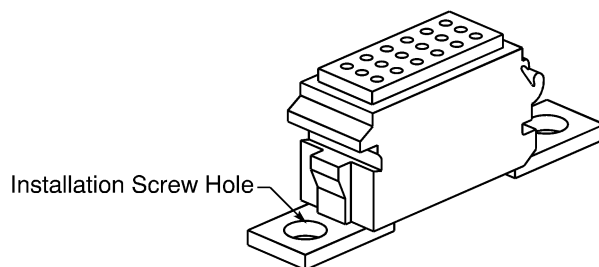
TERMINAL MODULE

Figure 1



TRACK

Figure 2



GROUND MODULE

Figure 3



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B. Terminal Module Part Numbers

Table 1
TERMINAL MODULE PART NUMBERS

Part Number	Description	Mount Type	Supplier
40-718-5238	Terminal Module	Track	Smiths Industries
40-718-5240	Terminal Module	Track	Smiths Industries
40-718-5254	Terminal Module, Low Profile	Track	Smiths Industries
40-718-5256	Terminal Module, Low Profile	Track	Smiths Industries
40-718-5257	Terminal Module, Low Profile	Track	Smiths Industries
40-718-5258	Terminal Module, Low Profile	Track	Smiths Industries
40-718-5259	Terminal Module, Low Profile	Track	Smiths Industries
40-718-5266	Resistor Terminal Module	Track	Smiths Industries
40-718-5268	Resistor Terminal Module	Track	Smiths Industries
40-718-5269	Resistor Terminal Module	Track	Smiths Industries
40-718-5270	Resistor Terminal Module	Track	Smiths Industries
40-718-5271	Resistor Terminal Module	Track	Smiths Industries
40-718-5272	Resistor Terminal Module	Track	Smiths Industries
40-718-5273	Resistor Terminal Module	Track	Smiths Industries
40-718-5274	Resistor Terminal Module	Track	Smiths Industries
40-718-5276	Resistor Terminal Module	Track	Smiths Industries
40-718-5278	Resistor Terminal Module	Track	Smiths Industries
40-718-5282	Diode Terminal Module	Track	Smiths Industries
40-718-5290	Resistor Terminal Module	Track	Smiths Industries

Table 2
EQUIVALENT TERMINAL MODULE PART NUMBERS

Terminal Module	Equivalent Terminal Module	
	Part Number	Supplier
40-718-5238	001755-305-02	Air LB
40-718-5240	001755-101-02	Air LB
40-718-5254	001756-202-02	Air LB
40-718-5256	001756-204-02	Air LB
40-718-5257	001756-205-02	Air LB
40-718-5258	001756-206-02	Air LB
40-718-5259	001756-207-02	Air LB

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Table 2 (continued)

Terminal Module	Equivalent Terminal Module	
	Part Number	Supplier
40-718-5266	001766-101-02	Air LB
40-718-5268	001766-103-02	Air LB
40-718-5269	001766-107-02	Air LB
40-718-5270	001766-108-02	Air LB
40-718-5271	001767-101-02	Air LB
40-718-5272	001767-102-02	Air LB
40-718-5273	001767-103-02	Air LB
40-718-5274	001767-107-02	Air LB
40-718-5276	001768-101-02	Air LB
40-718-5278	001768-103-02	Air LB
40-718-5282	001765-101-02	Air LB
40-718-5290	001767-109-02	Air LB

C. Terminal Module Track Part Numbers

**Table 3
TRACK PART NUMBERS**

Part Number	Supplier	Maximum Number of Modules
40-718-938	Smiths Industries	2
40-718-939	Smiths Industries	3
40-718-940	Smiths Industries	4
40-718-942	Smiths Industries	6
40-718-944	Smiths Industries	8
40-718-946	Smiths Industries	10
40-718-950	Smiths Industries	14
40-718-960	Smiths Industries	18

**Table 4
EQUIVALENT TRACK PART NUMBERS**

Track	Equivalent Track	
	Part Number	Supplier
40-718-938	001751-102-00	Air LB

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Table 4 (continued)

Track	Equivalent Track	
	Part Number	Supplier
40-718-939	001751-103-00	Air LB
40-718-940	001751-104-00	Air LB
40-718-942	001751-106-00	Air LB
40-718-944	001751-108-00	Air LB
40-718-946	001751-110-00	Air LB
40-718-950	001751-114-00	Air LB
40-718-960	001751-118-00	Air LB

D. Ground Module Part Numbers

Table 5

GROUND MODULE PART NUMBERS

Part Number	Mount Type	Supplier
40-718-5262	Panel	Smiths Industries
40-718-5263	Panel	Smiths Industries

Table 6

EQUIVALENT GROUND MODULE PART NUMBERS

Ground Module	Equivalent Ground Module	
	Part Number	Supplier
40-718-5262	001758-202-02	Air LB
40-718-5263	001758-101-02	Air LB

E. Contact Part Numbers

Table 7

CONTACT PART NUMBERS

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
22	22	Pin	30-867-6730	Smiths Industries
20	20	Pin	30-867-6724	Smiths Industries
16	16	Pin	30-867-6727	Smiths Industries
12	12	Pin	30-867-6729	Smiths Industries

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**Table 8
EQUIVALENT CONTACT PART NUMBERS**

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6730	001104-100-02	Air LB
30-867-6724	001104-200-02	Air LB
30-867-6727	001104-300-02	Air LB
30-867-6729	001104-400-02	Air LB

2. TERMINAL MODULE AND GROUND MODULE CONFIGURATIONS

A. Air LB Terminal Modules

NOTE: The size of the contact cavity is equivalent to the size of the contact crimp barrel.

**Table 9
TERMINAL MODULE CONFIGURATIONS**

Terminal Module	Contact		Bus Configuration	
	Size	Quantity	Sets	Contact Cavities
40-718-5238	16	10	1	10
40-718-5240	22	36	18	2
40-718-5254	20	18	6	3
40-718-5256	20	18	3	6
40-718-5257	20	18	1	18
40-718-5258	20	18	1	12
			1	6
40-718-5259	20	18	2	3
			3	4

**Table 10
DIODE MODULE CONFIGURATIONS**

Diode Module		Contact	
Part Number	Diode Current (amp)	Size	Quantity
40-718-5282	2	20	4
		16	4

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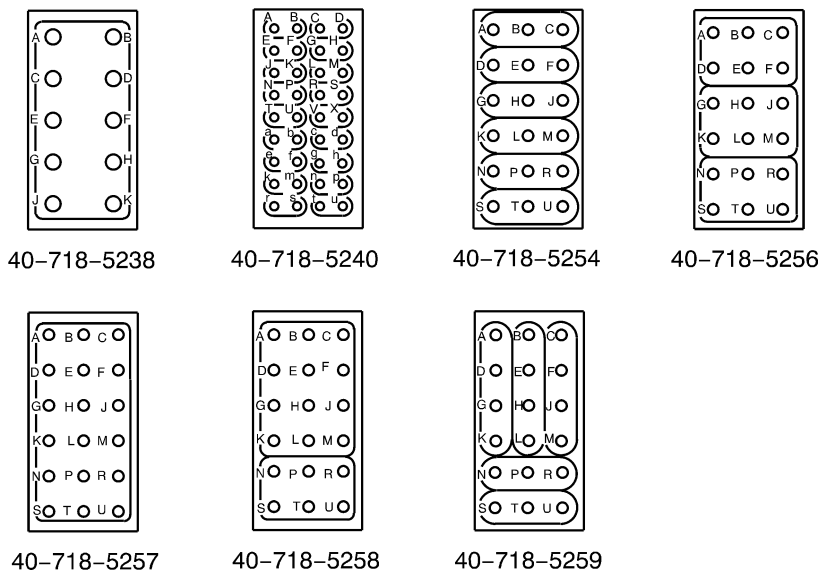
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**Table 11
RESISTOR MODULE CONFIGURATIONS**

Resistor Module		Contact	
Part Number	Resistance (ohm)	Size	Quantity
40-718-5266	6.8k	20	8
40-718-5268	47k	20	8
40-718-5269	4.7k	20	8
40-718-5270	33k	20	8
40-718-5271	6.8k	20	4
		12	4
40-718-5272	4.7k	20	4
		12	4
40-718-5273	47k	20	4
		12	4
40-718-5274	4.7k	20	4
		12	4
40-718-5276	6.8k	20	4
		16	4
40-718-5278	47k	20	4
		16	4
40-718-5290	33k	20	4
		12	4

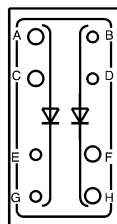
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TERMINAL MODULE BUS CONFIGURATIONS

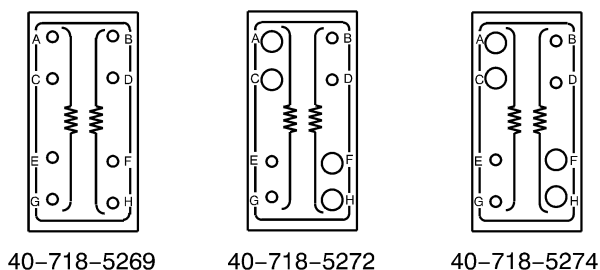
Figure 4



40-718-5282

DIODE MODULE BUS CONFIGURATIONS

Figure 5

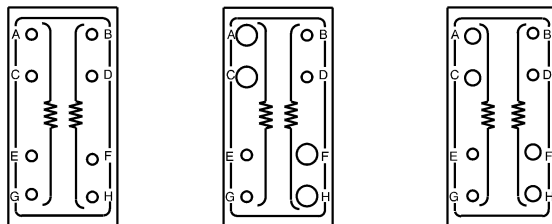


4.7K OHM RESISTOR MODULE BUS CONFIGURATIONS

Figure 6

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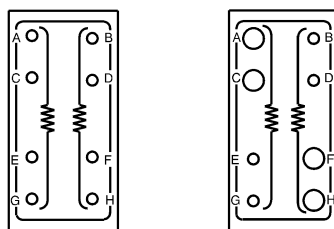
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40-718-5266 40-718-5271 40-718-5276

6.8K OHM RESISTOR MODULE BUS CONFIGURATIONS

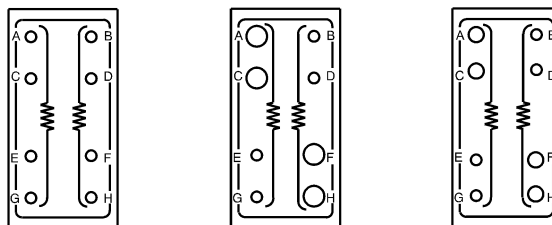
Figure 7



40-718-5270 40-718-5290

33K OHM RESISTOR MODULE BUS CONFIGURATIONS

Figure 8



40-718-5268 40-718-5273 40-718-5278

47K OHM RESISTOR MODULE BUS CONFIGURATIONS

Figure 9

B. Air LB Ground Modules

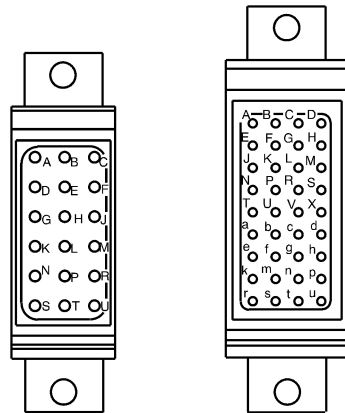
**Table 12
GROUND MODULE CONFIGURATIONS**

Ground Module	Contact	
	Size	Quantity
40-718-5262	20	18
40-718-5263	22	36

NOTE: The size of the contact cavity is equivalent to the size of the contact crimp barrel.

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40-718-5262

40-718-5263

GROUND MODULE CONFIGURATIONS

Figure 10

3. TERMINAL JUNCTION SYSTEM DISASSEMBLY

A. Contact Removal

**Table 13
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	
	Part Number	Color
22	M81969/8-04	-
	M81969/14-01	White
20	M81969/8-06	-
	M81969/14-02	White
16	M81969/8-08	-
	M81969/14-03	White
12	M81969/8-10	-
	M81969/14-04	White

- (1) Make a selection of a contact removal tool from Table 13.
- (2) Put the end of the removal tool on the wire.
- (3) Carefully push the tool into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHILE IT IS IN THE CONTACT CAVITY. DAMAGE TO THE RETENTION CLIPS CAN OCCUR.

- (4) Pull the wire and the tool out of the contact cavity at the same time.
- (5) If the contact does not come out of the contact cavity:

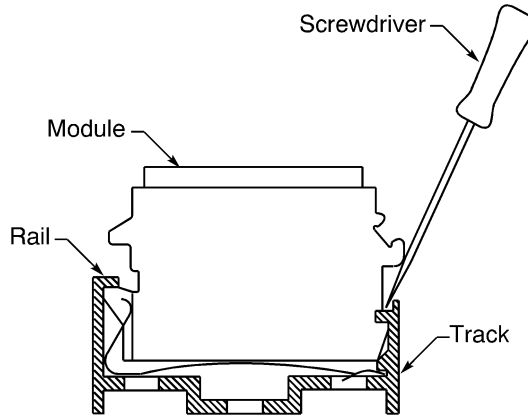
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- (a) Pull the tool out of the contact cavity.
- (b) Turn the tool 90 degrees.
- (c) Do Step (2) through Step (4) again.

B. Removal of a Terminal Module from a Track

- (1) Put a flat screwdriver or an equivalent tool on the module against the side of the track that is opposite the rail. Refer to Figure 11.



POSITION OF THE TOOL
Figure 11

- (2) Push the module up until it is disengaged from the track.

4. TERMINAL JUNCTION SYSTEM ASSEMBLY

A. Contact Assembly

Table 14
CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Part Number
		Part Number	Setting	
22	22	M22520/2-01	3	K673
	20	M22520/1-01	3	M22520/1-02
	22	M22520/1-01	4	M22520/1-02
20	20	M22520/1-01	4	M22520/1-02
	16	M22520/1-01	4	M22520/1-02
18	20	M22520/1-01	5	M22520/1-02
	16	M22520/1-01	5	M22520/1-02
16	16	M22520/1-01	6	M22520/1-02
14	12	M22520/1-01	7	M22520/1-02

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Table 14 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Part Number
		Part Number	Setting	
12	12	M22520/1-01	8	M22520/1-02

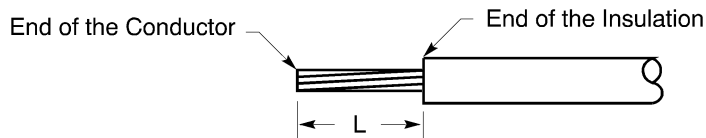
**Table 15
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
22	22	0.16	0.03	-
	20	0.16	0.03	-
	16	0.56	0.03	Fold the conductor back
20	20	0.16	0.03	-
	16	0.28	0.03	-
18	20	0.16	0.03	-
	16	0.28	0.03	-
16	16	0.28	0.03	-
14	12	0.28	0.03	-
12	12	0.28	0.03	-

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 12
- Table 15 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

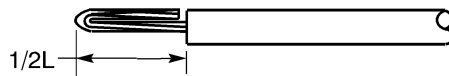


**WIRE PREPARATION
Figure 12**

(2) If it is specified, fold the conductor back. Refer to Figure 13.

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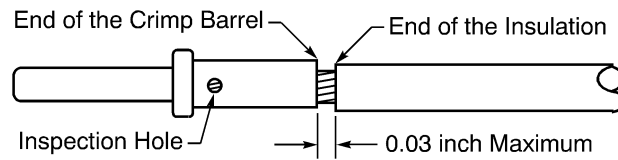
CONDUCTOR FOLDED BACK

Figure 13

- (3) Make a selection of a crimp tool from Table 14.
- (4) Push the conductor into the crimp barrel of the contact. Refer to Figure 14.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is a maximum of 0.03 inch.



THE POSITION OF THE WIRE IN THE CRIMP BARREL

Figure 14

- (5) Crimp the contact.
- (6) Examine the wired contact for these types of damage:
 - A strand of the conductor is broken
 - The base metal of a strand of the conductor can be seen
 - The crimp barrel of the contact has a crack.
- (7) If the contact or the wire has damage, replace the contact.

B. Contact Insertion

**Table 16
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
22	M81969/8-03	-
	M81969/14-01	Green
20	M81969/8-05	-
	M81969/14-02	Red
16	M81969/8-07	-
	M81969/14-03	Blue
12	M81969/8-09	-
	M81969/14-04	Yellow

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- (1) Make a selection of a contact insertion tool from Table 16.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT:

- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (2) Put the contact in the insertion end of the insertion tool.

CAUTION: AN UNWIRED CONTACT MUST NOT BE INSTALLED IN A MODULE. IT CANNOT BE REMOVED.

- (3) Axially align the contact and the tool with the contact cavity.

- (4) Carefully push the tool straight into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHILE IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool straight out of the contact cavity.

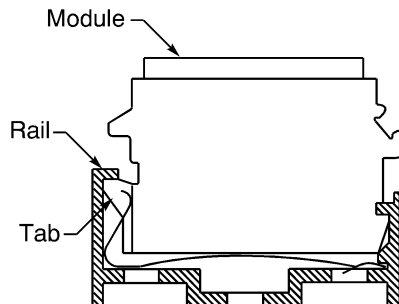
- (6) Lightly pull the wire to make sure that the contact is locked in position.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINAL MODULE OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:

- (a) Pull the contact out of the cavity.
- (b) Do Step (2) through Step (6) again.

C. Installation of a Terminal Module on a Track

POSITION OF THE MODULE IN THE TRACK
Figure 15

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Refer to Figure 15.

- (1) Put the tab of the terminal module in the slot below the rail of the track.
- (2) Align the tab on the opposite side of the module with the cutout on the opposite side of the track.
- (3) Push the module down until it makes click and the module is locked in position.

D. Installation of a Ground Module on a Panel

Table 17
GROUND MODULE INSTALLATION FASTENERS

Fastener	Size	Quantity
Screw, Hex	6-32	2
Washer, Flat	6	2
Washer, Lock	6	2

- (1) Make a selection of the necessary fasteners from Table 17.
- (2) Put a lock washer on each screw.
- (3) Put a flat washer on each screw.
- (4) Align the installation screw holes on the ground module with the installation holes in the panel.
- (5) Engage the threads of the screws and the installation holes.
- (6) Torque each screw 13 inch-pounds \pm 1 inch-pound.

5. APPROVED TOOL SUPPLIERS

A. Contact Removal and Insertion Tools

Table 18
CONTACT REMOVAL AND INSERTION TOOL SUPPLIERS

Tool	Supplier
M81969/8-03	QPL
M81969/8-04	QPL
M81969/8-05	QPL
M81969/8-06	QPL
M81969/8-07	QPL
M81969/8-08	QPL
M81969/8-09	QPL
M81969/8-10	QPL
M81969/14-01	QPL
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL



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B. Contact Crimp Tools

**Table 19
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
K673	Daniels
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL

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1. PART NUMBERS AND DESCRIPTION

A. Terminal Junction System Description

The terminal junction system has these components:

- Terminal modules
- Tracks
- Ground modules.

B. Terminal Module Part Numbers

**Table 1
TERMINAL MODULE PART NUMBERS**

Part Number	Size	Mount Type	Supplier
53710-001	22	Track	Smiths Industries
53710-002	22	Track	Smiths Industries
53710-003	22	Track	Smiths Industries

**Table 2
EQUIVALENT TERMINAL MODULE PART NUMBERS**

Terminal Module	Equivalent Terminal Module	
	Part Number	Supplier
53710-001	M81714/60-22-01	QPL
53710-002	M81714/60-22-02	QPL
53710-003	M81714/60-22-06	QPL

C. Terminal Module Track Part Numbers

**Table 3
TRACK PART NUMBERS**

Part Number	Supplier	Maximum Number of Modules
53270-002	Smiths Industries	4
53270-003	Smiths Industries	8
53270-005	Smiths Industries	7

**Table 4
EQUIVALENT TRACK PART NUMBERS**

Track	Equivalent Track	
	Part Number	Supplier
53720-002	M81714/67-04	QPL
53720-003	M81714/67-08	QPL

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Table 4 (continued)

Track	Equivalent Track	
	Part Number	Supplier
53720-005	M81714/67-07	QPL

D. Ground Module Part Numbers

**Table 5
GROUND MODULE PART NUMBERS**

Part Number	Mount Type	Supplier
53710-005	Panel	Smiths Industries
40-718-5368-01	Panel	Smiths Industries

**Table 6
EQUIVALENT GROUND MODULE PART NUMBERS**

Ground Module	Equivalent Ground Module	
	Part Number	Supplier
53710-005	M81714/63-16F	QPL
40-718-5368-01	M81714/63-20F	QPL

E. Contact Part Numbers

**Table 7
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Color Code		Supplier
Engaging End	Crimp Barrel			Band	Color	
22	22	Socket	30-867-6811U	1	Brown	Smiths Industries
				2	White	
				3	Brown	
20	20	Socket	30-867-6839U	1	Brown	Smiths Industries
				2	White	
				3	Red	
16	16	Socket	30-867-6812U	1	Brown	Smiths Industries
				2	White	
				3	Orange	

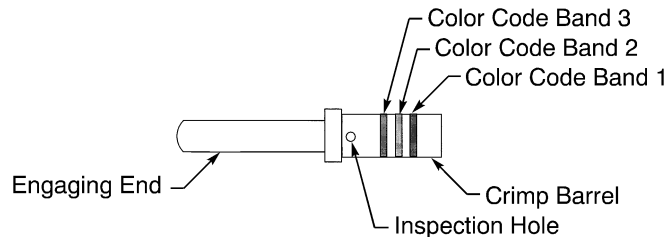
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**Table 8
EQUIVALENT CONTACT PART NUMBERS**

Contact	Equivalent Contact	
	Part Number	Supplier
30-867-6811U	M39029/22-191	QPL
30-867-6812U	M39029/22-193	QPL
30-867-6839U	M39029/22-192	QPL



**PIN CONTACT
Figure 1**

2. TERMINAL MODULE AND GROUND MODULE CONFIGURATIONS

A. M81714 Series II Terminal Module Configurations

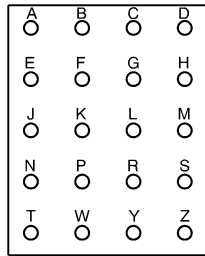
**Table 9
TERMINAL MODULE CONFIGURATIONS**

Terminal Module	Contact		Bus Configuration	
	Size	Quantity	Sets	Contact Cavities
53710-001	22	20	1	20
53710-002	22	20	2	10
53710-003	22	20	4	4
			2	2

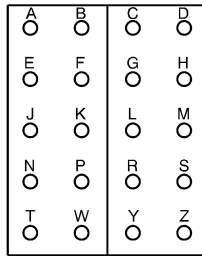
NOTE: The size of the contact cavity is equivalent to the size of the contact crimp barrel.

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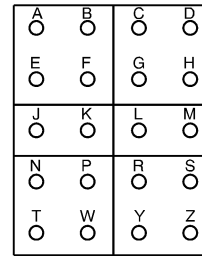
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53710-001



53710-002



53710-003

TERMINAL MODULE BUS CONFIGURATIONS

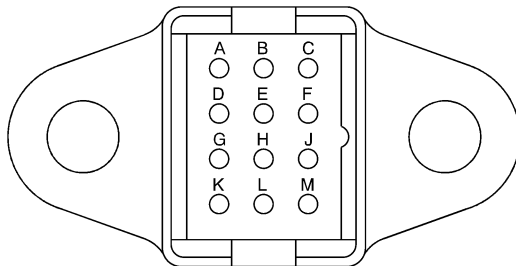
Figure 2

B. M81714 Series II Ground Module Configurations

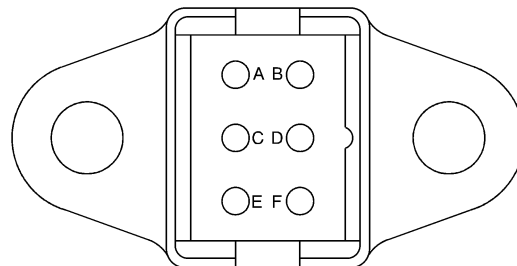
**Table 10
GROUND MODULE CONFIGURATIONS**

Ground Module	Contact	
	Size	Quantity
53710-005	16	6
40-718-5368-01	20	12

NOTE: The size of the contact cavity is equivalent to the size of the contact crimp barrel.



40-718-5368-01



53710-005

GROUND MODULE CONFIGURATIONS

Figure 3

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3. TERMINAL JUNCTION SYSTEM DISASSEMBLY

A. Contact Removal

**Table 11
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	
	Part Number	Color
22	M81969/14-01	White
	M81969/16-04	White
20	M81969/14-02	White
	M81969/16-01	White
16	M81969/14-03	White
	M81969/16-02	White

- (1) Make a selection of a contact removal tool from Table 11.
- (2) Put end of the removal tool on the wire near the grommet.
- (3) Carefully push the tool into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHILE IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (4) Pull the wire and the tool out of the contact cavity at the same time.
- (5) If the contact does not come out of the contact cavity:
 - (a) Pull the tool out of the contact cavity.
 - (b) Pull the tool out of the contact cavity.
 - (c) Turn the tool 90 degrees.
 - (d) Do Step (2) through Step (4) again.

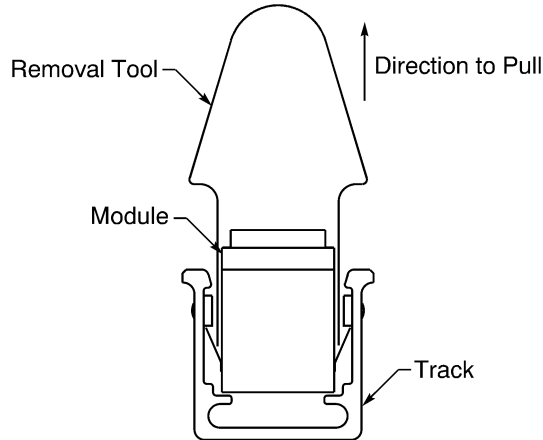
B. Removal of a Terminal Module from a Track

**Table 12
MODULE REMOVAL TOOLS**

Terminal Module Size	Tool Part Number
22	CNA051300
	M81714/69-01

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REMOVAL OF THE MODULE
Figure 4

Refer to Figure 4.

- (1) Make a selection of a terminal module removal tool from Table 12.
- (2) Put each end of the tool on opposite sides of the module.
- (3) Push the tool to the track until it is fully inserted.
- (4) Push the ends of the tool together.
- (5) Pull the module from the track.

4. TERMINAL JUNCTION SYSTEM ASSEMBLY

A. Contact Assembly

Table 13
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
22	22	0.156	0.030	-
	20	0.156	0.030	-
	16	0.312	0.030	Fold the conductor back
20	20	0.156	0.030	-
	16	0.156	0.030	-
18	16	0.156	0.030	-
16	16	0.156	0.030	-

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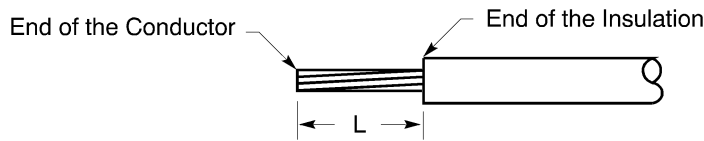
**Table 14
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Part Number
		Part Number	Setting	
22	22	M22520/2-01	5	K330-3
	20	M22520/7-01	4	M22520/7-12
	16	M22520/7-01	6	M22520/7-13
20	20	M22520/7-01	5	M22520/7-12
	16	M22520/7-01	6	M22520/7-13
18	16	M22520/7-01	7	M22520/7-13
16	16	M22520/7-01	8	M22520/7-13

(1) Remove the necessary length of insulation from the end of the wire.

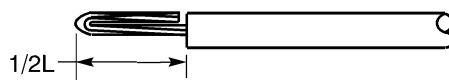
Refer to:

- Figure 5
- Table 13 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



**WIRE PREPARATION
Figure 5**

(2) If it is specified, fold the conductor back. Refer to Figure 6.



**CONDUCTOR FOLDED BACK
Figure 6**

(3) Make a selection of a crimp tool from Table 14.

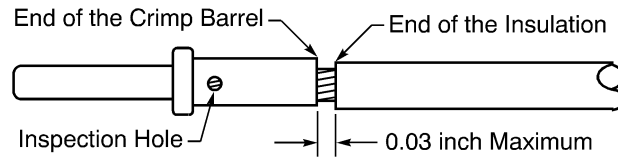
(4) Push the end of the wire into the crimp barrel of the contact. Refer to Figure 7.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel a maximum of 0.03 inch.

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POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 7

- (5) Crimp the contact.
- (6) Examine the wired contact for these types of damage:
 - A strand of the conductor is broken
 - The base metal of a strand of the conductor can be seen
 - The crimp barrel of the contact has a crack.
- (7) If the contact or the wire has damage, replace the contact.

B. Contact Insertion

Table 15
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
22	M81969/14-01	Green
	M81969/16-04	Green
20	M81969/14-02	Red
	M81969/16-01	Red
16	M81969/14-03	Blue
	M81969/16-02	Blue

- (1) Make a selection of a contact insertion tool from Table 15.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT:

- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (2) Put the contact in the insertion end of the insertion tool.

CAUTION: AN UNWIRED CONTACT MUST NOT BE INSTALLED IN A MODULE. IT CANNOT BE REMOVED.

- (3) Axially align the contact and the tool with the contact cavity.

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(4) Carefully push the tool straight into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

(5) Carefully pull the tool straight out of the contact cavity.

(6) Lightly pull the wire to make sure that the contact is locked in position.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINAL MODULE OR THE CONTACT.

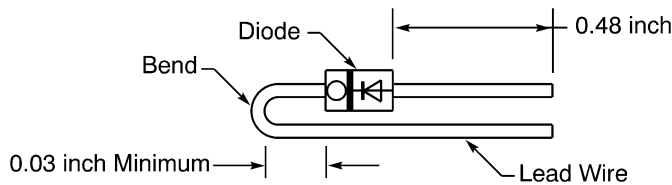
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

(7) If the contact is not locked in the contact cavity:

- (a) Pull the contact out of the cavity.
- (b) Do Step (2) through Step (6) again.

C. Installation of a Diode

(1) Prepare the lead wires of the diode. Refer to Figure 8.

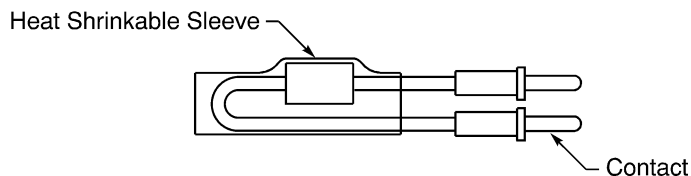


LEAD WIRE PREPARATION
Figure 8

- (a) Bend one lead wire back to make it parallel with the other lead wire. Make sure that the bend is not less than 0.03 inch from the body of the diode.
- (b) Cut each lead wire on the diode to make the length from the end of the diode to the end of the wire equal to 0.48 inch.

(2) Assemble a contact on the end of each lead wire. Refer to Paragraph 4.A.

(3) Put a length of heat shrinkable sleeve on the diode and the lead wires. Refer to Figure 9.

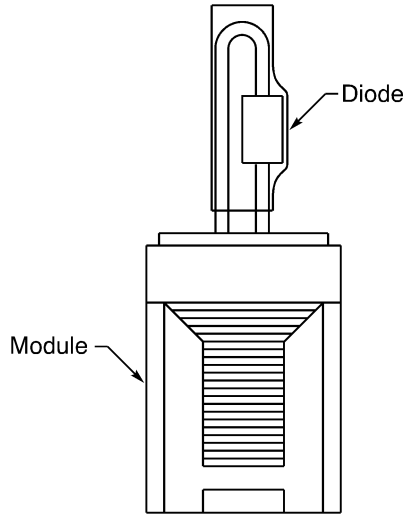


POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 9

(4) Insert the contacts of the diode into the terminal module. Refer to Paragraph 4.B. and Figure 10.

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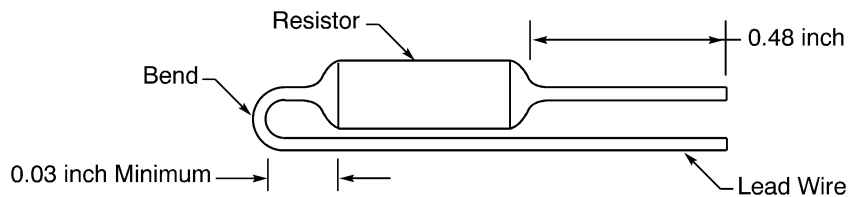
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INSTALLATION OF THE DIODE
Figure 10

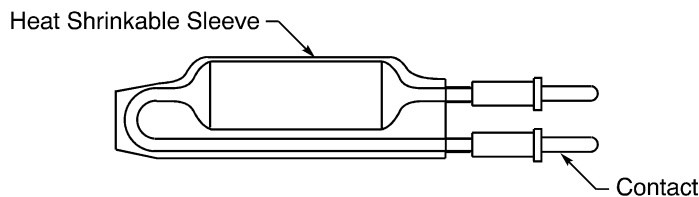
D. Installation of a Resistor

- (1) Prepare the lead wires of the resistor. Refer to Figure 11.



LEAD WIRE PREPARATION
Figure 11

- (a) Bend one lead wire back to make it parallel with the other lead wire.
Make sure that the bend is not less than 0.03 inch from the body of the resistor.
 - (b) Cut each lead wire on the resistor to make the length from the end of the resistor to the end of the wire equal to 0.48 inch.
- (2) Assemble a contact on the end of each lead wire. Refer to Paragraph 4.A.
 - (3) Put a length of heat shrinkable sleeve on the resistor. Refer to Figure 12.



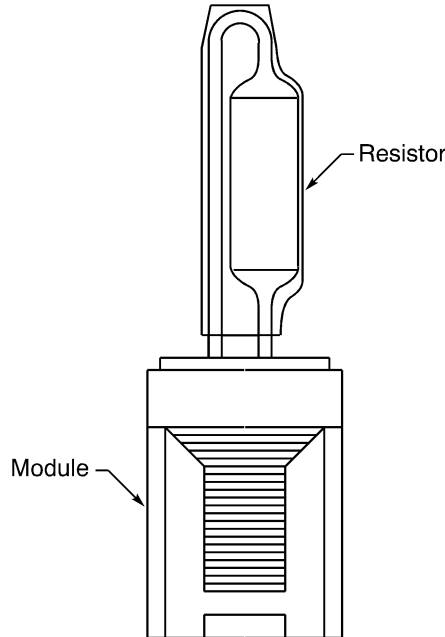
POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 12

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- (4) Insert the contacts of the resistor into the terminal module. Refer to Paragraph 4.B. and Figure 13.



INSTALLATION OF THE RESISTOR
Figure 13

E. Installation of a Terminal Module on a Track

- (1) Put the terminal module in the correct position on the top of the rail.
- (2) Push down on the module until it makes a click is heard and the module is locked in position.

F. Installation of a Ground Module on a Panel

Table 16
GROUND MODULE INSTALLATION FASTENERS

Fastener	Size	Quantity
Screw, Hex	8-32	2
Washer, Flat	8	2
Washer, Lock	8	2

- (1) Make a selection of the necessary fasteners from Table 16.
- (2) Put a lock washer on each screw.
- (3) Put a flat washer on each screw.
- (4) Align the installation screw holes on the ground module with the installation holes in the panel.
- (5) Engage the threads of the screws and the installation holes.
- (6) Torque each screw 17 inch-pounds \pm 2 inch-pounds.

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5. APPROVED TOOL SUPPLIERS

A. Contact Removal and Insertion Tools

**Table 17
CONTACT REMOVAL AND INSERTION TOOL SUPPLIERS**

Removal Tool	Supplier
M81969/14-01	QPL
M81969/14-02	QPL
M81969/14-03	QPL
M81969/16-01	QPL
M81969/16-02	QPL
M81969/16-04	QPL

B. Terminal Module Removal Tools

**Table 18
TERMINAL MODULE REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
CNA051300	Precision Connector Design
M81714/69-01	QPL

C. Contact Crimp Tools

**Table 19
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
K330-3	Daniels
M22520/2-01	QPL
M22520/7-01	QPL
M22520/7-12	QPL
M22520/7-13	QPL



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ELECTRICAL BONDS AND GROUNDS

This Subject gives the necessary conditions and procedures for electrical bonds and electrical grounds.

1. GENERAL DATA

A. Definitions

**Table 1
DEFINITIONS**

Term	Definition
Basic Structure	The major, electrically integral, metallic part of an airplane
Carbon Fiber Reinforced Plastic (CFRP)	A strong, lightweight, composite material consisting of a plastic matrix (often an epoxy) embedded with carbon filament thread fibers or fabric.
Case Ground	A current return path through the equipment mounting surface
Clearance Fit Hole	A hole with dimension limits larger than the shank diameter of the fastener. The installed fastener will always have a clearance between the shank and the mating surface.
Critical Ground	An important current return path; the voltage drop (resistance) from the wire terminal to the structure must be measured after the assembly of each wire terminal to a ground
Current-Return Ground	A current path or connection that is established between the ground side of the circuit of an electrical or electronic device and the basic structure; made with a designated ground lead or wire on the non-case grounded equipment with either a direct case to the structure ground or a jumper on the Case Grounded equipment
Designated Bond	An important bond; the maximum permitted resistance and the other major conditions are directly specified; are designed to permit the operation of a circuit-protective device, reduce any fire or explosion hazards, avoid electric shocks to personnel, minimize radio interference; examples include bonds for lightning protection, static bleed-off, and case bonds for electrical and electronic equipment in flammable leakage zones
Dual Ground	A type of connection that has two physical paths of the current return to structure
Dual Terminated Ground	An alternative term for Dual Ground
Electrical Bond	A stable connection between two objects that has the result of electrical conductivity between those objects
Electrostatic Drain Ground Path	An electrical path through which electrical charge current generated by electrostatic charging is continuously conducted to ground in order to prevent the accumulation of the charge to levels where damaging sudden discharge would occur.
Explosion Hazard Area	A work area, or the area of an airplane or any other manufactured product that is identified by the responsible organization as a hazard because of the combustible or explosive substances in the area
Faying Surface	A surface that is prepared to have the correct fit against a second surface so that an electrical bond is made between the two surfaces
Ground	An electrically conductive path between a component or an electrical circuit and the basic structure, or a connection between the conductive frame or housing of an object and the earth-ground connection point in a facility

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Table 1 (continued)

Term	Definition
Inherent Bond	When the materials that are used and the assembly procedure gives the low resistance junction without special installation procedures; included are parts that are welded, brazed, sweated, or swaged; also included are any major structural components that are attached by a large number of fasteners
Interference Fit Hole	A hole with dimension limits smaller than the shank diameter of the fastener. The installed fastener will have interference between the shank and the mating surface. An interference fit hole will always have a permanent fastener installed in it.
Non-Designated Bond or Ground	A bond or ground that is not directly specified, but occurs with any parts that are inherently bonded or that have no specific electrical function; the parts must be satisfactorily bonded to structure so that the ECM static dissipation and shock hazard conditions of MIL-B-5087 are obeyed
Precipitation Static	An electrical charge accumulation on surfaces of an aircraft as a result if triboelectric or frictional charging caused by flying through snow, ice, sleet, hail, and dust.

B. Applicable Conditions for the Separation of Grounds

These are the types of grounds:

- A direct current or DC ground
- An alternating current or AC ground
- A static ground.

For the conditions that are applicable for:

- Ground wires in one termination, refer to Table 2
- Ground connections, refer to Table 3.

Table 2

APPLICABLE CONDITIONS FOR GROUNDS IN A WIRE TERMINATION

Wire Termination	Applicable Condition
A Contact	More than one type of ground is not permitted
A Terminal Lug	More than one type of ground is not permitted

Table 3

APPLICABLE CONDITIONS FOR GROUNDS IN A GROUND CONNECTION

Ground Connection	Wire Termination	Applicable Condition
Ground Module	A Contact	More than one type of ground is permitted
Ground Stud	A Terminal Lug	More than one type of ground is not permitted

C. Applicable Conditions for the Seal of a Ground Stud Ground Assembly

For the conditions that are applicable for a ground assembly in a flammable leakage zone, refer to 20-30-00.

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For a location that is not a flammable leakage zone, the ground assembly must be sealed if the initial configuration of the ground assembly is sealed.

D. Damage Limits and Service Conditions for a Bond and Ground Jumper Assembly

This paragraph gives the damage limits and service conditions for electrical bond and ground jumper assemblies.

For the applicable:

- Assemblies, refer to Table 4
- Damage limits and service conditions, refer to Table 5.

Table 4
BOND AND GROUND JUMPER ASSEMBLIES

Jumper Assembly	Supplier
BACJ40A()	Boeing
BACJ40B()	Boeing
BACJ40C()	Boeing
BACJ40D()	Boeing
BACJ40E()	Boeing
BACJ40F()	Boeing
BACJ40T()	Boeing
BACJ40W()	Boeing
M83413/8-A()	QPL
M83413/8-B()	QPL
M83413/8-D()	QPL
M83413/8-E()	QPL
M83413/8-F()	QPL
M83413/8-G()	QPL
M83413/8-H()	QPL
MS25083-2()	QPL
MS25083-3()	QPL
MS25083-4()	QPL
MS25083-5()	QPL
MS25083-6()	QPL

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**Table 5
APPLICABLE SERVICE CONDITIONS FOR JUMPER ASSEMBLIES**

Assembly Configuration	Type of Damage	Permitted Number of Broken Strands	Service Condition
Installed in a Fuel Tank	All	0	If the assembly has one or more broken strands, it must be replaced immediately
Insulated Jumper	All	0	If the assembly has one or more broken strands, it must be replaced immediately
			If the assembly has damage to the insulation, repair of the insulation can be necessary; refer to Subject 20-10-13
Uninsulated Jumper shorter than or equal to 12 inches	Abrasion	6	The source of abrasion must be removed immediately
			The assembly must be replaced at the next scheduled maintenance
	Not Abrasion	6	If the assembly has more than 6 broken strands, it must be replaced at the next scheduled maintenance
			If the assembly has less than 7 broken strands, it must be inspected at each scheduled maintenance
Uninsulated Supported Jumper longer than 12 inches	Abrasion	6	The source of abrasion must be removed immediately
			The assembly must be replaced at the next scheduled maintenance
	Not Abrasion	6	If the assembly has more than 6 broken strands, it must be replaced at the next scheduled maintenance
			If the assembly has less than 7 broken strands, it must be inspected at each scheduled maintenance
Uninsulated Unsupported Jumper longer than 12 inches	All	0	If the assembly has one or more broken strands, it must be replaced at next scheduled maintenance

E. General Conditions for the Preparation of a Faying Surface

All faying surfaces in the current path must be cleaned. Refer to Table 6.

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These conditions are applicable:

- Lye, alkaline paint remover, hydroxides, or other caustic solutions must not be used to clean any bonding surface
- Abrasive cleaning materials or wire brushes must not be used to clean plated surfaces, clad surfaces, or unpainted metals such as corrosion resistant or stainless steel and 6061 aluminum
- If the bond will be made immediately after cleaning, the faying surfaces must be cleaned again with a clean cloth that is free of lint to make sure that any remaining, abrasive particles are removed
- If a cleaned faying surface shows any sign of contamination, clean the surface again
- The bond assembly and resistance measurement must be done within 24 hours of the surface preparation. If the bond assembly and resistance measurement are not done within 24 hours, the faying surfaces must be cleaned again.

CAUTION: DO NOT PERMIT ANY CONTAMINATION FROM THE ABRASIVE MATERIALS THAT ARE USED TO PREPARE A SURFACE FOR AN ELECTRICAL BOND TO GO INTO ANY MECHANISM OR ELECTRICAL EQUIPMENT.

**Table 6
FAYING SURFACE PREPARATION PROCEDURES**

Faying Surface	Finish	Preparation Procedure
Aluminum Alloy	Bare with or without grease, oil, corrosion inhibiting compound, or other contaminants	Paragraph 2.E.
	Bare with oxide film contamination	Paragraph 2.
	Paint, primer or enamel	Paragraph 2.
	Chemical conversion coating	Paragraph 2.
	Anodize	Paragraph 2.
BMS10-21 Type III Anti-Static Coating	Bare	Paragraph 2.E.
	Paint, primer or enamel	Paragraph 2.
Flame Spray	Bare	Paragraph 2.E.
	Paint, primer or enamel	Paragraph 2.
Magnesium	Bare	Paragraph 2.E.
Nickel Alloy 625	Bare	Paragraph 2.E.
Stainless Steel	Bare	Paragraph 2.E.
	Paint, primer or enamel	Paragraph 2.
Stainless Steel with Cadmium Plating	Bare	Paragraph 2.E.
Titanium	Bare	Paragraph 2.E.
	Paint, primer or enamel	Paragraph 2.

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F. Replacement of a Surface Finish After a Bond Is Made

After the bond is made, these conditions are applicable for the cleaned surfaces that are not part of the faying surface:

- All finishes must be applied again
- The applicable surface finish must be applied within one week after the original finish is been removed
- A minimum of one layer of primer and one layer of the equivalent finish must be applied where the original paint finish is removed
- Machine finished flanges of fuel or hydraulic pumps, valves, and equivalent equipment that must have a seal for liquids at the mounting surface must not be painted
- A chemical conversion coating can be applied if the original finish is anodized
- A layer of alodine or chemical conversion coating must be applied to all bare aluminum surfaces that have no protection.

After the bond is made, these conditions are applicable for the cleaned magnesium surfaces that are not part of the faying surface:

- A layer of primer must be applied 24 hours after the original finish has been removed
- If the specified finish is Dow 17 Anodize or equivalent, a minimum of one coat of zinc chromate primer must be applied.

G. Airworthiness Limitations

These types of wiring configurations are specified as Critical Design Configuration Control Limitations (CDCCL):

- Fuel System Wiring that has Airworthiness Limitations
- Wiring that is installed adjacent to the fuel tank. Refer to Subject 20-10-11.

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

To find more data about CDCCL wiring, refer to Table 7 for the document that is applicable for the airplane model.

**Table 7
BOEING DOCUMENTS FOR AIRWORTHINESS LIMITATIONS**

Boeing Document	Airplane Model
D6-7552-AWL	707
D6-8766-AWL	727
D6-38278-CMR	737-100,-200,-200C,-300,-500
D6-13747-CMR	747-100,-200,-300,-SP
Maintenance Planning Document, Section 9	737-600,-700,-800 and later 737 models
	747-400 and later 747 models
	757
	767
	777

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2. CLEANING OF FAYING SURFACES

A. Cleaning Procedure 1 - Abrasives Applied Manually

**Table 8
ABRASIVE MATERIALS**

Description	Specification	Supplier
Scotch-Brite Pad	Type A Very Fine	3M
Garnet Sandpaper	ANSI B74.18	An available source
Wet/Dry Sandpaper	ANSI B74.18 Grit size 280 or finer	An available source

- (1) Make a selection of an abrasive material. Refer to Table 8.
- (2) Manually apply the abrasive to the specified faying surface or spot area with a circular or an elliptical movement.

Make sure that the area is cleaned until:

- The surface is smooth and even
- Bright metal can be seen.

B. Cleaning Procedure 2 - Stainless Steel Rotary Brush

This paragraph gives the procedure to satisfactorily remove:

- Paint from any metal
- Alodine, iridite, or light anodize from aluminum.

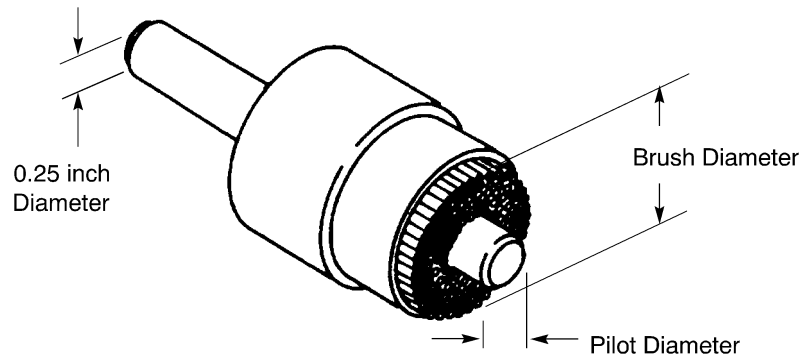
NOTE: Anodic films can have different thickness and can be difficult to remove with the wire brush. A better alternative for these surfaces is Cleaning Procedure 3. Refer to Paragraph 2.C.

**Table 9
STAINLESS STEEL ROTARY BRUSHES**

Pilot Diameter (inch)	Brush Diameter (inch)	Brush Wire Size (inch)		Boeing Standard
		Maximum	Minimum	
3/32	1/2	0.005	0.004	ST913K-50-09
1/8	1/2	0.005	0.004	ST913K-50-12
5/32	1/2	0.005	0.004	ST913K-50-16
3/16	1/2	0.005	0.004	ST913K-50-19
	3/4	0.006	0.005	ST913K-75-19
	1.0	0.008	0.006	ST913K-100-19
1/4	11/32	0.005	0.004	ST913K-34-24
	3/4	0.006	0.005	ST913K-75-25
	1.0	0.008	0.006	ST913K-100-25
5/16	3/4	0.006	0.005	ST913K-75-31
	1.0	0.008	0.006	ST913K-100-31

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DIMENSIONS OF THE ST913K-() ROTARY BRUSH
Figure 1

Table 10
ROTARY BRUSH COLOR CODES

Bond Surface	Color Code	
	Color	Identification
Aluminum	-	-
Composite	Red	J7-42-5600
Magnesium	Green	J7-42-5700
Stainless Steel	Blue	J7-42-5200

Table 11
APPROVED SUPPLIERS OF BOEING STANDARD ROTARY BRUSHES

Boeing Specification	Supplier
ST913K-()	Alvord-Polk Tool Company

- I (1) Make a selection of a rotary brush from Table 9.
Make sure that the brush:
 - Has the correct size to clean the specified area
 - Has the correct color for the type of bond surface; refer to Table 10.

CAUTION: DO NOT USE A CARBON STEEL BRUSH. DAMAGE FROM CORROSION CAN OCCUR BECAUSE OF THE POSSIBLE CONTAMINATION OF THE SURFACE OF THE MATERIAL WITH PARTICLES FROM THE BRUSH.

CAUTION: DO NOT USE A BRUSH THAT IS SPECIFIED FOR A DIFFERENT BOND SURFACE.

- (2) Put the brush in a drill motor or an applicable drive.
- (3) Clean the specified area:
 - (a) Apply the brush to the bond surface for a short time.
Make sure to keep the cleaning surface of the brush parallel to the bond surface.

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- (b) Examine the bond surface.
Make sure that the bond surface is clean.
- (c) If the bond surface is not clean, do Step (a) and Step (b) again until the specified area is fully clean.

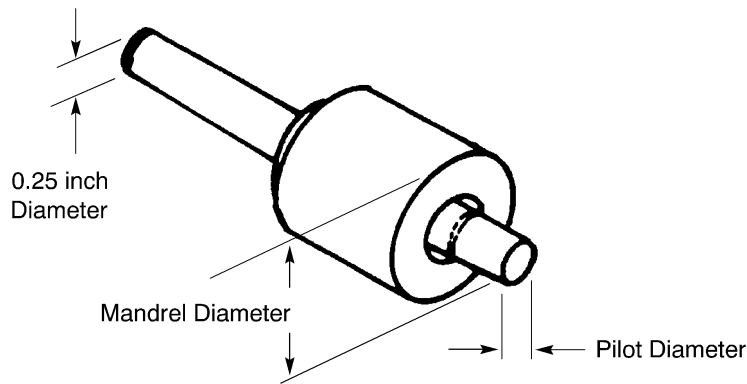
CAUTION: MAKE SURE TO KEEP THE LOSS OF MATERIAL OF THE BOND SURFACE TO A MINIMUM.

C. Cleaning Procedure 3 - Rotary Abrasive Disc

This paragraph gives the procedure to satisfactorily remove:

- Anodize
- Iridite
- Alodine
- Skydrol Resistant Finish (SRF)
- Similar hard finishes.

NOTE: Paint can also be removed, but frequent replacement of the abrasive disc is necessary.



DIMENSIONS OF THE ST913M-() MANDREL
Figure 2

Table 12
MANDRELS FOR ABRASIVE DISCS

Pilot Diameter (inch)	Mandrel Diameter (inch)	Boeing Standard
3/32	1/2	ST913M-50-09
1/8	1/2	ST913M-50-12
5/32	1/2	ST913M-50-16
3/16	1/2	ST913M-50-19
	3/4	ST913M-75-19
	1.0	ST913M-100-19

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Table 12 (continued)

Pilot Diameter (inch)	Mandrel Diameter (inch)	Boeing Standard
1/4	11/32	-
	3/4	ST913M-75-25
	1.0	ST913M-100-25
5/16	3/4	ST913M-75-31
	1.0	ST913M-100-31

Table 13

APPROVED SUPPLIERS OF BOEING STANDARD MANDRELS

Boeing Specification	Supplier
ST913M-()	Manufacturing Tool Services
	West Coast Industries

- (1) Make a selection of an abrasive disc.
Make sure that the disc has the correct size to clean the specified spot area.

CAUTION: DO NOT USE AN ABRASIVE DISC THAT HAS BEEN USED ON A DIFFERENT TYPE OF BOND SURFACE.

- I (2) Make a selection of the applicable mandrel from Table 12.
- (3) Put the mandrel into a drill motor or an applicable drive.
- (4) Put the disc on the mandrel.
- (5) Clean the specified area:
 - (a) Lightly apply the disc to the surface of the material for a short time.
Make sure to keep the cleaning surface of the disc parallel to the surface of the material.
 - (b) Examine the surface of the disc to see if it is clogged.
If it is necessary, replace the disc.
 - (c) Examine the bond surface.
Make sure that the bond surface is clean.
 - (d) If the bond surface is not clean, do Sub-step 5(a) through Sub-step 5(c) again until the specified area is fully clean.

CAUTION: MAKE SURE TO KEEP THE LOSS OF MATERIAL OF THE BOND SURFACE TO A MINIMUM.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL BONDS AND GROUNDS****D. Cleaning Procedure 4 - Removal of Paint with Lacquer Thinner**

NOTE: This procedure is recommended to satisfactorily remove these types of paint from clad aluminum or other metal surfaces:

- MIL-P-6889 primer
- Lacquer-based paint
- Enamel paint.

- (1) Apply lacquer thinner or methyl ethyl ketone to the specified area with a clean cotton or linen cloth, or a gauze applicator until the area is fully clean.

Make sure to use a clean part of the cloth each time the thinner is applied.

CAUTION: APPLY THE THINNER ONLY TO THE SPECIFIED AREA OF THE BOND.

- (2) Immediately dry the area with another clean cloth.

E. Cleaning Procedure 5 - Removal of Contamination with Cleaning Solvent

NOTE: This procedure is recommended to satisfactorily remove contamination from these types of metal:

- Bare metal
- Clad metal
- Plated metal.

- I (1) Make a selection of a solvent. Refer to Table 21.
- I (2) Apply the cleaning solvent to the bond surfaces with a nonmetallic brush or a cloth applicator.
- I (3) If it is necessary, scrub the area to remove any contamination that can be seen.

CAUTION: DO NOT USE ABRASIVE MATERIALS. IF ABRASIVE MATERIALS ARE USED, DAMAGE TO THE FAYING SURFACE OCCURS.

3. GROUND STUD ASSEMBLY AND TERMINAL LUG INSTALLATION**A. General Conditions for Ground Stud Assembly**

These washers must not be used in the conductive path of a bond:

- Steel washers
- Dyed washers
- Other types of washers with a non-conductive layer on the surface.

Only these hardware are permitted:

- I
- I
- I
- Table 14 for aluminum and magnesium structure
 - Table 16 for stainless steel and titanium structure
 - Table 17 for different tube materials.

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**Table 14
GROUND STUD HARDWARE FOR ALUMINUM AND MAGNESIUM STRUCTURE**

Stud Size	Hardware	Part Number	Supplier
10-32	Bolt, Hexagonal	NAS563-()	QPL
	Screw, Hexagonal Head Phillips	NAS1801-3-()	QPL
	Screw, Hexagonal, Cross Recess Head	BACS12GU3K()	QPL
	Nut, Plain Electrical	MS35650-305T	QPL
	Nut, Self Lock	BACN10YR3CD	QPL
		MS21042L-3	QPL
	Washer, Corrosion Protective	AN960D10L	QPL
		NAS1149D0316H	QPL
	Washer, Protective Pressure	AN960D10L	QPL
		NAS1149D0316H	QPL
Washer, Split Lock	MS35338-43	QPL	
1/4-28	Bolt, Hexagonal	NAS564-()	QPL
	Screw, Hexagonal Head Phillips	NAS1801-4-()	QPL
	Nut, Plain Electrical	MS35650-3255T	QPL
	Nut, Self Lock	BACN10YR4CD	QPL
		MS21042L-4	QPL
	Washer, Corrosion Protective	AN960D416L	QPL
		NAS1149D0416H	QPL
	Washer, Protective Pressure	AN960D416L	QPL
NAS1149D0416H		QPL	
Washer, Split Lock	MS35338-44	QPL	
5/16-24	Bolt, Hexagonal	NAS565-()	QPL
	Screw, Hexagonal Head Phillips	NAS1801-5-()	QPL
	Nut, Plain Electrical	MS35650-3315T	QPL
	Nut, Self Lock	BACN10YR5CD	QPL
		MS21042L-5	QPL
	Washer, Corrosion Protective	AN960D516L	QPL
		NAS1149D0516H	QPL
	Washer, Protective Pressure	AN960D516L	QPL
		NAS1149D0516H	QPL
Washer, Split Lock	MS35338-45	QPL	

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Table 14 (continued)

Stud Size	Hardware	Part Number	Supplier
3/8-24	Bolt, Hexagonal	NAS566-()	QPL
	Screw, Hexagonal Head Phillips	NAS1801-6-()	QPL
	Nut, Plain Electrical	MS35650-3385T	QPL
	Nut, Self Lock	BACN10YR6CD	QPL
		MS21042L-6	QPL
	Washer, Corrosion Protective	AN960D616L	QPL
		NAS1149D0616H	QPL
	Washer, Protective Pressure	AN960D616L	QPL
NAS1149D0616H		QPL	
Washer, Split Lock	MS35338-46	QPL	
1/2-20	Bolt, Hexagonal	NAS568-()	QPL
	Screw, Hexagonal Head Phillips	-	-
	Nut, Plain Electrical	MS35650-3395T	QPL
	Nut, Self Lock	-	-
	Washer, Corrosion Protective	AN960D816L	QPL
		NAS1149D0816H	QPL
	Washer, Protective Pressure	AN960D816L	QPL
		NAS1149D0816H	QPL
Washer, Split Lock	MS35338-48	QPL	

Table 15

SUPERSEDED WASHER PART NUMBERS

Superseded Washer		Washer	
Part Number	Supplier	Part Number	Supplier
AN960D10L	QPL	NAS1149D0316H	QPL
AN960D10	QPL	NAS1149D0363H	QPL
AN960D11	QPL	NAS1149D1165H	QPL
AN960D416L	QPL	NAS1149D0416H	QPL
AN960D416	QPL	NAS1149D0463H	QPL
AN960D516L	QPL	NAS1149D0516H	QPL
AN960D516	QPL	NAS1149D0563H	QPL
AN960D616L	QPL	NAS1149D0616H	QPL
AN960D616	QPL	NAS1149D0663H	QPL

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Table 15 (continued)

Superseded Washer		Washer	
Part Number	Supplier	Part Number	Supplier
AN960D716L	QPL	NAS1149D0716H	QPL
AN960D716	QPL	NAS1149D0763H	QPL
AN960D816L	QPL	NAS1149D0816H	QPL
AN960D816	QPL	NAS1149D0863H	QPL
AN960JD10L	QPL	NAS1149D0332J	QPL
AN960JD10	QPL	NAS1149D0363J	QPL
AN960JD11	QPL	NAS1149D1165J	QPL
AN960JD416L	QPL	NAS1149D0416J	QPL
AN960JD416	QPL	NAS1149D0463J	QPL
AN960JD516L	QPL	NAS1149D0516J	QPL
AN960JD516	QPL	NAS1149D0563J	QPL
AN960JD616L	QPL	NAS1149D0616J	QPL
AN960JD616	QPL	NAS1149D0663J	QPL
AN960JD716L	QPL	NAS1149D0716J	QPL
AN960JD716	QPL	NAS1149D0763J	QPL
AN960JD816L	QPL	NAS1149D0816J	QPL
AN960JD816	QPL	NAS1149D0863J	QPL

Table 16

GROUND STUD HARDWARE FOR STAINLESS STEEL AND TITANIUM STRUCTURE

Stud Size	Hardware	Part Number	Supplier
10-32	Bolt, Hexagonal	NAS563C-()	QPL
	Screw, Hexagonal Head Phillips	NAS1802-3-()	QPL
	Nut, Plain Electrical	MS35650-304	QPL
	Nut, Self Lock	BACN10JC3CM	QPL
	Washer, Corrosion Protective	BACW10BP3APU	QPL
	Washer, Protective Pressure	BACW10BP3APU	QPL
	Washer, Split Lock	MS35338-138	QPL

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Table 16 (continued)

Stud Size	Hardware	Part Number	Supplier
1/4-28	Bolt, Hexagonal	NAS564C-()	QPL
	Screw, Hexagonal Head Phillips	NAS1802-4-()	QPL
	Nut, Plain Electrical	MS35650-3254	QPL
	Nut, Self Lock	BACN10JC4CM	QPL
	Washer, Corrosion Protective	BACW10BP4APU	QPL
	Washer, Protective Pressure	BACW10BP4APU	QPL
	Washer, Split Lock	MS35338-139	QPL
5/16-24	Bolt, Hexagonal	NAS565C-()	QPL
	Screw, Hexagonal Head Phillips	NAS1802-5-()	QPL
	Nut, Plain Electrical	MS35650-3314	QPL
	Nut, Self Lock	BACN10JC5CM	QPL
	Washer, Corrosion Protective	BACW10BP5APU	QPL
	Washer, Protective Pressure	BACW10BP5APU	QPL
	Washer, Split Lock	MS35338-140	QPL
3/8-24	Bolt, Hexagonal	NAS566C-()	QPL
	Screw, Hexagonal Head Phillips	NAS1802-6-()	QPL
	Nut, Plain Electrical	MS35650-3384	QPL
	Nut, Self Lock	BACN10JC6CM	QPL
	Washer, Corrosion Protective	BACW10BP6APU	QPL
	Washer, Protective Pressure	BACW10BP6APU	QPL
	Washer, Split Lock	MS35338-141	QPL
1/2-20	Bolt, Hexagonal	NAS568C-()	QPL
	Screw, Hexagonal Head Phillips	NAS1802-8-()	QPL
	Nut, Plain Electrical	MS35650-3394	QPL
	Nut, Self Lock	BACN10JC8CM	QPL
	Washer, Corrosion Protective	BACW10BP8APU	QPL
	Washer, Protective Pressure	BACW10BP8APU	QPL
	Washer, Split Lock	MS35338-143	QPL

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**Table 17
CLAMPS FOR DIFFERENT TUBE MATERIALS**

Tube Material	Clamp		
	Part Number	Finish	Supplier
Aluminum	AN735DC()	MIL-C-5541, Class 3	QPL
Steel, Cadmium Plated	AN735DC()	MIL-C-5541, Class 3	QPL
Steel, Stainless	AN735C()	Passivated	QPL
Titanium	AN735C()	Passivated	QPL

B. General Conditions for Terminal Lug Installation - Configuration

These conditions are applicable:

- Tin plated copper terminal lugs must be used on aluminum structure
- Nickel plated terminal lugs must be used on steel and titanium structure
- When a clamp is used to attach a terminal lug to a metallic tube, the clamp must be tightened carefully to make sure that damage to the tube does not occur

A terminal lug of a ground wire must not make an interference with the operation of:

- A control surface that moves
- A shock mount the moves
- Other equipment that is attached to a fixed point that moves.

When more than one terminal lug is attached with one fastener to the basic structure, these conditions are applicable:

- The largest terminal lug must be adjacent to the structure
- The remaining terminal lugs must be in the sequence of the next largest size to the smallest size
- The terminal lugs must be even and symmetrical around the stud
- The terminal lugs must not make an interference with another part or a structure
- No more than 4 terminal lugs are permitted on one fastener with threads.

C. General Conditions for Terminal Lug Installation - Torque

I

For a size 10 or larger ground stud, the nut must be torqued; refer to Table 18.

For a size 8 or smaller ground stud:

- A lock washer must be tightened until it is fully compressed
- A self lock nut must be tightened until movement of connection hardware does not occur
- When the connection is tightened, the connection hardware must not be deformed or damaged
- Tightness must be checked only in the direction that the nut is tightened.

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**Table 18
GROUND STUD TERMINAL LUG INSTALLATION TORQUE VALUES**

Structure Material	Terminal Lug Material or Plating	Stud Size	Nut Type	Torque (inch-pound)			
				Minimum	Maximum		
Aluminum	All	10-32	Nut, Plain Electrical	35	40		
			Nut, Self Lock	28	35		
		1/4-28	Nut, Plain Electrical	85	105		
			Nut, Self Lock	65	70		
		5/16-24	Nut, Plain Electrical	150	180		
			Nut, Self Lock	135	145		
		3/8-24	Nut, Plain Electrical	230	280		
			Nut, Self Lock	180	200		
		1/2-20	Nut, Plain Electrical	500	720		
			Nut, Self Lock	480	520		
		Stainless Steel	Nickel	10-32	Nut, Self Lock	33	40
				1/4-28	Nut, Self Lock	90	105
5/16-24	Nut, Self Lock			170	200		
3/8-24	Nut, Self Lock			300	350		
1/2-20	Nut, Self Lock			730	840		
Titanium	Nickel	10-32	Nut, Self Lock	33	40		
		1/4-28	Nut, Self Lock	90	105		
		5/16-24	Nut, Self Lock	172	202		
		3/8-24	Nut, Self Lock	300	350		
		1/2-20	Nut, Self Lock	730	840		

D. Necessary Materials

I NOTE: The cure times and the tack free times that are specified in Table 19 are applicable for 77 degrees F \pm 5 degrees F and 50 percent relative humidity.

NOTE: The cure time and tack free time:

- Increase at lower temperature and lower humidity
- Decrease at higher temperature and higher humidity.

NOTE: A fuel vapor area is an area where fuel vapors are present.



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**Table 19
SEALANTS FOR GROUND STUD ASSEMBLIES**

Applicable Condition	Cure Time (Hours)	Tack Free Time (Hours)	Part Number	Supplier	Special Instructions
Fuel Tank	2	1	PR 1826 B-1/4	PRC-DeSoto International	Not applicable for clad aluminum
	3	2.5	PR 1826 B-1/2	PRC-DeSoto International	Not applicable for clad aluminum
	8	3	Proseal 860 B-1/6	PRC-DeSoto International	Not applicable for CRES or bare titanium
	48	24	BMS5-26 B-2 Type II	Boeing	-
			BMS5-45 B-2	Boeing	-
72	36	BMS5-26 A-2 Type II	Boeing	-	
Fuel Vapor	2	1	PR 1826 B-1/4	PRC-DeSoto International	Not applicable for clad aluminum
	3	2.5	PR 1826 B-1/2	PRC-DeSoto International	Not applicable for clad aluminum
	8	3	Proseal 860 B-1/6	PRC-DeSoto International	Not applicable for CRES or bare titanium
	20	10	BMS5-95 B-1/2	Boeing	-
	24	10	BMS5-142 B-1/2	Boeing	Not applicable for faying surfaces
			BMS5-37 B-2	Boeing	-
	48	24	BMS5-26 B-2 Type II	Boeing	-
			BMS5-45 B-2	Boeing	-
			BMS5-142 B-2	Boeing	Not applicable for faying surfaces
		36	BMS5-95 B-2	Boeing	-
72	36	BMS5-26 A-2 Type II	Boeing	-	

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Table 19 (continued)

Applicable Condition	Cure Time (Hours)	Tack Free Time (Hours)	Part Number	Supplier	Special Instructions
Other Areas	2	1	PR 1826 B-1/4	PRC-DeSoto International	Not applicable for clad aluminum
	3	2.5	PR 1826 B-1/2	PRC-DeSoto International	Not applicable for clad aluminum
	8	3	Proseal 860 B-1/6	PRC-DeSoto International	Not applicable for CRES or bare titanium
	20	10	BMS5-95 B-1/2	Boeing	-
	24	10	BMS5-142 B-1/2	Boeing	Not applicable for faying surfaces
			BMS5-37 B-2	Boeing	-
	48	24	BMS5-26 B-2 Type II	Boeing	-
			BMS5-45 B-2	Boeing	-
			BMS5-142 B-2	Boeing	Not applicable for faying surfaces
	36	36	BMS5-95 B-2	Boeing	-
72	36	BMS5-26 A-2 Type II	Boeing	-	

Table 20

APPROVED SUPPLIERS OF BOEING STANDARD SEALANTS

Part Number	Supplier
BMS5-26 A-2 Type II	Courtaulds Aerospace
BMS5-26 B-2 Type II	Courtaulds Aerospace
BMS5-37 B-2	PRC-DeSoto International
BMS5-45 B-2	Le Joint Francais
	PRC-DeSoto International
	Yokohama Rubber
BMS5-95 B-1/2	PRC-DeSoto International
BMS5-95 B-2	Le Joint Francais
	PRC-DeSoto International
	Yokohama Rubber
BMS5-142 B-1/2	PRC-DeSoto International
BMS5-142 B-2	PRC-DeSoto International

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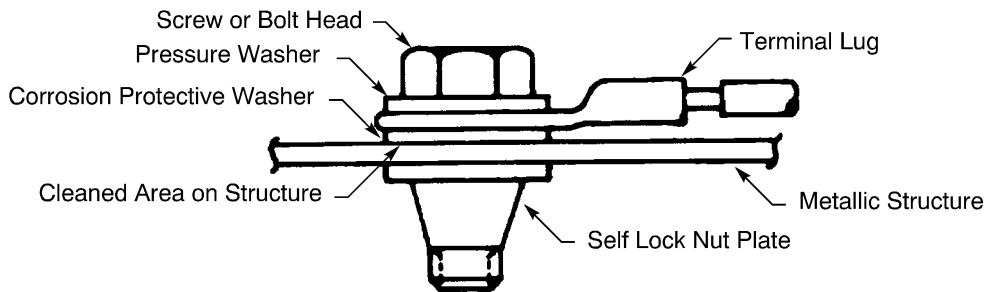
**Table 21
SOLVENTS**

Material	Specification	Supplier
Acetone	0-A-51	An available source
	ASTM D 329	An available source
Ethyl Alcohol, Denatured	AMS 3002	An available source
	ASTM E 1145 Type II	An available source
Alcohol, Isopropyl	TT-I-735 Grade A	An available source
	TT-I-735 Grade B	An available source
Naptha, Aliphatic	TT-N-95, Type II	An available source
Methyl Ethyl Ketone	ASTM D 740 Type I	An available source

E. Configurations of Terminal Lugs on a Ground Stud

Refer to:

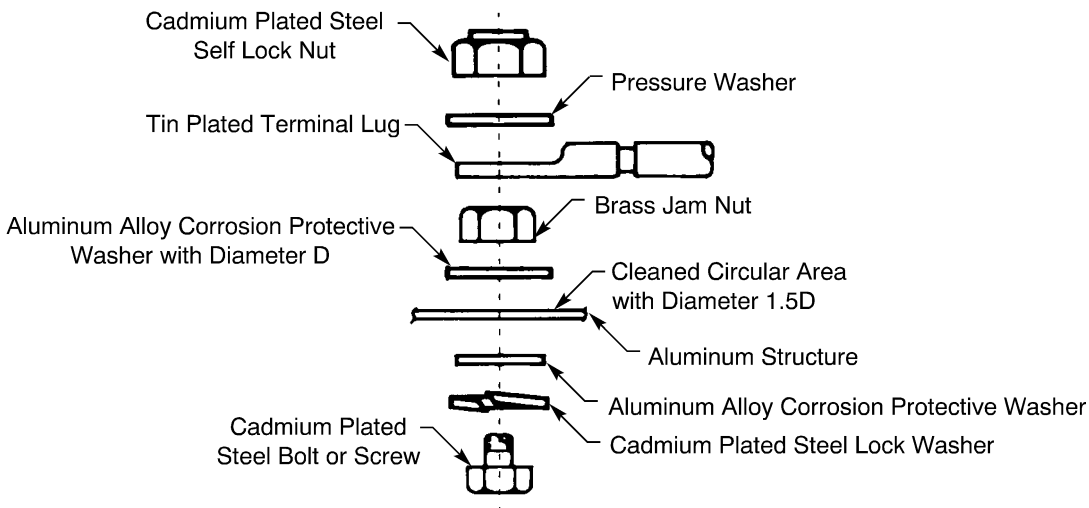
- Figure 3 for a nut plate ground stud ground assembly
- Figure 4 for a pre-installed ground stud ground assembly
- Figure 5 for a direct standard ground stud ground assembly
- Figure 6 for a BACS53B or MIL-T-83454/4 ground stud ground assembly
- Figure 7 for an equipment ground stud ground assembly
- Figure 8 for a direct standard dual ground stud ground assembly
- Figure 9 for a dual ground stud ground assembly
- Figure 10 for a clamp ground stud ground assembly.



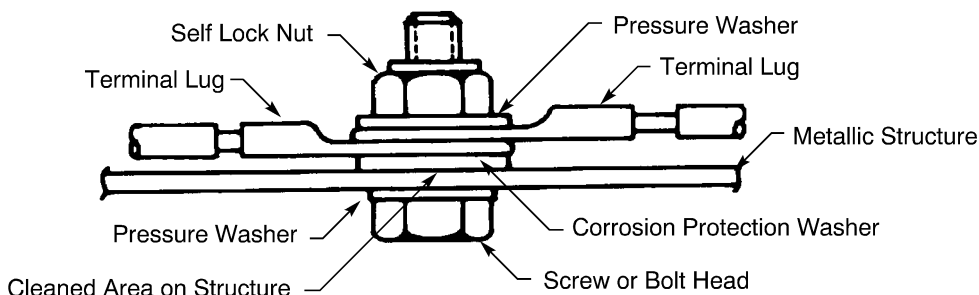
**CONFIGURATION OF A NUT PLATE GROUND STUD GROUND ASSEMBLY
Figure 3**

STANDARD WIRING PRACTICES MANUAL

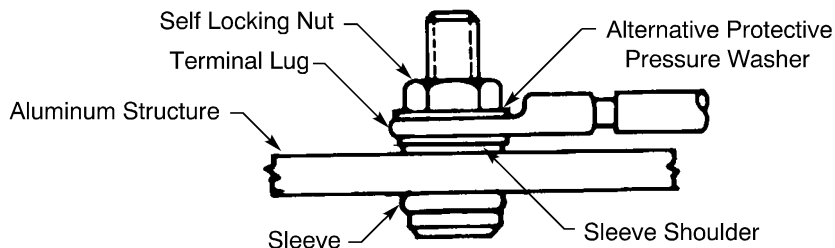
ELECTRICAL BONDS AND GROUNDS



CONFIGURATION OF A PRE-INSTALLED STANDARD GROUND STUD GROUND ASSEMBLY
Figure 4



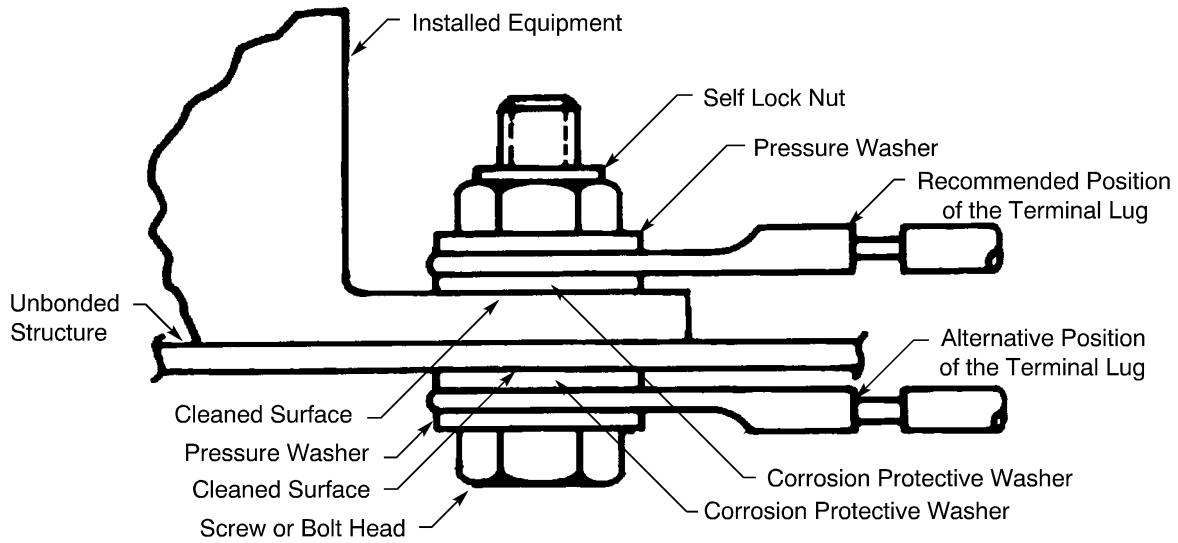
CONFIGURATION OF A DIRECT STANDARD GROUND STUD GROUND ASSEMBLY
Figure 5



CONFIGURATION OF A BACS53B OR MIL-T-83454/4 GROUND STUD GROUND ASSEMBLY
Figure 6

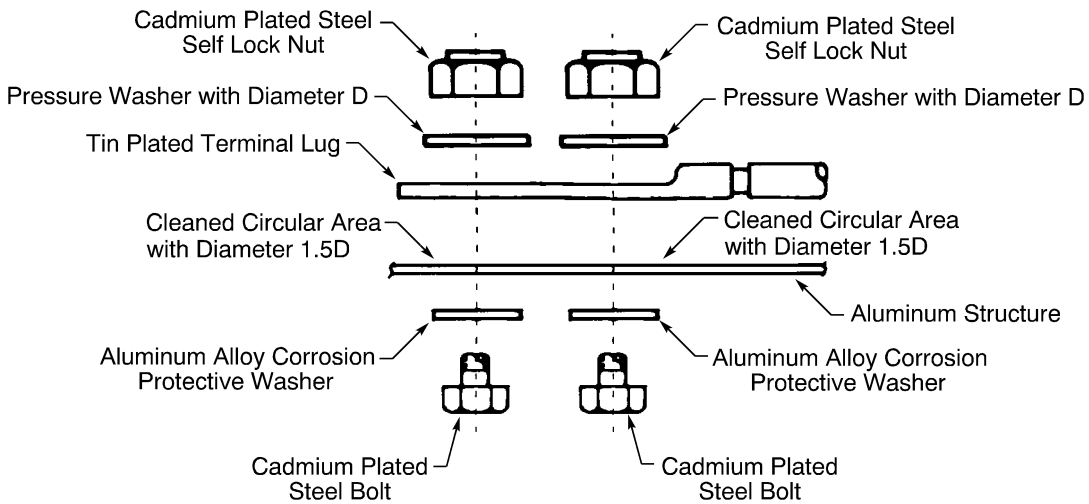
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CONFIGURATION OF AN EQUIPMENT GROUND STUD GROUND ASSEMBLY

Figure 7

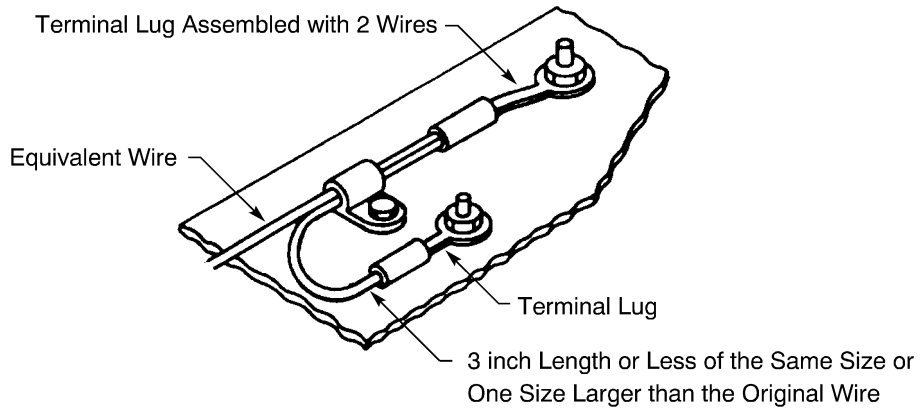


CONFIGURATION OF A DIRECT STANDARD DUAL GROUND STUD GROUND ASSEMBLY

Figure 8

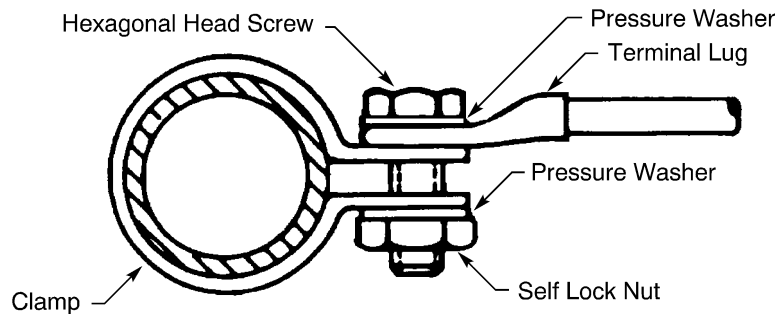
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ELECTRICAL BONDS AND GROUNDS



CONFIGURATION OF A DUAL GROUND STUD GROUND ASSEMBLY

Figure 9



CONFIGURATION OF A CLAMP GROUND STUD GROUND ASSEMBLY

Figure 10

F. Seal of a Ground Stud Ground Assembly

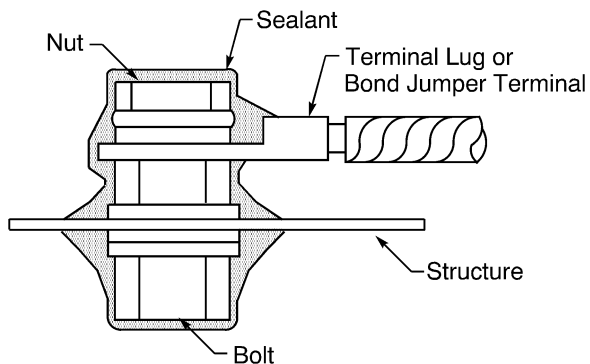
This paragraph gives the procedure to seal a ground stud ground assembly with the terminal lugs or the bond jumper terminals installed.

For the procedure to:

- Seal a ground stud assembly before the terminal lugs or the bond jumper terminals are installed, refer to Paragraph 3.G.
- Seal a sealed ground stud ground connection after the terminal lugs or the bond jumper terminals are installed, refer to Paragraph 3.H.

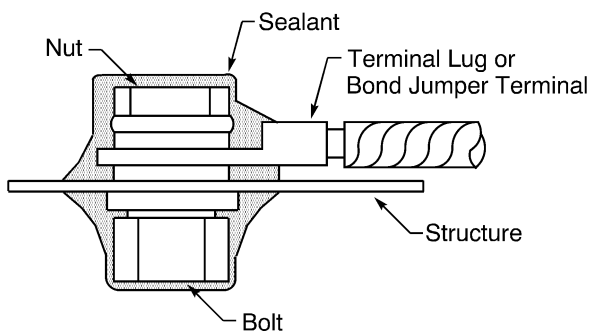
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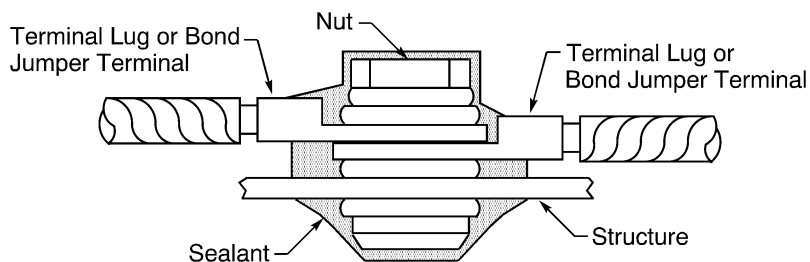
SEAL OF A PRE-INSTALLED GROUND STUD GROUND ASSEMBLY

Figure 11



SEAL OF A STANDARD GROUND STUD GROUND ASSEMBLY

Figure 12

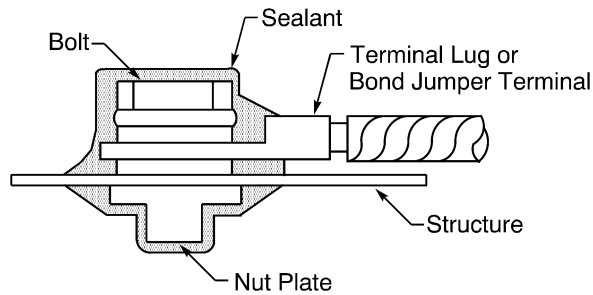


SEAL OF A BACS53B OR A MIL-T-83454 GROUND STUDS GROUND ASSEMBLY

Figure 13

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SEAL OF A NUT PLATE GROUND STUD GROUND ASSEMBLY

Figure 14

- I (1) Make a selection of a sealant from Table 19.
- I (2) Make a selection of a solvent from Table 21.
- (3) Make a selection of a tool to apply the sealant.
Make sure that the tool:
 - Can make a small fillet
 - Can make a smooth, continuous layer of sealant
 - Does not cause damage to the structure or the finish when the sealant is applied.
- (4) Remove the contamination with a clean cloth and solvent from these surfaces:
 - The outer surfaces of the ground stud ground assembly on each side of the structure and the terminal lug
 - A 1 inch minimum area around the ground assembly on each side of the structure.

CAUTION: THE SURFACES THAT THE SEALANT IS APPLIED ON MUST BE CLEAN. A CONTAMINATION ON A SURFACE CAN CAUSE AN UNSATISFACTORY BOND BETWEEN THE SEALANT AND THE SURFACE.

- (5) Let the area dry.

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(6) Apply a continuous layer of sealant on:

- The ground stud ground assembly hardware on each side of the structure
- The tongue and the forward end of the crimp barrel of the terminal lug.

For the seal of:

- A pre-installed ground stud ground assembly, refer to Figure 11
- A standard ground stud ground assembly, refer to Figure 12
- A BACS53B or a MIL-T-83454 ground stud ground assembly, refer to Figure 13
- A nut plate ground stud ground assembly, refer to Figure 14.

Make sure that the layer of sealant:

- Is a small fillet
- Is smooth and continuous
- Does not have air bubbles or voids
- Does not have contamination in it.

(7) Let the sealant fully cure.

NOTE: The full cure of a sealant is recommended, but the sealant is serviceable when:

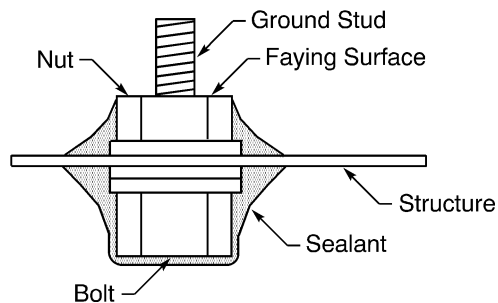
- It is tack free
- It is in an area where wind shear does not occur.

G. Seal of a Ground Stud Assembly Before the Electrical Connection

This paragraph gives the procedure to seal these ground stud assemblies before the terminal lugs or the bond jumper terminals are installed:

- A pre-installed ground stud
- A BACS53B ground stud
- A MIL-T-83454 ground stud.

After the terminal lugs or the bond jumper terminals are installed, the ground stud ground assembly must be sealed. Refer to Paragraph 3.H.

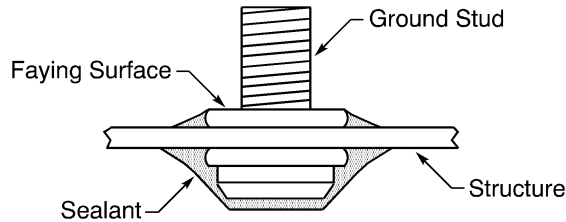


SEAL OF A PRE-INSTALLED GROUND STUD ASSEMBLY

Figure 15

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SEAL OF A BACS53B OR A MIL-T-83454 GROUND STUD ASSEMBLY
Figure 16

- I (1) Make a selection of a sealant from Table 19.
- I (2) Make a selection of a solvent from Table 21.
- (3) Make a selection of a tool to apply the sealant.
 Make sure that the tool:
 - Can make a small fillet
 - Can make a smooth, continuous layer of sealant
 - Does not cause damage to the structure or the finish when the sealant is applied.
- (4) Remove the contamination with a clean cloth and solvent from these surfaces:
 - The outer surfaces of the ground stud assembly on each side of the structure
 - A 1 inch minimum area around the ground assembly on each side of the structure.

CAUTION: THE SURFACES THAT THE SEALANT IS APPLIED ON MUST BE CLEAN. A CONTAMINATION ON A SURFACE CAN CAUSE AN UNSATISFACTORY BOND BETWEEN THE SEALANT AND THE SURFACE.

- (5) Let the area dry.
- (6) Apply a continuous layer of sealant on the ground stud assembly on each side of the structure.
 For the seal of:
 - A pre-installed ground stud assembly, refer to Figure 15
 - A BACS53B or a MIL-T-83454 ground stud assembly, refer to Figure 16.

Make sure that the sealant:

- Is a small fillet
- Is smooth and continuous
- Does not have air bubbles or voids
- Does not have contamination in it
- Does not touch the faying surfaces of the ground stud components or the terminal lug.

CAUTION: SEALANT ON THE FAYING SURFACES CAN CAUSE UNSATISFACTORY RESISTANCE OF THE GROUND ASSEMBLY.

- (7) If sealant touches a faying surface:
 - (a) Remove all contamination from the faying surface with a clean cloth and naphtha or an equivalent solvent.
 - (b) Let the surface dry.
 - (c) If the sealant must be applied again, do Step (6) again.

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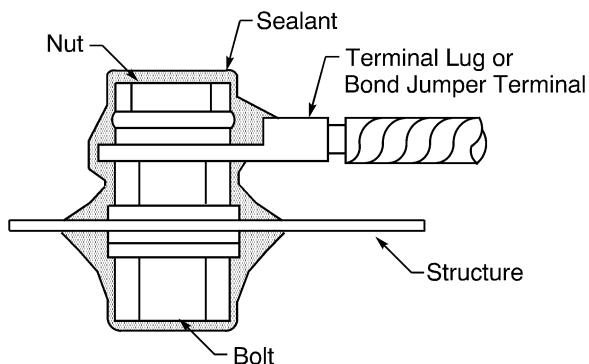
(8) Let the sealant cure.

NOTE: The full cure of a sealant is recommended, but the sealant is serviceable when:

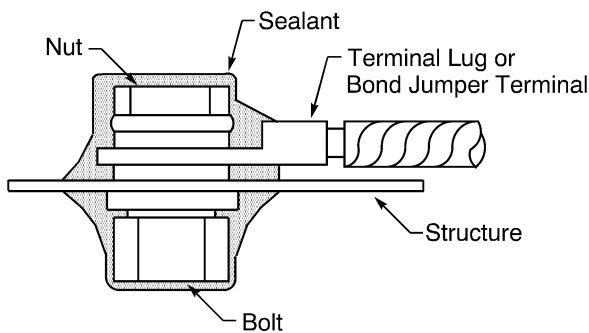
- It is tack free
- It is in an area where wind shear does not occur.

H. Seal of a Ground Stud Ground Assembly After the Electrical Connection

This paragraph gives the procedure to seal a sealed ground stud ground assembly after the terminal lugs or the bond jumper terminals are installed.



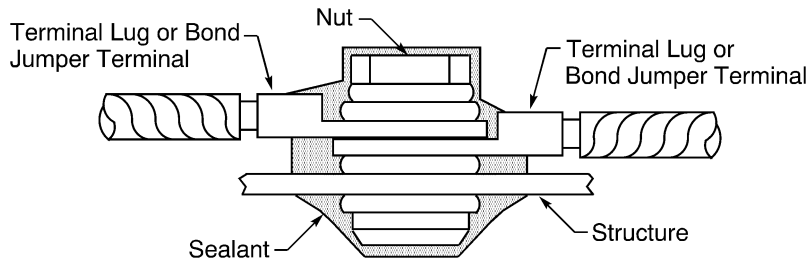
SEAL OF A PRE-INSTALLED GROUND STUD GROUND ASSEMBLY
Figure 17



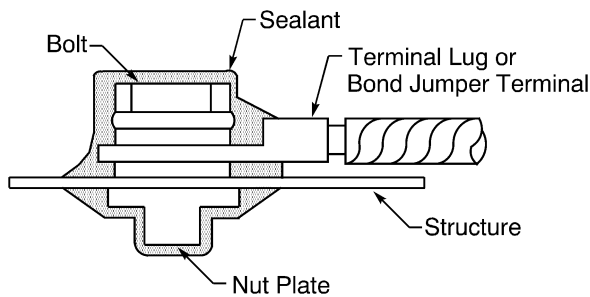
SEAL OF A STANDARD GROUND STUD GROUND ASSEMBLY
Figure 18

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SEAL OF A BACS53B OR A MIL-T-83454 GROUND STUD GROUND ASSEMBLY
Figure 19



SEAL OF A NUT PLATE GROUND STUD GROUND ASSEMBLY
Figure 20

- I (1) Make a selection of a sealant from Table 19.
 - I (2) Make a selection of a solvent from Table 21.
 - (3) Make a selection of a tool to apply the sealant.
 Make sure that the tool:
 - Can make a small fillet
 - Can make a smooth, continuous layer of sealant
 - Does not cause damage to the structure or the finish when the sealant is applied.
 - (4) Remove the contamination with a clean cloth and solvent from these surfaces:
 - The outer surfaces of the ground stud ground assembly on each side of the structure and the terminal lug
 - A 1 inch minimum area around the ground assembly on each side of the structure.
- CAUTION:** THE SURFACES THAT THE SEALANT IS APPLIED ON MUST BE CLEAN. A CONTAMINATION ON A SURFACE CAN CAUSE AN UNSATISFACTORY BOND BETWEEN THE SEALANT AND THE SURFACE.
- (5) Let the area dry.

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(6) Apply a continuous layer of sealant on:

- The surface of the ground stud ground assembly without sealant
- The tongue and the forward end of the crimp barrel of the terminal lug.

For the seal of:

- A pre-installed ground stud ground assembly, refer to Figure 11
- A standard ground stud ground assembly, refer to Figure 12
- A BACS53B or a MIL-T-83454 ground stud ground assembly, refer to Figure 13
- A nut plate ground stud ground assembly, refer to Figure 14.

Make sure that the sealant:

- Is a small fillet
- Is smooth and continuous
- Does not have air bubbles or voids
- Does not have contamination in it
- Makes an overlap with the sealant that was applied on the other ground stud components.

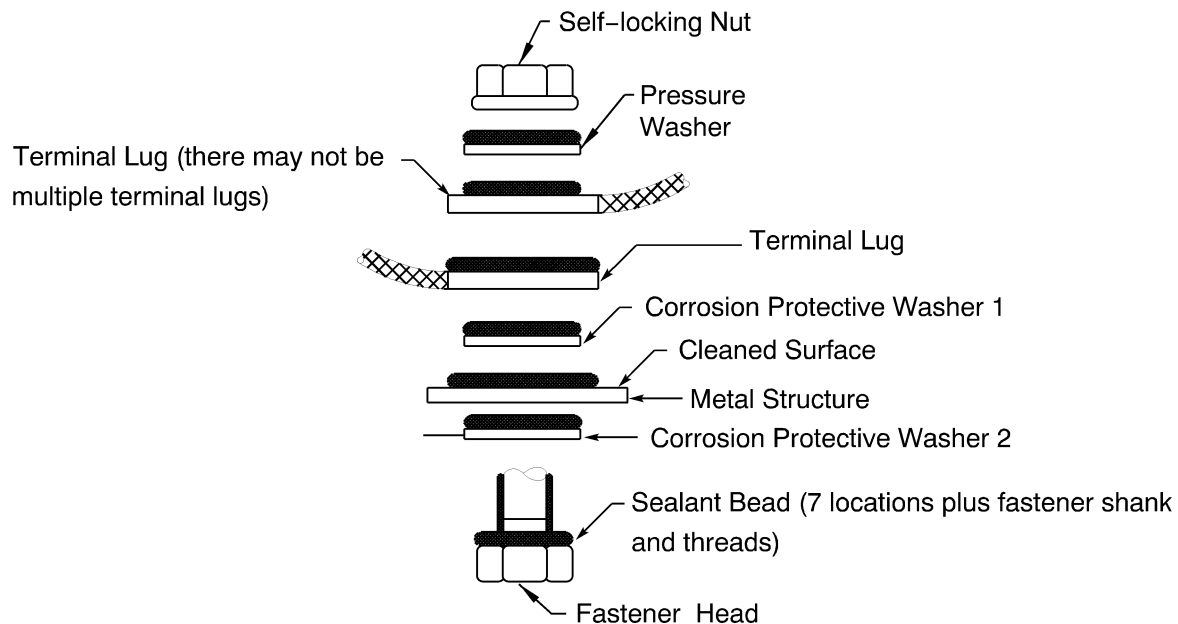
(7) Let the sealant cure.

NOTE: The full cure of a sealant is recommended, but the sealant is serviceable when:

- It is tack free
- It is in an area where wind shear does not occur.

I. Category 2 Fay Sealed Direct Standard Ground Stud Installation

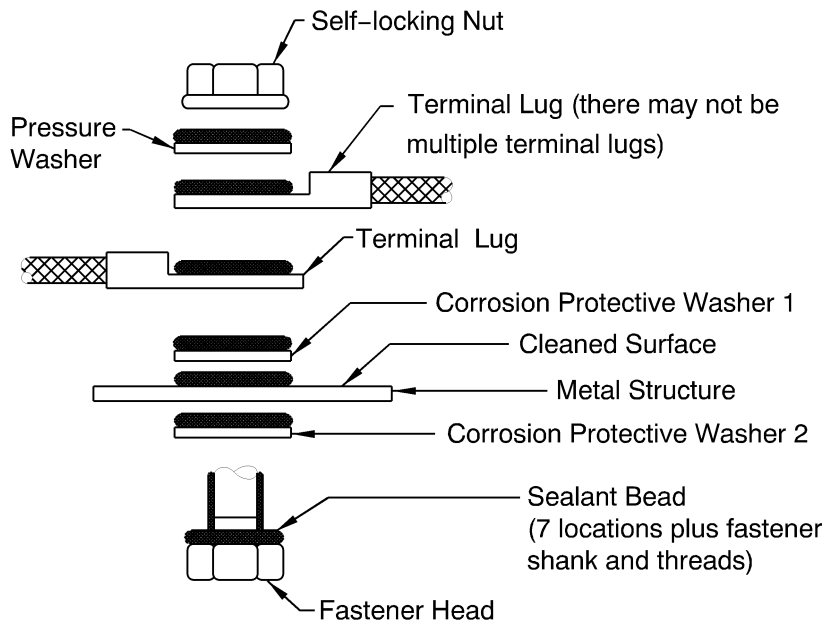
This paragraph gives the procedure to seal a ground stud assembly while the terminal lugs are being installed.



**BACJ40C,D,E JUMPER ASSEMBLY CATEGORY 2 FAY SEALED DIRECT STANDARD GROUND STUD
INSTALLATION
Figure 21**

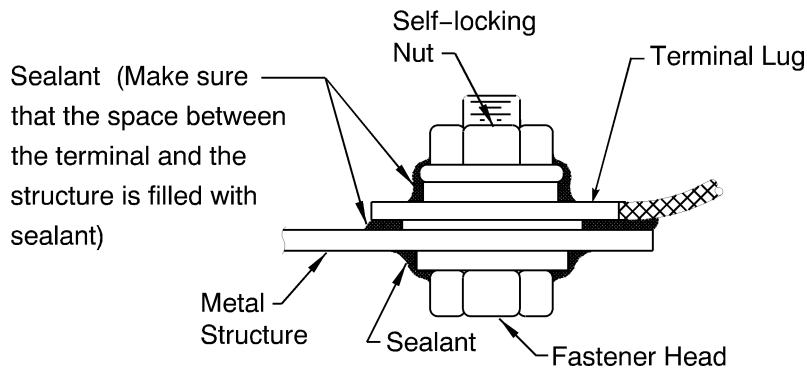
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BACJ40A,AB,AC,AD,K JUMPER ASSEMBLY CATEGORY 2 FAY SEALED DIRECT STANDARD GROUND STUD INSTALLATION

Figure 22

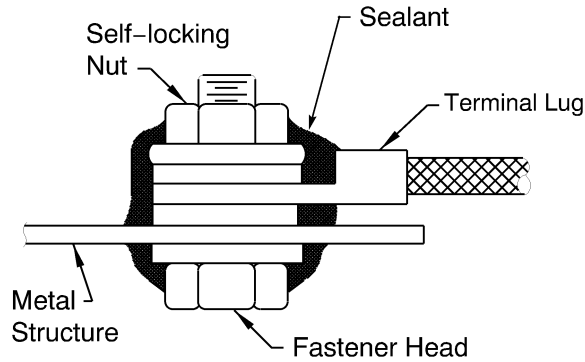


COMPLETED BACJ40C,D,E JUMPER ASSEMBLY CATEGORY 2 FAY SEALED DIRECT STANDARD GROUND STUD INSTALLATION

Figure 23

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS



COMPLETED BACJ40A,AB,AC,AD,K JUMPER ASSEMBLY CATEGORY 2 FAY SEALED DIRECT STANDARD GROUND STUD INSTALLATION

Figure 24

**Table 22
SURFACE CLEANING METHODS FOR CATEGORY 2 FAY SEALED DIRECT STANDARD GROUND STUD INSTALLATION**

Bonding Surface		Cleaning Method	
Material	Finish	Description	Reference
Aluminum Alloy	Anodized	Abrasive Cleaning	Paragraph 2.A.
			Paragraph 2.B.
			Paragraph 2.C.
	Bare with or without grease, oil, CIC, oxide film contamination or other contaminants	Abrasive Cleaning	Paragraph 2.A.
			Paragraph 2.B.
			Paragraph 2.C.
	Chemical Conversion Coating	Abrasive Cleaning	Paragraph 2.A.
			Paragraph 2.B.
			Paragraph 2.C.
	Paint, Primer, or Enamel	Abrasive Cleaning	Paragraph 2.A.
			Paragraph 2.B.
			Paragraph 2.C.
Clad Aluminum Alloy	Bare with or without grease, oil, CIC, or other contaminants	Solvent Cleaning	Paragraph 2.E.

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Table 22 (continued)

Bonding Surface		Cleaning Method	
Material	Finish	Description	Reference
Stainless Steel	Bare with or without grease, oil, CIC, or other contaminants	Solvent Cleaning	Paragraph 2.E.
	Paint, Primer, or Enamel	Abrasive Cleaning	Paragraph 2.A.
			Paragraph 2.C.
Cadmium plating with or without grease, oil, CIC, or other contaminants	Solvent Cleaning	Paragraph 2.E.	
Titanium	Bare with or without grease, oil, CIC, or other contaminants	Solvent Cleaning	Paragraph 2.E.
	Paint, Primer, or Enamel	Abrasive Cleaning	Paragraph 2.A.
			Paragraph 2.C.

- (1) Make a selection of a surface cleaning method. Refer to Table 22.
- (2) Clean the faying surface of the structure that touches Corrosion Protective Washer 1. Refer to Figure 21, Figure 22, and Table 22.
- (3) Clean these components using solvent. Refer to Paragraph 2.E., Figure 21 and Figure 22:
 - The faying surface of the structure
 - Corrosion Protective Washer 1
 - Terminal Lug or Terminal Lugs.

CAUTION: REMOVAL OF PLATING ON THE TERMINALS CAN CAUSE AN UNSATISFACTORY ELECTRICAL BOND.

CAUTION: USING THE WRONG PARTS CAN CAUSE AN UNSATISFACTORY ELECTRICAL BOND.

Table 23
SEALANT FOR FAY SEALED DIRECT STANDARD GROUND STUD INSTALLATION

Applicable Condition	Cure Time (Hours)	Tack Free Time (Hours)	Squeeze-Out Life (Hours)	Part Number	Supplier
Fuel Tank Areas	48	24	6	P/S 890 B-2 AMS-S-8802	PRC-Desoto International
	48	24	6	PR-1440 B-2 AMS-S-8802	PRC-Desoto International
Non-Fuel Tank Areas	48	36	6	BMS5-95 B-2	Boeing

- (4) Make a selection of a sealant that is applicable for the area the Ground Stud is located in. Refer to Table 23.
- (5) Make a selection of a tool to apply the sealant.

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Make sure that the tool:

- Can make a small fillet
- Can make a smooth, continuous layer of sealant
- Does not cause damage to the structure or the finish when the sealant is applied.

(6) Apply a continuous layer of sealant to the fastener threads, fastener head, and the fastener shank. Refer to Figure 21 and Figure 22.

(7) Apply a sealant bead to the following components:

- Corrosion Protective Washer 2
- The cleaned surface of the structure
- Corrosion Protective Washer 1
- Terminal or Terminals
- Pressure Washer

Refer to Figure 21 and Figure 22.

NOTE: It is necessary to apply the sealant on the surface of one component of two adjacent components.

NOTE: It is satisfactory to apply the sealant to the parts with a brush. Make sure that a uniform coat of sealant covers the mating surface.

CAUTION: THE SEALANT MUST HAVE SUFFICIENT THICKNESS TO FILL THE SPACE BETWEEN THE TERMINAL LUG AND THE STRUCTURE. EMPTY SPACES BETWEEN THE TERMINAL LUG AND THE STRUCTURE THAT ARE NOT FILLED WITH SEALANT CAN CAUSE AN UNSATISFACTORY ELECTRICAL BOND.

(8) Put the threads of the Fastener through the Corrosion Protective Washer 2.

(9) Put the threads of the Fastener through the hole in the structure.

(10) Put the remaining parts on the assembly in this order:

- Corrosion Protective Washer 1
- Terminal or Terminals
- Pressure Washer
- Self Locking Nut

Refer to Figure 21 and Figure 22.

(11) Torque the self locking nut with a manual torque wrench. Refer to Table 18.

Make sure that:

- The torque is applied before the end of the squeeze-out life of the sealant. Refer to Table 23
- You see the sealant come out from between each component of the assembly when the self-locking nut is tightened
- There are no empty spaces between the terminal lug and the structure
- The sealant is continuous around each component.

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CAUTION: FAILURE TO APPLY THE TORQUE BEFORE THE END OF THE SQUEEZE-OUT LIFE OF THE SEALANT CAN CAUSE AN UNSATISFACTORY ELECTRICAL BOND.

CAUTION: FAILURE TO SEE THE SEALANT COME OUT FROM BETWEEN EACH COMPONENT CAN CAUSE AN UNSATISFACTORY ELECTRICAL BOND.

NOTE: It is satisfactory to use a power tool to apply 75[pct] of the torque value followed by the use of a manual torque tool to apply the final torque value.

NOTE: If the terminal or jumper rotates when applying torque to the self-locking nut, hold the self-locking nut with a wrench and apply torque to the fastener head. Refer to Table 24.

**Table 24
FASTENER HEAD TORQUE VALUES**

Stud Size	Structure Material	Torque (inch pounds)	
		Minimum	Maximum
10-32 (3/16)	Aluminum	32	38
	Stainless Steel or Titanium	35	45
1/4-28	Aluminum	63	77
	Stainless Steel or Titanium	95	115
5/16-24	Aluminum	130	160
	Stainless Steel or Titanium	180	220
3/8-24	Aluminum	180	220
	Stainless Steel or Titanium	315	385
1/2-20	Aluminum	470	570
	Stainless Steel or Titanium	755	925

(12) Smooth out the sealant using a brush or clean wiper. Refer to Figure 23 and Figure 24.

Make sure that:

- The sealant is continuous around each component
- There are no empty spaces between the terminal lug and the structure
- The sealant makes a seal around each component.

(13) Do a test of the electrical resistance between the terminal lug and the structure. Refer to Paragraph 15.A.

(14) If the measured electrical resistance is more than the specified maximum resistance in Table 39:

- (a) Disassemble the components and do Step (b) and Step (d) or Step (c) and Step (d).
- (b) Clean the components with solvent. Refer to Paragraph 2.E.
- (c) Discard the components and get new components.
- (d) Do Step (1) through Step (13) again.

(15) If the area adjacent to the ground stud has bare metal, replace the surface finish on the bare metal. Refer to Paragraph 1.F.

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4. BONDING OF CIRCULAR RECEPTACLE CONNECTORS IN AN UNPRESSURIZED AREA

This paragraph gives the procedures to make an electrical bond between a receptacle connector and the airplane structure or a bracket.

A. General Conditions

An electrical bond of a receptacle and the installation surface is necessary when the bond is specified for the connector in the WDM 91-05-05.

The bond must be assembled again if the connector is specified in the WDM 91-05-05 and any of these conditions occur:

- The wire harness is replaced
- The connector is repaired or replaced
- The specified bond has an electrical resistance that is greater than the maximum permitted resistance.

Refer to:

- Paragraph 15.D. for the maximum resistance values
- Paragraph 16.H. for the test procedure for the bond.

B. Surface Preparation.

**Table 25
FAYING SURFACE PREPARATION**

Installation Surface	Preparation Procedure	Reference
Aluminum, Alodine Finish	Cleaning Procedure 5 with BMS 11-7 Solvent or Isopropyl Alcohol	Paragraph 2.E.
Aluminum, alodine finish with damage	Any Abrasive Cleaning Procedure	Table 26
	Layer of Alodine 600 on the installation surface	SOPM 20-43-03
Aluminum, Bare	Any Abrasive Cleaning Procedure	Table 26
	Layer of Alodine 600 on the installation surface	SOPM 20-43-03
Aluminum, non-alodine finish	Any Abrasive Cleaning Procedure	Table 26
	Layer of Alodine 600 on the installation surface	SOPM 20-43-03
Composite, Nickel Plated	Cleaning Procedure 5 with BMS 11-7 Solvent or Isopropyl Alcohol	Paragraph 2.E.
Steel, Bare	Cleaning Procedure 5 with BMS 11-7 Solvent or Isopropyl Alcohol	Paragraph 2.E.
Titanium, Bare	Cleaning Procedure 5 with BMS 11-7 Solvent or Isopropyl Alcohol	Paragraph 2.E.

**Table 26
ABRASIVE CLEANING PROCEDURES**

Cleaning Procedure	Reference
Cleaning Procedure 1 - Abrasives Applied Manually	Paragraph 2.A.
Cleaning Procedure 2 - Stainless Steel, Rotary Bonding Brush	Paragraph 2.B.

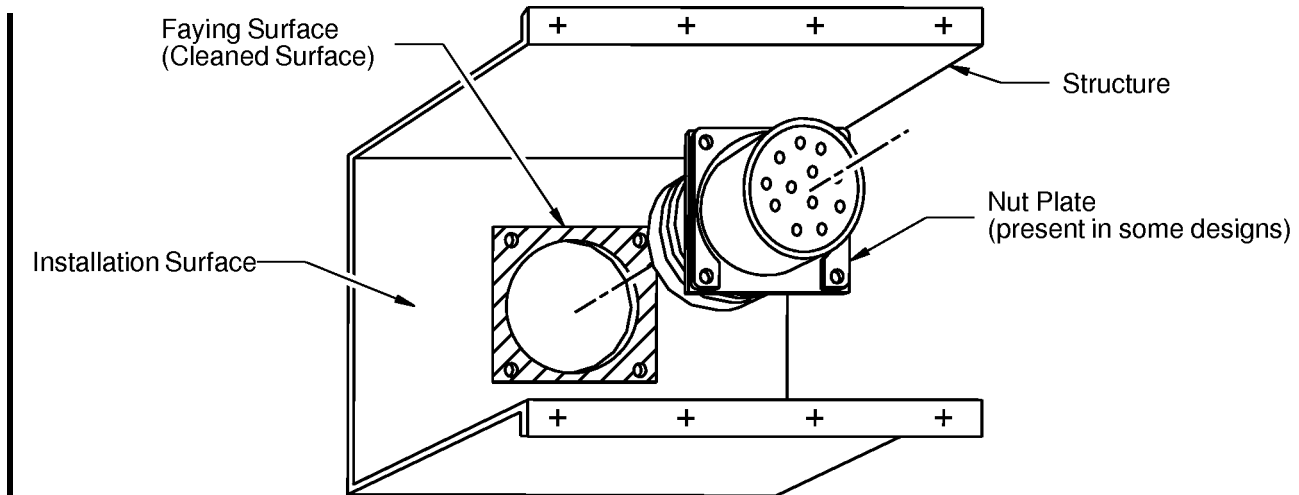
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Table 26 (continued)

Cleaning Procedure	Reference
Cleaning Procedure 3 - Rotary Abrasive Disc	Paragraph 2.C.



INSTALLATION SURFACE PREPARATION FOR THE BONDING OF CIRCULAR CONNECTOR RECEPTACLES

Figure 25

(1) To prepare the faying surface:

(a) Clean the faying surface of the structure.

Refer to:

- Table 25 for the procedure to clean the faying surface
- Figure 25 for the area to clean.

Make sure that the area where the receptacle flange touches the structure is clean.

(b) For an aluminum faying surfaces that are cleaned using Paragraph 2.A., apply Alodine to the faying surface.

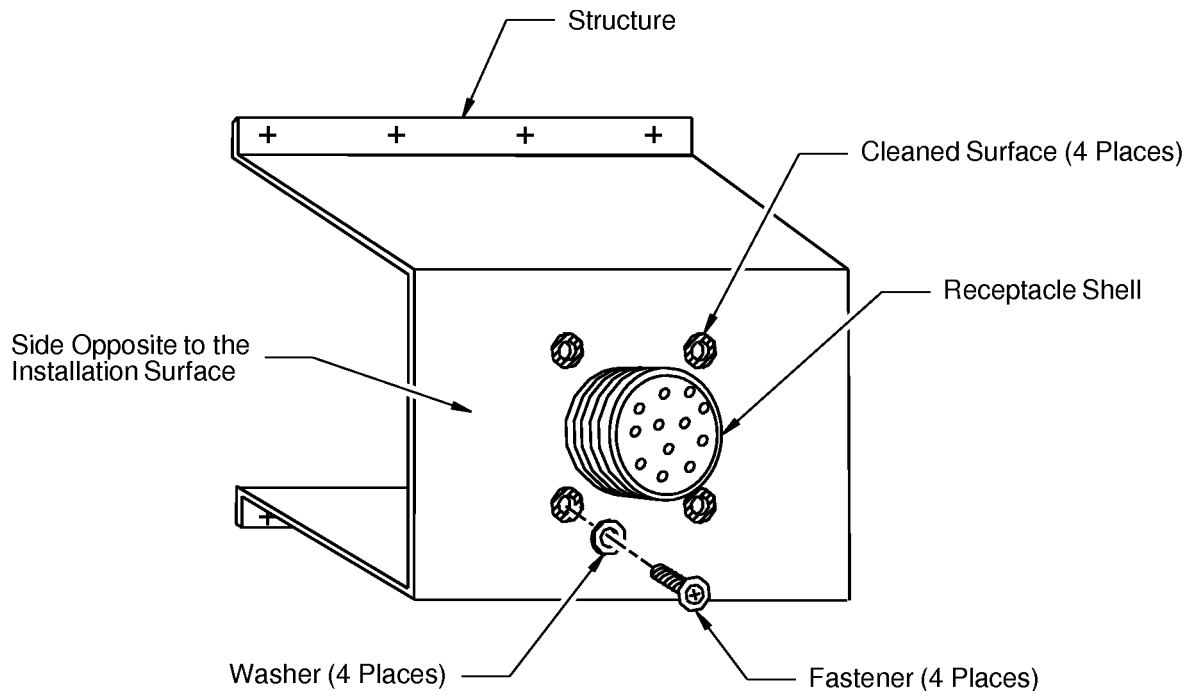
(2) Clean the surface that is under the fastener head and washer.

Refer to:

- Table 25 for the procedure to clean the faying surface
- Figure 26 for the area to clean.

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OPPOSITE SIDE SURFACE PREPARATION FOR THE BONDING OF CIRCULAR RECEPTACLE CONNECTORS

Figure 26

- (a) If the surface is masked, remove the mask.
- (b) For aluminum and steel structure, use the cleaning procedure specified in Paragraph 2.A.. Make sure that the area covered by the fastener head and the washer is clean.

CAUTION: DO NOT APPLY ALODINE TO ALUMINUM SURFACE AREA BELOW THE FASTENER HEAD AND WASHER. THESE AREAS ARE TO STAY BARE ALUMINUM.

- (c) For nickel plated composite structure, prepare the faying surface with the cleaning procedure specified in Paragraph 2.E.. Make sure that the area below the fastener heads and washers is clean.
- (3) Clean both sides of the receptacle. Refer to Paragraph 2.E..

C. Receptacle Installation

NOTE: INSTALLATION OF THE RECEPTACLE MUST BE DONE WITHIN 24 HOURS OF SURFACE PREPARATION AND CLEANING. REFER TO PARAGRAPH 4.B. IF INSTALLATION IS NOT DONE WITHIN 24 HOURS, THE SURFACE MUST BE PREPARED AND CLEANED AGAIN.

- (1) Put a washer on each of the four screws. Refer to Figure 26.
- (2) To attach the receptacle with lock nuts:
 - (a) Align the mounting holes of the receptacle flange and the installation surface.
 - (b) Install each screw from the side opposite to the receptacle flange.
 - (c) Put a washer and a lock nut on each screw.

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- (d) Tighten each nut until the nut and washer are against the surface of the receptacle flange.
 - (e) Tighten each nut a small amount until the faying surface of the receptacle flange is fully flat against the installation surface.
 - (f) Torque each nut on size 4 fasteners 8 to 15 inch-pounds.
 - (g) Torque each nut on size 6 fasteners 12 to 15 inch-pounds.
 - (h) For the torque values of different size fasteners, refer to SOPM 20-50-01.
- (3) To attach the receptacle with a nut plate:
- (a) Put the nut plate on the receptacle flange.
 - (b) Align the mounting holes of the nut plate, the receptacle flange, and the installation surface.
 - (c) From the side opposite to the receptacle flange, engage the threads of the fasteners and the threads of the nut plate.
 - (d) Tighten each fastener a small amount until the faying surface of the receptacle flange is fully flat against the installation surface.
 - (e) Torque each nut on size 4 fasteners 8 to 15 inch-pounds.
 - (f) Torque each nut on size 6 fasteners 12 to 15 inch-pounds.
 - (g) For the torque values of different size fasteners, refer to SOPM 20-50-01.
- (4) Do the test of the electrical bond.

Refer to:

- Paragraph 15.D. for the maximum resistance value
- Paragraph 16.H. for the test procedure.

D. Sealing of a Receptacle Assembly

NOTE: The cure times and tack free times given in Table 27 are applicable for 77degrees \pm 5degrees F and 50% Relative Humidity.

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NOTE: The cure time and tack free time:

- Increase at lower temperature and lower humidity
- Decrease at higher temperature and higher humidity.

CAUTION: THE SEALING OF THE RECEPTACLE ASSEMBLY MUST BE DONE WITHIN 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH. SEALING THE ASSEMBLY AFTER 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE SEAL.

**Table 27
SEALANTS FOR ELECTRICALLY BONDED RECEPTACLE CONNECTORS**

Applicable Condition	Cure Time (Hours)	Tack Free Time (Hours)	Part Number	Supplier	Special Instructions
Fuel Tank	2	1	PR 1826 B-1/4	PRC-DeSoto International	Not applicable for clad aluminum
	3	2.5	PR 1826 B-1/2	PRC-DeSoto International	Not applicable for clad aluminum
	8	3	Proseal 860 B-1/6	PRC-DeSoto International	Not applicable for CRES or bare titanium
	48	24	BMS5-26 B-2 Type II	Boeing	-
			BMS5-45 B-2	Boeing	-
72	36	BMS5-26 A-2 Type II	Boeing	-	
Fuel Vapor	2	1	PR 1826 B-1/4	PRC-DeSoto International	Not applicable for clad aluminum
	3	2.5	PR 1826 B-1/2	PRC-DeSoto International	Not applicable for clad aluminum
	8	3	Proseal 860 B-1/6	PRC-DeSoto International	Not applicable for CRES or bare titanium
	20	10	BMS5-95 B-1/2	Boeing	-
	24	10	BMS5-142 B-1/2	Boeing	Not applicable for faying surfaces
			BMS5-37 B-2	Boeing	-
	48	24	BMS5-26 B-2 Type II	Boeing	-
			BMS5-45 B-2	Boeing	-
			BMS5-142 B-2	Boeing	Not applicable for faying surfaces
	72	36	BMS5-95 B-2	Boeing	-
BMS5-26 A-2 Type II			Boeing	-	

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Table 27 (continued)

Applicable Condition	Cure Time (Hours)	Tack Free Time (Hours)	Part Number	Supplier	Special Instructions
Other Areas	2	1	PR 1826 B-1/4	PRC-DeSoto International	Not applicable for clad aluminum
	3	2.5	PR 1826 B-1/2	PRC-DeSoto International	Not applicable for clad aluminum
	8	3	Proseal 860 B-1/6	PRC-DeSoto International	Not applicable for CRES or bare titanium
	20	10	BMS5-95 B-1/2	Boeing	-
	24	10	BMS5-142 B-1/2	Boeing	Not applicable for faying surfaces
			BMS5-37 B-2	Boeing	-
	48	24	BMS5-26 B-2 Type II	Boeing	-
			BMS5-45 B-2	Boeing	-
			BMS5-142 B-2	Boeing	Not applicable for faying surfaces
		36	BMS5-95 B-2	Boeing	-
72	36	BMS5-26 A-2 Type II	Boeing	-	

Table 28

APPROVED SUPPLIERS OF BOEING STANDARD SEALANTS

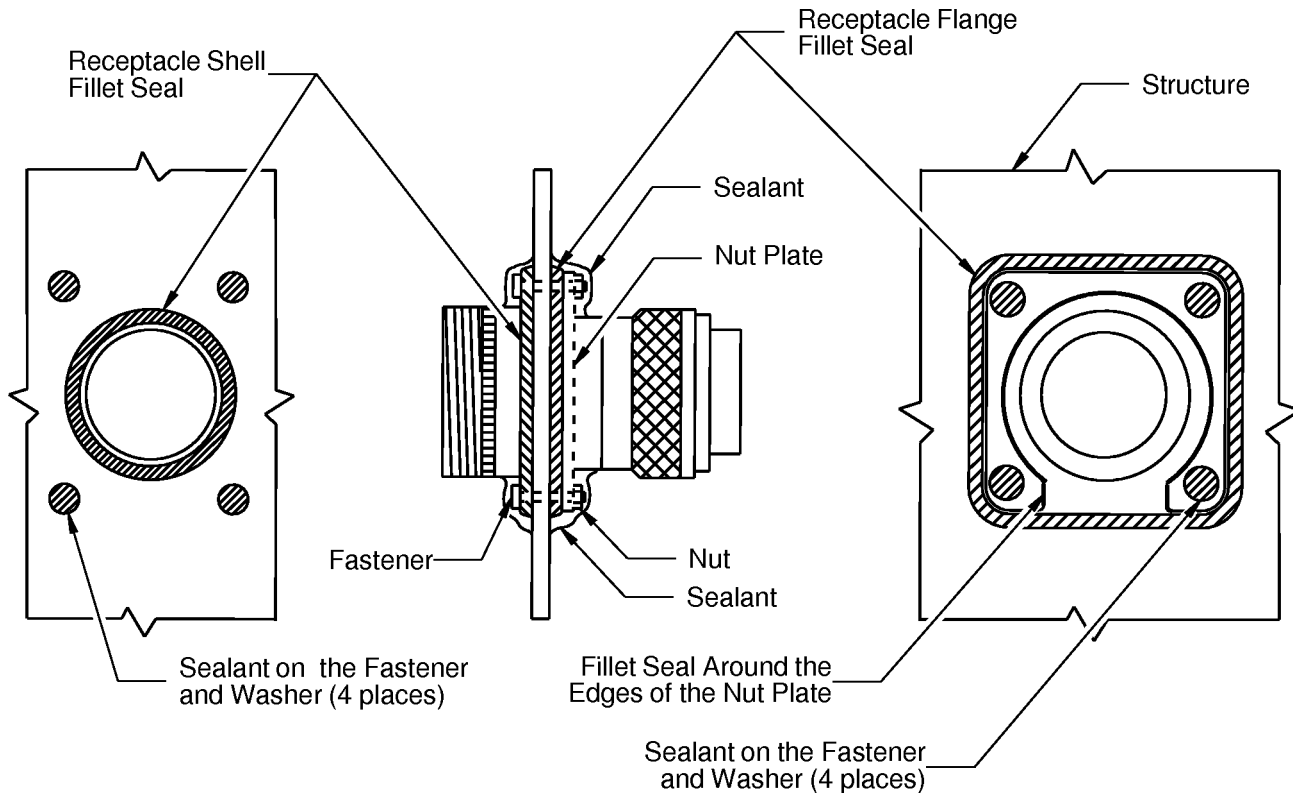
Part Number	Supplier
BMS5-26 A-2 Type II	Courtaulds Aerospace
BMS5-26 B-2 Type II	Courtaulds Aerospace
BMS5-37 B-2	PRC-DeSoto International
BMS5-45 B-2	Le Joint Francais
	PRC-DeSoto International
	Yokohama Rubber
BMS5-95 B-1/2	PRC-DeSoto International
BMS5-95 B-2	Le Joint Francais
	PRC-DeSoto International
	Yokohama Rubber
BMS5-142 B-1/2	PRC-DeSoto International
BMS5-142 B-2	PRC-DeSoto International

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**Table 29
FINISH MATERIALS**

Description	Specification	Supplier
Chemical Conversion Coating	Alodine 600	Henkel
		Nihon Parkerizing



**SEALING A RECEPTACLE CONNECTOR BOND IN AN UNPRESSURIZED AREA
Figure 27**

- I (1) Make a selection of a sealant from Table 27.

I **NOTE:** THE CURE TIMES AND TACK FREE TIMES GIVEN IN TABLE 27 ARE APPLICABLE FOR
I 77degrees ± 5degrees F AND 50% RELATIVE HUMIDITY.

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NOTE: The cure time and tack free time:

- Increase at lower temperature and lower humidity
- Decrease at higher temperature and higher humidity.

(2) Apply a fillet seal to the following areas shown in Figure 27.

- The area around the receptacle flange
- The area around the receptacle shell
- If a nut ring is used, apply a fillet seal around all edges of the nut ring flange
- The fastener, washer, and installation surface joints.

NOTE: IT IS PERMITTED TO SEAL THE FASTENER HEADS AND WASHERS.

NOTE: IT IS PERMITTED TO SEAL THE NUT RING FLANGE, NUTS, WASHERS, AND CONNECTOR RECEPTACLE BARREL WITH SEALANT. REFER TO FIGURE 27. SEALANT ON THE BACKSHELL COUPLING NUT IS PERMITTED. DO NOT APPLY SEALANT TO THE KNURLED AREA OF THE BACKSHELL COUPLING NUT.

CAUTION: THE SEALING OF THE RECEPTACLE ASSEMBLY MUST BE DONE WITHIN 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH. SEALING THE ASSEMBLY AFTER 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE SEAL.

(3) If the area adjacent to the seal has bare metal, replace the surface finish on the bare metal. Refer to Paragraph 1.E.

NOTE: IF AN ALUMINUM PART HAD AN ANODIZED SURFACE THAT WAS REMOVED DURING THE SURFACE PREPARATION, IT IS PERMITTED TO MANUALLY APPLY CHEMICAL CONVERSION COATING ON THE BARE METAL. REFER TO TABLE 29.

(4) Let the sealant cure.

NOTE: The full cure of a sealant is recommended, but the sealant is serviceable when:

- It is tack free
- It is in an area where wind shear does not occur.

5. BONDING OF CIRCULAR RECEPTACLE CONNECTORS IN A PRESSURIZED AREA**A. General Conditions**

For the general conditions applicable to the electrical bonding of circular connectors in a pressurized area, refer to Paragraph 4.A.

B. Surface Preparation

(1) To prepare the faying surface:

(a) Clean the faying surface of the structure.

Refer to:

- Table 25 for the procedure to clean the faying surface
- Figure 27 for the area to clean.

Make sure that the area where the receptacle flange touches the structure is clean.

(b) For an aluminum faying surface that are cleaned using Paragraph 2.A., apply Alodine to the faying surface.

(2) To prepare the surface that is under the fastener head and washer:

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- (a) Prepare the faying surface. Refer to Table 6.
Make sure that the area covered by the fastener head and the washer is clean. Refer to Figure 27.
- (3) For an aluminum faying surface that is cleaned using Paragraph 2.A., apply Alodine to the faying surface.
- (4) Clean both sides of the receptacle. Refer to Paragraph 2.E.

C. Receptacle Installation

NOTE: Installation of the receptacle must be done within 24 hours of surface preparation and cleaning. If installation is not done within 24 hours, the surface must be prepared and cleaned again.

- (1) Put a washer on each of the four screws.
- (2) To attach the receptacle with lock nuts:
 - (a) Align the mounting holes of the receptacle flange and the installation surface.
 - (b) Install each screw from the side opposite to the receptacle flange. Refer to Figure 26.
 - (c) Put a washer and a lock nut on each screw.
 - (d) Tighten each nut until the nut and washer are against the surface of the receptacle flange.
 - (e) Tighten each nut a small amount until the faying surface of the receptacle flange is fully flat against the installation surface.
 - (f) Torque each nut on size 4 fasteners 8 to 15 inch-pounds.
 - (g) Torque each nut on size 6 fasteners 12 to 15 inch-pounds.
 - (h) For the torque values of different size fasteners, refer to SOPM 20-50-01.
- (3) To attach the receptacle with a nut plate:
 - (a) Put the nut plate on the receptacle flange. Refer to Figure 25.
 - (b) Align the mounting holes of the nut plate, the receptacle flange, and the installation surface.
 - (c) From the side opposite to the receptacle flange, engage the threads of the fasteners and the threads of the nut plate.
 - (d) Tighten each fastener a small amount until the faying surface of the receptacle flange is fully flat against the installation surface.
 - (e) Torque each nut on size 4 fasteners 8 to 15 inch-pounds.
 - (f) Torque each nut on size 6 fasteners 12 to 15 inch-pounds.
 - (g) For the torque values of different size fasteners, refer to SOPM 20-50-01.
- (4) Do the test of the electrical bond.

Refer to:

- Paragraph 15.D. for the maximum resistance value
- Paragraph 16.H. for the test procedure.

NOTE: Perform the test of the electrical bond within 24 hours of surface preparation.

- (5) Apply finish to any bare metal areas around the receptacle flange and fastener head and washers. Refer to Paragraph 1.F.

NOTE: If an aluminum that had an anodized surface was cleaned and the anodized finish was removed, manually apply chemical conversion coating to the bare metal.

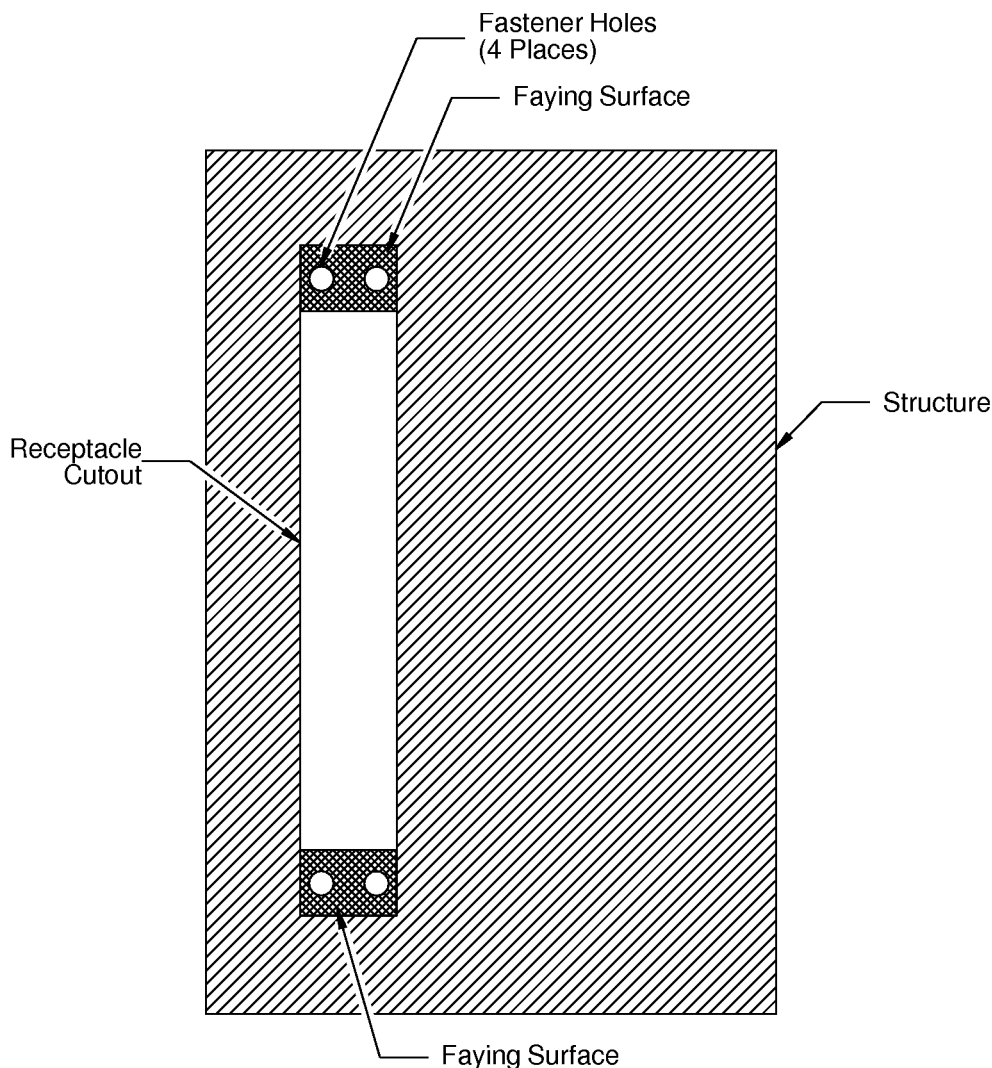
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CAUTION: APPLY ALL FINISHES WITHIN 7 DAYS OF WHEN THE ORIGINAL FINISH WAS REMOVED. FINISHES APPLIED AFTER 7 DAYS OF REMOVING THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE ELECTRICAL BOND.

6. BONDING OF BACC65AB, BACC65AP, AND BACC65AV RECEPTACLE CONNECTORS IN AN UNPRESSURIZED AREA**A. General Conditions**

For the general conditions applicable to the electrical bonding of BACC65AB, BACC65AP, and BACC65AV receptacle connectors in an unpressurized area, refer to Paragraph 4.A.

B. Preparation of the Faying Surface**PREPARATION OF THE FAYING SURFACE****Figure 28**

(1) To prepare the faying surface:

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- (a) Clean the faying surface of the structure.

Refer to:

- Table 25 for the procedure to clean the faying surface
- Figure 28 for the area to clean.

Make sure that the area where the receptacle flange touches the structure is clean.

- (b) For an aluminum faying surface that are cleaned using Paragraph 2.A., apply Alodine to the faying surface.

- (2) To prepare the surface that is under the fastener head and washer:

- (a) For aluminum and steel structure, use the cleaning procedure specified in Paragraph 2.A..

Make sure that the area covered by the fastener head and the washer is clean.

CAUTION: DO NOT APPLY ALODINE TO ALUMINUM SURFACE AREA BELOW THE FASTENER HEAD AND WASHER. THESE AREAS ARE TO STAY BARE ALUMINUM.

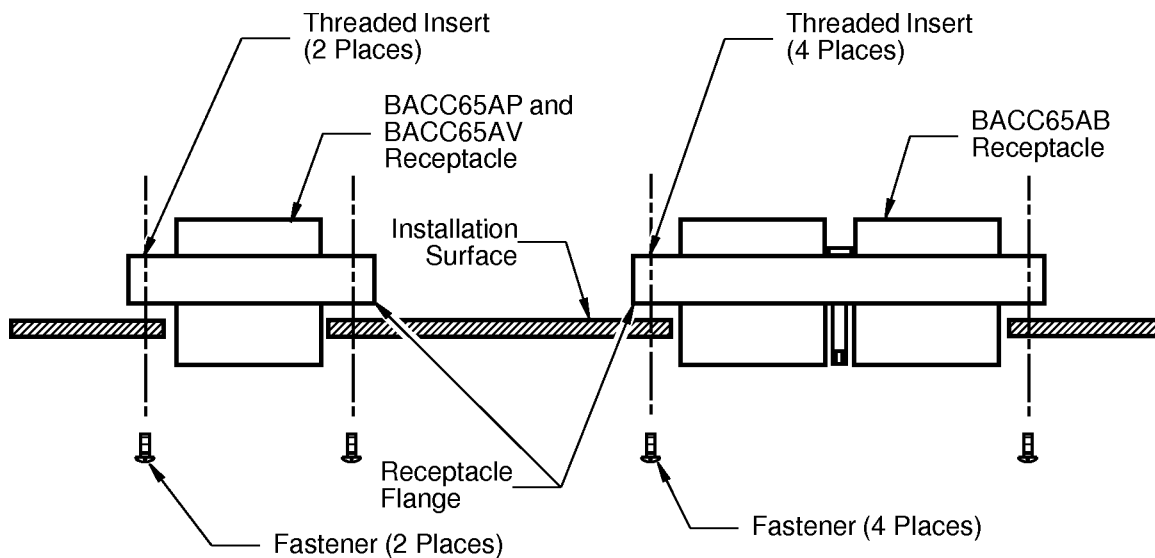
- (b) For nickel plated composite structure, prepare the faying surface with the cleaning procedure specified in Paragraph 2.E..

Make sure that the area below the fastener heads and washers is clean.

- (3) Clean both sides of the receptacle. Refer to Paragraph 2.E.

C. Receptacle Installation

NOTE: Installation of the receptacle must be done within 24 hours of surface preparation and cleaning. If installation is not done within 24 hours, the surface must be prepared and cleaned again.



RECEPTACLE INSTALLATION

Figure 29

- (1) Align the mounting holes of the receptacle flange and the installation surface. Refer to Figure 29.
- (2) Install each fastener from the side opposite to the receptacle flange.

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- (3) Tighten each fastener until the fastener head is against the surface of the mounting structure.
- (4) Tighten each fastener a small amount until the faying surface of the receptacle flange is fully flat against the installation surface.
- (5) Torque each nut on size 6 fasteners 12 to 15 inch-pounds.
- (6) For the torque values of different size fasteners, refer to SOPM 20-50-01.
- (7) Do a test of the electrical resistance.

Refer to:

- Paragraph 15.D. for the maximum resistance value
- Paragraph 16.H. for the test procedure.

NOTE: Perform the test of the electrical bond within 24 hours of surface preparation.

D. Sealing of a Receptacle Assembly

CAUTION: THE SEALING OF THE RECEPTACLE ASSEMBLY MUST BE DONE WITHIN 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH. SEALING THE ASSEMBLY AFTER 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE SEAL.

- (1) Make a selection of a sealant from Table 27.

NOTE: The cure times and tack free times given in Table 27 are applicable for 77degrees \pm 5degrees F and 50% Relative Humidity.

NOTE: The cure time and tack free time:

- Increase at lower temperature and lower humidity
- Decrease at higher temperature and higher humidity.

- (2) Apply a fillet seal to the following areas:
 - The area around the receptacle flange
 - The fastener, washer, and installation surface joints.

NOTE: It is permitted to seal the fastener heads.

NOTE: It is permitted to seal the nuts and washers with sealant. Refer to Figure 29.

CAUTION: THE SEALING OF THE RECEPTACLE ASSEMBLY MUST BE DONE WITHIN 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH. SEALING THE ASSEMBLY AFTER 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE SEAL.

- (3) If the area adjacent to the seal has bare metal, replace the surface finish on the bare metal. Refer to Paragraph 1.E.

NOTE: If an aluminum part had an anodized surface that was removed during the surface preparation, it is permitted to manually apply chemical conversion coating on the bare metal. Refer to Table 29.

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CAUTION: APPLY ALL FINISHES WITHIN 7 DAYS OF WHEN THE ORIGINAL FINISH WAS REMOVED. FINISHES APPLIED AFTER 7 DAYS OF REMOVING THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE ELECTRICAL BOND.

- (4) Let the sealant cure.

NOTE: The full cure of a sealant is recommended, but the sealant is serviceable when:

- It is tack free
- It is in an area where wind shear does not occur.

7. BONDING OF BACC65AB, BACC65AP, AND BACC65AV AND MTC PQKT RECEPTACLE CONNECTORS IN A PRESSURIZED AREA

A. General Conditions

For the general conditions applicable to the electrical bonding of BACC65AB, BACC65AP, and BACC65AV receptacle connectors in a pressurized area, refer to Paragraph 4.A.

B. Preparation of the Faying Surface

- (1) To prepare the faying surface:

- (a) Clean the faying surface of the structure.

Refer to:

- Table 25 for the procedure to clean the faying surface
- Figure 29 for the area to clean.

Make sure that the area where the receptacle flange touches the structure is clean.

- (b) For an aluminum faying surface that are cleaned using Paragraph 2.A., apply Alodine to the faying surface.

- (2) To prepare the surface that is under the fastener head:

- (a) If the surface is masked, remove the mask.

- (b) For an aluminum faying surface that is cleaned using Paragraph 2.A., apply Alodine to the faying surface.

- (3) Clean both sides of the receptacle. Refer to Paragraph 2.E.

C. BACC65AB, BACC65AP, and BACC65AV Receptacle Installation

NOTE: Installation of the receptacle must be done within 24 hours of surface preparation and cleaning. If installation is not done within 24 hours, the surface must be prepared and cleaned again.

- (1) Align the mounting holes of the receptacle flange and the installation surface. Refer to Figure 29.

- (2) Install each fastener from the side opposite to the receptacle flange.

- (3) Tighten each fastener until the fastener head is against the surface of the mounting structure.

- (4) Tighten each fastener a small amount until the faying surface of the receptacle flange is fully flat against the installation surface.

- (5) Torque each nut on size 6 fasteners 12 to 15 inch-pounds.

- (6) For the torque values of different size fasteners, refer to SOPM 20-50-01.

- (7) Do a test of the electrical resistance.

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Refer to:

- Paragraph 15.D. for the maximum resistance value
- Paragraph 16.H. for the test procedure.

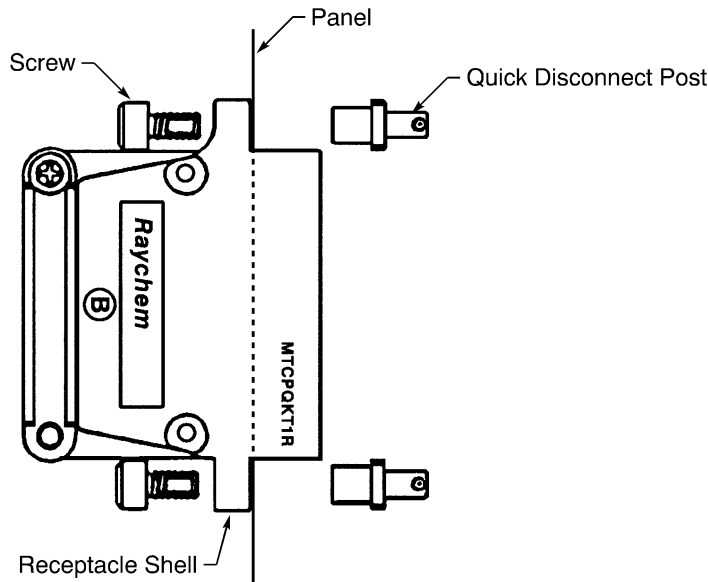
NOTE: Perform the test of the electrical bond within 24 hours of surface preparation.

- (8) If the area adjacent to the seal has bare metal, replace the surface finish on the bare metal. Refer to Paragraph 1.E.

NOTE: If an aluminum part had an anodized surface that was removed during the surface preparation, it is permitted to manually apply chemical conversion coating on the bare metal. Refer to Table 29.

CAUTION: APPLY ALL FINISHES WITHIN 7 DAYS OF WHEN THE ORIGINAL FINISH WAS REMOVED. FINISHES APPLIED AFTER 7 DAYS OF REMOVING THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE ELECTRICAL BOND.

D. MTCPQKT Receptacle Installation



INSTALLATION OF THE RECEPTACLE

Figure 30

NOTE: Installation of the receptacle must be done within 24 hours of surface preparation and cleaning. If installation is not done within 24 hours, the surface must be prepared and cleaned again.

- (1) Align the mounting holes of the receptacle flange and the installation surface. Refer to Figure 30.
- (2) Install the quick disconnect posts on the opposite side of the receptacle flange.
- (3) Torque each fastener 18 to 22 inch-pounds.
- (4) Do a test of the electrical resistance.



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Refer to:

- Paragraph 15.D. for the maximum resistance value
- Paragraph 16.H. for the test procedure.

NOTE: Perform the test of the electrical bond within 24 hours of surface preparation.

- (5) If the area adjacent to the seal has bare metal, replace the surface finish on the bare metal. Refer to Paragraph 1.E.

NOTE: If an aluminum part had an anodized surface that was removed during the surface preparation, it is permitted to manually apply chemical conversion coating on the bare metal. Refer to Table 29.

CAUTION: APPLY ALL FINISHES WITHIN 7 DAYS OF WHEN THE ORIGINAL FINISH WAS REMOVED. FINISHES APPLIED AFTER 7 DAYS OF REMOVING THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE ELECTRICAL BOND.

8. BONDING OF ARINC 404 AND 600 SERIES PLUG CONNECTORS IN A PRESSURIZED AREA

A. General Conditions

For the general conditions applicable to the electrical bonding of ARINC 404 and 600 series plug connectors in a pressurized area, refer to Paragraph 4.A.

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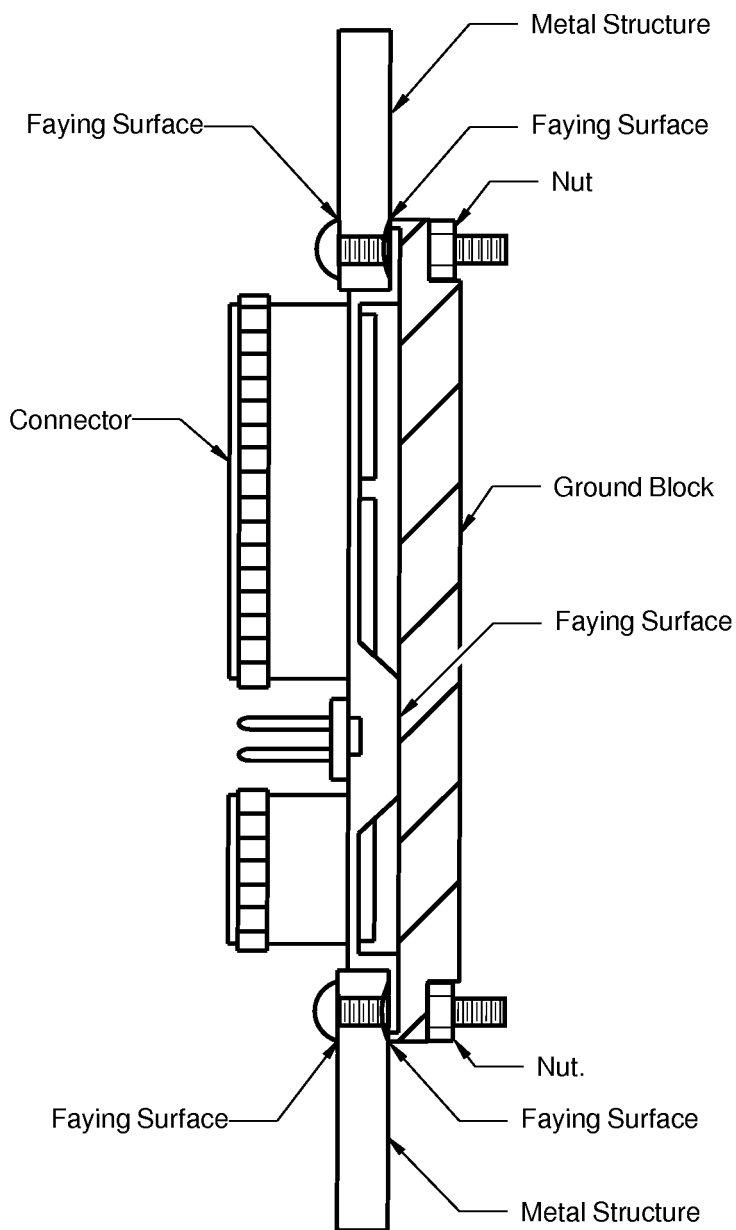
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B. Preparation of the Faying Surface



INSTALLATION OF THE ARINC 600 CONNECTOR
Figure 31

- (1) To prepare the faying surface that mates with the fastener bolt head:
 - (a) Clean the faying surface of the structure.

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Refer to:

- Table 25 for the procedure to clean the faying surface
- Figure 31 for the area to clean.

Make sure that the area where the fastener head touches the structure is clean.

- (b) For an aluminum faying surface that are cleaned using Paragraph 2.A., apply Alodine to the faying surface.
- (2) To prepare the surface that is under the fastener head:
 - (a) For an aluminum faying surface that is cleaned using Paragraph 2.A., apply Alodine to the faying surface.
- (3) Clean both sides of the plug flange. Refer to Paragraph 2.E.

C. Plug Installation

NOTE: Installation of the receptacle must be done within 24 hours of surface preparation and cleaning. If installation is not done within 24 hours, the surface must be prepared and cleaned again.

- (1) Align the mounting holes of the plug flange and the installation surface. Refer to Figure 31.
- (2) Install each fastener from the side opposite to the plug flange.
- (3) Tighten each fastener until the fastener head is against the surface of the mounting structure.
- (4) Tighten each fastener a small amount until the faying surface of the receptacle flange is fully flat against the installation surface.
- (5) Torque each nut 6 to 8 inch-pounds.
- (6) Do a test of the electrical resistance.

Refer to:

- Paragraph 15.D. for the maximum resistance value
- Paragraph 16.H. for the test procedure.

NOTE: Perform the test of the electrical bond within 24 hours of surface preparation.

- (7) Apply finish to any bare metal areas around the plug flange and fastener head and nut. Refer to Paragraph 1.F.

NOTE: If an aluminum part that had an anodized surface was cleaned and the anodized finish was removed, manually apply chemical conversion coating to the bare metal.

CAUTION: APPLY ALL FINISHES WITHIN 7 DAYS OF WHEN THE ORIGINAL FINISH WAS REMOVED. FINISHES APPLIED AFTER 7 DAYS OF REMOVING THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE ELECTRICAL BOND.

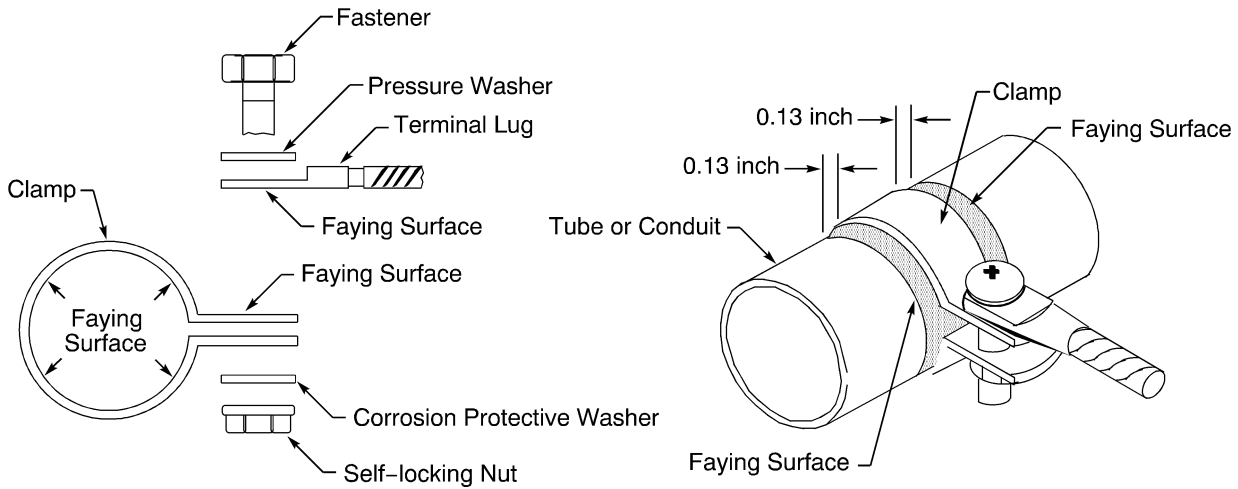
9. CLAMP AND TUBE OR CONDUIT BONDS

This paragraph gives the procedures to make an electrical bond between a tube or a conduit and a clamp.

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A. Preparation of the Faying Surfaces



FAYING SURFACE PREPARATION
Figure 32

Refer to Figure 32.

- I (1) Clean the faying surface of the terminal lug. Refer to Paragraph 2.E.
- I (2) Clean the faying surface of the clamp. Refer to Paragraph 2.E.
- I (3) If the tube or conduit has a layer of corrosion inhibiting compound, remove the compound from an area that is 0.23 inch larger on all sides than the area of the faying surface. Refer to Paragraph 2.E.
- I (4) Clean an area that is 0.13 inches larger on all sides than the area of the faying surface. Refer to Paragraph 2.

B. Installation of the Clamp

Table 30
TORQUE VALUES FOR SELF-LOCKING NUTS

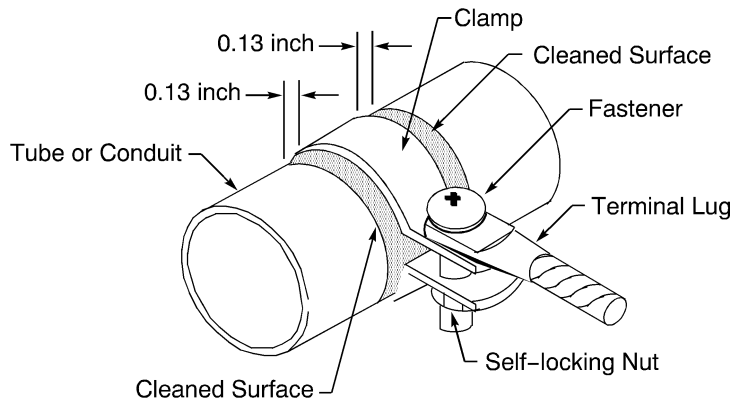
Installation Hardware Material		Fastener Size	Torque (inch-pound)	
Terminal Lug	Clamp		Minimum	Maximum
Tin Plated Copper	Aluminum	10-32	28	35
		1/4-28	65	70
		5/16-24	135	145
		3/8-24	180	200
		1/2-20	480	520

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Table 30 (continued)

Installation Hardware Material		Fastener Size	Torque (inch-pound)	
Terminal Lug	Clamp		Minimum	Maximum
Nickel Plated Copper	Stainless Steel or Titanium	10-32	33	40
		1/4-28	90	105
		5/16-24	170	200
		3/8-24	300	350
		1/2-20	730	840



CLAMP INSTALLATION
Figure 33

Refer to Figure 33.

- (1) Put the clamp on the tube or conduit assembly.
Make sure that the cleaned surface extends 0.13 inch farther than the sides of the clamp.
- (2) Align the holes of the clamp and the terminal lug.
- (3) Install the fastener and the self-locking nut.
- (4) Torque the nut. Refer to Table 30.

CAUTION: MORE THAN THE NECESSARY AMOUNT OF TORQUE MUST NOT BE APPLIED. DAMAGE TO THE TUBE OR CONDUIT CAN OCCUR.

- (5) Replace the finish of the tube or conduit. Refer to Paragraph 1.F.

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10. BACS53F GROUND STUD INSTALLATION IN CARBON FIBER REINFORCED PLASTIC (CFRP)

A. General Conditions

These conditions are applicable:

- After the ground stud is clean, the ground stud installation must occur in less than 24 hours
- Clean the ground stud again if it becomes dirty before the installation occurs. Refer to Paragraph 2.E.
- Clean the ground stud again if the installation did not occur in less than 24 hours. Refer to Paragraph 2.E.
- If the ground stud has damaged threads, the ground stud must be removed and replaced with a new undamaged ground stud.

CAUTION: DO NOT LET THE GROUND STUD BECOME DIRTY BEFORE INSTALLATION.

Table 31

NECESSARY TOOLS FOR THE INSTALLATION AND REMOVAL OF BACS53F GROUND STUD

Name	Part Number	Description	Supplier
Drill	ST1257B-1600-()	Carbide Drill Bit	Boeing
Ground Stud Installation Tool	ST2336C-1	Ground Stud Installation Tool	Boeing
Shear Collar Installation Tool	TP931()	Socket Wrench	U.S. Tool & Supply
Shear Collar Removal Tool	MED50-()	Offset Handle Wrench	Alcoa Fastening Systems
	MED50-()S	Straight Handle Wrench	
	MED50-()CF	Square Drive Wrench	
Reamer	ST1864R-1900-()	Carbide Reamer	Boeing
Drill Guide	AT589AA	Drill Guide Housing	ATI Tools
Drill Guide Bushing	AT589AB-1875	Threaded Bushing 0.1875 inch Dia.	ATI Tools
Drill Guide Bushing	AT589AB-1285	Threaded Bushing 0.1285 inch Dia.	ATI Tools

Table 32

NECESSARY MATERIALS FOR BACS53F GROUND STUD INSTALLATION

Material	Specification	Supplier
Low Density Integral Fuel Tank Sealant	BMS5-45, Class B	Boeing
Alcohol, Isopropyl	TT-I-735 Grade A or B	An available source

B. Hole Drilling

Refer to Paragraph 14.A..

C. Installation of the Ground Stud

(1) Clean the holes, ground stud, and adjacent surfaces before installation. Refer to Paragraph 2.E..

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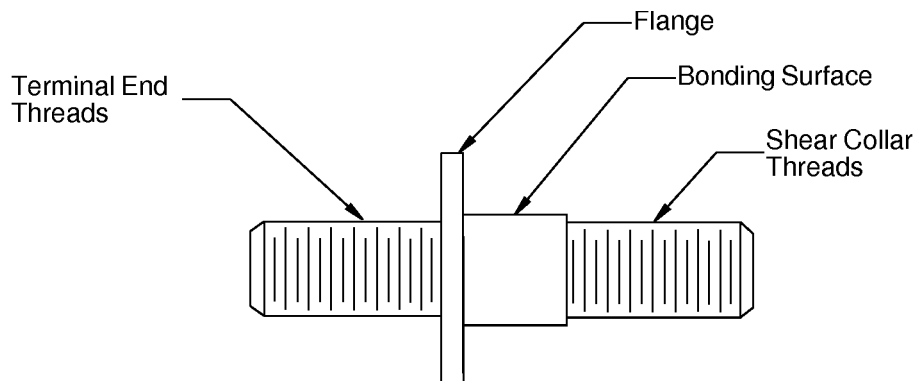
ELECTRICAL BONDS AND GROUNDS

CAUTION: MAKE SURE THAT THE SOLVENT THAT IS USED TO CLEAN IS PERMITTED FOR THE SURFACES TO CLEAN. THE SOLVENT THAT IS NOT PERMITTED CAN CAUSE DAMAGE TO THE MATERIALS.

Table 33

PARTS FOR GROUND STUD INSTALLATION ON COMPOSITE STRUCTURE

Hardware	Part Number	Supplier
Ground Stud	BACS53F6-()	Boeing
Shear Collar	BACC30AB6S	Boeing



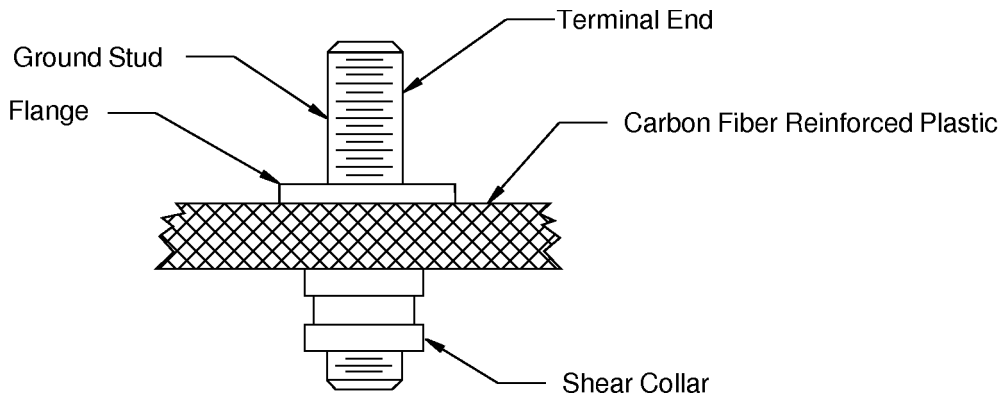
**BACS53F Ground Stud
Figure 34**

- (2) Put the ground stud through only one panel of the composite structure.
- (3) Install the ground stud:
 - (a) Make a selection of a ground installation tool. Refer to Table 31
 - (b) Put the terminal end of the ground stud into the installation tool. Refer to Figure 34.
 - (c) Put support around the area of the hole before the ground stud is installed.
 - (d) Put the bonding surface end of the ground stud in the hole of the composite structure. Refer to Figure 34. Push or lightly tap on the end of the installation tool until the flange of the ground stud is tightly to the surface of the composite structure.
 - (e) Remove the installation tool after the ground stud is in the hole.

CAUTION: THE GROUND STUD MUST NOT TURN IN THE HOLE DURING INSTALLATION. UNSATISFACTORY PERFORMANCE OF THE GROUND STUD ELECTRICAL BOND CAN OCCUR.

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INSTALLED BACS53F GROUND STUD

Figure 35

- (4) Install the shear collar. Refer to Figure 35.
 - (a) Put the shear collar on the ground stud.
Make sure the ground stud does not turn in the hole.
 - (b) Hold the ground stud with a hex wrench.
 - (c) Make a selection of a shear collar installation tool from Table 31 to tighten the hex head of the shear collar until it breaks off.

NOTE: An equivalent tool is a satisfactory alternative.
 - (d) Discard the broken off hex head.

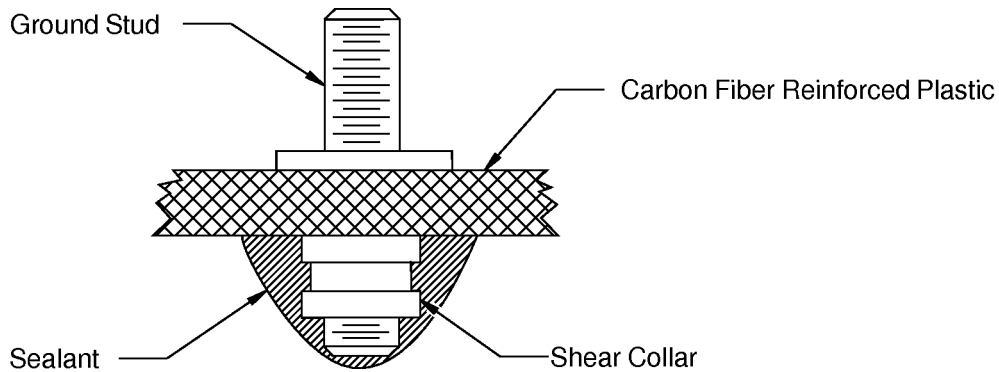
D. Seal The Ground Stud

- (1) If it is specified to seal the ground stud, make a selection of a sealant, Refer to Table 32.
- (2) To seal the ground stud, Refer to Figure 36.
Make sure that the Sealant:
 - Is a small fillet
 - Is smooth and continuous
 - Does not have air bubbles or voids
 - Does not have contamination in it.
- (3) If it is not specified to seal the ground stud, the installation is completed.

NOTE: IT IS PERMITTED TO SEAL THE SHEAR COLLAR FULLY.

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SEALING OF BACS53F GROUND STUD
Figure 36

E. Ground Stud Repair

(1) Make a selection of a tool to remove the ground stud. Refer to Table 31.

NOTE: An equivalent tool is a satisfactory alternative.

(2) Install the new ground stud.

Make sure that:

- The ground stud has no visible damage
- The hole has no visible damage
- The ground stud does not turn in the hole
- The hole is not oversize.

(3) If the hole is oversize or the ground stud turns in the hole.

(a) Make a selection of an oversize stud and oversize collar from Table 34.

(b) Install the new oversize ground stud and shear collar. Refer to Paragraph 10.C. and Paragraph 10.D..

Table 34

HOLE SIZES FOR OVERSIZE REPLACEMENT GROUND STUD

Nominal Oversize (inches)	Hole Sizes for Oversize Replacement Stud		Oversize Stud Part Number	Oversize Shear Collar Part Number
	Minimum (inches)	Maximum (inches)		
1/64	0.200	0.203	BACS53F6-()X	BACC30AB6SY
1/32	0.216	0.219	BACS53F6-()Y	BACC30AB6SY

NOTE: THE TWO OVERSIZE GROUND STUDS USE THE SAME OVERSIZE SHEAR COLLAR, REFER TO .34

11. ELECTRICAL BONDING OF CARBON FIBER REINFORCED PLASTIC (CFRP) STRUCTURE

This paragraph gives the procedure for the bond of carbon fiber reinforced plastic (CFRP) structure to a second CFRP or metal structure.

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These conditions are applicable:

- Three or more fasteners are used as the ground path
- The carbon fibers in the CFRP hole must touch the fastener to make an electrical bond
- This process is used to make an electrostatic drain path for precipitation static.

NOTE: The outer surfaces of the CFRP will not make a satisfactory bond.

B. Hole Drilling

- (1) Find the number and type of fasteners for the electrical bond of the structures.
- (2) Find and drill the holes for the fasteners. The holes must be drilled through the two bonded structures. Refer to the applicable Structural Repair Manual (SRM) Chapter 51 for the procedure to drill the holes and install the fastener.

C. Installation

- (1) Make sure that the inner fastener holes are free of primer, paint or other finishes. Clean the holes after they are drilled and before installation with solvent cleaner, refer to Paragraph .2.E.

CAUTION: MAKE SURE THAT THERE IS NO PRIMER, PAINT, OTHER FINISHES OR OTHER CONTAMINATION IN THE HOLE. PRIMER, PAINT, OTHER FINISHES, OR OTHER CONTAMINATION IN THE HOLE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE ELECTRICAL BOND.

- (2) Clean the fastener with solvent, refer to Paragraph .2.E.

CAUTION: MAKE SURE THAT THE SOLVENT THAT IS USED TO CLEAN IS PERMITTED FOR THE SURFACES TO CLEAN. THE SOLVENT THAT IS NOT PERMITTED CAN CAUSE DAMAGE TO THE MATERIALS.

- (3) Electrically bond the surfaces with the number and type of fasteners found in Paragraph .(1)
- (4) Complete the installation in less than 24 hours after the hole is drilled. Clean the holes again if the installation is not completed in less than 24 hours after the hole is drilled.

12. ELECTRICAL BONDING THROUGH FASTENER - CLEARANCE FIT HOLE

This paragraph gives the procedures for installation of structural joints where the fastener, nut/collar and washers make an electrical bond.

This process is used for:

- Precipitation static drain
- Electrostatic drain

A. General Conditions

These conditions are applicable:

- The fasteners, the locknut and the washer must be electrically conductive
- A faying surface bond is made below the fastener head or below the fastener nut/washer
- Two or more electrically conductive fasteners are installed in a clearance fit hole.

B. Surface Preparation

- (1) To prepare the faying surface:
 - (a) Disassemble the components.

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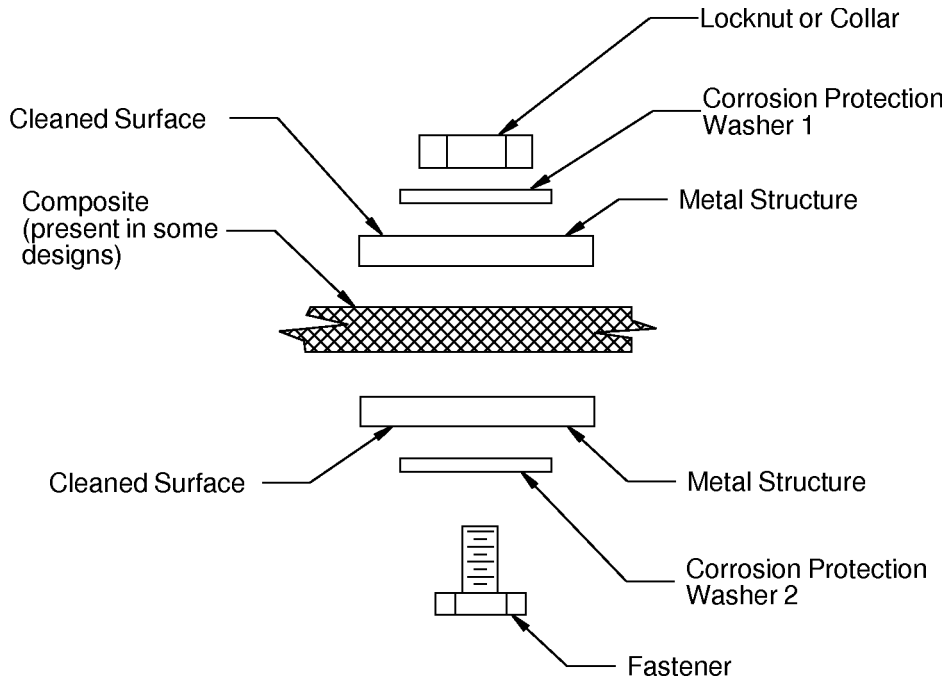
(b) Clean the faying surfaces of the structure.

Make sure that the area below washer 1 and 2 are clean, Refer to Paragraph 1.E..

Make sure that you remove all non-conductive finishes around fastener, washers and locknut/collars.

Refer to:

- Paragraph 1.E. for the procedure to clean the faying surface
- Figure 37 and Figure 38 for the area to clean.

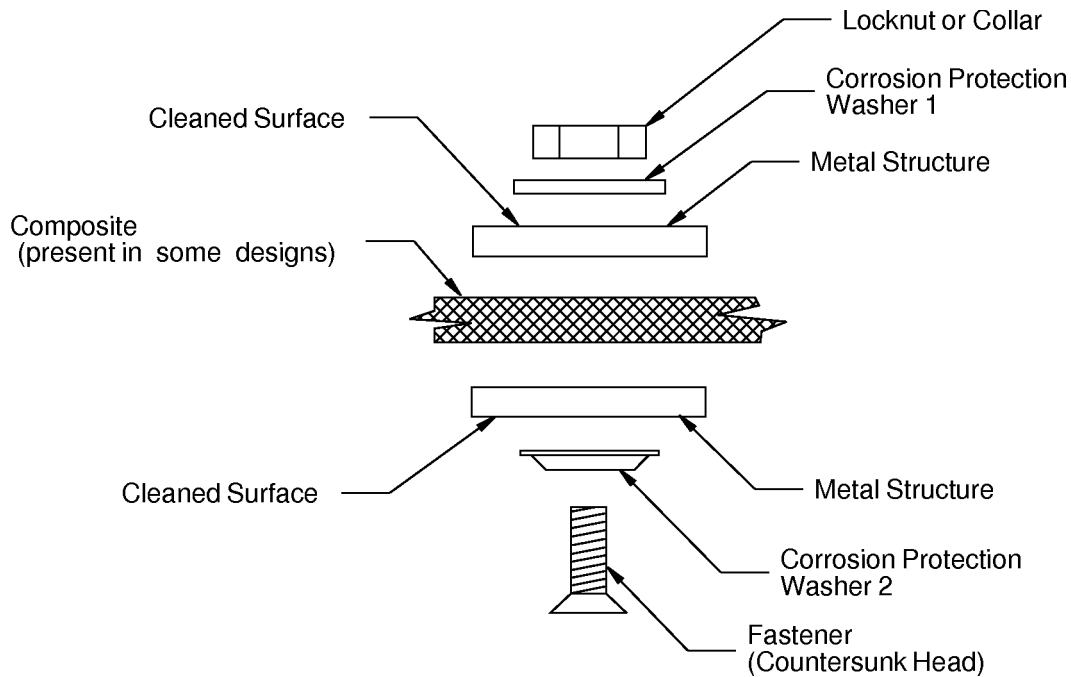


PRE-INSTALLED CLEARANCE FIT FASTENER

Figure 37

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PRE-INSTALLED CLEARANCE FIT FASTENER COUNTERSUNK HEAD

Figure 38

(c) Clean fastener, locknut/collar and washers. Refer to Paragraph 1.E..

C. Clearance Fit Fastener Installation

If it is necessary to drill holes in the structure for fastener installation, refer to the applicable Structural Repair Manual (SRM) Chapter 51 for the procedure to drill the holes.

CAUTION: THE INSTALLATION OF THE FASTENER AND RESISTANCE MEASURE MUST BE DONE IN LESS THAN 24 HOURS AFTER SURFACE PREPARATION AND CLEANING. IF INSTALLATION IS NOT DONE IN LESS THAN 24 HOURS THEN THE SURFACE MUST BE PREPARED AND CLEANED AGAIN.

(1) For each fastener to be bonded, install:

- Fastener
- Washers
- Locknut/Collar.

Refer to Figure 37 and Figure 38

For the torque value, Refer to SOPM 20-50-01.

CAUTION: DO NOT USE A NON-CONDUCTIVE FASTENER. USE OF A NON-CONDUCTIVE FASTENER AND/OR WASHER WILL CAUSE THE MEASURED RESISTANCE VALUE TO BE MORE THAN IS ALLOWED.

(2) Do a test of electrical resistance between the clearance fit fastener and the structure.

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Refer to the:

- Paragraph 15.D. for the maximum resistance value
 - Paragraph 16.D. for the test procedure.
- (3) If the measured electrical resistance is more than the specified maximum resistance in Table 40:
- (a) Disassemble the components.
 - (b) Prepare and clean the surfaces. Refer to Paragraph 1.E. for cleaning and Paragraph 12.B. for surface preparation.
 - (c) Do Step (1) through Step (3) again.

D. Sealing of Clearance Fit Fasteners

- (1) Refer to Paragraph 12.E. to find if it is necessary to seal the fastener.
- (2) If sealing is necessary, make a selection of a sealant. Refer to Table 35.
- (3) To seal the fastener, Refer to Figure 39.

Make sure that the sealant:

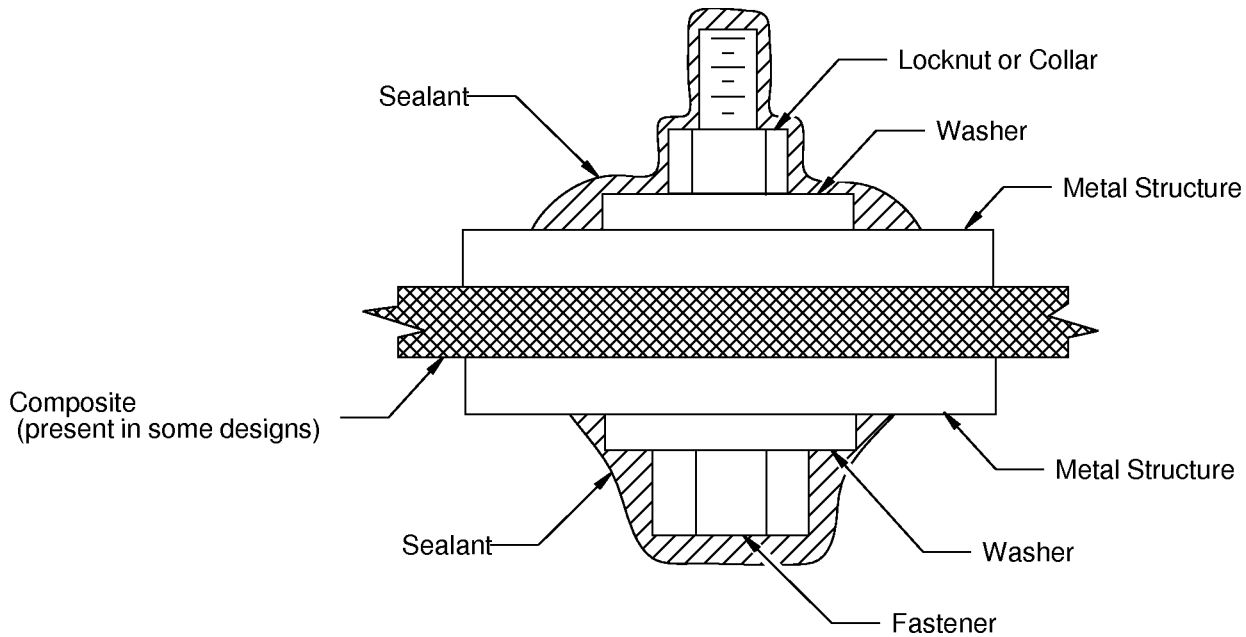
- Is a small fillet
- Is smooth and continuous
- Does not have air bubbles or voids
- Does not have contamination in it.

**Table 35
SELECTION OF SEALANT**

Bond Location	Sealant
Fuel Tank or areas where fuel fumes are present	BMS 5-45, Class B
Non-Fuel Tank or areas where no fuel fumes are present	BMS 5-142, Class B
	BMS 5-95, Class B

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SEALING OF CLEARANCE FIT FASTENERS

Figure 39

(4) If sealing is not necessary then continue. Refer to Paragraph 12.E..

CAUTION: THE SEALING OF THE CLEARANCE FIT FASTENER MUST BE DONE WITHIN 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH. SEALING THE ASSEMBLY AFTER 7 DAYS OF REMOVAL OF THE ORIGINAL FINISH CAN CAUSE AN UNSATISFACTORY PERFORMANCE OF THE SEAL.

NOTE: IT IS SATISFACTORY TO HAVE SEALANT ON THE FASTENER HEAD AND LOCKNUT/ COLLAR.

E. Refinishing Clearance Fit Fasteners

Apply finishes to the area that was cleaned and is not included by the fastener assembly or sealant. Refer to Paragraph 1.F. .

CAUTION: USE ONLY THE SPECIFIED SOLVENTS. USING INCORRECT SOLVENTS CAN CAUSE DAMAGE TO THE ELECTRICAL BONDING SURFACE.

13. ELECTRICAL BONDING THROUGH FASTENER - INTERFERENCE FIT

This paragraph gives the procedures for installation of two or more fasteners 3/16 inch or larger in diameter that make an electrical bond in interference fit holes.

The electrical current goes through the inner edge of the holes and the shank of the fastener.

A. General Conditions

These conditions are applicable:

- The fastener must be electrically conductive
- Fasteners must be 3/16 inch or larger in diameter.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL BONDS AND GROUNDS****B. Interference Fit Fastener Installation**

If it is necessary to drill holes in the structure for fastener installation, refer to the applicable Structural Repair Manual (SRM) Chapter 51 for the procedure to drill the holes and install the fastener.

CAUTION: INSTALLATION OF THE FASTENER AND RESISTANCE MEASURE MUST BE DONE IN LESS THAN 24 HOURS AFTER SURFACE PREPARATION AND CLEANING. IF INSTALLATION IS NOT DONE IN LESS THAN 24 HOURS THEN THE SURFACE MUST BE PREPARED AND CLEANED AGAIN.

- (1) Clean the holes and the fastener. Refer to Paragraph .2.E.

Make sure that the inside of the fastener holes is bare metal.

CAUTION: MAKE SURE THAT THERE IS NO PRIMER, PAINT, FINISHES , OR OTHER CONTAMINATION IN THE HOLE. PRIMER, PAINT, FINISHES OR OTHER CONTAMINATION IN THE HOLE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE ELECTRICAL BOND.

- (2) Install the fastener in the hole. Refer to applicable Structural Repair Manual Chapter 51 for the procedure to install the fastener.

NOTE: The use of non-conductive fasteners will cause the resistance to be unsatisfactory.

- (3) Clean the fastener:

- (a) Make a selection of a solvent. Refer to Table 21.
- (b) Make a selection of a wiper. Refer to Subject 20-00-11.
- (c) Clean surface with solvent and wiper.

NOTE: Do not put the wiper into the solvent. Put the solvent on the wiper.

- (d) Immediately wipe dry with a clean, dry wiper.

NOTE: Do not let the solvent dry in the air.

- (e) Do steps (3c) through (3d) until the wiper stays clean.

- (4) Do a test of electrical resistance between the interference fit fastener and the structure.

Refer to:

- Paragraph 15.J.for the maximum resistance values
- Paragraph 16.K.for the test procedure.

- (5) If the measured electrical resistance is more than the specified maximum resistance in Table 49, then do these steps:

- (a) Disassemble the components.
- (b) Prepare and clean the surfaces. Refer to Paragraph .2.E..
- (c) Do Step (1) through Step (4) again.

C. Refinishing Interference Fit Fasteners

Paragraph 1.F. gives the conditions when refinishing is necessary.

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CAUTION: DO NOT USE AN INCORRECT SOLVENT. USING AN INCORRECT SOLVENT CAN DAMAGE THE BONDING SURFACE.

14. HOLE DRILLING

This paragraph gives the procedures for drilling a hole for fasteners in a composite structure.

A. Drilling a hole for BACS53F Ground Stud Installation in a Carbon Fiber Reinforced Plastic (CFRP) Structure

If it is necessary, drill holes in the structure for the installation of the ground stud:

- (1) Make a selection of:
 - a drill bit
 - a reamer
 - a drill guide.

Refer to Table 31.

NOTE: AN EQUIVALENT TOOL IS A SATISFACTORY ALTERNATIVE.

- (2) Drill a test hole in a piece of scrap material.

Make sure that:

- The scrap material is the same type and thickness
- The size of the hole is correct
- The shape of the hole is correct
- No worn edges are on the entrance or the exit side of the composite structure
- There are no fracture cracks around the hole
- There are not too many burrs
- No delamination has occurred
- No gouges are in the hole
- The surface around the hole is not glossy
- The surface around the hole does not have a brown-black ring
- The hole is aligned.

- (3) Clamp a backup material on the exit side of the Carbon Fiber Reinforced Plastic (CFRP) Structure. Refer to Table 36 for a necessary material.

Make sure that:

- The backup material is harder than the Carbon Fiber Reinforced Plastic (CFRP)
- The backup material is equal to or is thicker than the CFRP structure.

**Table 36
BACKUP MATERIAL**

Backup Material
Urethane
Glass Fiber Reinforced Plastic (GFRP)
Phenolic material (Solid resin, laminate, fiberglass)
Wood (clear fir or oak)

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- (4) Drill a pilot hole at the minimum hole size. Refer to Table 38 for minimum hole size. Refer to Table 31 for the correct drill bit. Use appropriate drill speed and feed, refer to Table 37.

**Table 37
DRILL SPEED AND FEED**

Drill	Speed (RPM)	Feed (IPR)
Hand Drill	5000	.002
Power Feed	6000	-

NOTE: FASTENER HOLES MUST BE PERPENDICULAR TO THE SURFACE PLUS OR MINUS 2 DEGREES.

NOTE: IT IS ACCEPTABLE TO USE CETYL ALCOHOL AS A LUBRICANT.

CAUTION: DO NOT LET CARBON FIBER DUST GO ON ELECTRICAL COMPONENTS. CARBON FIBER DUST IS CONDUCTIVE AND CAN CAUSE DAMAGE TO COMPONENTS. USE A VACUUM NEAR THE SOURCE OF THE DUST TO REMOVE THE DUST FROM THE AIR.

CAUTION: DO NOT USE HIGH SPEED STEEL OR COBALT DRILL BITS IN CFRP. THEY WILL BECOME DULL. DAMAGE TO THE HOLE AND THE AREA AROUND THE HOLE WILL OCCUR.

WARNING: WEAR GLOVES, PROTECTIVE CLOTHING, DUST MASKS AND EYE PROTECTION WHEN WORKING WITH COMPOSITE MATERIALS. DO NOT BREATHE THE DUST OR LET IT TOUCH YOUR SKIN.

WARNING: GROUND CFRP PARTS TO STOP ELECTRICAL CURRENT. IF YOU DO NOT, INJURY TO PERSON AND DAMAGE TO THE COMPONENTS CAN OCCUR.

WARNING: DRILLS LONGER THAN THREE INCHES MUST NOT BE USED AT SPEEDS ABOVE 6000 RPM. THE DRILL BIT CAN BREAK AND CAUSE INJURY TO THE PERSON.

**Table 38
GROUND STUD HOLE SIZE**

Hole Size (inch)	
Minimum	Maximum
0.187	0.190

- (5) Ream the hole to the maximum size. Refer to Table 38 for maximum hole size. Refer to Table 31 for the correct reamer tool.
- (6) Remove all debris inside the hole and around the outside of the hole after drilling.

15. MAXIMUM PERMITTED RESISTANCE OF ELECTRICAL BONDS

NOTE: Unless it is specified differently, the resistance values given in the tables in this Paragraph refer to the overall resistance as it is measured across the bond from the object to the basic structure.

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NOTE: If the resistance measurement is more than the specified maximum resistance, then you must:

- Disassemble the components
- Reclean the mating surfaces
- Reassemble the components
- Retest the bond resistance.

A. Resistance of Ground Stud Bonds

A current return ground must be tested if it is:

- Changed
- Added to
- Temporarily disconnected.

Table 39 specifies the maximum bond resistance of a ground stud and the structure for a new installation or a repair where the faying surfaces are prepared for a bond again.

For the bond test of a current return ground, refer to Paragraph 16.E.

**Table 39
MAXIMUM RESISTANCE OF BONDS FOR GROUND STUDS**

Ground Stud Size	Maximum Resistance (ohm)
10-32	0.001
1/4-18	0.001
5/16-24	0.0007
3/8-24	0.0001
1/2-20	0.0001
BACS53B	0.0001
MIL-T-83534/4	0.0001

B. Resistance of Faying Surface Bonds

Table 40 specifies the maximum resistance between the different surfaces of a faying surface bond for a new installation or a repair where the faying surfaces are prepared for a bond again.

For the bond test of faying surfaces, refer to Paragraph 16.D. .

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Table 40
MAXIMUM RESISTANCE OF FAYING SURFACE BONDS

Surface Material	Configuration	Maximum Resistance (ohm)
Composite	Single Structure Only One Junction	1.0
Metal	Single Structure Only One Junction	0.0005
	Ground Module	0.001
	For Each Different Structure Interface	0.0005
	Between Fastener head and Structure	0.0005
	Between Locknut/Collar and Structure	0.001

C. Resistance of Composite Panel Bonds

Table 41 specifies the maximum resistance of the bond of a fastener and a composite structure with conductive finish for a new installation or a repair where the faying surfaces are prepared for a bond again.

Table 42 specifies the maximum resistance of the bond of a removable composite panel with conductive finish and a fixed composite panel with conductive finish for a new installation or a repair where the faying surfaces are prepared for a bond again.

For the bond test of composite panels, refer to Paragraph 16.l.

NOTE: The resistance values in Table 41 and in Table 42 are not applicable for radomes.

Table 41
MAXIMUM RESISTANCE OF THE BOND OF A FASTENER AND A COMPOSITE STRUCTURE WITH A CONDUCTIVE FINISH

Finish Material	Maximum Resistance (ohm)
BMS10-21 Antistatic Conductive Paint	300,000
BMS8-278 Aluminum Coated Fabric	10
Expanded Aluminum Foil	0.5
Flamespray	0.5

Table 42
MAXIMUM RESISTANCE OF THE BOND OF A REMOVABLE COMPOSITE PANEL WITH A CONDUCTIVE FINISH AND A FIXED COMPOSITE PANEL WITH A CONDUCTIVE FINISH

Finish Material	Maximum Resistance (ohm)
BMS10-21 Antistatic Conductive Paint	300,000
Flamespray	0.5

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D. Resistance of Receptacle Connector Shell Bonds

The maximum resistance between the receptacle flange and the installation surface:

- Is given in Table 43 for a new installation or a repair where the faying surfaces are prepared for a bond again.
- Is 2.5 milliohms for a wire harness that is in service and the wire harness components have not been replaced or repaired.
- Is 10.0 milliohms for a 737-600, 737-700, 737-800, 737-900, or 737-900ER Wing to Body feedthrough connector that is in service and has not been replaced or repaired. Refer to WDM 91-04-13.

Table 44 specifies the maximum bond resistance between the shield termination and the installation surface for a new installation or a repair where the faying surfaces are prepared for a bond again.

For the bond test of connector shells, refer to Paragraph 16.H.

**Table 43
MAXIMUM RESISTANCE BETWEEN A CONNECTOR SHELL AND STRUCTURE**

Electrical Bond	Maximum Resistance (milliohm)	Reference
737-600, 737-700, 737-800, 737-900, or 737-900ER Wing Body Feedthrough Receptacle to Structure	0.05	Figure 50
Aluminum Receptacle Flange to Structure or Bracket	1.0	Figure 50
Stainless Steel Receptacle Flange to Structure or Bracket	2.0	Figure 50

**Table 44
MAXIMUM RESISTANCE BETWEEN A SHIELD TERMINATION AND STRUCTURE**

Electrical Bond	Maximum Resistance (milliohm)	Reference
Aluminum Receptacle Peripheral Backshell to Structure or Bracket	1.5	Figure 52
Aluminum Receptacle Shield Terminator Band to Structure or Bracket	1.5	Figure 53
Aluminum Receptacle Strain Relief Backshell to Structure or Bracket	1.5	Figure 51
Stainless Steel Receptacle Peripheral Backshell to Structure or Bracket	3.0	Figure 52
Stainless Steel Receptacle Shield Terminator Band to Structure or Bracket	3.0	Figure 53
Stainless Steel Receptacle Strain Relief Backshell to Structure or Bracket	3.0	Figure 51

E. Resistance of Static Discharger Bases Installed on Composite Surfaces

Table 45 specifies the maximum bond resistance of a static discharger base that is mounted on a composite structure for a new installation or a repair where the faying surfaces are prepared for a bond again.

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**Table 45
MAXIMUM RESISTANCE OF STATIC DISCHARGER BASES**

Discharger Base	Surface Mounted On	Maximum Resistance (ohm)	Measured Between
Aluminum	Aluminum	0.1	Discharger and Bond Structure
	BMS8-278 Aluminum Coated Fabric	0.01	Discharger and Basic Structure
	Flamespray	0.1	Discharger and Bond Structure
Titanium	Graphite	1.0	Discharger and Bond Structure
	Epoxy	1.0	Discharger and Bond Structure

F. Resistance of Hydraulic Fitting Bonds Inside a Fuel Tank

The resistance of a hydraulic fitting bond inside a fuel tank is designated as a Critical Design Configuration Control Limitation (CDCCL).

WARNING: IT IS MANDATORY THAT THE SPECIFIED REPAIR PROCEDURES ARE OBEYED FULLY.

For the conditions that are applicable for the data in this paragraph, refer to Paragraph 1.G..

Table 46 specifies the maximum bond resistance of a hydraulic fitting inside a fuel tank for a new installation or a repair where the faying surfaces are prepared for a bond again.

Table 47 specifies the maximum bond resistance of a hydraulic tube and a bulkhead fitting inside a fuel tank for a new installation or a repair where the faying surfaces are prepared for a bond again.

For the bond test of hydraulic fittings inside a fuel tank, refer to Paragraph 16.F.

NOTE: For hydraulic union or tee fitting bonds:

- The resistance is measured from the surface of one hydraulic tube to the surface of the other through the union or the tee
- The resistance that is specified for the larger size of tube is applicable for a reducer fitting.

NOTE: For a hydraulic tube and a bulkhead fitting bond inside a fuel tank, the resistance is measured from the surface of the hydraulic tube to the surface of the bulkhead.

**Table 46
MAXIMUM RESISTANCE OF A HYDRAULIC UNION OR TEE FITTING BOND INSIDE A FUEL TANK**

Size	Tube	Maximum Resistance (ohm)
	Material	
-04	Stainless Steel	0.012
	Titanium	0.012
-06	Aluminum	0.0013
	Stainless Steel	0.008
	Titanium	0.008

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Table 46 (continued)

Tube		Maximum Resistance (ohm)
Size	Material	
-08	Aluminum	0.00095
	Stainless Steel	0.005
	Titanium	0.005
-10	Aluminum	0.00075
	Stainless Steel	0.003
	Titanium	0.003

Table 47

MAXIMUM RESISTANCE OF A HYDRAULIC TUBE AND A BULKHEAD FITTING BOND INSIDE A FUEL TANK

Tube		Type of Fitting	Maximum Resistance (ohm)
Size	Material		
-04	Titanium	Permaswage	0.006
		Weld-On	0.012
-06	Aluminum	All	0.0007
	Titanium	Permaswage	0.004
		Weld-On	0.008
-08	Aluminum	All	0.0005
	Titanium	Permaswage	0.0025
		Weld-On	0.005
-10	Aluminum	All	0.00041
	Titanium	Permaswage	0.0015
		Weld-On	0.003

G. Resistance of Bulkhead Fitting Bonds

The maximum resistance between the basic structure and the bulkhead fitting is 0.001 ohm for a new installation or a repair where the faying surfaces are prepared for a bond again.

H. Resistance of Clamp and Conduit or Tube Bonds

I Table 48 specifies the maximum resistance between a conduit or a tube and a clamp that holds the conduit or the tube for a new installation or a repair where the faying surfaces are prepared for a bond again.

I For the bond test of hydraulic fittings inside a fuel tank, refer to Paragraph 16.G.

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Table 48
MAXIMUM RESISTANCE OF BONDS BETWEEN A CONDUIT OR TUBE AND A CLAMP

Electrical Bond	Maximum Resistance (ohm)
Conduit or Tube to a Clamp	0.0015

I. Resistance of S280W555-() and YHLZG-() Ground Module Bonds

The maximum resistance from the basic structure to the body of the ground module is 0.001 ohm for a new installation or a repair where the faying surfaces are prepared for a bond again.

For the bond test of S280W555-() and YHLZG-() ground modules, refer to Paragraph 16.J.

J. Resistance of Interference Fit Fastener

Table 49 specifies the maximum resistance between two metal surfaces using an interference fit fasteners for new installation or a repair.

For the bond test of a interference fit fastener, refer to Paragraph 16.K. .

Table 49
MAXIMUM RESISTANCE OF INTERFERENCE FIT FASTENERS

Fastener Quantity	Maximum Resistance Milliohms	Maximum Resistance Ohms
2 or 3	1	0.001
4 or more	0.5	0.0005

16. TEST PROCEDURES FOR ELECTRICAL BONDS

A. General Conditions for Bond Resistance Tests

For any bond that has a jumper or a designated ground wire, a control point that is used to measure the resistance must be:

- In the cleaned area for the terminal
- 0.25 inch maximum from the terminal.

Two points must be used to calibrate the meter to zero ohms:

- One point is on one side of the cleaned area
- The other point is on the opposite side of the same cleaned area.

NOTE: Either of the two points can be used as the control point.

B. Conditions for Bond Resistance Tests - Not Explosion Hazard Areas

Refer to Table 50 for the recommended bond resistance meters.

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Other bond resistance meters are acceptable if all of these conditions occur:

- The meter is calibrated
- The meter has an accuracy of ± 5 percent of the reading in the range specified by the manufacturer of the equipment
- The value of the resistance is not less than 10 percent of the full range of the meter
- The meter has a four probe design
- The meter has separate current and potential probes.

NOTE: The satisfactory alternatives to measure resistances that are greater than 1 ohm are:

- An ohmmeter
- A multimeter.

NOTE: To measure AC and DC current return grounds:

- With Model M1 bond resistance meter, it is not necessary to disconnect each plug from the equipment
- With other bond resistance meters, it is necessary to disconnect each plug from the equipment.

Table 50
RECOMMENDED BOND RESISTANCE METERS

Part Number	Supplier
DLRO 247000-47	Biddle
DLRO 247000-7	Biddle
Model M1	BCD Electronics
Model T207 Type W	Avtron
Model T477W	Avtron

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C. Conditions for Bond Resistance Tests - Explosion Hazard Areas

WARNING: BEFORE A METER IS USED IN AN EXPLOSION HAZARD AREA, MAKE SURE THAT DANGEROUS VAPORS ARE NOT IN THE AREA. INJURY CAN OCCUR.

WARNING: THE PROBES OF THE METER MUST NOT BE PUT DIRECTLY ON:

- THE TERMINAL OF AN EXPLOSIVE SQUIB
- A PART OF THE CIRCUIT THAT IS CONNECTED TO AN EXPLOSIVE SQUIB.

Refer to Table 51 for the permitted bond resistance meters.

NOTE: To measure AC and DC current return grounds:

- With Model M1 bond resistance meter, it is not necessary to disconnect each plug from the equipment
- With other bond resistance meters, it is necessary to disconnect each plug from the equipment.

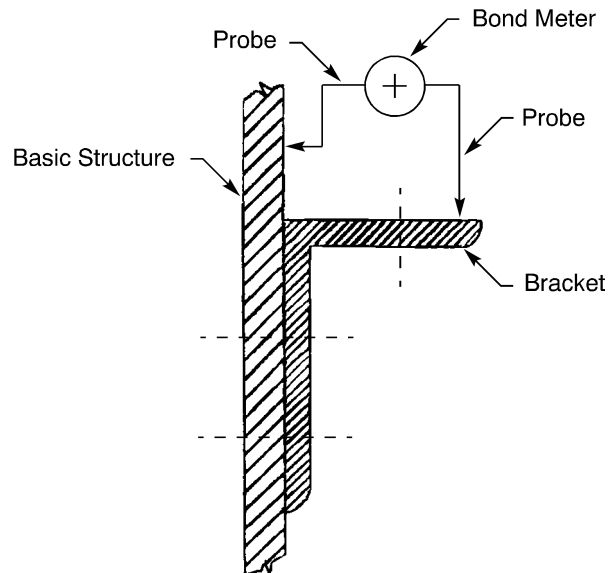
**Table 51
PERMITTED BOND RESISTANCE METERS**

Part Number	Supplier
Model M1	BCD Electronics
Model T477W	Avtron

D. Bond Test for Faying Surfaces

(1) For the test points for a bracket to structure bond:

Refer to Paragraph 15.B. for the maximum resistance values. The location of the test points for a bracket to structure bond is shown in Figure 40.



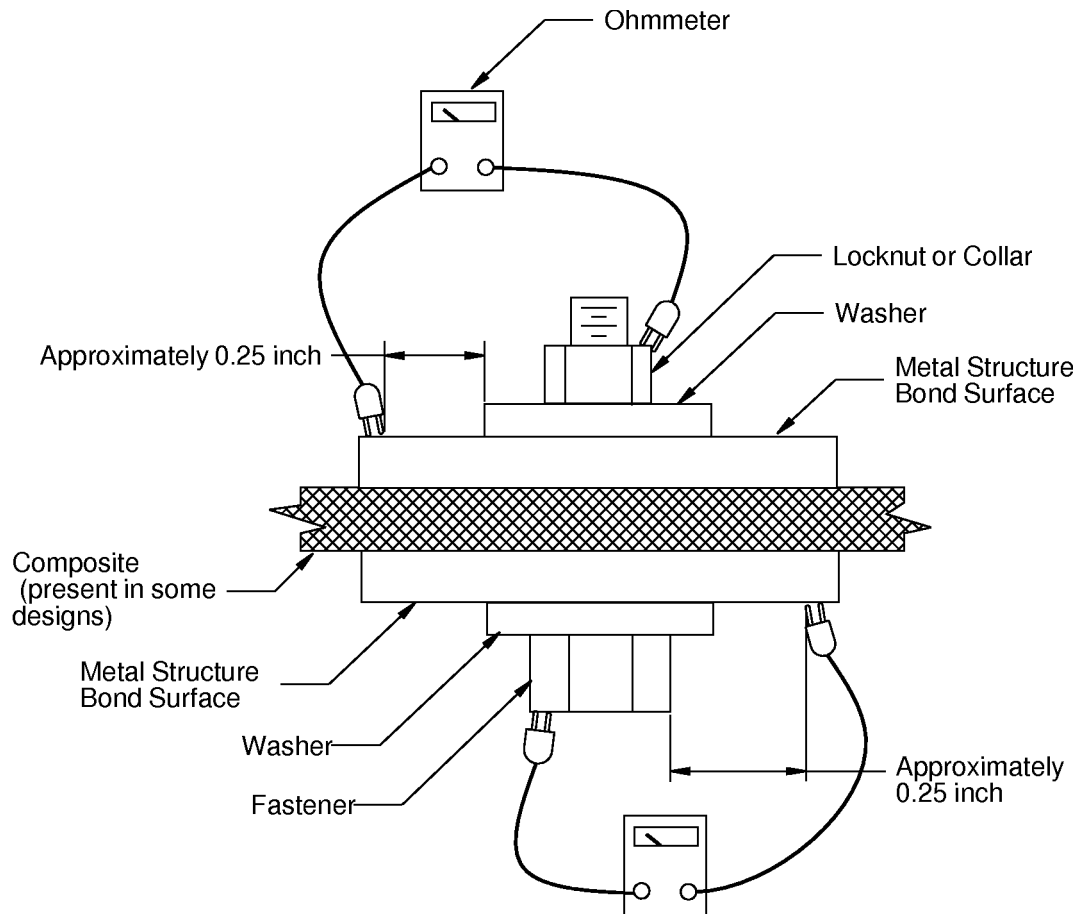
**TEST POINTS FOR A BRACKET TO STRUCTURE BOND
Figure 40**

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS

- (2) For the test points for a fastener or locknut/collar to structure bond:

Refer to Paragraph 15.B. for the maximum resistance. The location of the test points for a fastener or locknut/collar is shown in Figure 41



TEST POINTS FOR A FASTENER OR LOCKNUT/COLLAR TO A STRUCTURE BOND

Figure 41

- (3) If the bonding surface of the metal structure has a surface finish, then remove a sufficient area of the surface finish to let the probe touch the bonding surface. To remove the finish, Refer to Paragraph 1.E.

NOTE: AN ALTERNATE PROCEDURE WOULD BE TO CAREFULLY PIERCE THE SURFACE FINISH WITH THE PROBES TO LET THE PROBE TOUCH THE BONDING SURFACE.

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ELECTRICAL BONDS AND GROUNDS

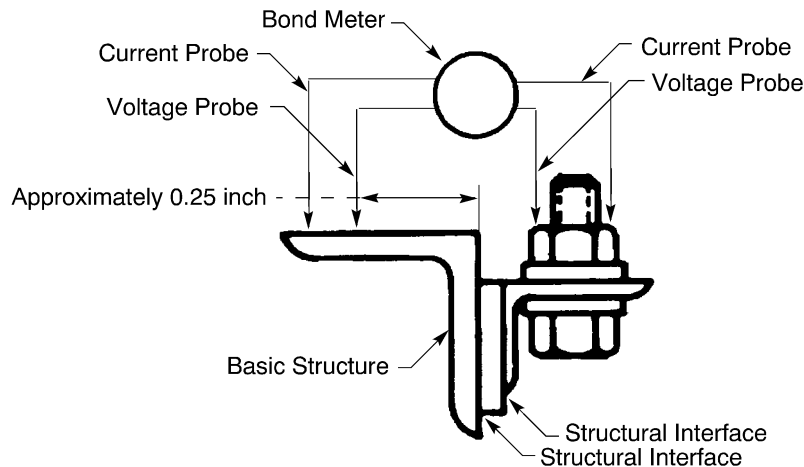
E. Bond Test of a Current Return Ground

Refer to:

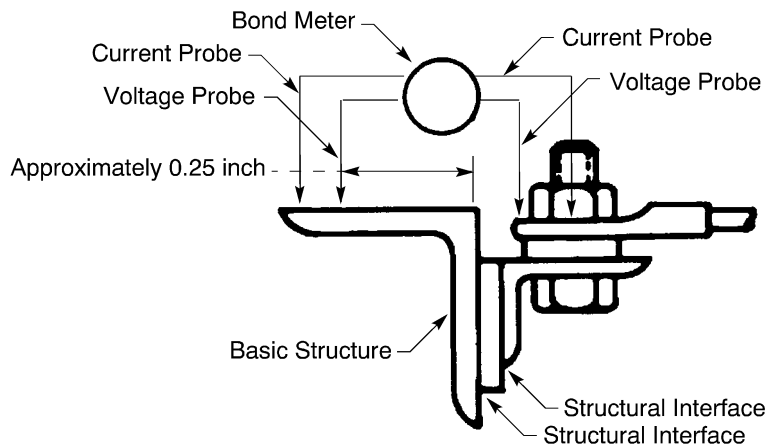
- Paragraph 15.A. for the conditions of the test
- Table 39 for the maximum resistance values.

The location of the test points is shown in:

- Figure 42 for a pre-installed standard ground stud
- Figure 43 for a direct standard ground stud.



TEST POINTS FOR A PRE-INSTALLED STANDARD GROUND STUD
Figure 42



TEST POINTS FOR A DIRECT STANDARD GROUND STUD
Figure 43

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS

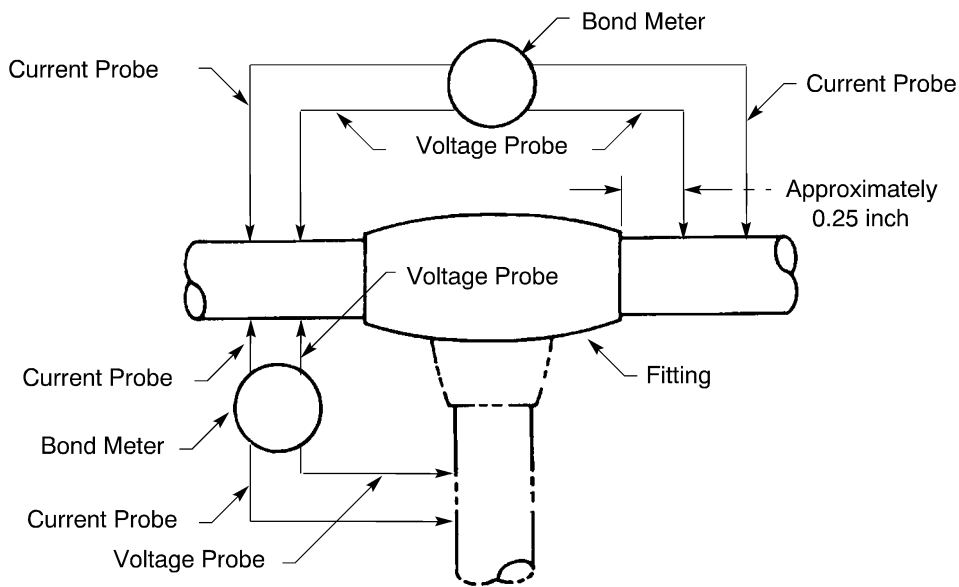
F. Bond Test of Hydraulic Fittings in Fuel Tank

Refer to:

- Paragraph 15.F. for the conditions of the test
- Table 46 or Table 47 for the maximum resistance values.

The location of the test points is shown in:

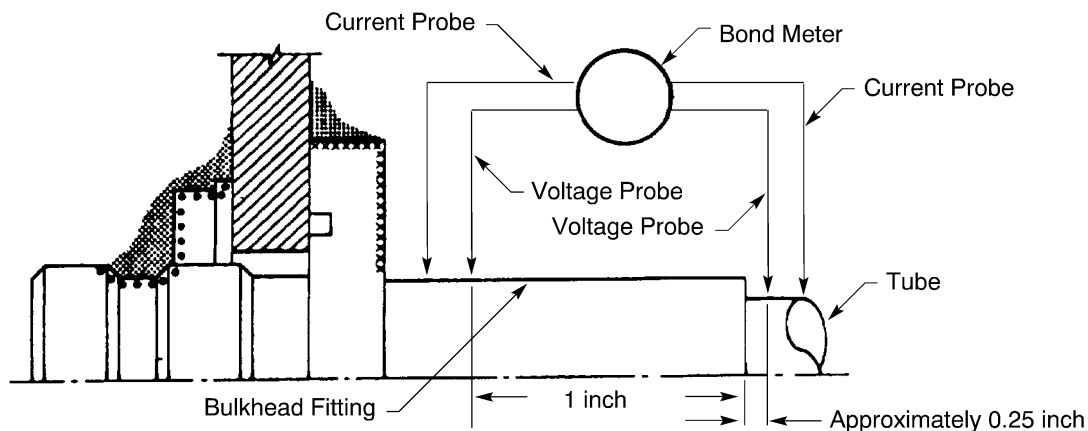
- Figure 44 for a union or tee fitting
- Figure 45 for a permaswage bulkhead fitting
- Figure 46 for a welded bulkhead fitting
- Figure 47 for a permaswage bulkhead fitting and basic structure
- Figure 48 for a welded bulkhead fitting and basic structure.



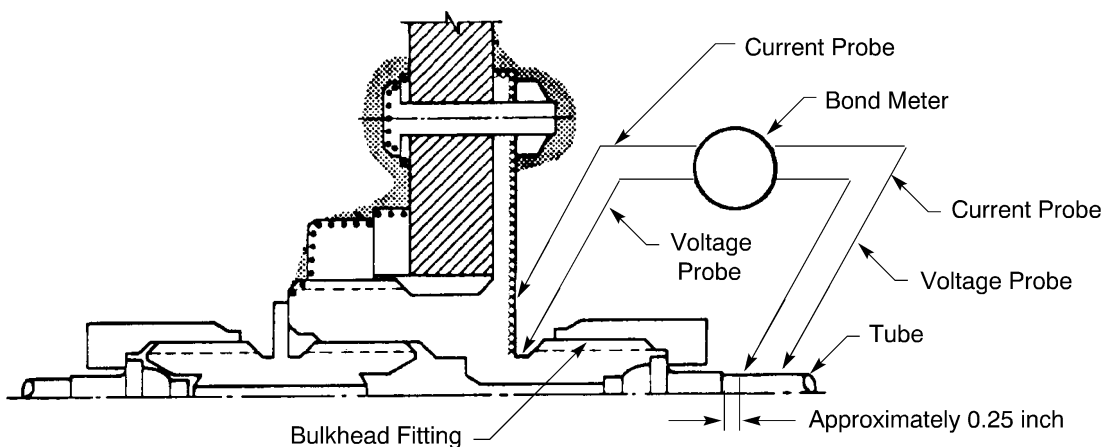
TEST POINTS FOR A HYDRAULIC UNION OR TEE FITTING
Figure 44

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ELECTRICAL BONDS AND GROUNDS



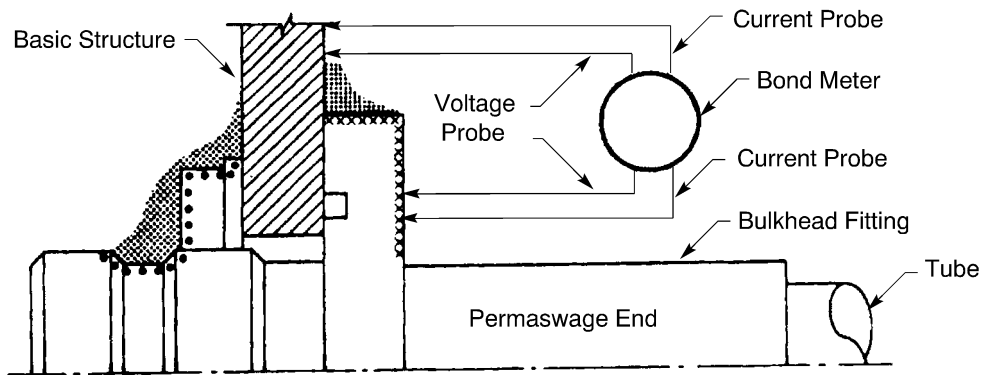
TEST POINTS FOR A PERMASWAGE BULKHEAD FITTING
Figure 45



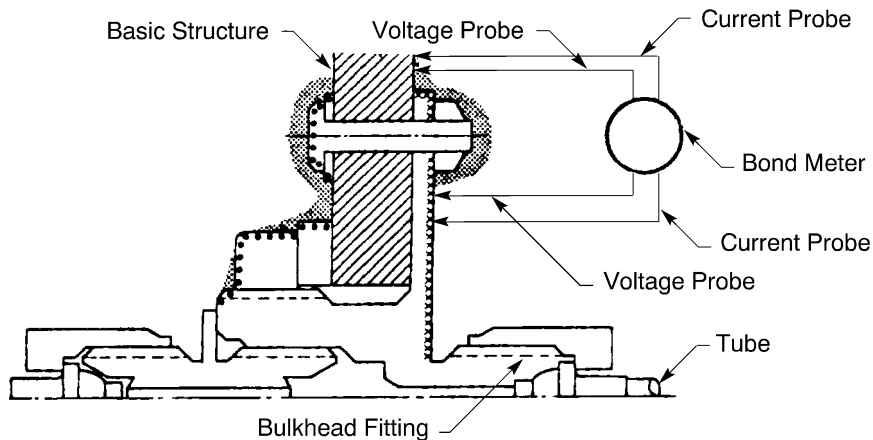
TEST POINTS FOR A WELDED BULKHEAD FITTING
Figure 46

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ELECTRICAL BONDS AND GROUNDS



TEST POINTS FOR A PERMASWAGE BULKHEAD FITTING AND BASIC STRUCTURE
Figure 47



TEST POINTS FOR A WELDED BULKHEAD FITTING AND BASIC STRUCTURE
Figure 48

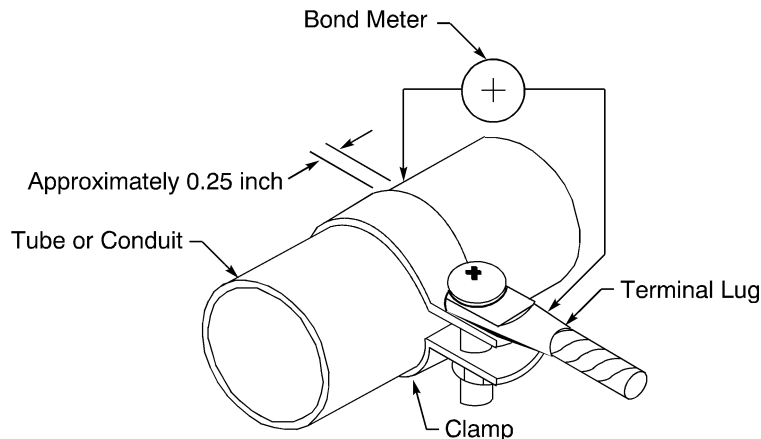
G. Bond Test of a Clamp on a Conduit or a Tube

Refer to:

- Paragraph 16.A. for the general conditions for a bond test
- Paragraph 16.B. for the conditions and bond meters for a bond test in a not explosion hazard area
- Paragraph 16.C. for the conditions and bond meters for a bond test in an explosion hazard area.
- Paragraph 15.H. for the maximum resistance values.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS



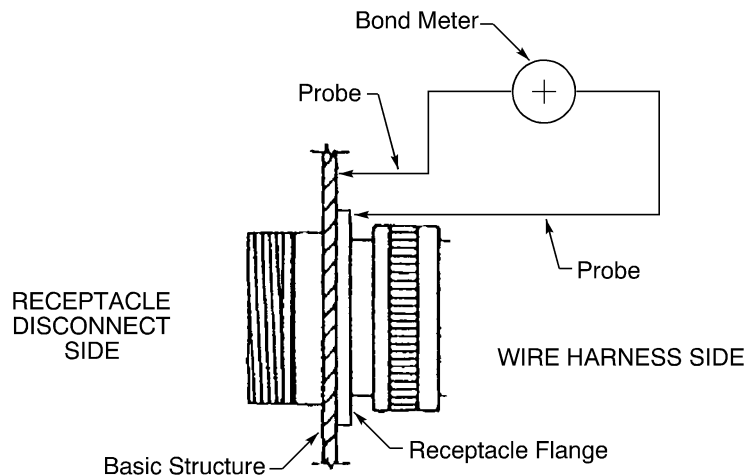
TEST POINTS FOR A CLAMP AND CONDUIT OR TUBE BOND
Figure 49

H. Bond Test of Receptacle Connector Shells

Refer to Paragraph 15.D. for the maximum resistance values.

The location of the test points is shown in:

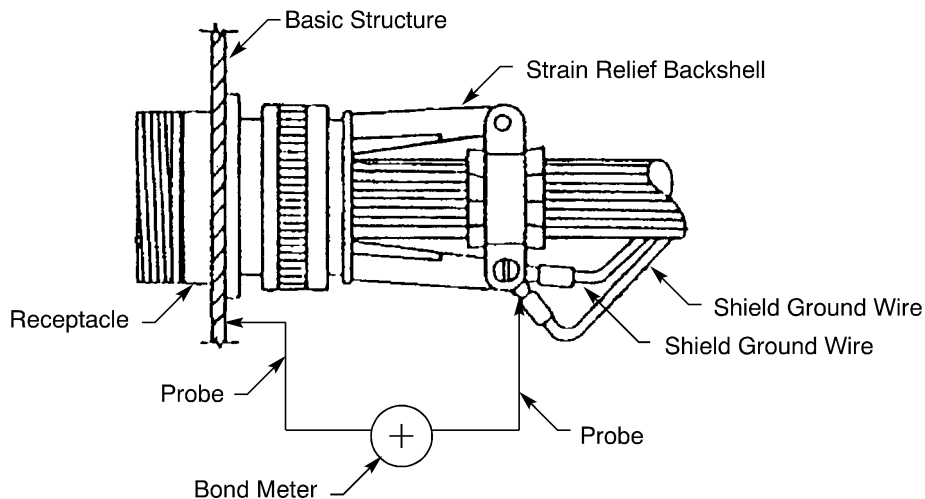
- Figure 50 for the bond of the receptacle and the installation surface
- Figure 51 for shield termination on a receptacle with a strain relief backshell
- Figure 52 for shield termination on a receptacle with a peripheral backshell
- Figure 53 for shield termination on a receptacle with a backshell and a shield terminator band
- Figure 54 for a special configuration of stainless steel plug and receptacle.



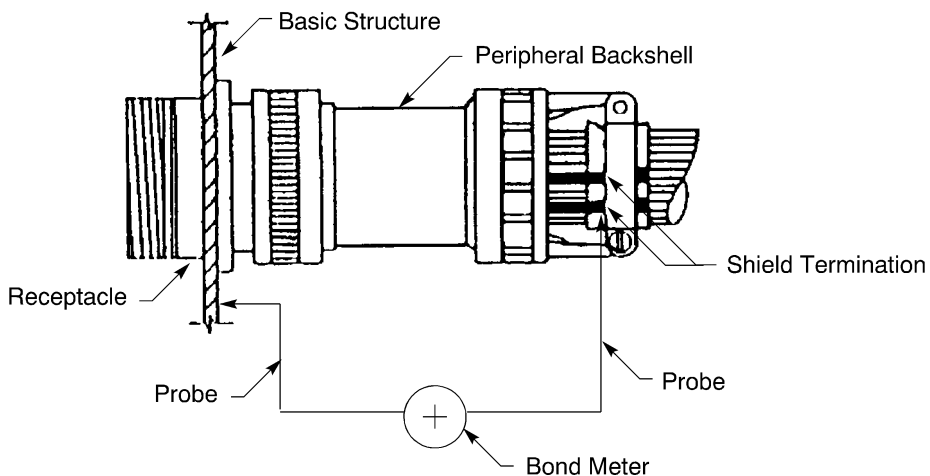
TEST POINTS FOR A RECEPTACLE CONNECTOR AND STRUCTURE BOND
Figure 50

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS



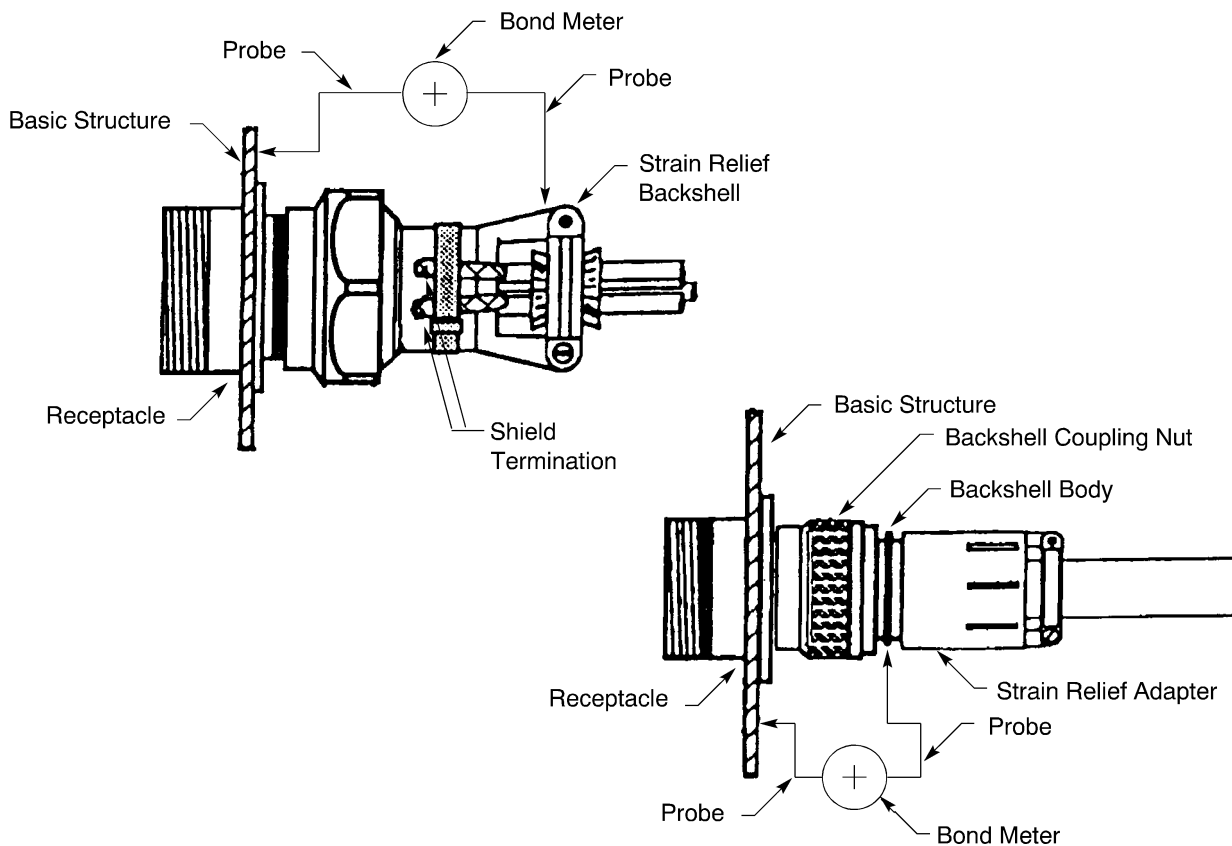
TEST POINTS FOR A CONNECTOR WITH A STRAIN RELIEF BACKSHELL
Figure 51



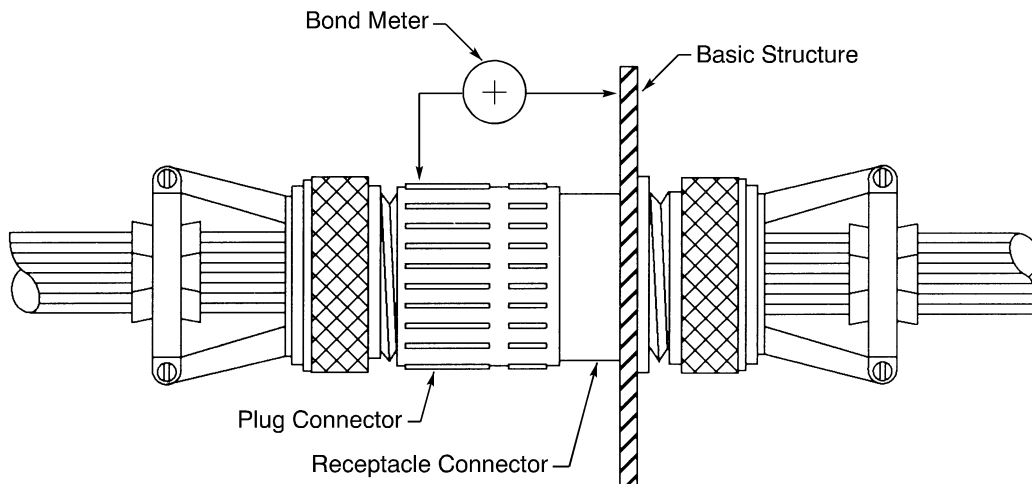
TEST POINTS FOR A CONNECTOR WITH A PERIPHERAL BACKSHELL
Figure 52

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS



TEST POINTS FOR THE CONNECTORS WITH A SHIELD TERMINATOR BAND
Figure 53



TEST POINTS FOR A STAINLESS STEEL PLUG AND STRUCTURE BOND
Figure 54

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS

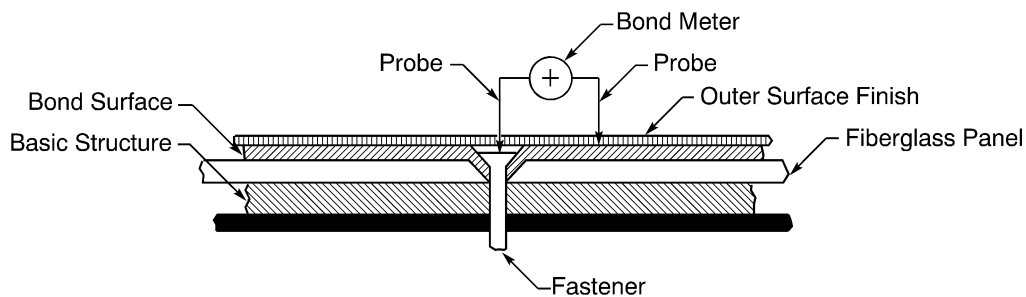
I. Bond Test of Composite Panels

Refer to:

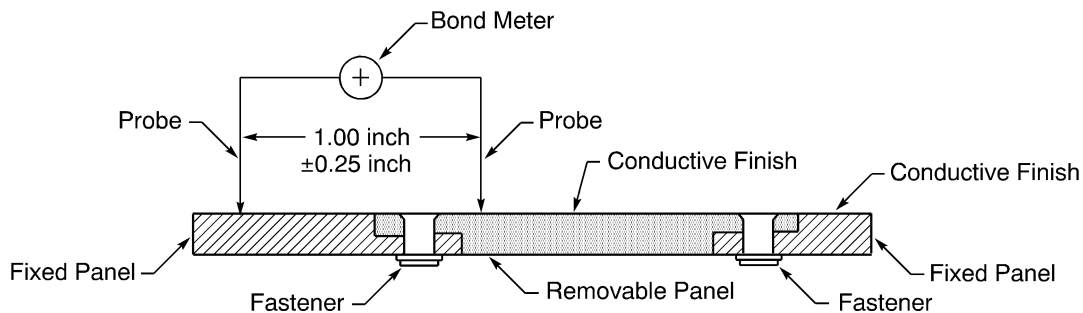
- Paragraph 16.A. for the general conditions for a bond test
- Paragraph 16.B. for the conditions and bond meters for a bond test in a not explosion hazard area
- Paragraph 16.C. for the conditions and bond meters for a bond test in an explosion hazard area
- Paragraph 15.C. for the maximum resistance values.

The location of the test points is shown in:

- Figure 55 for a fastener and a composite panel with a conductive finish
- Figure 56 for a removable panel with a conductive finish and a fixed panel with a conductive finish.



TEST POINTS FOR A FASTENER AND A COMPOSITE PANEL WITH A CONDUCTIVE FINISH
Figure 55



TEST POINTS FOR A REMOVABLE PANEL WITH A CONDUCTIVE FINISH AND A FIXED PANEL WITH A CONDUCTIVE FINISH
Figure 56

J. Bond Test of S280W555-() and YHLZG-() Ground Modules

Refer to Paragraph 15.I. for the maximum resistance.

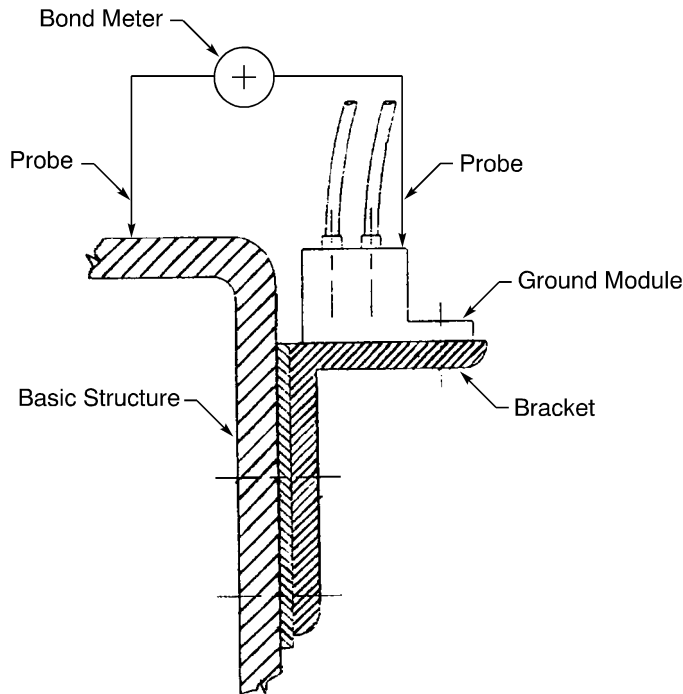
STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS

If designated grounds are terminated in a ground module, it is not necessary to measure the resistance between each individual wire and the basic structure. The ground module and the basic structure are sufficient as test points. Refer to Figure 57.

NOTE: To measure the resistance in a stow bin, the test points are either of these pairs:

- The ground module and the adjacent support structure of the stow bin
- The ground stud and the adjacent support structure of the stow bin.



TEST POINTS FOR A GROUND MODULE
Figure 57

K. Bond Test for Interference Fit Fastener

For the bond test of Interference Fit fastener, follow these steps:

- (1) If the bonding surface of the metal structure has a surface finish, then remove a sufficient area of the surface to allow the probe to touch the bonding surface. To remove the finish, Refer to Paragraph 1.E.

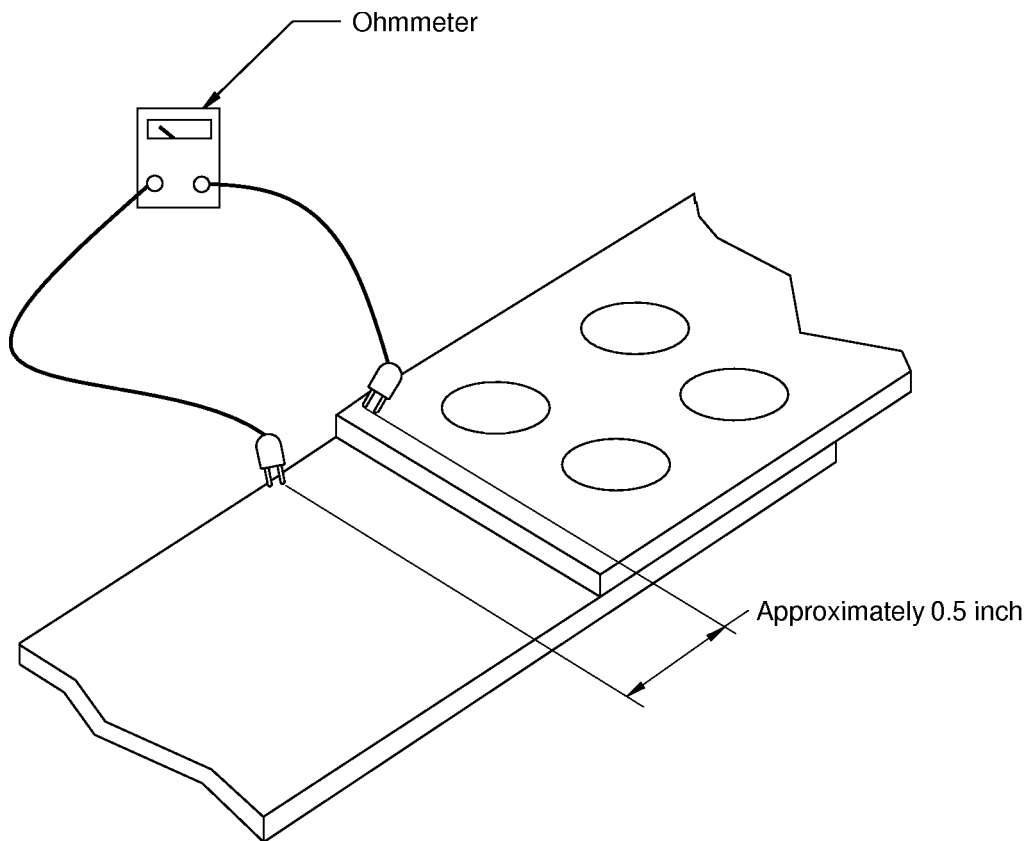
NOTE: AN ALTERNATE PROCEDURE WOULD BE TO CAREFULLY PIERCE THE SURFACE FINISH WITH THE PROBES TO LET THE PROBE TOUCH THE BONDING SURFACE.

- (2) Place the ohmmeter probes on the electrical bonded surfaces as shown in Figure 58.

NOTE: THE DISTANCE BETWEEN THE TEST PROBES CAN BE MORE THAN THE VALUE SHOWN IN FIGURE 58. IF THE MEASURED RESISTANCE AT THE INCREASED DISTANCE IS MORE THAN ALLOWED, THEN DO THE TEST AGAIN WITH THE PROBES AT THE DISTANCE SHOWN.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL BONDS AND GROUNDS



BOND TEST FOR INTERFERENCE FIT FASTENER
Figure 58



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STANDARD WIRING PRACTICES MANUAL

REPLACEMENT OF GROUND STUDS

<u>Paragraph</u>		<u>Page</u>
1.	<u>GROUND STUD REMOVAL</u>	1
	A. Removal of a BACS53B Ground Stud	1
2.	<u>GROUND STUD INSTALLATION</u>	3
	A. Installation of a BACS53B Ground Stud	3

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STANDARD WIRING PRACTICES MANUAL

REPLACEMENT OF GROUND STUDS

1. GROUND STUD REMOVAL

A. Removal of a BACS53B Ground Stud

NOTE: The ST2336A-1 tools is used as:

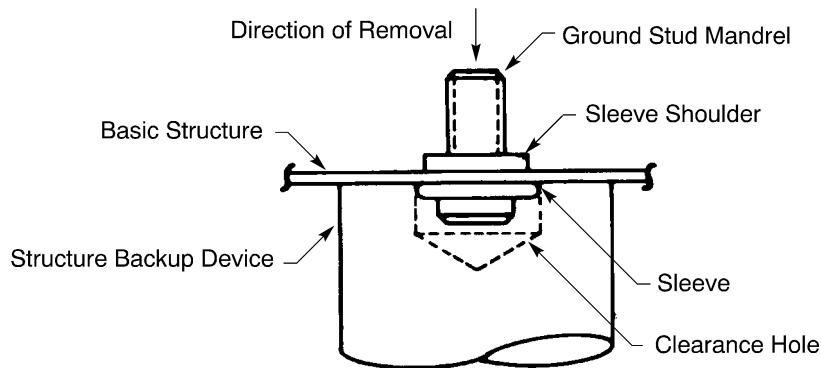
- A structure backup device
- A reamer clamp assembly.

**Table 1
GROUND STUD REMOVAL TOOLS**

Tool	Part Number	Supplier
C-clamp Assembly	ST2336A-11	Boeing
Drill Bushing	ST2336A-3	Boeing
Handle	ST2336A-9	Boeing
Reamer Clamp Assembly	ST2336A-1	Boeing
Structure Backup Device	ST2336A-1	Boeing

- (1) Remove the ground stud mandrel.

Refer to Figure 1.



**REMOVAL OF THE GROUND STUD MANDREL
Figure 1**

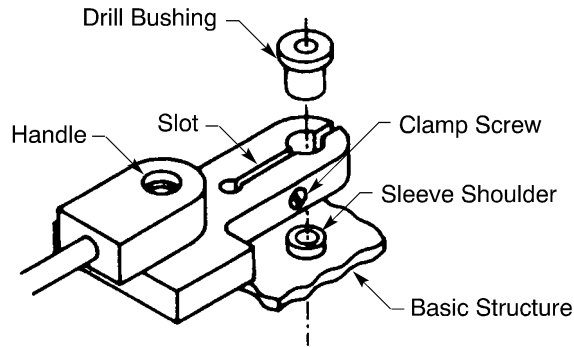
- (a) Make a selection of a structure backup device from Table 1.

NOTE: As an alternative, a special C-clamp assembly can be used. Refer to Table 1.

- (b) Put the device against the basic structure so that it is over the end of the ground stud that is opposite the long part of the mandrel.
- (c) Carefully hit the end of the mandrel with a hammer until it becomes loose.
Make sure that the force is applied in the direction that is parallel to the longitudinal axis of the mandrel.

- (2) Remove the ground stud sleeve.

Refer to Figure 2.

STANDARD WIRING PRACTICES MANUAL**REPLACEMENT OF GROUND STUDS****REMOVAL OF THE GROUND STUD SLEEVE****Figure 2**

- (a) Make a selection of these tools from Table 1:
 - A reamer clamp assembly
 - A handle.
 - (b) Put the reamer clamp over the sleeve shoulder of the ground stud so that the hole of the clamp is aligned with the hole of the sleeve.
 - (c) Put the drill bushing in the hole of the reamer clamp.
 - (d) Tighten the clamp screw until the sleeve should be tightly held.
 - (e) Put the handle on the reamer clamp so that the sleeve does not turn when it is drilled.
 - (f) Drill the sleeve out with a 0.260 inch x 0.309 inch diameter, 2 step drill.
 - (g) Remove the reamer clamp.
 - (h) Remove any remaining part of the sleeve.
- (3) If it is necessary, remove any oxide film from the hole with a 5/16 inch diameter expansion reamer or a stainless steel brush.

STANDARD WIRING PRACTICES MANUAL

REPLACEMENT OF GROUND STUDS

CAUTION: IF A REAMER IS USED, MAKE SURE THAT THE HOLE DOES NOT BECOME LARGER. IF THE HOLE DIAMETER IS GREATER THAN 0.317 INCH, A NEW GROUND STUD CANNOT BE SATISFACTORILY INSTALLED.

CAUTION: DO NOT PERMIT ANY INSULATION MATERIAL OR OTHER CONTAMINATION TO GO INTO THE HOLE.

2. GROUND STUD INSTALLATION

A. Installation of a BACS53B Ground Stud

**Table 2
BACS53B() GROUND STUDS**

Boeing Standard	Installation Dimensions (inch)	
	Structure Thickness T	Head Clearance H
BACS53B1EA1	0.03	0.157
	0.04	0.157
	0.05	0.157
	0.06	0.157
	0.07	0.152
	0.08	0.142
	0.09	0.132
BACS53B1EA2	0.08	0.185
	0.09	0.185
	0.10	0.185
	0.12	0.175
	0.14	0.155

**Table 3
BACS53B GROUND STUD INSTALLATION TOOLS**

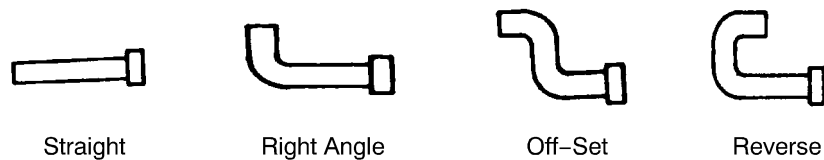
Power Unit		Puller Head		
Part Number	Supplier	Configuration	Part Number	Supplier
RV14GB	Allfast	Straight	ST1088PH	Boeing

STANDARD WIRING PRACTICES MANUAL

REPLACEMENT OF GROUND STUDS

Table 3 (continued)

Power Unit		Puller Head		
Part Number	Supplier	Configuration	Part Number	Supplier
RV30GB	Allfast	Straight	RV911-10	Allfast
			VST 1116-10	Fairchild
		Right Angle	RV981-10	Allfast
			VST 1049-10	Fairchild
		Off-Set	RV971-10	Allfast
			VST 1050-10	Fairchild
		Reverse	-	Allfast
			VST 1048-10	Fairchild



GROUND STUD PULLER HEAD CONFIGURATIONS

Figure 3

- (1) Make a selection an installation tool from Table 3. Refer to Figure 3.
- (2) Make an inspection of the ground stud hole to make sure that there is not any insulation material or other contamination in the hole.
- (3) Put the ground stud in the puller head of the tool.

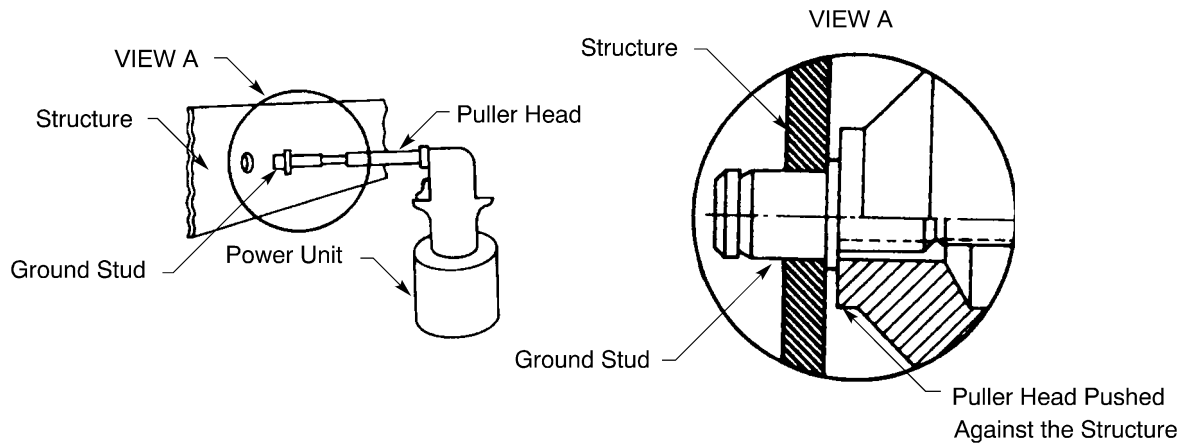
CAUTION: DO NOT MOVE THE TRIGGER UNTIL THE GROUND STUD IS IN THE CORRECT POSITION IN RELATION TO THE HOLE AND THE STRUCTURE.

- (4) Put the ground stud into the hole with the puller head so that:
 - The puller head of the tool is against the structure
 - The longitudinal axis of the ground stud is perpendicular to the structure.

Refer to Figure 4.

STANDARD WIRING PRACTICES MANUAL

REPLACEMENT OF GROUND STUDS



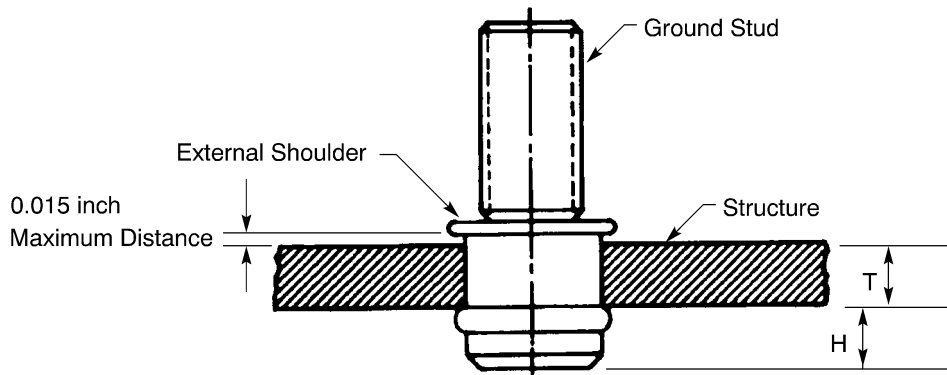
POSITION OF THE GROUND STUD AND THE INSTALLATION TOOL

Figure 4

- (5) Pull the trigger of the power unit of the installation tool.
- (6) Make an inspection of the ground stud head in relation to the structure. Refer to Figure 5.

NOTE: A Boeing ST8711T tool can be used for to measure the distance from the top of the head of the ground stud to the structure.

Make sure that Dimension H is not greater than the specified value in Table 2.



INSTALLED BACS53B GROUND STUD

Figure 5

- (7) Put a nut on the ground stud.
- (8) Torque the nut 35 inch-pounds.
- (9) If the ground stud does not turn when it is torqued, remove the nut.
- (10) If the ground stud turns when it is torqued:
 - (a) Remove the ground stud. Refer to Paragraph 1.
 - (b) Replace the ground stud with a 1/4-28 ground stud assembly. Refer to Subject 20-20-00.
 - (c) Remove the terminals from the wires that will be attached to the ground stud.



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STANDARD WIRING PRACTICES MANUAL

REPLACEMENT OF GROUND STUDS

- (d) Assemble a terminal of the correct size on each ground wire. Refer to Subject 20-30-11.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY YHLZG GROUND BLOCK MODULES

<u>Paragraph</u>		<u>Page</u>
1.	<u>PART NUMBERS AND DESCRIPTION</u>	1
	A. Ground Block Part Numbers	1
	B. Contact Part Numbers	1
2.	<u>GROUND BLOCK MODULE DISASSEMBLY</u>	2
	A. Contact Removal	2
3.	<u>GROUND BLOCK MODULE ASSEMBLY</u>	3
	A. Contact Selection	3
	B. Contact Assembly	5
	C. Contact Insertion	6

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STANDARD WIRING PRACTICES MANUAL

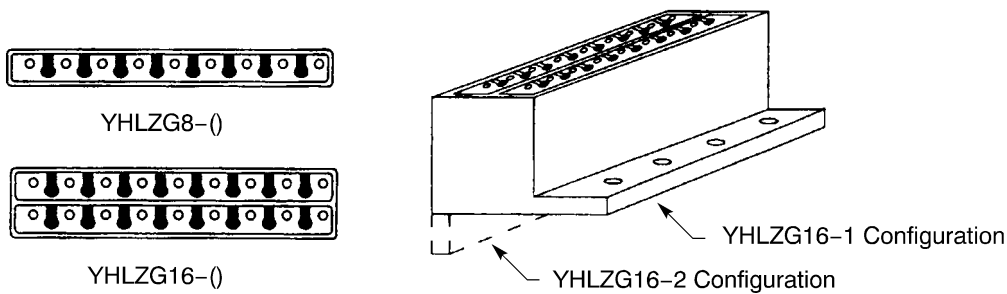
ASSEMBLY OF BURNDY YHLZG GROUND BLOCK MODULES

1. PART NUMBERS AND DESCRIPTION

A. Ground Block Part Numbers

**Table 1
GROUND BLOCK PART NUMBERS**

Part Number	Configuration	Supplier
YHLZG8-1	8 Socket Common Bus	Burndy
YHLZG8-1	8 Socket Common Bus	Burndy
YHLZG16-1	16 Socket Common Bus	Burndy
YHLZG16-2	16 Socket Common Bus	Burndy



**CONFIGURATIONS OF THE BURNDY YHLZG GROUND BLOCK MODULE
Figure 1**

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

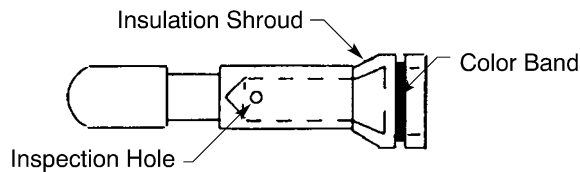
Boeing Standard	Part Number	Supplier
BACC47DE1	YHMM16-1F50	Burndy
BACC47DE1A	YHMM16-6D28	Burndy
	417-1215-332	Tri-Star
BACC47DE3	YHMM22-1DB8	Burndy
BACC47DE3A	YHMM22-4D28	Burndy
	417-1223-332	Tri-Star
BACC47DE4	YHMM22-2DB8	Burndy
BACC47DE4A	YHMM22-5D28	Burndy
	417-1222-332	Tri-Star
BACC47DE5	YHMM16-4F50	Burndy

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY YHLZG GROUND BLOCK MODULES

Table 2 (continued)

Boeing Standard	Part Number	Supplier
BACC47DE5A	YHMM16-7D28	Burndy
	417-1216-332	Tri-Star
BACC47DE6	YHMM18-2F50	Burndy
BACC47DE6A	YHMM18-3D28	Burndy
	417-1218-332	Tri-Star
BACC47DE7	YHMM20-2DB8	Burndy
BACC47DE7A	YHMM20-3D28	Burndy
	417-1220-332	Tri-Star
BACC47DE8	YHMM24-1F50	Burndy
BACC47DE8A	YHMM24-3D28	Burndy
	417-1224-332	Tri-Star



BACC47DE(A) CONTACT
Figure 2

2. GROUND BLOCK MODULE DISASSEMBLY

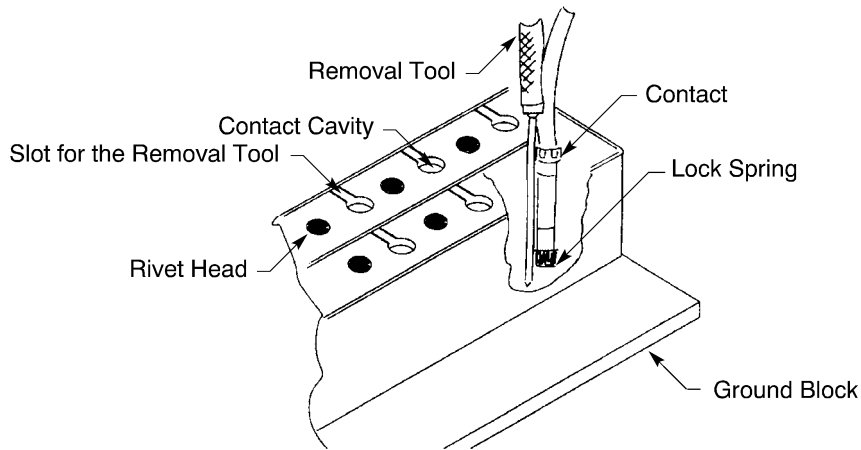
A. Contact Removal

Table 3
CONTACT REMOVAL TOOLS

Removal Tool		Supplier
Handle	Tip	
ATB3062-2	-	Astro
DHK21	-	Daniels
J-1276-1	-	Burndy
ST2220-3-34A-1	ST2220-3-34A-3	Boeing
ST2220-3-34A-2	ST2220-3-34A-8	Boeing

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY YHLZG GROUND BLOCK MODULES



CONTACT REMOVAL
Figure 3

- (1) Make a selection of a contact removal tool from Table 3.

CAUTION: ONLY THE REMOVAL TOOLS THAT ARE GIVEN IN TABLE 3 PERMITTED. OTHER REMOVAL TOOLS CAN CAUSE DAMAGE TO THE MODULE.

- (2) Put the tip of the removal tool in the slot that is adjacent to the contact cavity. Refer to Figure 3.
- (3) Push the tool into the slot and into the module until it stops.

This releases the lock spring that holds the contact in position. Refer to Figure 3.

CAUTION: IF REMOVAL OF THE CONTACT IS TRIED BEFORE THE LOCK SPRING IS RELEASED, DAMAGE TO THE CONTACT, THE MODULE, OR THE WIRE CAN OCCUR.

- (4) Carefully pull the wired contact from the contact cavity.
- (5) Pull the removal tool out of the slot.

3. GROUND BLOCK MODULE ASSEMBLY

A. Contact Selection

NOTE: The BACC47DE()A contacts are replacements for the BACC47DE() contacts.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY YHLZG GROUND BLOCK MODULES

**Table 4
CONTACT SELECTION**

Wire Size (AWG)	Insulation Diameter (inch)		Contact		
	Minimum	Maximum	Boeing Standard	Finish	Color Band
24	0.032	0.045	BACC47DE8A	Gold	Violet
			BACC47DE8	Silver	Green
	0.041	0.065	BACC47DE4A	Gold	Green
			BACC47DE4	Gold	Green
	0.070	0.080	BACC47DE3A	Gold	None
			BACC47DE3	Gold	None
22	0.047	0.065	BACC47DE7A	Gold	Red
			BACC47DE7	Gold	Red
	0.041	0.065	BACC47DE4A	Gold	Green
			BACC47DE4	Gold	Green
	0.070	0.080	BACC47DE3A	Gold	None
			BACC47DE3	Gold	None
20	0.047	0.065	BACC47DE7A	Gold	Red
			BACC47DE7	Gold	Red
	0.056	0.069	BACC47DE6A	Gold	Black
			BACC47DE6	Silver	Black
	0.063	0.083	BACC47DE5A	Gold	Blue
			BACC47DE5	Silver	Red
	0.080	0.110	BACC47DE1A	Gold	Brown
			BACC47DE1	Silver	None
18	0.056	0.069	BACC47DE6A	Gold	Black
			BACC47DE6	Silver	Black
	0.063	0.083	BACC47DE5A	Gold	Blue
			BACC47DE5	Silver	Red
	0.080	0.110	BACC47DE1A	Gold	Brown
			BACC47DE1	Silver	None
16	0.063	0.083	BACC47DE5A	Gold	Blue
			BACC47DE5	Silver	Red
	0.080	0.110	BACC47DE1A	Gold	Brown
			BACC47DE1	Silver	None

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY YHLZG GROUND BLOCK MODULES

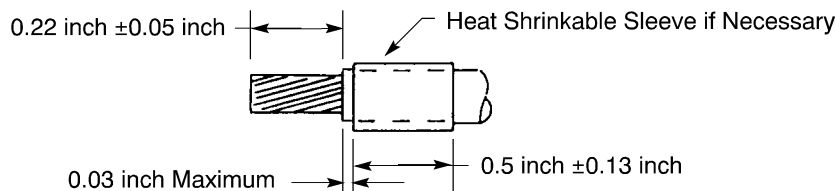
- (1) Use BACC47DE4 or BACC47DE4A contacts for these wires:
 - BMS 13-51 Type XXVI AWG 22
 - BMS 13-48 Type IX AWG 20
 - Haveg 51-04570
 - Haveg 51-04569.
- (2) For BMS 13-48 Type VIII AWG 20 wire, use BACC47DE7 or BACC47DE7A contacts.
- (3) For all other wires:
 - Find the wire size.
 - Measure the outer diameter of the insulation of the wire.
 - Make a selection of the contact from Table 4.

B. Contact Assembly

**Table 5
CONTACT CRIMP TOOLS**

Basic Unit	Die	Locator	Supplier
M10S-1	S-1	SL-53	Burndy
11210	-	612245	Astro

- (1) Remove 0.22 inch \pm 0.05 inch of insulation from the end of the wire. Refer to Figure 4.



**WIRE PREPARATION
Figure 4**

- (2) If the diameter of the wire insulation is not within the minimum and maximum diameter for the contact:
 - (a) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
 - (b) Put a 0.5 inch \pm 0.13 inch length of the heat shrinkable sleeve on the wire. Refer to Figure 4.
Make sure that:
 - The sleeve has the smallest diameter that will fit over the wire
 - The forward end of the sleeve is aligned with or is within 0.03 inch of the end of the insulation of the wire.
 - (c) Shrink the sleeve in its position. Refer to Subject 20-10-14.
Make sure that the forward end of the sleeve is aligned with, or is within 0.03 inch of the end of the insulation of the wire.
- (3) Put the conductor into the wire barrel of the contact.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY YHLZG GROUND BLOCK MODULES

Make sure that:

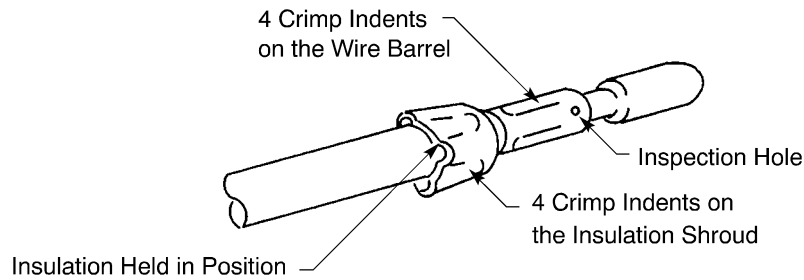
- The conductor can be seen in the inspection hole
- The wire insulation is against the bottom of the insulation shroud of the contact.

(4) Make a selection of a crimp tool from Table 5.

(5) Crimp the contact. Refer to Figure 5.

Make sure that there are 4 crimp indents on:

- The insulation shroud of the contact to hold the insulation
- The wire barrel of the contact to hold the wire.

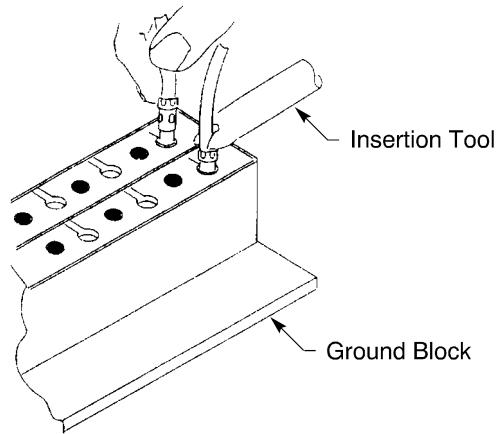


POSITION OF THE CRIMP INDENTS ON THE CONTACT
Figure 5

C. Contact Insertion

Table 6
CONTACT INSERTION TOOLS

Insertion Tool	Supplier
ATB3062-2	Astro
DHK21	Daniels
J-1276-1	Burndy
ST2220-3-34A-1	Boeing
ST2220-3-34A-2	Boeing

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BURNDY YHLZG GROUND BLOCK MODULES**

CONTACT INSERTION
Figure 6

Refer to Figure 6.

- (1) Make a selection of a contact insertion tool from Table 6.
- (2) Put the wired contact into the contact cavity of the module.
- (3) Push the tip of the insertion tool onto the end of the contact.
- (4) Push the tool and the contact into the contact cavity until it is fully inserted.
- (5) Make sure the contact is locked in the contact cavity of the module:
 - (a) Lightly hold the wire between the thumb and the forefinger.
 - (b) Pull slowly until the thumb and the forefinger move on the wire.

CAUTION: DO NOT CAUSE DAMAGE TO THE WIRE INSULATION WITH THE FINGERNAILS.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF A DUAL GROUND

<u>Paragraph</u>		<u>Page</u>
1.	<u>PART NUMBERS AND DESCRIPTION</u>	1
	A. BACT12G Terminal Part Numbers	1
2.	<u>DUAL GROUND ASSEMBLY</u>	1
	A. Wire Preparation	1
	B. Assembly of Flag Terminals for a Dual Ground	2
3.	<u>OPERATION OF THE BURNDY MY28 CRIMP TOOL</u>	5
	A. Tool Description	5
	B. Tool Operation	6
4.	<u>APPROVED TOOL SUPPLIERS</u>	6
	A. Crimp Tools	6

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF A DUAL GROUND

1. PART NUMBERS AND DESCRIPTION

A. BACT12G Terminal Part Numbers

**Table 1
BACT12G TERMINAL PART NUMBERS**

Wire Size (AWG)	Crimp Barrel Size	Ground Stud Size	Boeing Standard	Supplier Part Number	Supplier
8	8	10	BACT12G81	YBM8C	Burndy
				FCI	
		1/4	BACT12G82	YBM8C-T2	Burndy
				YBM8CT2	FCI
6	6	1/4	BACT12G62	YBM6C-L	Burndy
				YBM6CL	FCI
		5/16	BACT12G64	YBM6C-L2	Burndy
				YBM6CL2	FCI
4	4	1/4	BACT12G42	YBM4C-L	Burndy
				YBM4CL	FCI
		3/8	BACT12G44	YBM4C-L2	Burndy
				YBM4CL2	FCI
2	2	1/4	BACT12G23	YBM2C-L1	Burndy
				YBM2CL1	FCI
		3/8	BACT12G24	YBM2C-L	Burndy
				YBM2CL	FCI
1/0	1/0	3/8	BACT12G102	YBM25-L	Burndy
				YBM25L	FCI
2/0	2/0	3/8	BACT12G202	YBM26-L	Burndy
				YBM26L	FCI

2. DUAL GROUND ASSEMBLY

A. Wire Preparation

**Table 2
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Terminal	Removal Length L (inch)	
		Target	Tolerance
8	BACT12G81	1.88	0.06
	BACT12G82	1.88	0.06

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF A DUAL GROUND

Table 2 (continued)

Wire Size (AWG)	Terminal	Removal Length L (inch)	
		Target	Tolerance
6	BACT12G62	1.88	0.06
	BACT12G64	1.88	0.06
4	BACT12G42	1.88	0.06
	BACT12G44	1.88	0.06
2	BACT12G23	1.88	0.06
	BACT12G24	1.88	0.06
1/0	BACT12G102	2.00	0.06
2/0	BACT12G202	2.00	0.06

- (1) Cut the wire so that the end of the wire is perpendicular to its longitudinal axis.
- (2) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (3) Put a 1 inch length of the heat shrinkable sleeve on the wire.
- (4) Remove the necessary length of insulation from the end of the wire.

Refer to Table 2 and Figure 1.

B. Assembly of Flag Terminals for a Dual Ground

**Table 3
CRIMP TOOLS FOR BACT12G AND BURNDY YBM SERIES FLAG TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool						
	Basic Unit	Type	Head	Adapter	Nest	Indenter	
8	BAT35	Battery Powered	-	Y35P3	UV8B-1	Y29PBL	
	MY28	Large Adjustable Hand Tool	-	-	-	-	
	Power Pump	-	BDHD1	-	-	DV8BL-1	Y29PBL-1
			Y29B	-	-	DV8BL	Y29PBL
			Y35BH	Y35P3	UV8B-1	Y29PBL-1	Y29PBL
	Y29BH	Hydraulic Head	-	-	DV88	Y29PBL	
	Y29NC	Pneumatic Head	-	-	DV88	Y29PBL	
	Y35	Hydraulic Hand	-	Y35P3	UV8B-1	Y29PBL	
	Y6NP-5	-	Y29B	-	DV88	Y29PBL	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF A DUAL GROUND

Table 3 (continued)

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Type	Head	Adapter	Nest	Indenter
6	BAT35	Battery Powered	-	Y35P3	UV6B-1	Y29PBL
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV6BL	Y29PBL-1
			Y29B	-	DV6BL	Y29PBL
			Y35BH	Y35P3	UV6B-1	Y29PBL-1
	Y29BH	Hydraulic Head	-	-	DV6L	Y29PBL
	Y29NC	Pneumatic Head	-	-	DV6L	Y29PBL
	Y35	Hydraulic Hand	-	Y35P3	UV6B-1	Y29PBL
Y6NP-5	-	Y29B	-	DV6L	Y29PBL	
4	BAT35	Battery Powered	-	Y35P3	UV4B-1	Y29PL
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV4BL	Y29PBL
			Y29B	-	DV4BL	Y29PBL
			Y35BH	Y35P3	UV4B-1	Y29PL
	Y29BH	Hydraulic Head	-	-	DV4BL	Y29PBL
	Y29NC	Pneumatic Head	-	-	DV4BL	Y29PBL
	Y35	Hydraulic Hand	-	Y35P3	UV4B-1	Y29PL
Y6NP-5	-	Y29B	-	DV4BL	Y29PBL	
2	BAT35	Battery Powered	-	Y35P3	UV2B-1	Y29PA
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV2BL	Y29PBL
			Y29B	-	DV2BL	Y29PBL
			Y35BH	Y35P3	UV2B-1	Y29PA
	Y29BH	Hydraulic Head	-	-	DV2BL	Y29PL
	Y29NC	Pneumatic Head	-	-	DV2BL	Y29PL
	Y35	Hydraulic Hand	-	Y35P3	UV2B-1	Y29PA
	Y35BH	-	-	Y35P3	UV2B-1	Y29PA
Y6NP-5	-	Y29B	-	DV2BL	Y29PL	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF A DUAL GROUND

Table 3 (continued)

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Type	Head	Adapter	Nest	Indenter
1/0	BAT35	Battery Powered	-	Y35P3	UV25B-1	Y29PA-1
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV25BL-1	Y29PR
			Y29B	-	DV25BL DV25BL-1	
			Y35BH	Y35P3	UV25B-1	Y29PA Y29PA-1
	Y29BH	Hydraulic Head	-	-	DV25BL	Y29PR
	Y29NC	Pneumatic Head	-	-	DV25BL	Y29PR
	Y35	Hydraulic Hand	-	Y35P3	UV25B-1	Y29PA Y29PA-1
	Y6NP-5	-	Y29B	-	DV25BL	Y29PR
2/0	BAT35	Battery Powered	-	Y35P3	UV26B-1	Y29PA-1
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV26BL	Y29PR
			Y29B	-	DV26BL	Y29PR
			Y35BH	Y35P3	UV26B-1	Y29PA-1
Y35	Hydraulic Hand	-	Y35P3	UV26B-1	Y29PA-1	

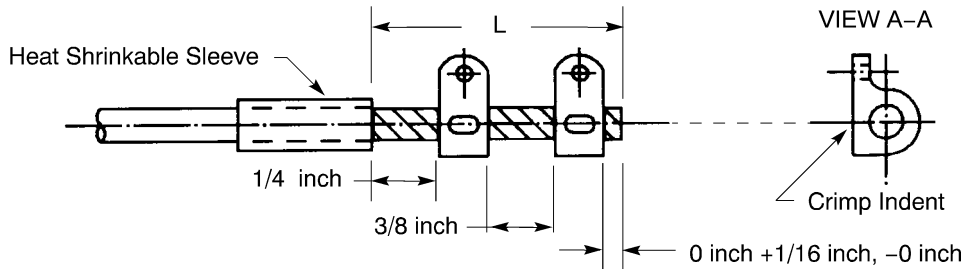
Table 4

GAGE PIN DIAMETERS FOR THE CALIBRATION OF THE BURNDY MY28 CRIMP TOOL

Terminal Crimp Barrel Size	Gage Pin Diameter (inch)	
	Target	Tolerance
8	0.1360	0.0005
6	0.1360	0.0005
4	0.1960	0.0005
2	0.2950	0.0005
1/0	0.3906	0.0005
2/0	0.4375	0.0005

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF A DUAL GROUND



FLAG TERMINAL ASSEMBLY FOR A DUAL GROUND

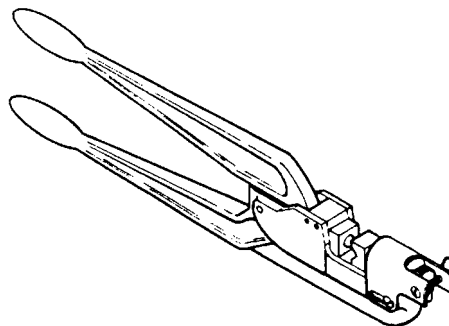
Figure 1

- (1) Make a selection of a crimp tool from Table 3.
NOTE: Refer to Paragraph 3. for the operation of the Burndy MY28 crimp tool.
- (2) Put both of the flag terminals in the correct position on the wire. Refer to Figure 1.
 Make sure that the tongues of the terminals are in the same plane.
 - (a) Push the inner terminal toward the wire insulation until the rear edge of the terminal is 1/4 inch from the end of the insulation.
 - (b) Push the outer terminal toward the inner terminal until the rear edge of the terminal is 3/8 inch from the forward edge of the inner terminal.
- (3) Crimp the outer terminal so that the conductor strands do not move apart.
- (4) Put the inner terminal in the correct position. Refer to Figure 1.
- (5) Crimp the inner terminal.
- (6) Push the heat shrinkable sleeve forward until the end of the sleeve is aligned with the rear end of the inner terminal.
- (7) Shrink the sleeve into position. Refer to Subject 20-10-14.

3. OPERATION OF THE BURNDY MY28 CRIMP TOOL

A. Tool Description

The MY28 crimp tool is an adjustable hand crimp tool. Refer to Figure 2.



BURNDY MY28 HAND CRIMP TOOL

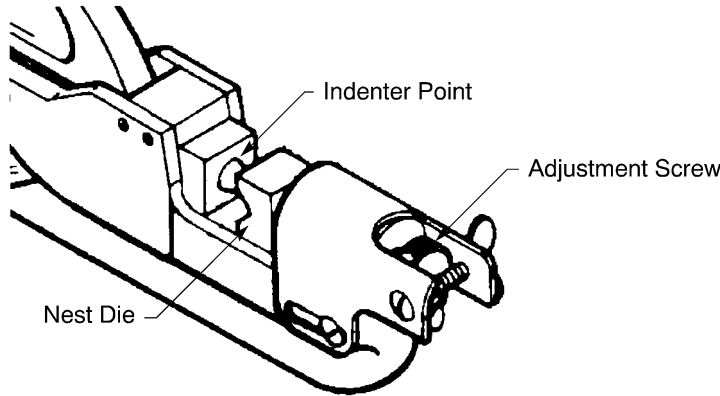
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF A DUAL GROUND

B. Tool Operation

- (1) Adjust the crimp depth. Refer to Figure 3.



LOCATION OF THE INDENTER POINT ON THE CRIMP TOOL
Figure 3

- (a) Move the tool handles to the closed position.
- (b) Make a selection of the correct size of gauge pin from Table 3.
- (c) Put the gauge pin directly under the indenter point.
- (d) Tighten the nest die with the adjustment screw.
- (2) Fully open the handles of the tool.
- (3) Put the terminal in the tool so that the flat side of the terminal is toward the indenter point.
- (4) Put the end of the wire in the crimp barrel of the terminal.
- (5) Close the handles fully.

4. APPROVED TOOL SUPPLIERS

A. Crimp Tools

Table 5
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
DV25BL	Burndy
DV2BL	Burndy
DV4BL	Burndy
DV6L	Burndy
DV88	Burndy
MY28	Burndy
Y29B	Burndy
Y29BH	Burndy



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF A DUAL GROUND

Table 5 (continued)

Crimp Tool	Supplier
Y29NC	Burndy
Y29PBL	Burndy
Y29PL	Burndy
Y29PR	Burndy
Y6NP-5	Burndy

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STANDARD WIRING PRACTICES MANUAL

GE90 POWER PLANT: WIRING REPAIR

<u>Paragraph</u>	<u>Page</u>
1. <u>GENERAL DATA</u>	1
A. Applicable Conditions for the Repair of GE90 Power Plant Wiring	1

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STANDARD WIRING PRACTICES MANUAL

GE90 POWER PLANT: WIRING REPAIR

1. GENERAL DATA

A. **Applicable Conditions for the Repair of GE90 Power Plant Wiring**

Unserviceable GE90 power plant wire harnesses that have General Electric part numbers must be returned to General Electric for repair.

CAUTION: THE DATA AND PROCEDURES IN THE SWPM ARE NOT APPLICABLE FOR THE REPAIR OF THE GE90 POWER PLANT WIRE HARNESSSES THAT HAVE A GENERAL ELECTRIC PART NUMBER. REPAIRS THAT ARE NOT APPROVED CAN CAUSE UNSATISFACTORY PERFORMANCE OR RELIABILITY OF A WIRE HARNESS.

Refer to:

- The remainder of the SWPM for a GE90 power plant wire harness that has a Boeing part number
- General Electric for problems with a GE90 power plant wire harness that has a General Electric part number.

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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

<u>Paragraph</u>		<u>Page</u>
1.	<u>GENERAL DATA</u>	1
	A. Applicable Conditions for the RB 211 Trent 800 Power Plant Wiring Repair Data	1
	B. RB 211 Trent 800 Power Plant Wiring Repair Data and Procedures	1

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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

1. GENERAL DATA

A. Applicable Conditions for the RB 211 Trent 800 Power Plant Wiring Repair Data

The data and procedures that are given in Subject 20-23-00 through Subject 20-23-39 are applicable only for the RB 211 Trent 800 power plant wire harnesses that have Rolls-Royce part numbers.

CAUTION: THE DATA AND PROCEDURES IN Subject 20-23-00 THROUGH Subject 20-23-39 ARE NOT APPLICABLE FOR THE REPAIR OF THE WIRING OF OTHER POWER PLANTS, OF OTHER POWER PLANT MANUFACTURERS, OR OF RB 211 TRENT 800 WIRING THAT HAS A BOEING PART NUMBER. REPAIRS THAT ARE NOT APPROVED CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRING.

Refer to:

- The remainder of the SWPM for an RB 211 Trent 800 power plant wire harness that has a Boeing part number
- Rolls-Royce for problems with the RB 211 Trent 800 power plant wiring repair data and procedures.

B. RB 211 Trent 800 Power Plant Wiring Repair Data and Procedures

Table 1
WIRING REPAIR DATA AND PROCEDURES

Wiring Repair Data or Procedure	Location
Connectors	Subject 20-23-01
Wire and Cable Types	Subject 20-23-03
Wiring Repair	Subject 20-23-15
Repair of Wire Harness Identification	Subject 20-23-16
Repair of Shielded Cables	Subject 20-23-17
Repair of Alternator Lead Wires	Subject 20-23-19
Wire Harness Disassembly and Assembly	Subject 20-23-30
Assembly of Terminal Lugs	Subject 20-23-32
Connector Disassembly and Assembly	Subject 20-23-37
Assembly of Backshells	Subject 20-23-39

20-23-00



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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTORS

<u>Paragraph</u>	<u>Page</u>
1. <u>GENERAL DATA</u>	1
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2. <u>PART NUMBERS AND DESCRIPTIONS</u>	1
A. Connector Part Numbers	1
B. ESC30() Contact Part Numbers	1
C. CA66279-106 Contact Part Numbers	2
D. ESC36() Seal Plug Part Numbers	2
3. <u>INSERT CONFIGURATIONS</u>	2
A. ESC10 and ESC11 Connectors	2
B. ITT Cannon CA66279-106 Connector	7

20-23-01 CONTENTS

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTORS

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. PART NUMBERS AND DESCRIPTIONS

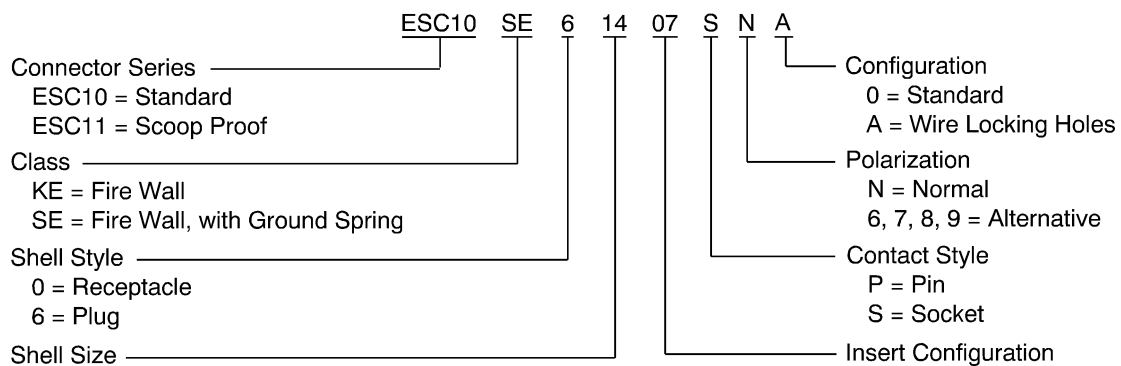
A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Contact Retention	Supplier
ESC10()	Rear Release	QPL
ESC11()	Rear Release	QPL
CA66279-106	Front Release	ITT Cannon

**Table 2
APPROVED SUPPLIERS OF ESC10() AND ESC11() CONNECTORS**

Standard	Supplier
ESC10()	Amphenol
	Deutsch
	Souriau
ESC11()	Amphenol
	Deutsch
	Souriau



**ESC10() CONNECTOR PART NUMBER STRUCTURE
Figure 1**

B. ESC30() Contact Part Numbers

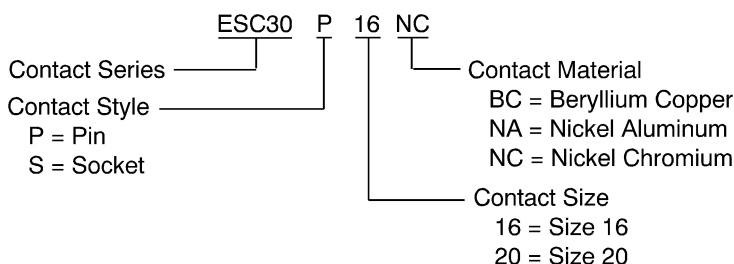
To find the contact part numbers, refer to the Aircraft Illustrated Parts Catalogue (AIPC).

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTORS

**Table 3
APPROVED SUPPLIERS**

Standard	Supplier
ESC30()	Amphenol
	Deutsch
	Souriau



**ESC30() CONTACT PART NUMBER STRUCTURE
Figure 2**

C. CA66279-106 Contact Part Numbers

To find the contact part numbers, refer to the Aircraft Illustrated Parts Catalogue (AIPC).

D. ESC36() Seal Plug Part Numbers

**Table 4
ESC() SEAL PLUG PART NUMBERS**

Part Number	Contact Cavity Size	Supplier
ESC3620	20	QPL
ESC3616	16	QPL

**Table 5
APPROVED SUPPLIERS OF ESC36() SEAL PLUGS**

Standard	Supplier
ESC36()	Amphenol
	Deutsch
	Souriau

3. INSERT CONFIGURATIONS

A. ESC10 and ESC11 Connectors

NOTE: The contact cavity size that is specified in Table 6 is equivalent to the size of the engaging end of the contact.

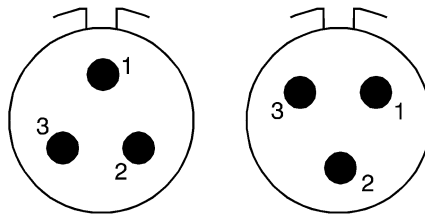
STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTORS

**Table 6
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Quantity	Size	
08-03	3	20	Figure 3
08-98	3	20	Figure 3
10-05	5	20	Figure 4
12-03	3	16	Figure 5
12-12	12	20	Figure 5
14-07	7	16	Figure 6
14-15	15	20	Figure 6
16-10	10	16	Figure 7
16-24	24	20	Figure 7
18-14	14	16	Figure 8
18-31	31	20	Figure 8
20-39	2	16	Figure 9
	37	20	Figure 9
20-41	41	20	Figure 9
22-19	19	16	Figure 10
22-55	55	20	Figure 10
24-30	30	16	Figure 11
24-61	61	20	Figure 11
28-42	42	16	Figure 12

NOTE: Figure 3 through Figure 12 show the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.



08-03

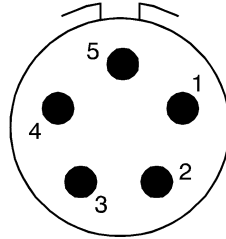
08-98

**08-() INSERT CONFIGURATIONS
Figure 3**

20-23-01

STANDARD WIRING PRACTICES MANUAL

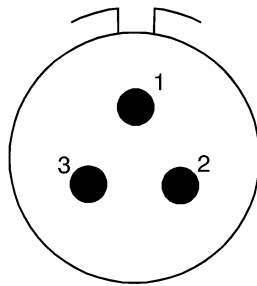
RB 211 TRENT 800 POWER PLANT: CONNECTORS



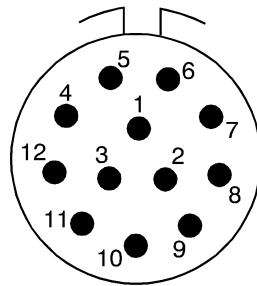
10-05

10-() INSERT CONFIGURATIONS

Figure 4



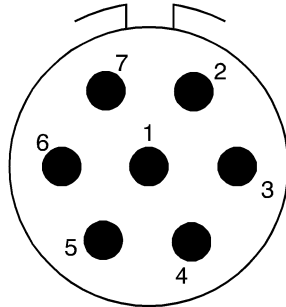
12-03



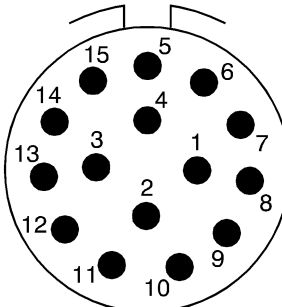
12-12

12-() INSERT CONFIGURATIONS

Figure 5



14-07



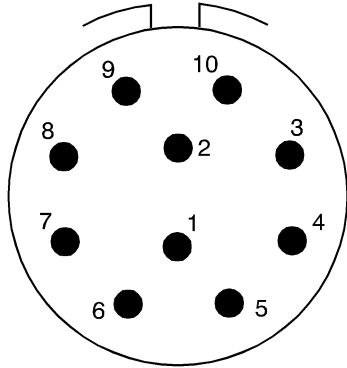
14-15

14-() INSERT CONFIGURATIONS

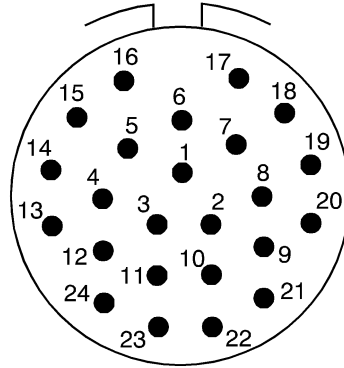
Figure 6

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTORS

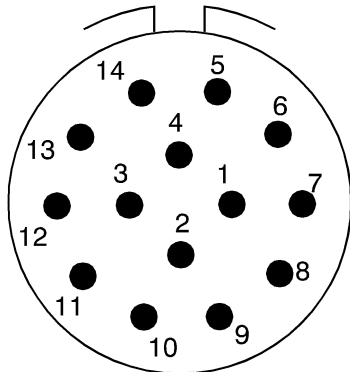


16-10

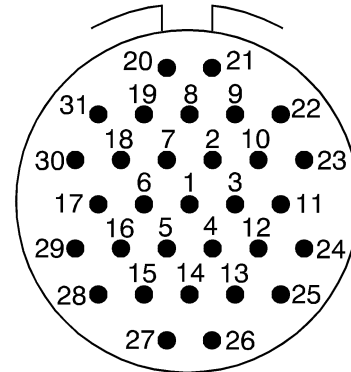


16-24

16-() INSERT CONFIGURATIONS
Figure 7



18-14

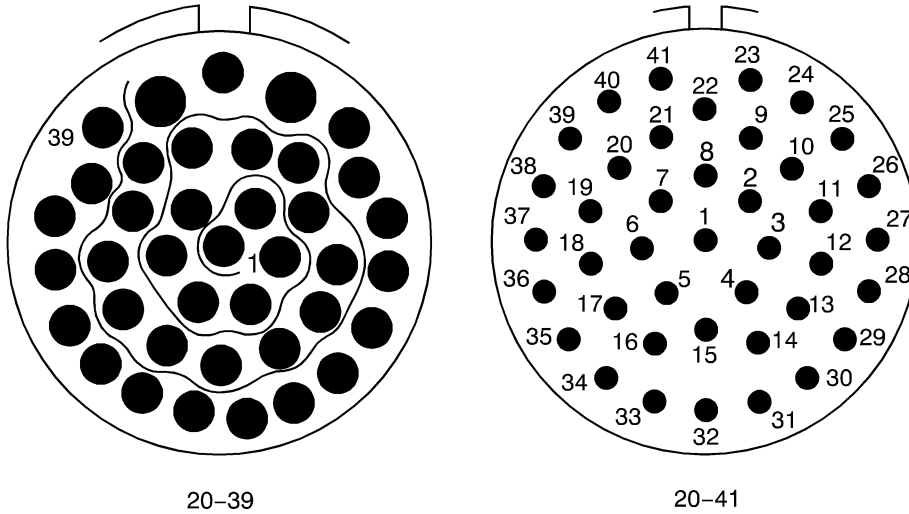


18-31

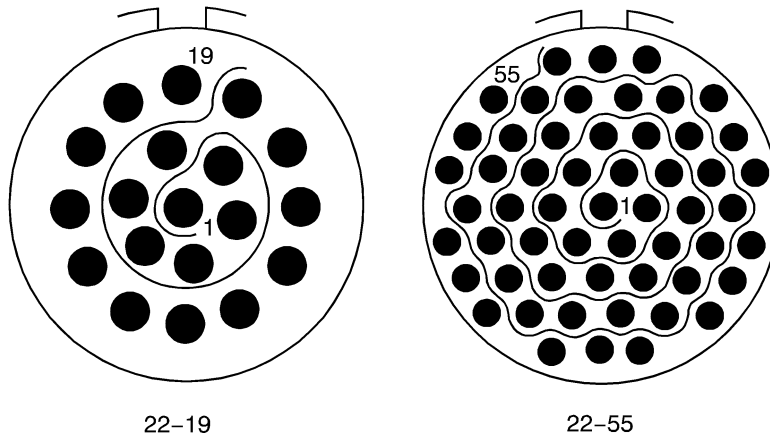
18-() INSERT CONFIGURATIONS
Figure 8

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTORS



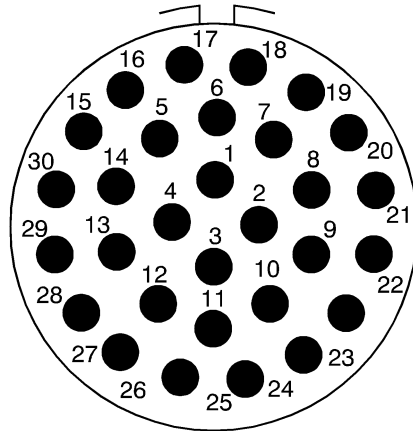
20-() INSERT CONFIGURATIONS
Figure 9



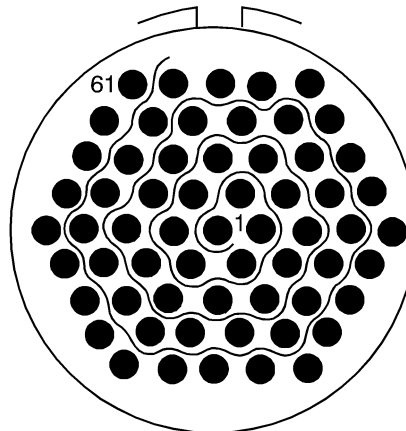
22-() INSERT CONFIGURATIONS
Figure 10

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTORS

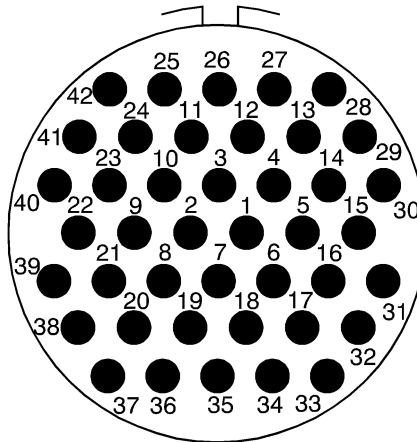


24-30



24-61

24-() INSERT CONFIGURATIONS
Figure 11



28-42

28-() INSERT CONFIGURATIONS
Figure 12

B. ITT Cannon CA66279-106 Connector

NOTE: The contact cavity size that is specified in Table 7 is equivalent to the size of the engaging end of the contact.

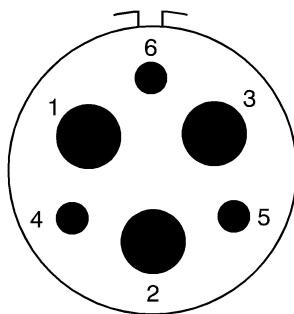
STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTORS

**Table 7
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Quantity	Size	
6	3	4	Figure 13
	3	16	Figure 13

NOTE: Figure 13 shows the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.



6

**INSERT CONFIGURATION 6
Figure 13**



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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRE AND CABLE TYPES

<u>Paragraph</u>		<u>Page</u>
1.	<u>GENERAL DATA</u>	1
	A. Applicable Conditions	1
2.	<u>WIRE SPECIFICATIONS</u>	1
	A. Specified Wire Part Numbers and Description	1
	B. Alternative Wires	1

20-23-03 CONTENTS

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRE AND CABLE TYPES

This Subject gives the wire part number data of the RB 211 Trent 800 power plant wiring.

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. WIRE SPECIFICATIONS

A. Specified Wire Part Numbers and Description

**Table 1
SPECIFIED WIRES**

Wire Specification	Conductors	Wire Size (AWG)	Material	Note
ESW1200-010-006	1	20	High Strength Copper Alloy	Fire Resistant
ESW1202-022-006	2	20	High Strength Copper Alloy	Fire Resistant, Twisted, 1 Shield
ESW1202-032-006	3	20	High Strength Copper Alloy	Fire Resistant, Twisted, 1 Shield
ESW1202-032-012	3	16	High Strength Copper Alloy	Fire Resistant, Twisted, 1 Shield
ESW1602-022-006	2	20	1 Alumel, 1 Chromel	Fire Resistant, Twisted, 1 Shield
Low Noise Cable	-	-	-	-
MI Cable	-	-	-	-
RTS71445	2	18	Nickel Clad Copper	Fire Resistant, Twisted, 1 Shield
RTS71446	3	18	Nickel Clad Copper	Fire Resistant, Twisted, 1 Shield
RTS77084	1	16	High Strength Copper Alloy	Fire Resistant, Shield
RTS77086	3	20	High Strength Copper Alloy	Twisted, 2 Shields
RTS77161	3	8	Nickel Clad copper	Twisted

B. Alternative Wires

**Table 2
ALTERNATIVE WIRES**

Specified Wire	Alternative Wire	
	Specification or Part Number	Supplier
ESW1200-010-006	BMS 13-55 Type II Class 1	Boeing
ESW1202-022-006	BMS 13-55 Type IV Class 2	Boeing
ESW1202-032-006	BMS 13-55 Type IV Class 3	Boeing
ESW1202-032-012	BMS 13-55 Type IV Class 3	Boeing
ESW1602-022-006	-	-
Low Noise Cable	-	-

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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRE AND CABLE TYPES

Table 2 (continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Supplier
MI Cable	-	-
RTS71445	BMS 13-55 Type III Class 2	Boeing
RTS71446	BMS 13-55 Type III Class 3	Boeing
RTS77084	BMS 13-55 Type IV Class 1	Boeing
RTS77086	-	-
RTS77161	BMS 13-58 Type I Class 3	Boeing

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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

<u>Paragraph</u>	<u>Page</u>
1. <u>GENERAL DATA</u>	1
A. Applicable Conditions	1
B. Damage and Repair Conditions	1
2. <u>WIRING COMPONENT REPLACEMENT</u>	4
A. Applicable Conditions for the Replacement of a Wiring Component	4
B. Replacement of a Contact	4
C. Replacement of a Connector	4
D. Replacement of a Backshell	5
E. Replacement of a Terminal Lug	5
F. Replacement of a Shielded Cable - Temporary Repair	5
G. Replacement of a Shielded Cable - Permanent Repair	9
3. <u>CLEANING OF ELECTRICAL CONNECTORS</u>	11
A. Removal of Liquid and Solid Contamination	11

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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

B. Damage and Repair Conditions

**Table 1
LOCATION OF DAMAGE AND REPAIR CONDITIONS**

Component	Location
Alternator Lead Wire	Table 2
Connector	Table 3
Identification Marker	Table 4
Shielded Cable	Table 5
Terminal Lug	Table 6

**Table 2
DAMAGE AND REPAIR CONDITIONS - ALTERNATOR LEAD WIRE**

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the shield	The shield is not in its original configuration	Replacement of the alternator	AMM
Damage that goes through the jacket	The area is more than 50 percent of the circumference of the cable	Replacement of the alternator	Subject 20-23-17
	The length is more than 2 inches (50 millimeters)	Replacement of the alternator	AMM
	The length is less than 2 inches (50 millimeters)	Repair of the jacket	Subject 20-23-17
		Replacement of the alternator	AMM
	The area is less than 50 percent of the circumference of the cable	Repair of the jacket	Subject 20-23-17
Replacement of the alternator		AMM	

**Table 3
DAMAGE AND REPAIR CONDITIONS - CONNECTOR COMPONENTS**

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the backshell	The backshell has corrosion	Replacement of the backshell	Paragraph 2.B.
	The backshell is not in its initial configuration	Replacement of the backshell	Paragraph 2.B.
Damage to the contact	The contact is not in its initial configuration	Replacement of the contact	Paragraph 2.D.
	The contact has corrosion	Replacement of the contact	Paragraph 2.D.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

Table 3 (continued)

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the connector shell	The connector shell is not in its initial configuration	Replacement of the connector	Paragraph 2.C.
	The connector shell has corrosion	Replacement of the connector	Paragraph 2.C.
Damage to the connector grommet	The grommet is oil soaked	Replacement of the connector	Paragraph 2.C.
	The grommet is swollen	Replacement of the connector	Paragraph 2.C.
The connector has contamination	The contamination cannot be removed	Replacement of the connector	Paragraph 2.C.
	The contamination can be removed	Cleaning of the connector	Paragraph 3.A.

Table 4

DAMAGE AND REPAIR CONDITIONS - IDENTIFICATION MARKER

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the identification marks	The marks cannot be read	Marker Replacement	Subject 20-23-16

Table 5

DAMAGE AND REPAIR CONDITIONS - SHIELDED CABLE

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the insulation of the component wire	The insulation of the component wires are have damage	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
Damage to the shield	The area of damage on the jacket is equal to or more than 50 percent of the circumference of the cable	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
	The area is less than 50 percent of the circumference of the cable	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17

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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

Table 5 (continued)

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage that goes through the jacket	The length is equal to or more than 2 inches (50 millimeters)	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
	The area is equal to or more than 50 percent of the circumference of the cable	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
	The length is less than 2 inches (50 millimeters)	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
		Repair of the jacket	Subject 20-23-17
	The area is less than 50 percent of the circumference of the cable	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
		Repair of the jacket	Subject 20-23-17

Table 6

DAMAGE AND REPAIR CONDITIONS - TERMINAL LUG

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the terminal lug	The terminal lug is not in its initial configuration	Replacement of the terminal lug	Paragraph 2.E.
	The terminal lug has corrosion	Replacement of the terminal lug	Paragraph 2.E.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: WIRING REPAIR****2. WIRING COMPONENT REPLACEMENT****A. Applicable Conditions for the Replacement of a Wiring Component**

If it is necessary to replace a component, the component must be replaced with a component that:

- Has the same part number
- Is a specified alternative component
- Is an equivalent component.

Refer to the WDM equipment list to find:

- The connector part number
- The backshell part number.

Refer to the WDM wire list to find:

- The wire type
- The wire size
- The wire color
- The wire length.

NOTE: For alternative wires and cables, refer to Subject 20-23-03.

Refer to the Aircraft Illustrated Parts Catalog (AIPC) to find:

- The contact part numbers
- The support bushing part numbers
- The part numbers of alternative connectors.

B. Replacement of a Contact

For the general conditions that are applicable for the replacement of a wiring component, refer to Paragraph 2.A.

- (1) Find the contact part number.

Refer to:

- The WDM to find the connector equipment number
- The Aircraft Illustrated Parts Catalog (AIPC) for the contact part number.

- (2) Cut the contact at the center of the crimp barrel.
- (3) Remove the remaining length of the contact crimp barrel from the end of the wire.
- (4) Examine the length of the wire.
- (5) If a wire is too short to install a new contact assembly in the connector, replace the wire or cable.

For the replacement of a shielded cable as:

- A temporary repair, refer to Paragraph 2.F.
- A permanent repair, refer to Paragraph 2.G.

NOTE: As an alternative, a new length of wire or cable can be added to the wire or cable with a splice. Refer to Subject 20-23-17.

- (6) Assemble the contact. Refer to Subject 20-23-37.

C. Replacement of a Connector

For the general conditions that are applicable for the replacement of a wiring component, refer to Paragraph 2.A.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: WIRING REPAIR**

- (1) Find the connector part number.

Refer to:

- The WDM for the part number
- The Aircraft Illustrated Parts Catalog (AIPC) for the alternative connector part number.

- (2) Disassemble the connector. Refer to Subject 20-23-37.
- (3) Assemble the new connector. Refer to Subject 20-23-37.

D. Replacement of a Backshell

For the general conditions that are applicable for the replacement of a wiring component, refer to Paragraph 2.A.

- (1) Find the backshell part number.

Refer to:

- The WDM for the part number
- The Aircraft Illustrated Parts Catalog (AIPC) for the alternative backshell part number.

- (2) Disassemble the backshell. Refer to Subject 20-23-37.
- (3) Assemble the new backshell. Refer to Subject 20-23-39.

E. Replacement of a Terminal Lug

For the general conditions that are applicable for the replacement of a wiring component, refer to Paragraph 2.A.

- (1) Find the terminal lug part number. Refer to the WDM.
- (2) Remove the installation nut or the installation bolt that holds the terminal lug.
- (3) Remove the heat shrinkable sleeve from the terminal lug and the wire.
- (4) Cut the terminal lug at the center of the crimp barrel.
- (5) Carefully remove the remaining length of the terminal lug crimp barrel from the conductor.
- (6) Examine the length of the wire.
- (7) If the wire is too short to install a new terminal lug assembly on the stud, replace the wire or the cable.

For the replacement of a shielded cable as:

- A temporary repair, refer to Paragraph 2.F.
- A permanent repair, refer to Paragraph 2.G.

- (8) Assemble the new terminal lug on the wire. Refer to Subject 20-23-32.

F. Replacement of a Shielded Cable - Temporary Repair

For the general conditions that are applicable for this procedure, refer to Paragraph 2.A.

This Paragraph gives the procedure to replace a cable as a temporary repair. For the procedure to replace a cable as a permanent repair, refer to Paragraph 2.G.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

CAUTION: REPLACEMENT OF A CABLE WITHOUT REMOVAL OF THE OLD CABLE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED AT THE SUBSEQUENT SCHEDULED AIRPLANE MAINTENANCE.

**Table 7
NECESSARY MATERIALS**

Material	Specification	Description	Supplier
Tape	A-A-5479	PTFE, Pressure Sensitive	An available source

(1) Make a selection of a tape from Table 7.

NOTE: An equivalent tape is a satisfactory alternative.

(2) Find the identification of the cable with damage.

(3) Find the part numbers of the contacts.

Refer to:

- The WDM to for the connector equipment number
- The Aircraft Illustrated Parts Catalog (AIPC) for the contact part numbers.

(4) Find the cable part number.

For wire type, wire class, wire size and wire length data, refer to the WDM.

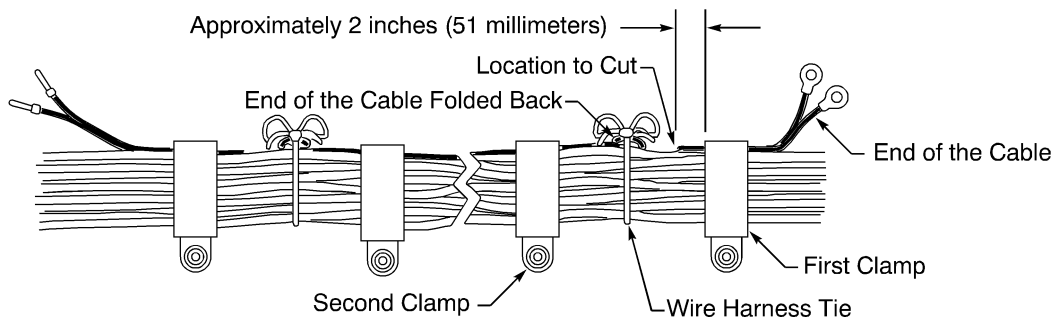
NOTE: An equivalent cable is a satisfactory alternative. Refer to Subject 20-23-03.

NOTE: It is not necessary to have the same wire color.

(5) Disassemble the connector on one end of the cable. Refer to Subject 20-23-37.

(6) Remove the wire harness ties between the end of the cable and the first wire harness clamp.

(7) Cut the cable between the first and second wire harness clamp approximately two inches (51 millimeters) from the first clamp. Refer to Figure 1.



**LOCATION TO CUT THE SHIELDED CABLE
Figure 1**

(8) Remove the end of cable held by the first clamp.

(9) Wind two layers of tape around the remaining end of the cable.

(10) Fold the end of the cable back on the wire harness.

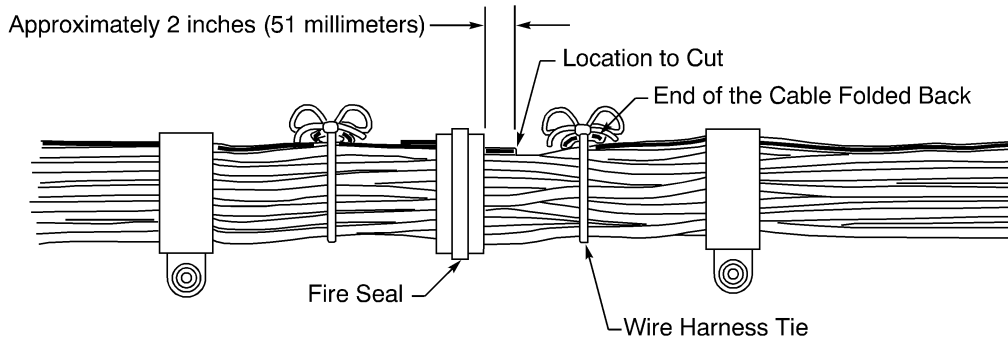
(11) Assemble a wire harness tie on the cable to hold it in its position. Refer to Subject 20-23-30.

(12) Do Step (5) through Step (11) again for the other end of the cable.

STANDARD WIRING PRACTICES MANUAL

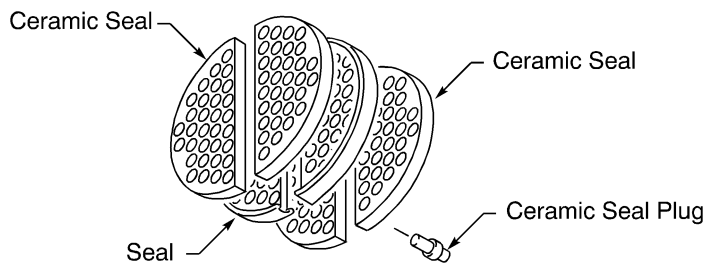
RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

- (13) If the damaged cable goes through a fire seal and it is known where the damaged cable goes through the seal:
 - (a) Remove the wire harness ties between one side of the seal and the first wire harness clamp.
 - (b) Cut the cable approximately 2 inches (51 millimeters) from the seal. Refer to Figure 2.



LOCATION TO CUT THE SHIELDED CABLE AT A FIRE SEAL
Figure 2

- (c) Wind two layers of tape around the end of the cable.
 - (d) Fold the end of the wire back against the wire harness.
 - (e) Assemble a wire harness tie on the end of the cable and the wire harness to hold the end of the cable in its position. Refer to Subject 20-23-30.
 - (f) Do Step (a) through Step (e) again on the other side of the seal.
 - (g) Remove the short piece of cable from the seal.
 - (h) Put the new cable through the hole in the seal.
- (14) If the damaged cable goes through a fire seal and it is not known where the cable goes through the seal:
 - (a) Disassemble the seal. Refer to Figure 3.

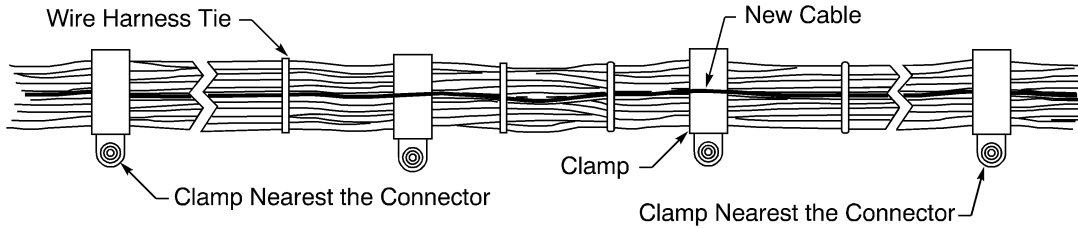


DISASSEMBLY OF THE FIRE SEAL
Figure 3

- (b) Remove a ceramic seal plug from the seal. Refer to Figure 3.
 - (c) Assemble the seal.
 - (d) Put the new cable through the hole in the seal.
- (15) Attach the new cable to the wire harness. Refer to Figure 4.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

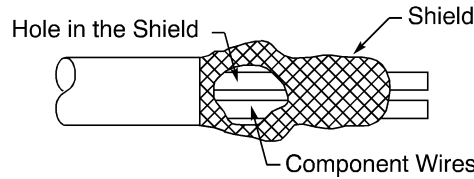


INSTALLATION OF A NEW CABLE

Figure 4

- (a) Put the new cable along the outer surface of the wire harness and the wire harness clamps. Make sure that the cable does not touch adjacent components and cannot rub against them.
 - (b) Put each end of the new cable through the clamp that is nearest the connector at each end of the cable.
 - (c) Assemble wire harness ties along the new cable. Refer to Subject 20-23-30.
- NOTE:** It is not necessary to assemble a wire harness tie at a clamp.
- (16) Prepare one end of the new cable.
- (a) Remove necessary length of the cable jacket. Make sure that the length of jacket that is removed on the new cable is the same as the length of jacket that is removed on the damaged cable.
 - (b) Push the shield rearward to expand it at the end of the jacket.
 - (c) Make a hole in the shield near the end of the cable jacket with a nylon tool. Refer to Figure 5.

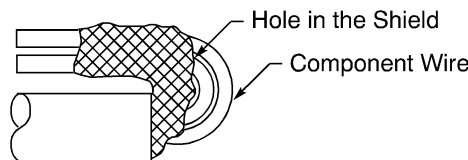
CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION CAN CAUSE A SHORT TO OCCUR.



PREPARATION OF THE HOLE IN THE SHIELD

Figure 5

- (d) Carefully bend the cable until the component wires can be seen in the hole. Refer to Figure 6.

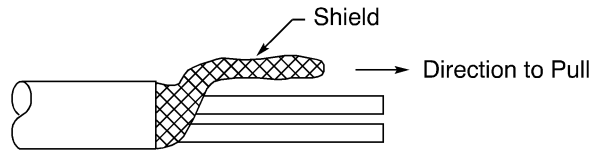


POSITION OF THE COMPONENT WIRES

Figure 6

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: WIRING REPAIR**

- (e) Pull one wire at a time through the hole in the shield.
- (f) Pull the shield tight to make a flat conductor. Refer to Figure 7.

**PREPARATION OF THE SHIELD GROUND WIRE****Figure 7**

- (g) Assemble the new contacts. Refer to Subject 20-23-37.
 - (h) Remove the identification marker for each contact from the old wires.
 - (i) Put the identification marker for each contact on the new wires.
- (17) Assemble the connectors at each end of the new cable. Refer to Subject 20-23-37.

G. Replacement of a Shielded Cable - Permanent Repair

For the general conditions that are applicable for this procedure, refer to Paragraph 2.A.

This Paragraph gives the procedure to replace a cable as a permanent repair. For the procedure to replace a cable as a temporary repair, refer to Paragraph 2.F.

- (1) Find the identification of the cable that has damage.
- (2) Find the part numbers of the contacts.

Refer to:

- The WDM to for the connector equipment number
- The Aircraft Illustrated Parts Catalog (AIPC) for the contact part numbers.

- (3) Find the cable part number.

For wire type, wire class, wire size, wire color, and wire length data, refer to the WDM.

Make sure that the new cable is a minimum of 0.75 inch (19 millimeters) longer than the length necessary to connect the connectors on the ends of the cable.

NOTE: An equivalent cable is a satisfactory alternative. Refer to Subject 20-23-03.

- (4) Remove the black equipment identification marker from the wire harness.

Make sure to put the identification marker in a safe place.

- (5) Disassemble the connector on one end of the cable. Refer to Subject 20-23-37.

- (6) Remove the damaged cable from the backshell and the support bushing.

- (7) Prepare one end of the new cable.

- (a) Remove necessary length of the cable jacket.

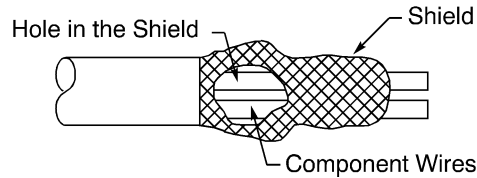
Make sure that the length of jacket that is removed is the same as the length of jacket that is removed on the damaged cable.

- (b) Push the shield rearward to expand it at the end of the jacket.

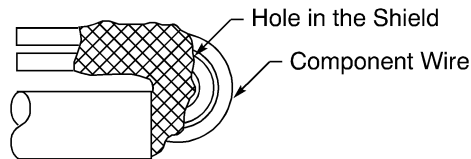
- (c) Make a hole in the shield near the end of the cable jacket with a nylon tool. Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: WIRING REPAIR**

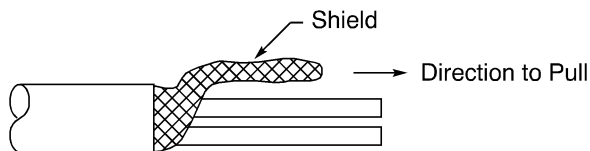
CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION CAN CAUSE A SHORT TO OCCUR.

**PREPARATION OF THE HOLE IN THE SHIELD****Figure 8**

- (d) Carefully bend the cable until the component wires can be seen in the hole. Refer to Figure 9.

**POSITION OF THE COMPONENT WIRES****Figure 9**

- (e) Pull one wire at a time through the hole in the shield.
(f) Pull the shield tight to make a flat conductor. Refer to Figure 10.

**PREPARATION OF THE SHIELD GROUND WIRE****Figure 10**

- (g) Assemble the new contacts. Refer to Subject 20-23-37.
(h) Remove the identification marker of each contact from the old wires.
(i) Put the identification marker of each contact on the new wires.
- (8) Remove the necessary length of cable from the other end of the cable.
(9) Do Step (7) again to prepare the other end of the cable.
(10) Put the ends of the cable through the backshell and the support bushing of each connector.
(11) Assemble the connector. Refer to Subject 20-23-37.
(12) Assemble the backshell. Refer to Subject 20-23-39.
(13) Remove the damaged cable from the wire harness. Refer to Subject 20-23-30.
(14) Install the new cable in the wire harness. Refer to Subject 20-23-30.
(15) Install the black identification marker on the wire harness.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

- (16) Install the receptacles in the engine bracket. Refer to Subject 20-23-37.
- (17) Connect the plug and the receptacle. Refer to Subject 20-23-37.
- (18) Do the necessary tests. Refer to the AMM.

3. CLEANING OF ELECTRICAL CONNECTORS

A. Removal of Liquid and Solid Contamination

**Table 8
NECESSARY TOOLS**

Tool	Specification	Description	Supplier
Brush	-	Solvent Resistant	An available source
Wiper	A-A-59323	Cloth, Lint Free	An available source
Spray Equipment	-	For solvent	An available source

**Table 9
SOLVENTS**

Specification	Description	Supplier
BDH 10224	Isopropanol, Analar Grade	An available source

- (1) Make a selection of these tools from Table 8:
 - A wiper
 - A brush or a spray equipment.

NOTE: An equivalent tool is a satisfactory alternative.

- (2) Make a selection of a solvent from Table 9.

NOTE: An equivalent solvent is a satisfactory alternative.

- (3) Apply the solvent to the contamination.
- (4) Use the brush or the solvent spray to remove the contamination.
- (5) Use a wiper to absorb the used solvent.

NOTE: Clean, dry compressed air is a satisfactory alternative to remove the remaining solvent.

CAUTION: DO NOT USE A COMPRESSED AIR SUPPLY WITH A PRESSURE THAT IS MORE THAN 15 POUNDS PER SQUARE INCH (1.03 BAR). DAMAGE TO THE CONNECTOR CAN OCCUR.

- (6) Dry the connector with clean, dry, compressed air.

CAUTION: DO NOT USE A COMPRESSED AIR SUPPLY WITH A PRESSURE THAT IS MORE THAN 15 POUNDS PER SQUARE INCH (1.03 BAR). DAMAGE TO THE CONNECTOR CAN OCCUR.

- (7) Examine the connector for remaining contamination.
- (8) If the connector has remaining contamination:
 - (a) Do Step (4) through Step (6) again.
 - (b) Examine the connector.



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- (c) If the connector has remaining contamination, replace the connector. Refer to Paragraph 2.C.

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RB 211 TRENT 800 POWER PLANT: REPAIR OF WIRE HARNESS IDENTIFICATION

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data of this Subject, refer to Subject 20-23-00.

2. REPLACEMENT OF A DISCONNECT OR A WIRE HARNESS MARKER

A. Location of a Marker

A marker for:

- A disconnect identification that is on the harness near each connector and backshell assembly
- A harness identification marker that is on the wire harness assembly at one location.

B. Replacement of a Marker

**Table 1
NECESSARY MATERIALS**

Description	Part Number	Supplier
Tape, Electrical, White Glass Cloth	Scotch 69	3M

**Table 2
NECESSARY TOOLS**

Description	Specification	Supplier
Pen, Ball Point, Black	DIN 16554/2	An available source

- (1) Make a selection of a tape from Table 1.

NOTE: An equivalent tape is a satisfactory alternative.

- (2) Make a selection of a pen from Table 2.

NOTE: An equivalent pen is a satisfactory alternative.

- (3) Record the identification number that is printed on the marker.
 (4) Cut the marker along the longitudinal axis of the marker.
 (5) Remove the marker.
 (6) Put two layers of tape on the wire harness assembly at the location of the old marker.

Make sure that:

- The edge of the tape is perpendicular to the longitudinal axis of the wire harness assembly
- Each layer of tape makes a 100 percent overlap.

- (7) Put the identification mark from the old marker on the tape with the pen.



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RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

1. GENERAL DATA

A. General Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

B. Applicable Conditions for the Repair of a Cable with a Splice

These conditions are applicable for the new length of cable of a splice assembly:

- The cable must be the same type of cable as the initial cable
- The cable have the same color as the initial cable
- The cable can be a specified alternative; refer to Subject 20-23-03.

A splice of a cable is not permitted:

- In a drip loop
- In a generator feeder cable
- In a location where a clamp holds the wire harness
- In a location that makes it necessary to change the position of the wire harness
- At a distance of less than 6.0 inches (150 millimeters) from the strain relief clamp of the connector backshell.

CAUTION: IF THE SPLICE OF A CABLE IS NOT A PERMITTED REPAIR, THE CABLE MUST BE REPLACED.

2. REPAIR OF A CABLE JACKET

A. Repair of the Cable Jacket with Tape

For the conditions that are applicable for this procedure, refer to Subject 20-23-15.

CAUTION: REPAIR OF THE CABLE JACKET IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED AT THE SUBSEQUENT, SCHEDULED AIRPLANE MAINTENANCE.

**Table 1
NECESSARY TOOLS**

Tool	Description	Part Number or Specification	Supplier
Wiper	Disposable Tissue	7105 Kimwipes	Kimberly-Clark

**Table 2
SOLVENTS**

Description	Part Number or Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

**Table 3
TAPES**

Description	Part Number or Specification	Supplier
Polyimide, 1 inch width	Scotch 62	3M
PTFE, 1 inch width	Scotch 92	3M

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- (1) Make a selection of a wiper from Table 1.

NOTE: An equivalent tool is a satisfactory alternative.

- (2) Make a selection of a solvent from Table 2.

NOTE: An equivalent solvent is a satisfactory alternative.

- (3) Make a selection of these tapes from Table 3:

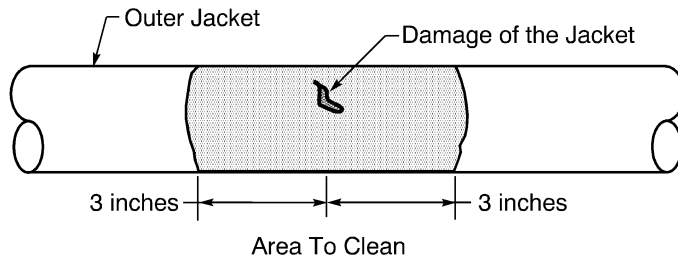
- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

- (4) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

- (5) Clean the area of the cable that has damage with solvent and a wiper. Refer to Figure 1.

Make sure to clean a minimum of 3.0 inches (75 millimeters) on each side of the damage.



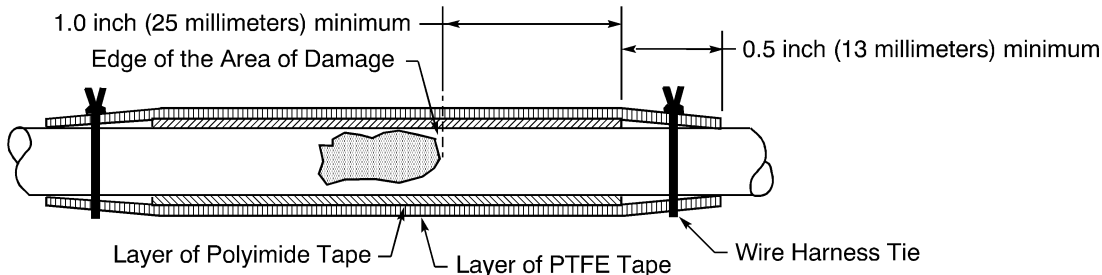
AREA TO CLEAN
Figure 1

- (6) Dry the solvent with a wiper.

- (7) Wind one layer of polyimide tape on the area with damage. Refer to Figure 2.

Make sure that the layer of tape:

- Starts a minimum of 1.0 inch (25 millimeters) from one side of the damage
- Stops a minimum of 1.0 inch (25 millimeters) from the other side of the damage
- Makes a 20 percent overlap.



INSTALLATION OF THE FIRST LAYER OF TAPE
Figure 2

- (8) Wind one layer of PTFE tape on the polyimide tape. Refer to Figure 2.

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Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 20 percent overlap.

(9) Assemble a wire harness tie on each end of the second layer of tape.

Refer to:

- Figure 2
- Subject 20-23-30 for the procedure to assemble a wire harness tie.

(10) Put the wire harness in its initial configuration.

(11) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

(12) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

3. SELECTION OF A SPLICE ASSEMBLY

A. Selection of a Splice Assembly Configuration

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

**Table 4
SPLICE ASSEMBLY CONFIGURATIONS**

Cable Class	Splice Assembly Configuration	Procedure
1	New length of cable with the connector on the end	Paragraph 4.A.
	New length of cable between the connectors	Paragraph 4.B.
2	New length of cable with the connector on the end	Paragraph 4.C.
	New length of cable between the connectors	Paragraph 4.D.
3	New length of cable with the connector on the end	Paragraph 4.E.
	New length of cable between the connectors	Paragraph 4.F.

B. Splice Component Part Numbers

**Table 5
MECHANICAL FERRULE PART NUMBERS**

Wire			Inner Ferrule	Outer Ferrule
Part Number or Specification	Size (AWG)	Class		
ESW()-022-006	20	2	BACS13S187BNP	BACS13S281CNP
ESW()-032-006	20	3	BACS13S205BNP	BACS13S312CNP
ESW()-032-012	16	3	BACS13S232BNP	BACS13S348CNP
RTS77084	16	1	BACS13S149BNP	BACS13S232CNP

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Table 5 (continued)

Wire			Inner Ferrule	Outer Ferrule
Part Number or Specification	Size (AWG)	Class		
RTS71445	18	2	BACS13S232BNP	BACS13S348CNP
RTS71446	18	3	BACS13S250BNP	BACS13S375CNP

**Table 6
SPLICE PART NUMBERS**

Crimp Barrel Size	Part Number	Supplier
22-16	322325	AMP

**Table 7
THERMOCOUPLE SPLICE PART NUMBERS**

Crimp Barrel Size	Wire Conductor Material	Splice	
		Part Number	Supplier
22-16	Alumel	1-322325-0	AMP
22-16	Chromel	1-322325-1	AMP

C. Necessary Materials

**Table 8
SOLVENTS**

Description	Part Number or Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

**Table 9
TAPES**

Description	Part Number or Specification	Supplier
Polyimide, 1 inch width	Scotch 62	3M
PTFE, 1 inch width	Scotch 92	3M

**Table 10
SHIELD MATERIALS**

Description	Part Number or Specification	Supplier
Copper, conductive adhesive, 1 inch width	Scotch 1181	3M

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RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

**Table 11
FIRE RESISTANT SLEEVES**

Sleeve	Wire Size (AWG)	Part Number	Supplier
Inner	20	EXSH-1	Raychem
		EXSH-2	Raychem
		TSX 1	Bently Harris
		TSX 2	Bently Harris
		TSX 4	Bently Harris
	18	EXSH-2	Raychem
		TSX 2	Bently Harris
		TSX 4	Bently Harris
	16	EXSH-2	Raychem
		TSX 2	Bently Harris
		TSX 4	Bently Harris
	Outer	20	EXSH-2
TSX 2			Bently Harris
TSX 6			Bently Harris
18		EXSH-3	Raychem
		TSX 3	Bently Harris
		TSX 6	Bently Harris
16		EXSH-3	Raychem
		TSX 3	Bently Harris
		TSX 6	Bently Harris

D. Necessary Tools

**Table 12
NECESSARY TOOLS**

Tool	Description	Part Number or Specification	Supplier
Wiper	Disposable Tissue	7105 Kimwipes	Kimberly-Clark

STANDARD WIRING PRACTICES MANUAL

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**Table 13
INSULATION REMOVAL TOOLS**

Wire Size (AWG)	Removal Tool	
	Part Number	Supplier
22-10	45-092	Ideal

**Table 14
FERRULE CRIMP TOOLS**

Ferrule	Crimp Tool		
	Basic Unit	Die	
		Die Part Number	Cavity
BACS13S149BNP	M22520/5-01	M22520/5-37	B
BACS13S187BNP	M22520/5-01	M22520/5-43	B
BACS13S205BNP	M22520/5-01	M22520/5-19	B
BACS13S232BNP	M22520/5-01	M22520/5-45	A
BACS13S232CNP	M22520/5-01	M22520/5-45	A
BACS13S250BNP	M22520/5-01	M22520/5-45	A
BACS13S281CNP	M22520/5-01	M22520/5-41	A
BACS13S312CNP	M22520/5-01	M22520/5-39	A
BACS13S348CNP	M22520/5-01	M22520/5-35	A
BACS13S375CNP	M22520/5-01	M22520/5-47	A

**Table 15
SPLICE CRIMP TOOLS**

Crimp Barrel Size	Crimp Tool	Supplier
22-18	46673	AMP

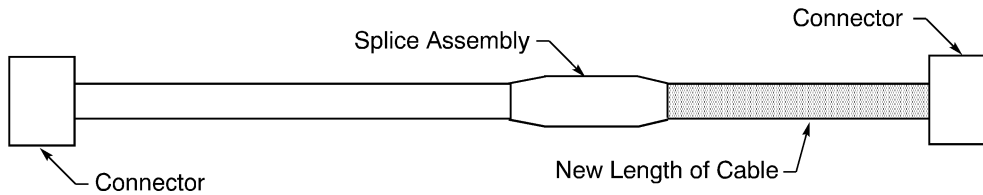
4. REPAIR OF A SHIELDED CABLE WITH A SPLICE

A. Class 1 Cable - New Length of Cable with the Connector on the End

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES****SPLICE WITH A NEW LENGTH OF CABLE WITH THE CONNECTOR ON THE END****Figure 3**

Refer to Figure 3.

- (1) Find the cable part number. Refer to the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

- (2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

- (3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

- (4) Make a selection of a shield material from Table 10.

NOTE: An equivalent shield material is a satisfactory alternative.

- (5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

- (6) Make a selection these fire resistant sleeves from Table 11:

- An inner sleeve
- An outer sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative.

- (7) Make a selection of two inner ferrules and two outer ferrules from Table 5.

- (8) Make a selection of a insulation removal tool from Table 13.

- (9) Make a selection of a ferrule crimp tool from Table 14.

- (10) Make a selection of a splice crimp tool from Table 15.

- (11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

- (12) Find the location on the damaged cable to put the cable splice.

Make sure that the location of the splice is in a permitted location; refer to Subject 20-23-15.

- (13) Cut the cable.

Make sure that area of the cable with damage is fully removed.

- (14) Clean the end of the cable with solvent and a wiper.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from the end of the cable.

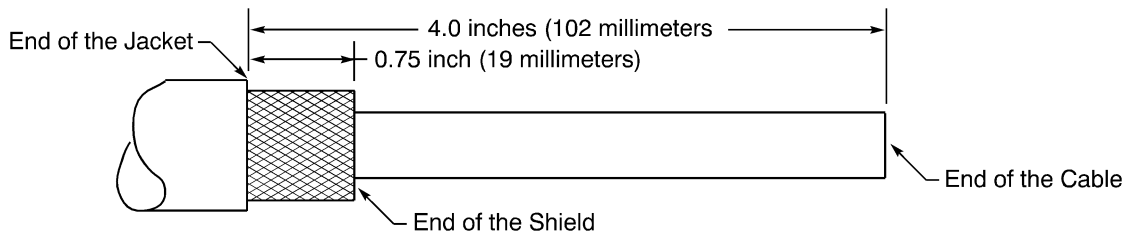
- (15) Prepare the end of the damaged cable.

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STANDARD WIRING PRACTICES MANUAL

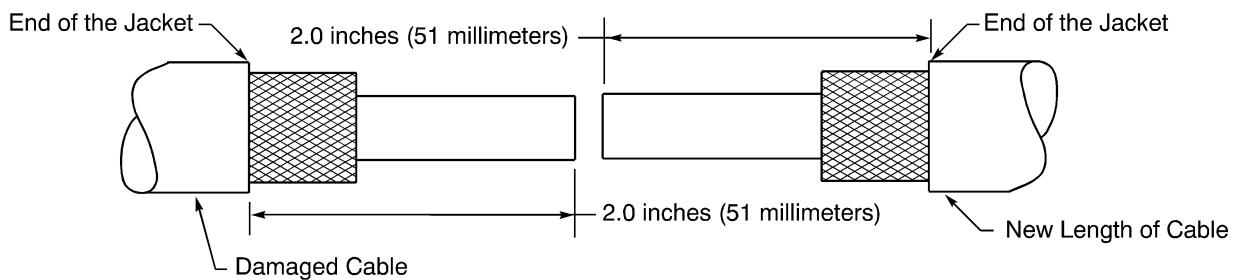
RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

- (a) Remove 4.0 inches (102 millimeters) of the jacket from the end of the cable. Refer to Figure 4.



JACKET REMOVAL
Figure 4

- (b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 4.
- (c) Remove the necessary length of the component wire to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 5.

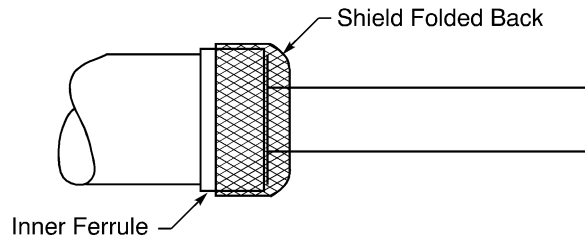


CABLE PREPARATION
Figure 5

- (16) Do Step (15) again for one end of the new length of cable.
- (17) Put the mechanical ferrules on the cables.
- (a) Put the inner and outer ferrules on the end of each cable in this sequence:
- The outer ferrule
 - The inner ferrule.
- (b) Move the outer ferrules back on the cable away from the splice area.
- (18) Install the inner ferrule on the end of the cable.
- (a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES



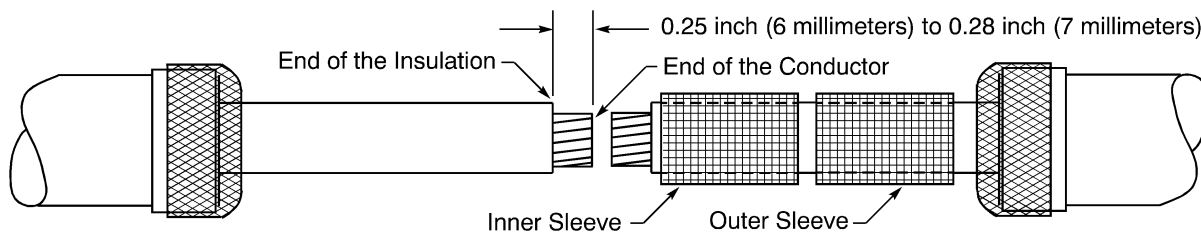
INSTALLATION OF THE INNER FERRULE
Figure 6

- (b) Crimp the inner ferrule.
 - (19) Fold the shield back on the inner ferrule.
- Make sure that:
- The shield is smooth
 - The strands are symmetrical around the circumference of the ferrule.
- (20) Do Step (18) through Step (19) again for each inner ferrule on each cable.
 - (21) Put the fire resistant sleeves on the component wire in this sequence:
 - The inner sleeve
 - The outer sleeve.

Refer to Figure 7.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient to extend farther than each end of the splice.

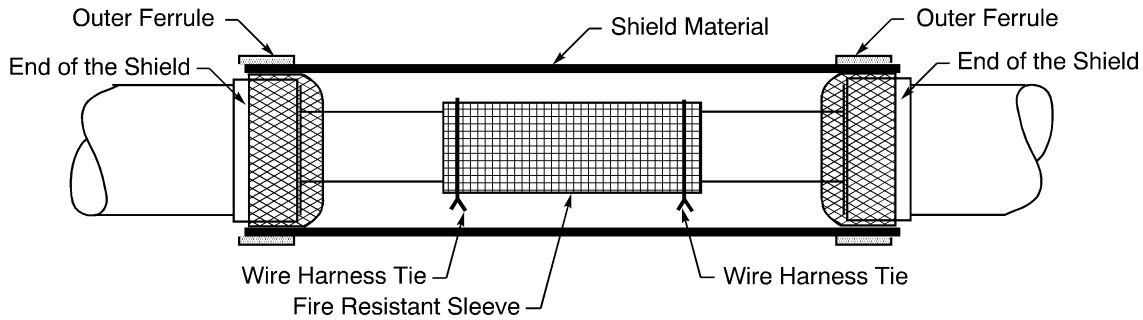


WIRE PREPARATION
Figure 7

- (22) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of the component wire. Refer to Figure 7.
- (23) Put the new length of cable in its position for the assembly of the cable splice.
- (24) Assemble a splice of the each component wire. Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL

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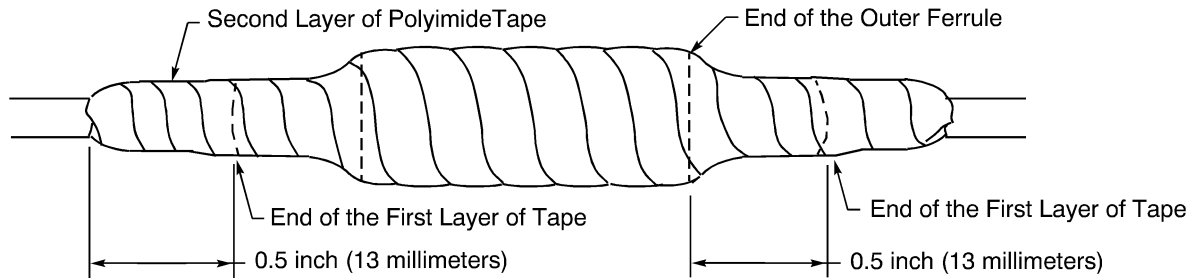
ASSEMBLY OF THE CONDUCTOR SPLICE

Figure 8

- (a) Put a conductor in each end of the splice.
Make sure all of the strands are in the crimp barrel.
 - (b) Crimp the splice.
 - (c) Lightly pull each conductor to make sure that they are held tightly in the splice.
 - (d) Move the inner fire resistant sleeve on the splice.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (e) Move the outer fire resistant sleeve on the inner sleeve.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.
- (25) Wind a layer of shield material on the splice area. Refer to Figure 8.
Make sure that the layer of shield material:
- Starts at the end of the folded back shield on one end of the splice assembly
 - Ends at the end of the folded back shield on the other end of the splice assembly
 - Makes a 0.5 inch (13 millimeters) overlap.
- (26) Move the outer ferrule into its position on the inner ferrule.
- (27) Crimp the outer ferrule.
- (28) Remove the shield material that extends farther than the rear end of each outer ferrule.
- (29) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 9.
Make sure that the layer of tape:
- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
 - Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
 - Makes a 50 percent overlap.

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INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE

Figure 9

(30) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 9.

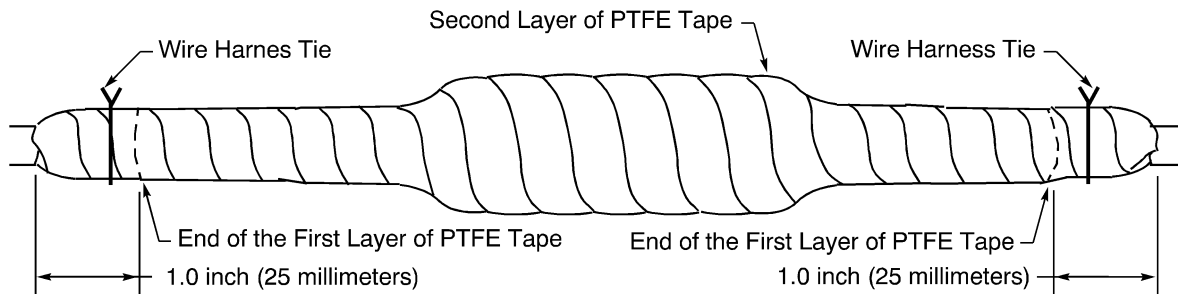
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(31) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 10.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the one end of the layer of the polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the layer of polyimide tape
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE

Figure 10

(32) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 10.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(33) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

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- (34) Put the wire harness in its initial configuration.
- (35) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.
- (36) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

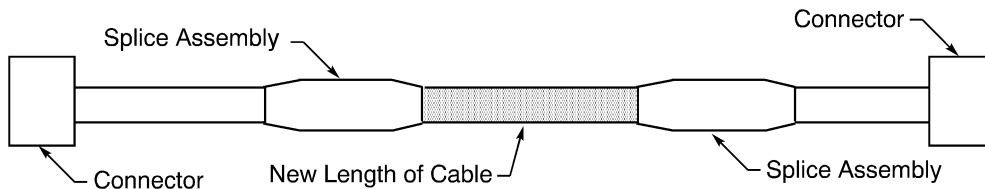
B. Class 1 Cable - New Length of Cable Between the Connectors

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.

NOTE: The procedure to assemble a splice with a new length of cable with the connector on the end is a satisfactory alternative to this procedure. Refer to Paragraph 4.A.



SPLICE WITH A NEW LENGTH OF CABLE BETWEEN THE CONNECTORS

Figure 11

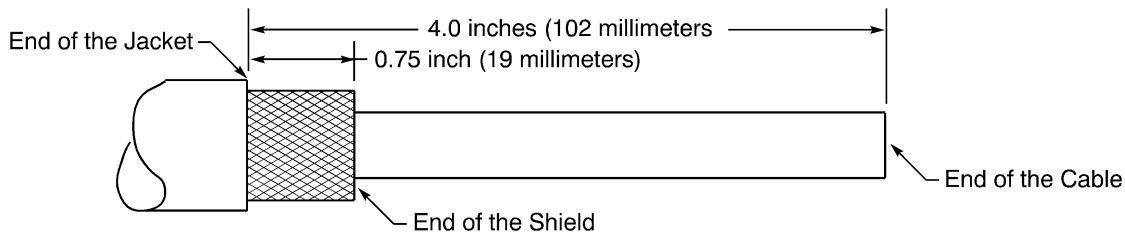
Refer to Figure 11.

- (1) Find the cable part number. Refer to the WDM.
 - NOTE:** For alternative cables, refer to Subject 20-23-03.
- (2) Make a selection of a wiper from Table 12.
 - NOTE:** An equivalent wiper is a satisfactory alternative.
- (3) Make a selection of a solvent from Table 8.
 - NOTE:** An equivalent solvent is a satisfactory alternative.
- (4) Make a selection of a shield material from Table 10.
 - NOTE:** An equivalent shield material is a satisfactory alternative.
- (5) Make a selection of these tapes from Table 9:
 - A polyimide tape
 - A PTFE tape.
 - NOTE:** An equivalent tape is a satisfactory alternative.
- (6) Make a selection these fire resistant sleeves from Table 11:
 - An inner sleeve
 - An outer sleeve.
 - NOTE:** An equivalent sleeve is a satisfactory alternative.
- (7) Make a selection of four inner ferrules and four outer ferrules from Table 5.

STANDARD WIRING PRACTICES MANUAL

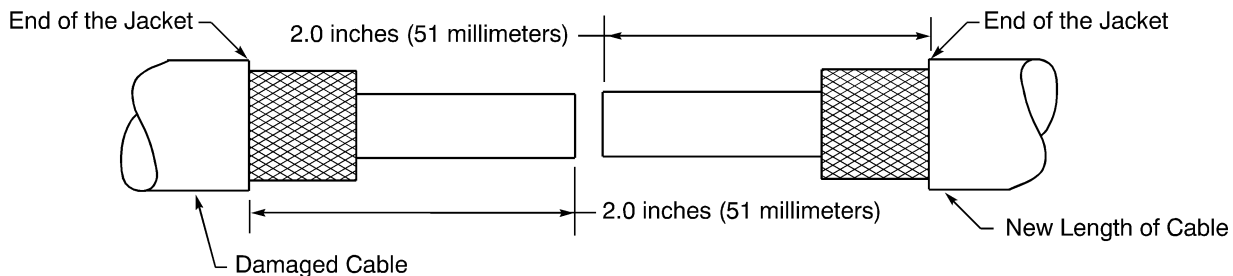
RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

- (8) Make a selection of a insulation removal tool from Table 13.
- (9) Make a selection of a ferrule crimp tool from Table 14.
- (10) Make a selection of a splice crimp tool from Table 15.
- (11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.
- (12) Find the location on the damaged cable to put the cable splice.
Make sure that the location of the splice on each end of the splice assembly is in a permitted location; refer to Subject 20-23-15.
- (13) Cut the cable on each side of the area with damage.
- (14) Clean the ends of the cable with solvent and a wiper.
Make sure to clean a minimum of 12.0 inches (305 millimeters) from the end of the cable.
- (15) Prepare the ends of the damaged cable and the new length of cable.
 - (a) Remove 4.0 inches (102 millimeters) of the jacket from the end of the cable. Refer to Figure 12.



JACKET REMOVAL
Figure 12

- (b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 12.
- (c) Remove the necessary length of the component wire to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 13.



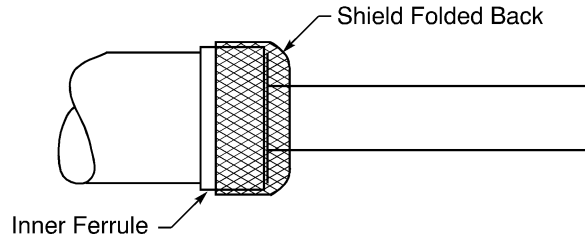
CABLE PREPARATION
Figure 13

- (d) Do Step (a) through Step (c) again for the other end of the damaged cable and the ends of the new length of cable.
- (16) Put the mechanical ferrules on the cables.

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- (a) Put an inner and outer ferrule on the end of each cable in this sequence:
 - The outer ferrule
 - The inner ferrule.
- (b) Move the outer ferrules back on the cables away from the splice area.
- (17) Install the inner ferrule on the end of the cable.
 - (a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 14.



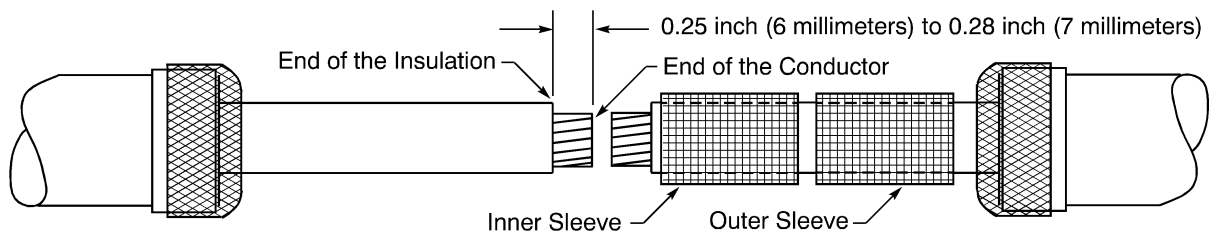
INSTALLATION OF THE INNER FERRULE
Figure 14

- (b) Crimp the inner ferrule.
- (18) Fold the shield back on the inner ferrule.
 - Make sure that:
 - The shield is smooth
 - The strands are symmetrical around the circumference of the ferrule.
- (19) Do Step (17) through Step (18) again for each inner ferrule on each cable.
- (20) Put necessary length of fire resistant sleeves on the component wire in this sequence:
 - The outer sleeve
 - The inner sleeve.

Refer to Figure 15.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.



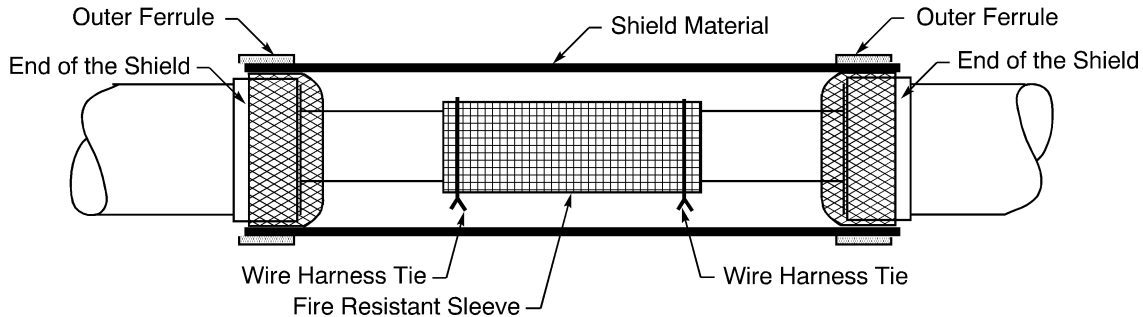
WIRE PREPARATION
Figure 15

- (21) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of the component wire. Refer to Figure 15.

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- (22) Put the new length of cable in its position for the cable splice.
- (23) Assemble a splice of the component wire. Refer to Figure 16.

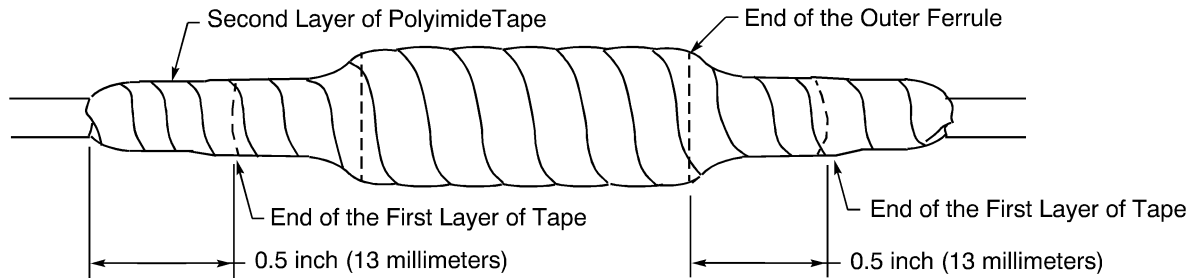


ASSEMBLY OF THE CONDUCTOR SPLICE
Figure 16

- (a) Put a conductor in each end of the splice.
Make sure that all of the strands are in the crimp barrel.
 - (b) Crimp the splice.
 - (c) Lightly pull each conductor to make sure that they are held tightly in the splice.
 - (d) Move the inner fire resistant sleeve on the splice.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (e) Move the outer fire resistant sleeve on the inner sleeve.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.
- (24) Wind a layer of shield material on the splice area. Refer to Figure 16.
Make sure that the layer of shield material:
 - Starts at the end of the folded back shield on one end of the splice
 - Ends at the end of the folded back shield on the other end of the splice assembly
 - Makes a 0.5 inch (13 millimeters) overlap.
 - (25) Move the outer ferrule into its position on the inner ferrule.
 - (26) Crimp the outer ferrule.
 - (27) Remove the shield material that extends farther than the rear end of each outer ferrule.
 - (28) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 17.
Make sure that the layer of tape:
 - Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
 - Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
 - Makes a 50 percent overlap.

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INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE

Figure 17

(29) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 17.

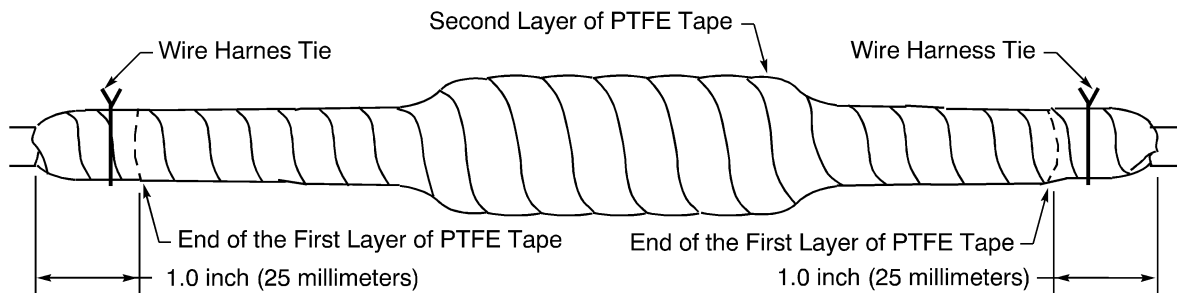
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(30) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 18.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the end of the layer of polyimide tape at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the end of the polyimide tape at the other end of the splice assembly
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE

Figure 18

(31) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 18.

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Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

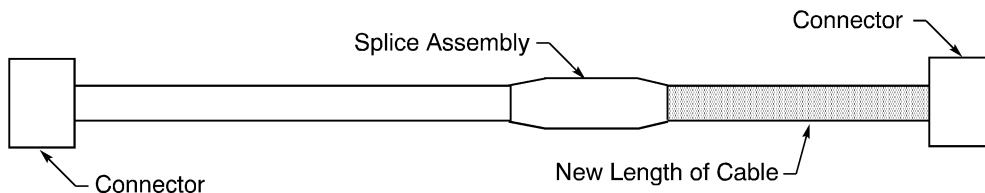
- (32) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.
- (33) Put the wire harness in its initial configuration.
- (34) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.
- (35) Do an insulation resistance of the component wires in the cable. Refer to Paragraph 5.B.

C. Class 2 Cable - New Length of Cable with the Connector on the End

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.



SPLICE WITH A NEW LENGTH OF CABLE WITH THE CONNECTOR ON THE END
Figure 19

Refer to Figure 19.

- (1) Find the cable part number. Refer to the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

- (2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

- (3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

- (4) Make a selection of a shield material from Table 10.

NOTE: An equivalent shield material is a satisfactory alternative.

- (5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

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- (6) Make a selection these fire resistant sleeves from Table 11:
 - An outer sleeve
 - An inner sleeve.

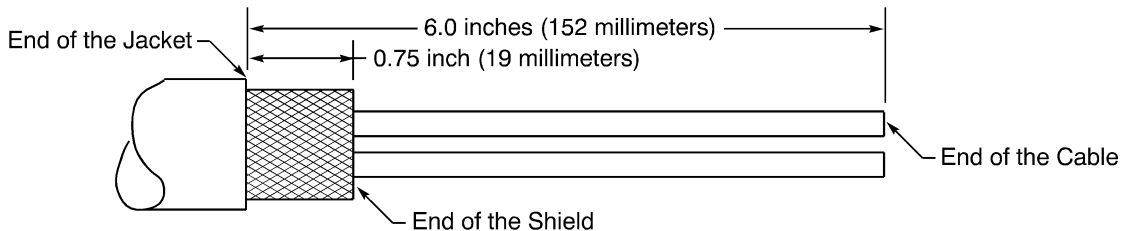
NOTE: An equivalent sleeve is a satisfactory alternative.

- (7) Make a selection of two inner ferrules and two outer ferrules from Table 5.
- (8) Make a selection of a insulation removal tool from Table 13.
- (9) Make a selection of a ferrule crimp tool from Table 14.
- (10) Make a selection of a splice crimp tool from Table 15.
- (11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.
- (12) Find the location on the damaged cable to put the cable splice.

Make sure that the location of the splice on each end of the splice assembly is in a permitted location; refer to Subject 20-23-15.
- (13) Cut the cable.

Make sure that area of the cable with damage is removed.
- (14) Clean the end of the cable with solvent and a wiper.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from the end of the cable.
- (15) Prepare the ends of the damaged cable.
 - (a) Remove 6.0 inches (152 millimeters) of the jacket from the end of the cable. Refer to Figure 20.



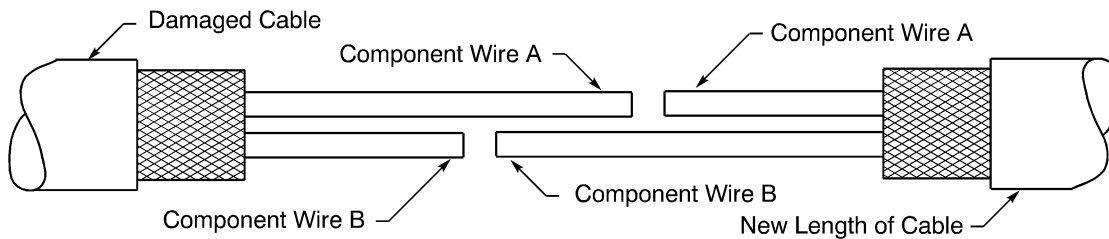
JACKET REMOVAL
Figure 20

- (b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 20.
- (c) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 21 and Figure 22.

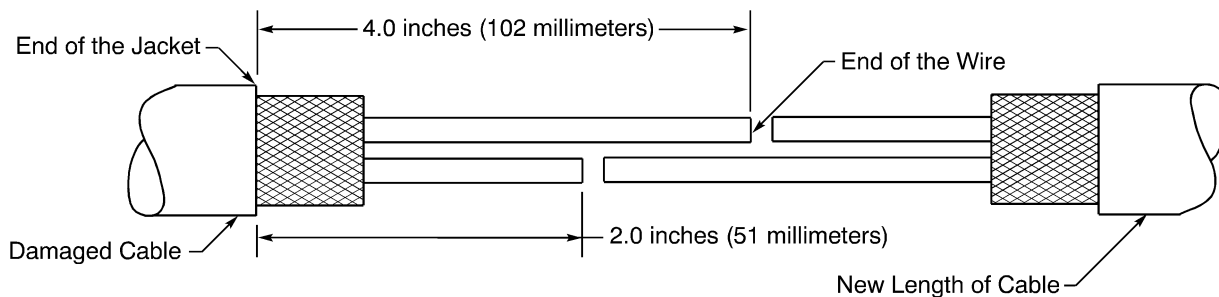
NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

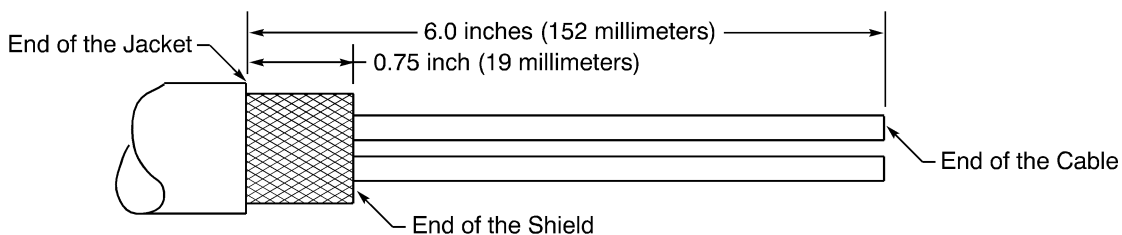


COMPONENT WIRE CONFIGURATION
Figure 21



CABLE PREPARATION
Figure 22

- (d) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 21 and Figure 22.
- (16) Prepare the new length of cable.
 - (a) Cut the necessary length of cable.
Make sure that the length is 12.0 inches (305 millimeters) longer than the distance between the two ends of the damaged cable.
 - (b) Clean the ends of the cable with solvent and a wipe.
Make sure to clean a minimum of 12.0 inches (305 millimeters) from each end of the cable.
 - (c) Remove 6.0 inches (152 millimeters) of the jacket from the end of the cable. Refer to Figure 23.



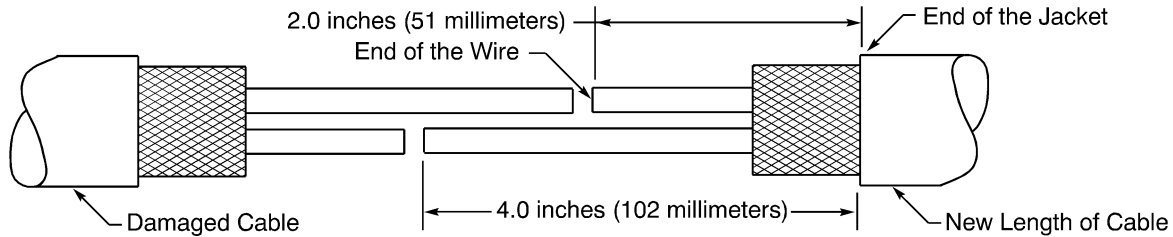
JACKET REMOVAL
Figure 23

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

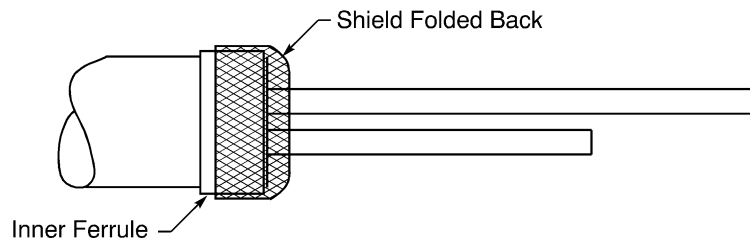
- (d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 23.
- (e) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 21 and Figure 24.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



CABLE PREPARATION
Figure 24

- (f) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 21 and Figure 24.
- (17) Put the mechanical ferrules on the end of each cable.
 - (a) Put the ferrules on the end of the cables in this sequence:
 - The outer ferrule
 - The inner ferrule.
 - (b) Move the ferrules back on the cable away from the splice area.
- (18) Install the inner ferrule on the end of the cable.
 - (a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 25.



INSTALLATION OF THE INNER FERRULE
Figure 25

- (b) Crimp the inner ferrule.
- (19) Fold the shield back on the inner ferrule.

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Make sure that:

- The shield is smooth
- The strands are symmetrical around the circumference of the ferrule.

(20) Do Step (18) through Step (19) again for the inner ferrule on each cable.

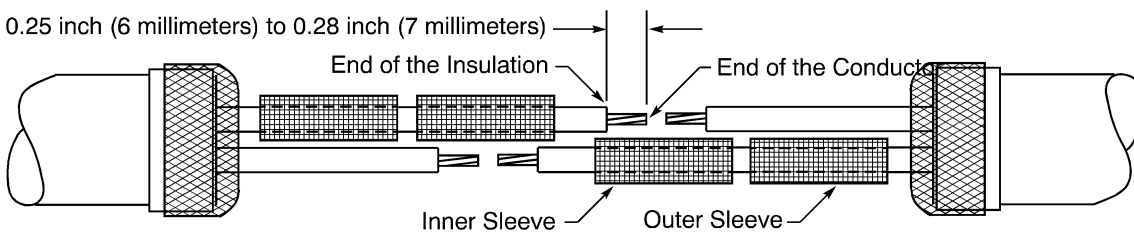
(21) Put the necessary lengths of fire resistant sleeves on the longest component wire of the new length of cable in this sequence:

- The outer layer
- The inner layer.

Refer to Figure 26.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient to extend farther than each end of the splice.



POSITION OF THE FIRE RESISTANT SLEEVES

Figure 26

(22) Put the necessary lengths of fire resistant sleeves on the longest component wire of the damaged cable in this sequence:

- The outer layer
- The inner layer.

Refer to Figure 26.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient to extend farther than each end of the splice.

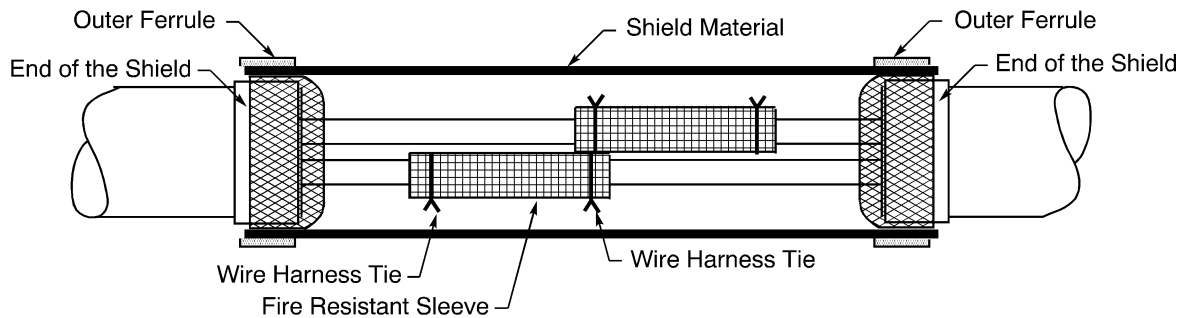
(23) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of each component wire. Refer to Figure 26.

(24) Put the new length of cable in position for the assembly of the cable splice.

(25) Assemble a splice of the each component wire. Refer to Figure 27.

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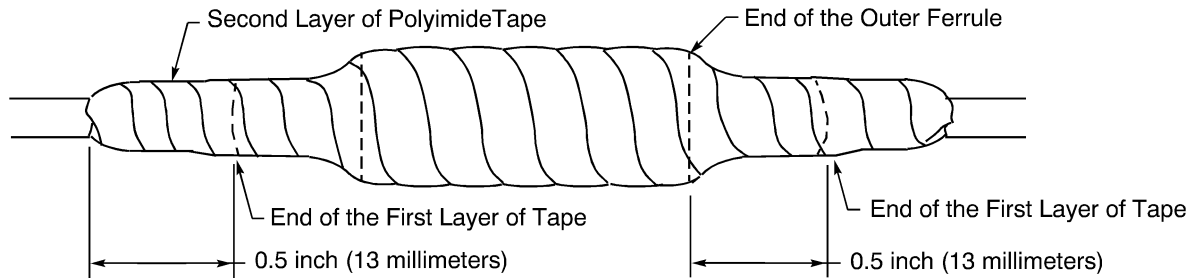
ASSEMBLY OF THE CONDUCTOR SPLICE

Figure 27

- (a) Put a conductor in each end of the splice.
Make sure all of the strands are in the crimp barrel.
 - (b) Crimp the splice.
 - (c) Lightly pull each conductor to make sure that they are held tightly in the splice.
 - (d) Move the inner fire resistant sleeve on the splice.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (e) Move the outer fire resistant sleeve on the inner sleeve.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.
- (26) Wind a layer of shield material on the splice area. Refer to Figure 27.
Make sure that the layer of shield material:
- Starts at the end of the folded back shield on one end of the splice
 - Ends at the end of the folded back shield on the other end of the splice assembly
 - Makes a 0.5 inch (13 millimeters) overlap.
- (27) Move the outer ferrule into its position on the inner ferrule.
- (28) Crimp the outer ferrule.
- (29) Remove the shield material that extends farther than the rear end of each outer ferrule.
- (30) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 28.
Make sure that the layer of tape:
- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
 - Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
 - Makes a 50 percent overlap.

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INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE

Figure 28

(31) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 28.

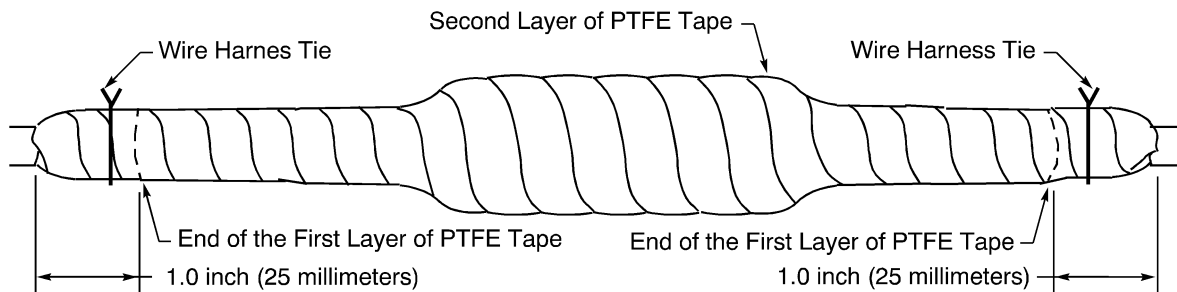
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(32) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 29.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the end of the layer of polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the layer of polyimide tape
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE

Figure 29

(33) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 29.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(34) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

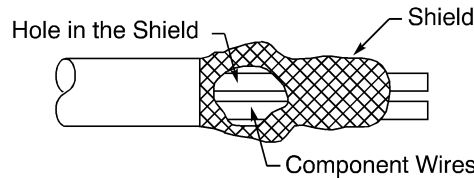
(35) Prepare the end of the new length of cable.

STANDARD WIRING PRACTICES MANUAL

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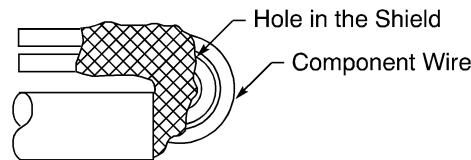
- (a) Remove necessary length of the cable jacket.
Make sure that the length of jacket that is removed on the new cable segment is the same as the length of jacket that is removed on the damaged cable.
- (b) Push the shield rearward to expand it at the end of the jacket.
- (c) Make a hole in the shield near the end of the cable jacket with a nylon tool. Refer to Figure 30.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION CAN CAUSE A SHORT TO OCCUR.



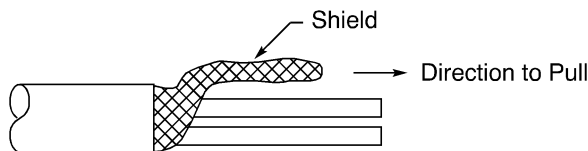
PREPARATION OF THE HOLE IN THE SHIELD
Figure 30

- (d) Carefully bend the cable until the component wires can be seen in the hole. Refer to Figure 31.



POSITION OF THE COMPONENT WIRES
Figure 31

- (e) Pull one wire at a time through the hole in the shield.
- (f) Pull the shield tight to make a flat conductor. Refer to Figure 32.



PREPARATION OF THE SHIELD GROUND WIRE
Figure 32

- (g) Assemble the new contacts. Refer to Subject 20-23-37.
- (h) Remove the identification marker for each contact from the old wires.
- (i) Put the identification marker for each contact on the new wires.
- (36) Disassemble the connector on the end of the damaged cable. Refer to Subject 20-23-37.
- (37) Remove the damaged cable from the wire harness clamps.
- (38) Put the wire harness in its initial configuration.

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- (39) Assemble the connector. Refer to Subject 20-23-37.
- (40) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.
- (41) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

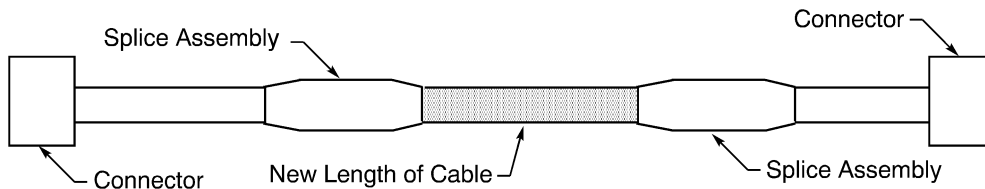
D. Class 2 Cable - New Length of Cable Between the Connectors

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.

NOTE: The procedure to assemble a splice with a new length of cable with the connector on the end is a satisfactory alternative to this procedure. Refer to Paragraph 4.C.



SPLICE WITH A NEW LENGTH OF CABLE BETWEEN THE CONNECTORS

Figure 33

Refer to Figure 33.

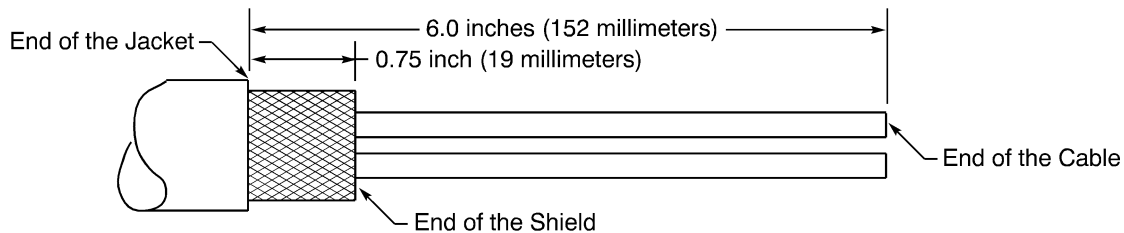
- (1) Find the cable part number. Refer to the WDM.
 - NOTE:** For alternative cables, refer to Subject 20-23-03.
- (2) Make a selection of a wiper from Table 12.
 - NOTE:** An equivalent wiper is a satisfactory alternative.
- (3) Make a selection of a solvent from Table 8.
 - NOTE:** An equivalent solvent is a satisfactory alternative.
- (4) Make a selection of a shield material from Table 10.
 - NOTE:** An equivalent shield material is a satisfactory alternative.
- (5) Make a selection of these tapes from Table 9:
 - A polyimide tape
 - A PTFE tape.
 - NOTE:** An equivalent tape is a satisfactory alternative.
- (6) Make a selection these fire resistant sleeves from Table 11:
 - An inner sleeve
 - An outer sleeve.
 - NOTE:** An equivalent sleeve is a satisfactory alternative.
- (7) Make a selection of four inner ferrules and four outer ferrules from Table 5.

20-23-17

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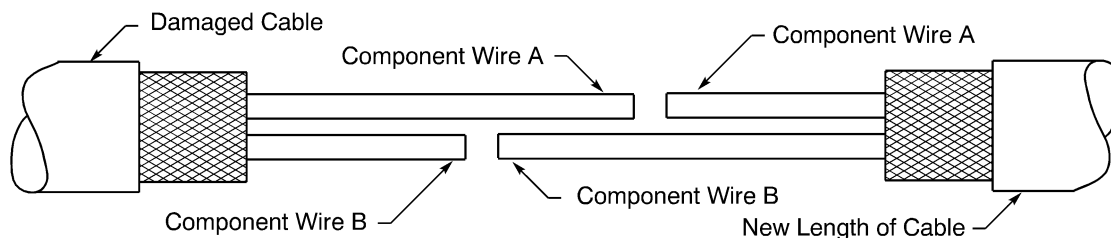
- (8) Make a selection of a insulation removal tool from Table 13.
- (9) Make a selection of a ferrule crimp tool from Table 14.
- (10) Make a selection of a splice crimp tool from Table 15.
- (11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.
- (12) Find the location on the damaged cable to put the cable splice.
Make sure that the location of the splice on each end of the splice assembly is in a permitted location; refer to Subject 20-23-15.
- (13) Cut the damaged cable on each side of the area with damage.
- (14) Clean the ends of the damaged cable with solvent and a wiper.
Make sure to clean a minimum of 12.0 inches (305 millimeters) from each end of the cable.
- (15) Prepare the ends of the damaged cable.
 - (a) Remove 6.0 inches (152 millimeters) of the jacket from the end of the cable. Refer to Figure 34.



JACKET REMOVAL
Figure 34

- (b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 34.
- (c) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 35 and Figure 36.

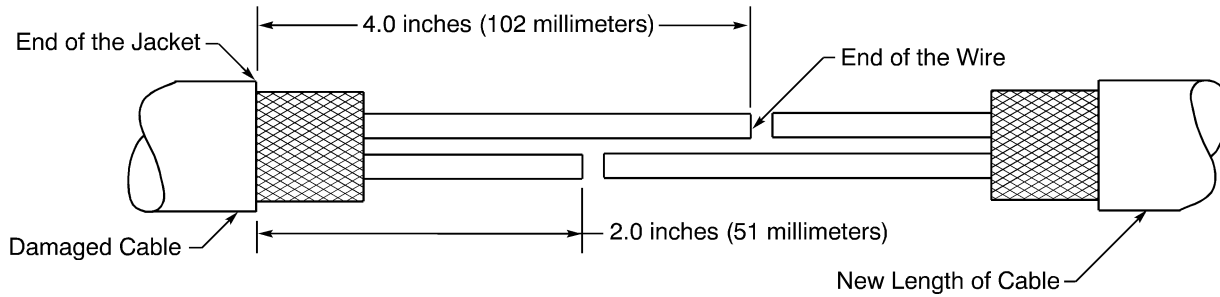
NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



COMPONENT WIRE CONFIGURATION
Figure 35

STANDARD WIRING PRACTICES MANUAL

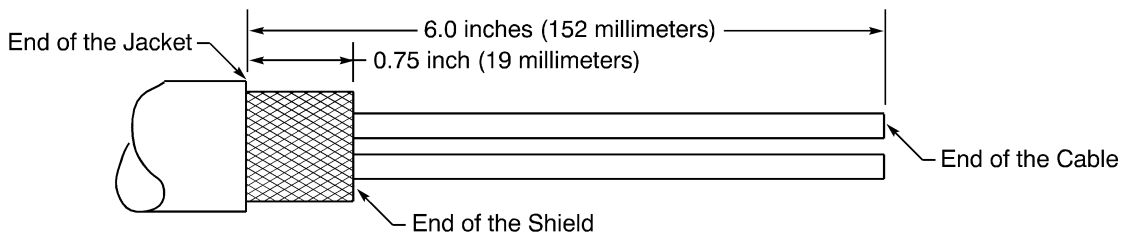
RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES



CABLE PREPARATION

Figure 36

- (d) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 35 and Figure 36.
- (e) Do Step (a) through Step (d) again for the other end of the cable.
- (16) Prepare the new length of cable. Refer to Figure 34.
 - (a) Cut the necessary length of cable.
Make sure that the length is 12.0 inches (305 millimeters) longer than the distance between the two ends of the damaged cable.
 - (b) Clean the ends of the cable with solvent and a wiper.
Make sure to clean a minimum of 12.0 inches (305 millimeters) from each end of the cable.
 - (c) Remove 6.0 inches (152 millimeters) of the jacket from the end of the cable. Refer to Figure 37.



JACKET REMOVAL

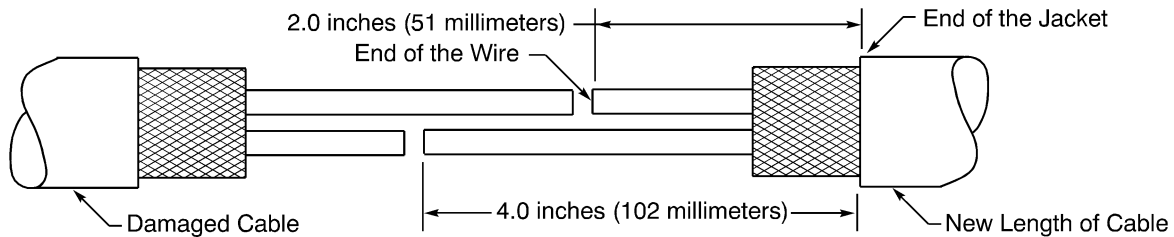
Figure 37

- (d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 34.
- (e) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 35 and Figure 38.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.

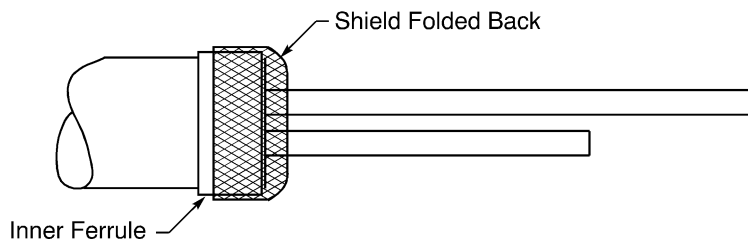
STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES



CABLE PREPARATION
Figure 38

- (f) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 35 and Figure 38.
- (g) Do Step (c) through Step (f) again for the other end of the new length of cable.
- (17) Put the mechanical ferrules on the cables.
 - (a) Put an inner and outer ferrule on the end of each cable in this sequence:
 - The outer ferrule
 - The inner ferrule.
 - (b) Move the outer ferrules back on the cables away from the splice area.
- (18) Install the inner ferrule on the end of the cable.
 - (a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 39.



INSTALLATION OF THE INNER FERRULE
Figure 39

- (b) Crimp the inner ferrule.
- (19) Fold the shield back on the inner ferrule.

Make sure that:

 - The shield is smooth
 - The strands are symmetrical around the circumference of the ferrule.
- (20) Do Step (18) through Step (19) again for each inner ferrule on each cable.

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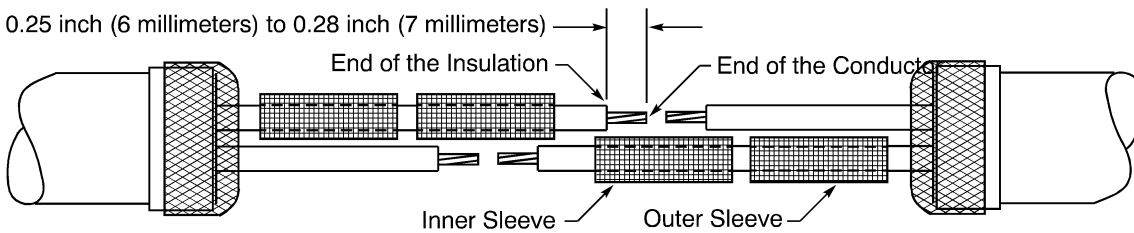
(21) Put necessary length of fire resistant sleeves on the component wire of the new length of cable in this sequence:

- The outer sleeve
- The inner sleeve.

Refer to Figure 40.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.



POSITION OF THE FIRE RESISTANT SLEEVES

Figure 40

(22) Put necessary length of fire resistant sleeves on the component wire of the damaged cable in this sequence:

- The outer sleeve
- The inner sleeve.

Refer to Figure 40.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.

(23) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of the component wire. Refer to Figure 40.

(24) Put the new length of cable in its position for the assembly of the cable splice.

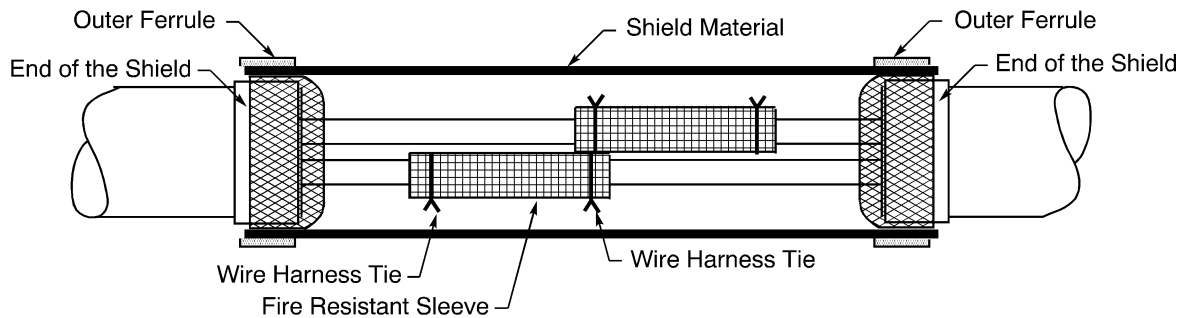
Make sure that:

- The component wires on the new length of cable are aligned with the same color of the component wires of the damaged cable
- The shorter component wire of the new length of cable is aligned with the longer component wire of the damaged cable.

(25) Assemble a splice of each component wire. Refer to Figure 41.

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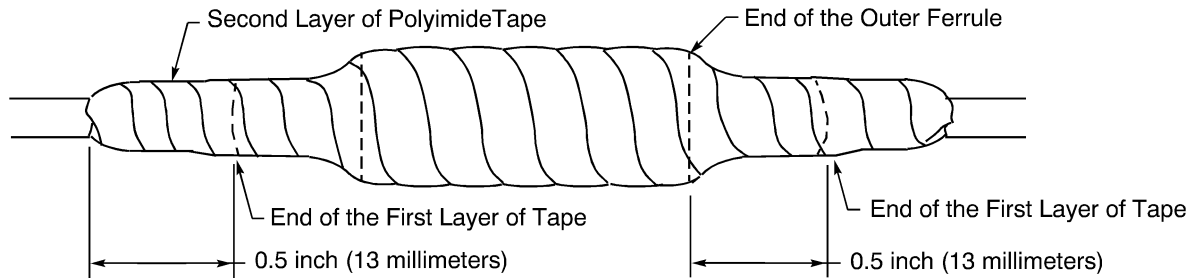
ASSEMBLY OF THE CONDUCTOR SPLICE

Figure 41

- (a) Put a conductor in each end of the splice.
Make sure all of the strands are in the crimp barrel.
 - (b) Crimp the splice.
 - (c) Lightly pull each conductor to make sure that they are held tightly in the splice.
 - (d) Move the inner fire resistant sleeve on the splice.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (e) Move the outer fire resistant sleeve on the inner sleeve.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.
- (26) Wind a layer of shield material on the splice area. Refer to Figure 41.
Make sure that the layer of shield material:
 - Starts at the end of the folded back shield on one end of the splice
 - Ends at the end of the folded back shield on the other end of the splice assembly
 - Makes a 0.5 inch (13 millimeters) overlap.
 - (27) Move the outer ferrule into its position on the inner ferrule.
 - (28) Crimp the outer ferrule.
 - (29) Remove the shield material that extends farther than the rear end of each outer ferrule.
 - (30) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 42.
Make sure that the layer of tape:
 - Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
 - Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
 - Makes a 50 percent overlap.

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INSTALLATION OF THE LAYERS OF TAPE

Figure 42

(31) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 42.

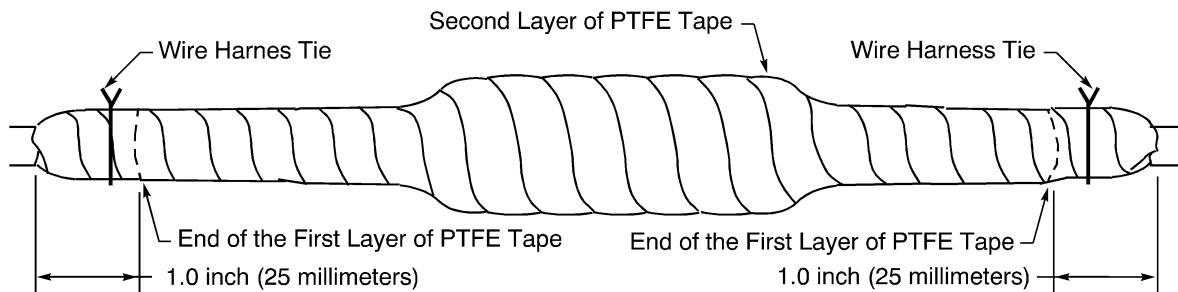
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(32) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 43.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from one end of the layer of polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of layer of polyimide tape
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE

Figure 43

(33) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 43.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(34) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(35) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

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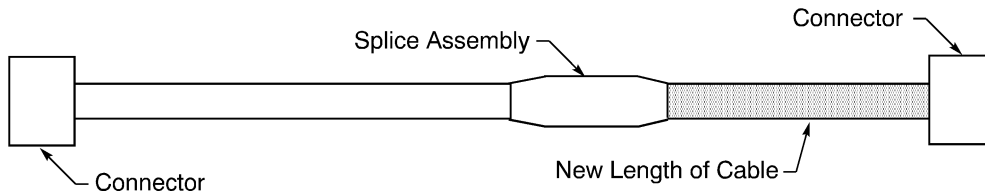
(36) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

E. Class 3 Cable - New Length of Cable with the Connector on the End

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.



SPLICE WITH A NEW LENGTH OF CABLE WITH THE CONNECTOR ON THE END
Figure 44

Refer to Figure 44.

(1) Find the cable part number. Refer to the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

(2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

(3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

(4) Make a selection of a shield material from Table 10.

NOTE: An equivalent shield material is a satisfactory alternative.

(5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

(6) Make a selection these fire resistant sleeves from Table 11:

- An inner sleeve
- An outer sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative.

(7) Make a selection of two inner ferrules and two outer ferrules from Table 5.

(8) Make a selection of a insulation removal tool from Table 13.

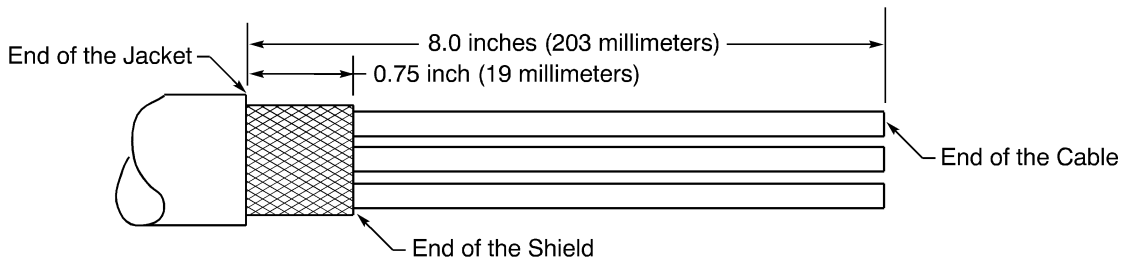
(9) Make a selection of a ferrule crimp tool from Table 14.

(10) Make a selection of a splice crimp tool from Table 15.

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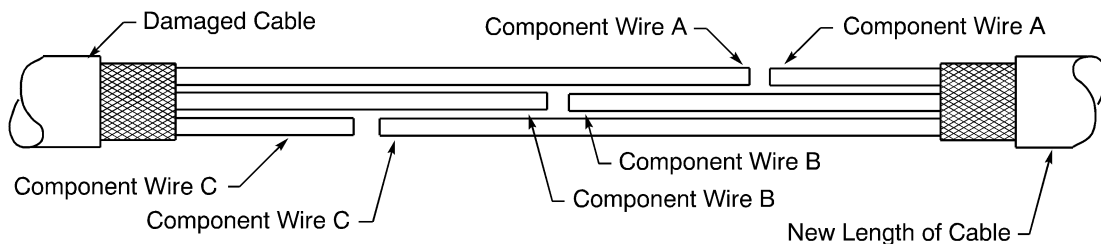
- (11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.
- (12) Find the location on the damaged cable to put the cable splice.
Make sure that the location of the splice on each end of the splice assembly is in a permitted location; refer to Subject 20-23-15.
- (13) Cut the cable.
Make sure that area with damage is on the end of the cable that is replaced.
- (14) Clean the end of the cable with solvent and a wiper.
Make sure to clean a minimum of 16 inches (406 millimeters) from the end of the cable.
- (15) Prepare the ends of the damaged cable.
 - (a) Remove 8.0 inches (203 millimeters) of the jacket from the end of the cable. Refer to Figure 45.



JACKET REMOVAL
Figure 45

- (b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of shield equal to 0.75 inch (19 millimeters). Refer to Figure 45.
- (c) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 6.0 inches (152 millimeters). Refer to Figure 46 and Figure 47.

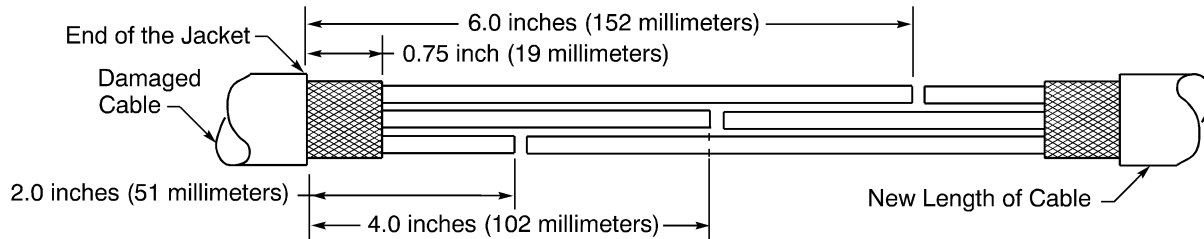
NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



COMPONENT WIRE CONFIGURATION
Figure 46

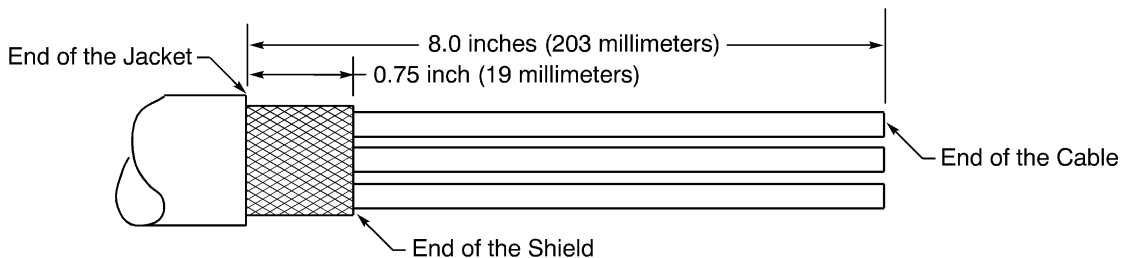
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CABLE PREPARATION
Figure 47

- (d) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 46 and Figure 47.
 - (e) Remove the necessary length of component wire C to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 46 and Figure 47.
- (16) Prepare the new length of cable.
- (a) Cut the necessary length of cable.
Make sure that the length is 8.0 inches (203 millimeters) longer than the distance from the end of the damaged cable to the location of the connector on the end of the cable.
 - (b) Clean the ends of the cable with solvent and a wiper.
Make sure to clean a minimum of 16.0 inches (406 millimeters) from each end of the cable.
 - (c) Remove 8.0 inches (203 millimeters) of the jacket from the end of the cable. Refer to Figure 48.



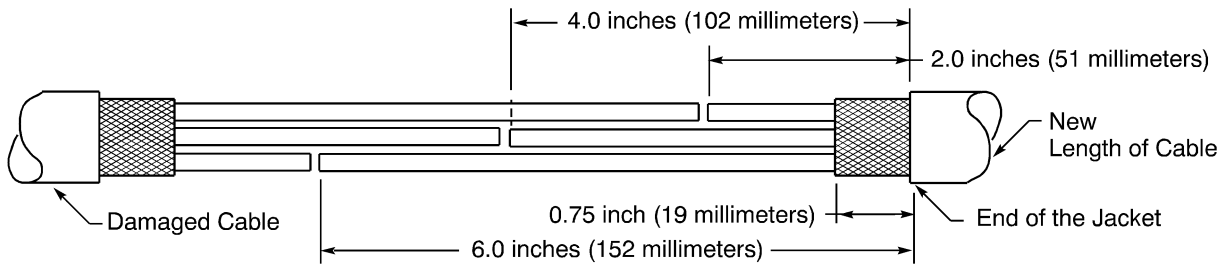
JACKET REMOVAL
Figure 48

- (d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of shield equal to 0.75 inch (19 millimeters). Refer to Figure 48.
- (e) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 46 and Figure 49.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.

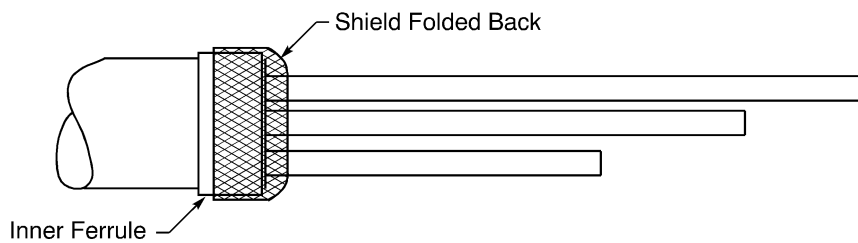
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CABLE PREPARATION
Figure 49

- (f) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 46 and Figure 49.
- (g) Remove the necessary length of component wire C to make the distance from the end of the jacket to the end of the wire equal to 6.0 inches (152 millimeters). Refer to Figure 46 and Figure 49.
- (17) Put the mechanical ferrules on the end of each cable.
 - (a) Put the ferrules on the end of the cables in this sequence:
 - The outer ferrule
 - The inner ferrule.
 - (b) Move the ferrules back on the cable away from the splice area.
- (18) Install the inner ferrule on the end of the cable.
 - (a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 50.



INSTALLATION OF THE INNER FERRULE
Figure 50

- (b) Crimp the inner ferrule.
- (19) Fold the shield back on the inner ferrule.
Make sure that:
 - The shield is smooth
 - The strands are symmetrical around the circumference of the ferrule.
- (20) Do Step (18) through Step (19) again for the inner ferrule on each cable.

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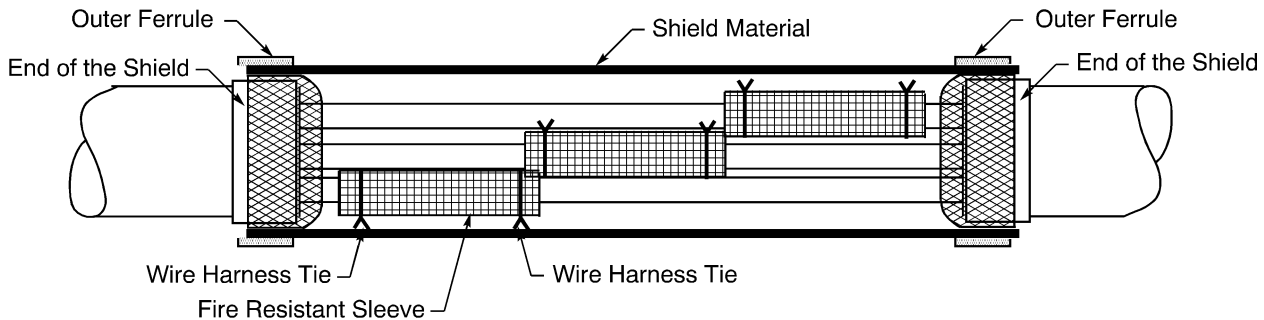
- (21) Put the necessary length of fire resistant sleeves on the longest component wire of the new cable segment in this sequence:
 - The outer sleeve
 - The inner sleeve.

Make sure that:

 - The sleeve is expanded
 - The length of the sleeve is sufficient extend farther than each end of the splice.
- (22) Put the necessary length of fire resistant sleeves on the two longest component wires of the damaged cable in this sequence:
 - The outer sleeve
 - The inner sleeve.

Make sure that:

 - The sleeve is expanded
 - The length of the sleeve is sufficient extend farther than each end of the splice.
- (23) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of each component wire.
- (24) Put the new length of cable in position for the assembly of the cable splice.
- (25) Assemble a splice of each component wire. Refer to Figure 51.



ASSEMBLY OF THE CONDUCTOR SPLICE
Figure 51

- (a) Put a conductor in each end of the splice.
Make sure that all of the strands are in the crimp barrel.
 - (b) Crimp the splice.
 - (c) Lightly pull each conductor to make sure that they are held tightly in the splice.
 - (d) Move the inner fire resistant sleeve on the splice.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (e) Move the outer fire resistant sleeve on the inner sleeve.
Make sure that the center of the sleeve is aligned with the center of the splice.
 - (f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.
- (26) Wind a layer of shield material on the splice area. Refer to Figure 51.

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Make sure that the layer of shield material:

- Starts at the end of the folded back shield on one end of the splice
- Ends at the end of the folded back shield on the other end of the splice assembly
- Makes a 0.5 inch (13 millimeters) overlap.

(27) Move the outer ferrule into its position on the inner ferrule.

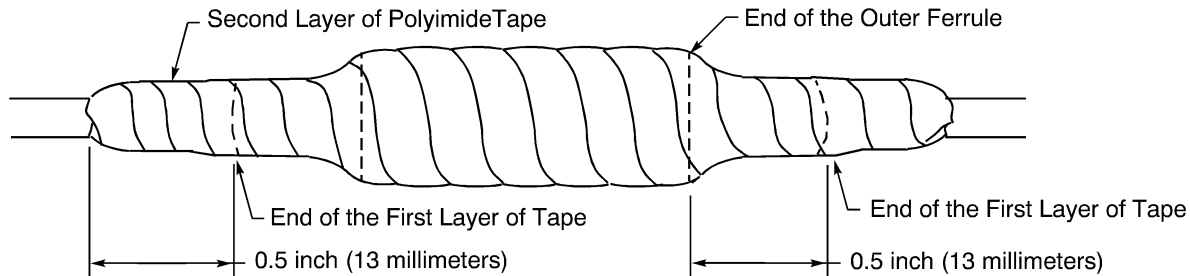
(28) Crimp the outer ferrule.

(29) Remove the shield material that extends farther than the rear end of each outer ferrule.

(30) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 52.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE

Figure 52

(31) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 52.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

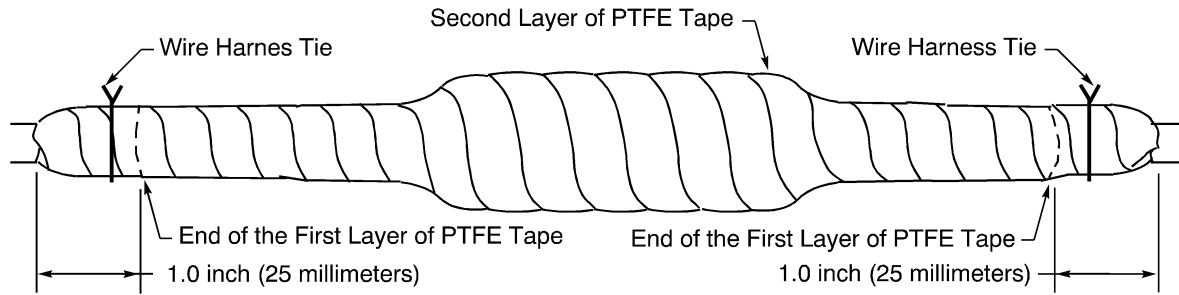
(32) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 53.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from one end of the layer of polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the layer of polyimide tape
- Makes a 50 percent overlap.

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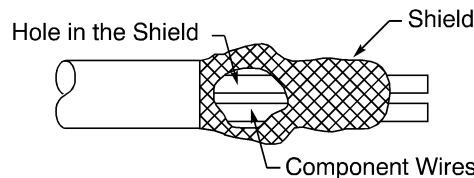


INSTALLATION OF THE LAYERS OF PTFE TAPE

Figure 53

- (33) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 53.
Make sure that the layer of tape:
 - Is in the opposite direction of the first layer of PTFE tape
 - Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
 - Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
 - Makes a 50 percent overlap.
- (34) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.
- (35) Prepare the end of the new length of cable.
 - (a) Remove necessary length of the cable jacket.
Make sure that the length of jacket removed on the new cable segment is the same as the length of jacket that is removed on the damaged cable segment.
 - (b) Push the shield rearward to expand it at the end of the jacket.
 - (c) Make a hole in the shield near the end of the cable jacket with a nylon tool. Refer to Figure 54.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION CAN CAUSE A SHORT TO OCCUR.



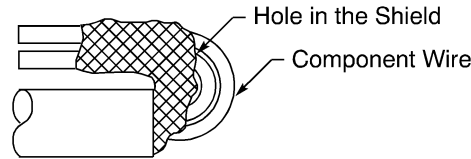
PREPARATION OF THE HOLE IN THE SHIELD

Figure 54

- (d) Carefully bend the cable until the component wires can be seen in the hole. Refer to Figure 55.

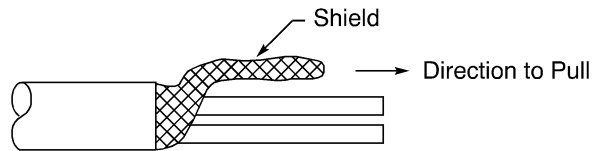
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POSITION OF THE COMPONENT WIRES
Figure 55

- (e) Pull one wire at a time through the hole in the shield.
- (f) Pull the shield tight to make a flat conductor. Refer to Figure 56.



PREPARATION OF THE SHIELD GROUND WIRE
Figure 56

- (g) Assemble the new contacts on the wires. Refer to Subject 20-23-37.
- (h) Remove the identification marker for each contact from the old wires.
- (i) Put the identification marker for each contact on the new wires.
- (36) Disassemble the connector on the end of the damaged cable. Refer to Subject 20-23-37.
- (37) Remove the damaged cable from the wire harness clamps.
- (38) Put the wire harness in its initial configuration.
- (39) Assemble the connector. Refer to Subject 20-23-37.
- (40) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.
- (41) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

F. Class 3 Cable - New Length of Cable Between the Connectors

For the conditions that are applicable for:

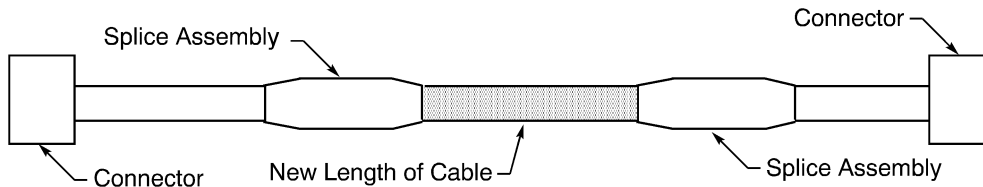
- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.

NOTE: The procedure to assemble a splice with a new length of cable with the connector on the end is a satisfactory alternative to this procedure. Refer to Paragraph 4.E.

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SPLICE WITH A NEW LENGTH OF CABLE BETWEEN THE CONNECTORS

Figure 57

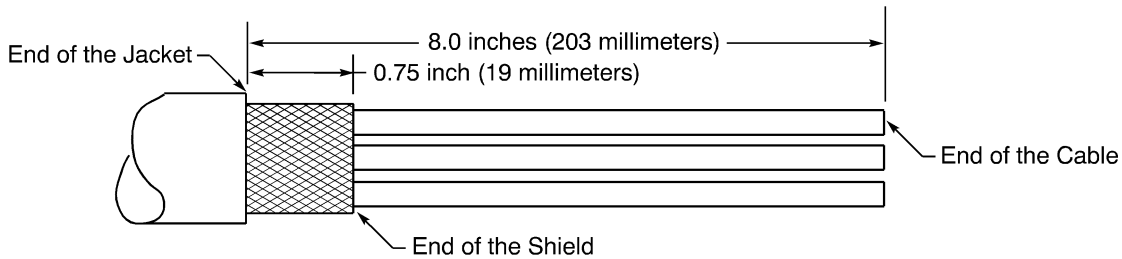
Refer to Figure 57.

- (1) Find the cable part number. Refer to the Subject 20-23-15 and the WDM.
NOTE: For alternative cables, refer to Subject 20-23-03.
- (2) Make a selection of a wiper from Table 12.
NOTE: An equivalent wiper is a satisfactory alternative.
- (3) Make a selection of a solvent from Table 8.
NOTE: An equivalent solvent is a satisfactory alternative.
- (4) Make a selection of a shield material from Table 10.
NOTE: An equivalent shield material is a satisfactory alternative.
- (5) Make a selection of these tapes from Table 9:
 - A polyimide tape
 - A PTFE tape.NOTE: An equivalent tape is a satisfactory alternative.
- (6) Make a selection these fire resistant sleeves from Table 11:
 - An inner sleeve
 - An outer sleeve.NOTE: An equivalent sleeve is a satisfactory alternative.
- (7) Make a selection of four inner ferrules and four outer ferrules from Table 5.
- (8) Make a selection of a insulation removal tool from Table 13.
- (9) Make a selection of a ferrule crimp tool from Table 14.
- (10) Make a selection of a splice crimp tool from Table 15.
- (11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.
- (12) Find the location on the damaged cable to put the cable splice.
 Make sure that the location of the splice on the cable is in a permitted location; refer to Subject 20-23-15.
- (13) Cut the damaged cable on each side of the area with damage.
- (14) Clean the ends of the damaged cable with solvent and a wiper.
 Make sure to clean a minimum of 16.0 inches (406 millimeters) from each end of the cable.
- (15) Prepare the ends of the damaged cable.

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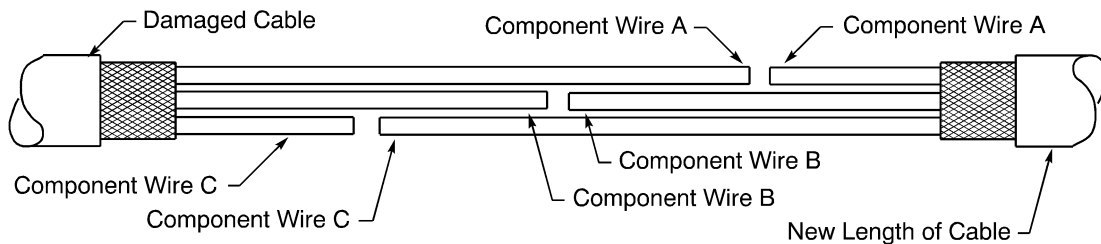
- (a) Remove 8.0 inches (203 millimeters) of the jacket from the end of the cable. Refer to Figure 58.



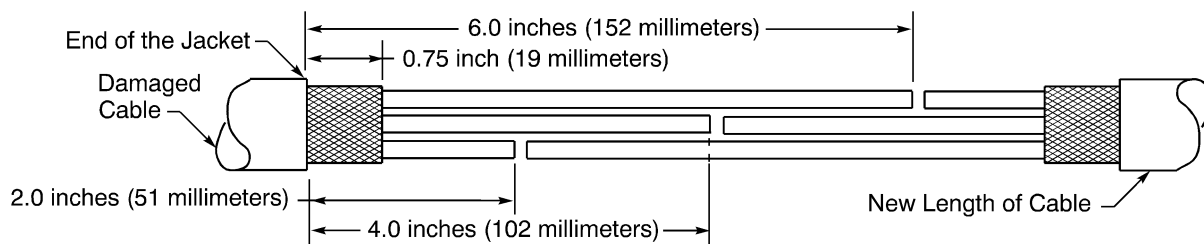
JACKET REMOVAL
Figure 58

- (b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 58.
- (c) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 6.0 inches (152 millimeters). Refer to Figure 59 and Figure 60.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



COMPONENT WIRE CONFIGURATION
Figure 59



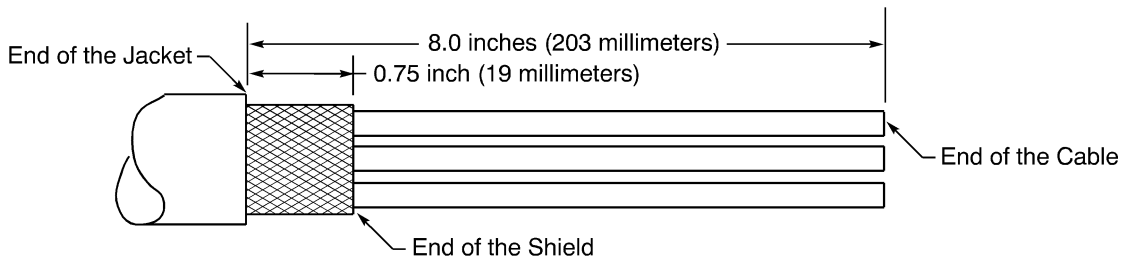
CABLE PREPARATION
Figure 60

- (d) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 59 and Figure 60.

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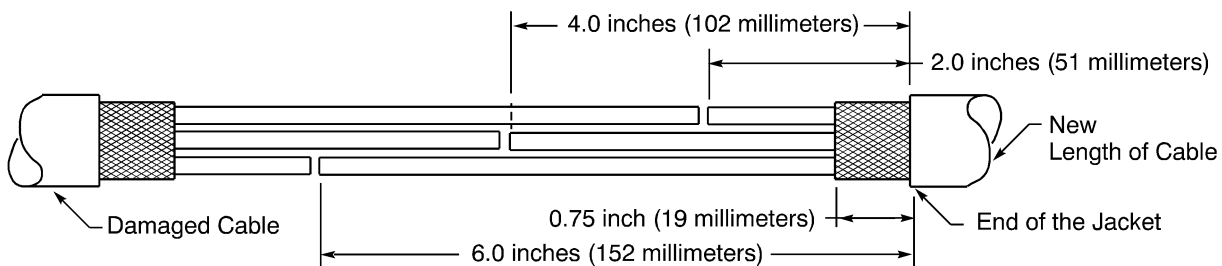
- (e) Remove the necessary length of component wire C to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 59 and Figure 60.
- (f) Do Step (a) through Step (d) again for the other end of the cable.
- (16) Prepare the length of new length of cable.
 - (a) Cut the necessary length of cable.
Make sure that the length is 16.0 inches (406 millimeters) longer than the distance between the two ends of the damaged cable.
 - (b) Clean the ends of the cable with solvent and a wiper.
Make sure to clean a minimum of 12.0 inches (305 millimeters) from each end of the cable.
 - (c) Remove 8.0 inches (203 millimeters) of the jacket from the end of the cable. Refer to Figure 61.



JACKET REMOVAL
Figure 61

- (d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 61.
- (e) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 59 and Figure 62.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.

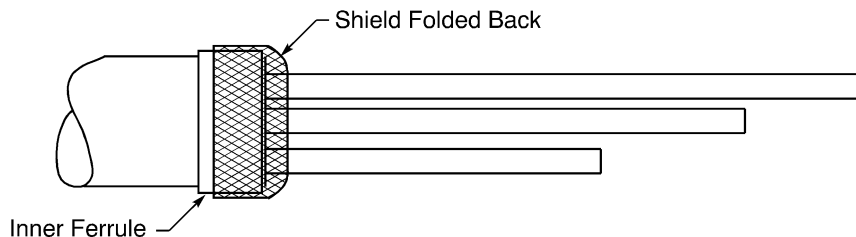


CABLE PREPARATION
Figure 62

- (f) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 59 and Figure 62.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES**

- (g) Remove the necessary length of component wire C to make the distance from the end of the jacket to the end of the wire equal to 6.0 inches (152 millimeters). Refer to Figure 59 and Figure 62.
- (h) Do Step (c) through Step (f) again for the other end of the new cable segment.
- (17) Put the mechanical ferrules on the cables.
 - (a) Put an inner and outer ferrule on the end of each cable in this sequence:
 - The outer ferrule
 - The inner ferrule.
 - (b) Move the outer ferrules back on the cables away from the splice area.
- (18) Install the inner ferrule on the end of the cable.
 - (a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 63.

**INSTALLATION OF THE INNER FERRULE****Figure 63**

- (b) Crimp the inner ferrule.
- (19) Fold the shield back on the inner ferrule. Refer to Figure 63.
Make sure that:
 - The shield is smooth
 - The strands are symmetrical around the circumference of the ferrule.
- (20) Do Step (18) through Step (19) again for each inner ferrule on each cable.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

(21) Put the necessary lengths of fire resistant sleeves on the longest component wire of the new length of cable in this sequence:

- The outer sleeve
- The inner sleeve.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.

(22) Put the necessary lengths of fire resistant sleeves on the two longest component wires of the damaged cable in this sequence:

- The outer sleeve
- The inner sleeve.

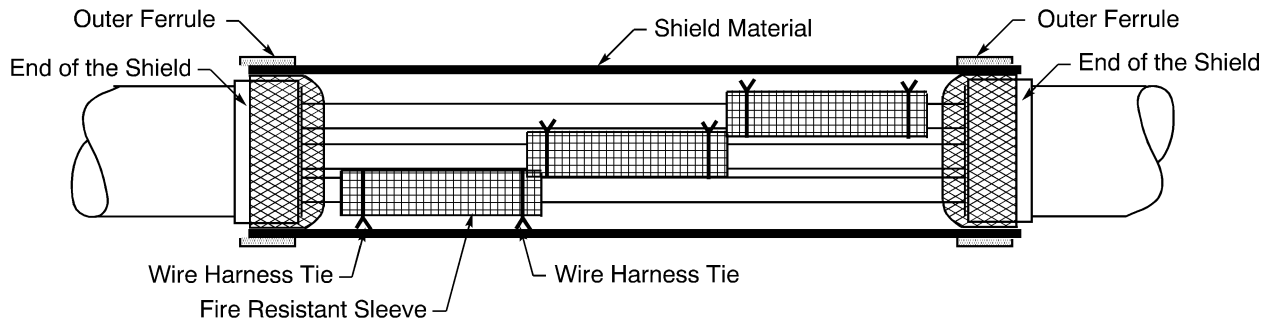
Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.

(23) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end each the component wire.

(24) Put the new length of cable in its position for the assembly of the cable splice.

(25) Assemble a splice of the each component wire. Refer to Figure 64.



ASSEMBLY OF THE CONDUCTOR SPLICE

Figure 64

(a) Put a conductor in each end of the splice.

Make sure all of the strands are in the crimp barrel.

(b) Crimp the splice.

(c) Lightly pull each conductor to make sure that they are held tightly in the splice.

(d) Move the inner fire resistant sleeve on the splice.

Make sure that the center of the sleeve is aligned with the center of the splice.

(e) Move the outer fire resistant sleeve on the inner sleeve.

Make sure that the center of the sleeve is aligned with the center of the splice.

(f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(26) Wind a layer of shield material on the splice area. Refer to Figure 64.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

Make sure that the layer of shield material:

- Starts at the end of the folded back shield on one end of the splice
- Ends at the end of the folded back shield on the other end of the splice assembly
- Makes a 0.5 inch (13 millimeters) overlap.

(27) Move the outer ferrule into its position on the inner ferrule.

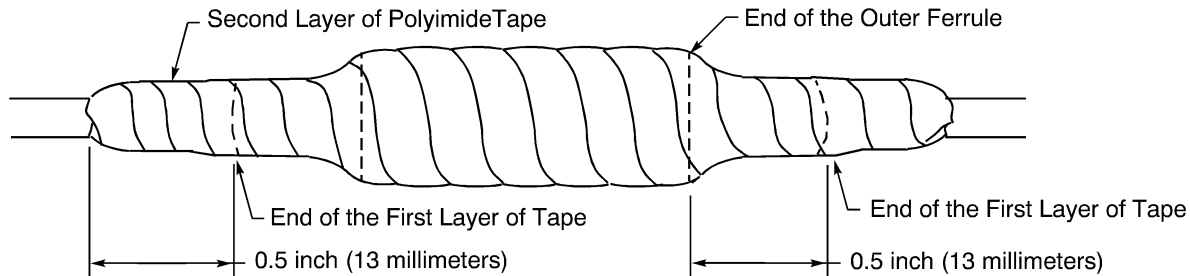
(28) Crimp the outer ferrule.

(29) Remove the shield material that extends farther than the rear end of each outer ferrule.

(30) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 65.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE

Figure 65

(31) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 65.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

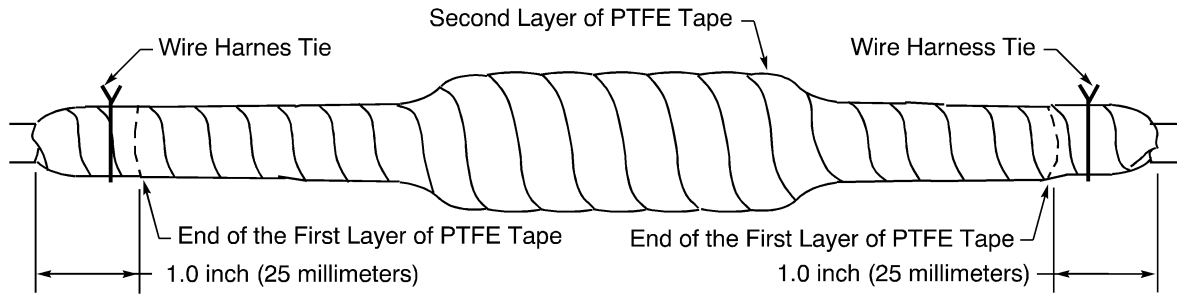
(32) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 66.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the end of the layer of polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the layer of polyimide tape
- Makes a 50 percent overlap.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES



INSTALLATION OF THE LAYERS OF PTFE TAPE

Figure 66

- (33) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 66.
Make sure that the layer of tape:
 - Is in the opposite direction of the first layer of PTFE tape
 - Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
 - Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
 - Makes a 50 percent overlap.
- (34) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.
- (35) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.
- (36) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

5. WIRE CHECKS

A. Wire Continuity Check

- (1) Find the wire termination data. Refer to the WDM.
- (2) Disconnect each connector on the circuit that must have a wire continuity check.

CAUTION: EACH CONNECTOR ON THE CIRCUIT THAT MUST HAVE A TEST MUST BE DISCONNECTED. IF THE CONNECTORS ARE NOT DISCONNECTED, UNSATISFACTORY RESISTANCE INDICATIONS OR DAMAGE TO THE CONNECTOR CAN OCCUR.

- (3) Measure the resistance on all wires.

Make sure that each circuit has continuity from one end of the wire to the other end of the wire.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

B. Insulation Resistance Check

- (1) Make a selection of a multimeter.

WARNING: DO NOT USE A MEGOHMMETER FOR THE INSULATION RESISTANCE TEST OF THE ON-WING WIRING REPAIR. INJURY TO PERSONNEL OR DAMAGE TO THE AIRPLANE CAN OCCUR.

- (2) Set the meter to the 100 megohm scale.
- (3) Attach one meter test lead to the contact assembly on the connector.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

- (4) Attach the other meter test lead to a contact assembly on a wire that does not connect to the same circuit.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

- (5) Read the meter.
Make sure that the resistance is a minimum of 100 megohm.
- (6) Do Step (3) through Step (5) for each contact in the connector.
- (7) Attach the one meter test lead to the backshell.
- (8) Attach the other meter test lead to the contact assembly on the wire that must have a test.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

- (9) Read the meter.
Make sure that the resistance is a minimum of 100 megohm.
- (10) Do Step (8) through Step (9) for each wire that must have a test.

6. APPROVED TOOL SUPPLIERS

A. Ferrule Crimp Tools

**Table 16
MECHANICAL FERRULE CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/5-01	QPL
M22520/5-19	QPL
M22520/5-35	QPL
M22520/5-37	QPL
M22520/5-39	QPL
M22520/5-41	QPL
M22520/5-43	QPL
M22520/5-45	QPL
M22520/5-47	QPL



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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF ALTERNATOR LEAD WIRES

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A. Applicable Conditions	1
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A. Cable Jacket Repair	1

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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF ALTERNATOR LEAD WIRES

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data of this Subject, refer to Subject 20-23-00.

2. ALTERNATOR LEAD WIRE REPAIR

A. Cable Jacket Repair

For the conditions that are applicable for this procedure, refer to Subject 20-23-15.

**Table 1
SOLVENTS**

Description	Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

**Table 2
TAPES**

Description	Part Number	Supplier
Polyimide, 1 inch width	Scotch 62	3M
PTFE, 1 inch width	Scotch 92	3M

**Table 3
NECESSARY TOOLS**

Description	Part Number	Supplier
Disposable Tissue	Kimwipe 7105	Kimberly-Clark

- (1) Make a selection of a solvent from from Table 1.

NOTE: An equivalent solvent is a satisfactory alternative.

- (2) Make a selection of a wiper from Table 3.

NOTE: An equivalent wiper is a satisfactory alternative.

- (3) Make a selection of these tapes from Table 2:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

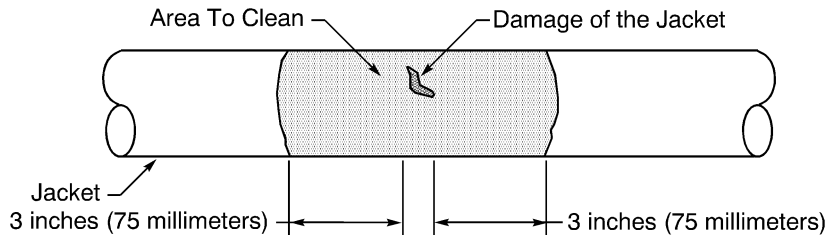
- (4) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the wire that has damage.

- (5) Clean the area of the cable that has damage with solvent and a wiper. Refer to Figure 1.

Make sure to clean a minimum of 3.0 inches (75 millimeters) on each side of the damage.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: REPAIR OF ALTERNATOR LEAD WIRES

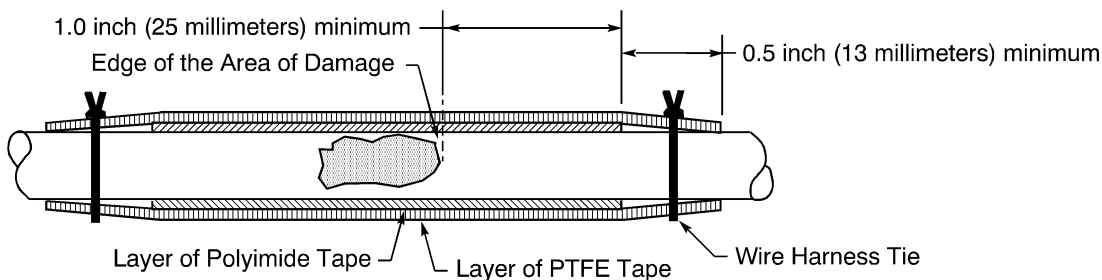


AREA TO CLEAN
Figure 1

- (6) Dry the solvent with a wiper.
- (7) Wind one layer of polyimide tape on the area with damage. Refer to Figure 2.

Make sure that the layer of tape:

- Starts a minimum of 1.0 inch (25 millimeters) from one side of the damage
- Stops a minimum of 1.0 inch (25 millimeters) from the other side of the damage
- Makes a 20 percent overlap.



INSTALLATION OF THE FIRST LAYER OF TAPE
Figure 2

- (8) Wind one layer of PTFE tape on the polyimide tape. Refer to Figure 2.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 20 percent overlap.

- (9) Assemble a wire harness tie on each end of the second layer of tape. Refer to Subject 20-23-30.



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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

<u>Paragraph</u>	<u>Page</u>
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A. Applicable Conditions	1
2. <u>WIRE HARNESS DISASSEMBLY</u>	1
A. Replacement of a Damaged Cable	1
3. <u>WIRE HARNESS ASSEMBLY</u>	1
A. General Conditions	1
B. Wire Harness Tie Materials	2
C. Assembly of a Wire Harness Tie	2
D. Assembly of a Wire Harness Tie Where a Wire Harness Goes Across a Different Wire Harness	4
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F. Assembly of a Wire Harness Tie at a 90 Degree Branch	7
G. Assembly of a Wire Harness Tie at a Branch	8

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STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY****1. GENERAL DATA****A. Applicable Conditions**

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. WIRE HARNESS DISASSEMBLY**A. Replacement of a Damaged Cable**

- (1) Loosen the first wire harness clamp that is next to the connector on one end of the wire harness.
- (2) Remove all of the wire harness ties between the first clamp and the second clamp.
- (3) Remove the damaged cable from the first clamp.
- (4) Put the new cable in its position in the first clamp.
- (5) Fully install the first clamp.
- (6) Assemble wire harness ties on the wire harness between the first clamp and the second clamp. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.
Make sure that a new wire harness tie is assembled at the same position as the wire harness tie that is removed.
- (7) Loosen the second wire harness clamp.
- (8) Remove all of the wire harness ties between the second clamp and the third clamp.
- (9) Remove the damaged cable from the third clamp.
- (10) Put the new cable in its position in the second clamp.
- (11) Fully install the second clamp.
- (12) Assemble wire harness ties on the wire harness between the first clamp and the second clamp. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.
Make sure that a new wire harness tie is assembled at the same position as the wire harness tie that is removed.
- (13) Do Step (7) through Step (9) again for each clamp location until the damaged cable is fully removed and the new cable is fully installed.
Make sure that a new wire harness tie is assembled at the same position as the wire harness tie that is removed.

3. WIRE HARNESS ASSEMBLY**A. General Conditions**

These conditions are applicable for the location of a wire harness tie:

- A replacement wire harness tie must be assembled at the same location as the initial wire harness tie that was removed
- A wire harness tie must be assembled at a maximum distance of 2 inches (51 millimeters) from an adjacent wire harness tie.

These conditions are applicable for the assembly of a wire harness tie:

- All wires must be parallel before the wire harness tie is assembled on the wire harness
- A wire harness tie must be assembled on two or more wires or cables that are together.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

B. Wire Harness Tie Materials

**Table 1
LACING TAPE PART NUMBERS**

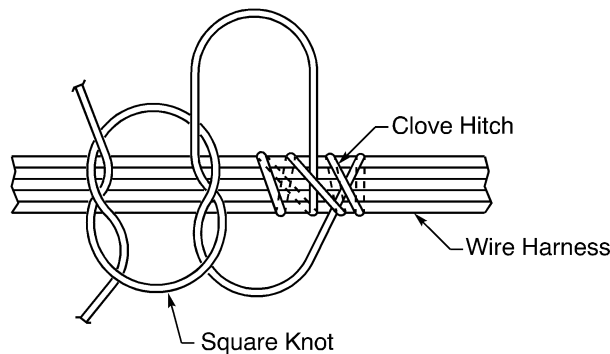
Part Number or Specification	Description	Supplier
BMS13-54 Type III Finish C	Nomex, flat braid; 0.110 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick	Gudebrod
		Western Filament
ESW-1900	Nomex, flat braid; 0.110 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick	Polamco
MIL-T-43435 Type V Finish C	Nomex, flat braid; 0.110 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick	QPL
T085	Nomex, flat braid; 0.110 inch \pm 0.010 inch wide, 0.014 inch \pm 0.003 inch thick	Raydex/CDT

C. Assembly of a Wire Harness Tie

This paragraph gives the procedure to assemble a wire harness tie when no special conditions occur.

For the procedures to assemble a wire harness tie:

- Where a wire harness tie goes across a different wire harness, refer to Paragraph 3.D.
- At a junction, refer to Paragraph 3.E.
- At a 90 degree branch, refer to Paragraph 3.F.
- At a branch, refer to Paragraph 3.G.



**ASSEMBLY OF A WIRE HARNESS TIE
Figure 1**

Refer to Figure 1.

- (1) Make a selection of a lacing tape from Table 1.

NOTE: An equivalent lacing tape is a satisfactory alternative.

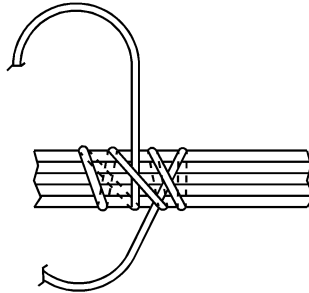
- (2) Make the wires parallel with a minimum number of twists.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY**

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

- (3) Make a clove hitch knot on the wire harness. Refer to Figure 2.

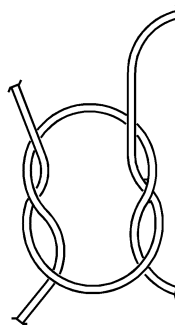
CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.



CLOVE HITCH KNOT
Figure 2

- (4) Make a square knot on top of the clove hitch knot. Refer to Figure 3.

CAUTION: MAKE SURE THAT THE TIE IS NOT TOO TIGHT. DAMAGE TO THE WIRE INSULATION CAN OCCUR.



SQUARE KNOT
Figure 3

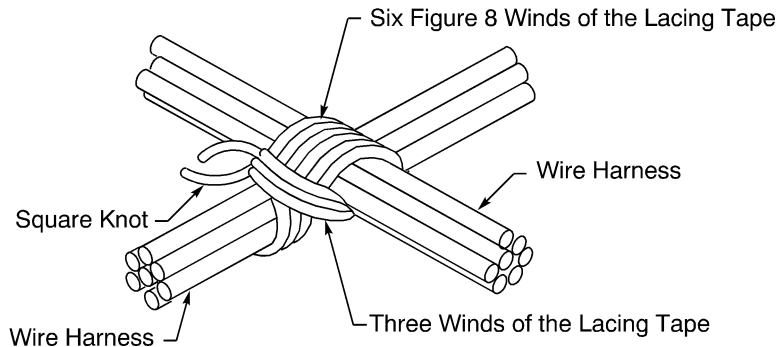
- (5) Cut each end of the lacing tape.

Make sure that the distance from the knot to the end of the lacing tape is between 0.25 inch (6 millimeters) and 0.50 inch (13 millimeters).

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

D. Assembly of a Wire Harness Tie Where a Wire Harness Goes Across a Different Wire Harness



CONFIGURATION OF TWO WIRE HARNESSES THAT GO ACROSS EACH OTHER
Figure 4

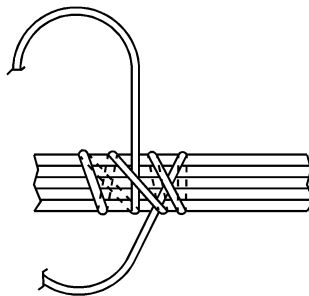
Refer to Figure 4.

- (1) Make a selection of a lacing tape from Table 1.
- (2) Make the wires parallel with minimum of twists.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

- (3) Assemble a clove hitch on one wire harness where the wire harnesses goes across the other wire harness. Refer to Figure 5.

CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.



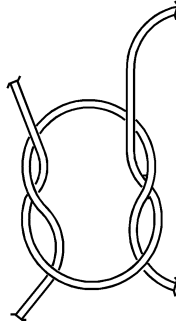
CLOVE HITCH
Figure 5

- (4) Make a figure 8 wind around the wire harnesses.
- (5) Pull the lacing tape tight.
- (6) Do Step (4) through Step (5) again 5 times.
- (7) Make a wind around the lacing tape between the two wire harnesses.
- (8) Pull the lacing tape tight.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY**

- (9) Do Step (7) through Step (8) again 2 times.
- (10) Make a square knot. Refer to Figure 6.

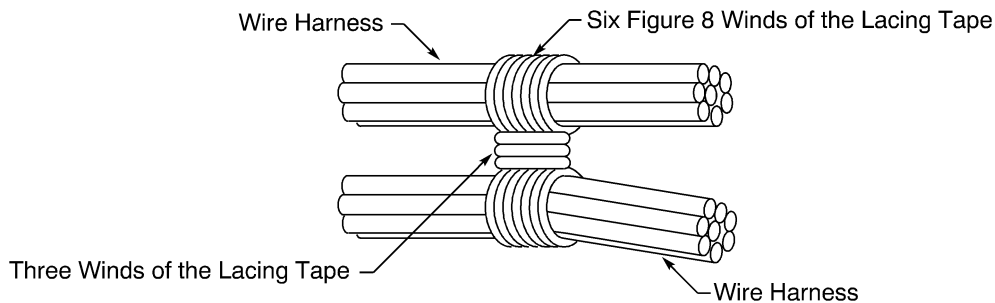
CAUTION: MAKE SURE THAT THE TIE IS NOT TOO TIGHT. DAMAGE TO THE WIRE INSULATION CAN OCCUR.



SQUARE KNOT
Figure 6

- (11) Cut each end of the lacing tape.

Make sure that the distance from the knot to the end of the lacing tape is between 0.25 inch (6 millimeters) and 0.50 inch (13 millimeters).

E. Assembly of a Wire Harness Tie at a Junction

CONFIGURATION OF A WIRE HARNESS JUNCTION
Figure 7

Refer to Figure 7.

- (1) Make a selection of a lacing tape from Table 1.
- (2) Make the wires parallel with a minimum number of twists.

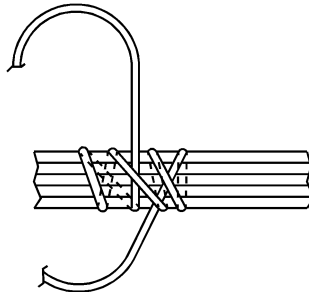
CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

- (3) Assemble a clove hitch on one wire harness. Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL

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CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.



CLOVE HITCH
Figure 8

- (4) Make a figure 8 wind around the wire harnesses. Refer to Figure 9.

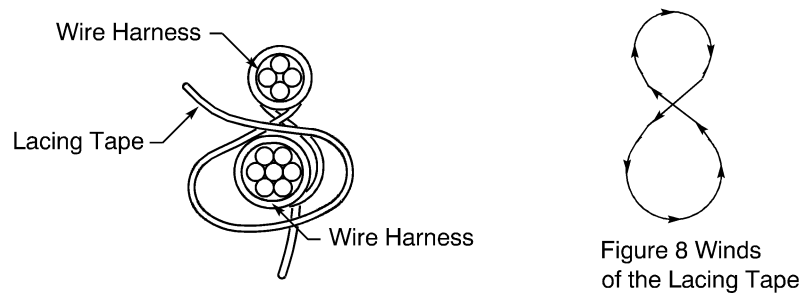


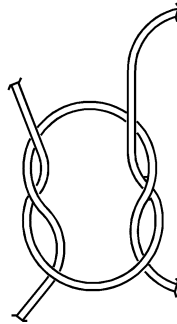
FIGURE 8 WINDS OF THE LACING TAPE
Figure 9

- (5) Pull the lacing tape tight.
- (6) Do Step (4) and Step (5) again 5 times.
- (7) Put the one end of the lacing tape through the two harnesses.
- (8) Make a wind around the lacing tape between the branches.
- (9) Pull the lacing tape tight.
- (10) Do Step (8) through Step (9) again 2 times.
- (11) Assemble a square knot. Refer to Figure 10.

CAUTION: DO NOT CAUSE DEFORMATION OF THE WIRE OR THE CABLE DURING ASSEMBLY OF THE SQUARE KNOT. DAMAGE TO THE WIRE OR CABLE CAN OCCUR.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

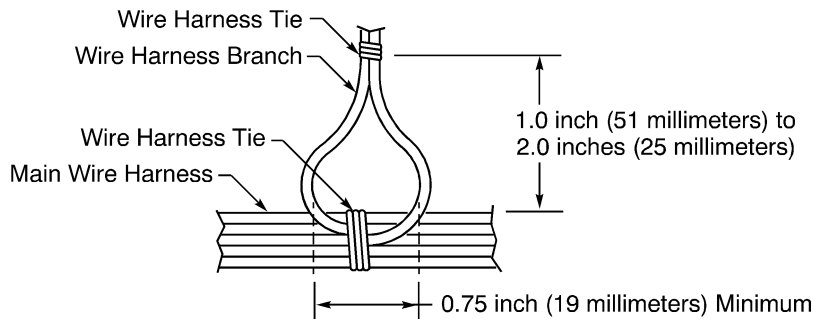


SQUARE KNOT
Figure 10

- (12) Cut each end of the lacing tape.

Make sure that the distance from the knot to the end of the lacing tape is between 0.25 inch (6 millimeters) and 0.50 inch (13 millimeters).

F. Assembly of a Wire Harness Tie at a 90 Degree Branch



CONFIGURATION OF A 90 DEGREE WIRE HARNESS BRANCH
Figure 11

Refer to Figure 11.

- (1) Make a selection of a lacing tape from Table 1.
- (2) Make the wires parallel with a minimum number of twists.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

- (3) Assemble a wire harness tie at the location of the branch. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.
- (4) Move each wire to make a 90 degree branch.

STANDARD WIRING PRACTICES MANUAL

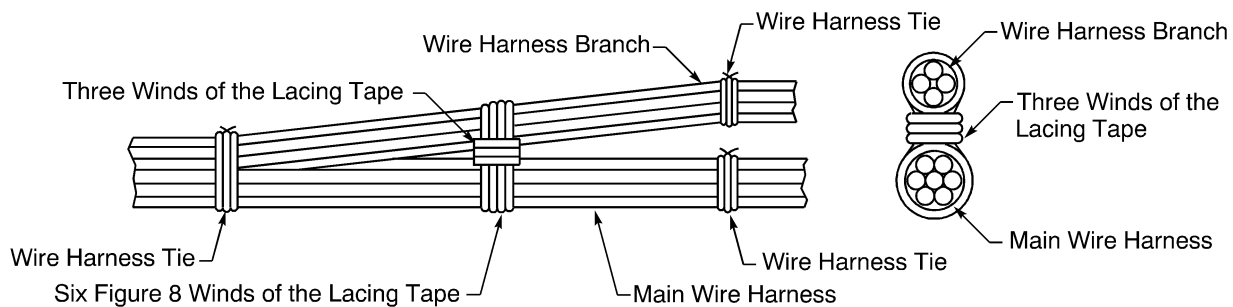
RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

Make sure that:

- Each side of the branch has an equal number of wires
 - The distance between the wires on one side of the tie are a 0.75 inch (19 millimeters) minimum from wires on the other side of the tie.
- (5) Assemble a wire harness tie on the branch between 1 inch (25 millimeters) and 2 inches (51 millimeters) from the main wire harness. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.

G. Assembly of a Wire Harness Tie at a Branch

This paragraph gives the procedure to assemble a wire harness tie at a branch that is not 90 degrees. For the procedure to assemble a wire harness tie at a 90 degree branch, refer to Paragraph 3.F.



CONFIGURATION OF A WIRE HARNESS BRANCH THAT IS NOT 90 DEGREES

Figure 12

Refer to Figure 12.

- (1) Make a selection of a lacing tape from Table 1.
- (2) Make the wires parallel with a minimum number of twists.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

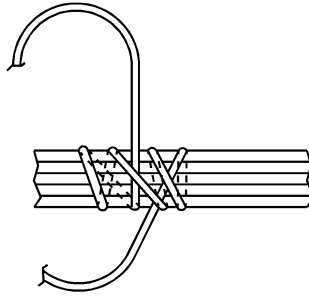
- (3) Assemble a wire harness tie on the main wire harness branch a maximum of 2 inches (51 millimeters) before the branch. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.
- (4) Assemble a wire harness tie on the main wire harness a maximum of 2 inches (51 millimeters) from the location of the wire harness branch.

Refer to:

- Figure 13
 - Paragraph 3.C. for the procedure to assemble a wire harness tie.
- (5) Assemble a clove hitch on the main wire harness at the location of the wire harness branch. Refer to Figure 13.

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CLOVE HITCH
Figure 13

- (6) Make a figure 8 wind around the wire harnesses Refer to Figure 14.

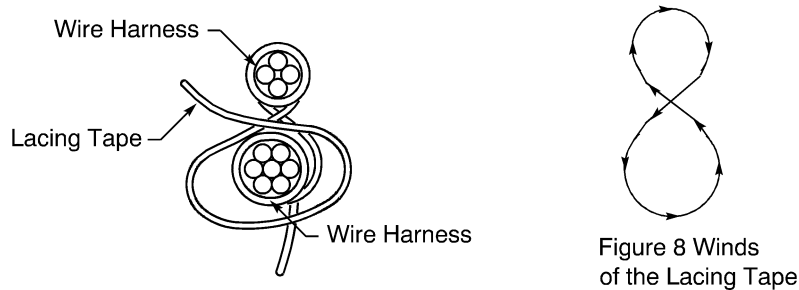


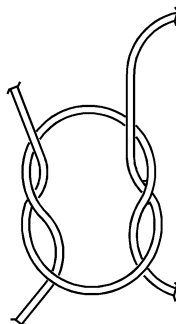
FIGURE 8 WINDS OF THE LACING TAPE
Figure 14

- (7) Pull the lacing tape tight.
- (8) Do Step (6) and Step (7) again 5 times.
- (9) Put the one end of the lacing tape through the two harnesses.
- (10) Make a wind around the strands of the lacing tape between the branches.
- (11) Pull the lacing tape tight.
- (12) Do Step (10) through Step (11) again 2 times.
- (13) Assemble a square knot. Refer to Figure 15.

CAUTION: DO NOT CAUSE DEFORMATION OF THE WIRE OR THE CABLE DURING ASSEMBLY OF THE SQUARE KNOT. DAMAGE TO THE WIRE OR CABLE CAN OCCUR.

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RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY



SQUARE KNOT
Figure 15

- (14) Cut each end of the lacing tape.

Make sure that the distance from the knot to the end of the lacing tape is between 0.25 inch (6 millimeters) and 0.50 inch (13 millimeters).



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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF TERMINAL LUGS

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STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF TERMINAL LUGS

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. TERMINAL LUG ASSEMBLY

A. Assembly of Terminal Lugs

**Table 1
NECESSARY MATERIALS**

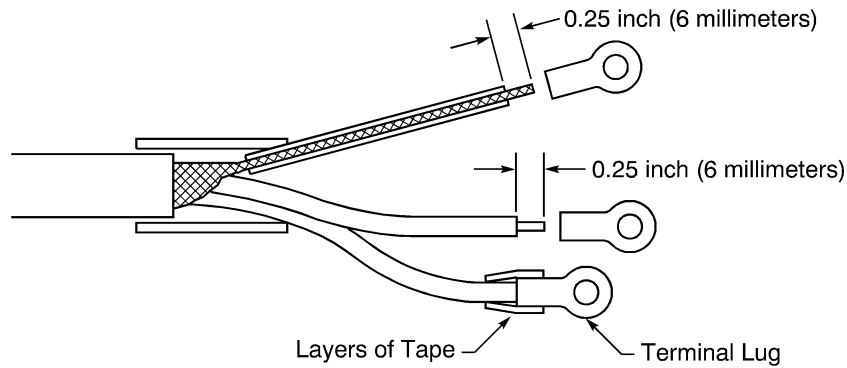
Material	Specification	Description	Supplier
Tape	A-A-59474	TFE, Pressure Sensitive	An available source

**Table 2
INSULATION REMOVAL TOOLS**

Wire Size (AWG)	Removal Tool	
	Part Number	Supplier
22-10	45-092	Ideal

**Table 3
CRIMP TOOLS**

Crimp Barrel Size	Crimp Tool	
	Part Number	Supplier
22-16	46673	AMP



**TERMINAL LUG ASSEMBLY
Figure 1**

Refer to Figure 1.

- (1) Make a selection of an insulation removal tool from Table 2.
- (2) Make a selection of crimp tool from Table 3.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF TERMINAL LUGS**

- (3) Make a selection of a tape from Table 1.

NOTE: An equivalent tape is a satisfactory alternative.

- (4) Remove 0.25 inch (6 millimeters) of the length of the insulation from the end of the wire.

- (5) Put the end of the wire in the crimp barrel of the terminal lug.

Make sure that the end of the conductor can be seen at the front of the crimp barrel.

- (6) Crimp the terminal lug.

(a) Align the number printed on the terminal lug with the number printed on the jaws of the crimp tool.

(b) Put the terminal lug in the center of the jaws of the crimp tool.

(c) Move the crimp tool handles together until the ratchet releases.

(d) Pull gently on the wire to make sure that the wire is held tightly in the terminal lug.

- (7) Do a continuity test:

(a) Set the multimeter to the 100 ohm scale.

(b) Attach one meter test lead to a backshell in the wire harness.

(c) Insert the other meter test lead to the terminal lug.

(d) Measure the resistance.

Make sure that the resistance is less than 1 ohm.

- (8) Wind two layers of tape on the crimp barrel and the wire.

3. TERMINAL LUG INSTALLATION**A. Installation on a Stud**

- (1) Put the terminal lug on the stud.
- (2) If a washer is specified, put the washer on the stud.
- (3) Fully engage the threads of the nut and the threads of the stud.
- (4) Tighten the nut to the specified torque. Refer to the AMM.
- (5) Do the necessary tests. Refer to the AMM.

B. Installation with a Nut and a Bolt

- (1) Put the terminal lug in its position on the engine bracket.
- (2) Install the boot on the terminal lug.
- (3) If a washer is specified, put the washer on the bolt.
- (4) Put the bolt through the hole in the terminal lug and the bracket.
- (5) Tighten the nut to the specified torque. Refer to the AMM.
- (6) Do the necessary tests. Refer to the AMM.



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RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

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RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. CONNECTOR DISASSEMBLY OF THE ESC() CONNECTORS

A. Separation of the ESC() Plug and Receptacle

NOTE: If disassembly of the backshell of the plug is necessary, the plug must stay connected to the receptacle.

**Table 1
NECESSARY TOOLS**

Tool	Part Number	Supplier
Pliers, Soft Jaw	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair

- (1) Make a selection of pliers from Table 1.
- (2) Disengage the threads of the coupling ring of the plug connector and the receptacle with the pliers.
- (3) Pull the plug from the receptacle.

B. Removal of an ESC() Receptacle from a Bracket

NOTE: If disassembly of the backshell of the receptacle is necessary, the receptacle must stay installed in the bracket.

**Table 2
NECESSARY TOOLS**

Tool	Part Number	Supplier
Marker	Sharpie	Sanford
Screwdriver, Number 3 Phillips	-	An available source

- (1) Make a selection of a screwdriver from Table 2.
- (2) For a connector that has a 90 degree backshell or a 45 degree backshell:
 - (a) Make a selection of a marker from Table 2.

NOTE: An equivalent marker is a satisfactory alternative.
 - (b) Make a mark on the engine bracket on the same side as the keyway of the connector.

NOTE: This records the master keyway clock position on the engine bracket.
- (3) Remove the nuts and the bolts that attach the receptacle to the engine bracket.
- (4) Remove the receptacle from the engine bracket.

C. Disassembly of a ESC() Plug Connector

NOTE: For the removal of the strain relief backshell or the backshell extension, the plug must be connected to the receptacle.

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RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

**Table 3
NECESSARY TOOLS**

Tool	Part Number	Supplier
Marker	Sharpie	Sanford
Pliers, Soft Jaw	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair
Screwdriver, Number 3 Phillips	-	An available source

- (1) Make a selection of pliers from Table 3:

NOTE: An equivalent pliers is a satisfactory alternative.

- (2) Make a selection of a screwdriver from Table 3:

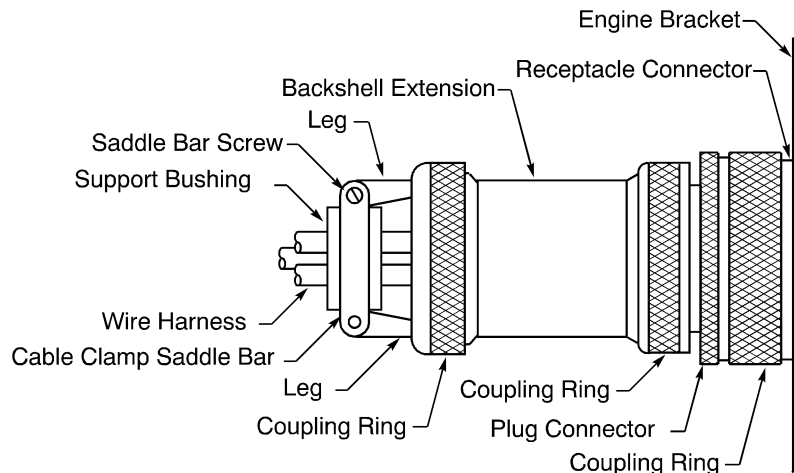
NOTE: An equivalent screwdriver is a satisfactory alternative.

- (3) Examine the plug and the receptacle.

Make sure that:

- The receptacle connector is attached to the engine bracket
- The plug and the receptacle are connected.

- (4) Loosen the saddle bar screws sufficiently to let the support bushing move rearward on the wire harness. Refer to Figure 1.



**ESC() CONNECTOR AND BACKSHELL DISASSEMBLY
Figure 1**

- (5) If the saddle bars do not let the bushing move rearward on the harness, remove the screws and the saddle bars. Refer to Figure 1.

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- (6) If the saddle bars are removed, put these strain relief assembly components in a safe place:
 - The screws
 - The washers
 - The saddle bars.

NOTE: These components are necessary to assemble the backshell again.

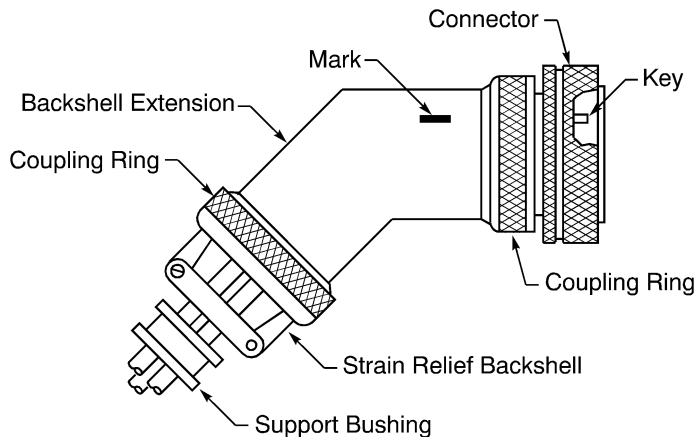
- (7) Push the support bushing rearward on the wire harness. Refer to Figure 1.
- (8) Loosen the coupling ring of the strain relief backshell with the pliers. Refer to Figure 1.
- (9) Loosen the coupling ring of the backshell extension with the pliers. Refer to Figure 1.
Make sure that you do not turn the backshell extension if the backshell is a 45 degree or a 90 degree backshell.

NOTE: The position of the angled backshell extension is the backshell clock position.

- (10) Disengage the threads of the coupling ring of the plug connector and the receptacle with the pliers. Refer to Figure 1.
- (11) Pull the plug from the receptacle.
- (12) For a 45 degree or a 90 degree backshell, record the backshell clock position. Refer to Figure 2.
 - (a) Make a selection of a marker from Table 3.

NOTE: An equivalent marker is a satisfactory alternative.

- (b) Make a mark on the backshell extension on the same side as the master key of the connector.



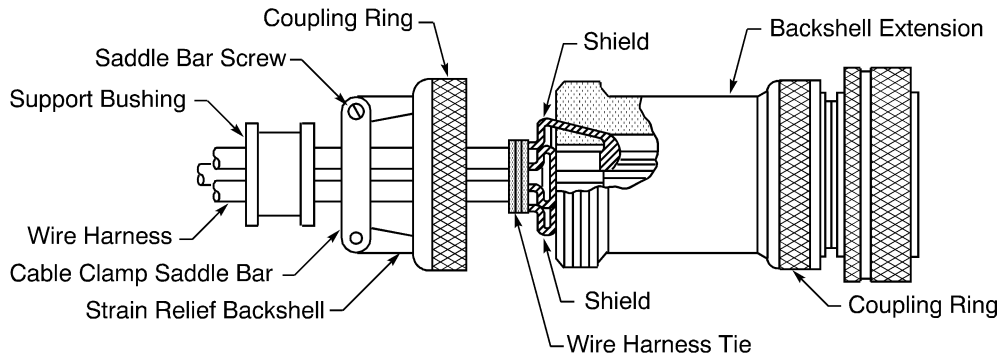
THE POSITION OF THE MARK ON THE ESC() BACKSHELL EXTENSION
Figure 2

NOTE: This records the backshell clock position on the backshell extension.

- (13) Disengage the threads of the coupling ring of the strain relief backshell from the backshell extension. Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY



DISASSEMBLY OF THE ESC() STRAIN RELIEF BACKSHELL
Figure 3

- (14) Carefully push the strain relief backshell rearward on the wire harness. Refer to Figure 3.
- (15) Carefully cut the wire harness tie that holds the shields. Refer to Figure 3.

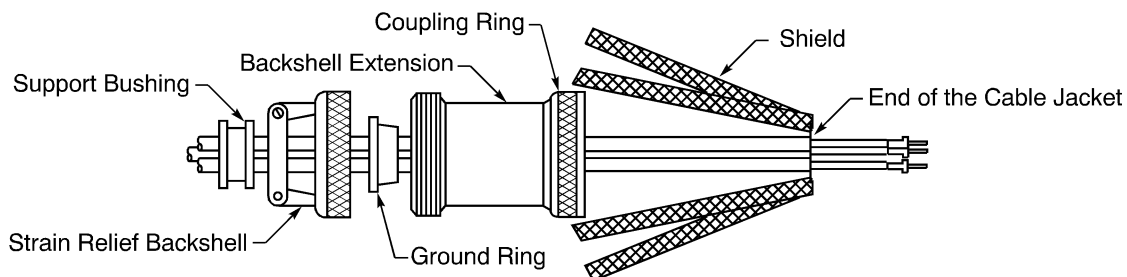
CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES, CABLES OR SHIELDS OF THE WIRE HARNESS.

- (16) Push the ground ring rearward on the wire harness.
- (17) Fold the shields rearward on the wire harness.
- (18) Disengage the threads of the coupling ring of the backshell extension from the connector.
- (19) Push the backshell extension rearward on the wire harness, away from the connector.

CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES, CABLES OR SHIELDS OF THE WIRE HARNESS.

- (20) Remove the contacts from the connector. Refer to Paragraph 2.F.
- (21) Remove these backshell components from the end of the harness:
 - The backshell extension
 - The ground ring
 - The backshell strain relief clamp
 - The support bushing.

Refer to Figure 4.



THE POSITION OF THE ESC() BACKSHELL EXTENSION, THE GROUND RING, THE STRAIN RELIEF BACKSHELL, AND THE SUPPORT BUSHING
Figure 4

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

D. Disassembly of a ESC() Receptacle Connector

NOTE: For the removal of the strain relief backshell or the backshell extension, the receptacle must be installed in the engine bracket.

**Table 4
NECESSARY TOOLS**

Tool	Part Number	Supplier
Marker	Sharpie	Sanford
Pliers, Soft Jaw	TG69	Glenair
		Daniels
	BT-SJ-468	Daniels
Screwdriver, Number 3 Phillips	-	An available source

- (1) Make a selection of pliers from Table 4:

NOTE: An equivalent pliers is a satisfactory alternative.

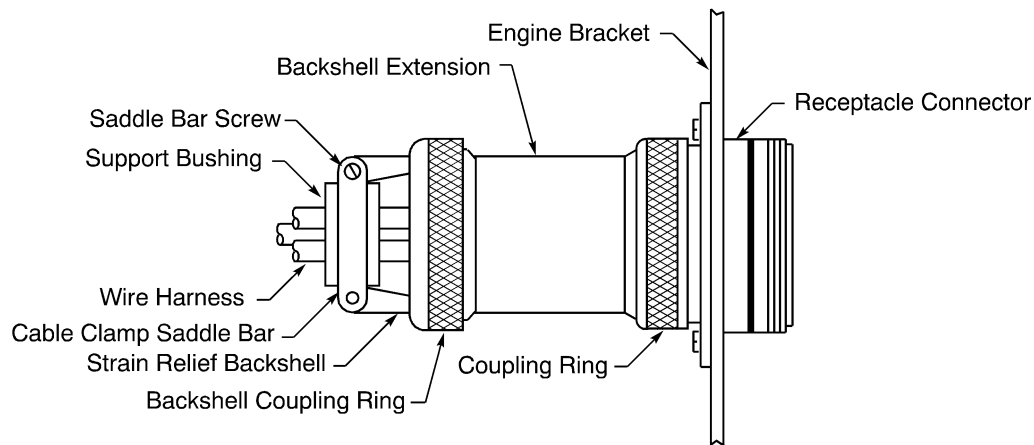
- (2) Make a selection of a screwdriver from Table 4:

NOTE: An equivalent screwdriver is a satisfactory alternative.

- (3) Examine the receptacle.

Make sure that the receptacle connector is attached to the engine bracket.

- (4) Loosen the saddle bar screws sufficiently to let the support bushing move rearward on the wire harness. Refer to Figure 5.



**ESC() CONNECTOR AND BACKSHELL DISASSEMBLY
Figure 5**

- (5) If the saddle bars do not let the bushing move rearward on the harness, remove the screws and the saddle bars. Refer to Figure 5.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

- (6) If the saddle bars are removed, put these strain relief assembly components in a safe place:
- The screws
 - The washers
 - The saddle bars.

NOTE: These components are necessary to assemble the backshell again.

- (7) Push the support bushing rearward on the wire harness. Refer to Figure 5.
 (8) Loosen the coupling ring of the strain relief backshell with the pliers. Refer to Figure 5.
 (9) Loosen the coupling ring of the backshell extension with the pliers. Refer to Figure 5.
 Make sure that you do not turn the backshell extension if the backshell is a 45 degree or a 90 degree backshell.

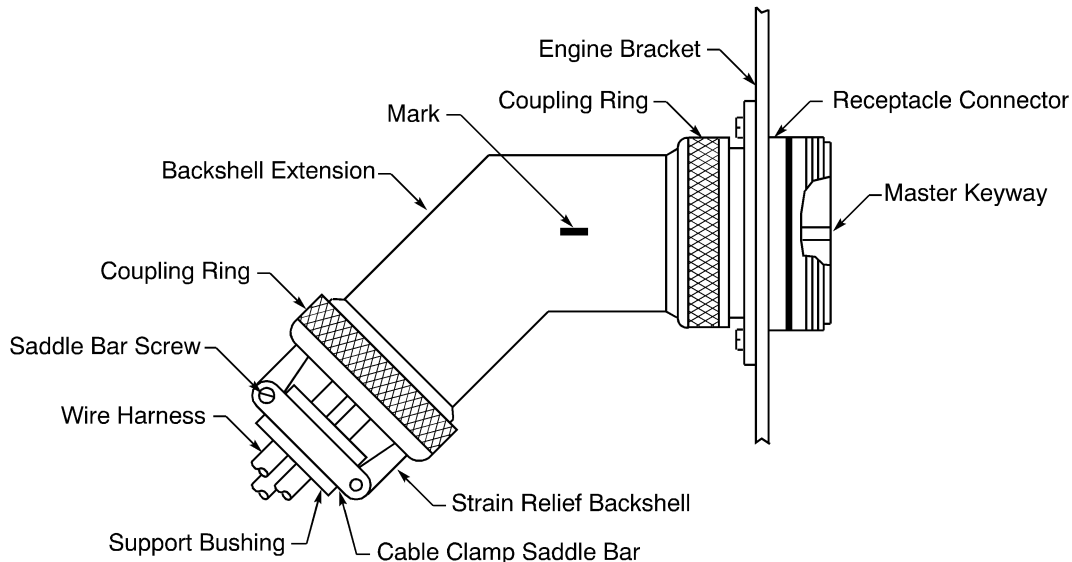
NOTE: The position of the angled backshell extension is the backshell clock position.

- (10) Disengage the threads of the coupling ring of the plug connector and the receptacle with the pliers. Refer to Figure 5.
 (11) Pull the plug from the receptacle.
 (12) For a 45 degree or a 90 degree backshell, record the backshell clock position. Refer to Figure 6.

- (a) Make a selection of a marker from Table 4.

NOTE: An equivalent marker is a satisfactory alternative.

- (b) Make a mark on the backshell extension on the same side as the master keyway of the connector.



THE POSITION OF THE MARK ON THE ESC() BACKSHELL EXTENSION
Figure 6

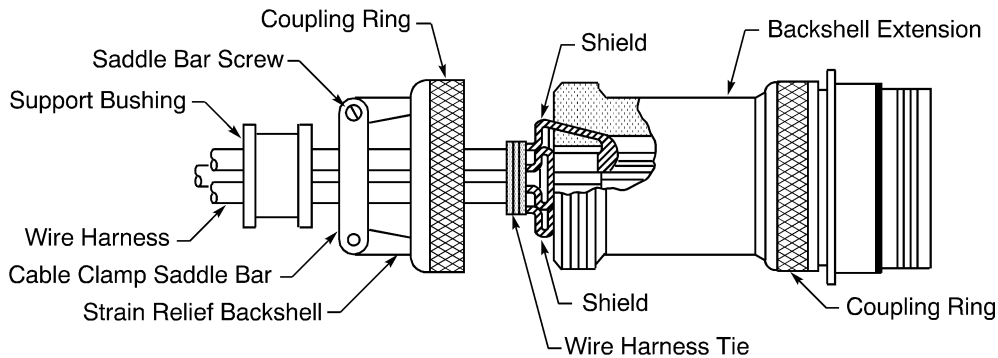
NOTE: This records the backshell clock position on the backshell extension.

- (13) Remove the receptacle from the engine bracket. Refer to Paragraph 2.B.

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RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

- (14) Disengage the threads of the coupling ring of the strain relief backshell from the backshell extension. Refer to Figure 7.



DISASSEMBLY OF THE ESC() STRAIN RELIEF BACKSHELL
Figure 7

- (15) Carefully push the strain relief backshell rearward on the wire harness. Refer to Figure 7.
 (16) Carefully cut the wire harness tie that holds the shields. Refer to Figure 7.

CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES, CABLES OR SHIELDS OF THE WIRE HARNESS.

- (17) Push the ground ring rearward on the wire harness.
 (18) Fold the shields rearward on the wire harness.
 (19) Disengage the threads of the coupling ring of the backshell extension from the connector.
 (20) Push the backshell extension rearward on the wire harness, away from the connector.

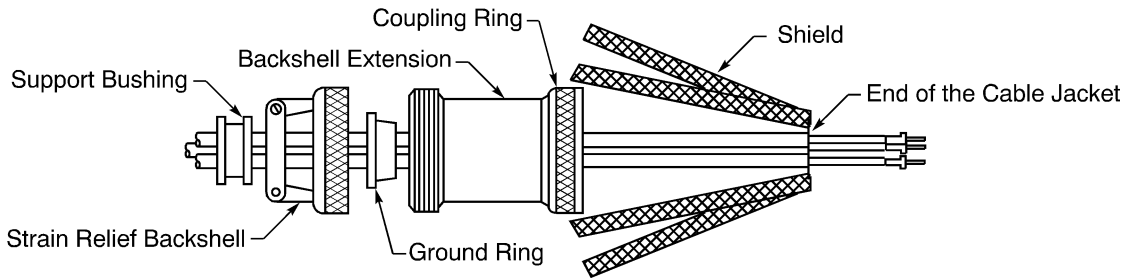
CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES, CABLES OR SHIELDS OF THE WIRE HARNESS.

- (21) Remove the contacts from the connector. Refer to Paragraph 2.F.
 (22) Remove these backshell components from the end of the harness:
- The backshell extension
 - The ground ring
 - The backshell strain relief clamp
 - The support bushing.

Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY



THE POSITION OF THE ESC() BACKSHELL EXTENSION, THE GROUND RING, THE STRAIN RELIEF BACKSHELL, AND THE BUSHING
Figure 8

E. Seal Plug and Seal Rod Removal

- (1) Make a selection of a needle nose pair of pliers.

CAUTION: MAKE SURE THAT THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, remove a plastic tie strap or a wire harness tie that is less than 6 inches from the connector.
- (3) Hold the end of the seal plug or the seal rod tightly in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod from the contact cavity.

F. Contact Removal - ESC() Rear Release Connectors

Table 5
CONTACT REMOVAL TOOLS - REAR RELEASE CONNECTORS

Contact Size	Removal Tool	Supplier
16	M83723/31-16	Daniels
20	M83723/31-20	Daniels

- (1) Make a selection of a contact removal tool from Table 5.
- (2) Put the tip of the tool on the wire.

WARNING: DO NOT USE A REMOVAL TOOL THAT HAS A BENT TIP. AN INJURY CAN OCCUR.

- (3) At the rear of the connector, axially align the tool and the contact cavity at the rear of the connector.
- (4) Carefully push the tool into the contact cavity until it stops.

Make sure that the tool stays aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT CAVITY CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Hold the wire against the tool.
- (6) Pull the tool and the wire out from the contact cavity at the same time.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

Make sure that the tool stays aligned with the contact cavity.

- (7) If the contact is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (2) through Step (6) again.

3. CONNECTOR DISASSEMBLY OF THE CA66279-106 CONNECTOR

A. Separation of the CA66279-106 Plug and the Receptacle

NOTE: If disassembly of the backshell of the plug is necessary, the plug must stay connected to the receptacle.

**Table 6
NECESSARY TOOLS**

Tool	Part Number	Supplier
Adapter, Coupling Ring	MT0011	Daniels
Drive Extension	-	An available source
Wrench, Socket	-	An available source

- (1) Make a selection of these tools from Table 6:
 - A coupling ring adapter
 - A drive extension
 - A socket wrench.
- (2) Disengage the threads of the coupling ring of the plug connector and the receptacle with the coupling ring adapter, the drive extension, and the socket wrench.
- (3) Pull the plug from the receptacle.

B. Disassembly of a CA66279-106 Plug Connector

NOTE: For the removal of the strain relief backshell, the plug must be connected to the receptacle and the receptacle must be installed in the bracket.

**Table 7
NECESSARY TOOLS**

Tool	Part Number	Supplier
Pliers, Soft Jaw	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair
Screwdriver, Number 3 Phillips	-	An available source
Adapter, Coupling Ring	MT0011	Daniels
Drive Extension	-	An available source
Wrench, Socket	-	An available source

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY**

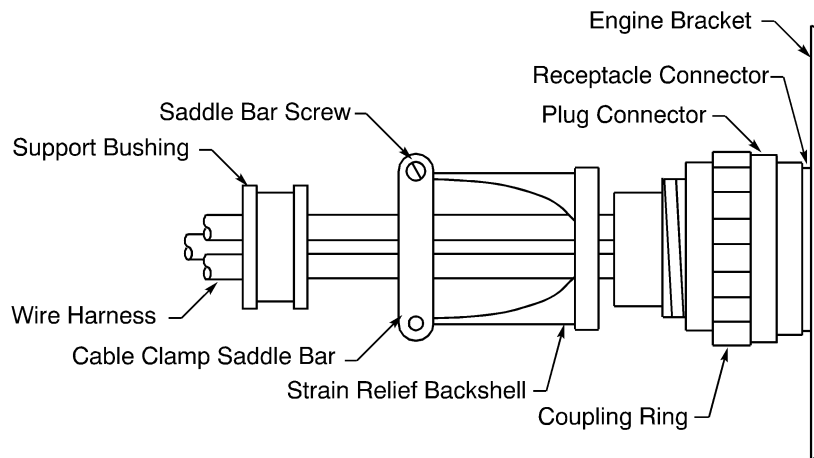
- (1) Make a selection of pliers from Table 7:

NOTE: An equivalent pliers is a satisfactory alternative.

- (2) Make a selection of a screwdriver from Table 7.

NOTE: An equivalent screwdriver is a satisfactory alternative.

- (3) Remove the saddle bar screws and the saddle bars.
(4) Push the support bushing rearward on the wire harness.
(5) Loosen the strain relief backshell with the pliers.
(6) Push the strain relief backshell rearward on the wire harness. Refer to Figure 9.



BACKSHELL REMOVAL
Figure 9

- (7) Make a selection of these tools from Table 7:
- A coupling ring adapter
 - A drive extension
 - A socket wrench.
- (8) Disengage the threads of the coupling ring using the coupling ring adapter, the socket extension, and the socket wrench.
- (9) Pull the plug from the receptacle.
- (10) Remove the contacts from the connector. Refer to Paragraph 2.F.
- (11) Remove the strain relief backshell from the wire harness.
Refer to Figure 9.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

C. Contact Removal - CA66279-106 Front Release Connectors

**Table 8
CONTACT REMOVAL TOOLS - FRONT RELEASE CA66279-106 CONNECTORS**

Engaging End	Removal Tool	Supplier
4	294-239	Amphenol
	CET-FRF-4	ITT Cannon
	M81969/19-04	QPL
	MS90456-4	QPL
16	294-219	Amphenol
	CET-FRF-16-22A	ITT Cannon
	M81969/19-02	QPL
	MS90456-3	QPL

- (1) Make a selection of a contact removal tool from Table 8.
- (2) Axially align the tool and the contact cavity at the front face of the connector.
Make sure that the plunger of the removal tool is fully retracted.
- (3) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT CAVITY CAN OCCUR.

- (4) Push the plunger of the tool until the contact starts to come out of the contact cavity.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out from the contact cavity.
Make sure that the tool stays aligned with the contact cavity.
- (6) Pull the contact out of the contact cavity from the rear of the connector.

4. CONNECTOR ASSEMBLY OF THE ESC() CONNECTOR

A. ESC() Contact Assembly

**Table 9
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit Part Number	Locator Part Number	Supplier
16	16	M22520/7-01	M22520/7-03	Daniels
20	20	M22520/7-01	M22520/7-02	Daniels

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

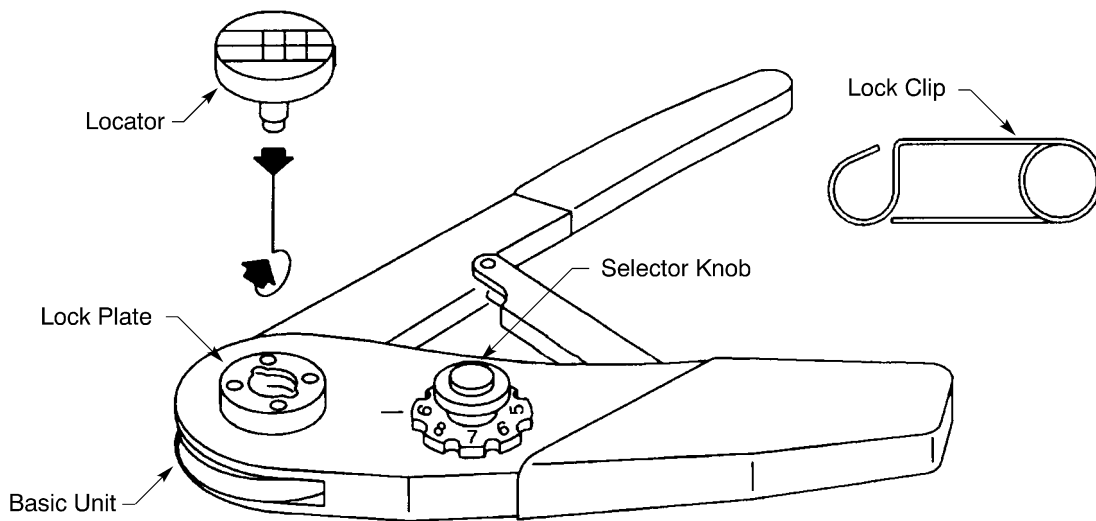
**Table 10
INSULATION REMOVAL LENGTH**

Wire Size	Crimp Barrel Size	Removal Length L (inch)		Removal Length L (millimeters)	
		Minimum	Maximum	Minimum	Maximum
20	20	0.11	0.15	3	4
16	16	0.21	0.25	5	6

- (1) Make a selection of a crimp tool from Table 9.
- (2) Assemble the crimp tool. Refer to Figure 10.

CAUTION: TO PREVENT DAMAGE TO THE CRIMP TOOL, THE HANDLE OF THE BASIC UNIT MUST BE IN THE OPEN POSITION WHEN THE LOCATOR IS:

- INSTALLED
- REMOVED
- RELEASED.



**CONTACT CRIMP TOOL
Figure 10**

- (a) Remove the lock clip from the lock ring on the locator.
 - (b) Put the locator in the lock plate of the basic unit.
 - (c) Align the locator pins with the ring slots on the lock plate.
 - (d) Push the locator into the basic unit.
 - (e) Turn the locator in a clockwise direction until it locks in its position, approximately 90 degrees.
 - (f) Put the lock clip in the lock ring.
- (3) Adjust the crimp tool.

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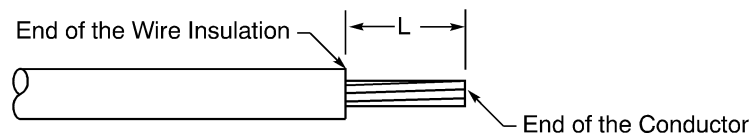
CAUTION: IF THE SELECTOR KNOB OF THE BASIC UNIT IS IN AN INCORRECT POSITION WHEN THE CONTACT IS CRIMPED:

- DAMAGE TO THE CONTACT CAN OCCUR
- UNSATISFACTORY RELIABILITY AND PERFORMANCE OF THE CONTACT ASSEMBLY CAN OCCUR.

- (a) Remove the lock clip from the lock ring hole in the selector knob.
 - (b) Lift and turn the selector knob of the basic unit until the number on the knob is the same as the number on the locator data plate for the size of the wire.
 - (c) Put the lock clip in the lock ring hole.
 - (d) Align the number on the knob to the index mark on the basic unit.
 - (e) Release the knob.
- (4) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 11
- Table 10 for the insulation removal length.



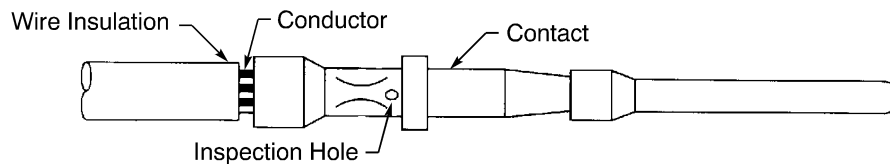
INSULATION REMOVAL LENGTH

Figure 11

- (5) Put the conductor in the crimp barrel of the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch (1 millimeter).



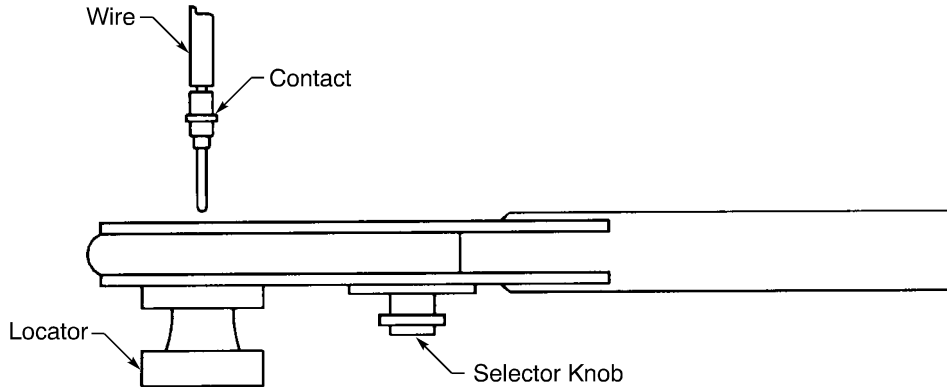
POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT

Figure 12

- (6) Put the wire and the contact in the locator of the crimp tool. Refer to Figure 13.
 Make sure that the forward end of the contact is against the bottom of the locator.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY



ALIGNMENT OF THE WIRE, THE CONTACT, AND THE CRIMP TOOL
Figure 13

(7) Crimp the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- You can see the conductor in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch (1 millimeter).

(a) Close the handles of the basic unit until the ratchet is released.

CAUTION: DO NOT RELEASE THE LATCH FOR THE LOCATOR WHEN THE BASIC UNIT HANDLE IS IN THE CLOSED POSITION.

(b) Remove the contact assembly from the tool.

(8) Hold the wire and lightly pull the contact to make sure that the contact is crimped on the conductor.

B. ESC() Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be put on the wire harness before the insertion of the contacts into the connector. Refer to Subject 20-23-39.

Table 11
CONTACT INSERTION TOOLS - REAR RELEASE CONNECTORS

Contact Size	Insertion Tool	Supplier
20	M83723/31-20	QPL
16	M83723/31-16	QPL

Table 12
CONTACT RETENTION TEST TOOLS

Contact		Contact Retention Test Tool		Supplier
Engaging End Size	Type	Basic Unit	Tip	
20	Pin	HT250-4	68-020-01	Daniels
	Socket	HT250-4	67-020-01	Daniels

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RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

Table 12 (continued)

Contact		Contact Retention Test Tool		Supplier
Engaging End Size	Type	Basic Unit	Tip	
16	Pin	HT250-4	68-016-01	Daniels
	Socket	HT250-4	67-016-01	Daniels

- (1) Make a selection of an insertion tool from Table 11.
- (2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

- (3) Put the contact assembly in the insertion tool.
- (4) At the rear of the connector, axially align the tool and the contact cavity.
- (5) Carefully push the contact into the contact cavity until it stops.

Make sure that the tool and the contact cavity stay axially aligned.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the tool out of the contact cavity.
Make sure that the tool and the contact cavity stay axially aligned.
- (7) Do a contact retention test:

NOTE: The retention test tool applies a known force to the contact to make sure that the connector holds the contact.

- (a) Make a selection of a contact retention test tool basic unit from Table 12.
- (b) Make a selection of a contact retention test tool tip from Table 12:
 - A tip for a pin to test a pin contact
 - A tip for a socket to test a socket contact.
- (c) Axially align the retention test tool, the tip, and the engaging end of the contact.
- (d) Apply hand pressure with the test tool against the contact until the indicator located on the tip is aligned with the body of the test tool.

CAUTION: KEEP THE RETENTION TEST TOOL AXIALLY ALIGNED TO THE CONTACT. DAMAGE TO THE CONTACT CAN OCCUR.

- (e) If the contact stays locked in the contact cavity, the contact retention is satisfactory.
- (f) Do steps (7a) through (7d) again for all the contacts in the connector.
- (8) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (3) through Step (7) again.

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RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

C. Seal of an Empty Contact Cavity

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

If a stub wire is necessary, the length of the stub wire must be 4 inches to 6 inches.

D. ESC() Backshell Assembly

- (1) Assemble the backshell. Refer to Subject 20-23-39.
- (2) Do an insulation resistance check for each wire that terminates in the connector. Refer to Paragraph 6.B.
- (3) Do a wire continuity check for each wire that terminates in the connector. Refer to Paragraph 6.A.

5. CONNECTOR ASSEMBLY OF THE CA66279-106 CONNECTOR

A. CA66279-106 Contact Assembly

**Table 13
INDENTER TYPE CRIMP TOOLS**

Wire Size (AWG)	Engaging End	Crimp Barrel	Crimp Tool				Supplier	
			Basic Unit		Die	Locator		
			Part Number	Setting		Part Number		Color
16	16	16	294-126	-	-	-	-	Amphenol
			M22520/1-01	6	-	M22520/1-02	Blue	QPL
			MS3191-1	6	-	MS3191-16A	Blue	QPL
			ST2220-1-Y	6	-	ST2220-1-2	-	Boeing
			WA27F	6	-	M22520/1-02	Blue	Daniels
8	4	8	400B	-	414DA-8~N	4112	-	Pico
			M22520/23-01	-	WA23-02	WA23-09	-	QPL
			WA23	-	WA23-02	WA23-09	-	Daniels

**Table 14
HEX TYPE CRIMP TOOLS**

Wire Size (AWG)	Contact Size		Crimp Tool			Supplier
	Engaging End	Crimp Barrel	Basic Unit	Die Set		
				Primary	Secondary	
8	4	8	13642	ST2354-5	11732	Thomas & Betts

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**Table 15
INSULATION REMOVAL LENGTH**

Wire Size	Engaging End	Crimp Barrel	Removal Length L (inch)		Removal Length L (millimeter)		Special Instructions
			Minimum	Maximum	Minimum	Maximum	
16	16	16	0.22	0.28	6	7	-
8	4	8	0.50	0.56	13	14	Increase the O.D. of the wire

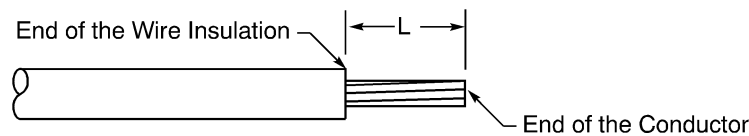
**Table 16
NECESSARY MATERIALS**

Description	Part Number	Approved Supplier
Tape, self-bonding silicone rubber, high temperature, 0.012 inch thick, 1 inch wide	912-10X12	Arlon, Silicone Technologies Division

- (1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 14
- Table 15 for the insulation removal length.

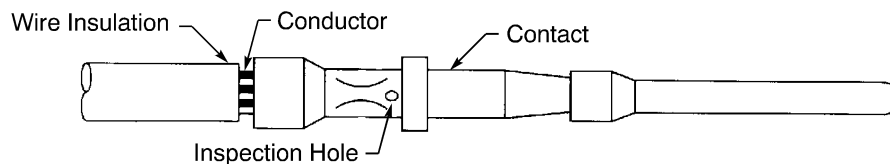


**INSULATION REMOVAL LENGTH
Figure 14**

- (2) Make a selection of a crimp tool from:
 - Table 13 for size 16 contacts
 - Table 13 or Table 14 for size 4 contacts.
- (3) Put the conductor in the crimp barrel of the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch (1 millimeter).



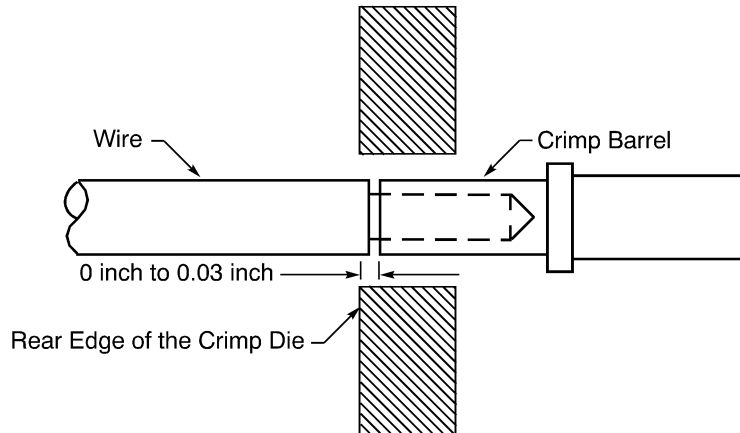
**POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 15**

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RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

- (4) If the crimp tool is an indenter type crimp tool, crimp the contact.
- (5) If the crimp tool is a hex type crimp tool:
 - (a) Put the contact in the primary crimp die. Refer to Figure 16.

Make sure that the distance from the rear end of the crimp barrel to the rear edge of the die is between 0 inch (0 millimeter) and 0.03 inch (1 millimeter).



POSITION OF THE CONTACT AND WIRE IN THE CRIMP TOOL DIE

Figure 16

- (b) Crimp the contact with the primary crimp die.
- (c) Turn the contact 60 degrees on the longitudinal axis of the contact.
- (d) Put the crimp barrel end of the contact in the secondary crimp die. Refer to Figure 16.

Make sure that the distance from the rear end of the crimp barrel to the rear edge of the die is between 0 inch (0 millimeter) and 0.03 inch (1 millimeter).
- (e) Crimp the contact with the secondary crimp die.
- (f) If the contact crimp barrel has flash, do Step (c) through Step (e) again.

NOTE: Copper that can be seen on the edges of the crimp barrel is permitted.

- (6) Hold the wire and lightly pull the contact to make sure that the contact is crimped on the conductor.
- (7) To increase the outside diameter of the 8 AWG wire, make a selection of tape from Table 16.

NOTE: An equivalent tape is a satisfactory alternative.

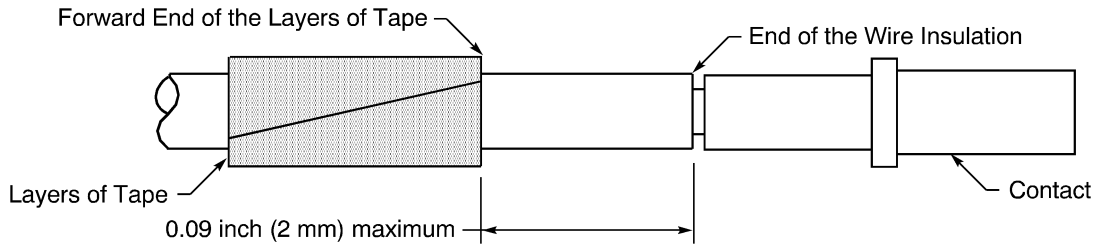
- (8) Increase the outside diameter of the 8 AWG wire by winding 4.5 to 5.0 layers of tape around the wire.

Make sure that:

- The distance from the forward edge of the tape to the end of the contact crimp barrel is 0.09 inches (2 millimeters) maximum
- Each layer of tape has a 100 percent overlap
- The minimum outside diameter of the wire and tape is 0.23 inch (6 millimeter) minimum.

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RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY



LOCATION OF THE TAPE ON THE WIRE
Figure 17

B. CA66279-106 Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be put on the wire harness before the insertion of the contacts into the connector. Refer to Subject 20-23-39.

Table 17
CONTACT INSERTION TOOLS - FRONT RELEASE CONNECTORS

Contact Size	Insertion Tool	Supplier
16	294-192	Amphenol
	CIT-16	ITT Cannon
	M81969/17-01	QPL
	M81969/17-04	QPL
4	294-236	Amphenol
	M81969/17-08	QPL

- (1) Make a selection of an insertion tool from Table 17.
- (2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

- (3) Put the contact assembly in the insertion tool.
- (4) At the rear of the connector, axially align the tool and the contact cavity.
- (5) Carefully push the contact into the contact cavity until it stops.

Make sure that the tool and the contact cavity stay axially aligned.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the tool out of the contact cavity.
 Make sure that the tool and the contact cavity stay axially aligned.
- (7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY**

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) Do Step (7) again for all the contacts in the connector.
- (9) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (3) through Step (7) again.

C. CA66279-106 Backshell Assembly

- (1) Assemble the backshell. Refer to Subject 20-23-39.
- (2) Do an insulation resistance check for each wire that terminates in the connector. Refer to Paragraph 6.B.
- (3) Do a wire continuity check for each wire that terminates in the connector. Refer to Paragraph 6.A.

6. WIRE CHECKS**A. Wire Continuity Check**

- (1) Find the wire termination data. Refer to the WDM.
- (2) Disconnect each connector on the circuit that must have a wire continuity check.

CAUTION: EACH CONNECTOR ON THE CIRCUIT THAT MUST HAVE A TEST MUST BE DISCONNECTED. IF THE CONNECTORS ARE NOT DISCONNECTED, UNSATISFACTORY RESISTANCE INDICATIONS OR DAMAGE TO THE CONNECTOR CAN OCCUR.

- (3) Measure the resistance on all wires.

Make sure that each circuit has continuity from one end of the wire to the other end of the wire.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

B. Insulation Resistance Check

- (1) Make a selection of a multimeter.

WARNING: DO NOT USE A MEGOHMMETER FOR THE INSULATION RESISTANCE TEST OF THE ON-WING WIRING REPAIR. INJURY TO PERSONNEL OR DAMAGE TO THE AIRPLANE CAN OCCUR.

- (2) Set the meter to the 100 megohm scale.
- (3) Attach one meter test lead to the contact assembly on the connector.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

- (4) Attach the other meter test lead to a contact assembly on a wire that does not connect to the same circuit.

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CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

- (5) Read the meter.
Make sure that the resistance is a minimum of 100 megohm.
- (6) Do Step (3) through Step (5) for each contact in the connector.
- (7) Attach the one meter test lead to the backshell.
- (8) Attach the other meter test lead to the contact assembly on the wire that must have a test.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

- (9) Read the meter.
Make sure that the resistance is a minimum of 100 megohm.
- (10) Do Step (8) through Step (9) for each wire that must have a test.

7. CONNECTOR INSTALLATION OF THE ESC() CONNECTOR

A. ESC() Receptacle Installation in a Bracket

**Table 18
RECEPTACLE INSTALLATION FASTENER TORQUE**

Fastener Thread Size	Fastener Torque		Connector Shell Size
	(pound-inches)	(Newton-meters)	
4-40	5.0	0.57	08
			10
			12
			14
			16
			18
			20
6-32	10.0	1.13	22
			24
			28

**Table 19
NECESSARY TOOLS**

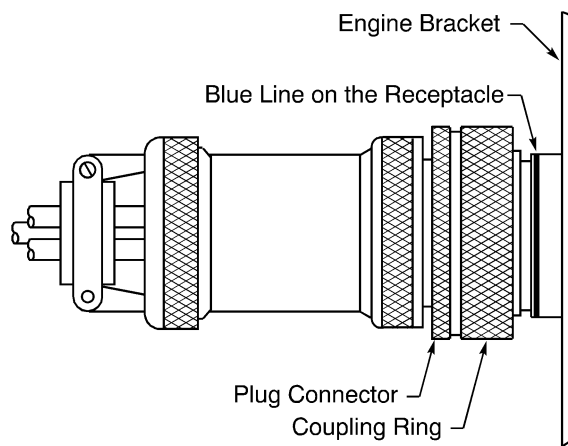
Tool	Special Instructions	Supplier
Screwdriver, Number 3 Phillips	-	An available source
Torque	Tool must measure 10 inch-pounds (1.13 newton-meters) minimum	An available source

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- (1) Make a selection of these tools from Table 19.
 - A screwdriver
 - A torque tool.
- (2) For a connector that has a 90 degree backshell or a 45 degree backshell, align the keyway of the connector with the mark that was made on the engine bracket.
- (3) Put the receptacle in its installation location in the engine bracket.
- (4) Put the screws through the installation holes in the engine bracket and the installation holes in the receptacle flange.
- (5) Engage the threads of the installation nuts and the screws.
- (6) Tighten the nuts to the specified torque. Refer to Table 18.

B. Connection of the ESC() Plug and Receptacle



CONNECTION OF THE PLUG AND RECEPTACLE
Figure 18

- (1) Align the key of the receptacle and the keyway of the plug.
 Make sure that the contacts are correctly aligned.
 Make sure that the wire harness has sufficient slack for the plug:
 - To move forward
 - To make a satisfactory connection with the receptacle
 - To prevent tension on the contact assemblies in the plug.
- (2) Engage the threads of the plug and the receptacle.
 Make sure that the threads of the plug and receptacle are correctly engaged.
- (3) Push the plug into the receptacle.
- (4) Tighten the coupling ring with the hand.
- (5) Move the backshell from side to side and continue to tighten the coupling ring of the plug with the hand.

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- (6) Tighten the coupling ring of the plug connector with the hand until you cannot see the blue line. Refer to Figure 18.

NOTE: If you can see the blue line on the connector, the connector is not installed correctly.

8. CONNECTOR INSTALLATION OF THE CA66279-106 CONNECTOR**A. Connection of the CA66279-106 Plug and a Receptacle**

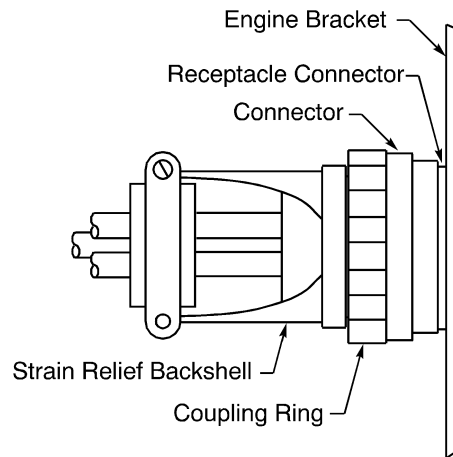
Table 20
NECESSARY TOOLS

Tool	Part Number	Supplier
Adapter, Coupling Ring	MT0011	Daniels
Drive Extension	-	An available source
Wrench, Torque	-	An available source

- (1) Make a selection of these tools from Table 20:
- A coupling ring adapter
 - A drive extension
 - A torque wrench.
- (2) Align the key of the receptacle and the keyway of the plug.
Make sure that the contacts are correctly aligned.
Make sure that the wire harness has sufficient slack for the plug:
- To move forward
 - To make a satisfactory connection with the receptacle
 - To prevent tension on the contact assemblies in the plug.
- (3) Engage the threads of the plug and the receptacle.
Make sure that the threads of the plug and receptacle are correctly engaged.
- (4) Push the plug into the receptacle.
- (5) Tighten the coupling ring with the hand.
- (6) Move the backshell from side to side and continue to tighten the coupling ring of the plug with the hand.

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CONNECTION OF THE PLUG AND RECEPTACLE

Figure 19

- (7) Torque the coupling ring 200 inch-pounds (23 newton-meters) to 240 inch-pounds (27 newton-meters).

CAUTION: DO NOT USE A METAL JAW TOOL TO TIGHTEN THE COUPLING RING OF THE CONNECTOR. DAMAGE TO THE CONNECTOR WILL OCCUR.



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RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

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RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable:

- To the data and procedures of this Subject, refer to Subject 20-23-00
- For the replacement of wiring components, refer to Subject 20-23-15.

2. PART NUMBERS AND DESCRIPTION

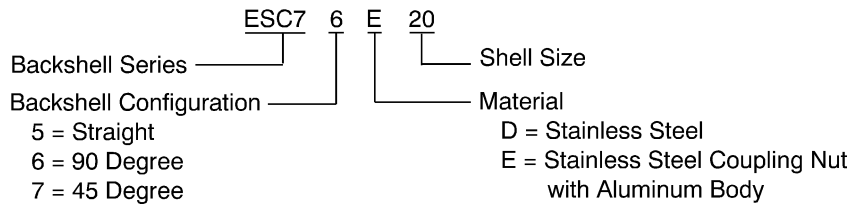
A. Backshell Part Numbers

**Table 1
BACKSHELL PART NUMBERS**

Backshell		Supplier
Part Number	Configuration	
ESC75()	Straight	QPL
ESC76()	90 Degree	QPL
ESC77()	45 Degree	QPL
057-0872-000	Straight	ITT Cannon

**Table 2
APPROVED SUPPLIERS OF ESC STANDARD BACKSHELLS**

Standard	Approved Supplier
ESC75()	Polamco
	Glenair
ESC76()	Polamco
	Glenair
ESC77()	Polamco
	Glenair



**ESC7() BACKSHELL PART NUMBER STRUCTURE
Figure 1**

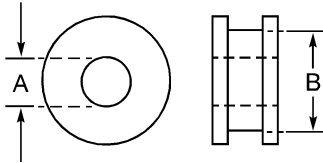
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B. Support Bushing Part Numbers

To find the ESC support bushing part numbers, refer to the Aircraft Illustrated Parts Catalog (AIPC).

NOTE: If the diameter of the wire harness is changed from the initial configuration, a new support bushing for the backshell strain relief can be selected from Table 3.



SUPPORT BUSHING
Figure 2

Table 3
SUPPORT BUSHING PART NUMBERS

Shell Size	Support Bushing			
	Dimension	Diameter (inch)	Diameter (millimeter)	Part Number
08	A	0.13	3.3	ESC53-20
	B	0.27	6.9	
	A	0.15	3.8	ESC53-21
	B	0.27	6.9	
10	A	0.20	5.1	ESC53-22
	B	0.46	11.7	
	A	0.25	6.4	ESC53-23
	B	0.46	11.7	
	A	0.30	7.6	ESC53-24
	B	0.46	11.7	
12	A	0.25	6.4	ESC53-25
	B	0.59	15.0	
	A	0.30	7.6	ESC53-26
	B	0.59	15.0	
	A	0.35	8.9	ESC53-27
	B	0.59	15.0	

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

Table 3 (continued)

Shell Size	Support Bushing			Part Number
	Dimension	Diameter (inch)	Diameter (millimeter)	
14	A	0.25	6.4	ESC53-28
	B	0.65	16.5	
	A	0.30	7.6	ESC53-29
	B	0.65	16.5	
	A	0.35	8.9	ESC53-30
	B	0.65	16.5	
	A	0.40	10.2	ESC53-31
	B	0.65	16.5	
16	A	0.40	10.2	ESC53-32
	B	0.78	19.8	
	A	0.50	12.7	ESC53-33
	B	0.78	19.8	
	A	0.60	15.2	ESC53-34
	B	0.78	19.8	
18	A	0.40	10.2	ESC53-32
	B	0.78	19.8	
	A	0.50	12.7	ESC53-33
	B	0.78	19.8	
	A	0.60	15.2	ESC53-34
	B	0.78	19.8	
22	A	0.40	10.2	ESC53-35
	B	0.98	24.9	
	A	0.50	12.7	ESC53-36
	B	0.98	24.9	
	A	0.60	15.2	ESC53-37
	B	0.98	24.9	
	A	0.70	17.8	ESC53-38
	B	0.98	24.9	

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RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

Table 3 (continued)

Shell Size	Support Bushing			Part Number
	Dimension	Diameter (inch)	Diameter (millimeter)	
24	A	0.50	12.7	ESC53-39
	B	1.28	32.5	
	A	0.75	19.1	ESC53-40
	B	1.28	32.5	
	A	0.88	22.4	ESC53-41
	B	1.28	32.5	
	A	1.00	25.4	ESC53-42
	B	1.28	32.5	
28	A	0.75	19.1	ESC53-43
	B	1.40	35.6	
	A	0.88	22.4	ESC53-44
	B	1.40	35.6	
	A	1.00	25.4	ESC53-45
	B	1.40	35.6	
	A	1.20	30.5	ESC53-46
	B	1.40	35.6	

Table 4

APPROVED SUPPLIERS OF ESC53 STANDARD SUPPORT BUSHINGS

Part Number	Supplier
ESC53()	Dunlop

3. ESC BACKSHELL ASSEMBLY

A. Assembly of Straight ESC Backshells

Table 5

NECESSARY MATERIALS

Material	Description	Supplier
Tape	Adhesive	An available source

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

**Table 6
BACKSHELL INSTALLATION TOOLS**

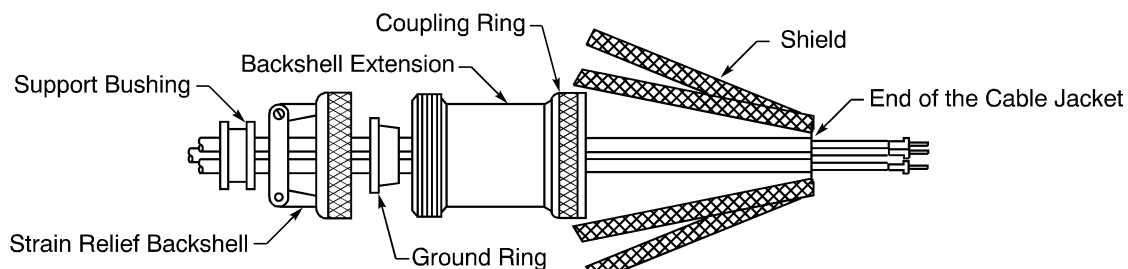
Tool	Part Number	Supplier
Pliers, Soft Jaw, Adjustable	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair
Screwdriver	Number 3 Phillips	An available source

- (1) Make a selection of a tape from Table 5.
NOTE: An equivalent tape is a satisfactory alternative.
- (2) Make a selection of pliers from Table 6.
NOTE: An equivalent pliers is a satisfactory alternative.
- (3) Make a selection of a screwdriver from Table 6.
- (4) If the diameter of the wire harness is not the same as the initial configuration, make a selection of a new support bushing from Table 3.
Make sure that the new support bushing is the correct size for the wire harness diameter and the diameter of the cable clamp of the strain relief backshell.
- (5) Put the necessary backshell components on the wire harness in this sequence:
 - The support bushing
 - The strain relief backshell
 - The ground ring
 - The backshell extension.

Refer to Figure 3.

Make sure that:

- The end of the strain relief backshell that has the coupling ring is pointed forward to the end of the wire harness
- The end of the ground ring that has the larger diameter is pointed rearward away from the end of the wire harness
- The end of the backshell extension that has the coupling ring is pointed forward to the end of the wire harness.



BACKSHELL COMPONENTS ON THE WIRE HARNESS

Figure 3

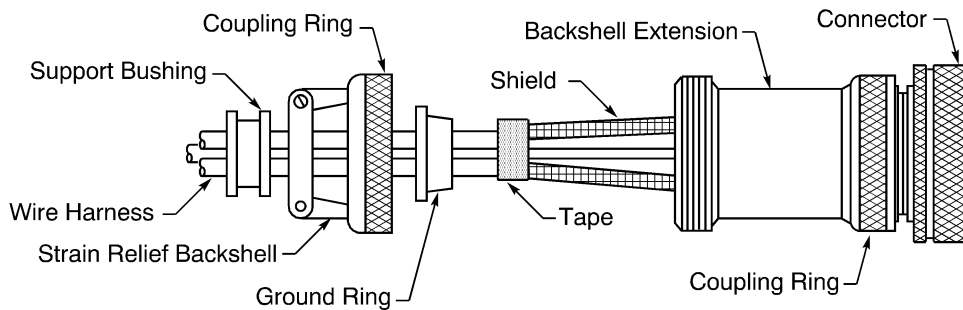
STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

- (6) Install the contacts in the connector. Refer to Subject 20-23-37.
- (7) Fold the shields back on the wire harness.

Make sure that:

- The shields are symmetrical around the circumference of the wire harness
 - The shields are flat against the wire harness.
- (8) Wind a layer of tape on the ends of the shields to temporarily hold the shields on the harness.
 - (9) Fully engage the threads of the coupling ring of the backshell extension and the connector. Refer to Figure 4.



ENGAGED THREADS OF THE BACKSHELL EXTENSION AND THE CONNECTOR

Figure 4

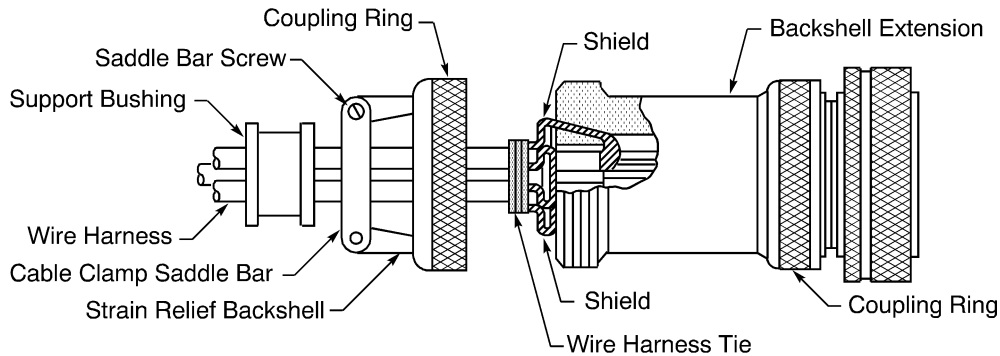
- (10) To remove the play between the backshell extension and the connector:
 - (a) Tighten the coupling ring of the backshell extension with the hand and, at the same time, twist the backshell extension clockwise and counterclockwise approximately 1/8 inch in each direction.
 - (b) Move the backshell extension from side to side and continue to tighten the coupling ring.
 - (c) Twist the backshell extension clockwise and counterclockwise approximately 1/8 inch in each direction and fully tighten the coupling ring.
 - (11) Remove the tape that holds the shields on the wire harness.
 - (12) Carefully fold the shields forward on the backshell extension.
 - (13) Push the ground ring forward into the backshell extension.
 - (14) Carefully fold the shields back against the wire harness.
- Make sure that the shields are even and symmetrical around the ground ring.
- (15) Assemble a wire harness tie on the ends of the shields at the rear end of the ground ring.

Refer to:

- Figure 5
- Subject 20-23-30 for the procedure to assemble a wire harness tie.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS



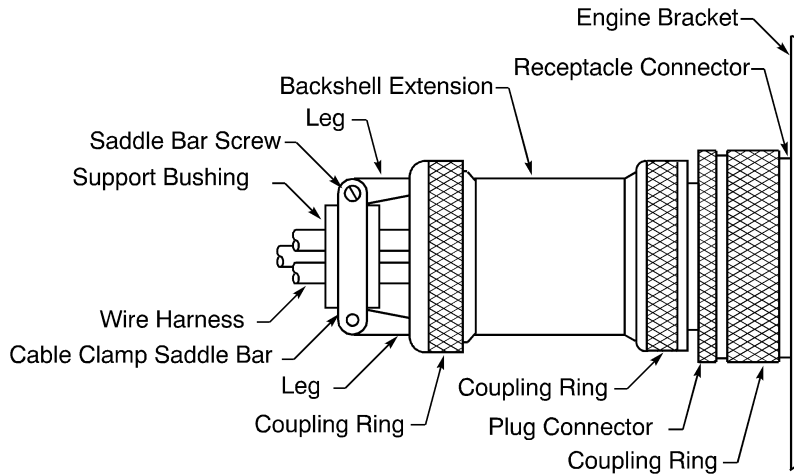
POSITION OF THE WIRE HARNESS TIE ON THE ENDS OF THE SHIELDS

Figure 5

- (16) Fully engage the threads of the coupling ring of the strain relief backshell and the backshell extension.
- (17) Align the center of the support bushing with the saddle bar installation screw holes in the legs of the strain relief backshell.
- (18) Align the installation screw holes of the saddle bars and the legs of the strain relief backshell.
- (19) Install the saddle bar screws.
Make sure that the screws are not fully tightened.
- (20) If the connector is a receptacle, install it. Refer to Subject 20-23-37.
- (21) If the connector is a plug, connect it to the related receptacle. Refer to Subject 20-23-37.
NOTE: The receptacle must be installed before the coupling ring can be fully tightened.
- (22) Move the backshell extension from side to side and, at the same time, tighten the backshell extension coupling ring with the pliers until the pliers move on the surface of the coupling ring.
- (23) Move the strain relief backshell from side to side and, at the same time, tighten the strain relief backshell coupling ring with the pliers until the pliers move on the surface of the coupling ring.
- (24) Fully tighten the saddle bar screws. Refer to Figure 6.
Make sure that:
 - The saddle bar screws are tight
 - The saddle bars are against the legs of the strain relief backshell
 - The wire harness cannot be moved in the cable clamp.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS



FULLY ASSEMBLED BACKSHELL
Figure 6

B. Assembly of 45 Degree and 90 Degree ESC Backshells

Table 7
NECESSARY MATERIALS

Material	Description	Supplier
Tape	Adhesive	An available source

Table 8
NECESSARY TOOLS

Tool	Part Number	Supplier
Marker	Sharpie	Sanford
Pliers, Soft Jaw, Adjustable	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair
Screwdriver	Number 3 Phillips	An available source

- (1) Make a selection of a tape from Table 7.
NOTE: An equivalent tape is a satisfactory alternative.
- (2) Make a selection of a marker from Table 8.
NOTE: An equivalent marker is a satisfactory alternative.
- (3) Make a selection of pliers from Table 8.
NOTE: An equivalent pliers is a satisfactory alternative.
- (4) Make a selection of a screwdriver from Table 8.

STANDARD WIRING PRACTICES MANUAL**RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS**

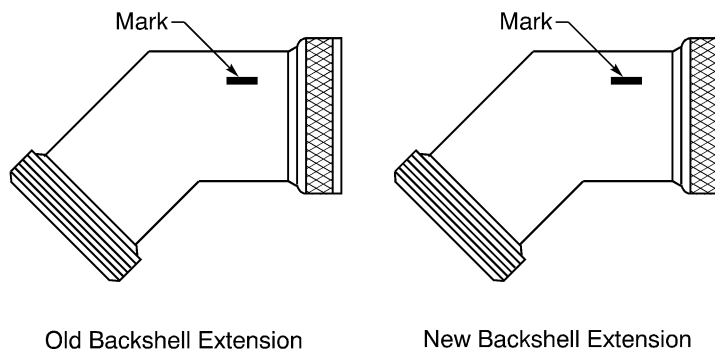
- (5) If the diameter of the wire harness is not the same as the initial configuration, make a selection of a new support bushing from Table 3.

Make sure that the new support bushing is the correct size for the wire harness diameter and the diameter of the cable clamp of the strain relief backshell.

- (6) Make a mark on the new backshell extension in the same location as the mark on the backshell extension in the initial installation.

Refer to:

- Figure 7
- Subject 20-23-37 for the procedure to record the clock position of the backshell extension of the initial installation.

**MARK ON THE NEW BACKSHELL EXTENSION IN THE SAME LOCATION AS THE MARK ON THE OLD BACKSHELL EXTENSION****Figure 7**

- (7) Put the necessary backshell components on the wire harness in this sequence:

- The support bushing
- The strain relief backshell
- The ground ring
- The backshell extension.

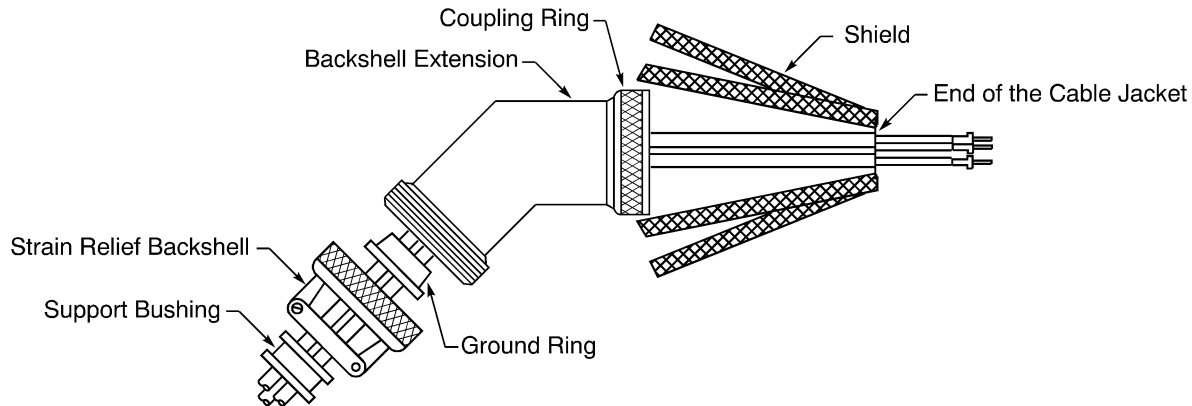
Refer to Figure 8.

Make sure that:

- The end of the strain relief backshell that has the coupling ring is pointed forward to the end of the wire harness
- The end of the ground ring that has the larger diameter is pointed rearward away from the end of the wire harness
- The end of the backshell extension that has the coupling ring is pointed forward to the end of the wire harness.

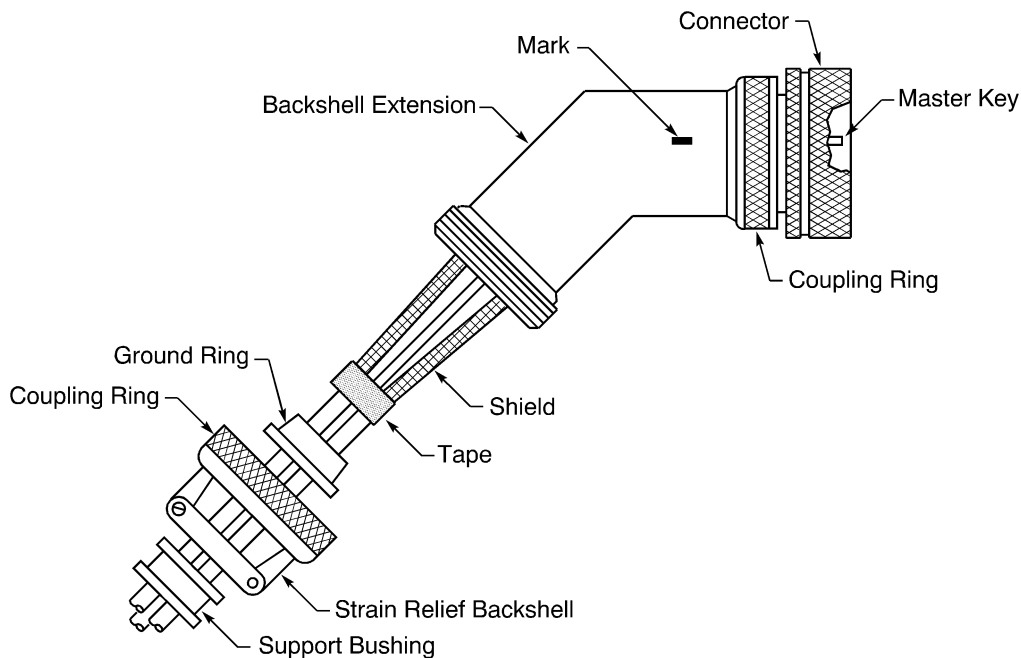
STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS



BACKSHELL COMPONENTS ON THE WIRE HARNESS
Figure 8

- (8) Install the contacts in the connector. Refer to Subject 20-23-37.
- (9) Fold the shields back on the wire harness.
 Make sure that:
 - The shields are symmetrical around the circumference of the wire harness
 - The shields are flat against the wire harness.
- (10) Wind a layer of tape on the ends of the shields to temporarily hold the shields on the harness.
- (11) Align the mark on the backshell extension with the master key or the master keyway of the connector. Refer to Figure 9.



ALIGNMENT OF THE BACKSHELL EXTENSION AND THE CONNECTOR
Figure 9

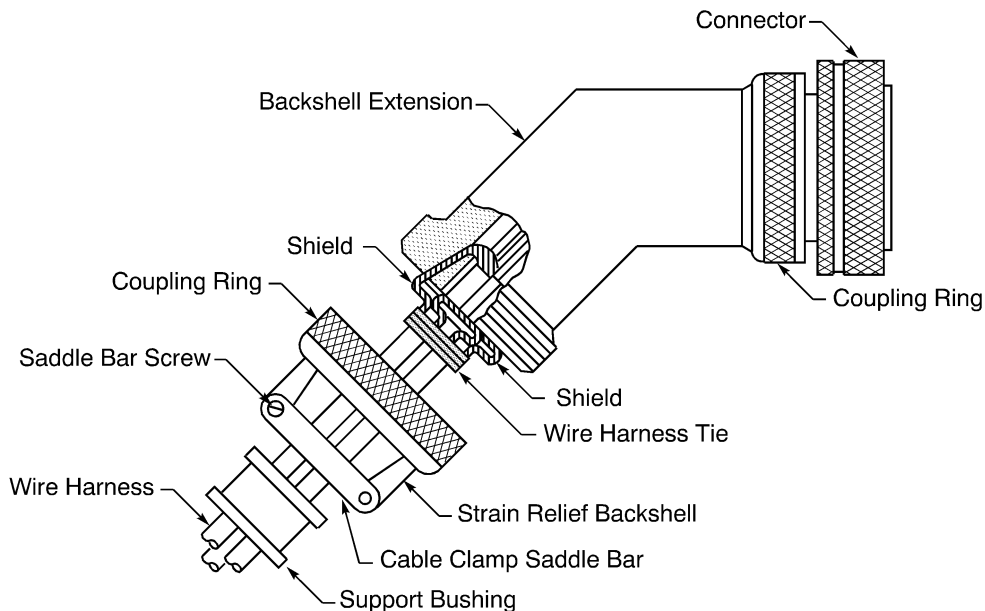
STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

- (12) Fully engage the threads of the coupling ring of the backshell extension and the connector.
Make sure that the mark on the backshell extension stays aligned with the master key or the master keyway of the connector. Refer to Figure 9.
- (13) To remove the play between the backshell extension and the connector:
 - (a) Tighten the coupling ring of the backshell extension with the hand and, at the same time, twist the backshell extension clockwise and counterclockwise approximately 1/8 inch in each direction.
 - (b) Move the backshell extension from side to side and continue to tighten the coupling ring.
 - (c) Twist the backshell extension clockwise and counterclockwise approximately 1/8 inch in each direction and fully tighten the coupling ring.
- (14) Remove the tape that holds the shields on the wire harness.
- (15) Carefully fold the shields forward on the backshell extension.
- (16) Push the ground ring forward into the backshell extension.
- (17) Carefully fold the shields back against the wire harness.
Make sure that the shields are even and symmetrical around the ground ring.
- (18) Assemble a wire harness tie on the ends of the shields at the rear end of the ground ring.

Refer to:

- Figure 10
- Subject 20-23-30 for the procedure to assemble a wire harness tie.



POSITION OF THE WIRE HARNESS TIE ON THE ENDS OF THE SHIELDS

Figure 10

- (19) Fully engage the threads of the coupling ring of the strain relief backshell and the backshell extension.

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RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

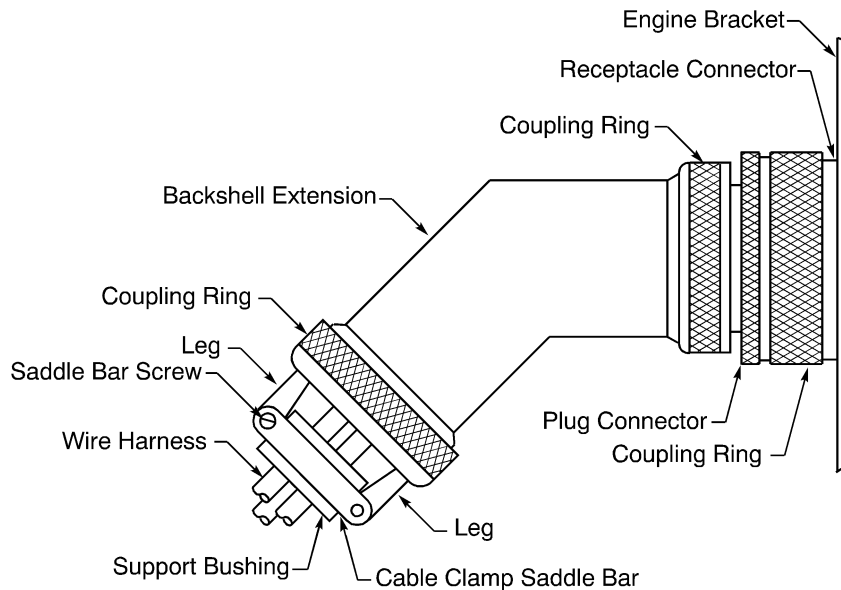
- (20) Align the center of the support bushing with the saddle bar installation screw holes in the legs of the strain relief backshell.
- (21) Align the installation screw holes of the saddle bars and the legs of the strain relief backshell.
- (22) Install the saddle bar screws.
Make sure that the screws are not fully tightened.
- (23) If the connector is a receptacle, install it. Refer to Subject 20-23-37.
- (24) If the connector is a plug, connect it to the related receptacle. Refer to Subject 20-23-37.

NOTE: The receptacle must be installed before the coupling ring can be fully tightened.

- (25) Move the backshell extension from side to side and, at the same time, tighten the backshell extension coupling ring with the pliers until the pliers move on the surface of the coupling ring.
- (26) Move the strain relief backshell from side to side and, at the same time, tighten the strain relief backshell coupling ring with the pliers until the pliers move on the surface of the coupling ring.
- (27) Fully tighten the saddle bar screws. Refer to Figure 11.

Make sure that:

- The saddle bar screws are tight
- The saddle bars are against the legs of the strain relief backshell
- The wire harness cannot be moved in the cable clamp.



FULLY ASSEMBLED BACKSHELL
Figure 11

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

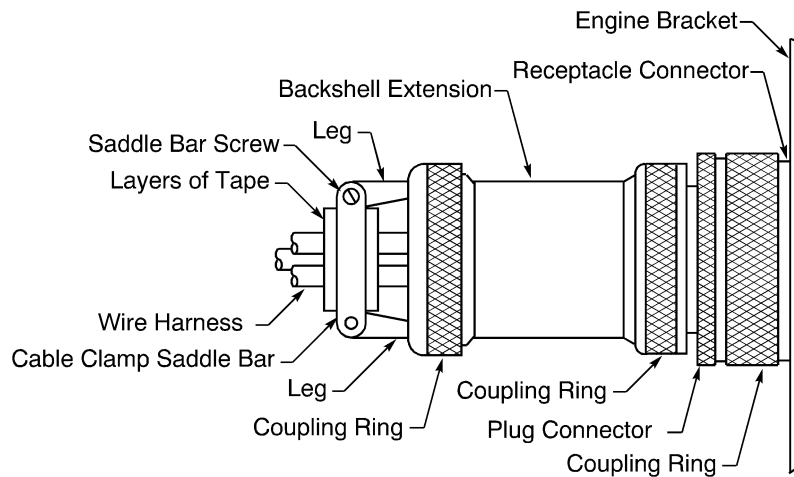
C. Strain Relief Assembly Without a Support Bushing

**Table 9
NECESSARY MATERIALS**

Material	Specification	Description	Supplier
Tape	A-A-59474	TFE, High Temperature, Pressure Sensitive	An available source

**Table 10
NECESSARY TOOLS**

Tool	Description	Supplier
Screwdriver	Number 3 Phillips	An available source



**FULLY ASSEMBLED BACKSHELL
Figure 12**

Refer to Figure 12.

- (1) Make a selection of a screwdriver from Table 10.
- (2) Align the installation screw holes of the saddle bars and the legs of the strain relief backshell.
- (3) Install the saddle bar screws.
- (4) Fully tighten the saddle bar screws.

Make sure that:

- The saddle bar screws are tight
 - The saddle bars do not crush or pinch the wire harness
 - The wire harness does not move in the cable clamp.
- (5) If the wire harness can be moved in the clamp, increase the diameter of the wire harness with tape:
 - (a) Remove the saddle bars.
 - (b) Make a selection of tape from Table 9.

STANDARD WIRING PRACTICES MANUAL

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

- (c) Wind a sufficient number of layers of tape on the wire harness where the saddle bars hold the wire harness to increase the wire harness diameter.

Make sure that the layers of tape make a 100 percent overlap.

- (6) If the ends of the saddle bars are not against the legs, or the wire harness is too tight in the clamp, decrease the diameter of the wire harness:
 - (a) Remove the saddle bars.
 - (b) Remove a sufficient number of layers of tape to decrease the diameter of the wire harness.
- (7) Fully tighten the saddle bar screws.

Make sure that:

- The saddle bar screws are tight
- The saddle bars are against the legs of the strain relief backshell
- The saddle bars do not crush or pinch the wire harness
- The wire harness cannot be moved in the cable clamp
- Tape is not between the saddle bars and the legs of the strain relief backshell.

- (8) If the fit of the wire harness in the clamp is not correct, do Step (5) through Step (7) again.

4. ASSEMBLY OF BACKSHELLS FOR CA66279-106 CONNECTORS

A. Assembly of Backshells for CA66279-106 Connectors

**Table 11
NECESSARY MATERIALS**

Material	Part Number	Approved Supplier
Thread Lock Compound	222	Loctite

**Table 12
NECESSARY TOOLS**

Tool	Description
Torque	Torque tool with strap wrench

**Table 13
BACKSHELL INSTALLATION TORQUE VALUES**

Connector Shell Size	Torque (inch-pounds)		Torque (newton-meters)	
	Minimum	Maximum	Minimum	Maximum
28	115	120	1.33	1.38

- (1) Put the necessary backshell components on the wire harness in this sequence:
 - The ESC53-37 support bushing
 - The strain relief backshell

Make sure that the strain relief end of the backshell is pointed rearward away from the end of the wire harness.

- (2) Install the contacts in the connector. Refer to Subject 20-23-37.

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RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

- (3) Make a selection of thread lock compound from Table 11.
- (4) Put one drop of thread lock compound on the threads at the rear of the connector on one side of the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (5) Put one drop of thread lock compound on the threads at the rear of the connector on the other side of the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (6) Engage the threads of the backshell and the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (7) Torque the backshell 115 inch-pounds (1.33 newton-meters) to 120 inch-pounds (1.38 newton-meters).
- (8) Assemble the strain relief. Refer to Paragraph 4.B.

B. Standard Strain Relief Assembly

**Table 14
NECESSARY MATERIALS**

Material	Part Number	Approved Supplier
Thread Lock Compound	222	Loctite

**Table 15
NECESSARY TOOLS**

Tool	Type	Supplier
Screwdriver	Flat Blade	An available source

**Table 16
TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	Part Number	Supplier
16-14	322334	AMP

- (1) Make a selection of a terminal lug from Table 16.

NOTE: An equivalent terminal lug is a satisfactory alternative.

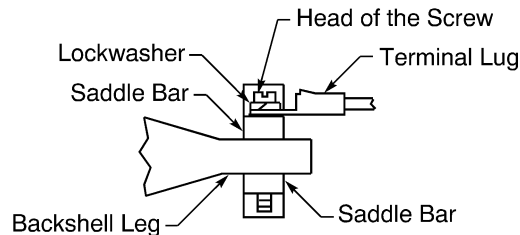
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Make sure that:

- The type of terminal lug is applicable for the type of the shield ground wire
- The type of terminal lug is applicable for the location of the installation of the connector
- The stud size hole of the terminal lug is applicable for the cable clamp screw.

- (2) Assemble the terminal lug. Refer to Subject 20-23-32.
- (3) Make a selection of a screwdriver from Table 15.
- (4) Make a selection of thread lock compound from Table 14.
- (5) Align the center of the support bushing with the saddle bar installation screw holes in the legs of the strain relief backshell.
- (6) Put a lockwasher on each cable clamp screw.
- (7) Put the terminal lug in its position on the saddle clamp screw.



POSITION OF THE TERMINAL LUG

Figure 13

- (8) Align the screw holes of a saddle bar of the cable clamp and the screw holes in the legs of the backshell.
- (9) Put the other saddle bar on the wire harness and the backshell.
- (10) Push the saddle bars of the cable clamp together.
- (11) Engage the threads of each cable clamp screw and the applicable screw hole.
- (12) Put a thin layer of the compound on one or two threads of the cable clamp screws around the circumference of the threads.

Make sure that the thread lock compound is applied to screw threads that engage the threads in the saddle bar.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (13) Tighten the screws until the ends of the saddle bars are against the legs of the backshell.

Make sure that:

- The saddle bars do not crush or pinch the wire harness
- The wire harness is tight in the cable clamp
- The cable clamp screws are tight.



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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: WIRING REPAIR

<u>Paragraph</u>		<u>Page</u>
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	B. PW4000/777 Power Plant Wiring Repair Data and Procedures	1
	C. Applicable Subjects for Power Plant Part Numbers	1

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: WIRING REPAIR

This Subject gives the applicable PW4000/777 power plant part numbers and the related repair Subjects.

1. GENERAL DATA

A. Applicable Conditions for the PW4000/777 Power Plant Wiring Repair Data

The data and procedures that are given in Subject 20-24-00 through Subject 20-24-27 are applicable only for the PW4000/777 power plant wire harnesses that have Pratt & Whitney part numbers. Refer to Table 2.

CAUTION: THE DATA AND PROCEDURES IN Subject 20-24-00 THROUGH Subject 20-24-27 ARE NOT APPLICABLE FOR THE REPAIR OF THE WIRING OF OTHER POWER PLANTS, OF OTHER POWER PLANT MANUFACTURERS, OR OF PW4000/777 WIRING THAT HAS A BOEING PART NUMBER. REPAIRS THAT ARE NOT APPROVED CAN CAUSE UNSATISFACTORY PERFORMANCE OR RELIABILITY OF THE WIRING.

Refer to:

- The remainder of the SWPM for a PW4000/777 power plant wire harness that has a Boeing part number
- Pratt & Whitney for problems with the PW4000/777 power plant wiring repair data and procedures.

B. PW4000/777 Power Plant Wiring Repair Data and Procedures

**Table 1
WIRING REPAIR DATA AND PROCEDURES**

Wiring Repair Data or Procedure	Location
General Data for Wiring Repair	Subject 20-24-01
Wiring Component and Tool Suppliers	Subject 20-24-02
Connector Insert Configurations and Polarization	Subject 20-24-12
Assembly of Wire Harness Ties	Subject 20-24-14
Connector and Backshell Replacement	Subject 20-24-20
Contact Replacement	Subject 20-24-21
Cable Jacket Repair	Subject 20-24-22
Replacement of a Shielded Cable	Subject 20-24-24
Connector Adapter Plate Replacement	Subject 20-24-25
Replacement of Terminal Lugs	Subject 20-24-26
Repair of Wiring Identification Markers	Subject 20-24-27

C. Applicable Subjects for Power Plant Part Numbers

Table 2 gives the Illustrated Parts Catalog (IPC) reference and the applicable SWPM Subjects for the specified power plant part numbers.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: WIRING REPAIR

**Table 2
APPLICABLE SUBJECTS FOR PW4000/777 POWER PLANT WIRING PART NUMBERS**

Part Number	Description	IPC		Applicable Subject
		Reference Number	Figure-Item	
M77001	E Flange Transducer	77-31-00	04-001	Subject 20-24-20
				Subject 20-24-21
M77002	No. 1 Bearing Transducer	77-31-00	01-100	Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-25
M77004	Exhaust Case Vibration Sensor	77-31-00	03-001	Subject 20-24-20
				Subject 20-24-21
W0601	Harness	73-21-00	09-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
Subject 20-24-27				
W0602	Harness	73-21-00	10-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
Subject 20-24-27				



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PW4000/777 POWER PLANT: WIRING REPAIR

Table 2 (continued)

Part Number	Description	IPC		Applicable Subject
		Reference Number	Figure-Item	
W0603	Harness	73-21-00	11-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27
W0604	Harness	73-21-00	08-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-25
W0605	Harness	73-21-00	12-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-25
Subject 20-24-27				

20-24-00



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PW4000/777 POWER PLANT: WIRING REPAIR

Table 2 (continued)

Part Number	Description	IPC		Applicable Subject
		Reference Number	Figure-Item	
W0606	Harness	73-21-00	13-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27
W0607	Harness	73-21-00	14-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27
W0608	Harness	73-21-00	15-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: WIRING REPAIR

Table 2 (continued)

Part Number	Description	IPC		Applicable Subject
		Reference Number	Figure-Item	
W0609	Harness	73-21-00	16-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27
W0610	Harness	73-21-00	17-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27
W0611	Harness	73-21-00	18-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27

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PW4000/777 POWER PLANT: WIRING REPAIR

Table 2 (continued)

Part Number	Description	IPC		Applicable Subject
		Reference Number	Figure-Item	
W0621	Harness	73-21-00	19-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-25
				Subject 20-24-27
W0622	Harness	73-21-00	20-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
W0623	Harness	73-21-00	21-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-26
				Subject 20-24-27

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: WIRING REPAIR

Table 2 (continued)

Part Number	Description	IPC		Applicable Subject
		Reference Number	Figure-Item	
W0624	Harness	73-21-00	22-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27
W0625	Harness	73-21-00	23-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27
W0626	Harness	73-21-00	24-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-27

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: WIRING REPAIR

Table 2 (continued)

Part Number	Description	IPC		Applicable Subject
		Reference Number	Figure-Item	
W0628	Harness	73-21-00	25-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-25
				Subject 20-24-27
W0629	Harness	73-21-00	26-001	Subject 20-24-01
				Subject 20-24-02
				Subject 20-24-12
				Subject 20-24-14
				Subject 20-24-20
				Subject 20-24-21
				Subject 20-24-22
				Subject 20-24-24
				Subject 20-24-25
				Subject 20-24-26
W0635	Harness, EGT	77-21-00	02-001	Subject 20-24-20
				Subject 20-24-21
W0636	Harness, T3 and TCA	73-21-00	27-040	Subject 20-24-20
				Subject 20-24-21
W0641	Harness, AVM	77-31-00	02-001	Subject 20-24-20
				Subject 20-24-21



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PW4000/777 POWER PLANT: GENERAL DATA FOR WIRING REPAIR

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A. Applicable Conditions	1
B. Equipment Identification Numbers	1
C. Cable Identification	1
D. Cable Jacket Colors	1
E. Primary Wire Color Codes	1
2. <u>REPAIR AND REPLACEMENT OF WIRING COMPONENTS</u>	2
A. Necessary Repair Conditions	2
B. Necessary Conditions for the Replacement of a Wire or a Cable	2
C. Necessary Conditions for the Replacement of a Terminal Lug, a Connector, a Contact, or a Backshell	2

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: GENERAL DATA FOR WIRING REPAIR

This Subject gives the general data for the repair of the PW4000/777 power plant wiring.

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data of this Subject, refer to Subject 20-24-00.

B. Equipment Identification Numbers

All of the wire harnesses, components, and connectors of the power plant have an Equipment Identification Number.

C. Cable Identification

Each cable has an identification label.

NOTE: 2953 is an example of a cable circuit identification.

D. Cable Jacket Colors

The jackets of the cables in the harnesses have specified colors to show the related system. Refer to Table 1.

**Table 1
COLORS OF POWER PLANT CABLES**

Color	System
Blue	Electronic Engine Control (EEC) Channel A
Gray	Circuits that are not related to the EEC
Green	Electronic Engine Control (EEC) Channel B
Yellow	Thermocouple Circuits

E. Primary Wire Color Codes

**Table 2
COLOR CODES OF POWER PLANT PRIMARY WIRES**

Color Code	Color	Description
B	Blue	General power plant wire
O	Orange	General power plant wire
R	Red	Alumel Thermocouple wire
W	White	General power plant wire
Y	Yellow	Chromel Thermocouple wire



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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: GENERAL DATA FOR WIRING REPAIR

2. REPAIR AND REPLACEMENT OF WIRING COMPONENTS

A. Necessary Repair Conditions

A wire harness must be repaired when one or more of these conditions occur:

- The insulation of a cable or a wire has damage
- The conductor of a wire has damage
- The shield of a cable or a wire has damage
- A terminal lug is broken
- A connector has contacts that are bent, broken, or recessed
- A connector has threads that are worn or stripped
- A backshell threads that are broken, worn, or stripped.

A wiring component must be replaced if the amount of damage makes it unserviceable.

Refer to:

- Paragraph 2.B. for the conditions that are applicable for the replacement of a wire or a cable
- Paragraph 2.C. for the conditions that are applicable for the replacement of a terminal lug, a connector, a contact, or a backshell
- Subject 20-24-00 for the applicable repair procedure.

B. Necessary Conditions for the Replacement of a Wire or a Cable

If replacement is necessary, a wire or a cable must be replaced with a new wire that has the same part number.

Refer to the Wiring Diagram Manual (WDM) Chapter 91 Wire List for:

- The wire identification number
- The correct part number of the wire
- The size of the wire
- The length of the wire.

Refer to Subject 20-24-00 for the applicable replacement procedure.

C. Necessary Conditions for the Replacement of a Terminal Lug, a Connector, a Contact, or a Backshell

If replacement is necessary, a terminal lug, a connector, a contact, or a backshell must be replaced with a new component that has the same part number or a specified alternative.

CAUTION: IF A TERMINAL LUG, A CONNECTOR, A CONTACT, OR A BACKSHELL IS REPLACED WITH A COMPONENT THAT DOES NOT HAVE THE SAME PART NUMBER OR A COMPONENT THAT IS NOT A SPECIFIED ALTERNATIVE, DAMAGE TO THE COMPONENT OR THE SYSTEM CAN OCCUR.

Make sure that:

- The location of the connection is correct
- The Equipment Identification Number of the component is correct.

Refer to:

- The WDM Equipment List for the correct part number of the terminal lug, the connector, the contact, or the backshell
- The Airplane Illustrated Parts Catalog (AIPC) for the specified alternative part numbers
- Subject 20-24-00 for the applicable replacement procedure.

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: WIRING COMPONENT AND TOOL SUPPLIERS

<u>Paragraph</u>	<u>Page</u>
1. <u>GENERAL DATA</u>	1
A. Applicable Conditions	1
2. <u>SUPPLIER DATA</u>	1
A. Component and Tool Suppliers	1

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STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: WIRING COMPONENT AND TOOL SUPPLIERS**

This Subject gives the suppliers of the components and the tools that are necessary for the repair of PW4000/777 power plant wire harnesses.

1. GENERAL DATA**A. Applicable Conditions**

For the conditions that are applicable to the data of this Subject, refer to Subject 20-24-00.

2. SUPPLIER DATA**A. Component and Tool Suppliers**

Table 1
WIRING COMPONENT AND TOOL SUPPLIERS

Supplier Code	Supplier	Location
00779	AMP Incorporated	Harrisburg, Pennsylvania
04963	3M - Adhesive Coatings and Sealer Division	Austin, Texas
06324	Glenair Incorporated	Glendale, California
06324	Glenair International Limited	Mansfield Notts, England
07099	Moxness Products Incorporated	Racine, Wisconsin
11139	Deutsch - Engineered Connecting Devices	Banning, California
11851	Daniels Manufacturing Corporation	Orlando, Florida
13556	Cinch Connectors	Elk Grove Village, Illinois
14283	Matrix Science Corporation	Hampshire, England
14283	Matrix Science Corporation	Torrance, California
16902	Simpson Electric Company - Simpson Instruments Division	Elgin, Illinois
31746	Cannon Electronics	Woodbury, Tennessee
49367	Pyle-National Company	Chicago, Illinois
56501	Thomas & Betts Corporation	Raritan, New Jersey
71785	Labinal Components and Systems	Elk Grove Village, Illinois
74116	New England Electrical Wire Corporation	Lisbon, New Hampshire
77445	Pratt and Whitney - Commercial Parts Support	East Hartford, Connecticut
77820	Amphenol Corporation	Sidney, New York
80164	Keithley Instruments Incorporated	Cleveland, Ohio
82110	Gudebrod Incorporated	Pottstown, Pennsylvania
83311	Simmonds Precision Engine Systems - BF Goodrich Aerospace	Norwich, New York
K1636	AMP Incorporated of Great Britain Limited	Middlesex, England
U0419	Glenair International Limited	Mansfield Notts, England

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: WIRING COMPONENT AND TOOL SUPPLIERS

Table 1 (continued)

Supplier Code	Supplier	Location
U0425	Pyle-National Limited	Nottingham, England

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

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2.	<u>PART NUMBERS AND DESCRIPTION</u>	1
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	B. MIL-C-26500 Type Connectors	2
	C. MIL-C-38999 Series III Connectors	3
	D. MIL-C-5015 Connectors	3
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	B. MIL-C-38999 Series III Connectors	8
	C. MIL-C-5015 Connectors	9
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4.	<u>CONNECTOR POLARIZATION</u>	14
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	C. MIL-C-5015 Connectors	16

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

This Subject gives the configuration data of the connectors in the PW4000/777 power plant wiring.

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data of this Subject, refer to Subject 20-24-00.

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Connector Series	Supplier	Connector Data	
			Type	Reference
CN0966()	Modified MIL-C-26500	Cinch	Part Number Structure	Figure 1
			Insert Configurations	Paragraph 3.A.
			Polarization	Paragraph 4.A.
CN0967()	Modified MIL-C-26500	Cinch	Part Number Structure	Figure 1
			Insert Configurations	Paragraph 3.A.
			Polarization	Paragraph 4.A.
D38999()	MIL-C-38999 Series III	QPL	Part Number Structure	Figure 3
			Insert Configurations	Paragraph 3.B.
			Polarization	Paragraph 4.B.
ESC10()	Modified MIL-C-83723 Series III	QPL	Part Number Structure	Figure 5
			Insert Configurations	Paragraph 3.D.
			Polarization	Paragraph 4.A.
FPK()	Modified MIL-C-26500	Pyle-National	Part Number Structure	Figure 2
			Insert Configurations	Paragraph 3.A.
			Polarization	Paragraph 4.A.
M83723()	MIL-C-83723 Series III	QPL	Part Number Structure	Figure 6
			Insert Configurations	Paragraph 3.D.
			Polarization	Paragraph 4.A.
MS3459()	MIL-C-5015	QPL	Part Number Structure	Figure 4
			Insert Configurations	Paragraph 3.C.
			Polarization	Paragraph 4.C.

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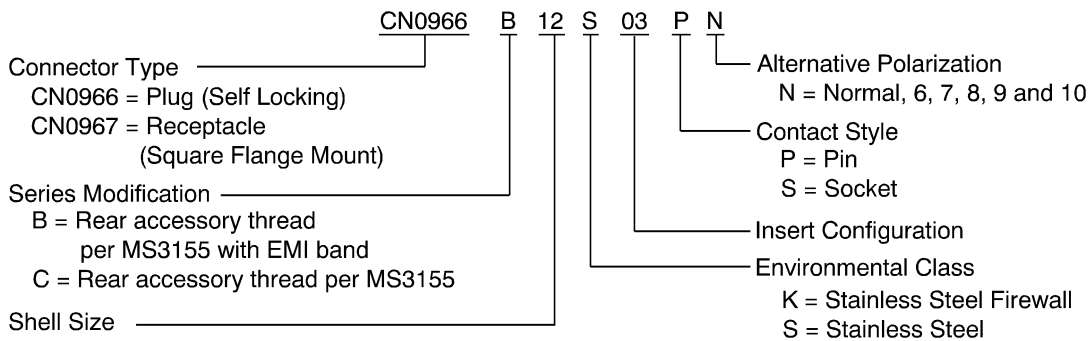
PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

CAUTION: A CONNECTOR FROM ONE SERIES MUST NOT BE CONNECTED TO A CONNECTOR FROM DIFFERENT SERIES. DAMAGE TO THE CONNECTORS CAN OCCUR.

Make sure that:

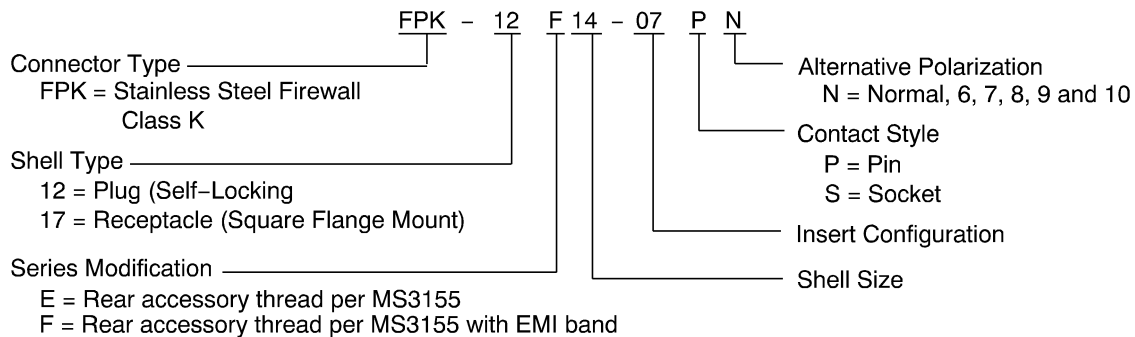
- An ESC10 connector is only connected to an ESC10 connector
- A modified MIL-C-26500 connector is only connected to modified MIL-C-26500 connector
- A MIL-C-38999 Series III connector is only connected to a MIL-C-38999 Series III connector
- A MIL-C-5015 connector is only connected to MIL-C-5015 connector
- A MIL-C-83723 Series III connector is only connected to MIL-C-83723 Series III connector.

B. MIL-C-26500 Type Connectors



CINCH CN096() CONNECTOR PART NUMBER STRUCTURE

Figure 1



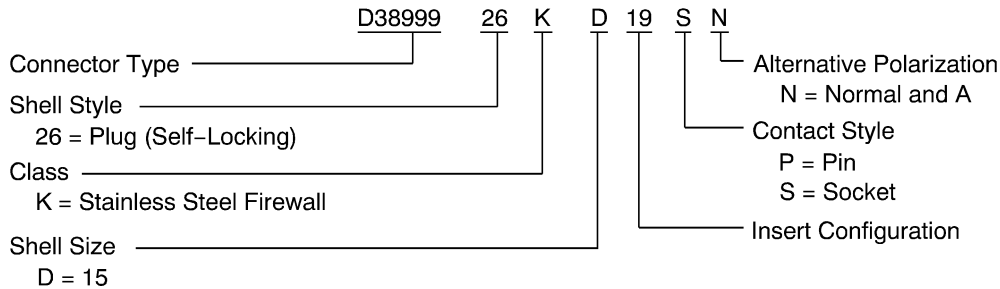
PYLE-NATIONAL FPK() CONNECTOR PART NUMBER STRUCTURE

Figure 2

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

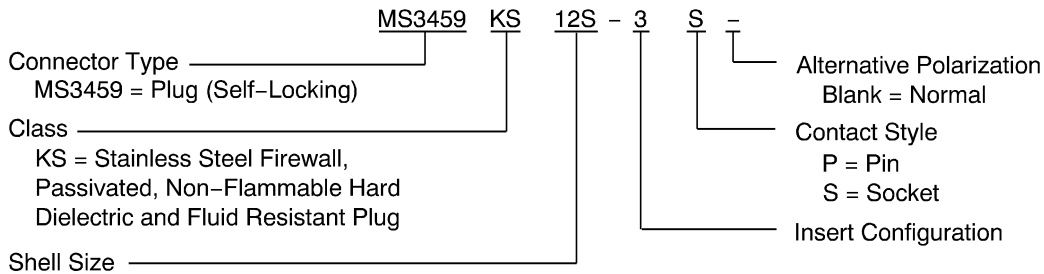
C. MIL-C-38999 Series III Connectors



D38999() CONNECTOR PART NUMBER STRUCTURE

Figure 3

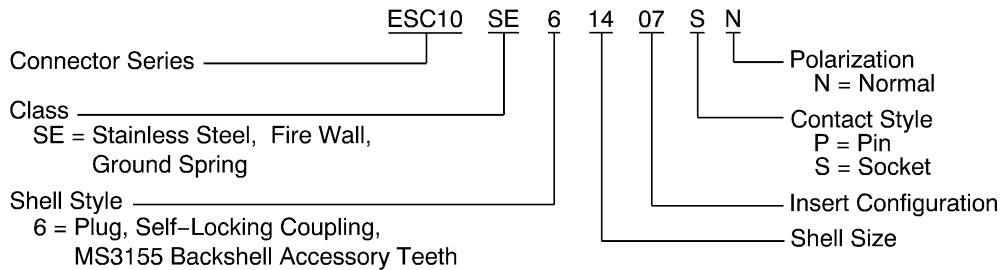
D. MIL-C-5015 Connectors



MS3459() CONNECTOR PART NUMBER STRUCTURE

Figure 4

E. MIL-C-83723 Series III Type Connectors

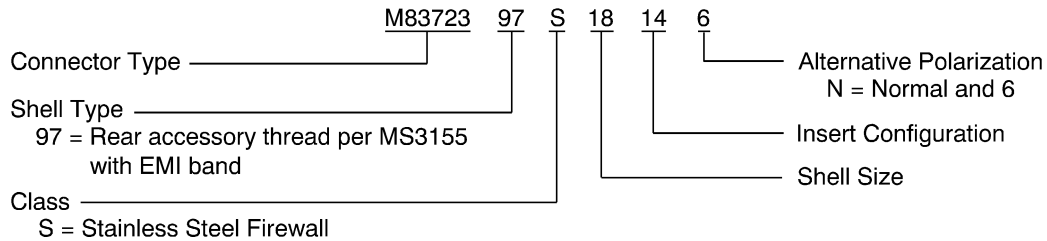


ESC10() CONNECTOR PART NUMBER STRUCTURE

Figure 5

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PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION



M83723() CONNECTOR PART NUMBER STRUCTURE
Figure 6

F. Connector Contact Retention

Table 2
CONNECTOR CONTACT RETENTION

Connector Series	Contact Retention
MIL-C-26500 Type	Front Release, Rear Removal and Insertion
MIL-C-38999 Series III	Rear Release, Rear Removal and Insertion
MIL-C-5015	Rear Release, Rear Removal and Insertion
MIL-C-83723 Series III Type	Rear Release, Rear Removal and Insertion

G. Contact Part Numbers

Refer to the WDM Equipment List for the correct part numbers of the contacts for the applicable connector.

3. INSERT CONFIGURATIONS

A. MIL-C-26500 Type Connectors

NOTE: The insert configurations that are specified in Table 3 include the connector shell size as the first part of the configuration. Refer to Paragraph 2.B. for the part number structure that is applicable for the connector.

NOTE: The contact cavity size that is specified in Table 3 is equivalent to the size of the engaging end of the contact.

Table 3
CONNECTOR INSERT CONFIGURATIONS

Insert Configuration	Contact Cavity			Reference
	Quantity	Size	Type	
10-05	5	20	Socket	Figure 7
12-03	3	16	Socket	Figure 8
14-07	7	16	Socket	Figure 9
16-10	10	16	Socket	Figure 10
18-14	14	16	Socket	Figure 11

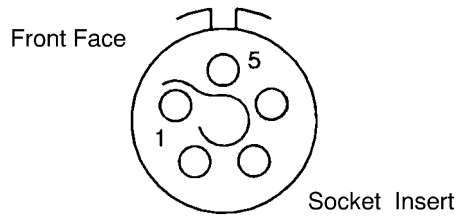
20-24-12

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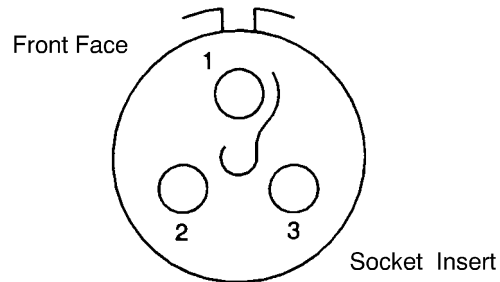
PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

Table 3 (continued)

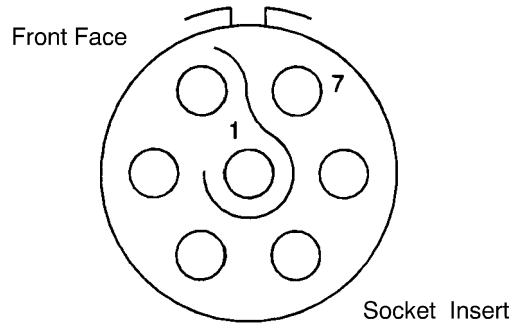
Insert Configuration	Contact Cavity			Reference
	Quantity	Size	Type	
20-16	16	16	Socket	Figure 12
22-19	19	16	Socket	Figure 13
24-30	30	16	Socket	Figure 14
28-42	42	16	Socket	Figure 15



10-05 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 7



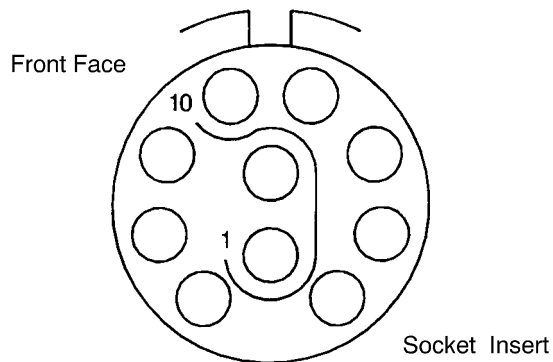
12-03 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 8



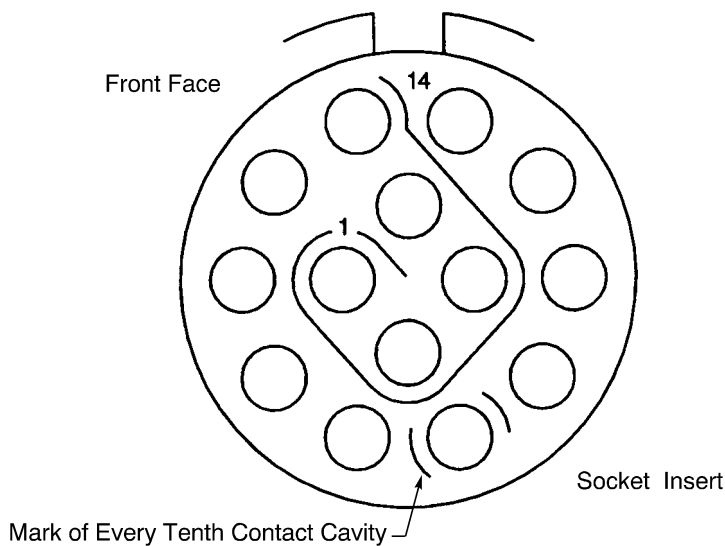
14-07 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 9

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION



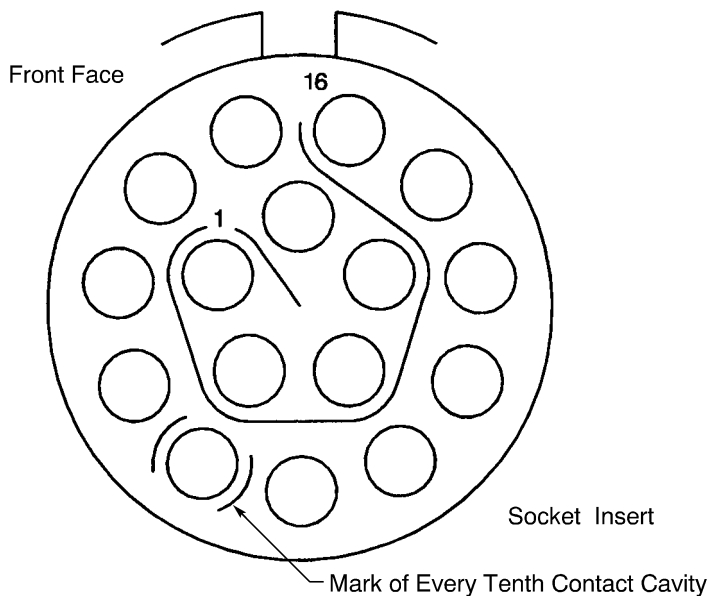
16-10 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 10



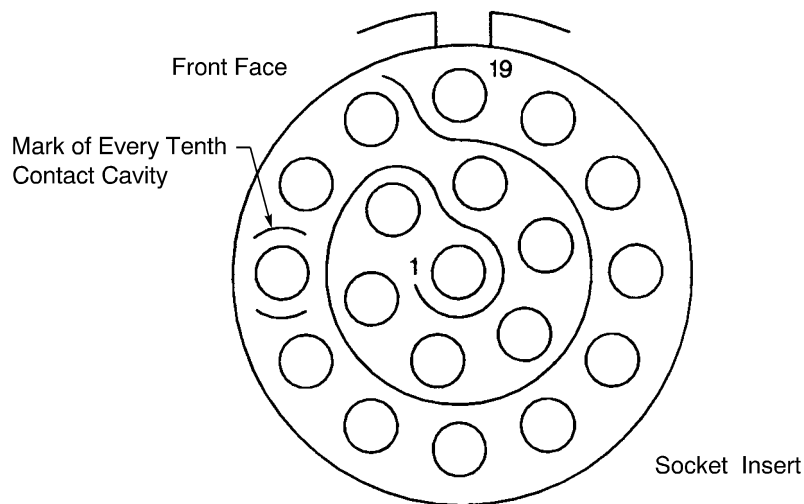
18-14 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 11

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION



20-16 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 12

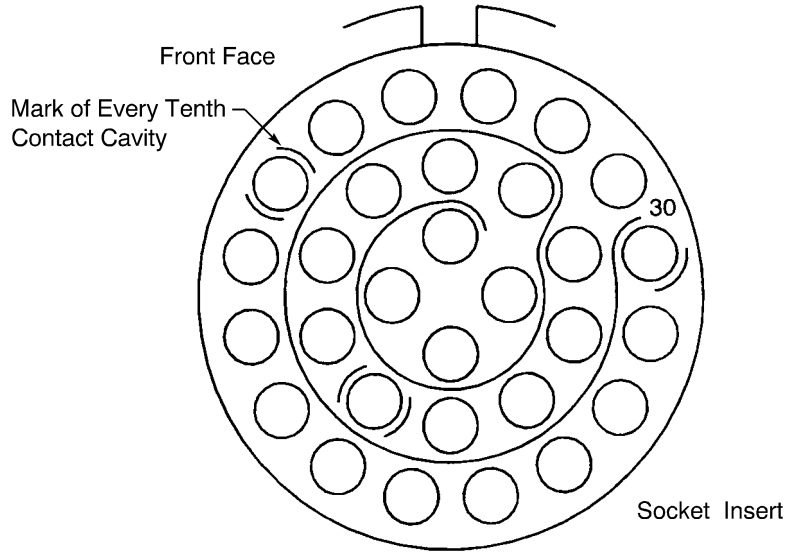


22-19 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 13

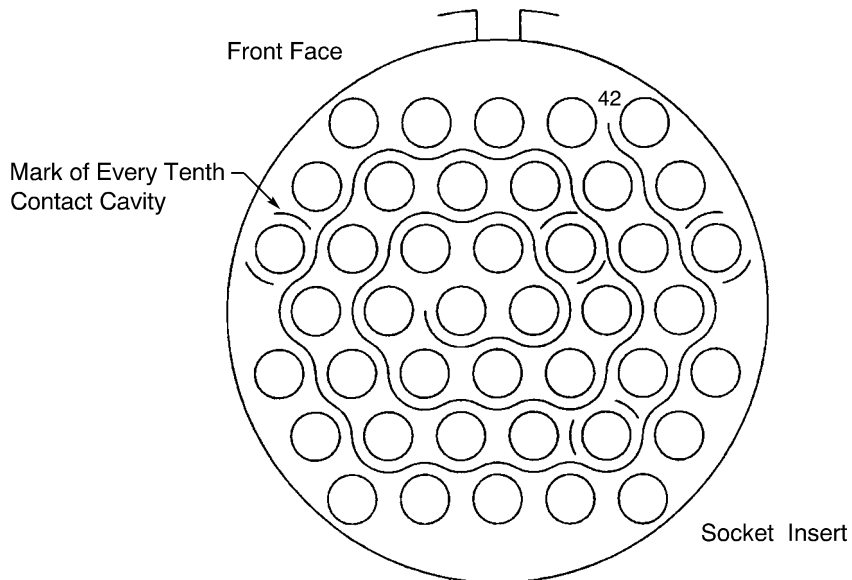
20-24-12

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION



24-30 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 14



28-42 INSERT CONFIGURATION FOR MIL-C-26500 TYPE CONNECTORS
Figure 15

B. MIL-C-38999 Series III Connectors

NOTE: The insert configurations that are specified in Table 4 include the connector shell size as the first part of the configuration. Refer to Paragraph 2.C. for the part number structure that is applicable for the connector.

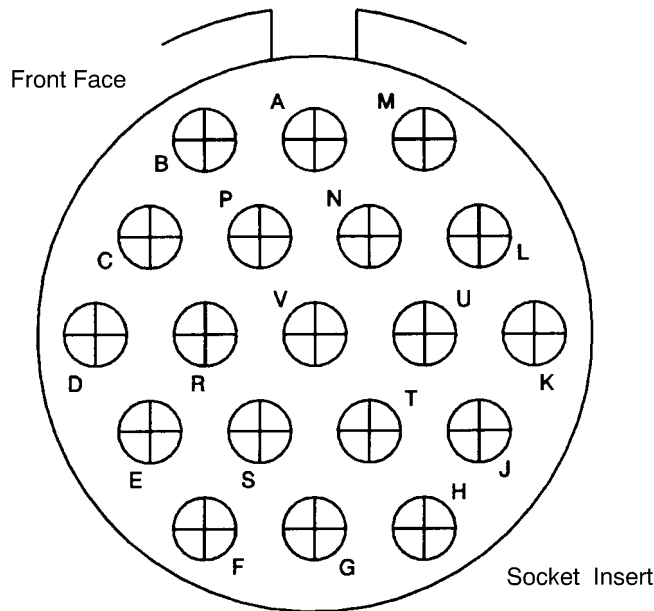
STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

NOTE: The contact cavity size that is specified in Table 4 is equivalent to the size of the engaging end of the contact.

**Table 4
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity			Reference
	Quantity	Size	Type	
15-19	19	20	Socket	Figure 16



**15-19 INSERT CONFIGURATION FOR MIL-C-38999 CONNECTORS
Figure 16**

C. MIL-C-5015 Connectors

NOTE: The insert configurations that are specified in Table 5 include the connector shell size as the first part of the configuration. Refer to Paragraph 2.D. for the part number structure that is applicable for the connector.

NOTE: The contact cavity size that is specified in Table 5 is equivalent to the size of the engaging end of the contact.

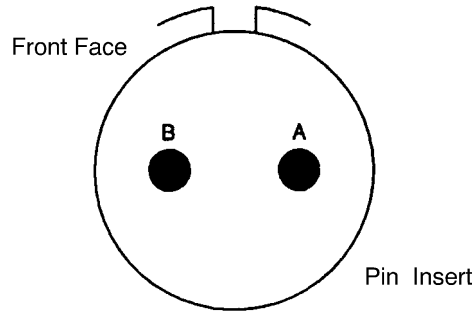
**Table 5
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity			Reference
	Quantity	Size	Type	
12S-3	2	16	Pin	Figure 17
14S-7	3	16	Pin	Figure 18

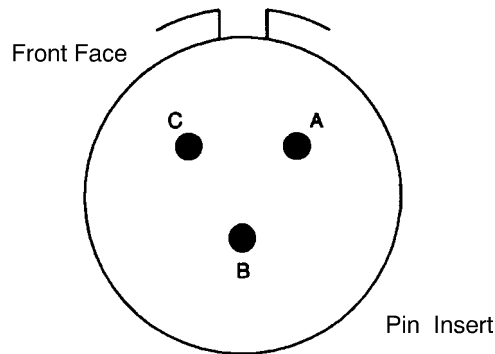
20-24-12

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION



12S-3 INSERT CONFIGURATION FOR MIL-C-5015 CONNECTORS
Figure 17



14S-7 INSERT CONFIGURATION FOR MIL-C-5015 CONNECTORS
Figure 18

D. MIL-C-83723 Series III Type Connectors

NOTE: The insert configurations that are specified in Table 6 include the connector shell size as the first part of the configuration. Refer to Paragraph 2.E. for the part number structure that is applicable for the connector.

NOTE: The contact cavity size that is specified in Table 6 is equivalent to the size of the engaging end of the contact.

Table 6
CONNECTOR INSERT CONFIGURATIONS

Insert Configuration	Contact Cavity			Reference
	Quantity	Size	Type	
10-05	5	20	Pin	Figure 19
12-03	3	16	Pin	Figure 20
14-07	7	16	Pin	Figure 21
16-10	10	16	Pin	Figure 22

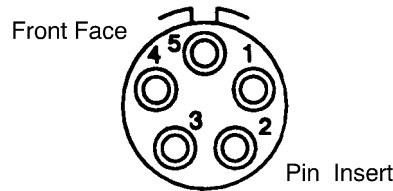
20-24-12

STANDARD WIRING PRACTICES MANUAL

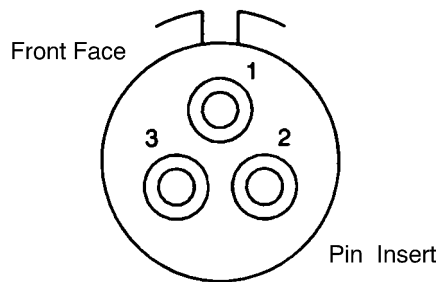
PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

Table 6 (continued)

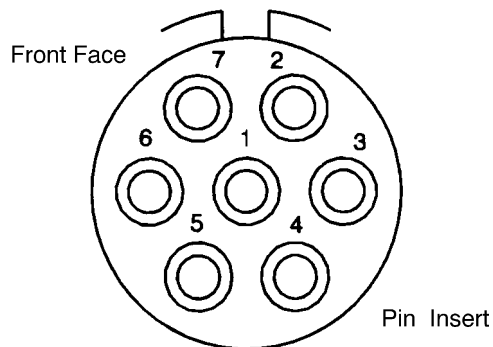
Insert Configuration	Contact Cavity			Reference
	Quantity	Size	Type	
18-14	14	16	Pin	Figure 23
24-30	30	16	Pin	Figure 24



10-05 INSERT CONFIGURATION FOR MIL-C-83723 TYPE CONNECTORS
Figure 19



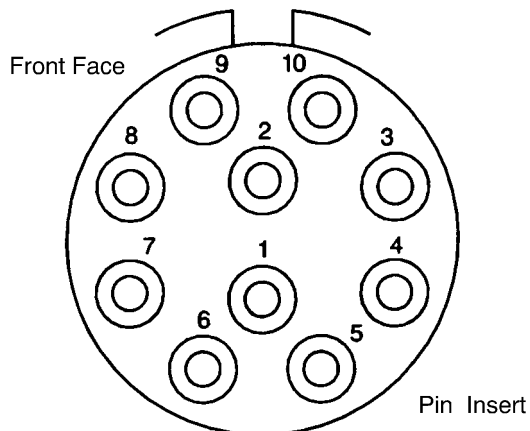
12-03 INSERT CONFIGURATION FOR MIL-C-83723 TYPE CONNECTORS
Figure 20



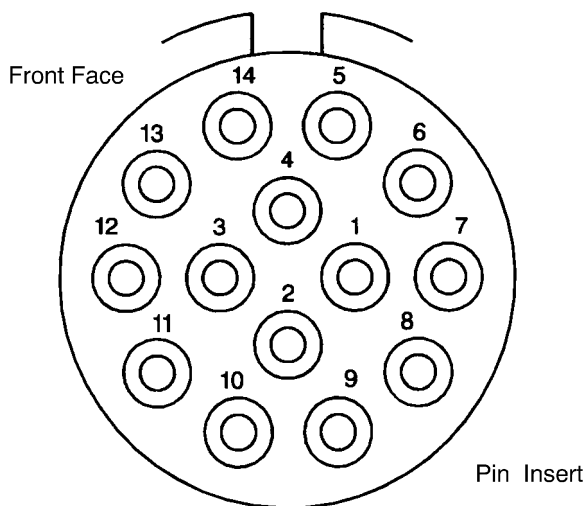
14-07 INSERT CONFIGURATION FOR MIL-C-83723 TYPE CONNECTORS
Figure 21

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION



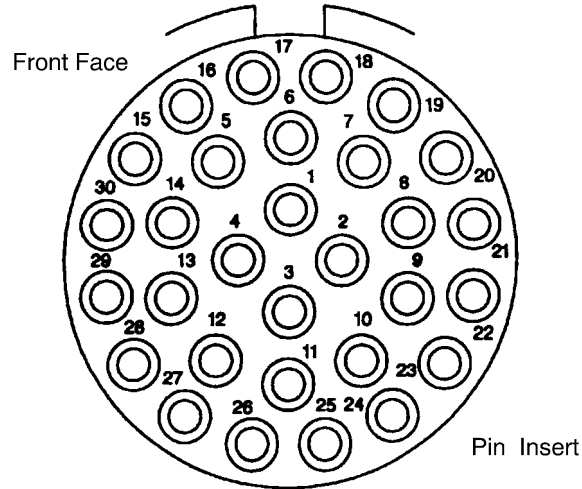
16-10 INSERT CONFIGURATION FOR MIL-C-83723 TYPE CONNECTORS
Figure 22



18-14 INSERT CONFIGURATION FOR MIL-C-83723 TYPE CONNECTORS
Figure 23

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION



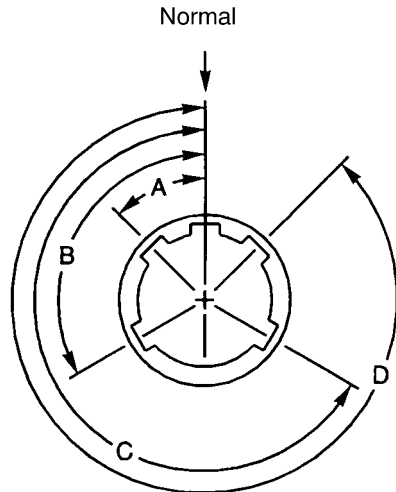
24-30 INSERT CONFIGURATION FOR MIL-C-83723 TYPE CONNECTORS
Figure 24

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

4. CONNECTOR POLARIZATION

A. MIL-C-26500 Type and MIL-C-83723 Series III Type Connectors



The Angles are Counterclockwise from the Normal Keyway

For the Front Face of the Plug Shell, the Key Locations Are Clockwise

Front Face of the Receptacle Shell

POSITION	FOR CONNECTORS SIZE 8 AND 10				FOR CONNECTORS SIZE 12, 14, 16, 18, 20, 22, 24 AND 28			
	A	B	C	D	A	B	C	D
NORMAL	105°	140°	215°	265°	105°	140°	215°	265°
6	102°	132°	248°	320°	18°	149°	192°	259°
7	80°	118°	230°	312°	92°	152°	222°	342°
8	35°	140°	205°	275°	84°	152°	204°	334°
9	64°	155°	234°	304°	24°	135°	199°	240°
Y(10*)	25°	115°	220°	270°	98°	152°	268°	338°

* Not Available In Size 8 Connector

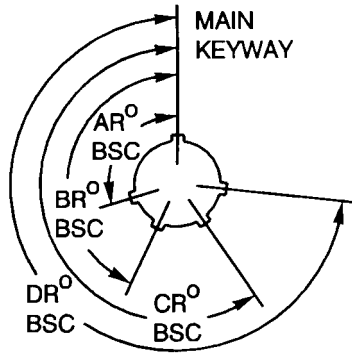
POLARIZATION POSITIONS FOR MIL-C-26500 TYPE AND MIL-C-83723 SERIES III TYPE CONNECTORS

Figure 25

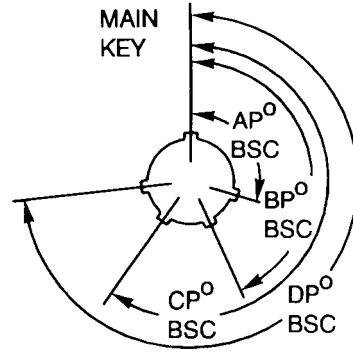
STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

B. MIL-C-38999 Series III Connectors



Front Face of the Socket Insert



Front Face of the Pin Insert

SHELL SIZE	KEY & KEYWAY ARRANGEMENT IDENTIFICATION LETTER	AR ^o	BR ^o	CR ^o	DR ^o
		OR AP ^o BSC	OR BP ^o BSC	OR CP ^o BSC	OR DP ^o BSC
9	N	105	140	215	265
	A	102	132	248	320
	B	80	118	230	312
	C	35	140	205	275
	D	64	155	234	304
	E	91	131	197	240
11, 13 AND 15	N	95	141	208	236
	A	113	156	182	292
	B	90	145	195	252
	C	53	156	220	255
	D	119	146	176	298
	E	51	141	184	242
17 AND 19	N	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
	C	66	140	200	257
	D	62	145	180	280
	E	79	153	197	272
21, 23 AND 25	N	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
	C	66	140	200	257
	D	62	145	180	280
	E	79	153	197	272

All of the Angles are Basic

The Main Keys and Keyways, and Inserts are Fixed in the Normal Polarization Position

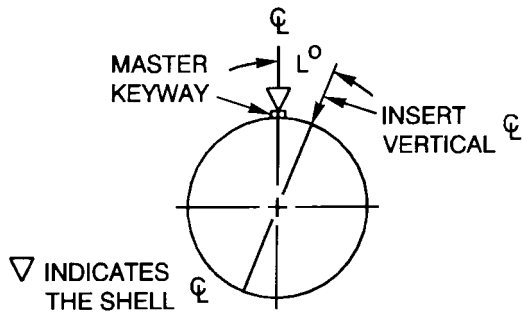
The Auxiliary Keys and Keyways Are Moved for the Alternative Polarization

POLARIZATION POSITIONS FOR MIL-C-38999 CONNECTORS
Figure 26

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR INSERT CONFIGURATIONS AND POLARIZATION

C. MIL-C-5015 Connectors



Front Face of the Pin Insert

In the normal position, the insert vertical, the key, and the keyway are the same: $L = 0$ degrees.

In the alternative positions W, X, Y, and Z, the insert is turned in relation to the centerline of the master key or keyway of the shell:

- The pin insert is turned clockwise in the shell; the position is the angle between the index radius and the centerline of the master key or keyway
- The socket insert is turned counterclockwise in the shell; the position is the angle between the index radius and the centerline of the master key or keyway.

SHELL SIZE	INSERT ARRANGEMENTS	CONTACTS		ALTERNATE INSERT POSITIONS L DEGREES			
		QTY.	SIZE	W	X	Y	Z
12S	12S-3	2	16	70	145	215	290
14S	14S-7	3	16	90	180	270	-

POLARIZATION POSITIONS FOR MIL-C-5015 CONNECTORS
Figure 27



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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: ASSEMBLY OF WIRE HARNESS TIES

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B. Wire Harness Components	1
C. Wire Routing	1
D. Necessary Materials	1
2. <u>CONFIGURATION OF WIRE HARNESS TIES</u>	1
A. Types of Knots	1
B. Location and Position of Wire Harness Ties	2
3. <u>ASSEMBLY OF WIRE HARNESS TIES</u>	3
A. Assembly of a Standard Wire Harness Tie	3
B. Assembly of a Wire Harness Tie That Supports a Wire Harness Branch	4
C. Assembly of a Wire Harness Tie on Spiral Wrap	5

20-24-14 CONTENTS

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: ASSEMBLY OF WIRE HARNESS TIES

This Subject gives the procedures to assemble wire harness ties.

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-24-00.

B. Wire Harness Components

**Table 1
DEFINITIONS**

Term	Definition
Cable	A group of wires in a metal shield and an insulated jacket
Harness	One or more cables with connectors or terminal lugs attached to the ends of the cables
Wire	A single electrical conductor with insulation around it

C. Wire Routing

These conditions are applicable:

- The twists of cable in a wire harness must be kept to a minimum
- The routing of the wire harness must be as straight as possible.

D. Necessary Materials

NOTE: Alternatives to the materials in Table 2 must be equivalent materials. Refer to Subject 20-00-11.

**Table 2
NECESSARY MATERIALS**

Material	Part Number	Supplier Code
Tape, Lacing, White	718Z	82110

2. CONFIGURATION OF WIRE HARNESS TIES

A. Types of Knots

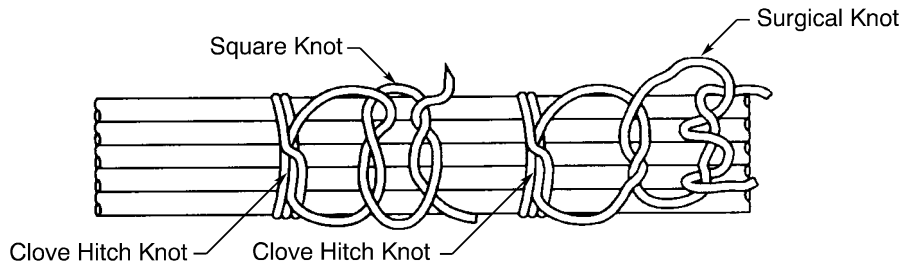
A wire harness tie has two knots:

- A clove hitch knot; refer to Figure 1
- A square knot or a surgical knot; refer to Figure 1.

A square knot or a surgical knot is used to prevent the unwanted movement of a clove hitch on the harness.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: ASSEMBLY OF WIRE HARNESS TIES



TYPES OF KNOTS FOR WIRE HARNESS TIES

Figure 1

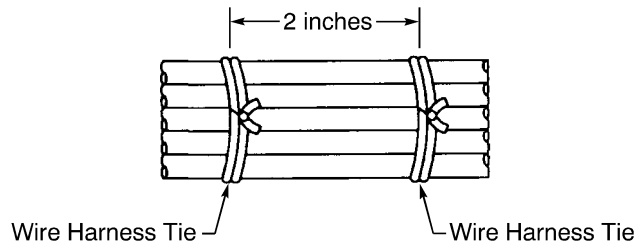
B. Location and Position of Wire Harness Ties

These general conditions are applicable:

- A wire harness must have wire harness ties if the harness has two or more cables
- If it is necessary to disassemble a wire harness tie or replace a damaged wire harness tie, a new tie must be put in the same location
- The maximum interval between two wire harness ties is 2 inches (50.8 mm); refer to Figure 2.
- If the diameter of the wire harness is larger than 1.5 inches (38.1 mm), two wire harness ties must be put at the same location; refer to Figure 3.

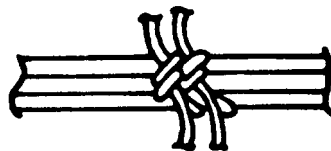
These conditions are applicable for wire harnesses with wire harness branches:

- The wire harness must have a wire harness tie on each side of a branch
- The branch must have a wire harness tie at the wire harness.



STANDARD INTERVAL FOR WIRE HARNESS TIES

Figure 2



TWO WIRE HARNESS TIES AT THE SAME LOCATION

Figure 3

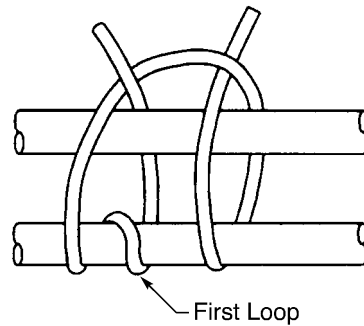
STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: ASSEMBLY OF WIRE HARNESS TIES****3. ASSEMBLY OF WIRE HARNESS TIES****A. Assembly of a Standard Wire Harness Tie**

- (1) Make a clove hitch on the harness. Refer to Figure 4 and Figure 5.

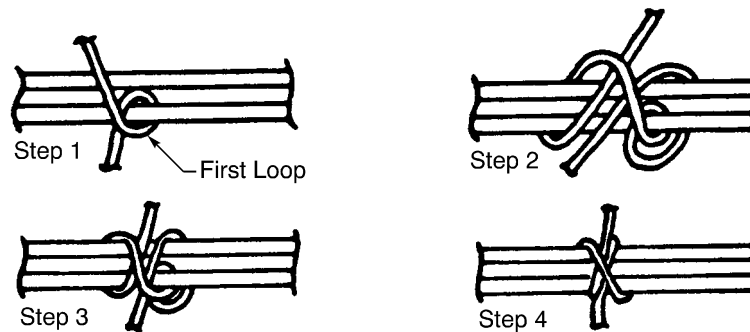
Make sure that the knot is tight.

CAUTION: DO NOT MAKE THE FIRST LOOP ON:

- A THERMOCOUPLE CABLE (YELLOW JACKET)
- A THERMOCOUPLE WIRE (RED OR YELLOW INSULATION)



CLOVE HITCH KNOT
Figure 4

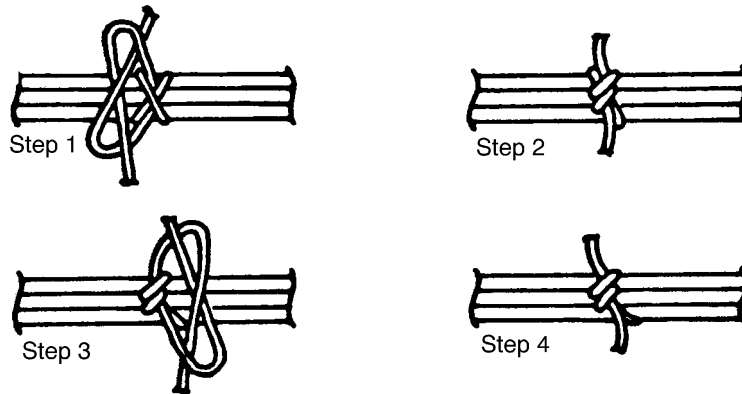


STEPS TO MAKE A CLOVE HITCH KNOT
Figure 5

- (2) Make a square knot or surgical knot on top of the clove hitch knot. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: ASSEMBLY OF WIRE HARNESS TIES

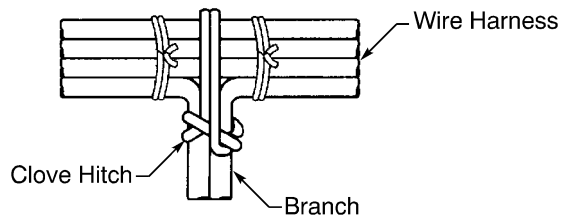


STEPS TO MAKE A SQUARE KNOT
Figure 6

- (3) Cut the two ends of the tie material to make the distance between each end and the knot equal to:
- A minimum of 0.25 inch (6.35 mm)
 - A maximum of 0.50 inch (12.7 mm).

B. Assembly of a Wire Harness Tie That Supports a Wire Harness Branch

- (1) Assemble a wire harness tie on the wire harness on both sides of the branch.
- (2) Make a loose clove hitch on the wire harness and the branch. Refer to Figure 7.
 Make sure that the clove hitch is not tight.

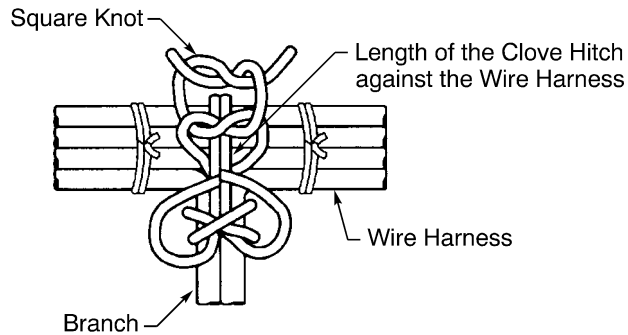


CLOVE HITCH AROUND THE WIRE HARNESS AND THE BRANCH
Figure 7

- (3) Put each end of the tie material across the other and between the wire harness and the lengths of the clove hitch that are against wire harness. Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL

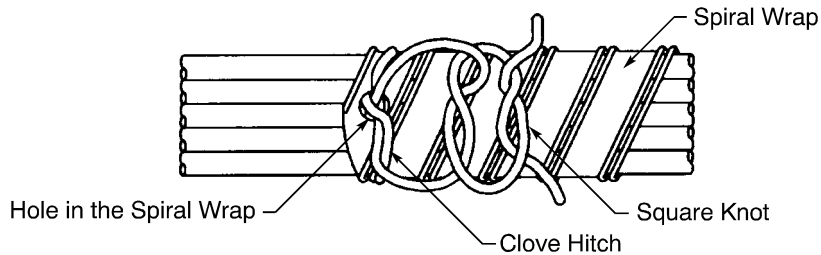
PW4000/777 POWER PLANT: ASSEMBLY OF WIRE HARNESS TIES



SQUARE KNOT ON TOP OF THE CLOVE HITCH
Figure 8

- (4) Tighten the clove hitch.
- (5) Make a square knot or surgical knot on top of the clove hitch knot. Refer to Figure 8.
- (6) Cut the two ends of the tie material to make the distance between each end and the knot equal to:
 - A minimum of 0.25 inch (6.35 mm)
 - A maximum of 0.50 inch (12.7 mm).

C. Assembly of a Wire Harness Tie on Spiral Wrap



POSTION OF THE WIRE HARNESS TIE ON THE SPIRAL WRAP
Figure 9

Refer to Figure 9.

- (1) Make a 0.075 inch to 0.175 inch (1.9 mm to 4.4 mm) diameter hole in the spiral wrap at the end.
- (2) Put one end of the tie material through the hole.
- (3) Assemble a wire harness tie on the spiral wrap. Refer to Paragraph 3.A.



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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT

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20-24-20 CONTENTS

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT**

This Subject gives the procedures to replace a connector or a backshell on a wire harness or cable assembly.

1. GENERAL DATA**A. Applicable Conditions**

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-24-00.

B. Wire Harness Components

Table 1
DEFINITIONS

Term	Definition
Cable	A group of wires in a metal shield and an insulated jacket
Harness	One or more cables with connectors or terminal lugs attached to the ends of the cables
Wire	A single electrical conductor with insulation around it
Stubwire Assembly	A 4 inch wire that is sealed with a cap on one end and has a contact crimped to the other end

C. Disconnect Identification Number

Refer to the Equipment List of the Wiring Diagram Manual (WDM) to find the Disconnect Identification Number for the correct connector and backshell part numbers.

D. Alternative Part Numbers

To identify alternative part numbers, refer to the Airplane Illustrated Parts Catalog (AIPC).

E. Wire Data

Refer to the WDM Wire List (Chapter 91) for detailed pin to pin and wire color data.

F. More References

Refer to:

- Subject 20-24-12 for the insert configurations of the connectors
- Subject 20-24-14 for the assembly of the wire harness ties
- Subject 20-24-25 for the adapter plate assembly.

G. Connector or Backshell Replacement

These conditions are applicable when a connector or backshell must be replaced:

- The connector or backshell must be replaced with a connector or backshell that has the same part number; refer to the WDM Equipment list
- The part number must be correct for the Disconnect Identification Number location
- If a contact cavity of the old connector has a stub wire assembly, the same contact cavity of the new connector must have a stub wire assembly
- If a contact cavity of the old connector has an unwired contact and a seal plug, the same contact cavity of the new connector must have an unwired contact and a seal plug.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT

2. STANDARD EQUIPMENT

A. Tools

WARNING: TO AVOID INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHILE AN ON-WING REPAIR IS MADE, DO NOT USE THESE TOOLS:

- A HEAT GUN
- A SOLDERING GUN
- A SOLDERING IRON.

NOTE: Alternatives to the tools specified in Table 2 must be equivalent tools.

**Table 2
TOOLS**

Tool	Procedure	Part Number	Supplier Code
Adapter Kit, Connector	Backshell removal from the MIL-C-83723, modified MIL-C-26500, and ESC10 connectors	CM-S-837	11851
	Backshell removal from the MIL-C-38999 series plug connectors	CM-S-389T	11851
	Backshell removal from the MIL-C-5015 series plug connectors	CM-S-5015S	11851
Contact Insertion Tool	MIL-C-26500 connector size 20 contact insertion	M81969/17-03	11851
	MIL-C-26500 connector size 16 contact insertion	M81969/17-04	11851
	MIL-C-38999 connector size 20 contact insertion	M81969/8-05	11851
	MIL-C-83723 and MIL-C-5015 connector size 20 contact insertion	M81969/14-02	11851
	MIL-C-83723 and MIL-C-5015 connector size 16 contact insertion	M81969/14-03	11851

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT

Table 2 (continued)

Tool	Procedure	Part Number	Supplier Code
Contact Removal Tool	MIL-C-26500 connector size 20 contact front release removal	AT 2020	58164
		ATML 1907	58164
		DRK20	11851
		M81969/19-07	11851
		M81969/19-07	58164
		MS24256R20	11851
		MS24256R20	58164
	MIL-C-26500 connector size 16 contact front release removal	AT 2016	58164
		ATML 1908	58164
		DRK16	11851
		M81969/19-08	11851
		M81969/19-08	58164
		MS24256R16	11851
		MS24256R16	58164
	MIL-C-26500 connector size 12 contact front release removal	AT 2012	58164
		ATML 1909	58164
		DRK12	11851
		M81969/19-02	11851
		M81969/19-09	58164
		MS24256R12	11851
		MS24256R12	58164
		ST2220-3-15	81205
	MIL-C-38999 connector size 20 rear release contact removal	M81969/8-06	11851
	MIL-C-83723 and MIL-C-5015 connector size 20 contact rear release removal	M81969/14-02	11851
MIL-C-83723 and MIL-C-5015 connector size 16 contact rear release removal	M81969/14-03	11851	
Digital Multimeter	Continuity measurement	Model 177	80164
Ohmmeter	Continuity measurement	Model 260	16902

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT

Table 2 (continued)

Tool	Procedure	Part Number	Supplier Code
Pliers, Soft Jaw	Connector and backshell removal and installation	BT-SJ-468	11851
		TG-69	06324
		TG-69	11851
Retention Test Tool	Contact retention test	HT250-4	11851
Retention Test Tool Tip for Pin Contacts	Retention test for size 16 contacts	67-016-01	11851
	Retention test for size 20 contacts	68-020-01	11851
Retention Test Tool Tip for Socket Contacts	Retention test for size 16 contacts	68-016-01	11851
	Retention test for size 20 contacts	67-020-01	11851
Wrench, Strap	Connector and backshell removal and installation	BT-BS-6()	11851
		TG-70	06324
		TG-70	11851

B. Necessary Materials

NOTE: Alternatives to the materials specified in Table 3 must be equivalent materials.

**Table 3
NECESSARY MATERIALS**

Material	Part Number	Supplier Code
Oil, Lubricating, Turbine Engine	PWA 521B, Type II	77445
Tape, Silicone Rubber, Self-bonding, Black	Moxness 620-1	07099

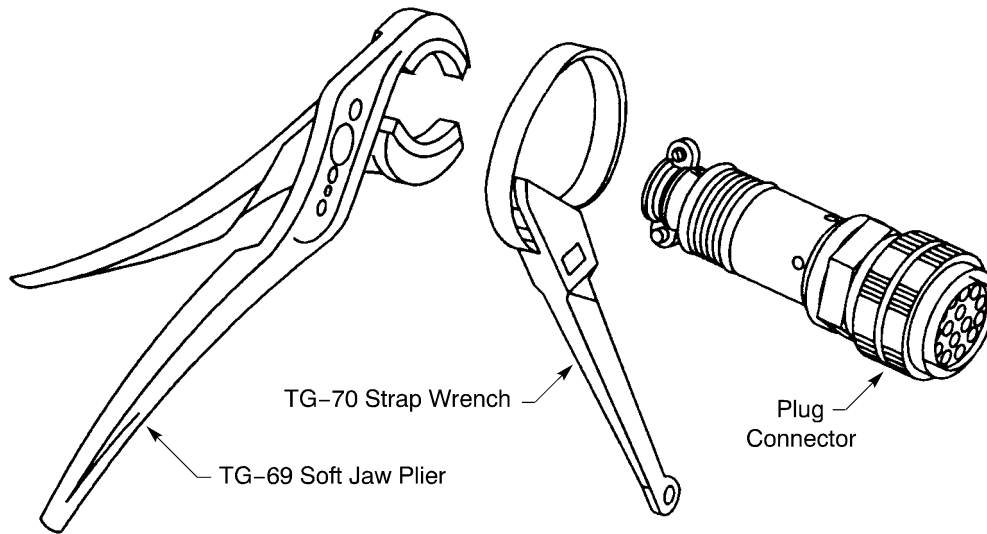
3. CONNECTOR DISASSEMBLY

A. Connector Separation

- (1) Disconnect the plug from the receptacle with the TG-69 pliers or the TG-70 strap wrench. Refer to Figure 1.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT

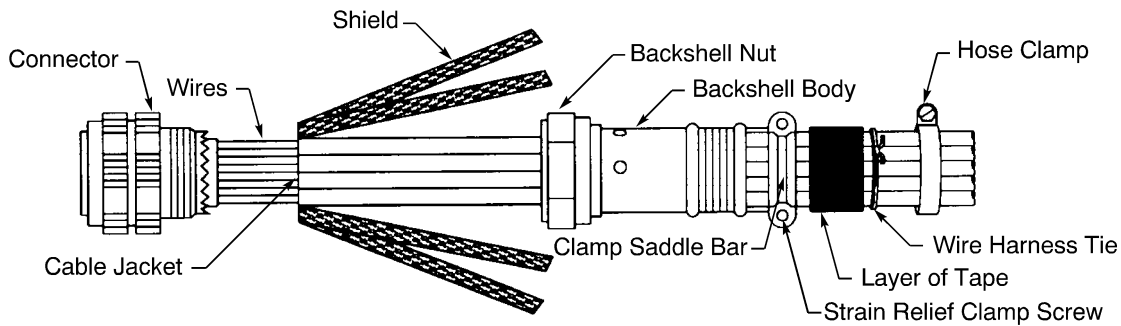


CONNECTOR SEPARATION TOOLS

Figure 1

- (2) If it is necessary, remove the adapter plate assembly and the receptacle from the engine bracket. Refer to Subject 20-24-25.

B. Backshell Removal



BACKSHELL REMOVAL

Figure 2

Refer to Figure 2.

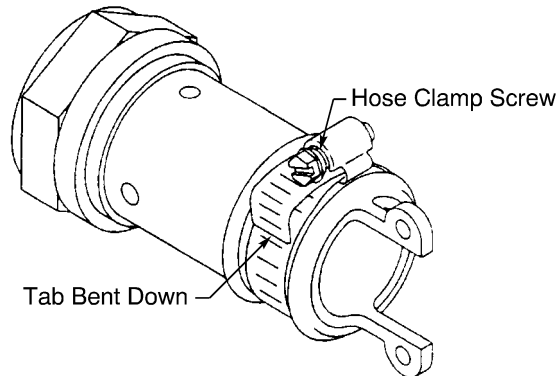
- (1) Make a mark on the connector backshell in relation to the master key or keyway on the front of the connector.

NOTE: The backshell is installed at an angular or the straight position in relation to the master key on the connector. The position must be the same after the backshell is removed and attached to the connector again.

- (2) If it is necessary to replace the backshell, make a mark on a new backshell in the same position as the mark on the old backshell.

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT**

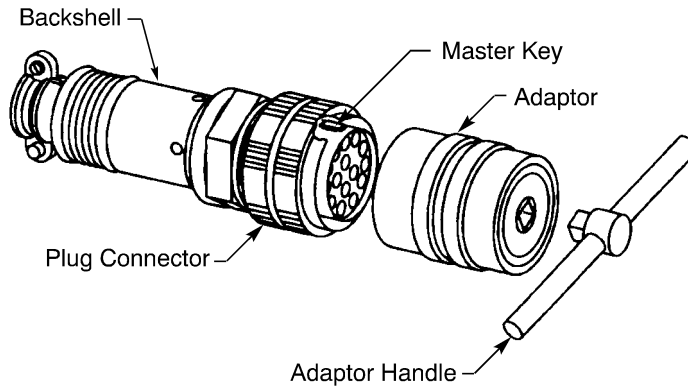
- (3) Make a record of the direction and position of the hose clamp screw in relation to the master key on the front of the connector.
- (4) Move the hose clamp away from the repair area. Refer to Figure 3.

**POSITION OF THE HOSE CLAMP ON THE BACKSHELL****Figure 3**

- (a) Loosen the hose clamp screw.
NOTE: If it is necessary, the tab of the hose clamp can be bent to make it straight.
 - (b) Push the hose clamp rearward away from the backshell.
NOTE: If the saddle bars of the strain relief clamp stop the hose clamp, the hose clamp can be fully removed.
- (5) Loosen the strain relief clamp screws sufficiently.
NOTE: To make the removal of the backshell easier, the saddle bars of the strain relief clamp can be fully removed.
 - (6) If it is necessary to remove the saddle bars:
 - (a) Make a record of the direction and position of the saddle bars and screws of the strain relief clamp in relation to the master key on the front of the connector.
NOTE: The position of the saddle bars and the screws must be the same after the backshell is assembled again.
 - (b) Remove the strain relief clamp screws.
 - (7) Fold the ends of the shields rearward against the wire harness.
Make sure that the shields are flat and symmetrical around the circumference of the wire harness.
 - (8) For the plug connector:
 - (a) Make a selection of a connector adapter kit from Table 2.
 - (b) Align the master key on the engaging end of the connector and the master keyway of the adapter. Refer to Figure 4.

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PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT



ALIGNMENT OF THE ADAPTER AND THE PLUG CONNECTOR
Figure 4

- (c) Engage the adapter and the plug.
- (9) Hold the plug connector and the adaptor or the flange of the receptacle connector with a standard wrench or a small vise.
- (10) Put the TG-69 pliers or the TG-70 strap wrench on the backshell.
NOTE: A standard crowsfoot wrench is a satisfactory alternative.
- (11) Turn the backshell in a counterclockwise direction until it is disengaged from the connector.
- (12) Push the black rubber tape rearward away from the backshell.
NOTE: If it is necessary, the tape can be fully removed from the wire harness.
- (13) Push the backshell rearward away from the rear of the connector.

CAUTION: DO NOT CAUSE DAMAGE TO THE CABLES, THE WIRES, OR THE SHIELDS. DAMAGE CAN CAUSE UNSATISFACTORY PERFORMANCE OR RELIABILITY OF THE SYSTEM.

C. Contact Removal

Table 4
CONTACT REMOVAL PROCEDURES

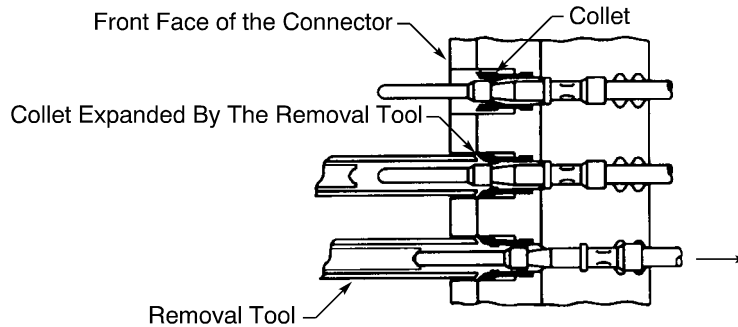
Connector Series	Contact Retention	Procedure
D38999	Rear Release	Paragraph 3.E.
ESC10	Rear Release	Paragraph 3.E.
MIL-C-26500	Front Release	Paragraph 3.D.
MIL-C-5015	Rear Release	Paragraph 3.E.
MIL-C-83723	Rear Release	Paragraph 3.E.

- (1) If it is necessary, remove the tie material to permit the removal of the contacts.
- (2) Make a selection of a contact removal procedure. Refer to Table 4.

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D. Front Release Contact Contact Removal



FRONT RELEASE CONTACT REMOVAL
Figure 5

Refer to Figure 5.

- (1) Make a selection of a contact removal tool from Table 2.
- (2) Put the removal tool on the contact from the front face of the connector.
- (3) Axially align the removal tool and the contact.
- (4) Push the removal tool into the grommet until it stops.

CAUTION: IF TOO MUCH PRESSURE IS APPLIED, DAMAGE TO THE COLLET, THE CONTACT, OR THE GROMMET CAN OCCUR.

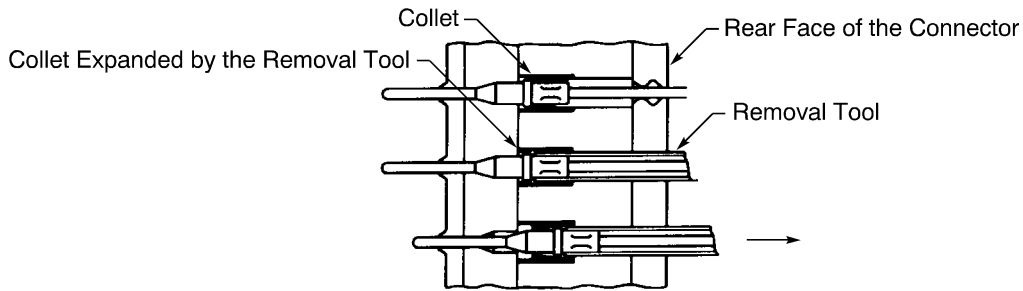
NOTE: When the tool is fully inserted, it:

- Expands the collet
 - Releases the contact
 - Starts to push the contact out of the contact cavity.
- (5) From the rear of the connector, pull the contact out of the contact cavity.
 - (6) Remove the tool from the grommet.
 - (7) For a contact that is assembled with a wire:
 - (a) Make a label that identifies the contact number
 - (b) Put the label on the wire.

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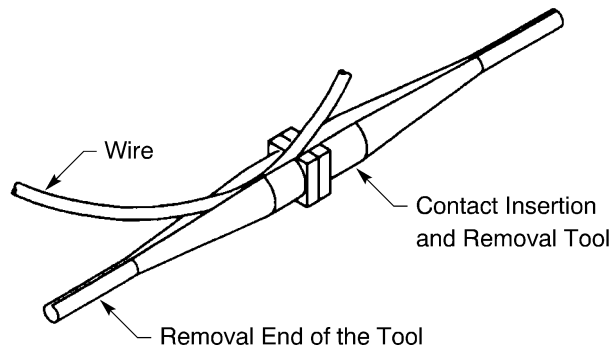
E. Rear Release Contact Contact Removal



REAR RELEASE CONTACT REMOVAL
Figure 6

Refer to Figure 6.

- (1) Make a selection of a contact removal tool from Table 2.
- (2) At the rear of the connector, put the removal tool on the wire. Refer to Figure 7.



POSITION OF THE WIRE IN THE CONTACT REMOVAL TOOL
Figure 7

- (3) Hold the wire tight and move the tool on the wire in the direction away from the contact to make the wire go into the slot of the tool.
- (4) Axially align the removal tool and the contact.
- (5) Push the tool forward into the connector grommet until it stops.

CAUTION: IF TOO MUCH PRESSURE IS APPLIED, DAMAGE TO THE COLLET, THE CONTACT, OR THE GROMMET CAN OCCUR.

NOTE: When the tool is fully inserted, it:

- Expands the collet
- Releases the contact.

- (6) Hold the wire against the serrated shoulder of the tool.
- (7) Pull the tool and the contact assembly from the connector.
- (8) Remove the wire from the tool.

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PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT

- (9) Make a label that identifies the contact number.
- (10) Put the label on the wire.

4. CONNECTOR ASSEMBLY

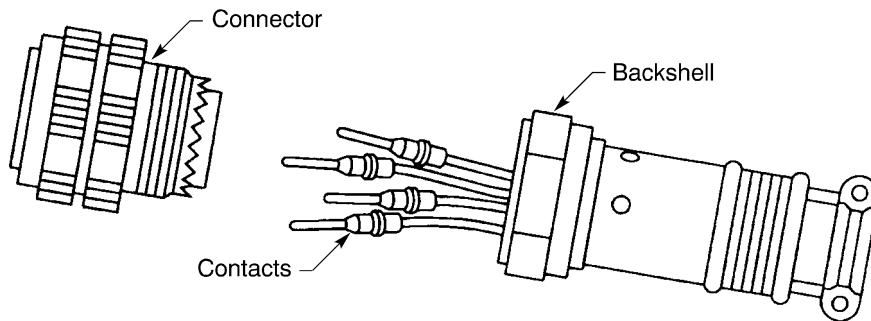
A. Contact Assembly

Refer to Subject 20-24-21.

B. Contact Insertion

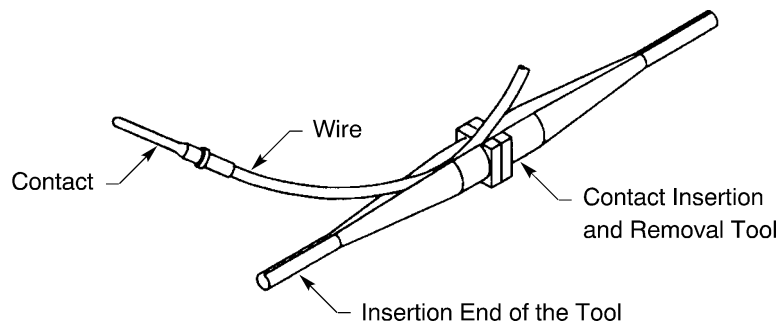
NOTE: If more than one contact must be installed, it is easier to start in the center of the connector insert.

- (1) Put the backshell on the wire harness.
- (2) Push the backshell away from the end of the wire harness. Refer to Figure 8.



POSITION OF THE BACKSHELL FOR CONTACT INSERTION
Figure 8

- (3) Make a selection of a contact insertion tool from Table 2.
- (4) Examine the label on the wire.
 Make sure that the contact cavity is correct for the contact. Refer to the WDM Chapter 91 Wire List for the detailed wire data.
- (5) Put the insertion tool on the wire. Refer to Figure 9.



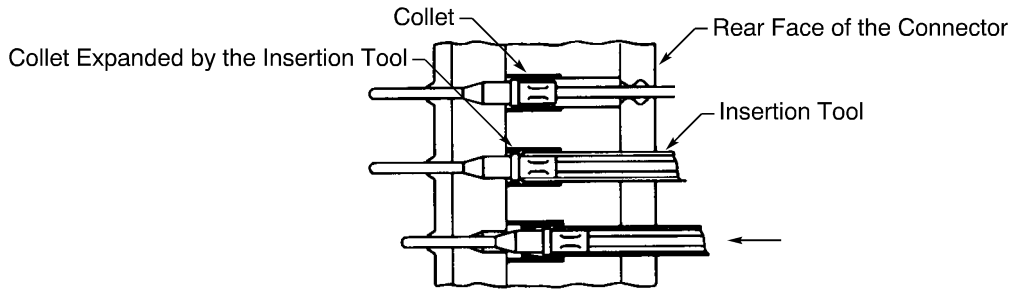
POSITION OF THE WIRE IN THE CONTACT INSERTION TOOL
Figure 9

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- (6) Hold the wire tight and move the tool on the wire in the direction away from the contact to make the wire go into the slot of the tool.
- (7) Push the tool forward until the tip of the tool is against the rear shoulder of the contact.
- (8) Carefully push the contact into the contact cavity. Refer to Figure 10.

CAUTION: IF TOO MUCH PRESSURE IS APPLIED, DAMAGE TO THE COLLET, THE CONTACT, OR THE GROMMET CAN OCCUR.



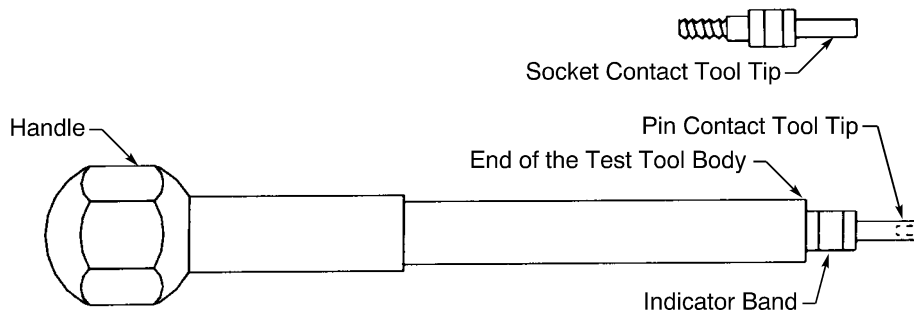
CONTACT INSERTION
Figure 10

- (9) Remove the tool.
- (10) Lightly pull the wire.
Make sure that the contact is locked in the collet.
- (11) Do the contact retention test. Refer to Paragraph 4.C.

C. Contact Retention Test

NOTE: The contact retention force that is necessary to make sure that the contact is locked in the connector is 10 pounds to 15 pounds (44.5 Newtons to 66.7 Newtons).

- (1) Make a selection of a contact retention test tool and tool tip from Table 2. Refer to Figure 11.



CONTACT RETENTION TEST TOOL
Figure 11

- (2) Put the tool tip in the retention test tool.
- (3) Axially align the tip and the engaging end of the contact.

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- (4) Put the tip on the engaging end of the contact.

NOTE: For the most accurate measurement, the test tool must stay axially aligned with the contact.

- (5) Carefully apply pressure on the tool handle forward until the indicator band on the tip is aligned with the end of the body of the tool.

Make sure to keep the tip and the engaging end of the contact axially aligned.

CAUTION: IF THE CONTACT RETENTION TEST TOOL TIP AND THE CONTACT ARE NOT AXIALLY ALIGNED, DAMAGE TO THE CONTACT, THE CONNECTOR, OR THE TOOL CAN OCCUR.

NOTE: At this point, the pressure is 13 pounds (57.8 Newtons). If the contact stays in position, the contact retention is satisfactory.

D. Seal of an Empty Contact Cavity

All unused contact cavities must be sealed with the specified:

- Stub wire assembly
- An unwired contact and a seal plug.

Refer to the applicable conditions for connector replacement in Paragraph 1.G.

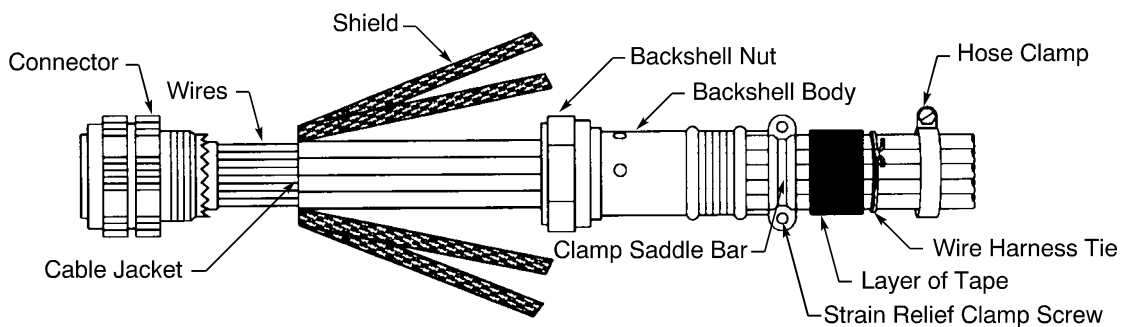
- (1) If a stubwire assembly is specified, install the stubwire. Refer to Paragraph 4.B.
- (2) If an unwired contact and seal plug are specified:
 - (a) Make a selection of a contact insertion tool from Table 2.
 - (b) Put the contact in the contact cavity.
 - (c) Put the end of the insertion tool on the rear shoulder of the contact.
 - (d) Carefully push the contact into the contact cavity.

CAUTION: IF TOO MUCH PRESSURE IS APPLIED, DAMAGE TO THE COLLET, THE CONTACT, OR THE GROMMET CAN OCCUR.

- (e) Remove the tool.
- (f) Do the contact retention test. Refer to Paragraph 4.C.
- (g) Install a seal plug in the contact cavity.

Make sure that the large end of the seal plug in put the contact cavity first.

E. Backshell Assembly



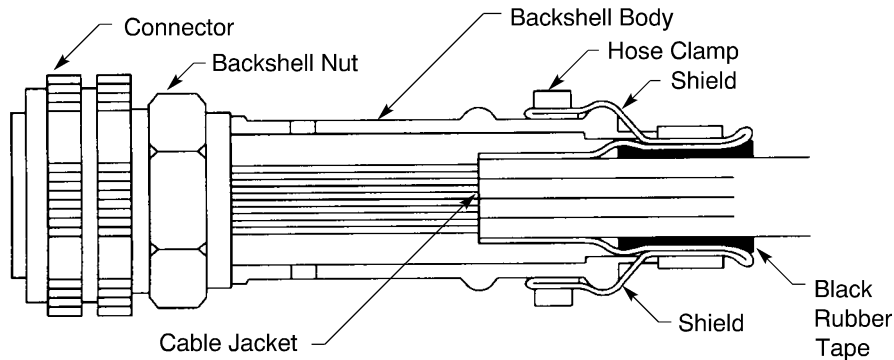
BACKSHELL ASSEMBLY
Figure 12

STANDARD WIRING PRACTICES MANUAL

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Refer to Figure 12.

- (1) Assemble the necessary wire harness ties. Refer to Subject 20-24-14.
- (2) Fold the ends of the shields rearward against the wire harness.
Make sure that the shields are flat and symmetrical around the circumference of the wire harness.
NOTE: If it is necessary, tape can be used to temporarily hold the shields on the harness.
- (3) Move the backshell forward until the backshell nut is against the rear of the connector. Refer to Figure 13.



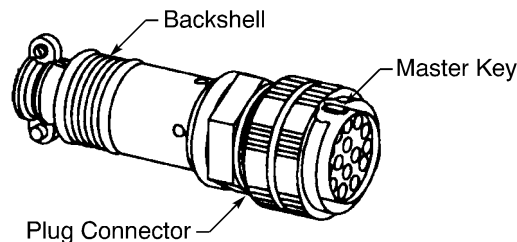
POSITION OF THE BACKSHELL AGAINST THE REAR OF THE CONNECTOR

Figure 13

- (4) Align the mark on the backshell, from the removal of the backshell in Paragraph 3.B., with the master key on the front face of the connector. Refer to Figure 14.

CAUTION: IF THE MARK ON THE BACKSHELL IS NOT ALIGNED WITH THE MASTER KEY ON THE CONNECTOR:

- THE CONNECTOR AND THE BACKSHELL DO NOT ENGAGE CORRECTLY
- DAMAGE TO THE ANTI-ROTATION TEETH OF THE CONNECTOR OR THE BACKSHELL CAN OCCUR.



ALIGNMENT OF THE BACKSHELL AND THE MASTER KEY OF THE CONNECTOR

Figure 14

- (5) Engage the threads of the backshell nut and the connector.
- (6) Tighten the nut and, at the same time, lightly twist the backshell clockwise and counterclockwise to engage the anti-rotation teeth.

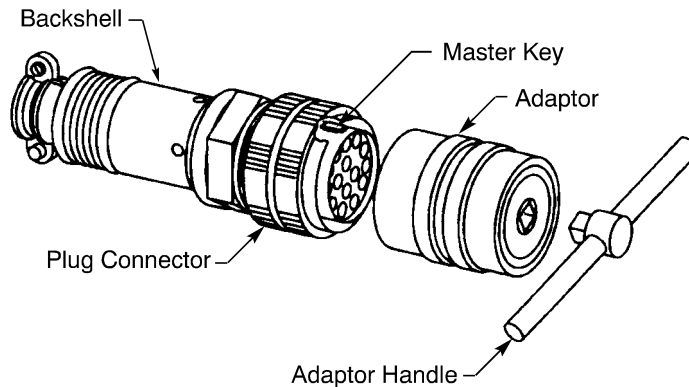
STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT**

Make sure that:

- The mark on the backshell stays aligned with the master key on the connector
- The anti-rotation teeth of the connector and the backshell engage correctly.

NOTE: The anti-rotation teeth can be examined through the inspection hole on the coupling nut of the backshell.

- (7) For the plug connector:
- (a) Make a selection of a connector adapter kit from Table 2.
 - (b) Align the master key on the engaging end of the connector and the master keyway of the adapter. Refer to Figure 15.

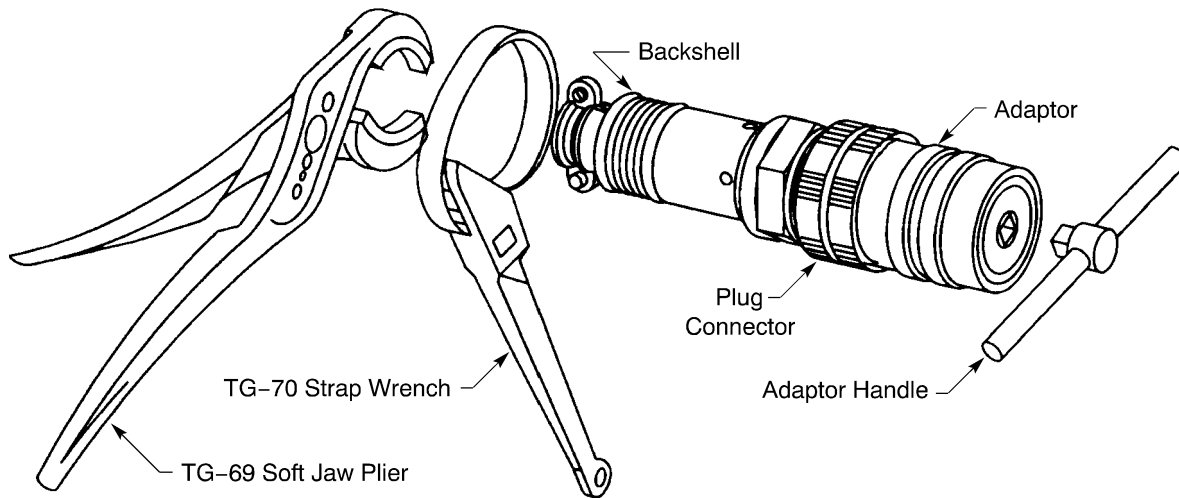
**ALIGNMENT OF THE ADAPTER AND THE PLUG CONNECTOR****Figure 15**

- (c) Engage the adapter and the plug.
- (8) Hold the plug connector and the adaptor or the flange of the receptacle connector with a standard wrench or a small vise.
- (9) Put the TG-69 pliers or the TG-70 strap wrench on the backshell. Refer to Figure 16.

NOTE: As an alternative, a standard crowsfoot wrench can be used.

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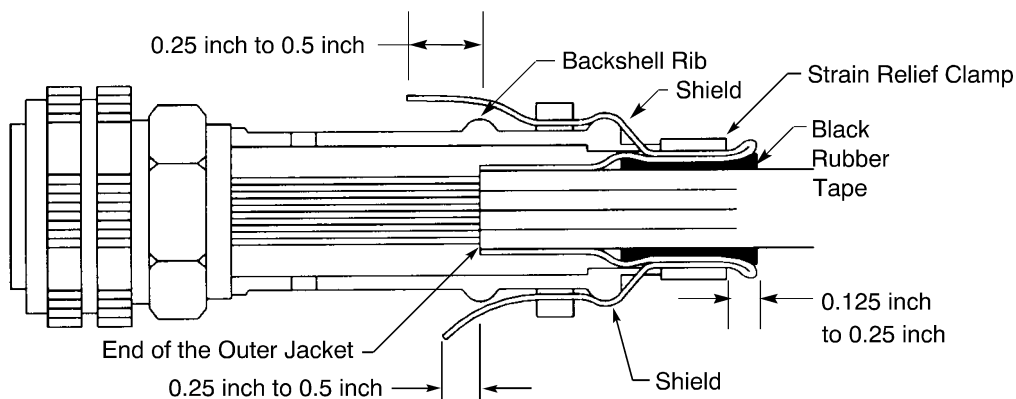


BACKSHELL INSTALLATION ON A PLUG CONNECTOR

Figure 16

- (10) To make sure that the anti-rotation teeth in the connector and the backshell are engaged correctly:
 - (a) Move the backshell from one side of the longitudinal axis of the wire harness to the other side.
 - (b) Twist the backshell in a clockwise and counterclockwise direction.
- (11) Torque the backshell nut 115 inch-pounds to 125 inch-pounds (511.5 Newton-meters to 556 Newton-meters).
- (12) Remove the temporary layer of tape that holds the shields to the harness.

F. Strain Relief Clamp Assembly



POSITION OF THE CABLE SHIELDS

Figure 17

Refer to Figure 17.

- (1) Put the wire harness in the correct position.

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Make sure that the end of the outer jacket of each cable extends 0.25 inch to 0.50 inch (6.35 mm to 12.7 mm) forward from the rear end of the primary backshell body.

NOTE: The strain relief clamp part of the backshell is not part of the primary backshell body.

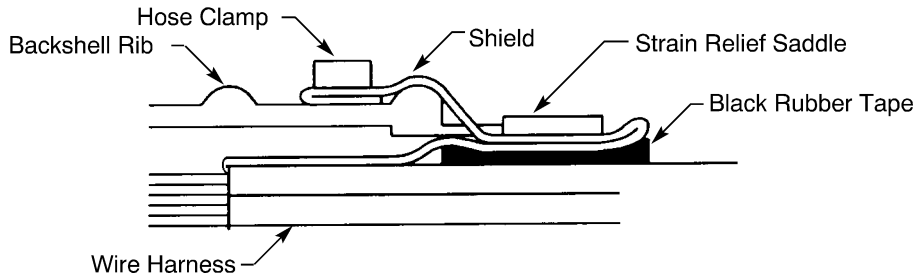
- (2) Fold the shields forward on top of the backshell.
Make sure that the shields are flat and symmetrical around the circumference of the backshell.
- (3) Remove the necessary length from the end of each shield to make the distance from the forward rib of the backshell to the end of the shield equal to 0.24 inch to 0.5 inch.
- (4) If the black rubber tape is on the wire harness:
 - (a) Hold the cables tight from the rear.
 - (b) Carefully push the tape forward until the center of the tape is aligned with the screw holes in the ears of the strain relief clamp.
- (5) If the black rubber tape is not on the wire harness:
 - (a) Make a selection of a black rubber tape from Table 3.
 - (b) Put the necessary layers of the tape on the harness between the ears of the strain relief clamp.
Make sure that:
 - The layers of tape make a 100 percent overlap
 - The number of layers of the tape is sufficient for the saddle bars to hold the wire harness tightly.
 - (c) Hold the cables tight from the rear.
 - (d) Carefully push the tape forward until the center of the tape is aligned with the screw holes in the ears of the strain relief clamp.
- (6) Install the saddle bars on the strain relief clamp:
 - (a) Align the screw holes of the saddle bars with the holes in the strain relief clamp ears.
Make sure that the position of the saddle bars is the same as the position of the saddle bars before the backshell was disassembled.
 - (b) Engage the first two or three threads of the clamp screws with the threads of the clamp ears.
Make sure that the direction that the screws are pointed is the same as the direction that the screws pointed before the backshell was disassembled.
- (7) Fold each shield forward between the layer of tape and the saddle bars.
Make sure that:
 - The shields are flat and symmetrical around the circumference of the backshell
 - A shield does not make an overlap with the other shields
 - The rear end of the shield is 0.125 inch to 0.25 inch (3.2 mm to 6.4 mm) from the rear end of the saddle bar of the strain relief clamp.
- (8) Tighten each screw two turns at a time until the saddle bars are against the clamp ears.
Make sure that:
 - The wire harness does not move in the clamp
 - The tape is not between the clamp ears and the saddle bars.
- (9) If the saddle bars are not against the clamp ears:
 - (a) Remove the saddle bars.
 - (b) Remove the necessary layers of the tape.

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- (c) Do Step (4) through Step (8) again.
- (10) If the clamp does not hold the wire harness tightly:
 - (a) Remove the saddle bars.
 - (b) Add the necessary layers of the tape.
 - (c) Do Step (4) through Step (8) again.

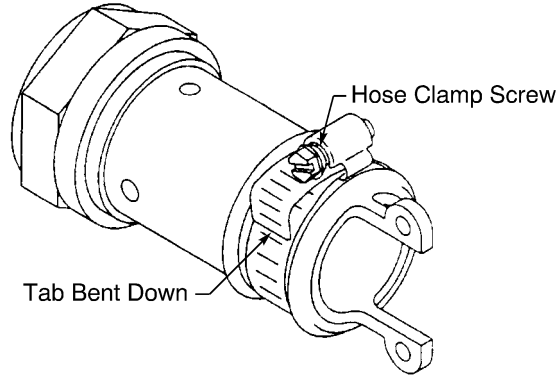
G. Hose Clamp Installation



POSITION OF THE HOSE CLAMP ON THE BACKSHELL
Figure 18

Refer to Figure 18.

- (1) Fold the end of each shield rearward and down against the body of the backshell.
 Make sure that:
 - The shields are flat and symmetrical around the circumference of the backshell
 - A shield does not make an overlap with the other shields.
 - (2) Put the hose clamp on the shields in the area between the backshell ribs.
 Make sure that the position of the hose clamp is the same as the initial position before the removal of the backshell.
 - (3) Carefully align each shield under the clamp.
 Make sure that:
 - The folded edge of each shield extends a small distance farther the edge of the clamp
 - A shield is not put between the backshell and the hose clamp screw.
- CAUTION:** IF A SHIELD IS PUT THE BACKSHELL AND THE HOSE CLAMP SCREW, DAMAGE TO THE SHIELD CAN OCCUR.
- (4) Tighten the screw.
 - (5) Bend the end of the hose clamp down until it is against the part of the hose clamp that is against the backshell. Refer to Figure 19.

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CONNECTOR AND BACKSHELL REPLACEMENT****POSITION OF THE END OF THE HOSE CLAMP****Figure 19**

(6) Do the necessary electrical checks. Refer to Paragraph 5.

5. ELECTRICAL CHECKS

Electrical checks must be done for all circuits. Refer to the WDM Chapter 91 Wire List for the detailed pin to pin and the wire color data.

A. Wire Continuity

- (1) Disconnect the wire harness connectors from the ends of the circuit with the TG-69 pliers or the TG-70 strap wrench.
- (2) Make a selection of a multimeter or an ohmmeter from Table 2.
- (3) Do the wire continuity check from the contact on one end of the wire to the contact on the other end of the wire.

Make sure that each circuit has continuity from the contact on one end of the wire to the contact on the other end of the wire.

CAUTION: DO NOT PUT STRESS ON OR BEND THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

B. Insulation Resistance

WARNING: A MEGOHMMETER MUST NOT BE USED FOR THE INSULATION RESISTANCE TEST OF THE ON-WING WIRE REPAIR. A MEGOHMMETER CAN CAUSE:

- PERSONAL INJURY
- DAMAGE TO THE AIRPLANE.

CAUTION: DO NOT PUT STRESS ON OR BEND THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

- (1) Make a selection of a multimeter or an ohmmeter from Table 2.
- (2) Set the ohmmeter scale to 100K ohms.
- (3) Disconnect all of the connectors on the circuit before the insulation resistance check.



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CAUTION: IF ALL OF THE CONNECTORS ARE NOT DISCONNECTED:

- UNSATISFACTORY RESISTANCE INDICATION CAN OCCUR
- POSSIBLE DAMAGE TO THE CIRCUITS CAN OCCUR.

(4) Measure the insulation resistance:

- Attach one lead of the ohmmeter to a contact.
- With the other lead of the ohmmeter, touch the contacts of a different circuit one at a time.

NOTE: The minimum resistance is 100K ohms.

- Attach one lead of the ohmmeter to the connector backshell.
- With the other lead of the ohmmeter, touch the contacts of a different circuit one at a time.

NOTE: The minimum resistance is 100K ohms.

(5) Install and connect the plugs and receptacles again. Refer to Subject 20-24-25.

C. Engine

Refer to the test reference table in the Aircraft Maintenance Manual 71-00-00/501.

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20-24-21 CONTENTS

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CONTACT REPLACEMENT**

This Subject gives the procedure to replace a pin or a socket contact in a connector.

1. GENERAL DATA**A. Applicable Conditions**

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-24-00.

B. Wire Harness Components

Table 1
DEFINITIONS

Term	Definition
Cable	A group of wires in a metal shield and an insulated jacket
Harness	One or more cables with connectors or terminal lugs attached to the ends of the cables
Wire	A single electrical conductor with insulation around it

C. Conditions for Contact Replacement

Before the first replacement of a contact, each wire is a minimum of 0.250 inch (6.35 mm) longer than the minimum length that is necessary for insertion of the contact and the assembly of the backshell.

These conditions are applicable:

- A contact on a wire can be replaced twice before the wire is too short for insertion of the contact into the connector
- If it is necessary to replace a contact on a wire in a cable more than 2 times, the cable must be replaced; refer to Subject 20-24-24.

D. Contact Part Numbers

Refer to:

- The Wiring Diagram Manual (WDM) Equipment List for the connector Disconnect Identification Number for the correct contact part numbers
- The Aircraft Illustrated Parts Catalog (AIPC) for alternate part numbers.

E. References

Refer to:

- The WDM Chapter 91 Wire List for the contact to contact hookup and wire color data
- Subject 20-24-12 for the insert configurations of the connectors
- Subject 20-24-14 for the assembly of the wire harness ties
- Subject 20-24-20 for the procedures to replace the connector and the connector backshell
- Subject 20-24-24 for the procedures to replace the wire harness cables
- Subject 20-24-25 for the adapter plate assembly.

2. STANDARD EQUIPMENT**A. Tools**

NOTE: Alternatives to the tools specified in Table 2 must be equivalent tools.

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PW4000/777 POWER PLANT: CONTACT REPLACEMENT

WARNING: TO AVOID INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHILE AN ON-WING REPAIR IS MADE, DO NOT USE THESE TOOLS:

- A HEAT GUN
- A SOLDERING GUN
- A SOLDERING IRON.

**Table 2
TOOLS**

Tool	Procedure	Part Number	Supplier Code
Contact Crimp Tool Basic Unit	Contact assembly	M22520/7-01	11851
Contact Crimp Tool Locator	Size 20 contact assembly for MIL-C-38999 connectors	M22520/7-08	11851
	Size 20 contact assembly except for MIL-C-38999 connectors	M22520/7-02	11851
	Size 16 contact assembly	M22520/7-03	11851
Pliers, Soft Jaw	Connector and backshell removal and installation	BT-SJ-468	11851
		TG-69	06324
		TG-69	11851
Wire Insulation Removal Tool	Removal of the wire insulation	45-092	11851
Wrench, Strap	Connector and backshell removal and installation	BT-BS-6()	11851
		TG-70	06324
		TG-70	11851

B. Necessary Materials

No materials are necessary for the replacement of a contact.

3. CONTACT REPLACEMENT

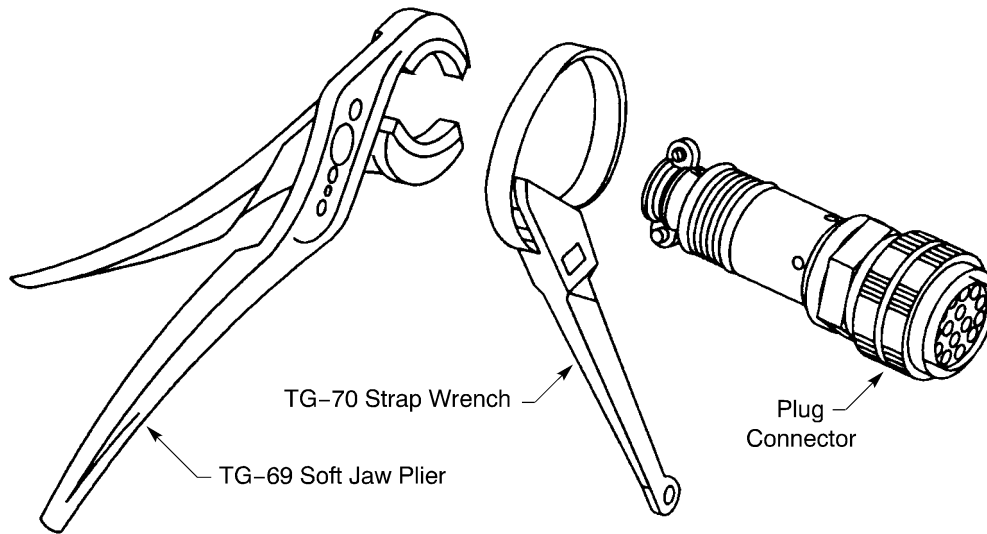
A. Connector Disassembly

Refer to Paragraph 1.C. for the conditions that are applicable for contact replacement.

- (1) Disconnect the plug from the receptacle with the TG-69 pliers or the TG-70 strap wrench. Refer to Figure 1.

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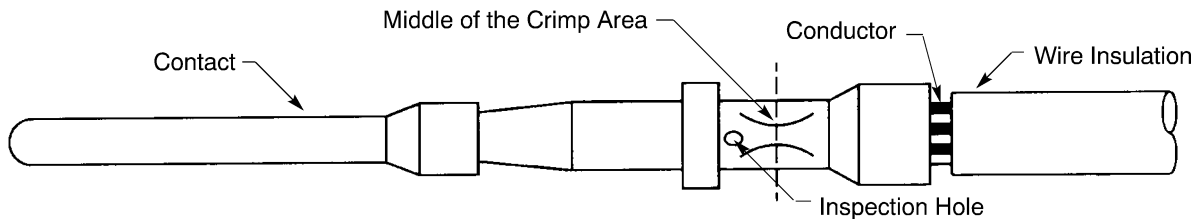
PW4000/777 POWER PLANT: CONTACT REPLACEMENT



CONNECTOR SEPARATION TOOLS

Figure 1

- (2) If it is necessary, remove the adapter plate assembly and the receptacle from the engine bracket. Refer to Subject 20-24-25.
- (3) If the connector has a backshell, remove it. Refer to Subject 20-24-20.
- (4) Remove the contact from the connector. Refer to Subject 20-24-20.
- (5) Cut the contact in the middle of the crimp area on the contact barrel. Refer to Figure 2.



LOCATION TO CUT THE CONTACT

Figure 2

- (6) Carefully remove the remaining part of the crimp barrel that is on the conductor.

B. Connector Assembly

- (1) Assemble the contact. Refer to Paragraph 4.
- (2) Assemble the connector. Refer to Subject 20-24-20.
Make sure to do all the necessary electrical checks.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONTACT REPLACEMENT

4. CONTACT ASSEMBLY

A. Contact Selection

- (1) Find the contact part number that is related to Connector Disconnect Identification Number. Refer to the WDM Equipment List.

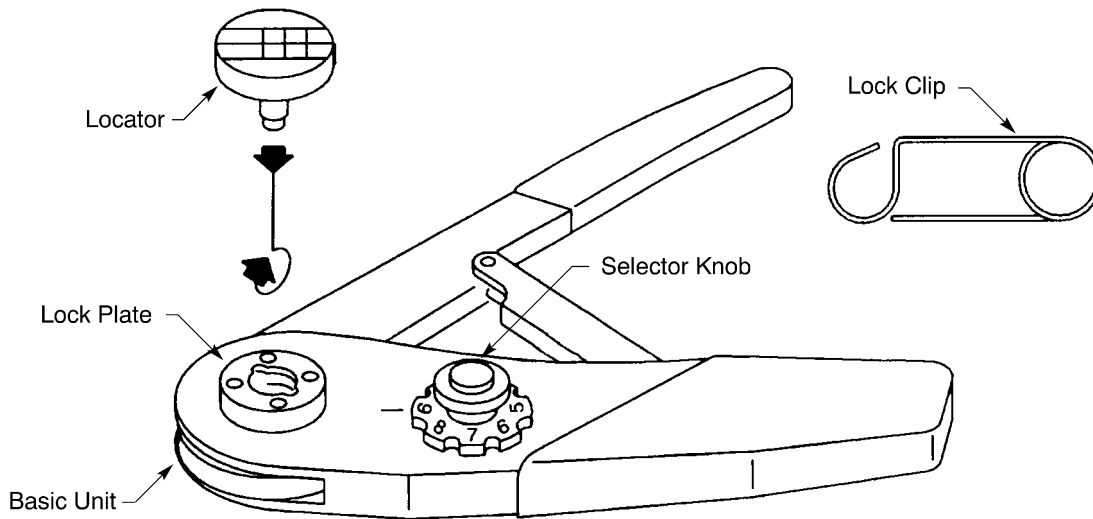
NOTE: For the part numbers of the alternative contacts, refer to the AIPC.

B. Crimp Tool Preparation

- (1) Make a selection of a crimp tool from Table 2.
Make sure to use the correct locator for each contact size.
- (2) Assemble the crimp tool. Refer to Figure 3.

CAUTION: TO AVOID DAMAGE TO THE CRIMP TOOL, THE HANDLE OF THE BASIC UNIT MUST BE IN THE OPEN POSITION WHEN THE LOCATOR IS:

- INSTALLED
- REMOVED
- RELEASED.



**CONTACT CRIMP TOOL
Figure 3**

- (a) Remove the lock clip from the lock ring on the locator.
 - (b) Put the locator in the lock plate of the basic unit.
 - (c) Align the locator pins with the ring slots on the lock plate.
 - (d) Push the locator into the basic unit.
 - (e) Turn the locator in a clockwise direction until it locks in position, approximately 90 degrees.
 - (f) Put the lock clip in the lock ring.
- (3) Adjust the crimp tool.

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CAUTION: IF THE SELECTOR KNOB OF THE BASIC UNIT IS IN AN INCORRECT POSITION WHEN THE CONTACT IS CRIMPED:

- DAMAGE TO THE CONTACT CAN OCCUR
- UNSATISFACTORY RELIABILITY AND PERFORMANCE OF THE CONTACT ASSEMBLY CAN OCCUR.

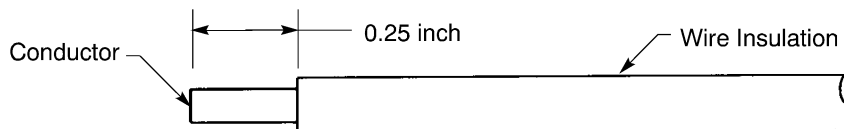
- Remove the lock clip from the lock ring hole in the selector knob.
- Raise and turn the selector knob of the basic unit until the number on the knob is the same as the number on the locator data plate for the wire size.
- Put the lock clip in the lock ring hole.
- Align the number on the knob to the index mark on the basic unit and release the knob.

C. Contact Assembly

- Make a selection of a wire insulation removal tool from Table 2.
- Remove the necessary length of the insulation from the end of the wire to make the distance from the end of the insulation to the end of the conductor equal to 0.250 inch (6.35 mm). Refer to Figure 4.

CAUTION: IF LESS THAN THE SPECIFIED LENGTH OF INSULATION IS REMOVED, THE END OF THE CONDUCTOR DOES NOT TOUCH THE FORWARD END OF THE CRIMP BARREL OF THE CONTACT.

CAUTION: IF MORE THAN THE SPECIFIED LENGTH OF INSULATION IS REMOVED, TOO MUCH BARE CONDUCTOR IS OUTSIDE THE REAR END OF CRIMP BARREL OF THE CONTACT.

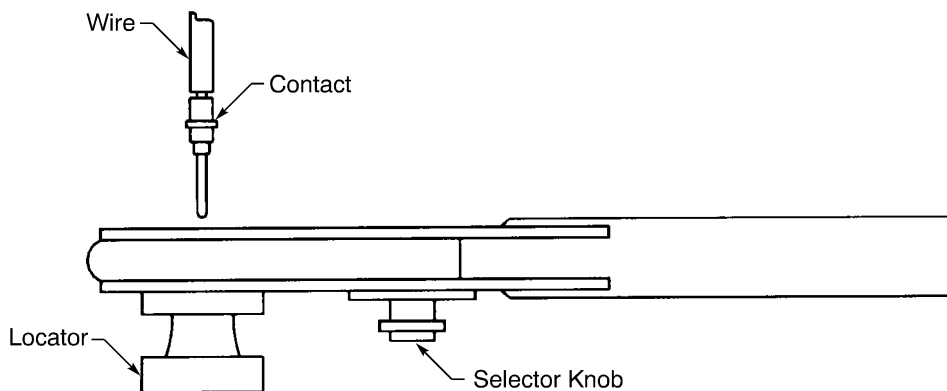


INSULATION REMOVAL LENGTH
Figure 4

- If it is necessary, carefully twist the strands of the conductor together.
Make sure that the strands are twisted in the same direction as the strands are twisted before the removal of the insulation.
- Put the end of the wire in the crimp barrel of the contact.
Make sure that:
 - The end of the wire is against the forward end of the crimp barrel
 - The strands of the conductor can be seen in the inspection hole.
- Put the wire and the contact in the locator of the crimp tool. Refer to Figure 5.
Make sure that the forward end of the contact is against the bottom of the locator.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONTACT REPLACEMENT



ALIGNMENT OF THE WIRE, THE CONTACT, AND THE CRIMP TOOL
Figure 5

- (6) Close the handles of the basic unit until the ratchet is released.

CAUTION: DO NOT RELEASE THE LATCH FOR THE LOCATOR WHEN THE BASIC UNIT HANDLE IS IN THE CLOSED POSITION.

- (7) Remove the contact assembly from the tool.
(8) Hold the wire and lightly pull the contact to make sure that the contact is crimped on the conductor.



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PW4000/777 POWER PLANT: CABLE JACKET REPAIR

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20-24-22 CONTENTS

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CABLE JACKET REPAIR**

This Subject gives the procedure to repair the damaged outer jacket of a cable.

1. GENERAL DATA**A. Applicable Conditions**

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-24-00.

B. Wire Harness Components

Table 1
DEFINITIONS

Term	Definition
Cable	A group of wires in a metal shield and an insulated jacket
Harness	One or more cables with connectors or terminal lugs attached to the ends of the cables
Wire	A single electrical conductor with insulation around it

C. Conditions for the Replacement of a Cable

Refer to Paragraph 1.D. for the conditions that are applicable for the repair of a cable.

A cable must be replaced if one or more of these conditions occur:

- The shield of a shielded cable has damage
- The cable jacket has damage that is more than 50 percent of the circumference of the cable
- The cable jacket has damage that is more than 2.0 inches (50.8 mm) in length parallel to the length of the cable.

For the procedures to replace a shielded cable, refer to Subject 20-24-24.

D. Conditions for the Repair of a Cable

The jacket of a cable can be repaired when these conditions occur:

- If the cable has a shield, the shield of the cable does not have damage
- The wires of the cable do not have damage
- The cable jacket has damage that is less than or equal to 50 percent the circumference of the cable
- The cable jacket has damage that is less than or equal to 2.0 inches (50.8 mm) in length parallel to the length of the cable.

Refer to Paragraph 3.

E. References

Refer to Subject 20-24-14 for the procedures to assemble a wire harness tie.

2. STANDARD EQUIPMENT**A. Tools**

No special tools are necessary for the repair of a cable jacket.

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CABLE JACKET REPAIR

WARNING: TO AVOID INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHILE AN ON-WING REPAIR IS MADE, DO NOT USE THESE TOOLS:

- A HEAT GUN
- A SOLDERING GUN
- A SOLDERING IRON.

B. Necessary Materials

NOTE: Alternatives to the materials specified in Table 2 must be equivalent materials.

**Table 2
NECESSARY MATERIALS**

Material	Part Number	Supplier Code
Alcohol, Isopropyl	TT-I-735	Local
Cloth, Clean, Lint Free	-	Local
Tape, Electrical Silicone, Inner Layer	Scotch No. 92	04963
Tape, Electrical Silicone, Outer Layer	Scotch No. 62	04963
Tape, Lacing, White	718Z	82110

3. REPAIR OF A CABLE JACKET

A. Cable Preparation

- (1) If it necessary to get sufficient access to the area where the jacket of the cable has damage, remove the wire harness.
- (2) If it not necessary to remove the wire harness:
 - (a) Remove the necessary wire harness ties.
 - (b) Loosen the necessary hinged clamp bolts.
- (3) Put a small amount of isopropyl alcohol on a clean cloth. Refer to Table 2.
Make sure to use the necessary skin and eye protection.

WARNING: ISOPROPYL ALCOHOL:

- IS FLAMMABLE
- IS DANGEROUS TO THE SKIN, THE EYES, AND THE RESPIRATORY SYSTEM
- MUST BE USED IN A WORK AREA THAT HAS A GOOD FLOW OF AIR
- MUST NOT BE HANDLED FOR LONG PERIODS OF TIME.

- (4) With the moist cloth, clean:
 - The area of the damaged jacket
 - 3.0 inches (76.2 mm) of the cable on both sides of the damaged area.

B. Installation of the Tape

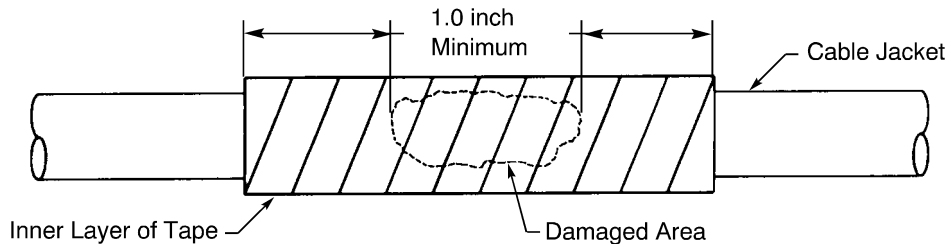
- (1) Make a selection of a tape for the inner layer from Table 2.
- (2) Put a layer of the tape on the cable. Refer to Figure 1.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CABLE JACKET REPAIR

Make sure that:

- Each end of the layer of tape is 1.0 inch (25.4 mm) minimum farther than the ends of the damaged area
- The layer of tape makes a 20 percent overlap.

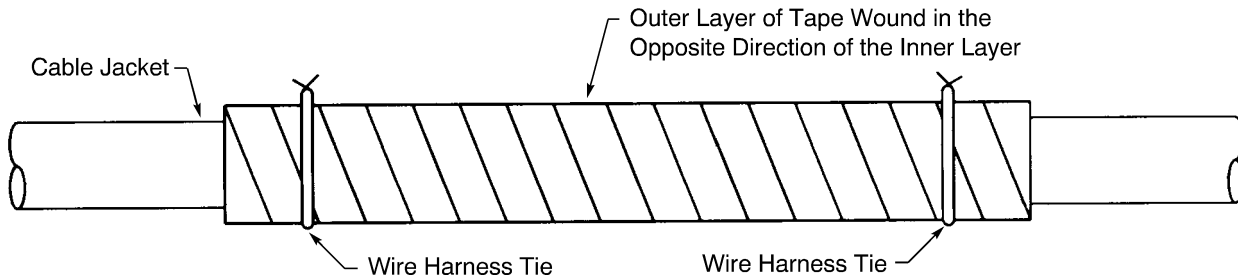


INNER LAYER OF TAPE
Figure 1

- (3) Make a selection of a tape for the outer layer from Table 2.
- (4) Put one more layer of the tape on the cable. Refer to Figure 2.

Make sure that:

- Each end of the layer of tape is 0.5 inch (12.7 mm) minimum farther than the ends of the inner layer
- The layer of tape is wound in the opposite direction of the inner layer
- The layer of tape makes a 20 percent overlap.

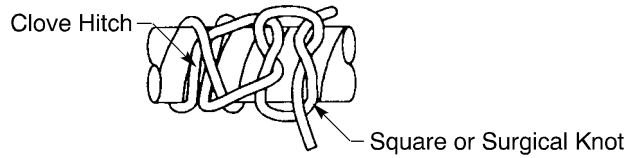


OUTER LAYER OF TAPE LAYER
Figure 2

- (5) Assemble a wire harness tie on the cable at each end of the tape.

Refer to:

- Figure 2
- Figure 3
- Subject 20-24-14.

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CABLE JACKET REPAIR****TIE ON THE END OF THE TAPE****Figure 3****C. Installation of the Wire Harness**

- (1) If the wire harness is removed from the hinged clamps:
 - (a) Put the harness back into the clamps.
Make sure that the tracer cord stays on the outboard side of the harness.
 - (b) Torque the bolts 36 inch-pounds to 40 inch-pounds (4.067 Newton-meters to 4.519 Newton-meters).
- (2) If wire harness ties are removed, assemble new ties on the harness in the same location. Refer to Subject 20-24-14.
- (3) If the bolts of a hinged clamp are loosened, torque the bolts 36 inch-pounds to 40 inch-pounds (4.067 Newton-meters to 4.519 Newton-meters).



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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: REPLACEMENT OF A SHIELDED CABLE

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20-24-24 CONTENTS

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: REPLACEMENT OF A SHIELDED CABLE**

This Subject gives the procedure to replace a damaged or open circuit shielded cable with a new shielded cable.

1. GENERAL DATA**A. Applicable Conditions**

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-24-00.

B. Wire Harness Components

Table 1
DEFINITIONS

Term	Definition
Cable	A group of wires in a metal shield and an insulated jacket
Harness	One or more cables with connectors or terminal lugs attached to the ends of the cables
Wire	A single electrical conductor with insulation around it

C. Conditions for the Replacement of a Shielded Cable

Refer to Paragraph 1.D. for the conditions that are applicable for the repair of a shielded cable.

A shielded cable must be replaced if one or more of these conditions occur:

- The shield of the cable has damage
- The cable jacket has damage that is more than 50 percent of the circumference of the cable
- The cable jacket has damage that is more than 2.0 inches (50.8 mm) in length parallel to the length of the cable.

The replacement cable must be:

- The same type of cable as the damaged cable
- Installed on the outer surface of the wire harness
- Installed in the harness clamps.

D. Conditions for the Repair of a Shielded Cable

The jacket of a cable can be repaired when these conditions occur:

- The shield of the cable does not have damage
- The cable jacket has damage that is less than or equal to 50 percent the circumference of the cable
- The cable jacket has damage that is less than or equal to 2.0 inches (50.8 mm) in length parallel to the length of the cable.

Refer to Subject 20-24-22.

E. Removal of the Damaged Cable

The damaged cable can be removed from the wire harness when one of these conditions occur:

- The wire harness is removed from the engine
- The next maintenance of the power plant is done.

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PW4000/777 POWER PLANT: REPLACEMENT OF A SHIELDED CABLE

F. Disconnect Identification Number

Refer to the Equipment List of the Wiring Diagram Manual (WDM) to find the Disconnect Identification Number for the correct contact part numbers.

G. Alternative Part Numbers

To identify alternative part numbers, refer to the Airplane Illustrated Parts Catalog (AIPC).

H. Wire Data

Refer to the WDM Wire List (Chapter 91) for wire type, size, pin to pin, and wire color data.

I. References

Refer to:

- Subject 20-24-12 for the insert configurations of the connectors
- Subject 20-24-14 for the assembly of wire harness ties
- Subject 20-24-20 for the replacement of the backshell and the connector
- Subject 20-24-21 for the replacement of the contacts
- Subject 20-24-25 for the replacement of the adapter plates.

2. STANDARD EQUIPMENT

A. Tools

WARNING: TO AVOID INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHILE AN ON-WING REPAIR IS MADE, DO NOT USE THESE TOOLS:

- A HEAT GUN
- A SOLDERING GUN
- A SOLDERING IRON.

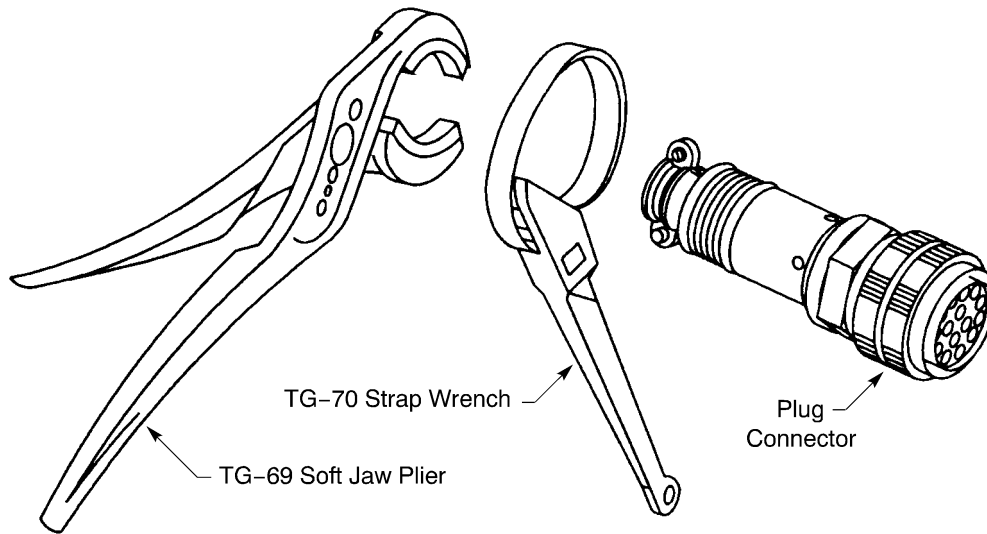
NOTE: Alternatives to the tools specified in must Table 2 be equivalent tools.

**Table 2
TOOLS**

Tool	Procedure	Part Number	Supplier Code
Pliers, Soft Jaw	Connector and backshell removal and installation	BT-SJ-468	11851
		TG-69	06324
		TG-69	11851
Wrench, Strap	Connector and backshell removal and installation	BT-BS-6()	11851
		TG-70	06324
		TG-70	11851
Wire Insulation Removal Tool	Removal of wire insulation	45-092	11851

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: REPLACEMENT OF A SHIELDED CABLE



CONNECTOR SEPARATION AND ASSEMBLY TOOLS
Figure 1

B. Necessary Materials

NOTE: Alternatives to the materials specified in Table 3 must be equivalent materials.

Table 3
NECESSARY MATERIALS

Material	Part Number	Supplier Code
Tape, Lacing, White	718Z	82110
Tape, Silicone Rubber, Self-bonding, Black	Moxness 620-1	07099

3. REPLACEMENT OF A SHIELDED CABLE

A. Installation of the New Cable on the Wire Harness

- (1) Identify the connectors that are attached to the ends of the damaged cable.
- (2) Make a selection of a replacement cable. Refer to the WDM Chapter 91 Wire List.
Make sure that the replacement cable type is the same type as the damaged cable.
- (3) Make a selection of silicone rubber tape from Table 3.
- (4) Temporarily attach the end of the replacement cable to one end of the wire harness with tape.
Make sure that:
 - The end of the replacement cable extends 6 inches (150 mm) farther than the connector of the damaged cable
 - The replacement cable is on the outer surface of the harness
 - The tape is in a location where it can be removed.
- (5) Temporarily attach the replacement cable to the other end of the harness.

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: REPLACEMENT OF A SHIELDED CABLE**

- (6) Cut the replacement cable at the location that is 6 inches (150 mm) farther than the connector on the end of the damaged cable.
- (7) Put the replacement cable in the same hinged clamps that hold the harness.

Make sure:

- To do one clamp at a time
- To start with the clamp that is the nearest the connector on one end of the harness
- That the routing of the harness tracer cord is outboard along the full length of the harness.

CAUTION: DO NOT ALLOW THE FULL WEIGHT OF THE HARNESS TO HANG ON AN ELECTRICAL CONNECTOR WITHOUT OTHER SUPPORT. DAMAGE TO THE CONNECTOR OR THE HARNESS CAN OCCUR.

- (a) Open the hinged clamp.
 - (b) Put the cable in the hinged clamp.
 - (c) Pull the cable to make it:
 - Tight
 - Flat against the harness
 - Parallel to the harness.
 - (d) Close the hinged clamp.
- (8) Assemble the necessary wire harness ties on the harness and the replacement cable. Refer to Subject 20-24-14.

Make sure that each tie is assembled:

 - Between each of the hinged clamps
 - At the center point between the two clamps.
 - (9) Torque the hinged clamp bolts 36 inch-pounds to 40 inch-pounds (4.067 Newton-meters to 4.519 Newton-meters).
 - (10) If it is necessary, cut the other end of the replacement cable again at the location that 6 inches (155 mm) farther than the connector of the damaged cable.
 - (11) Disassemble each connector on the damaged cable. Refer to Subject 20-24-20.

Make sure that each wired contact that is removed from each connector is identified with a label.

B. Preparation of the New Cable

- (1) Remove the necessary length of the jacket from the end of the new cable.

CAUTION: DO NOT CUT OR NICK THE WIRES OR THE SHIELD OF THE NEW CABLE. DAMAGE TO THE CABLE CAN OCCUR.

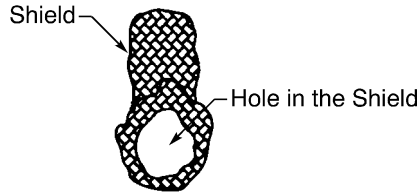
Make sure that:

- The end of the jacket is in the same location in relation to the end of the jacket on the damaged cable
 - The colors of the wire insulation of the new cable are the same as the colors of the wire insulation of the damaged cable.
- (2) Push the end of the shield rearward to the end of the jacket.
 - (3) Near the end of the jacket, move the strands of the shield apart to make a hole in the shield. Refer to Figure 2.

STANDARD WIRING PRACTICES MANUAL

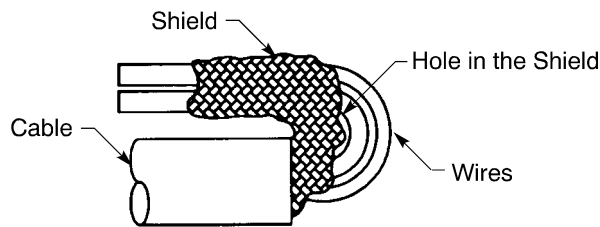
PW4000/777 POWER PLANT: REPLACEMENT OF A SHIELDED CABLE

CAUTION: DO NOT CUT THE STRANDS OF THE SHIELD. THE SHIELD MUST NOT HAVE DAMAGE. Make sure that the hole is sufficiently large to pull the wires the wires of the cable through.



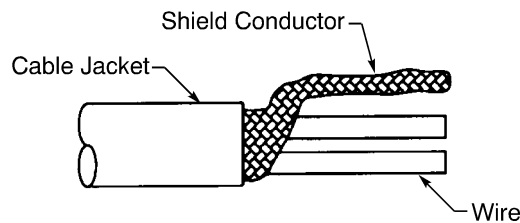
SHIELD PREPARATION
Figure 2

(4) Fold the wires and the shield back. Refer to Figure 3.



POSITION OF THE WIRES AND THE SHIELD
Figure 3

- (5) Pull the wires through the hole in the shield one at a time.
- (6) Pull the shield tight to make a flat and symmetrical conductor. Refer to Figure 4.



CONFIGURATION OF THE SHIELD CONDUCTOR
Figure 4

- (7) Cut the wires of the new cable to make the lengths the same as the wires of the damaged cable.
- (8) Move the contact number labels from the wires of the damaged cable to the wires of the new cable.

Make sure that:

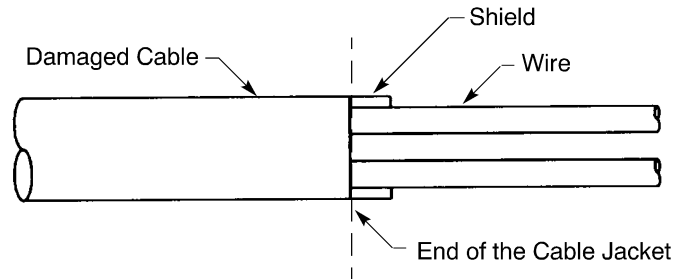
- One label at a time is done
- That the color of the insulation of the new wire is the same as the color of the insulation of the wire of the damaged cable.

C. Insulation of the Damaged Cable

(1) Cut each end of the damaged cable at the end of the cable jacket. Refer to Figure 5.

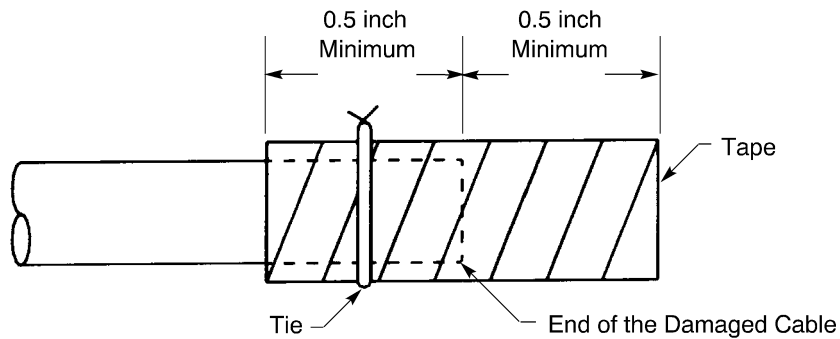
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LOCATION TO CUT THE DAMAGED CABLE
Figure 5

- (2) Install the necessary insulation on each end of the damaged cable. Refer to Figure 6.



INSULATION ON THE END OF THE DAMAGED CABLE
Figure 6

- (a) Make a selection of a black rubber tape from Table 3.
- (b) Put a layer of the tape on the cable.
 Make sure that:
 - The rear end of the tape is 0.5 inch (12.7 mm) minimum from the end of the cable
 - The forward end of the tape extends 0.5 inch (12.7 mm) minimum farther than the end of the cable.
- (c) Put a second layer of tape on the first layer.
- (d) Assemble a wire harness tie on the cable 0.25 inch (6.35 mm) from the rear end of the tape.
 Refer to Subject 20-24-14.

D. Connector Assembly

- (1) Assemble each contact. Refer to Subject 20-24-21.
- (2) Assemble the connector. Refer to Subject 20-24-20.

E. Electrical Checks

- (1) Do the necessary electrical checks. Refer to Subject 20-24-20.



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PW4000/777 POWER PLANT: CONNECTOR ADAPTER PLATE REPLACEMENT

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20-24-25 CONTENTS

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CONNECTOR ADAPTER PLATE REPLACEMENT**

This Subject gives the procedures to remove and install a connector adapter plate on an engine bracket.

1. GENERAL DATA**A. Applicable Conditions**

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-24-00.

B. Wire Harness Components

Table 1
DEFINITIONS

Term	Definition
Cable	A group of wires in a metal shield and an insulated jacket
Harness	One or more cables with connectors or terminal lugs attached to the ends of the cables
Wire	A single electrical conductor with insulation around it

C. Identification of the Adapter Assembly Part Number

(1) Identify the number on the wire harness.

These are the PW4000/777 power plant wire harness numbers:

- W0621
- W0628
- W0629
- W0604
- W0605.

(2) Refer to the wire harness located in the Airplane Illustrated Parts Catalog (AIPC) for the correct adapter assembly part number.

D. Additional References

Refer to:

- Subject 20-24-02 for supplier codes, names, and addresses
- Subject 20-00-11 for alternative materials
- The Aircraft Maintenance Manual (AMM).

2. STANDARD EQUIPMENT**A. Tools**

WARNING: TO AVOID INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHILE AN ON-WING REPAIR IS MADE, DO NOT USE THESE TOOLS:

- A HEAT GUN
- A SOLDERING GUN
- A SOLDERING IRON.

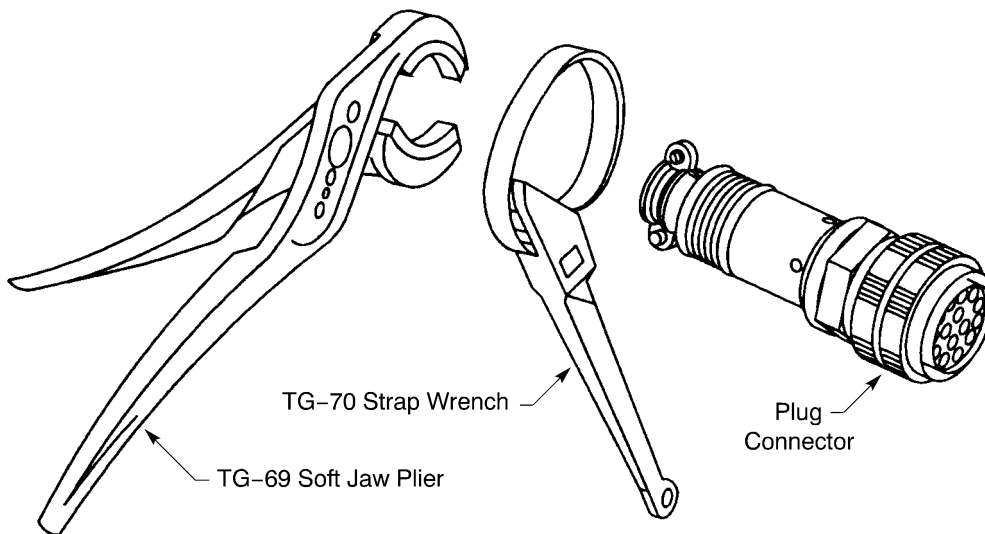
NOTE: Alternatives to the tools specified in must Table 2 be equivalent tools.

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR ADAPTER PLATE REPLACEMENT

**Table 2
TOOLS**

Tool	Procedure	Part Number	Supplier Code
Pliers, Soft Jaw	Connector and backshell removal and installation	BT-SJ-468	11851
		TG-69	06324
		TG-69	11851
Wrench, Strap	Connector and backshell removal and installation	BT-BS-6()	11851
		TG-70	06324
		TG-70	11851



**CONNECTOR SEPARATION AND ASSEMBLY TOOLS
Figure 1**

B. Necessary Materials

NOTE: Alternatives to the materials specified in Table 3 must be equivalent materials.

**Table 3
NECESSARY MATERIALS**

Material	Part Number	Supplier Code
Oil, Lubricating, Turbine Engine	PWA 521B Type II	77445

3. ADAPTER PLATE REPLACEMENT

A. Connector Separation

- (1) Make a selection of a connector separation tool from Table 2.

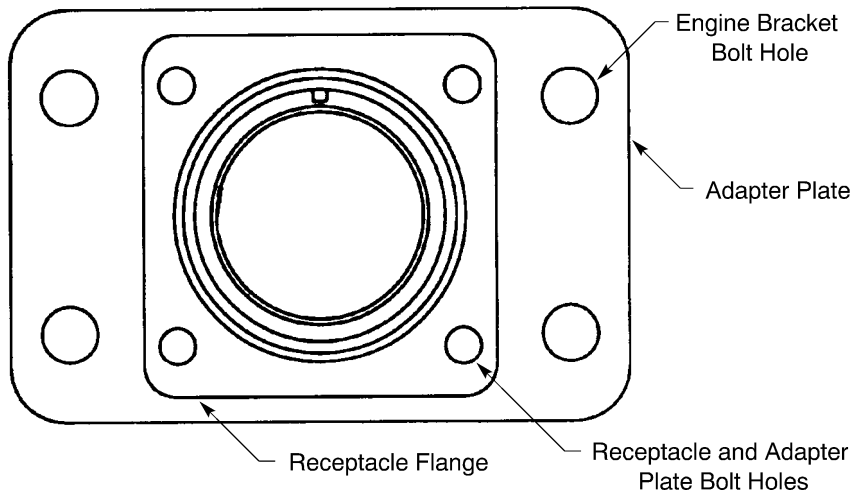
STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: CONNECTOR ADAPTER PLATE REPLACEMENT

Refer to Figure 1.

- (2) Put the pliers or the strap wrench on the coupling nut of the plug.
- (3) Turn the coupling nut until the threads are fully disengaged.
- (4) Pull the plug from the receptacle.

B. Adapter Plate Removal



ADAPTER PLATE CONFIGURATION
Figure 2

Refer to Figure 2.

- (1) Remove the adapter plate and receptacle from the engine bracket:
 - (a) Remove the bolts that attach the adapter plate to the engine bracket.
NOTE: Adapter plates that have different shapes can have a different quantity of bolt holes.
 - (b) Make a mark on the adapter plate to show the position of the master keyway of the receptacle.
- (2) Remove the nuts and screws that attach the adapter plate to the receptacle.
- (3) Remove the adapter plate from the receptacle.

C. Adapter Plate Installation

Table 4
MAXIMUM TORQUE FOR RECEPTACLE INSTALLATION NUTS

Nut Size	Maximum Torque	
	Standard (inch-pound)	Metric (Newton-meter)
4-40	5	0.565
6-32	10	1.130

- (1) Make a mark on the new adapter plate in the same location as the mark on the old adapter plate.
- (2) Align the master keyway of the receptacle with mark on the adapter plate.

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STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: CONNECTOR ADAPTER PLATE REPLACEMENT**

- (3) Put the screws through the holes of the adapter plate and the receptacle.
- (4) Engage the threads of an installation nut and each installation screw.
- (5) Torque the nuts. Refer to Table 4.
- (6) Install the adapter plate on the engine bracket:
 - (a) Make a selection of a lubricating oil from Table 3.
 - (b) Put a light layer of the oil on each bolt.
 - (c) Align the adapter plate with the engine bracket.
 - (d) Put the bolts through the engine bracket bolt holes.
 - (e) Torque the bolts 36 inch-pounds to 40 inch-pounds (4.067 Newton-meters to 4.519 Newton-meters).

D. Plug and Receptacle Connection

- (1) Align the master key of the plug with the master keyway of the receptacle.
- (2) Engage the plug and the receptacle.
- (3) Engage the threads of the coupling nut and the receptacle.
- (4) Move the backshell from one side to the other side to fully engage the contacts.
- (5) Turn the coupling nut again with light pressure until it is tight.
- (6) Make a selection of a connector installation tool from Table 2. Refer to Figure 1.

CAUTION: DO NOT USE A TOOL THAT HAS METAL JAWS TO TIGHTEN THE CONNECTOR. DAMAGE TO THE CONNECTOR CAN OCCUR.

- (7) Put the pliers or the strap wrench on the coupling nut.
- (8) Tighten the coupling nut until the pliers or strap wrench move on the surface of the nut.

Make sure that:

- The forward edge of the knurled nut on the plug goes farther than the top of the color indicator band
- No part of the color indicator band can be seen.

CAUTION: THE FULL ENGAGEMENT INDICATOR BAND ON THE RECEPTACLE, THE COLORED BAND NEAREST THE THREADS OF THE RECEPTACLE, IS NOT A STOP LINE.

- (9) Do the necessary engine tests.
Refer to the test reference table in the AMM 71-00-00-700/501.



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PW4000/777 POWER PLANT: REPLACEMENT OF TERMINAL LUGS

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: REPLACEMENT OF TERMINAL LUGS

This Subject gives the procedures to replace:

- The ground wire terminal lug on a thermocouple termination assembly
- A fan overheat terminal lug.

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-24-00.

B. Wire Harness Components

**Table 1
DEFINITIONS**

Term	Definition
Cable	A group of wires in a metal shield and an insulated jacket
Harness	One or more cables with connectors or terminal lugs attached to the ends of the cables
Wire	A single electrical conductor with insulation around it

C. Ground Wire Terminal Lug on a Thermocouple Termination Assembly

The part numbers of the PW4000/777 power plant wire harnesses that have ground wire terminations are:

- W0602
- W0603
- W0623
- W0629.

D. Fan Overheat Terminal Lug

The part numbers of the PW4000/777 power plant wire harnesses that have ground wire terminations are:

- W0602
- W0603.

E. References

Refer to:

- Subject 20-24-02 for the supplier codes, names, and addresses
- The Aircraft Maintenance Manual (AMM) for the engine test reference table.

2. STANDARD EQUIPMENT

A. Terminal Lug Part Numbers

**Table 2
TERMINAL LUG PART NUMBERS**

Description	Part Number	Size	Supplier Code
Terminal Lug, Fan Overheat	79208	8	83311
Terminal Lug, Ground Wire, Thermocouple Termination Assembly	158376	10	83311

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STANDARD WIRING PRACTICES MANUAL

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B. Tools

WARNING: TO AVOID INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHILE AN ON-WING REPAIR IS MADE, DO NOT USE THESE TOOLS:

- A HEAT GUN
- A SOLDERING GUN
- A SOLDERING IRON.

NOTE: Alternatives to the tools specified in Table 3 must be equivalent tools.

**Table 3
STANDARD EQUIPMENT**

Tool	Procedure	Part number	Supplier Code
Crimp Tool	Assembly of the ground wire terminal	49935	00779
Digital Multimeter	Continuity measurement	Model 177	80164
Ohmmeter	Continuity measurement	Model 260	16902
Wire Insulation Removal Tool	Removal of the wire insulation	45-092	11851

C. Necessary Materials

NOTE: Alternatives to the materials specified in Table 4 must be equivalent materials.

**Table 4
NECESSARY MATERIALS**

Description	Part Number	Code
Oil, Lubricating, Turbine Engine	PWA 521B Type II	77445

3. REPLACEMENT OF A GROUND WIRE TERMINAL LUG ON A THERMOCOUPLE TERMINATION ASSEMBLY

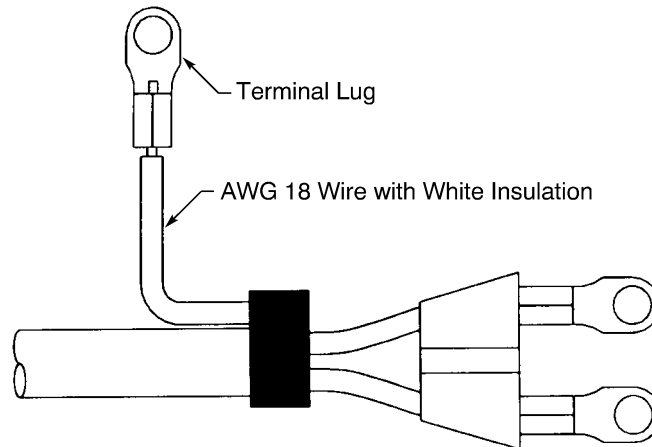
A. Terminal Lug Removal

- (1) Remove the bolt that attaches the ground wire terminal lug to the engine.
- (2) Cut the terminal lug from the ground wire.

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B. Terminal Lug Assembly

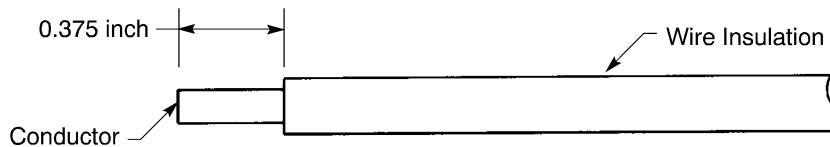


GROUND WIRE TERMINAL LUG ASSEMBLY
Figure 1

Refer to Figure 1.

- (1) Make a selection of an insulation removal tool from Table 3.
- (2) Remove the necessary length of the insulation from the end of the wire to make the distance from the end of the insulation to the end of the wire equal to 0.375 inch (9.525mm).

Refer to Figure 2.



INSULATION REMOVAL LENGTH
Figure 2

- (3) Make a selection of a ground wire terminal lug from Table 2.
- (4) Make a selection of a crimp tool from Table 3.
- (5) Put the wire in the crimp barrel of the terminal lug.
Make sure that the strands of the conductor can be seen at the forward end of the crimp barrel.
- (6) Put the terminal lug and the wire in the crimp tool.

Make sure that:

- The terminal lug is in the correct set of crimp dies for the size
- The center of the crimp barrel is aligned with the center crimp dies.

- (7) Crimp the terminal lug.

Make sure that the wire cannot be pulled out of the crimp barrel.

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: REPLACEMENT OF TERMINAL LUGS****C. Continuity Check**

- (1) Make a selection of a multimeter or an ohmmeter from Table 3.
- (2) Set the resistance scale to 100 ohms.
- (3) Attach one test lead to the backshell on the end of the harness.
- (4) Attach the other lead to the terminal lug.
- (5) Measure the resistance.
Make sure that the resistance is less than 1 ohm.
- (6) Remove the test leads.

D. Terminal Lug Installation

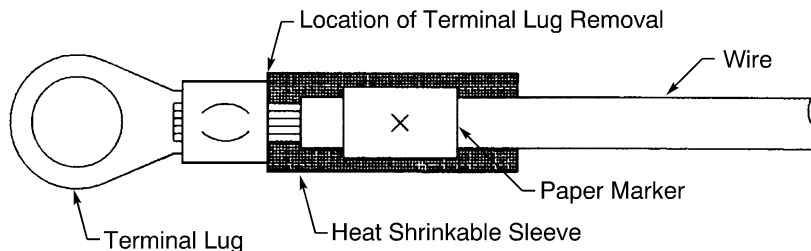
- (1) Make a selection of a lubricating oil from Table 4.
- (2) Put a light layer of the oil on the bolt.
- (3) Put the bolt through the terminal lug and into the engine bracket.
- (4) Torque the bolt 36 inch-pounds to 40-inch pounds (4.067 Newton-meters to 4.519 Newton-meters).

E. Power Plant Tests

- (1) Do the necessary engine tests.
Refer to the test reference table in the AMM 71-00-00-700/501.

4. REPLACEMENT OF A FAN OVERHEAT TERMINAL LUG**A. Terminal Lug Removal**

- (1) Remove the bolt that attaches the fan overheat terminal lug to the engine.
- (2) Cut the terminal lug from the wire. Refer to Figure 2.

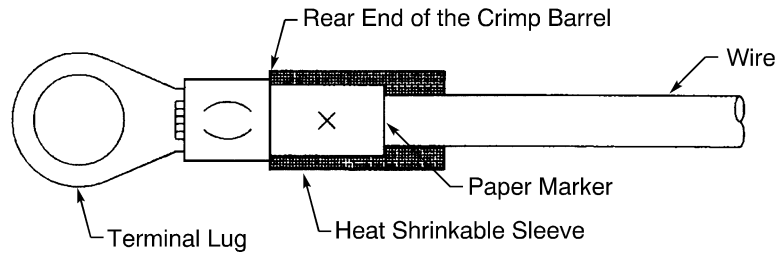


REMOVAL OF THE FAN OVERHEAT TERMINAL LUG
Figure 3

STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: REPLACEMENT OF TERMINAL LUGS

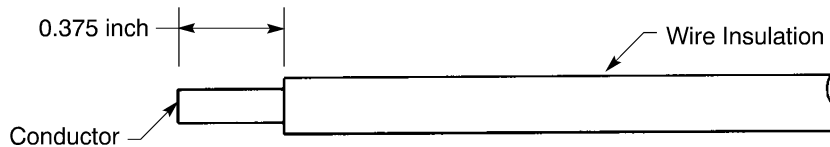
B. Terminal Lug Assembly



OVERHEAT FAN TERMINAL LUG ASSEMBLY
Figure 4

- (1) Move the paper marker away from the end of the wire approximately 0.500 inch (12.7 mm).
- (2) Move the heat shrinkable sleeve away from the end of the wire approximately 0.500 inch (12.7 mm).
- (3) Make a selection of an insulation removal tool from Table 3.
- (4) Remove the necessary length of the insulation from the end of the wire to make the distance from the end of the insulation to the end of the wire equal to 0.375 inch (9.525mm).

Refer to Figure 5.



INSULATION REMOVAL LENGTH
Figure 5

- (5) Make a selection of a fan overheat terminal lug from Table 2.
- (6) Make a selection of a crimp tool from Table 3.
- (7) Put the wire in the crimp barrel of the terminal lug. Refer to Figure 4.
Make sure that the strands of the conductor can be seen at the forward end of the crimp barrel.
- (8) Put the terminal lug and wire in the crimp tool.
Make sure that:
 - The terminal lug is in the correct set of crimp dies for the size
 - The center of the crimp barrel is aligned with the center crimp dies.
- (9) Crimp the terminal lug.
Make sure that the wire cannot be pulled out of the crimp barrel.
- (10) Push the paper marker forward until the forward end of the marker is against the rear end of the crimp barrel.
- (11) Push the heat shrinkable forward until the forward end of the sleeve is against the rear end of the crimp barrel.

C. Continuity Check

- (1) Check the continuity of the terminal lug assembly. Refer to Subject 20-24-20.



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PW4000/777 POWER PLANT: REPLACEMENT OF TERMINAL LUGS

D. Terminal Lug Installation

- (1) Make a selection of a lubricating oil from Table 4.
- (2) Put a light layer of the oil on the stud.
- (3) Put the terminal lug on the stud.
- (4) Install the nut.
- (5) Torque the nut:
 - 30 inch-pounds to 35 inch-pounds (3.39 Newton-meters to 3.95 Newton-meters) for a size 10 nut
 - 20 inch-pounds to 25 inch-pounds (2.6 Newton-meters to 2.82 Newton-meters) for a size 8 nut.

E. Power Plant Tests

- (1) Do the necessary engine tests.
Refer to the test reference table in the AMM 71-00-00-700/501.

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STANDARD WIRING PRACTICES MANUAL

PW4000/777 POWER PLANT: REPAIR OF WIRING IDENTIFICATION MARKERS

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STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: REPAIR OF WIRING IDENTIFICATION MARKERS**

This Subject gives the procedure to repair an identification marker on a wire harness.

1. GENERAL DATA**A. Applicable Conditions**

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-24-00.

B. Wire Harness Components

Table 1
DEFINITIONS

Term	Definition
Cable	A group of wires in a metal shield and an insulated jacket
Harness	One or more cables with connectors or terminal lugs attached to the ends of the cables
Wire	A single electrical conductor with insulation around it

C. Identification Markers

Each harness has one harness identification marker.

The disconnect identification markers are:

- Near each end of the harness
- Near each connector and each backshell assembly.

D. References

Refer to:

- Subject 20-24-02 for the supplier codes, names, and addresses
- Subject 20-24-14 for the assembly of wire harness ties.

2. STANDARD EQUIPMENT**A. Tools**

No special tools are necessary for this procedure.

WARNING: TO AVOID INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHILE AN ON-WING REPAIR IS MADE, DO NOT USE THESE TOOLS:

- A HEAT GUN
- A SOLDERING GUN
- A SOLDERING IRON.

B. Necessary Materials

NOTE: Alternatives to the materials specified in Table 2 must be equivalent materials.

STANDARD WIRING PRACTICES MANUAL**PW4000/777 POWER PLANT: REPAIR OF WIRING IDENTIFICATION MARKERS**

Table 2
NECESSARY MATERIALS

Description	Part Number	Supplier Code
Ink, Permanent, Black	-	Local
Tape, Fiberglass	Scotch 69	04963

3. IDENTIFICATION MARKER REPAIR**A. Identification Marker Removal**

- (1) Remove the wire harness ties.
- (2) Remove the chafe guard sleeve that covers the identification marker.
- (3) Remove the tape.

NOTE: This tape can be used again.

- (4) Remove the marker from the harness.

B. Identification Marker Assembly

- (1) Make a selection of a permanent ink from Table 2.
- (2) Make a line through the old identification number with the ink.
- (3) Write the new identification number on the marker with the ink.
- (4) Put the new marker in the same location as the old marker on the harness.
- (5) Make a selection of a fiberglass tape from Table 2.

NOTE: As an alternative, the tape that was removed can be used again.

- (6) Put two layers of tape around each edge of the marker.
Make sure that the tape does not make an overlap with the marker label.
- (7) Install the chafe guard sleeve over the marker.
- (8) Assemble a wire harness tie on the chafe guard sleeve. Refer to Subject 20-24-14.



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STANDARD WIRING PRACTICES MANUAL

SHIELDED CABLES

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STANDARD WIRING PRACTICES MANUAL**SHIELDED CABLES**

This Subject gives the general data about:

- The functions of a shielded cable in the aircraft
- The configurations of a shielded cable
- The procedures to attach a shield to an electrical connector
- Related data in other subjects of the Standard Wiring Practices Manual (SWPM).

1. GENERAL DATA**A. High Energy Impulses**

It is necessary to keep a high energy impulse out of a wire on the aircraft because:

- It can be read, in error, as data by the electronic equipment on the aircraft
- It can cause damage to the electronic equipment that is connected to the wires.

B. Functions of a Shield

A shield supplies the necessary protection for the wires and the equipment when it transmits the unwanted energy from the conductors in the shield to the electrical ground through these routings:

- From the shield to the plug connector strain relief to the plug connector backshell
- From the plug connector backshell to the plug connector
- From the plug connector to the receptacle connector
- From the receptacle connector to the ground of the aircraft structure.

The shield on a shielded cable only does its function correctly when these conditions occur:

- There is a low electrical impedance at each interface in the routing
- The length of the connection between the interfaces is short; the more sensitive the electrical circuit is, the shorter the connection between the shield and the backshell must be
- The shield coverage is in proportion to the sensitivity of the electrical circuits that the shield protects; very sensitive electrical circuits must have 100 percent coverage and less sensitive electrical circuits can have less than 100 percent coverage.

C. Functions of a Shielded Cable

A shielded cable does not let:

- The high energy, electrical impulses, that are caused by lightning, go into the wires in the shield
- The high intensity radio frequency (HIRF) energy from the different radio sources that are external to the aircraft go into the wires in the shield
- The radio frequency energy from the different electrical and electronic sources in the aircraft go into the wires in the shield
- The radio frequency energy from the wires in the shield come out and cause the incorrect performance of other equipment or systems on the aircraft.

D. Configurations of Shielded Cable

A shielded cable is an electrical cable that has a conductive shield around the wires in the cable. Usually, the conductive shield is metal.

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SHIELDED CABLES

Different shielded cables have shields that are made with:

- Braided, round conductors
- Braided, flat conductors
- Wrapped, round conductors
- Wrapped, flat conductors
- Wrapped, foil conductor
- A mixture of the braided or wrapped conductors.

Some shielded cables:

- Have one layer of shield material
- Have more than one layer of shield material
- Have insulation on top of the shield
- Do not have insulation on top of the shield
- Have insulation between the shields.

2. PROCEDURES TO ATTACH A SHIELDED CABLE TO AN ELECTRICAL CONNECTOR

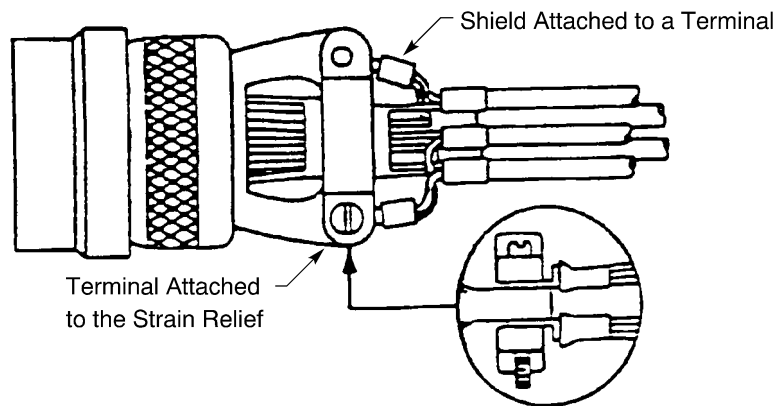
There are 2 usual procedures.

A. Connection of a Shield to the Connector Strain Relief

Refer to Figure 1.

Either of these connections is satisfactory:

- The shield is attached directly to a terminal and the terminal is attached to the connector strain relief.
- One end of a shield ground wire is attached to the shield and the other end is attached to a terminal that is subsequently attached to the connector strain relief.



SHIELD CONNECTED TO THE CONNECTOR STRAIN RELIEF

Figure 1

B. Connection of a Shield to the Connector Backshell through a Faying Surface Bond

NOTE: This procedure is recommended to connect the shields of the electrical circuits that are sensitive.

Refer to Figure 2 and Figure 3.

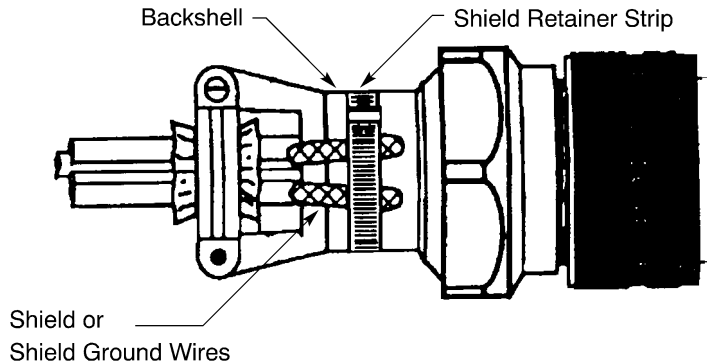
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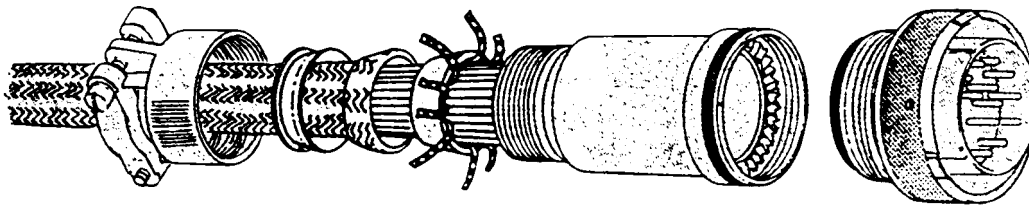
SHIELDED CABLES

To keep the faying surface bond in position, either of these connections is satisfactory:

- A shield retainer strip is used to press the shield against the surface of the backshell
- The internal components in the backshell and the position of the shield in relation to these components make the bond.



SHIELD CONNECTION WITH A SHIELD RETAINER STRIP
Figure 2



SHIELD CONNECTION WITH A PERIPHERAL BACKSHELL
Figure 3

3. RELATED DATA IN OTHER SWPM SUBJECTS

A. Bonding and Grounding of Electrical Connectors

For the procedure to make low impedance bond between the receptacle connector and the aircraft structure, refer to Subject 20-20-00.

B. Faying Surface Bond

For the procedures to install a faying surface bond, refer to Subject 20-20-00.

C. Overall Shield Termination

For the procedures to install overall shield braid on wire bundles, refer to Subject 20-25-11.

D. Strain Relief Shield Termination

For the procedures to assemble and maintain connections from the shield to the connector strain relief, refer to Subject 20-25-12.



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SHIELDED CABLES

E. Peripheral Shield Termination

For the procedures to assemble and maintain connections from the shield to the internal components in the backshell, refer to Subject 20-25-13.

F. Shield Braid Retainer Strip Termination

For the procedures to assemble and maintain connections that use a shield retainer strip to connect the shield to the backshell, refer to Subject 20-25-14.

G. Connector Assembly

For the procedures to connect the connector plug to the connector receptacle so that a low impedance interface occurs, refer to the Subject for the assembly of the connector.

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STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

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STANDARD WIRING PRACTICES MANUAL**OVERBRAID SHIELDS ON WIRE BUNDLES**

Critical system wiring has shielded wires and overbraid shields for protection. This Subject gives these procedures for overbraid shields:

- Installation
- Repair
- Rework.

1. GENERAL DATA**A. Lightning Strike Energy**

Lightning strike energy:

- Can be transferred or coupled through non-metallic skin panels to electrical wiring and equipment
- Can have a sufficient magnitude to cause a system failure if it is not attenuated.

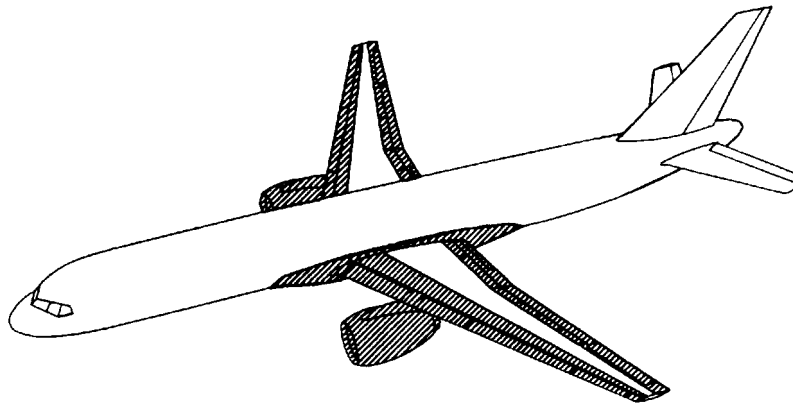
As a result of extensive studies, the aircraft have lightning protection which include:

- Transient suppression filters
- Metallic shields over the wire bundles.

B. Susceptible Areas

Refer to Figure 1 for the usual areas where electrical wiring is susceptible to interference or damage from lightning; the areas of the wheel wells are included.

NOTE: Almost all wire bundles in the susceptible areas have braided, metallic overbraid shields for protection.



AREAS SUSCEPTIBLE TO DAMAGE OR INTERFERENCE FROM LIGHTNING

Figure 1

C. Bonds or Grounds of Connectors

When it is necessary to bond or ground connectors, circuits, or backshell hardware to maintain lightning protection, refer to Subject 20-20-00.

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STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

2. GENERAL CONDITIONS FOR OVERBRAID SHIELDS

A. Identification

A wire bundle that has an overbraid shield installed must be identified with a W number at these locations:

- Within 18 inches of all connectors
- Within 18 inches of all shield terminations
- At branches
- Every six feet.

An example is W3108.

B. Selection of an Overbraid Shield

For the selection of a shield material for an overbraid shield, the shield must have the same or higher temperature grade as the wire bundle.

**Table 1
SHIELD MATERIALS**

Description	Temperature Grade	Boeing Standard	Assembly Procedure
Overbraid Shield, Tin Coated	B	BAC3108-()	Paragraph 3.
			Paragraph 4.
Overbraid Shield, Nickel Coated	D	BAC3106-()	Paragraph 3.

NOTE: The BAC3106-() overbraid shield is nickel coated and must be assembled without solder.

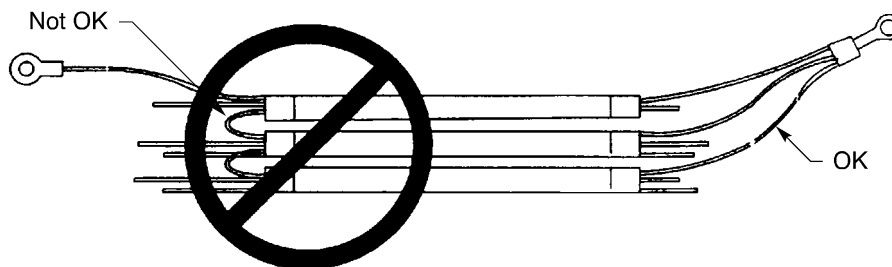
NOTE: For sizes and suppliers of shield materials, refer to Subject 20-00-11.

C. Conditions for the Installation of an Overbraid Shield

Overbraid shields must be:

- A tight fit on the wire bundle
- Attached to ground at both ends.
- Terminated within 4 inches of the center of a seal fitting.

The overbraid shields of the wire bundle and the individual shield ground wires of the cables must not be installed so that they are connected from shield to shield. Refer to Figure 2.



CONFIGURATION OF SHIELD GROUND WIRES AND OVERBRAID SHIELDS
Figure 2

STANDARD WIRING PRACTICES MANUAL**OVERBRAID SHIELDS ON WIRE BUNDLES****D. Shield Ground Wires, Short Wire Bundle Branches, and Adjacent Wires**

It is not necessary to install an overbraid shield on these wires when they are 6 inches or less in length:

- Shield ground wires of each shielded cable of the wire bundle
- Short branches of a wire bundle.

NOTE: The length of an unshielded wire must be kept as short as possible.

Shield ground wires and short wire bundle branches must have either of these type of protection from the abrasive overbraid shield:

- A heat shrinkable sleeve; refer to Subject 20-10-14
- The necessary layers of TFE Teflon tape.

Refer to Figure 3.

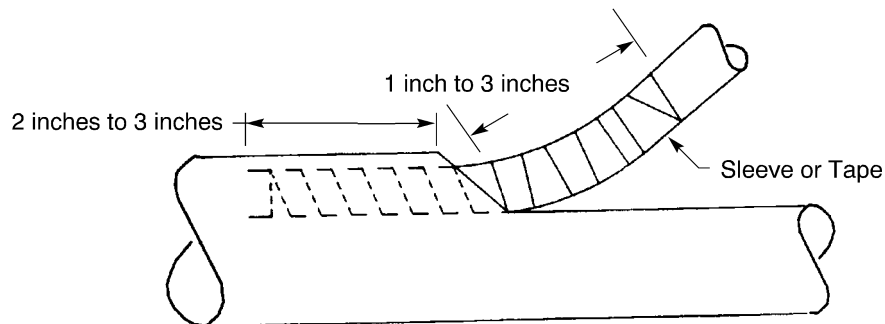
Adjacent wires must have protection from the abrasive overbraid shield. The protection is given by the installation of an expando sleeve. Refer to Subject 20-00-11.

NOTE: If the separation of the adjacent wires and the overbraid shield is not possible with an expando sleeve, the satisfactory alternatives are:

- A heat shrinkable sleeve; refer to Subject 20-10-14
- The necessary layers of TFE Teflon tape.

These conditions are applicable:

- It is not necessary for the sleeve of a shielded wire to obey the conditions for color code separation
- A layer of TFE Teflon tape must be installed on each end of an expando sleeve
- If the overbraid shield is soldered, a layer of TFE Teflon tape must be installed on the wire bundle or cable directly under the soldered area of the shield.



PROTECTION OF A SHORT WIRE BUNDLE BRANCH

Figure 3

E. Wire Bundle Ties

Refer to Subject 20-10-11.

STANDARD WIRING PRACTICES MANUAL**OVERBRAID SHIELDS ON WIRE BUNDLES**

Wire bundle ties:

- Must be installed on the overbraid shield every 4 inches, unless it is specified that the bundle must be tied every 2 inches
- Must be used to hold the end of a layer of tape
- Must be used to support a branch of a wire bundle
- Are not necessary under the overbraid shield.

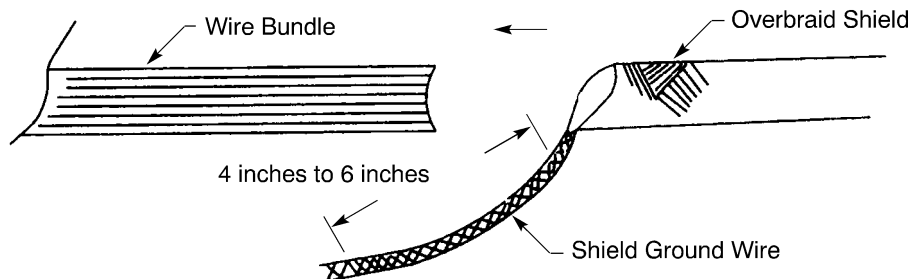
3. ASSEMBLY OF AN OVERBRAID SHIELD WITHOUT SOLDER**A. Overbraid Shield Installation**

- (1) Make a selection of a shield material from Table 1.

Make sure that the shield is the correct size for a tight fit on the wire bundle.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Cut the necessary length of the shield so that a 4 inch to 6 inch shield ground wire can be made at both ends.
- (3) Make a hole in the shield 4 inches 6 inches from each end. Refer to Figure 4.
Make sure that the location of the hole is correct in relation to the configuration of the wire bundle.



INSTALLATION OF THE OVERBRAID SHIELD ON THE WIRE BUNDLE
Figure 4

- (4) Put the necessary length of an expando sleeve on the wire bundle.
- (5) Put a layer of TFE Teflon tape or a heat shrinkable sleeve on the ends of the expand sleeve so that either the tape or the heat shrinkable sleeve:
- Makes an overlap with the expando sleeve
 - Extend 1 inch to 2 inches beyond the end of the overbraid shield.
- (6) Pull the shield over the wires or cables so that the hole is the correct position on the wire bundle.

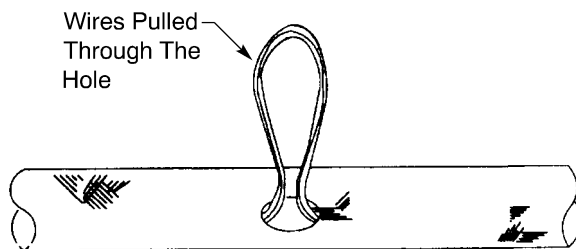
CAUTION: DO NOT INSTALL THE SHIELD OVER A WIRE BUNDLE TIE.

- (7) If it is possible, pull the wires or cable through the hole. Refer to Figure 5.

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STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

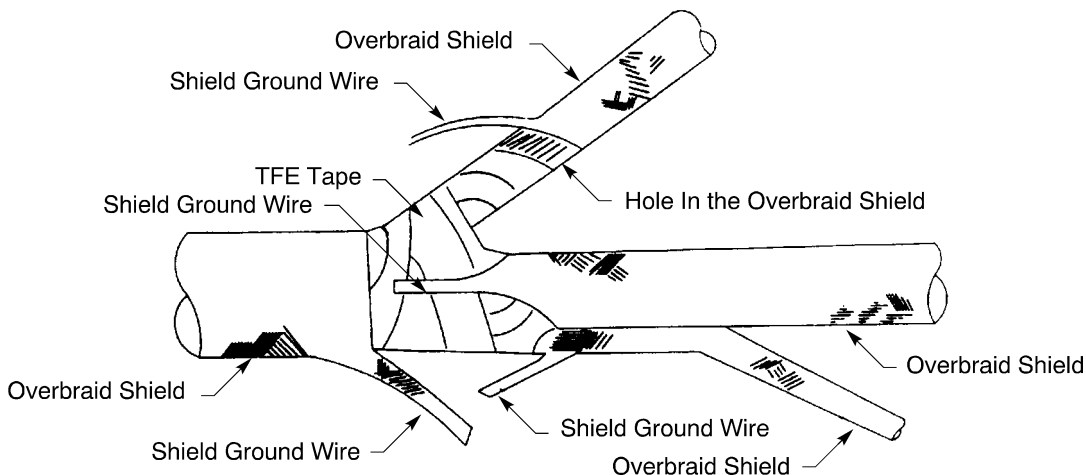


WIRES PULLED THROUGH THE HOLE IN THE SHIELD
Figure 5

- (8) If the wires or cables cannot be pulled through the hole in the shield because of the configuration of the wire bundle, a shield can be installed on each wire or cable. Refer to Figure 6.

NOTE: To make the installation easier, more than one shield can be installed on the wire bundle; refer to Figure 7. These conditions are applicable:

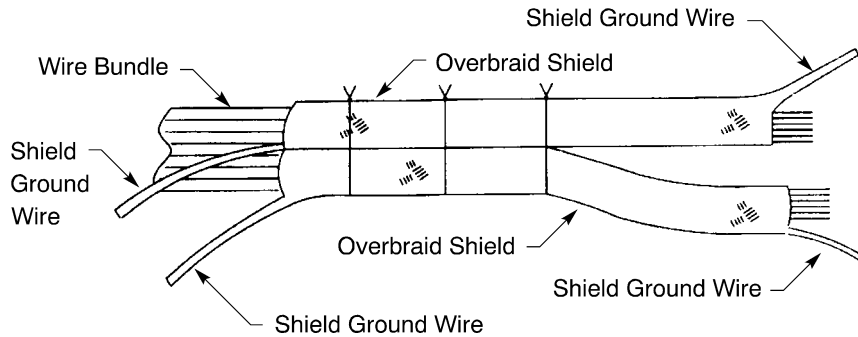
- Each shield is installed on the wires or cable that are attached to the same connector
- A larger wire bundle diameter is permitted.



OVERBRAID SHIELD INSTALLED ON EACH WIRE OR CABLE
Figure 6

STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES



MORE THAN ONE OVERBRAID SHIELD INSTALLED ON A WIRE BUNDLE
Figure 7

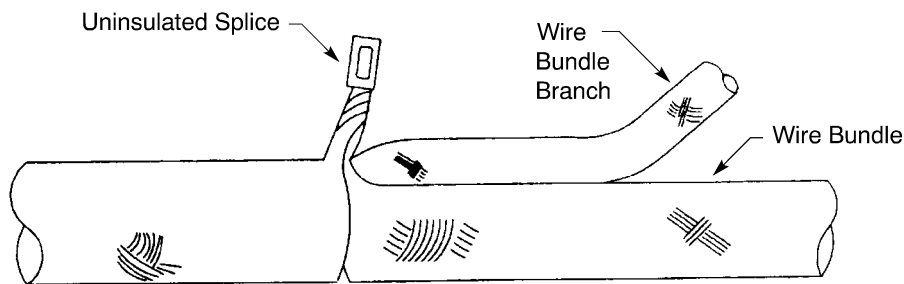
- (9) Install an expando sleeve on each shield. Refer to Paragraph 2.D.
- (10) Assemble the necessary quantity of wire bundle ties in the applicable positions on the wire bundle. Refer to Paragraph 2.E. and Subject 20-10-11.

CAUTION: DO NOT INSTALL AN EXPANDO SLEEVE OVER A WIRE BUNDLE TIE.

B. Connection of Overbraid Shields

- (1) On the end of the shield ground wires at the 2 adjacent ends of the overbraid shields on the wire bundle, move the strands of the shield ground wires apart.
- (2) Twist the two ends of the shield ground wires together.
- (3) Find the equivalent wire size of the attached shield ground wires at approximately one inch from the wire bundle.
- (4) Install an uninsulated splice on the attached shield ground wires so that the end of the splice is 1 inch maximum from the wire bundle.

Refer to Subject 20-30-12 and Figure 8.

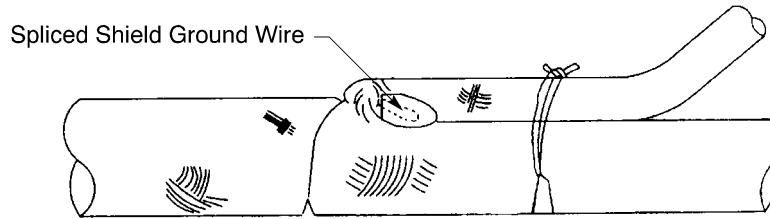


CONNECTION OF TWO OVERBRAID SHIELDS
Figure 8

- (5) Make the spliced shield ground wire flat against the overbraid shield on the wire bundle. Refer to Figure 9.

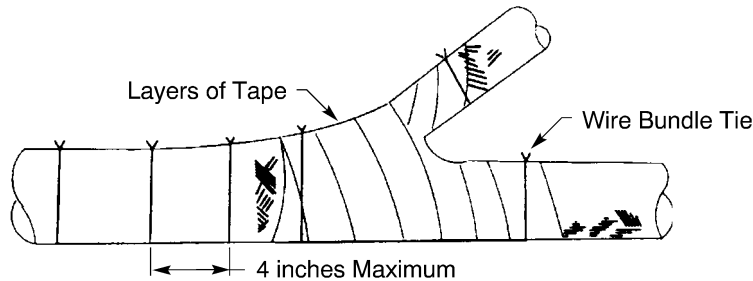
STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES



POSITION OF THE SPLICE AGAINST THE OVERBRAID SHIELD
Figure 9

- (6) Put a layer of TFE Teflon tape wrap over the connection of the overbraid shields on the wire bundle. Refer to Figure 10.



TAPE ON THE CONNECTION OF THE OVERBRAID SHIELDS
Figure 10

C. Overbraid Shield Termination

Table 2
SHIELD GROUND WIRE TERMINALS

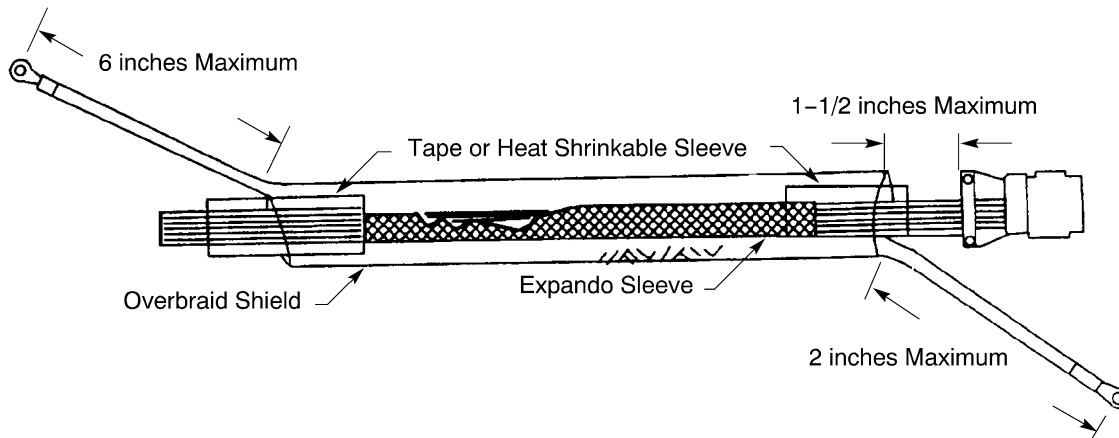
Overbraid Shield			Boeing Standard
Inside Diameter (inch)	Number of Conductors	Number of Ends	
0.109	24	96	BACT12AC3
0.172	24	168	BACT12AC8
0.203	24	384	BACT12AC12
0.375	48	384	BACT12AC12
0.500	48	528	BACT12AC15
0.781	48	864	BACT12AC19
0.875	48	336	BACT12AC15
1.00	48	864	BACT12AC19

STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

- (1) On each end of the overbraid shield, cut the shield ground wire so that it is a maximum length of:
 - 2.0 inches for termination at a connector strain relief
 - 6 inches for other terminations.
- (2) Move the strands of the shield apart on the last 1/2 inch of each shield ground wire.
- (3) Twist the strands of the shield to make a wire.
- (4) Make a selection of a terminal from Table 2.
- (5) Assemble a terminal on each shield ground wire. Refer to Subject 20-30-11 and Figure 11.

NOTE: To make it easier to put the terminal on the shield ground wire, the terminal can be twisted in the same direction as the twisted strands of the shield.

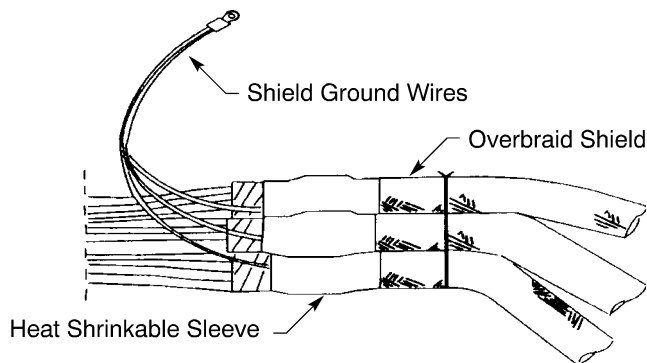


TERMINATION OF A SHIELD GROUND WIRE

Figure 11

- (6) Install the necessary length of a heat shrinkable sleeve on the end of the overbraid shield. Refer to Figure 12.

Make sure that the end of the sleeve extends 1/2 inch to 3/4 inch beyond the location where the shield ground wire comes out of the shield.



TERMINATION OF THE OVERBRAID SHIELD

Figure 12

STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

4. ASSEMBLY OF AN OVERBRAID SHIELD WITH SOLDER

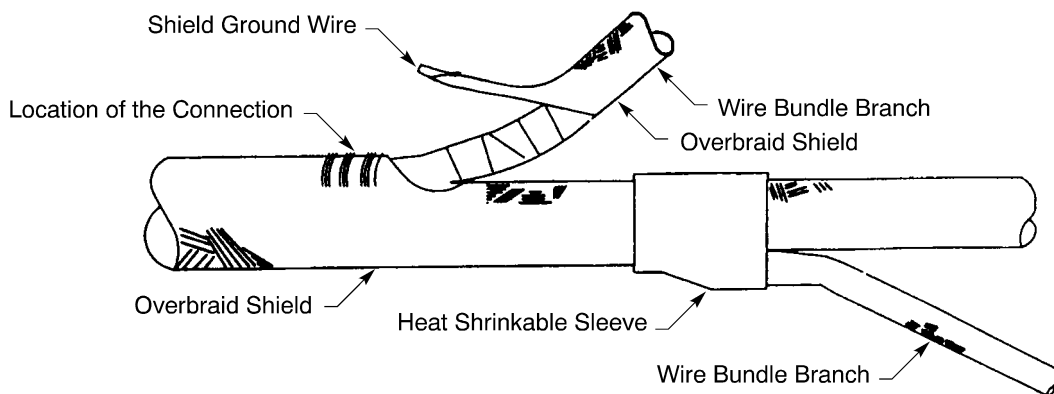
A. Overbraid Shield Installation

Refer to Paragraph 3.A. for the procedure to install the shield.

NOTE: When it is necessary to terminate the overbraid shield on a connector with a Sunbank S2408-XX-XX cable clamp, make sure that the ends of the expando sleeve and the TFE tape are:

- Under the clamp
- A minimum of 1/2 inch from the connector grommet.

B. Connection of Overbraid Shields with a Shield Ground Wire Soldered to the Shield



CONNECTION OF A BRANCH SHIELD TO THE WIRE BUNDLE SHIELD
Figure 13

NOTE: This procedure cannot be used for nickel coated overbraid shield. For nickel coated overbraid shield, refer to Paragraph 3.

- (1) Make a selection of the location on the overbraid shield of the wire bundle where the shield ground wire at the end of the overbraid shield of the wire bundle branch can be soldered.

Make sure that the distance from the end of the branch shield to the bundle shield is not greater than 0.25 inch.

NOTE: The assembly of the necessary number of wire bundle ties at the ends of adjacent shields can make the solder procedure easier.

- (2) At the location of the connection, put the end of the shield ground wire under 3 to 12 strands of the overbraid shield on the wire bundle. Refer to Figure 13.
- (3) Apply solder to the shield ground wire and the surface of the shield so that the length of the soldered area is:
 - At least equal to the diameter of the wire bundle
 - Not less than 0.25 inch.
- (4) Remove the length of the unwanted shield ground wire from the end of the soldered area.

STANDARD WIRING PRACTICES MANUAL

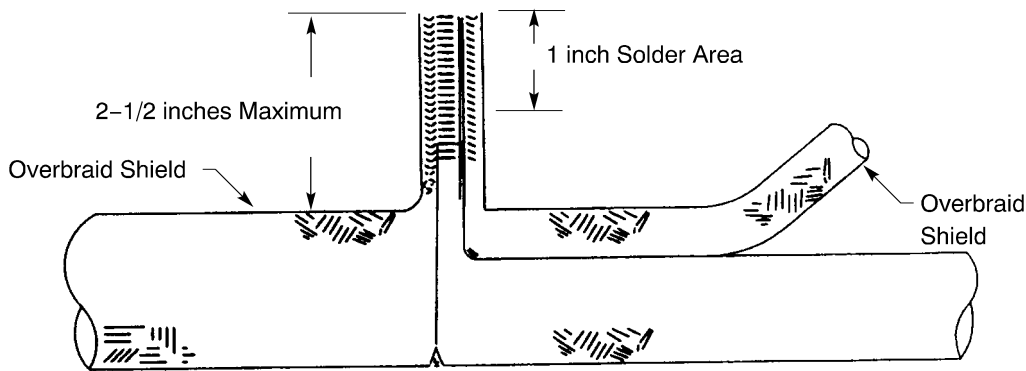
OVERBRAID SHIELDS ON WIRE BUNDLES

- (5) Put a heat shrinkable sleeve over the soldered area. Refer to Figure 13.

NOTE: If it is necessary, the sleeve can be installed over the wire bundle ties from Step (1).

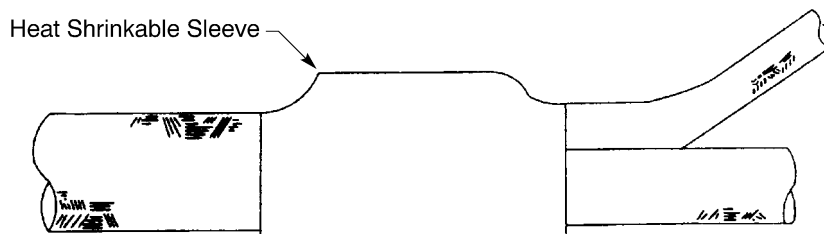
- (6) Shrink the sleeve into position. Refer to Subject 20-10-14.

C. Connection of Overbraid Shields with the Shield Ground Wires Soldered Together



CONNECTION OF A BRANCH SHIELD TO THE WIRE BUNDLE SHIELD
Figure 14

- (1) Make the shield ground wires of the adjacent overbraid shields flat.
- (2) Cut both of the shield ground wires so that the distance from the end of the wires to the shield on the wire bundle is 2-1/2 inches maximum.
Refer to Figure 14.
- (3) Solder the shield ground wires together.
Make sure that the solder is applied from the end of the wires to 1 inch from the ends.
- (4) Fold the soldered wires so that they are against the overbraid shield.
- (5) Put a heat shrinkable sleeve over the soldered area.
- (6) Shrink the sleeve into position. Refer to Figure 15 and Subject 20-10-14.

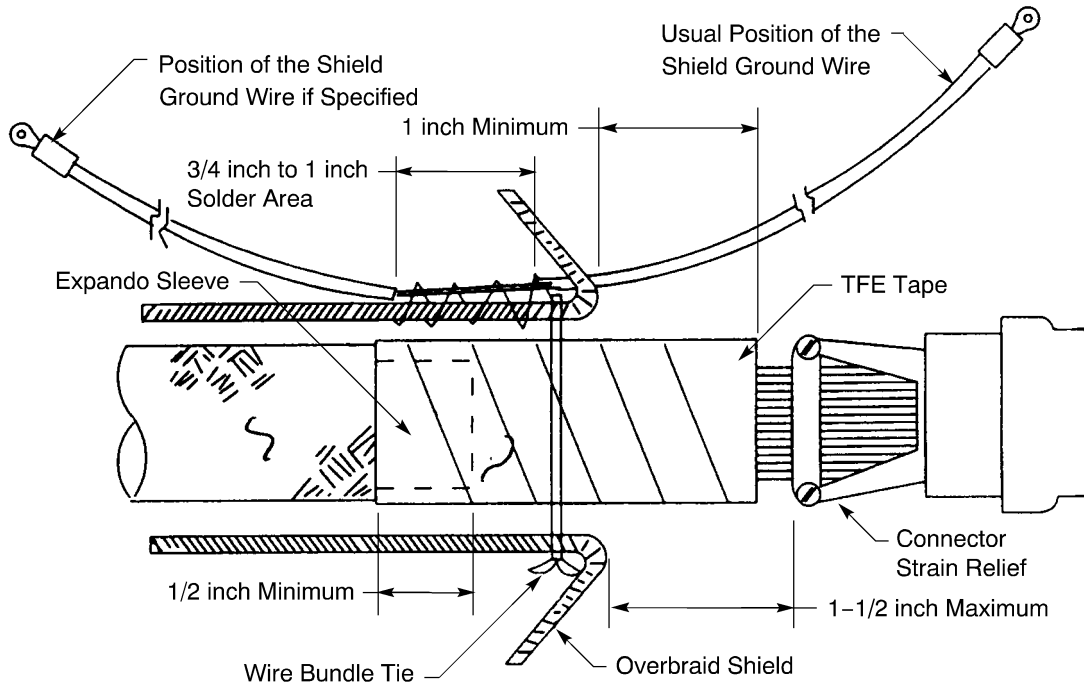


POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 15

STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

D. Overbraid Shield Termination



OVERBRAID SHIELD TERMINATION AT THE CONNECTOR STRAIN RELIEF

Figure 16

- (1) Prepare the shield ground wire:
 - (a) Make a selection of a shield ground wire. Refer to Subject 20-10-15.
 - (b) Cut a length of the wire so that it is a maximum of:
 - 2.0 inches for termination at a connector strain relief
 - 6 inches for other terminations.
 - (c) Assemble one of these terminals on end of the shield ground wire:
 - A general purpose terminal
 - A high temperature terminal.
 Refer to Subject 20-30-11.
 - (d) Remove 3/4 inch to 1 inch of insulation from the other end of the wire.
- (2) Prepare the overbraid shield. Refer Figure 16.
 - (a) Fold the shield back so that the distance from the location where the shield is folded to:
 - The end of the shield is, at the minimum, equal to the diameter of the wire bundle
 - The end of the TFE tape is 1-1/2 inches maximum.

NOTE: A white wire bundle tie can be assembled to hold the shield in position so it can be folded back.
 - (b) Make a small hole in the shield at the location where the shield is folded.
- (3) Put the end of the shield ground wire without any solder through the hold in the shield.

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OVERBRAID SHIELDS ON WIRE BUNDLES

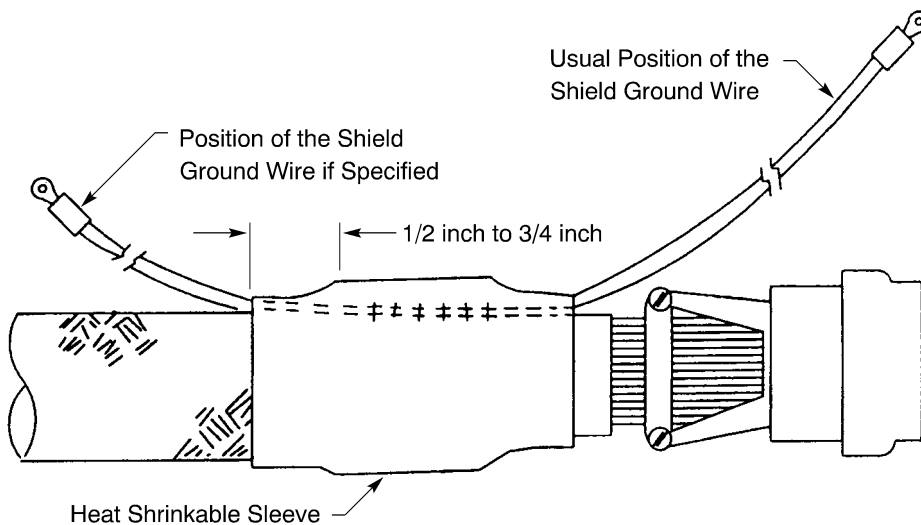
- (4) At the location for the connection of the shield ground wire to the shield, put the end of the wire under 3 to 6 strands of the overbraid shield on the wire bundle.

Refer to Figure 16.

- (5) Apply solder to the shield ground wire and the surface of the shield so that all of the strands of the shield that touch the shield ground wire are soldered.
- (6) Put the necessary length of a heat shrinkable sleeve on the connection of the shield ground wire and the overbraid shield so that the sleeve is over the free end of the shield. Refer to Figure 17.

Make sure that the rearward end of the sleeve is is 1/2 inch minimum beyond either of these locations:

- The rearward end of the shield
- The rearward end of the soldered area.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 17

5. ASSEMBLY OF A SHIELD GROUND WIRE WITH SHIELDED WIRE

NOTE: Shield ground wires that are assembled with shielded wire are only necessary when the specified length of the shield ground wire is greater than 6 inches.

A. General Conditions

When a ground wire that is assembled with a shielded wire terminates the shield at a dual termination ground, the unshielded distance between the end of the shield and the end of the ground wire terminal must be:

- 3 inches minimum
- 3-1/2 inches maximum.

STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

B. Shield Ground Wire Assembly

**Table 3
SHIELDED WIRE TYPES**

Wire Specification	Type
BMS 13-31	III
	VII
BMS 13-51	IX
	XV
	XXX

**Table 4
SHIELD CAU OF SHIELDED WIRE OR CABLE**

Wire			Shield Size (CAU)
Size (AWG)	Specification	Class	
22	BMS 13-51	1	6
		2	11
		3	12
20	BMS 13-31	1	9
		2	18
		3	19
	BMS 13-51	1	7
		2	13
		3	14
18	BMS 13-31	1	10
		2	20
		3	22
	BMS 13-51	1	8
		2	15
		3	16
16	BMS 13-31	1	10
		2	22
		3	24
	BMS 13-51	1	8
		2	16
		3	18

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STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

Table 4 (continued)

Wire			Shield Size (CAU)
Size (AWG)	Specification	Class	
14	BMS 13-31	1	13
		2	25
		3	27
12	BMS 13-31	1	14
		2	28
		3	31

**Table 5
CAU OF CONDUCTOR SIZES**

Wire Size (AWG)	Conductor Size (CAU)
22	8
20	12
18	19
16	24
14	38
12	59

- (1) Make a selection of a shielded wire or cable for the shield ground wire from Table 3 and Table 4.
- (2) Find the total CAU of the wire or wires and the shield.

NOTE: CAU is Circular Area Units. Refer to Subject 20-30-22.

- (a) Find the CAU of the shield in Table 4.
- (b) Find the CAU of the conductor in Table 5.
- (c) Add the CAU of the conductor multiplied by the number of conductors to the CAU of the shield .
- (3) With the total CAU, make a selection of a terminal. Refer to Subject 20-30-11.
- (4) Prepare the shielded wire for the assembly of the terminal:

- (a) Remove the necessary length of the outer insulation of the wire or cable plus:
 - 1/8 inch more for a cable with 1 conductor
 - 1 inch to 1-1/4 inches more for a cable with more than 1 conductor.

Refer to Subject 20-30-11 for the necessary length.

- (b) Fold the shield back over the outer insulation.
- (c) Remove the necessary length of the inner insulation from the each conductor. Refer to Subject 20-30-11.
- (d) Fold the shield back over the conductor or conductors.

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STANDARD WIRING PRACTICES MANUAL

OVERBRAID SHIELDS ON WIRE BUNDLES

- (e) For cables with more than 1 conductor, install a 1-1/2 inch to 1-3/4 inch length of heat shrinkable sleeve on the cable.

Refer to Subject 20-10-11.

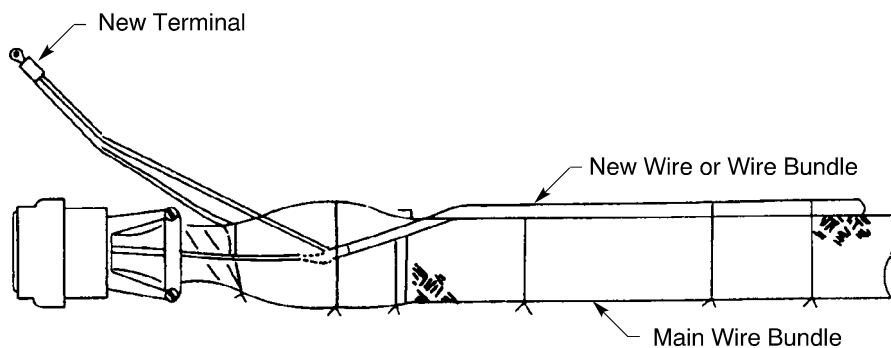
- (5) Assemble the terminal. Refer to Subject 20-30-11.

NOTE: If the insulation build-up of the wire combination is too large for the terminal, one of the conductors may be doubled back.

6. MODIFICATION OF A WIRE BUNDLE WITH AN OVERBRAID SHIELD

This paragraph gives the procedure to add a wire or wires to a wire bundle when it is not possible to open the overbraid shield.

A. Installation of a New Wire



INSTALLATION OF A NEW WIRE OR WIRE BUNDLE

Figure 18

- (1) Install the overbraid shield on the new wire as if it were a different wire bundle. Refer to Paragraph 3. for nickel or tin coated over braid shield or Paragraph 4. for tin coated overbraid shield.

NOTE: TFE tape wrap can be used as the alternative to a heat shrinkable sleeve at the branches or shield terminations. Make sure to assemble wire bundle ties to hold the ends of tape.

- (2) Align the locations of termination of the new bundle with the terminations of the main wire bundle. Refer to Figure 18.

NOTE: It is not necessary to assemble wire bundle ties on tape or sleeves of the new bundle.

- (3) Terminate the shield ground wire of the new bundle in the same terminal as the main bundle:
 - (a) Remove the terminal from the shield ground wire of the main bundle.
 - (b) Assemble a new terminal on the shield ground wires of the new bundle and the main bundle. Refer to Paragraph 3. for nickel or tin coated overbraid shield or Paragraph 4. for tin coated overbraid shield.

- (4) Remove the wire bundle ties from the overbraid shield of the main bundle that is adjacent to the shield of the new bundle.

NOTE: Do not remove ties that hold the TFE tape or heat shrinkable sleeve over a soldered area.

- (5) Assemble new wire bundles ties every 4 inches to hold the new bundle to the main bundle. Refer to Figure 18.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

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	B. Spacer Part Numbers	4
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20-25-12 CONTENTS

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

This Subject gives the procedures to assemble strain relief backshells with a shield termination. For the procedures to assemble strain relief backshells without a shield termination, refer to Subject 20-60-09.

1. PART NUMBERS AND DESCRIPTION

A. Backshell Part Numbers

**Table 1
BACKSHELL PART NUMBERS**

Part Number	Configuration	Description	Supplier
620AA028Z1-()	90 Degree	Anti-Rotation Teeth, Stainless Steel	Glenair
620AS048ZM-()	90 Degree	Anti-Rotation Teeth, Stainless Steel	Glenair
620HA048ZM-()	90 Degree	Anti-Rotation Teeth, Stainless Steel	Glenair
AS85049-38S()	Straight	Anti-Rotation Teeth, Aluminum	QPL
BACC10HD	Straight	Stainless Steel	Boeing
BACC10HE	90 Degree	Stainless Steel	Boeing
BACC10HF	Straight	Aluminum	Boeing
BACC10HG	90 Degree	Aluminum	Boeing
BACC10JV()A	Straight	Ground Spring, Aluminum	Boeing
BACC10JV()S	Straight	Ground Spring, Stainless Steel	Boeing
BACC10JW()A	90 Degree	Ground Spring, Aluminum	Boeing
BACC10JW()S	90 Degree	Ground Spring, Stainless Steel	Boeing
BACC10KA	Straight	Anti-Rotation Teeth, Stainless Steel	Boeing
BACC10KB	90 Degree	Anti-Rotation Teeth, Stainless Steel	Boeing
BACC10KC	45 Degree	Anti-Rotation Teeth, Stainless Steel	Boeing
BACC10KD	Straight	Anti-Rotation Teeth, Aluminum	Boeing
BACC10KE	90 Degree	Anti-Rotation Teeth, Aluminum	Boeing
BACC10KF	45 Degree	Anti-Rotation Teeth, Aluminum	Boeing
G8993-()	Straight	Anti-Rotation Teeth, Aluminum	Glenair
G8993M()	Straight	Anti-Rotation Teeth, Aluminum	Glenair
G8994-()	90 Degree	Anti-Rotation Teeth, Aluminum	Glenair
G8994M()	90 Degree	Anti-Rotation Teeth, Aluminum	Glenair
M85049-38S()	Straight	Anti-Rotation Teeth, Aluminum	QPL
S1347-()	90 Degree	Aluminum	Sunbank
S2277-()	45 Degree	Aluminum	Sunbank
S2408-()	Straight	Aluminum	Sunbank



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

**Table 2
APPROVED SUPPLIERS OF BOEING STANDARD BACKSHELL PART NUMBERS**

Backshell	Supplier
BACC10HD	Glenair
	Electro Adapter
	Sunbank
BACC10HE	Electro Adapter
	Glenair
	Sunbank
BACC10HF	Electro Adapter
	Glenair
	Sunbank
BACC10HG	Electro Adapter
	Glenair
	Sunbank
BACC10JV()A	Glenair
BACC10JV()S	Glenair
BACC10JW()A	Glenair
BACC10JW()S	Glenair
BACC10KA	Glenair
	Sunbank
BACC10KB	Glenair
	Sunbank
BACC10KC	Glenair
	Sunbank
BACC10KD	Glenair
	Sunbank
BACC10KE	Glenair
	Sunbank

**Table 3
OBSOLETE STRAIN RELIEF BACKSHELLS**

Obsolete Backshell	Replacement Backshell
BACC10HD	BACC10HD()A
	BACC10KA

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

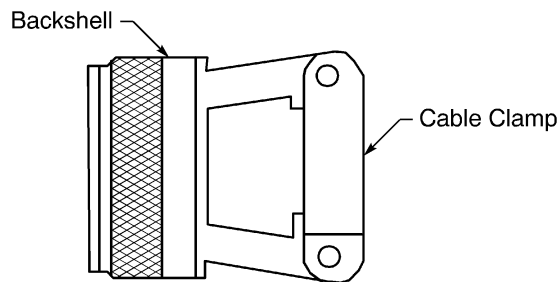
Table 3 (continued)

Obsolete Backshell	Replacement Backshell
BACC10HE	BACC10HE()A
	BACC10KB
BACC10HF	BACC10KD
BACC10HG	BACC10HG()A
	BACC10KE
M85049/38S	AS85049/38S

Table 4

ALTERNATIVE STRAIN RELIEF BACKSHELLS

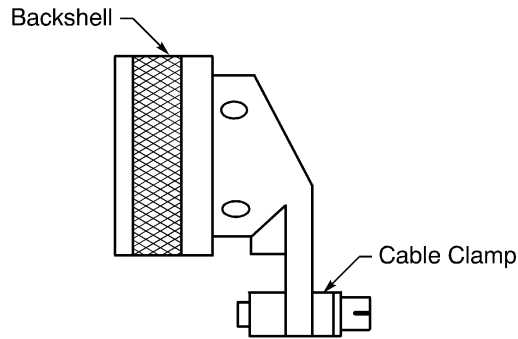
Specified Backshell	Alternative Backshell	
	Part Number	Supplier
G8993M()	BACC10HF()A	Boeing
	G8993-()	Glenair
G8993M()NF	BACC10HF()C	Boeing
G8994M()	BACC10HG()A	Boeing
	G8993-()	Glenair
G8994M()NF	BACC10HG()C	Boeing



STRAIGHT STRAIN RELIEF BACKSHELL
Figure 1

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION



90 DEGREE STRAIN RELIEF BACKSHELL
Figure 2

B. Spacer Part Numbers

Table 5
SPACER PART NUMBERS

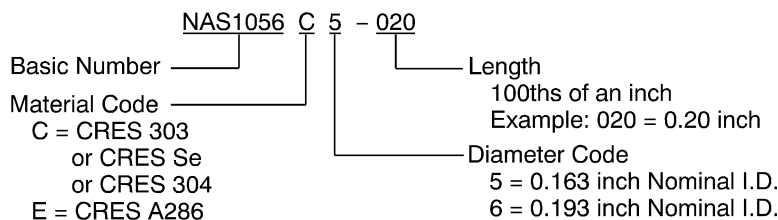
Connector Shell Size		Spacer		Reference
Minimum	Maximum	Part Number	Supplier	
8	16	NAS1056C5-()	QPL	Figure 3
		NAS1056C6-()	QPL	Figure 3
		NAS1057T1-()	QPL	Figure 4
		NAS1057W1-()	QPL	Figure 4
		NAS43DD1-()	QPL	Figure 5
18	28	NAS1056E5-()	QPL	Figure 3
		NAS1056E6-()	QPL	Figure 3
		NAS1057T3-()	QPL	Figure 4
		NAS1057W3-()	QPL	Figure 4
		NAS43DD3-()	QPL	Figure 5
36	36	BACS13S297B	Boeing	-

Table 6
APPROVED SUPPLIERS OF BOEING STANDARD SPACERS

Spacer	Supplier
BACS13S	Thomas & Betts

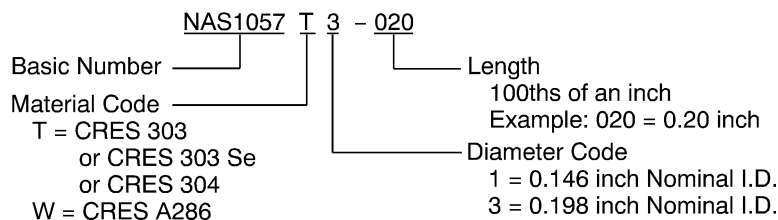
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION



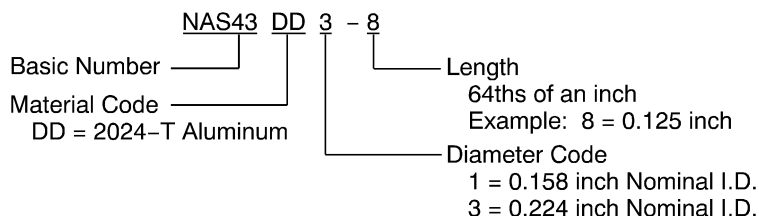
NAS1056 SPACER PART NUMBER STRUCTURE

Figure 3



NAS1057 SPACER PART NUMBER STRUCTURE

Figure 4



NAS43 SPACER PART NUMBER STRUCTURE

Figure 5

2. NECESSARY TOOLS

A. Connector Backshell Tools

**Table 7
CONNECTOR BACKSHELL TOOLS**

Backshell Tool	Part Number	Supplier
Strap Wrench	AT508K	Aircraft Tools
	ST2596G	Boeing
	ST2596C	Boeing
	TG-70	Glenair
Torque Driver	-	Available source
Torque Wrench	-	Available source

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

3. BACKSHELL DISASSEMBLY

A. Backshell Disassembly

- (1) If the backshell has safety wire, remove the safety wire from the cable clamp screws and the backshell coupling ring.
- (2) Remove the strain relief clamp screws.
- (3) Put the saddle bars, the screws, and the washers in a safe place.
- (4) Make a selection of a strap wrench from Table 7.
- (5) Disengage the threads of the backshell and the connector.

4. BACKSHELL ASSEMBLY

For the procedure to assemble a backshell without a shield ground wire termination, refer to Subject 20-60-09.

A. General Data

**Table 8
BACKSHELL INSTALLATION TORQUE VALUES**

Shell Size	Torque Wrench		Torque Value (inch-pounds)			
	Position (degree)	Reference	Aluminum Backshell		Stainless Steel Backshell	
			Minimum	Maximum	Minimum	Maximum
08	0	Figure 6	35	40	85	90
	45	Figure 7	35	40	85	90
	90	Figure 8	40	45	100	105
09	0	Figure 6	35	40	85	90
	45	Figure 7	35	40	85	90
	90	Figure 8	40	45	100	105
10	0	Figure 6	40	45	85	90
	45	Figure 7	40	45	85	90
	90	Figure 8	45	50	100	105
11	0	Figure 6	40	45	85	90
	45	Figure 7	40	45	85	90
	90	Figure 8	45	50	100	105
12	0	Figure 6	55	60	85	90
	45	Figure 7	55	60	85	90
	90	Figure 8	60	65	100	105
13	0	Figure 6	55	60	85	90
	45	Figure 7	55	60	85	90
	90	Figure 8	60	65	100	105

20-25-12

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

Table 8 (continued)

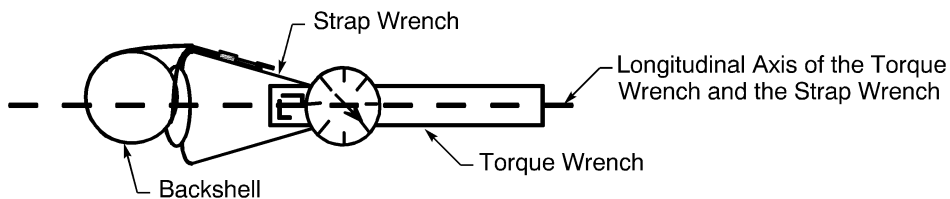
Shell Size	Torque Wrench		Torque Value (inch-pounds)			
	Position (degree)	Reference	Aluminum Backshell		Stainless Steel Backshell	
			Minimum	Maximum	Minimum	Maximum
14	0	Figure 6	65	70	120	125
	45	Figure 7	65	70	120	125
	90	Figure 8	75	80	140	145
15	0	Figure 6	65	70	120	125
	45	Figure 7	65	70	120	125
	90	Figure 8	75	80	140	145
16	0	Figure 6	75	80	120	125
	45	Figure 7	75	80	120	125
	90	Figure 8	90	95	140	145
17	0	Figure 6	75	80	120	125
	45	Figure 7	75	80	120	125
	90	Figure 8	90	95	140	145
18	0	Figure 6	95	100	140	145
	45	Figure 7	95	100	140	145
	90	Figure 8	115	120	160	165
19	0	Figure 6	95	100	140	145
	45	Figure 7	95	100	140	145
	90	Figure 8	115	120	160	165
20	0	Figure 6	105	110	165	170
	45	Figure 7	105	110	165	170
	90	Figure 8	125	130	190	195
21	0	Figure 6	105	110	165	170
	45	Figure 7	105	110	165	170
	90	Figure 8	125	130	190	195
22	0	Figure 6	105	110	165	170
	45	Figure 7	105	110	165	170
	90	Figure 8	125	130	190	195
23	0	Figure 6	105	110	165	170
	45	Figure 7	105	110	165	170
	90	Figure 8	125	130	190	195

STANDARD WIRING PRACTICES MANUAL

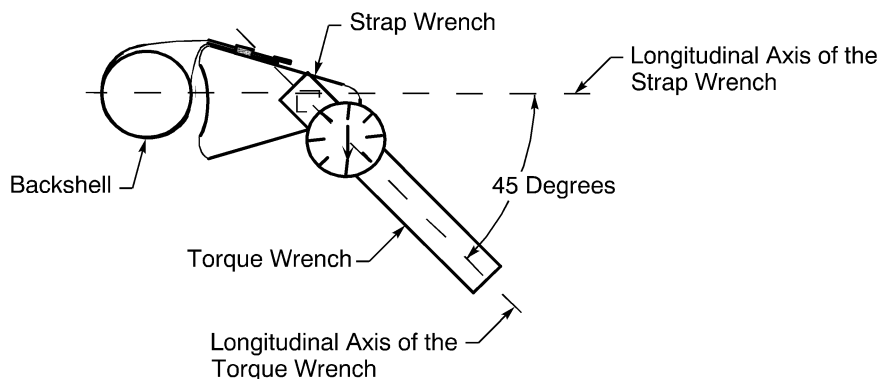
ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

Table 8 (continued)

Shell Size	Torque Wrench		Torque Value (inch-pounds)			
	Position (degree)	Reference	Aluminum Backshell		Stainless Steel Backshell	
			Minimum	Maximum	Minimum	Maximum
24	0	Figure 6	105	110	165	170
	45	Figure 7	105	110	165	170
	90	Figure 8	125	130	190	195
25	0	Figure 6	105	110	165	170
	45	Figure 7	105	110	165	170
	90	Figure 8	125	130	190	195
28	0	Figure 6	110	115	165	170
	45	Figure 7	110	115	165	170
	90	Figure 8	130	135	190	195



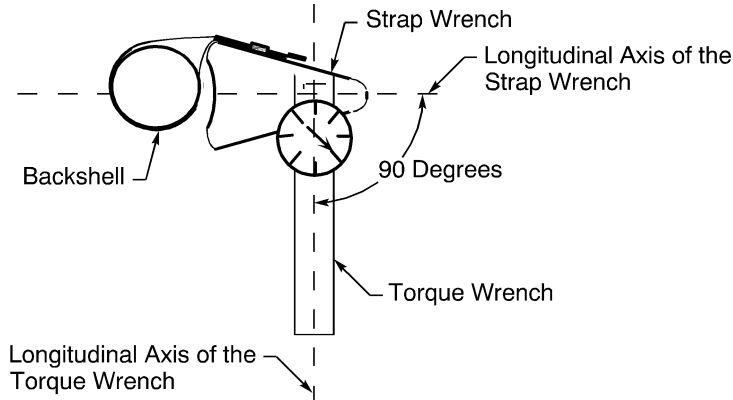
TORQUE WRENCH IN THE 0 DEGREE POSITION
Figure 6



TORQUE WRENCH IN THE 45 DEGREE POSITION
Figure 7

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

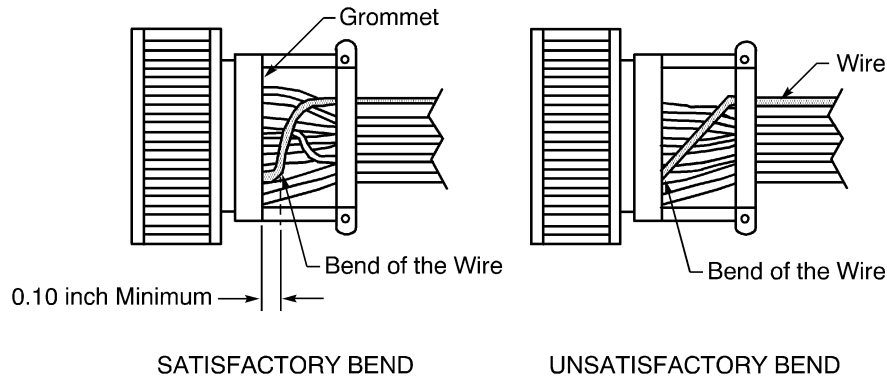


TORQUE WRENCH IN THE 90 DEGREE POSITION
Figure 8

B. Applicable Conditions for Backshell Assembly

These conditions are applicable for a wire harness in a backshell with a cable clamp:

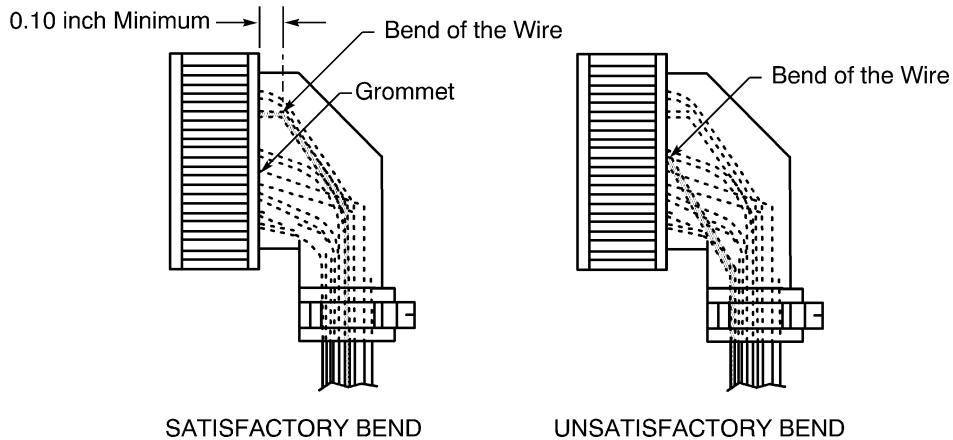
- Strain must not be put on the wires
- The wires must not have tension that pulls the seal webs of the grommet out of their shape
- The crimp barrel of a contact cannot be seen in the rear grommet of an environmental connector
- When a wire makes an exit from the rear of the connector grommet at an angle that is less than 60 degrees, the distance from the rear of the grommet to the bend must be 0.10 inch minimum
- Safety wire must be installed on the coupling ring of the backshell if the applicable conditions occur; refer to Subject 20-60-07.



BEND OF THE WIRE IN A STRAIGHT BACKSHELL
Figure 9

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION



BEND OF THE WIRE IN A 90 DEGREE BACKSHELL

Figure 10

C. Applicable Conditions for Strain Relief Assembly

These conditions are applicable for the assembly of the strain relief:

- The wires must not go across each other in the cable clamp
- The wire harness must have a minimum of two layers of tape for protection
- The tape must not be between the saddle bar and the backshell leg
- The wire harness must be held tightly in the cable clamp
- The cable clamp must not crush the wire harness
- The cable clamp screws must be tight.

The diameter of a wire harness must be increased when these conditions occur:

- The cable clamp does not hold the wire harness tightly
- The wire harness has a small number of wires
- The contact assemblies are installed only near the outer edge of the connector grommet

These conditions are applicable for the layers of tape:

- The forward and rear edges of the tape must extend a minimum of 0.06 inch farther than the edges of the saddle bar
- The edge of one layer is a maximum of 0.05 inch from the edge of a different layer
- For U shaped tape, each layer makes a 100 percent overlap.

Spacers must be installed between the saddle bar and the backshell leg when these conditions occur:

- The diameter of the wire harness is much larger than the diameter of the clamp
- The clamp crushes the wire harness before the screws are fully tightened.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

D. Necessary Materials

**Table 9
NECESSARY MATERIALS**

Material	Temperature Grade	Description	Part Number or Specification	Supplier
Filler Rod	C	Silicone	69B47691-()	Boeing
			BMS1-52	Boeing
	D	PTFE	AMS 3656	QPL
Tape	D	Silicone	912-10X12	Arlon
			Scotch 70	3M
		PTFE	P-212HD	Permacel
			P-421	Permacel
			P-440	Permacel
Tape, U Shaped	C	Silicone, 0.5 inch width	10-62034-1	Boeing
		Silicone, 0.4 inch width	10-62034-2	Boeing

E. Assembly of the Terminal Lug on the Shield Ground Wire

**Table 10
EQUIVALENT STUD SIZE**

Screw Diameter (inch)	Equivalent Stud Size
0.1120	4
0.1380	6
0.1640	8

**Table 11
RECOMMENDED TERMINAL LUGS**

Maximum Temperature Grade	Boeing Standard Terminal Lug
B	BACT12AC()
D	BACT12M()

- (1) Measure the diameter of the cable clamp screw.
- (2) Find the equivalent size of the stud for the terminal lug. Refer to Table 10.
- (3) Make a selection of a terminal lug. Refer to Table 11 and Subject 20-30-11.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

Make sure that:

- The type of terminal lug is applicable for the type of the shield ground wire
- The type of the terminal lug is applicable for the location of the installation of the connector
- The stud size hole of the terminal lug is applicable for the cable clamp screw.

(4) Assemble the terminal lug. Refer to Subject 20-30-11.

F. Backshell Assembly

(1) Make a selection of a strap wrench from Table 7.

(2) Put the necessary backshell components on the wire harness.

Make sure that the cable clamp of the backshell is pointed away from the end of the wire harness.

(3) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.

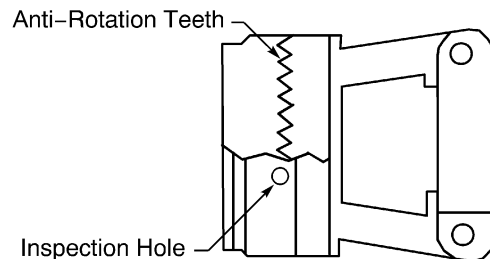
(4) Put the wires into their positions.

Make sure that:

- The wires do not go across each other
- The wires do not have tension that pulls the seal web out of its shape
- Strain is not put on the wires.

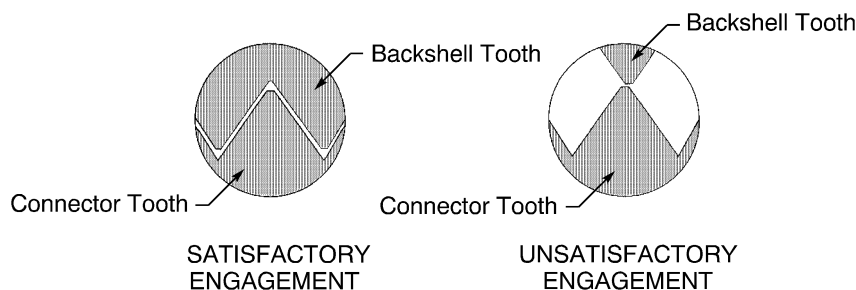
(5) If the backshell has anti-rotation teeth, examine the teeth of the backshell through the inspection hole. Refer to Figure 11.

Make sure that the backshell teeth are engaged with the connector teeth. Refer to Figure 12.



BACKSHELL WITH ANTI-ROTATION TEETH

Figure 11



ENGAGEMENT OF THE CONNECTOR TEETH AND THE BACKSHELL TEETH

Figure 12

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

- (6) Tighten the backshell on the connector with the strap wrench.

Make sure that:

- The backshell does not make more than 1/8 turn with the strap wrench
- The backshell is in the correct clock position.

CAUTION: DO NOT TIGHTEN THE BACKSHELL MORE THAN NECESSARY. DAMAGE TO THE BACKSHELL CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR OR THE BACKSHELL.

- (7) If the backshell has set screws, tighten one of the set screws.

- (8) Try to loosen the backshell manually.

NOTE: The backshell is installed correctly when the backshell does not move in relation to the connector.

- (9) If the backshell is loose, do Step (6) through Step (8) again.

- (10) Assemble the strain relief.

Refer to:

- Paragraph 4.G. for the assembly of the strain relief of a straight backshell
- Paragraph 4.H. for assembly of the strain relief of a 45 degree or a 90 degree backshell.

G. Strain Relief Assembly - Straight Backshell

**Table 12
CABLE CLAMP SCREW TORQUE VALUES**

Screw Size	Torque (inch-pounds)	
	Minimum	Maximum
4	10	12
6	15	23
8	25	30

- (1) Make a selection of a torque driver from Table 7.

- (2) Make a selection of a tape from Table 9.

Make sure that the tape is a minimum of 0.12 inch wider than the saddle bar.

NOTE: An equivalent tape is a satisfactory alternative. Refer to Subject 20-00-11.

NOTE: A thicker tape is recommended when the difference between the initial diameter of the wire harness and the inner diameter of the strain relief is large.

- (3) Align the screw holes in a saddle bar with the screw holes in the legs of the backshell.

- (4) Make a mark on the wire harness at the center of the width of the saddle bar.

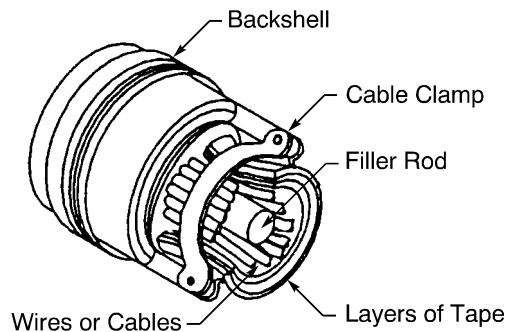
- (5) If the assembled contacts are installed only near the outer edge of the connector grommet:

- (a) Make a selection of a filler rod from Table 9.

- (b) Put the filler rod in the center of the group of wires where the saddle bars go across the wire harness. Refer to Figure 13.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

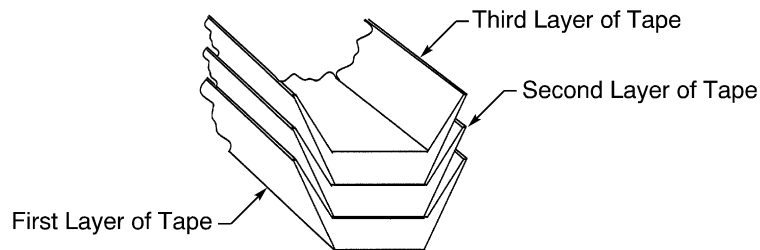


POSITION OF THE FILLER ROD
Figure 13

(6) Put a minimum of two layers of tape on the wires or cables at the location of the mark.

Make sure that:

- The outer diameter of the wire harness with the layers of tape is larger than the inner diameter of the strain relief
- The center of the layers of tape is aligned with the center of the saddle bar
- The edge of the tape extends a minimum of 0.06 inch farther than each edge of the saddle bar
- The edge of one layer of the tape is a maximum of 0.05 inch from the edge of a different layer of tape
- For U shaped tape, each layer of tape makes a 100 percent overlap.

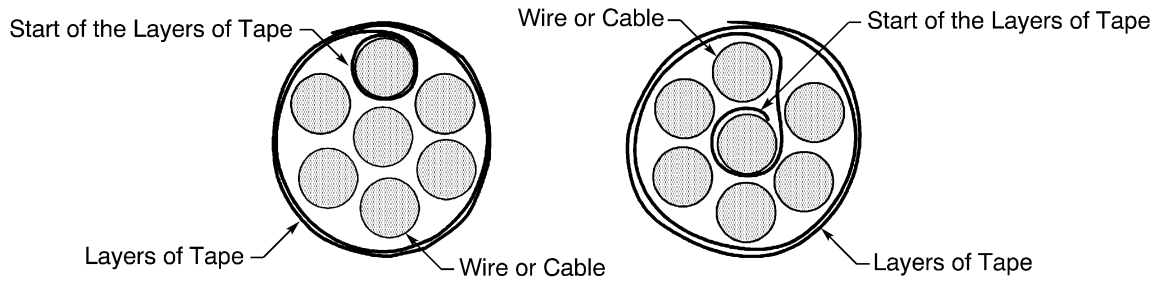


CONFIGURATION OF THE LAYERS OF U SHAPED TAPE
Figure 14

(a) Wind the tape around one wire to hold it in its position. Refer to Figure 15.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION



FIRST CONFIGURATION SECOND CONFIGURATION
CONFIGURATIONS OF THE LAYERS OF TAPE
Figure 15

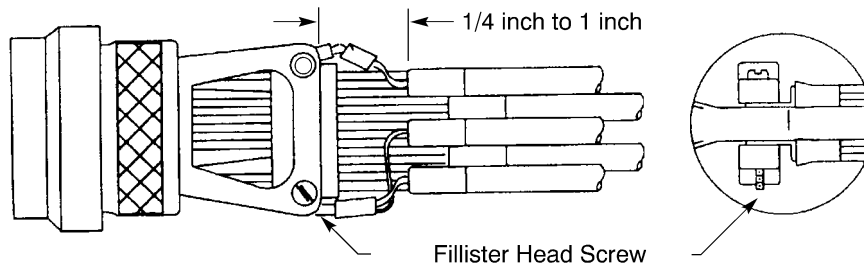
- (b) Continue to wind the tape around the wire harness until the tape is fully installed.
- (7) If spacers are necessary, specified, or installed on the initial backshell assembly, make a selection of a spacer from Table 5.

Make sure that the spacer is the smallest that can make a tight fit of the wire harness in the strain relief.

NOTE: A minimum of two spacers are necessary, one for each screw.

NOTE: The initial spacers can be installed again if they do not have damage.

- (8) If lockwashers are supplied, put a lockwasher on each screw.
- (9) If 1 to 4 terminal lugs must be installed, put each terminal lug in its position. Refer to Figure 16.



CABLE CLAMP CONFIGURATION WITH 1 TO 4 TERMINAL LUGS
Figure 16

- (a) Put a screw through a hole in a saddle bar.
- (b) Put a terminal lug on the screw.
- (c) If spacers are necessary, put a spacer on the screw.
- (d) Put the saddle bar with the screw against the backshell legs.
- (e) Put the screw through the hole in the backshell leg.

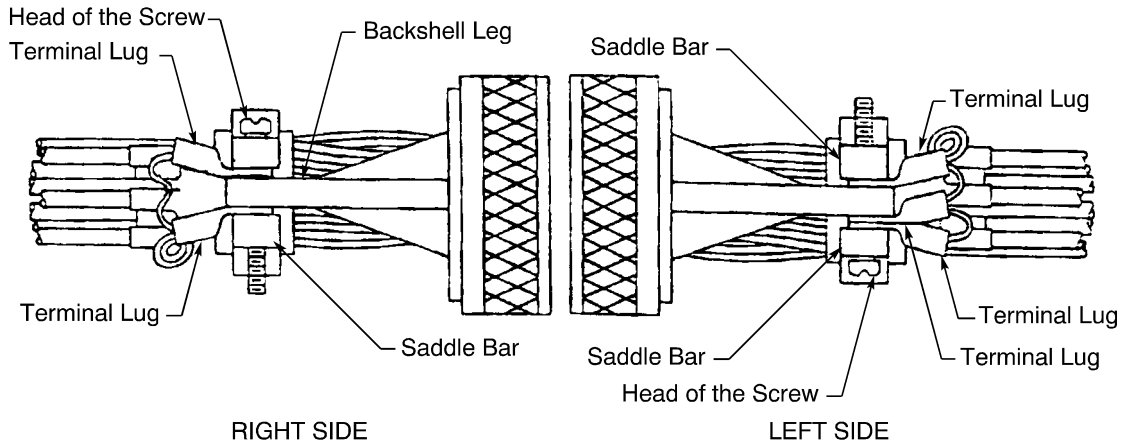
From the rear of the backshell, make sure that the head of the screw on the right is pointed up and the head on the screw on the left is pointed down.

- (f) If the wire harness has more terminal lugs, put a terminal lug on the screw.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

- (g) Put the other saddle bar against the backshell legs.
 - (h) Engage the threads of the screw and the threads of the nut.
 - (i) Put a screw through the empty hole in the saddle bar.
From the rear of the backshell, make sure that the head of the screw on the right is pointed up and the head on the screw on the left is pointed down.
 - (j) If the wire harness has more terminal lugs, put a terminal lug on the screw.
 - (k) Push the screw through the hole in the backshell leg.
 - (l) If the wire harness has more terminal lugs, put a terminal lug on the screw.
 - (m) If spacers are necessary, put a spacer on the screw.
 - (n) Engage the threads of the screw and the threads of the nut.
- (10) If 5 terminal lugs must be installed, put each terminal lug in its position. Refer to Figure 17.



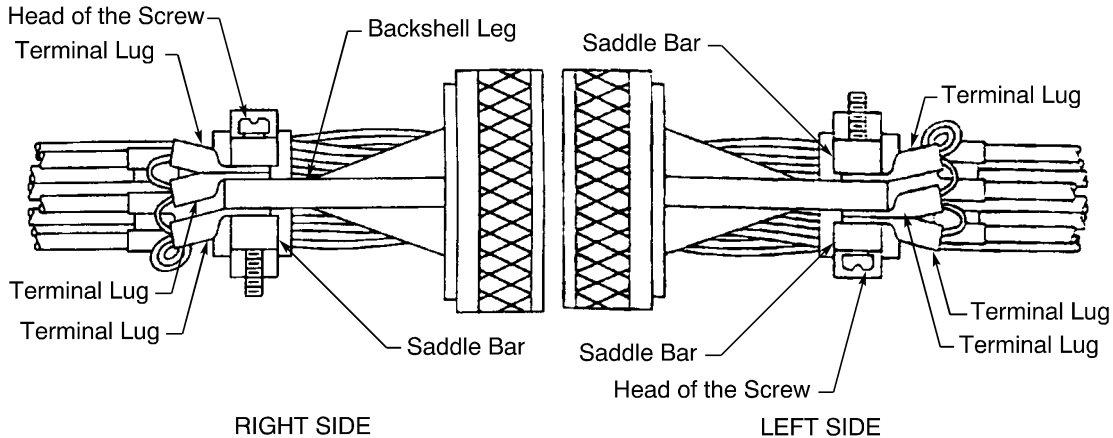
CABLE CLAMP CONFIGURATION WITH 5 TERMINAL LUGS
Figure 17

- (a) Put a screw through a hole in a saddle bar.
- (b) Put a terminal lug on the screw.
- (c) Put a different terminal lug on the screw.
- (d) If spacers are necessary, put a spacer on the screw.
- (e) Put the saddle bar with the screw against the backshell legs.
- (f) Put the screw through the hole in the backshell leg.
From the rear of the backshell, make sure that the head of the screw on the right is pointed up and the head on the screw on the left is pointed down.
- (g) Put a terminal lug on the screw.
- (h) Put the other saddle bar against the backshell legs.
- (i) Engage the threads of the screw and the threads of the nut.
- (j) Put a screw through the empty hole in the saddle bar.
From the rear of the backshell, make sure that the head of the screw on the right is pointed up and the head on the screw on the left is pointed down.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

- (k) Put a terminal lug on the screw.
 - (l) Put the screw through the hole in the backshell leg.
 - (m) If spacers are necessary, put a spacer on the screw.
 - (n) Put the remaining terminal lug on the screw.
 - (o) Engage the threads of the screw and the threads of the nut.
- (11) If the 6 terminal lugs must be installed, put each terminal lug in its position. Refer to Figure 18.



CABLE CLAMP CONFIGURATION WITH 6 TERMINAL LUGS

Figure 18

- (a) Put a screw through a hole in a saddle bar.
- (b) Put a terminal lug on the screw.
- (c) Put a different terminal lug on the screw.
- (d) If spacers are necessary, put a spacer on the screw.
- (e) Put the saddle bar with the screw against the backshell legs.
- (f) Put the screw through the hole in the backshell leg.
From the rear of the backshell, make sure that the head of the screw on the right is pointed up and the head on the screw on the left is pointed down.
- (g) Put a terminal lug on the screw.
- (h) Put the other saddle bar against the backshell legs.
- (i) Engage the threads of the screw and the threads of the nut.
- (j) Put a screw through the empty hole in the saddle bar.
From the rear of the backshell, make sure that the head of the screw on the right is pointed up and the head on the screw on the left is pointed down.
- (k) Put a terminal lug on the screw.
- (l) Put a different terminal lug on the screw.
- (m) Put the screw through the hole in the backshell leg.
- (n) If spacers are necessary, put a spacer on the screw.
- (o) Put the remaining terminal lug on the screw.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

- (p) Engage the threads of the screw and the threads of the nut.
- (12) Tighten the cable clamp screws.

Make sure that:

- The cable clamp does not crush or pinch the wire harness
- If the saddle bar and the backshell leg do not touch, the distance between the saddle bar and the backshell leg is approximately equal on each side of the cable clamp
- The layers of tape are not pinched between the saddle bars and the backshell leg
- The screws do not cause an interference with a wire harness or a component.

NOTE: It is not necessary for the saddle bars to touch the legs of the backshell.

- (13) If the wire harness is not held tightly:
 - (a) Remove the cable clamp screws.
 - (b) Wind two layers of tape on the wire harness on the existing layers of tape.
 - (c) Do Step (9), Step (10), or Step (11) again.
 - (d) Do Step (12) again.
- (14) Torque the screws to the specified value in Table 12.

Make sure that:

- The saddle bars are tight against the shield ground wire terminal lug
- The shield ground wire terminal lug is tight against the backshell leg
- The clamp does not crush or pinch the wire harness
- The layers of tape are not pinched between the saddle bars and the backshell leg
- The screws do not cause an interference with a wire harness or a component.

H. Strain Relief Assembly - 45 Degree or 90 Degree Backshell

**Table 13
CABLE CLAMP SCREW TORQUE VALUES**

Screw Size	Torque (inch-pounds)	
	Minimum	Maximum
4	10	12
6	15	23
8	25	30

**Table 14
FLAT WASHER PART NUMBERS**

Part Number	Supplier
NAS620()	Available source

- (1) Make a selection of a torque driver from Table 7.
- (2) Make a selection of a tape from Table 9.

STANDARD WIRING PRACTICES MANUAL

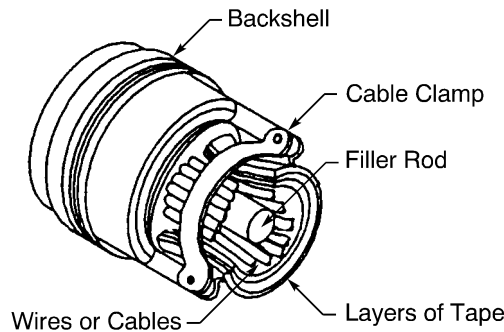
ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

Make sure that the tape is a minimum of 0.12 inch wider than the saddle bar.

NOTE: An equivalent tape is a satisfactory alternative. Refer to Subject 20-00-11.

NOTE: A thicker tape is recommended when the difference between the initial diameter of the wire harness and the inner diameter of the strain relief is large.

- (3) Align the screw holes in a saddle bar with the screw holes in the legs of the backshell.
- (4) Make a mark on the wire harness at the center of the width of the saddle bar.
- (5) If the assembled contacts are installed only near the outer edge of the connector grommet:
 - (a) Make a selection of a filler rod from Table 9.
 - (b) Put the filler rod in the center of the group of wires where the saddle bar goes across the wire harness. Refer to Figure 19.

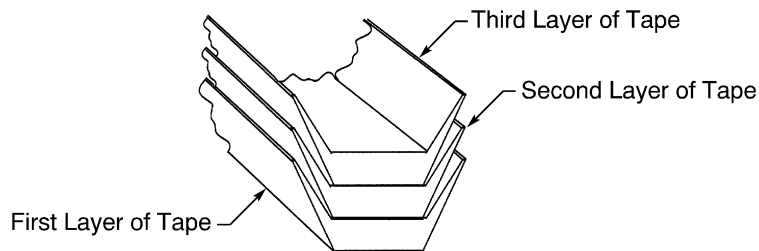


POSITION OF THE FILLER ROD
Figure 19

- (6) Put a minimum of two layers of tape on the wires or cables at the location of the mark.

Make sure that:

- The outer diameter of the wire harness with the layers of tape is larger than the inner diameter of the saddle bars
- The center of the layers of tape is aligned with the center of the saddle bar
- The edge of the tape extends a minimum of 0.06 inch farther than each edge of the saddle bar
- The edge of one layer of the tape is a maximum of 0.05 inch from the edge of a different layer of tape
- For U shaped tape, each layer of tape makes a 100 percent overlap.

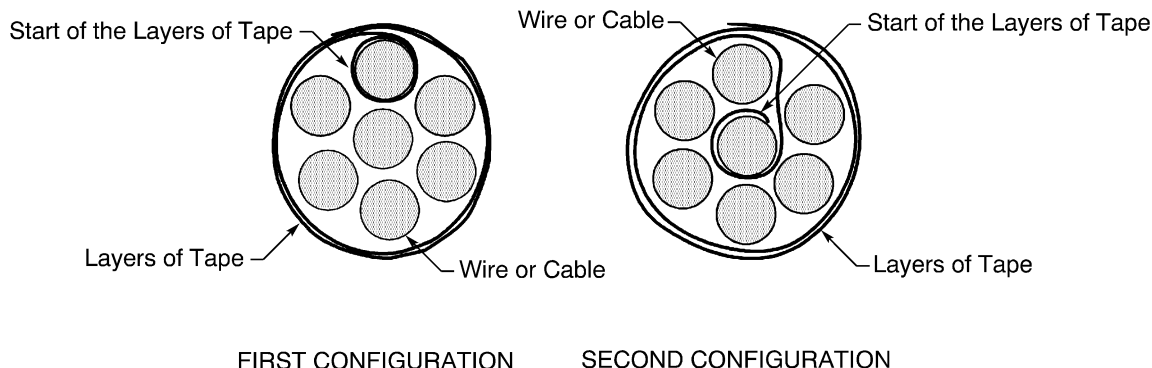


CONFIGURATION OF THE LAYERS OF U SHAPED TAPE
Figure 20

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

- (a) Wind the tape around one wire to hold it in its position. Refer to Figure 21.



CONFIGURATIONS OF THE LAYERS OF TAPE
Figure 21

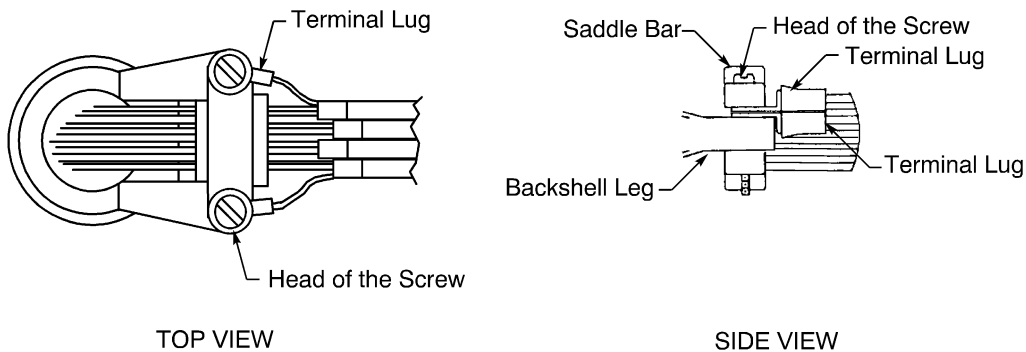
- (b) Continue to wind the tape around the wire harness until the tape is fully installed.
- (7) If spacers are necessary, specified, or installed on the initial backshell assembly, make a selection of a spacer from Table 5.

Make sure that the spacer is the smallest that can make a tight fit of the wire harness in the strain relief.

NOTE: A minimum of two spacers are necessary, one for each screw.

NOTE: The initial spacers can be installed again if they do not have damage.

- (8) If 1 to 4 terminal lugs must be installed, put each terminal lug in its position. Refer to Figure 22.



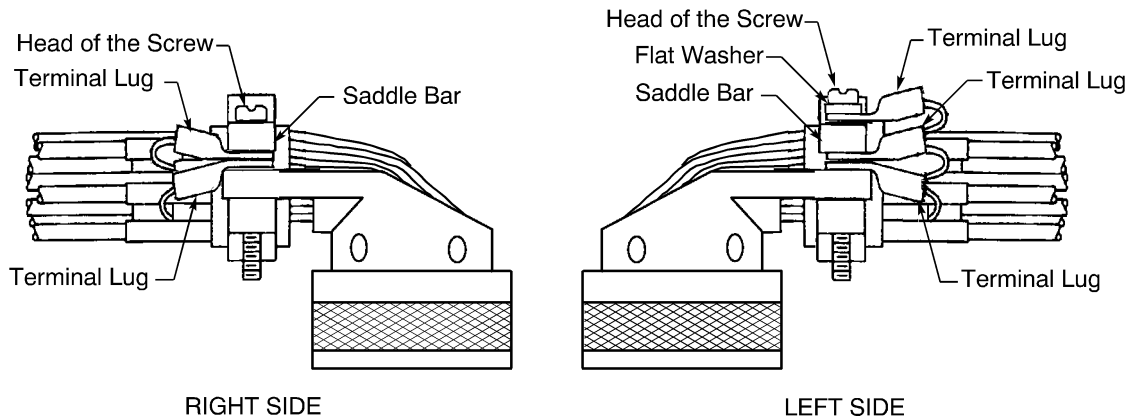
CABLE CLAMP CONFIGURATION WITH 1 TO 4 TERMINAL LUGS
Figure 22

- (a) If lockwashers are supplied, put a lockwasher on each screw.
- (b) Put a screw through a hole in the saddle bar.
- (c) Put a terminal lug on the screw.
- (d) If the wire harness has more terminal lugs, put a terminal lug on the screw.
- (e) If spacers are necessary, put a spacer on the screw.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION

- (f) Put the saddle bar against the backshell legs.
 - (g) Engage the threads of the screw and the threads of the nut.
 - (h) Put the remaining screw through the hole in the other end of the saddle bar.
 - (i) If the wire harness has more terminal lugs, put the remaining terminal lugs on the screw.
 - (j) If spacers are necessary, put a spacer on the screw.
 - (k) Engage the threads of the screw and the threads of the nut.
- (9) If 5 terminal lugs must be installed, put each terminal lug in its position. Refer to Figure 23.



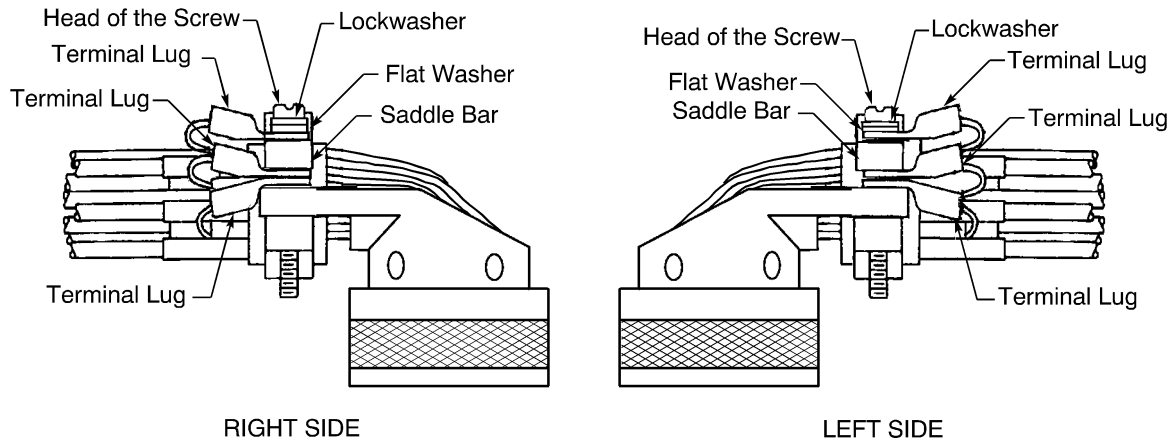
CABLE CLAMP CONFIGURATION WITH 5 TERMINAL LUGS

Figure 23

- (a) Make a selection of the applicable size of flat washer from Table 14.
 - (b) If lockwashers are supplied, put a lockwasher on each screw.
 - (c) Put the flat washer on the one of the screws.
 - (d) Put a terminal lug on the screw against the flat washer.
 - (e) Put the screw through the hole in the saddle bar.
 - (f) Put a terminal lug on the screw.
 - (g) Put a different terminal lug on the screw.
 - (h) If spacers are necessary, put a spacer on the screw.
 - (i) Put the saddle bar against the backshell legs.
 - (j) Engage the threads of the screw and the threads of the nut.
 - (k) Put the other screw through the hole on the other end of the saddle bar.
 - (l) Put a terminal lug on the screw.
 - (m) If spacers are necessary, put a spacer on the screw.
 - (n) Put the remaining terminal lug on the screw.
 - (o) Engage the threads of the screw and the threads of the nut.
- (10) If 6 terminal lugs must be installed, put each terminal lug in its position. Refer to Figure 24.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION



CABLE CLAMP CONFIGURATION WITH 6 TERMINAL LUGS

Figure 24

- (a) Make a selection of the applicable size of flat washer from Table 14.
 - (b) If lockwashers are supplied, put a lockwasher on each screw.
 - (c) Put a flat washer on each screw.
 - (d) Put a terminal lug on the screw against the flat washer.
 - (e) Put the screw through the hole in the saddle bar.
 - (f) Put a terminal lug on the screw.
 - (g) Put a different terminal lug on the screw.
 - (h) If spacers are necessary, put a spacer on the screw.
 - (i) Put the saddle bar against the backshell legs.
 - (j) Engage the threads of the screw and the threads of the nut.
 - (k) Put a terminal lug on the remaining screw.
 - (l) Put the screw through the hole on the other end of the saddle bar.
 - (m) Put a terminal lug on the screw.
 - (n) Put a different terminal lug on the screw.
 - (o) If spacers are necessary, put a spacer on the screw.
 - (p) Engage the threads of the screw and the threads of the nut.
- (11) Tighten the cable clamp screws.

Make sure that:

- The cable clamp does not crush or pinch the wire harness
- If the saddle bar and the backshell leg do not touch, the distance between the saddle bar and the backshell leg is approximately equal on each side of the cable clamp
- The layers of tape are not pinched between the saddle bars and the backshell leg
- The screws do not cause an interference with a wire harness or a component.

NOTE: It is not necessary for the saddle bars to touch the legs of the backshell.

- (12) If the wire harness is not held tightly:

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITH A SHIELD TERMINATION**

- (a) Remove the cable clamp screws.
 - (b) Wind two layers of tape on the wire harness on the existing layers of tape.
 - (c) Do Step (8), Step (9), or Step (10) again.
 - (d) Do Step (11) again.
- (13) Torque the screws to the specified value in Table 13.
Make sure that:
- The saddle bars are tight against the shield ground wire terminal lug
 - The shield ground wire terminal lug is tight against the backshell leg
 - The clamp does not crush or pinch the wire harness
 - The layers of tape are not pinched between the saddle bars and the backshell leg
 - The screws do not cause an interference with a wire harness or a component.
- (14) If screws are too long and screws with a shorter length are not available, cut off the unwanted length.
Make sure that the end of the screw is smooth and has no rough edges.
- CAUTION:** DO NOT LET METAL SAWDUST OR THE UNWANTED LENGTH OF THE SCREW FALL ON OR INTO THE WIRE HARNESS OR ON THE REAR GROMMET OF THE CONNECTOR. SHARP METAL PIECES CAN CAUSE DAMAGE TO THE WIRES AND THE CONNECTOR.
- (15) If safety wire is necessary, install safety wire on each screw.
Refer to Subject 20-60-07 for:
- The applicable conditions that make the installation of the safety wire on the cable clamp screw necessary
 - The procedures to install the safety wire.



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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

This subject gives the procedures to attach a shield of a cable or wire to a peripheral backshell to get a low resistance electrical bond.

1. PART NUMBERS AND DESCRIPTION

A. Connector Backshell Part Numbers

**Table 1
PERIPHERAL BACKSHELL PART NUMBERS**

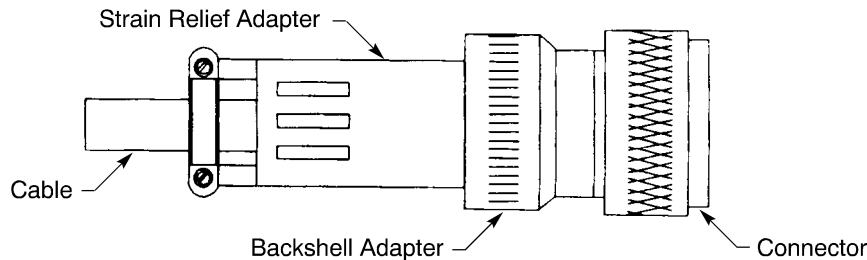
Boeing Specification	Configuration	Part Number	Supplier
-	-	380()001()	Glenair
-	-	380()003	Glenair
-	-	387()	Glenair
S280W605()-1	Straight Cable	467AS009LF10FR	Glenair
S280W605()-2	45 Degree Cable	467AH009LF10FR	Glenair
S280W605()-3	90 Degree Cable	467AJ009LF10FR	Glenair
-	-	G387()	Glenair
-	-	G4993	Glenair
-	-	G9034()	Glenair
-	-	G9166()	Glenair

B. Connector Backshell Description

The peripheral backshell has these technical features:

- It is conductive
- It gives a low impedance connection from the connector to the cable shield
- It can be repaired.

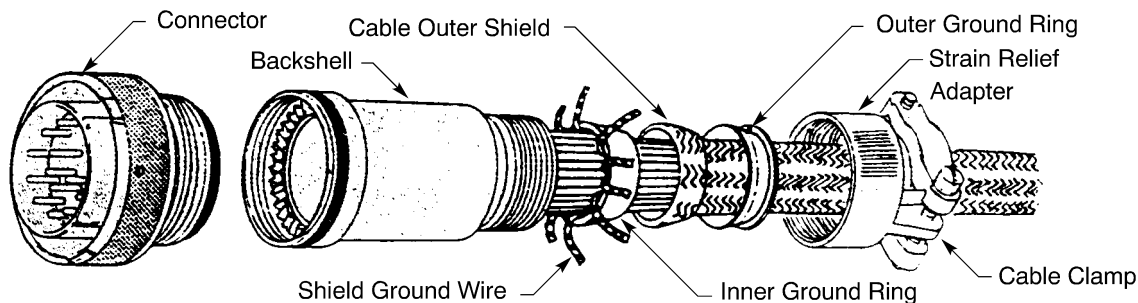
NOTE: Many components of the different peripheral backshells have the same configuration. The primary difference between the backshells are the design and configuration of the ground rings.



**S280W605() PERIPHERAL BACKSHELL ASSEMBLY
Figure 1**

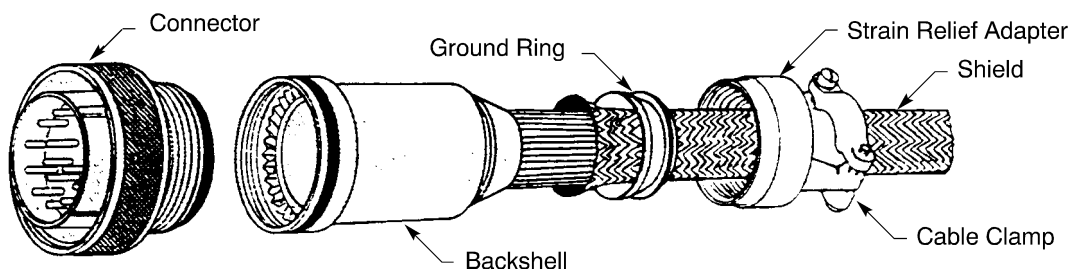
STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS



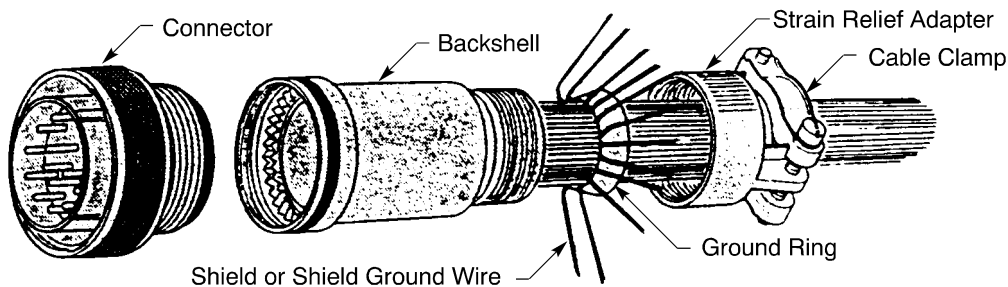
CONFIGURATION OF THE GLENAIR 380()001() PERIPHERAL BACKSHELL

Figure 2



CONFIGURATION OF THE GLENAIR G387() AND G4993 PERIPHERAL BACKSHELLS

Figure 3



CONFIGURATION OF THE GLENAIR 380()003, 387(), G9034(), AND G9166() PERIPHERAL BACKSHELLS

Figure 4

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

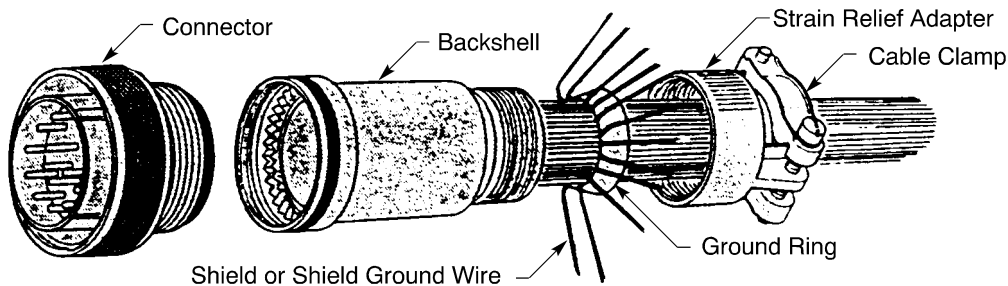
2. BACKSHELL DISASSEMBLY

A. Disassembly of a Peripheral Backshell with 1 Ground Ring

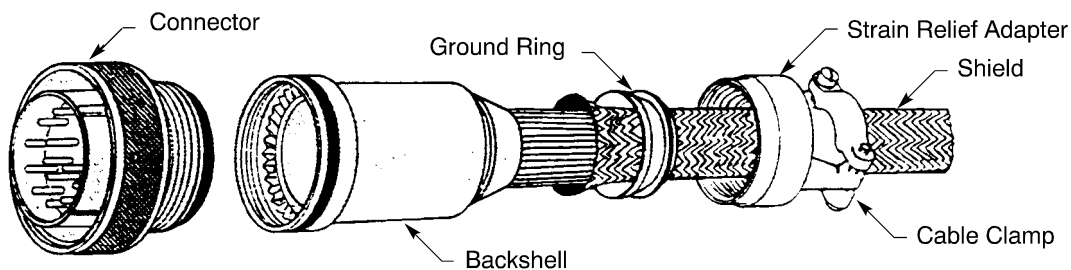
This paragraph gives the procedure to disassemble these Glenair peripheral backshells:

- 380()003
- 387()
- G387()
- G4993
- G9034()
- G9166().

NOTE: Figure 6 and Figure 5 show straight backshells. The procedure to disassemble the 45 degree configuration and 90 degree configuration is the same as the procedure for the straight configuration.



DISASSEMBLY OF THE GLENAIR 380()003, 387(), G9034(), AND G9166() BACKSHELLS
Figure 5



DISASSEMBLY OF THE GLENAIR G387() AND G4993 BACKSHELLS
Figure 6

- (1) Loosen the cable clamp screws of the strain relief adapter.
- (2) Remove any insulation tape on the cable that was the saddle bars of the clamp.
- (3) Loosen the strain relief adapter until it is free from the body of the backshell.
- (4) Push the adapter away from the body of the backshell.
- (5) Push the ground ring away from the body of the backshell.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

- (6) Push the strands of the outer shield of the primary cable against the surface of the cable so that the end of the shield is flat against the wires in the cable.
- (7) Loosen the body of the backshell from the connector.
- (8) Carefully push the body of the backshell away from the connector.

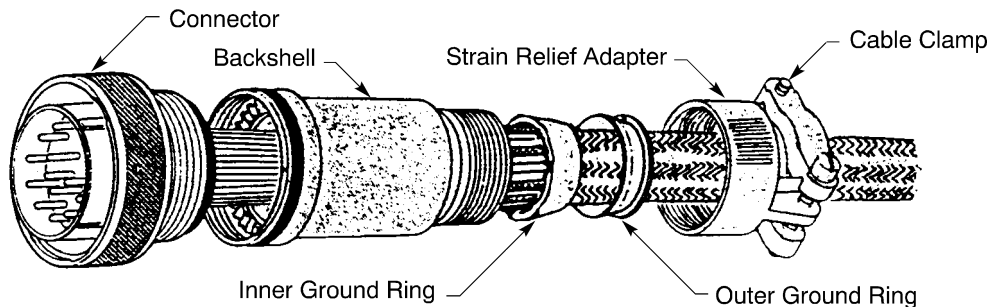
Make sure that:

- The end of the shield goes into the cable exit at the rear of the backshell
 - The backshell moves smoothly on the surface of the shield
 - The shield stays symmetrical around the wires in the cable.
- (9) Disassemble the connector. Refer to the applicable Subject.
 - (10) Remove these components from the cable:
 - The body of the backshell
 - The ground ring
 - The strain relief adapter.

B. Disassembly of a Peripheral Backshell with 2 Ground Rings

This paragraph gives the procedure to disassemble the Glenair 380()001() peripheral backshell.

NOTE: Figure 7 shows a straight backshell. The procedure to disassemble the 45 degree configuration and 90 degree configuration is the same as the procedure for the straight configuration.



DISASSEMBLY OF THE GLENAIR 380()001() BACKSHELL
Figure 7

- (1) Loosen the cable clamp screws of the strain relief adapter.
- (2) Remove any insulation tape on the cable that was the saddle bars of the clamp.
- (3) Loosen the strain relief adapter until it is free from the body of the backshell.
- (4) Push the adapter away from the body of the backshell.
- (5) Push the outer ground ring away from the body of the backshell.
- (6) Push the strands of the outer shield of the primary cable under the end of the inner ground ring with a plastic awl or an equivalent tool.

Make sure that the end of the shield is flat against the wires in the cable.

- (7) Move the inner ground ring away from the body of the backshell.

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

Make sure that:

- The ground ring moves smoothly on the surface of the shield
- The shield stays symmetrical around the wires in the cable.

(8) Loosen the body of the backshell from the connector.

(9) Carefully push the body of the backshell away from the connector.

Make sure that:

- The end of the shield goes into the cable exit at the rear of the backshell
- The backshell moves smoothly on the surface of the shield
- The shield stays symmetrical around the wires in the cable.

(10) Disassemble the connector. Refer to the applicable Subject.

(11) Remove these components from the cable:

- The body of the backshell
- The inner ground ring
- The outer ground ring
- The strain relief adapter.

3. TORQUE VALUES FOR BACKSHELL ASSEMBLY

A. Backshell to Connector Torque

**Table 2
BACKSHELL TO CONNECTOR TORQUE VALUES**

Connector Shell Size	Coupling Ring Torque (inch-pound)		Torque Wrench Setting (inch-pound)	
	Minimum	Maximum	Minimum	Maximum
10	45	50	39	44
12	65	70	56	61
14	85	90	73	78
16	105	110	91	96
18	135	140	117	122
20	145	150	125	130
22	145	150	125	130
24	145	150	125	130
28	155	160	134	139

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

B. Strain Relief Adapter to Backshell Torque

**Table 3
STRAIN RELIEF ADAPTER TO BACKSHELL TORQUE VALUES**

Connector Shell Size	Strain Relief Torque (inch-pound)		Torque Wrench Setting (inch-pound)	
	Minimum	Maximum	Minimum	Maximum
10	45	50	39	44
12	45	50	39	44
14	45	50	39	44
16	45	50	39	44
18	55	60	48	53
20	75	80	65	70
22	85	90	73	78
24	95	100	81	86
28	105	110	91	96

4. ASSEMBLY OF THE GLENAIR G387() AND G4993 PERIPHERAL BACKSHELLS

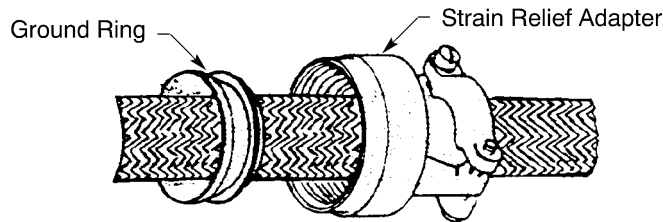
This paragraph gives the procedures to attach the end of the one shield of the primary cable to a backshell.

A. Cable Preparation

(1) In order, put these components on the end of the cable:

- The strain relief adapter
- The ground ring.

Refer to Figure 8.



POSITION OF THE GROUND RING AND THE STRAIN RELIEF ADAPTER ON THE CABLE

Figure 8

- (2) Temporarily attach the backshell to the connector.
- (3) Push the end of the cable into the backshell until the end of the cable touches the rear grommet of the connector.
- (4) If the cable has an outer jacket:
 - (a) Make a mark on the jacket 0.5 inches away from the rear end of the backshell.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS**

- (b) Remove the length of jacket between the mark and the end of the cable. Refer to Subject 20-00-15.
- (5) If the cable does not have a jacket, make a mark on the shield of the cable at the rear end of the backshell.
- (6) Remove the backshell from the connector.
- (7) Put the backshell on the end of the cable so that the front end of the backshell is beyond the end of the cable.
- (8) If the cable does not have a jacket, remove the length of shield between the end of the cable and the mark from Step (5). Refer to Subject 20-00-15.
- (9) If the cable has a jacket remove the necessary length of the shield so that the distance from the end of the shield to the end of the jacket is 0.5 inch. Refer to Subject 20-00-15.
- (10) Assemble the connector. Refer to the applicable Subject for the connector.

B. Backshell Installation

- (1) Push the backshell along the cable until the front of the backshell touches the back of the connector.
- (2) Engage the threads of the backshell and the connector.
- (3) Torque the backshell to the value specified in Table 2 with a strap wrench that has a 0.375 inch drive.

C. Strain Relief Adapter Installation

- (1) Move the strands at the end of the shield apart with a plastic awl or an equivalent tool.
- (2) Put the strands of the shield in sequence on the outer surface of the slope at the rear end of the backshell body.
Make sure that the strands of the shield do not make an overlap with each other.
- (3) Push the ground ring against the rear surface of the backshell so that the strands of the shield are between the ring and the slope of the backshell.
- (4) If the strands of the shield extend beyond the outer edge of the ground ring, cut the strands so that the end of the strands is aligned with the edge of the ground ring.
- (5) If it is necessary, put the sufficient layers of Scotch 70 insulation tape on the cable so that:
 - The layers of tape will be under the cable clamp
 - The quantity of the tape is sufficient for the cable clamp to hold the cable firmly in position.
- (6) Push the strain relief adapter against the rear of the backshell.
- (7) Engage the threads of the adapter and the backshell.
- (8) Torque the adapter to the value specified in Table 3 with a strap wrench that has a 0.375 inch drive.
- (9) Tighten the screws of the cable clamp.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS****5. ASSEMBLY OF THE GLENAIR 380()003, 387(), G9034(), AND G9166() PERIPHERAL BACKSHELLS**

This paragraph gives the procedures to assemble and attach the shield ground wires of these shields to a backshell:

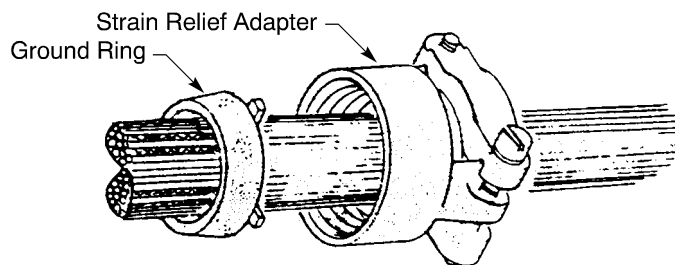
- The shield of the primary cable
- The adjacent shields of a primary cable
- The shield of each wire or cable in the primary cable.
- The adjacent shields of each wire or cable in the primary cable.

A. Cable Preparation

(1) In order, put these components on the end of the cable:

- The strain relief adapter
- The ground ring

Refer to Figure 9.

**POSITION OF THE GROUND RING AND THE STRAIN RELIEF ADAPTER ON THE CABLE****Figure 9**

- (2) Temporarily attach the backshell to the connector.
- (3) Push the end of the cable into the backshell until the end of the cable touches the rear grommet of the connector.
- (4) If the cable has an outer jacket:
 - (a) Make a mark on the jacket at the rear end of the backshell.
 - (b) Remove the length of jacket between the mark and the end of the cable. Refer to Subject 20-00-15.
- (5) If the cable does not have a jacket, make a mark on the shield of the cable at the rear end of the backshell.
- (6) Remove the backshell from the connector.
- (7) Put the backshell on the cable.
- (8) Assemble an uninsulated shield ground wire on the end of the shield of the primary cable. Refer to Subject 20-10-15.

Make sure that the shield ground wire configuration is applicable for the shielded cable.

- (9) Assemble an uninsulated shield ground wire on the shield of each shielded wire or shielded cable in the primary cable. Refer to Subject 20-10-15.

Make sure that the shield ground wire configuration is applicable for each shielded cable or shielded wire.

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- (10) Assemble the connector. Refer to the applicable Subject for the connector.

B. Backshell Installation

- (1) Push the backshell along the cable until the front of the backshell touches the back of the connector.
- (2) Engage the threads of the backshell and the connector.
- (3) Torque the backshell to the value specified in Table 2 with a strap wrench that has a 0.375 inch drive.

C. Strain Relief Adapter Installation

- (1) Put the shield ground wire or wires in sequence around the body of the backshell.
Make sure that each shield ground wire does not make an overlap with another shield ground wire.
- (2) Push the ground ring against the rear surface of the backshell so that the shield ground wires are between the ring and the rear end of the backshell.
- (3) If it is necessary, put the sufficient layers of Scotch 70 insulation tape on the cable so that:
 - The layers of tape will be under the cable clamp
 - The quantity of the tape is sufficient for the cable clamp to hold the cable firmly in position.
- (4) Make a selection of the location of the end of the shield ground wires for the completed assembly.
- (5) If the ends of the shield ground wires are at the rear end of the backshell:
 - (a) Cut each shield ground wire so that the end of each wire is aligned with the forward edge of the ground ring.
 - (b) Push the strain relief adapter against the rear of the backshell.
- (6) If the ends of the shield ground wires are at the rear end of the strain relief:
 - (a) Fold each shield ground wire back over the ground ring the wires are flat against the outer surface of the primary cable.
 - (b) Push the strain relief adapter over the shield ground wires until the adapter is against the rear of the backshell.
Make sure that each shield ground wire is inside the adapter.
- (7) Engage the threads of the adapter and the backshell.
- (8) Torque the adapter to the value specified in Table 3 with a strap wrench that has a 0.375 inch drive.
- (9) Tighten the screws of the cable clamp.

6. ASSEMBLY OF THE GLENAIR 380(001) PERIPHERAL BACKSHELL

This paragraph gives the procedures to assemble and attach the shield ground wires of these shields to a backshell:

- The shield of each wire or cable in the primary cable.
- The adjacent shields of each wire or cable in the primary cable.

A. Cable Preparation

- (1) In order, put these components on the end of the cable:
 - The strain relief adapter
 - The outer ground ring
 - The inner ground ring.
- (2) Temporarily attach the backshell to the connector.
- (3) Push the end of the cable into the backshell until the end of the cable touches the rear grommet of the connector.

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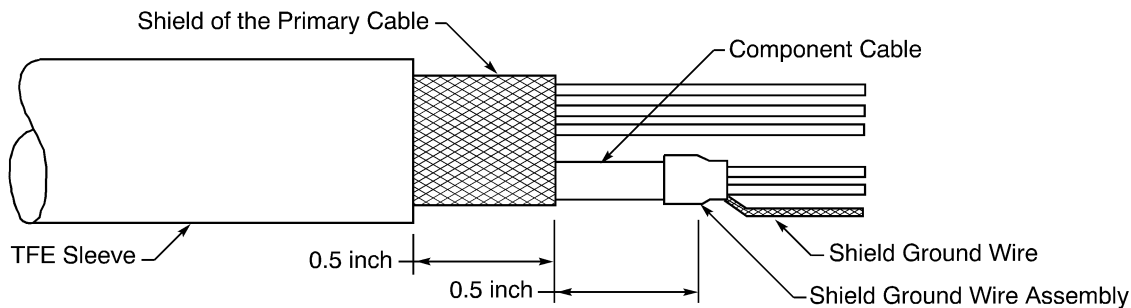
STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

- (4) If the cable has an outer jacket:
 - (a) Make a mark on the jacket 0.5 inches away from the rear end of the backshell.
 - (b) Remove the length of jacket between the mark and the end of the cable. Refer to Subject 20-00-15.
- (5) If the cable does not have a jacket, make a mark on the shield at the rear end of the backshell.
- (6) Remove the backshell from the connector.
- (7) Put the backshell on the cable.
- (8) If the cable has a jacket remove the necessary length of the shield so that the distance from the end of the shield to the end of the jacket is 0.5 inch. Refer to Subject 20-00-15.
- (9) If the cable does not have a jacket, remove the length of shield between the end of the cable and the mark from Step (5). Refer to Subject 20-00-15.
- (10) Assemble an uninsulated shield ground wire on the shield of each shielded wire or shielded cable. Refer to Subject 20-10-15.

Make sure that:

- The shield ground wire configuration is applicable for each shielded cable or shielded wire
- The start of each shield ground wire is approximately 0.5 inch from the end of the shield of the primary cable; refer to Figure 10.



CONFIGURATION OF A COMPONENT SHIELD GROUND WIRE AND THE SHIELD OF THE PRIMARY CABLE
Figure 10

- (11) Assemble the connector. Refer to the applicable Subject for the connector.

B. Backshell Installation

- (1) Push the backshell along the cable until the front of the backshell touches the back of the connector.
- (2) Engage the threads of the backshell and the connector.
- (3) Torque the backshell to the value specified in Table 2 with a strap wrench that has a 0.375 inch drive.

C. Strain Relief Adapter Installation

- (1) Put each shield ground wire of the cable or wires of the primary cable in sequence against the rear end of the backshell.

Make sure that each shield ground wire does not make an overlap with another shield ground wire.

- (2) Push the inner ground ring against the rear surface of the backshell so that the shield ground wires are between the ring and the rear end of the backshell.

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- (3) At the end of the shield of the primary cable, move the strands of the shield apart with a plastic awl or an equivalent tool.
- (4) Put the strands of the shield of the primary cable in sequence on the outer surface of the inner ground ring.
Make sure that the strands of the shield do not make an overlap with each other.
- (5) Fold each shield ground wire back over the outer surface of the inner ground ring so that each shield ground wire:
 - Does not make an overlap with another shield ground wire
 - Makes an overlap with the strands of the shield of the primary cable
 - Is flat against the outer surface of the primary cable.
- (6) Make a selection of the location of the end of the shield ground wires for the completed assembly.
- (7) If the ends of the shield ground wires are at the rear end of the backshell:
 - (a) Cut each shield ground wire so that the end of each wire is aligned with the rear edge of the inner ground ring.
 - (b) Push the outer ground ring over each shield ground wire until it is against the inner ground ring.
 - (c) Push the strain relief adapter against the rear of the backshell.
- (8) If the ends of the shield ground wires are at the rear end of the strain relief:
 - (a) Push the outer ground ring over the shield ground wires until it is against the inner ground ring.
 - (b) Push the strain relief adapter over the shield ground wires until the adapter is against the inner ground ring.
Make sure that each shield ground wire is inside the adapter.
- (9) Engage the threads of the adapter and the backshell.
- (10) Torque the adapter to the value specified in Table 3 with a strap wrench that has a 0.375 inch drive.
- (11) Tighten the screws of the cable clamp.

7. ASSEMBLY OF THE S280W605-() PERIPHERAL BACKSHELL

NOTE: The assembly procedures for the 45 degree backshell and the 90 degree backshell are the same the procedures for the straight backshell.

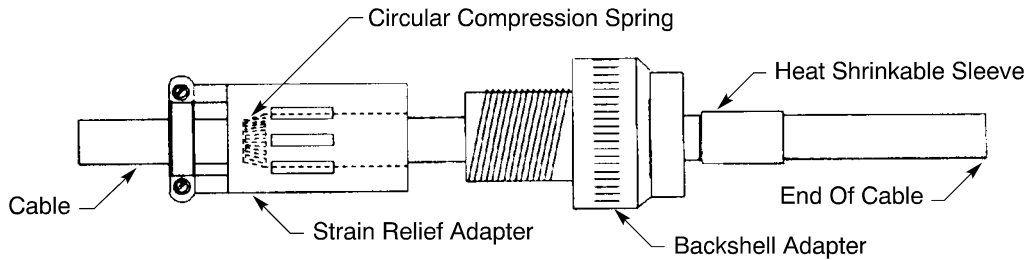
A. Cable Preparation

**Table 4
OUTER JACKET REMOVAL LENGTH**

Cable Exit Configuration	Removal Length L (inch)		
	Minimum	Target	Maximum
Straight	1.55	1.60	1.60
45 Degrees	2.35	2.40	2.40
90 Degrees	2.55	2.60	2.60

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

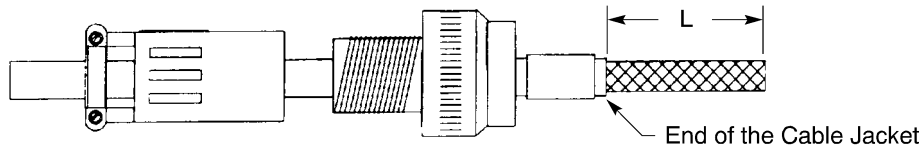


POSITION OF THE STRAIN RELIEF ADAPTER AND THE BACKSHELL ADAPTER
Figure 11

- (1) Look at the circular compression spring inside the strain relief adapter.
 Make sure that the spring is in the correct position.
- (2) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (3) In order, put these components on the cable:
 - The strain relief adapter
 - The backshell adapter
 - A 0.45 inch \pm 0.03 inch length of the heat shrinkable sleeve.

Refer to Figure 11.

- (4) Remove the length L of the outer jacket from the end of the cable.
 Refer to Table 4 and Figure 12.

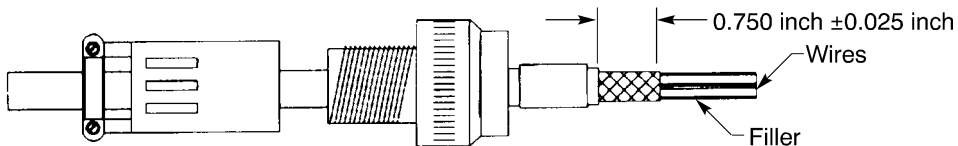


OUTER JACKET REMOVAL
Figure 12

- (5) Remove the necessary length of the shields so that the distance from the end of the cable jacket to the end of the shields is 0.75 inch \pm 0.03 inch.

Refer to:

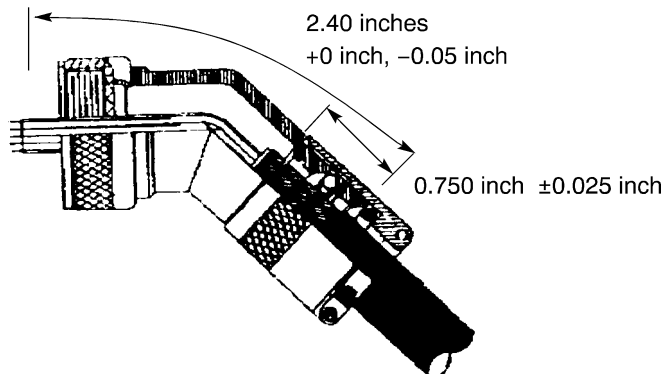
- Figure 13 for the straight configuration
- Figure 14 for the 45 degree configuration
- Figure 15 for the 90 degree configuration.



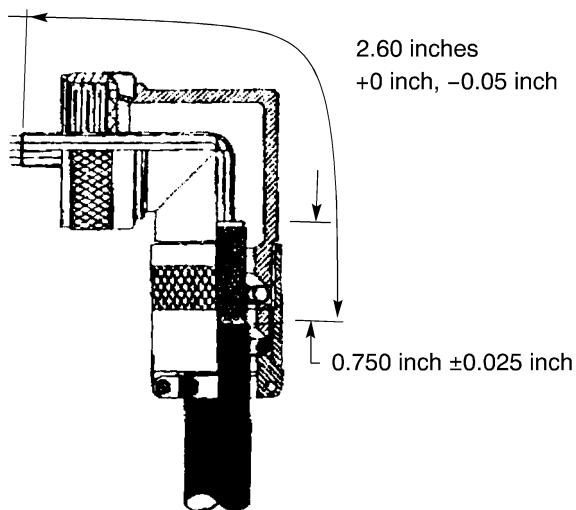
SHIELD REMOVAL LENGTH FOR A STRAIGHT CONFIGURATION BACKSHELL
Figure 13

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

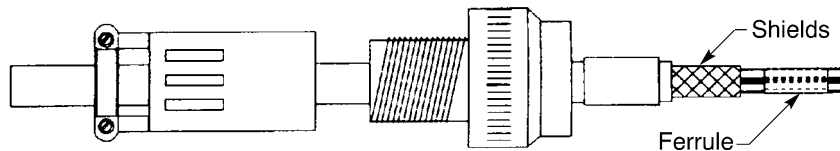


SHIELD REMOVAL LENGTH FOR A 45 DEGREE CONFIGURATION BACKSHELL
Figure 14



SHIELD REMOVAL LENGTH FOR A 90 DEGREE CONFIGURATION BACKSHELL
Figure 15

- (6) Put the ferrule on the cable. Refer to Figure 16.
 Make sure that all the wires and the fillers are in the ferrule.



POSITION OF THE FERRULE OVER THE WIRES AND FILLERS OF THE CABLE
Figure 16

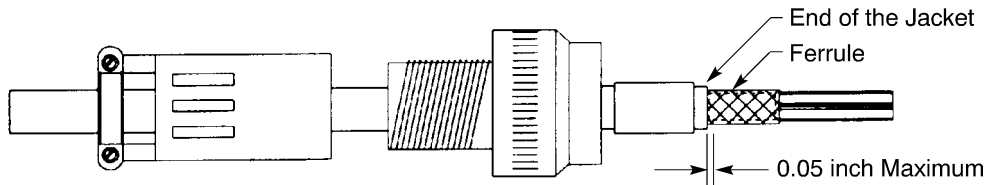
STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

- (7) Carefully push the shields back away from the end the cable so that the shields become loose.
- (8) Push the ferrule under both shields. Refer to Figure 17.

Make sure that:

- The end of the ferrule is against the end of the cable jacket
- The distance from the end of the cable jacket to the rear end of the ferrule is not greater than 0.05 inch.



POSITION OF THE FERRULE UNDER THE SHIELDS

Figure 17

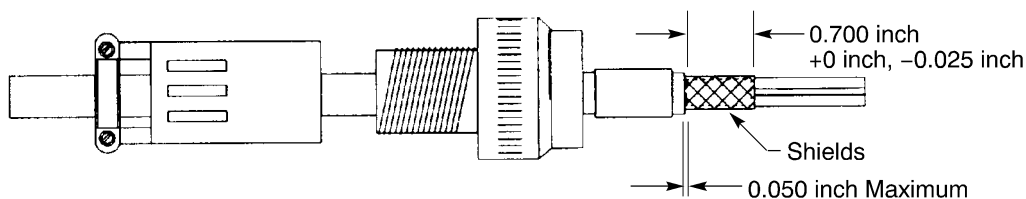
- (9) Cut the cable fillers so that the ends of the fillers are aligned with the forward end of the ferrule.
- (10) To make the shields smooth, carefully push the shields toward end of the cable.

Make sure that:

- The ferrule does not move
- The distance from the end of the cable jacket to the rear end of the ferrule is not greater than 0.05 inch.

- (11) Cut the shields so that the distance from the ends of the shields to the end of the cable jacket 0.70 inch +0 inch, -0.03 inch. Refer to Figure 18.

Make sure that the ends round conductors of the outer shield are aligned with the ends of the flat conductors of the inner shield.



DISTANCE FROM THE END OF THE CABLE JACKET TO THE END OF THE SHIELDS

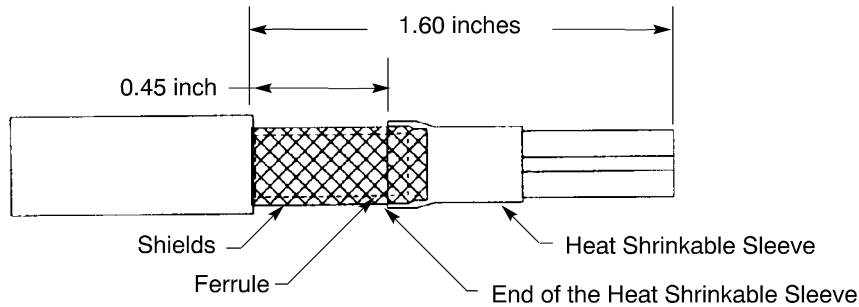
Figure 18

- (12) Put the wires in a sequence that agrees with the contact configuration of the connector.
- (13) Push the heat shrinkable sleeve over the shields and the ferrule until the distance from the end of the cable jacket to the rear end of the sleeve is 0.45 inch ±0.03 inch

Refer to Figure 19.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE SHIELD
Figure 19

- (14) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (15) Examine the cable to make sure that the distance from the end of the cable jacket to the end of the wires agrees with the specified distance in Table 4.
- (16) If distance from the end of the jacket to the end of any wire is longer than the specified distance, cut the necessary length from the end of the wire.
- (17) Assemble the connector. Refer to the applicable Subject for the connector.

B. Backshell Installation

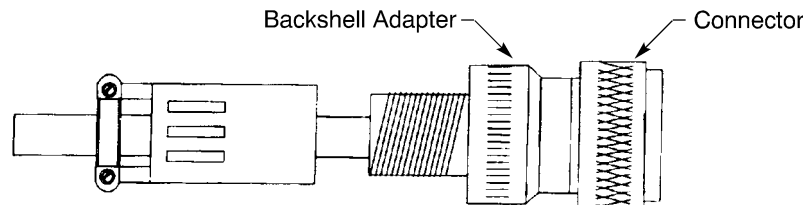
- (1) To hold the connector in position, attach the connector to a plug board.

NOTE: A satisfactory alternative is to use some other tool that:

- Can hold the connector stable
- Does not cause damage to the connector.

- (2) Push the backshell adapter toward the connector until the teeth in the adapter are against the teeth at the rear of the connector.
- (3) Carefully turn the coupling nut of the adapter until the teeth are fully engaged with the teeth in the back of the connector.

Refer to Figure 20.



POSITION OF THE BACKSHELL ADAPTER ON THE CONNECTOR
Figure 20

- (4) Torque the adapter to 75 inch-pounds \pm 5 inch-pounds.
- (5) Examine the position of the heat shrinkable sleeve in relation to the chamfer of the backshell adapter.

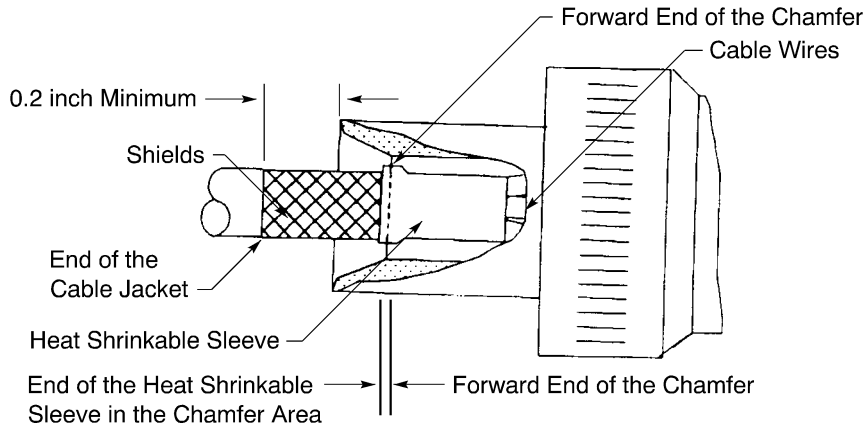
Make sure that the rear edge of the heat shrinkable sleeve is aligned with or inside the forward edge of the chamfer.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS

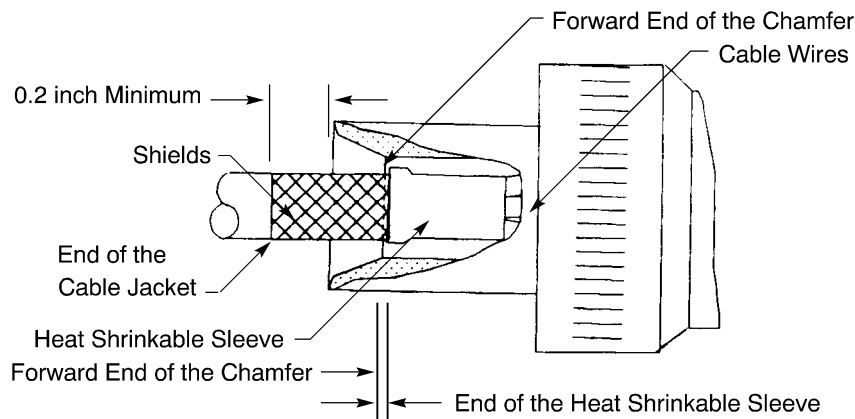
Refer to:

- Figure 21 for the incorrect position of the sleeve
- Figure 22 for the correct position of the sleeve.



INCORRECT POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 21



CORRECT POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 22

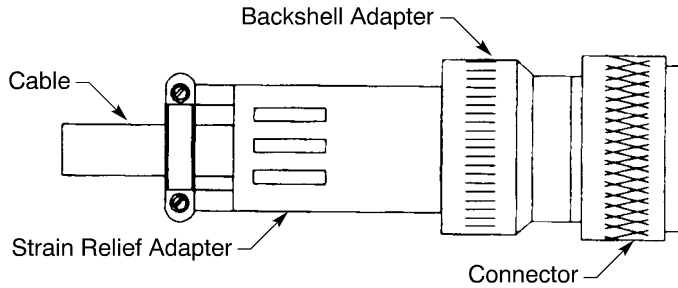
- (6) If the position of the sleeve is not correct:
- (a) Disconnect the backshell adapter from the connector.
 - (b) Disassemble the connector. Refer to the applicable Subject for the connector.
 - (c) Remove the heat shrinkable sleeve sleeve.
 - (d) Do the cable preparation and the backshell installation again.
- Refer to Paragraph 7.A. and Paragraph 7.B.

C. Strain Relief Adapter Installation

- (1) Push the strain relief adapter until it is against the backshell adapter. Refer to Figure 23.

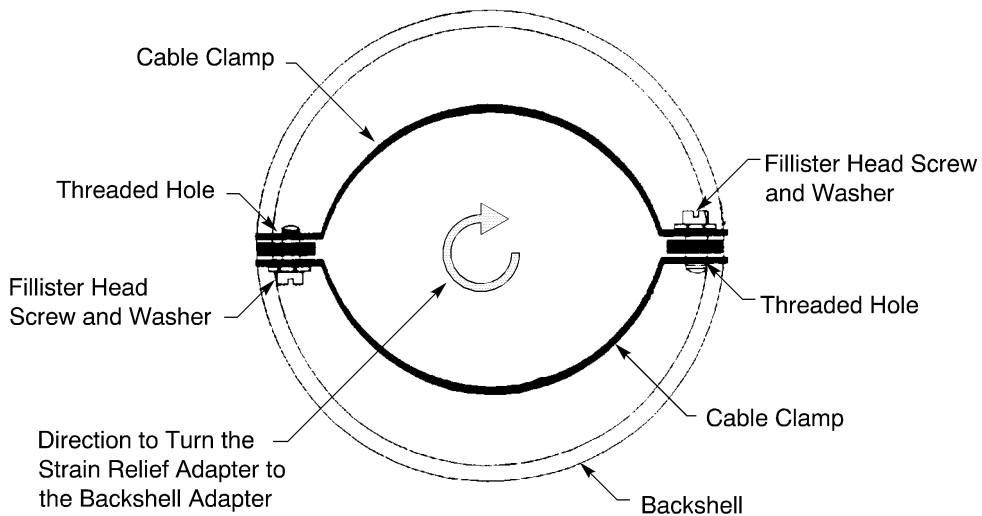
STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR PERIPHERAL BACKSHELLS



POSITION OF THE STRAIN RELIEF ADAPTER
Figure 23

- (2) Engage the threads of the strain relief adapter and the backshell adapter.
- (3) Torque the strain relief adapter to 25 inch-pound \pm 5 inch-pounds.
- (4) Install the saddle clamps. Refer to Figure 24.



INSTALLATION OF THE SADDLE CLAMPS
Figure 24

- (5) Tighten the cable clamp screws so that the clamp holds the cable tightly. Make sure that the surfaces of the saddle clamps are against the surfaces of the strain relief adapter.

NOTE: It is not necessary to put tape on the cable for protection.

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STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

This Subject gives the procedures to assemble a connector backshell with a shield terminator band that holds the shield of a cable on the backshell to get the specified low impedance electrical bond.

1. PART NUMBERS AND DESCRIPTION

A. Applicable Backshells

Table 1 gives the part numbers of the connector backshells that can be assembled with the Glenair 687-062-0() and the BACB42F() shield terminator bands.

NOTE: When the shield or the shield ground wire must make a specified electrical bond with the outer surface of the backshell, either terminator band assembly gives a satisfactory performance.

NOTE: When only a small area to make the bond is available, the backshell assembly with a BACB42F() shield terminator band gives a better result.

Refer to:

- Figure 1 for the Glenair 387()020 backshell
- Figure 2 for the S280W603-() backshell
- Figure 3 and Figure 4 for the Glenair 557-() backshell
- Figure 5 for the Glenair 440()031 and 440()069 backshells.

**Table 1
BACKSHELL PART NUMBERS**

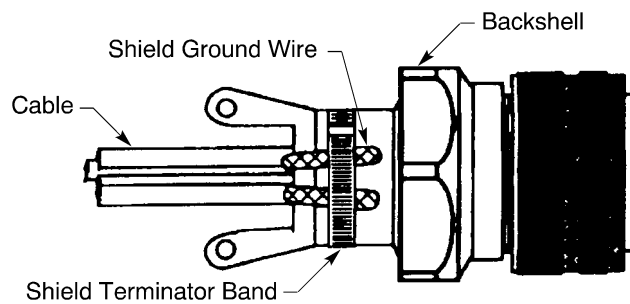
Boeing Specification	Backshell			
	Part Number	Supplier	Configuration	Assembly Procedure
-	387()A020	Glenair	EMI/RFI Backshell 90 Degree, Stainless Steel	Paragraph 3.
	387()B020	Glenair	EMI/RFI Backshell 45 Degree, Stainless Steel	Paragraph 3.
	387()S020	Glenair	EMI/RFI Backshell Straight, Stainless Steel	Paragraph 3.
-	440()H031	Glenair	EMI/RFI Backshell 45 Degree, Stainless Steel	Paragraph 10.A.
	440()J031	Glenair	EMI/RFI Backshell 90 Degree, Stainless Steel	Paragraph 10.A.
	440()S031	Glenair	EMI/RFI Backshell Straight, Stainless Steel	Paragraph 10.A.
-	440()J069	Glenair	EMI/RFI Backshell 90 Degree, Stainless Steel	Paragraph 10.A.
	440()S069	Glenair	EMI/RFI Backshell Straight, Stainless Steel	Paragraph 10.A.

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Table 1 (continued)

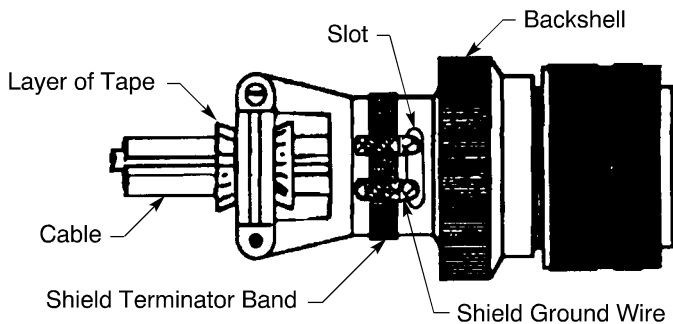
Boeing Specification	Backshell			
	Part Number	Supplier	Configuration	Assembly Procedure
-	527-187()	Glenair	Rectangular, Aluminum for Size 1 ARINC 600 Plugs	Paragraph 7.
	527-212()	Glenair	Rectangular, Aluminum for Size 2 ARINC 600 Plugs	Paragraph 8.
	557-()	Glenair	Rectangular, Aluminum for D-Subminiature Connectors	Paragraph 9.
S280W603-1()	S3929()-34	Sunbank	EMI/RFI Backshell Straight, Cadmium Plated, Aluminum	Paragraph 4.
S280W603-2()	S3929A()-34	Sunbank	EMI/RFI Backshell, 45 Degree, Cadmium Plated, Aluminum	Paragraph 4.
S280W603-3()	S3929R()-34	Sunbank	EMI/RFI Backshell, 90 Degree, Cadmium Plated, Aluminum	Paragraph 4.
S280W604-1()	S3930()-34	Sunbank	EMI/RFI Backshell, Straight, Cadmium Plated, Aluminum	Paragraph 5.
				Paragraph 6.
S280W604-2()	S3930A()-34	Sunbank	EMI/RFI Backshell, 45 Degree, Cadmium Plated, Aluminum	Paragraph 5.
				Paragraph 6.
S280W604-3()	S3930R()-34	Sunbank	EMI/RFI Backshell, 90 Degree, Cadmium Plated, Aluminum	Paragraph 5.
				Paragraph 6.



THE GLENAIR 387()020 BACKSHELL
Figure 1

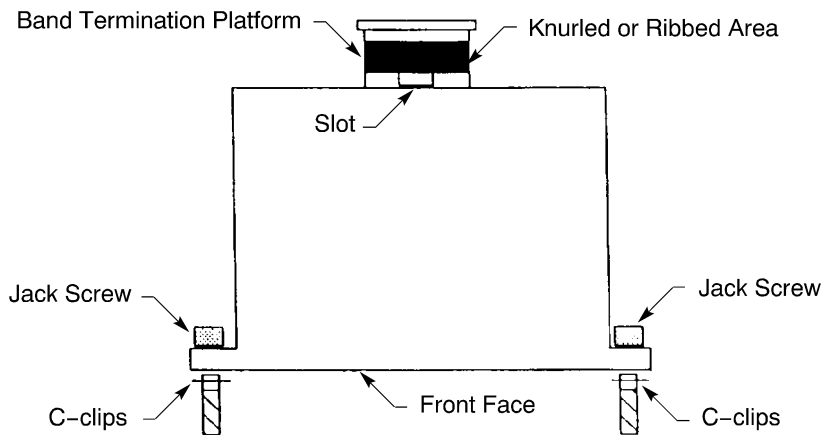
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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



THE S280W603 BACKSHELL

Figure 2

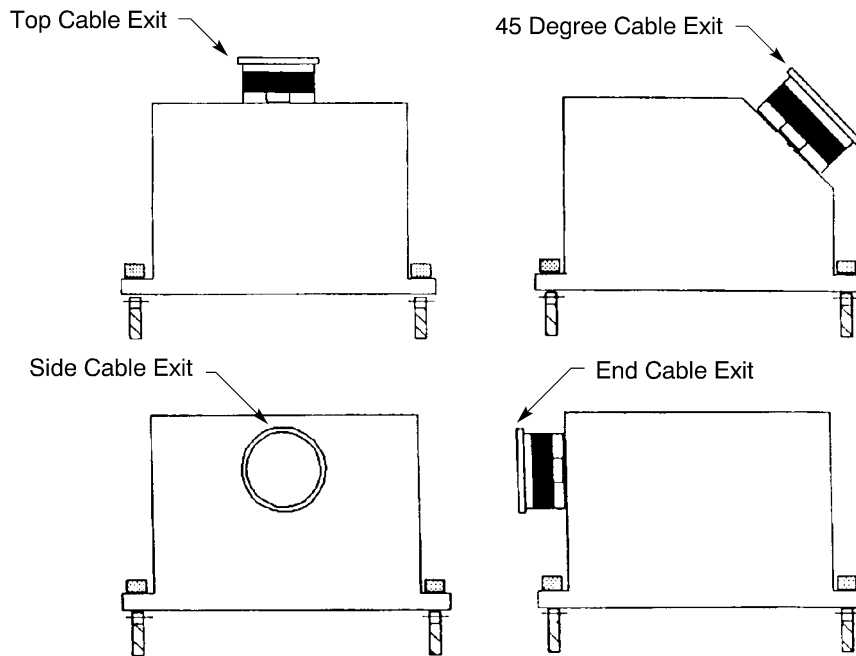


THE GLENAIR 557-() BACKSHELL

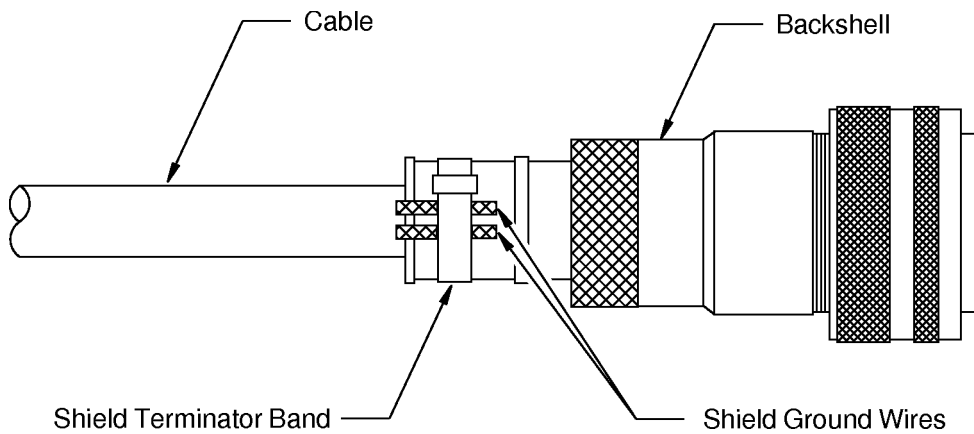
Figure 3

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



CONFIGURATIONS OF THE GLENAIR 557-() BACKSHELL
Figure 4



THE GLENAIR 440()031 AND 440()069 BACKSHELL
Figure 5

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

B. Glenair Shield Terminator Bands

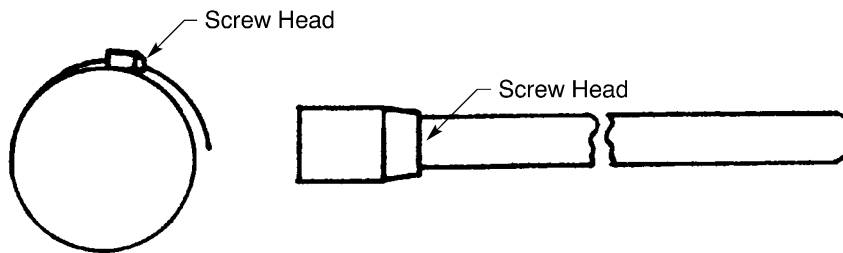
**Table 2
GLENAIR SHIELD TERMINATOR BAND PART NUMBERS**

Backshell	Part Number	Diameter (inch)		Shell Size	Supplier
		Minimum	Maximum		
387()020	687-062-01	0.44	0.78	08	Glenair
				10	
	687-062-02	0.50	0.90	12	Glenair
				14	
	687-062-03	0.69	1.25	16	Glenair
				18	
	687-062-04	0.82	1.50	20	Glenair
	687-062-05	0.82	1.75	22	Glenair
				24	
				28	
	687-062-06	1.06	2.00	-	Glenair

Refer to Figure 6.

The Glenair 687-062-() shield terminator band has these technical properties:

- It is easy to assemble and disassemble
- It is reusable
- It accepts many shield ground leads
- It is applicable for Zero Length grounds
- It gives a low impedance electrical bond.



CONFIGURATION OF THE GLENAIR 687-062-() SHIELD TERMINATOR BAND
Figure 6

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

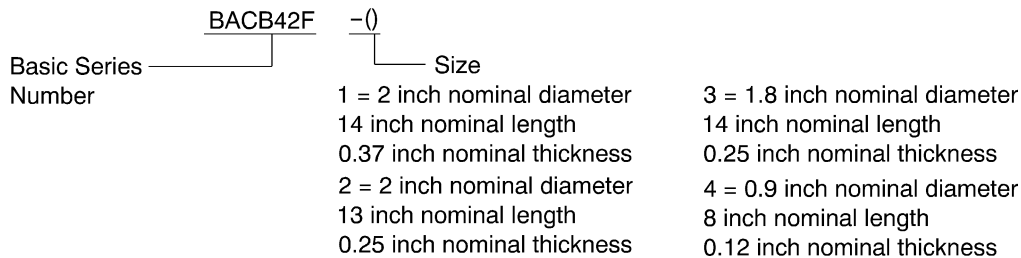
C. BACB42F() Shield Terminator Bands

The BACB42F() shield terminator band can be installed on these backshells:

- Boeing S280W603, and S280W604 backshells for circular connectors
- Glenair 440()031 and 440()069 backshells for circular connectors
- Glenair 527-187() backshell for ARINC 600 shell size 1 plug connectors
- Glenair 527-212() backshell for ARINC 600 shell size 2 plug connectors
- Glenair 557-() backshell for M24308/() D-subminiature connectors.

**Table 3
BACB42F() SHIELD TERMINATOR BAND PART NUMBERS**

Boeing Standard	Width (inch)	Nominal Diameter (inch)
BACB42F3	0.24	1.8
BACB42F4	0.12	0.9



**BACB42F() SHIELD TERMINATOR BAND PART NUMBER STRUCTURE
Figure 7**

**Table 4
APPROVED SUPPLIERS OF BOEING STANDARD SHIELD TERMINATOR BANDS**

Shield Terminator Band	Supplier
BACB42F3	Band-it Idex
	Glenair
	WTG Group
BACB42F4	Band-it Idex
	Glenair
	WTG Group

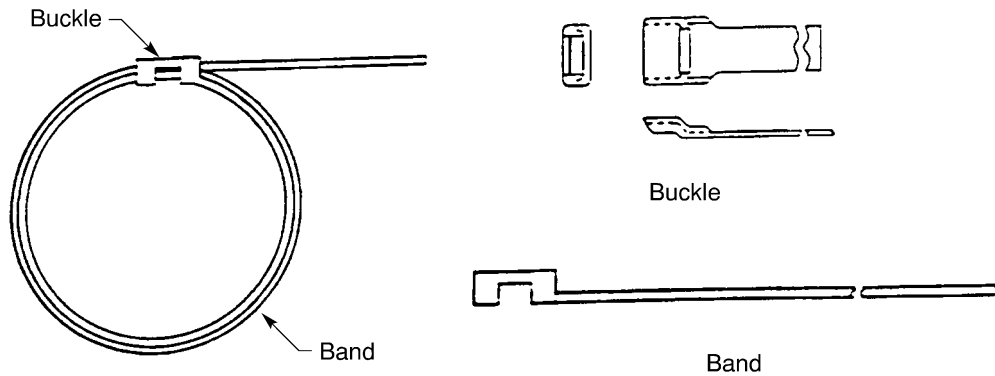
Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

The BACB42F() shield terminator band has these technical properties:

- It is easy to assemble and disassemble
- It is not reusable
- It accepts many shield ground leads
- It is applicable for Zero Length grounds
- It gives a low impedance electrical bond.



CONFIGURATION OF THE BACB42F() SHIELD TERMINATOR BAND
Figure 8

D. Necessary Materials for Backshell Assembly

Table 5
NECESSARY MATERIALS

Part or Material	Part Number	Supplier
Adhesive Sealant, Gray	DC 3145 RTV	Dow
Insulation Tape, Gray	Scotch 70	3M
Sleeve, Heat Shrinkable	AMS-DTL-23053/5 Class 1	Available source
	MIL-LT	Raychem

2. SHIELD TERMINATOR BAND REMOVAL

A. Removal of the Glenair 687-062-0() Shield Terminator Band

- (1) Loosen the screw until:
 - The end of the band goes through the screw head
 - The band disengages from the screw head.
- (2) Remove the band from the assembly.

B. Removal of the BACB42F() Shield Terminator Band

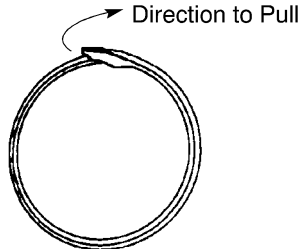
- (1) Hold the free end of the buckle on the band with a pair of needle nose pliers.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

- (2) To release the buckle, pull the free end of the buckle:
 - In a direction that is up and away from the band
 - Until the end of the band is free from the buckle.

Refer to Figure 9.



BUCKLE RELEASE OF THE SHIELD TERMINATOR BAND

Figure 9

- (3) Remove the band from the assembly.
- (4) Discard the BACB42F() shield terminator band.

3. ASSEMBLY OF THE GLENAIR 387()020 BACKSHELL

This paragraph gives the procedure to assemble and attach the shield ground wires of these shields to a backshell:

- The shield of a wire or cable
- The adjacent shields of a wire or cable.

A. Backshell Part Numbers

**Table 6
BACKSHELL PART NUMBERS**

Part Number	Supplier
387AA020	Glenair
387AB020	Glenair
387AS020	Glenair
387HA020	Glenair
387HB020	Glenair
387HS020	Glenair

B. Preparation of Cable with a Tin Plated or a Silver Plated Shield

NOTE: If the cable has one round conductor shield or two adjacent round conductor shields, the procedure to prepare a cable that has a nickel plated shield is a satisfactory alternative. Refer to Paragraph 3.C.

- (1) Remove 1.5 inches ± 0.1 inch of the outer jacket from the end of the cable.
- (2) Remove 1.25 inches ± 0.01 inch of the shield from the end of the cable.

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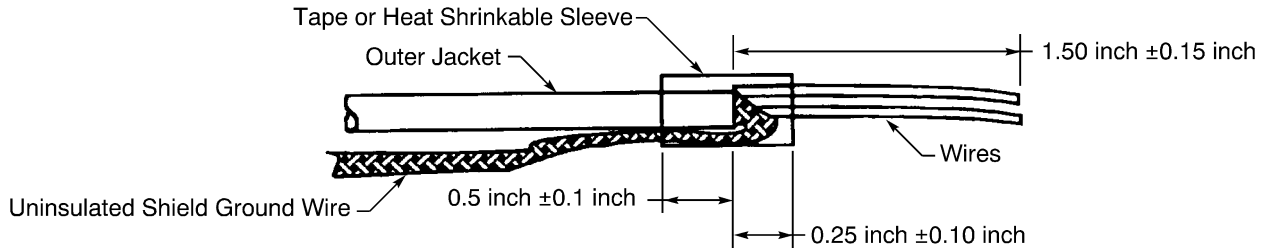
STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

- (3) Assemble a shield ground wire with a solder sleeve that has an uninsulated integral wire. Refer to Subject 20-10-15.

Make sure that the shield ground wire is pointed back away from the end of the cable.

C. Preparation of a Cable with a Nickel Plated Shield



CABLE PREPARATION
Figure 10

Refer to Figure 10.

- (1) Remove approximately 1.75 inches of the outer jacket from the end of the cable.
- (2) Cut the wires of the cable to make the distance from the end of the wires to the end of the cable jacket equal to 1.50 inches \pm 0.15 inch.
- (3) Assemble a shield ground wire with a shield pull through. Refer to Subject 20-10-15.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A SHIELD THAT HAS NICKEL PLATED CONDUCTORS. THE SOLDER DOES NOT MAKE A SATISFACTORY CONNECTION TO THE SHIELD.

Make sure that:

- The shield ground wire is pointed back away from the end of the cable
- The forward end of the tape or heat shrinkable sleeve extends 0.25 inch \pm 0.10 inch farther than the end of the outer jacket
- The rear end of the tape or heat shrinkable sleeve extends 0.5 inch \pm 0.1 inch farther than the end of the outer jacket.

D. Connector Assembly

- (1) Put the all the applicable cables through backshell.
- (2) Assemble the connector. Refer to the applicable Subject for the connector.

E. Backshell Installation

- (1) Push the backshell over the wires of the cables until the backshell is against the rear of the connector.

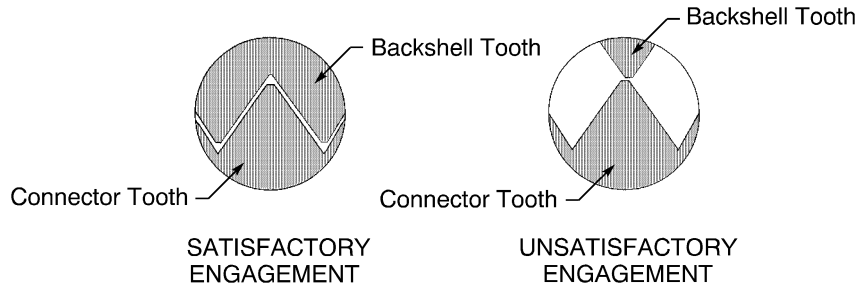
Make sure that the shield ground wires of all the cables come out of the rear end of the backshell.

- (2) Carefully, push and turn the backshell until the teeth of the backshell are fully engaged with the teeth of the connector.
- (3) Look in the inspection hole of the backshell adapter. Refer to Figure 11.

Make sure that the teeth of the backshell adapter are fully engaged with the teeth of the MIL-C-26500 connector.

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POSITION OF THE MIL-C-26500 TEETH AND THE BACKSHELL TEETH
Figure 11

- (4) Torque the backshell to the specified value in Table 7 with a torque wrench.

Table 7
BACKSHELL INSTALLATION TORQUE VALUES

Shell Size	Torque (inch-pound)	
	Minimum	Maximum
28	180	200
24	180	200
22	180	200
20	180	200
18	150	170
16	150	170
14	150	170
12	90	110
10	90	110
8	90	110

F. Installation of the Glenair 687-062-0() Shield Terminator Band

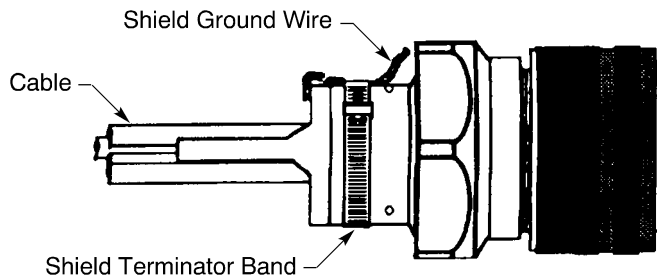
- (1) Make a selection of a shield terminator band from Table 2.
- (2) Put the band on the cable.

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- (3) Put each shield ground wire on the outer surface of the backshell so that the shield ground wires:
 - Are parallel to the longitudinal axis of the connector backshell
 - Are even and symmetrical around the circumference of the backshell
 - Do not make an overlap with another shield ground wire.
- (4) Push the shield terminator band toward the connector until:
 - The band is on the ribbed area on the rear of the backshell
 - There are no shield ground wires under the clamp components.

Refer to Figure 12.



POSITION OF THE SHIELD TERMINATOR BAND ON THE BACKSHELL

Figure 12

- (5) Torque the shield terminator band to the applicable torque in Table 8.

**Table 8
SHIELD TERMINATOR BAND INSTALLATION TORQUE VALUES**

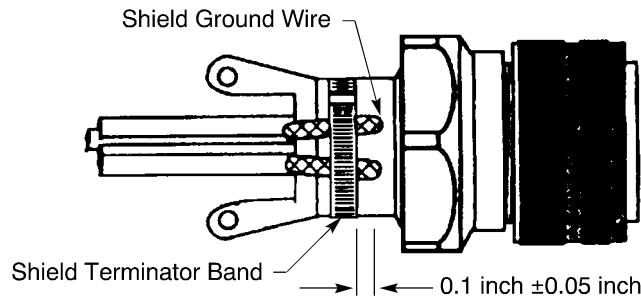
Shell Size	Torque (inch-pound)	
	Minimum	Maximum
28	45	55
24	45	55
22	45	55
20	45	55
18	45	55
16	45	55
14	15	25
12	15	25
10	15	25
08	15	25

- (6) If the free end of the shield terminator band is more than 0.4 inch from the end of the screw head, bend the free end of the band so that the distance from the end of the band to the body of the clamp is 0.02 inch or less.

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- (7) Cut each shield ground wire so that the end of each wire is 0.1 inch \pm 0.05 inch from the edge of the band. Refer to Figure 13.

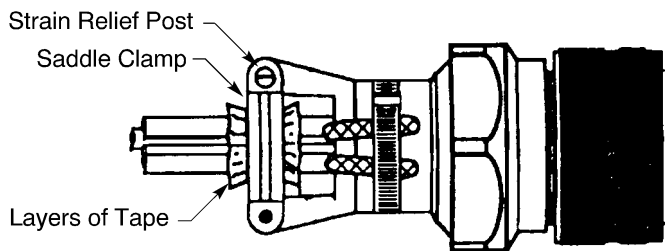


POSITION OF THE END OF THE SHIELD GROUND WIRES
Figure 13

- (8) Put the necessary layers of insulation tape on the cable so that the outer diameter of the cable is increased. Refer to Figure 14.

Make sure that:

- The tape is in the location where the saddle clamp holds the cable
- The outer diameter of the cable is equal to the inner diameter of the cable clamps
- The clamp will hold the cable satisfactorily.



POSITION OF THE INSULATION TAPE ON THE CABLE
Figure 14

- (9) Tighten the cable clamps.

Make sure that:

- The inner surface of the cable clamps is against the outer surface of the strain relief posts on the backshell
- The cable clamps hold the cable tightly, but does not cut into the cable jacket.

4. ASSEMBLY OF THE S280W603 BACKSHELL

This paragraph gives the procedure to assemble and attach the shield ground wires of these shields to a backshell:

- The shield of a wire or a cable
- The adjacent shields of a wire or a cable.

A. Cable Preparation

- (1) Remove a 1.5 inches \pm 0.1 inch of the outer jacket from the end of the cable.

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- (2) Remove 1.25 inches \pm 0.10 inch of the shield.
- (3) Assemble shield ground wire with a solder sleeve that has an uninsulated integral wire. Refer to Subject 20-10-15.

Make sure that the shield ground wire is pointed back away from the end of the cable.

B. Connector Assembly

- (1) Put the all the applicable cables through backshell.
- (2) Assemble the connector. Refer to the applicable Subject for the connector.

C. Backshell Installation

- (1) Put the shield ground wires against each cable so that the wires are:
 - Flat and symmetrical around the circumference of each cable
 - Aligned with the longitudinal axis of each cable.

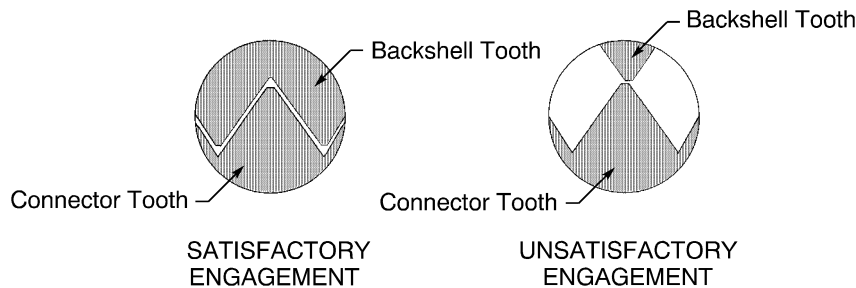
- (2) Push the backshell over the wires of the cables and the shield ground wires until the backshell is against the rear of the connector.

Make sure that each shield ground wire comes out of the end of the backshell that has the cable retention clamps.

- (3) Carefully, push and turn the backshell until the teeth of the backshell are fully engaged with the teeth of the connector.

- (4) Look in the inspection hole of the backshell adapter. Refer to Figure 15.

Make sure that the teeth of the backshell adapter are fully engaged with the teeth of the MIL-C-26500 connector.



POSITION OF THE MIL-C-26500 TEETH AND THE BACKSHELL TEETH
Figure 15

- (5) Torque the backshell to the specified value in Table 9 with a torque wrench.

Table 9
BACKSHELL INSTALLATION TORQUE VALUES

Shell Size	Torque (inch-pound)	
	Minimum	Maximum
28	180	200
24	180	200
22	180	200

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Table 9 (continued)

Shell Size	Torque (inch-pound)	
	Minimum	Maximum
20	180	200
18	150	170
16	150	170
14	150	170
12	90	110
10	90	110
8	90	110

D. Installation of the BACB42F() Shield Terminator Band

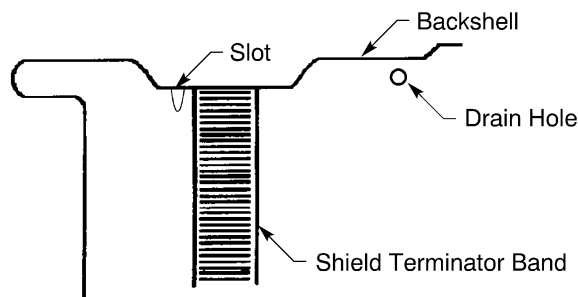
- (1) Pull the shield ground wires through the slots in the backshell with a plastic awl or an equivalent tool.
- (2) Carefully, pull the free ends of the shield ground wires tightly so that the wires are not loose inside the backshell.
- (3) Put the shield ground wires around on the outer surface of the backshell so that the wires:
 - Are even and symmetrical around the outer surface of the backshell
 - Do not make an overlap with another shield ground wire.
- (4) Make a selection of a shield terminator band from Table 3.
- (5) Attach the shield terminator band to the backshell.

Refer to:

- Figure 16 for the location of the installation
- Paragraph 10. for the installation procedure.

Make sure that:

- The band does not move the position of the shield ground wires
- The buckle of the band is not over a shield ground wire on the backshell
- The buckle of the band is not over a slot in the backshell.



POSITION OF THE SHIELD TERMINATOR BAND ON THE BACKSHELL

Figure 16

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS**

- (6) Fold the shield ground wires back across the shield terminator band.
- (7) Cut the ends of the shield ground wires so that end of each wire is aligned with the edge of the band that is adjacent to the connector.
- (8) To prevent the abrasive movement of the cable under the clamp, install either of these types of protection at the location of the clamp on the cable or cables:
 - A BACI12Z insert
 - The sufficient layers of insulation tape.

If the protection is insulation tape, make sure that the outer diameter of the cable and the insulation tape is sufficient for the clamp to hold the cable tightly.

Refer to Figure 17.

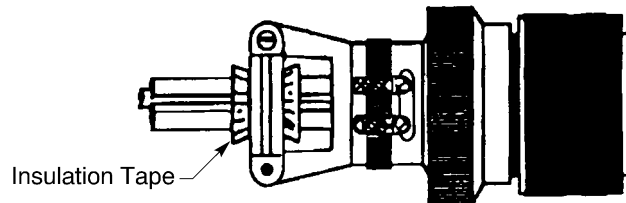
**POSITION OF THE INSULATION TAPE OR INSERT UNDER THE CABLE CLAMP**

Figure 17

- (9) Tighten the cable clamps.
Make sure that the inner surface of the clamp is against the outer surface of the strain relief posts on the backshell.

E. Insulation of the Shield Terminator Band

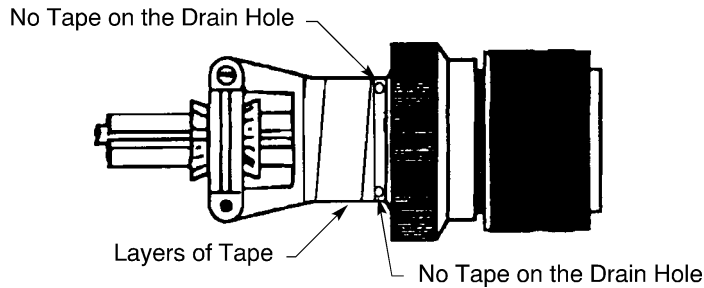
- (1) Clean the area of the electrical connection of the shield terminator band and the backshell with isopropyl alcohol. Refer to Figure 16.
- (2) Cut the sufficient length Scotch 70 insulation tape to put two layers of tape around the circumference of the backshell and shield terminator band.
- (3) Cut the length of tape again so that the width is 0.4 inch \pm 0.1 inch.
- (4) Put the two layers of tape around the circumference of the shield terminator band and the backshell so that:
 - Each layer of tape makes a small overlap
 - The tape is on the band termination area
 - The tape is on the body of the backshell on the both sides of the shield terminator band termination.

Refer to Figure 18.

CAUTION: DO NOT PUT THE TAPE OVER THE DRAIN HOLES IN THE BACKSHELL. DAMAGE TO THE CONNECTOR CAN OCCUR.

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POSITION OF THE INSULATION TAPE ON THE BACKSHELL

Figure 18

- (5) Apply a 0.02 inch thick, continuous layer of DC 3145 RTV adhesive sealant on the electrical connection with a clean spatula.

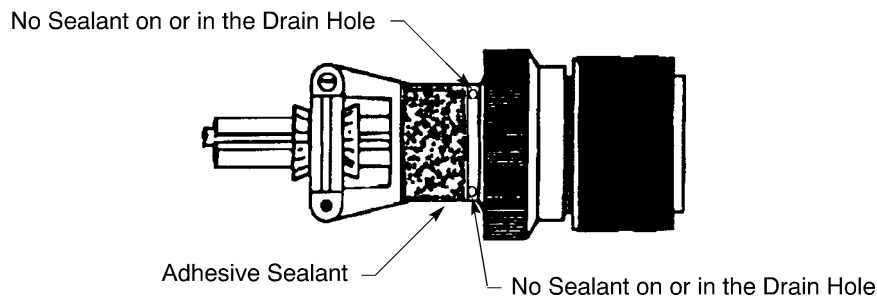
Refer to Figure 19.

Make sure that the layer of adhesive sealant:

- Is over the surface and the edges of the tape
- Is over the surface of the backshell from the edge of the tape that is adjacent to the connector to the forward edge of the strain relief of the backshell
- Has no cracks or openings to the surface of the insulation tape or the surface of the backshell.

CAUTION: DO NOT PUT THE ADHESIVE SEALANT IN OR ON THE DRAIN HOLES IN THE BACKSHELL. DAMAGE TO THE CONNECTOR CAN OCCUR.

NOTE: It is acceptable if the layer of sealant is not smooth or symmetrical.



LOCATION OF THE ADHESIVE SEALANT

Figure 19

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

5. ASSEMBLY OF THE S280W604 BACKSHELL

This paragraph gives the procedure to:

- Attach the shield of a primary cable to a backshell
- Attach the adjacent shields of a primary cable to a backshell
- Assemble the shield ground wires of each shielded wire or cable in the primary cable and attach them to a backshell
- Assemble the shield ground wires of each shielded wire or cable with adjacent shields in the primary cable and attach them to a backshell.

A. Cable Preparation

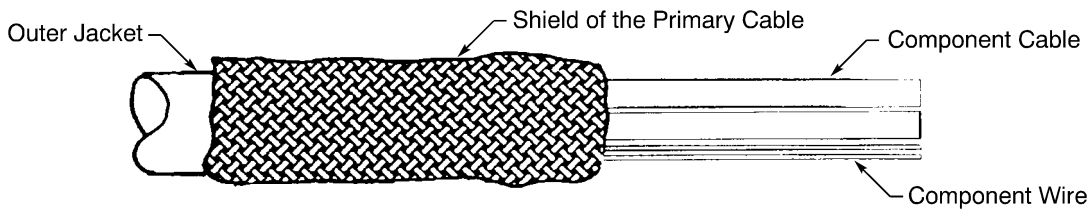
**Table 10
S280W501-() CABLE JACKET REMOVAL LENGTH**

Shell Size	Backshell Configuration	Removal Length (inch)	
		Target	Tolerance
22	Straight	2.0	± 0.05
	45 Degrees	2.3	
	90 Degrees	3.2	
20	Straight	2.0	± 0.05
	45 Degrees	2.3	
	90 Degrees	3.2	
18	Straight	2.0	± 0.05
	45 Degrees	2.3	
	90 Degrees	3.2	
16	Straight	2.0	± 0.05
	45 Degrees	2.3	
	90 Degrees	3.0	
14	Straight	2.0	± 0.05
	45 Degrees	2.3	
	90 Degrees	3.0	
12	Straight	2.0	± 0.05
	45 Degrees	2.3	
	90 Degrees	3.0	

- (1) Put the strain relief adapter on the cable.
- (2) Remove the necessary length of the outer jacket from the end of the primary cable. Refer to Table 10.
- (3) Fold the shield or shields of the primary cable back on the outer jacket. Refer to Figure 20.

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

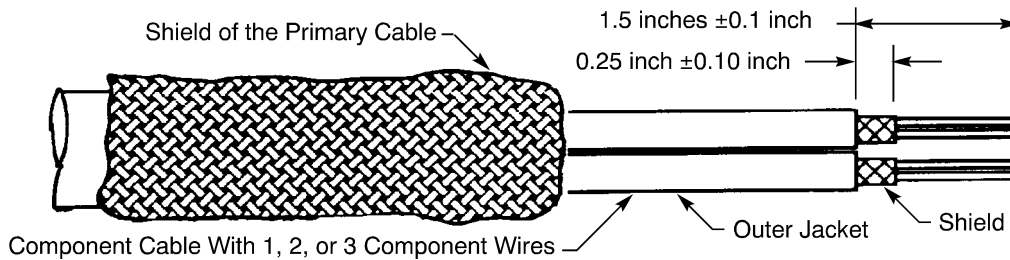


POSITION OF THE SHIELD
Figure 20

- (4) Remove 1.5 inches \pm 0.1 inch of the outer jacket of each inner cable in the S280W501-() cable.

NOTE: The S280W501-4 cable does not have shielded wire or cable.

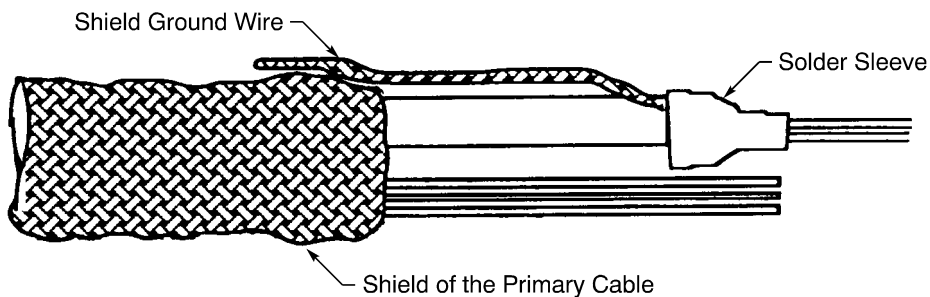
- (5) Remove the necessary length of the shield from each inner cable to make the distance from the end of the outer jacket to the end of the shield equal to 0.25 inch \pm 0.10 inch. Refer to Figure 21.



PREPARATION OF THE INNER CABLES
Figure 21

- (6) Assemble a shield ground wire with a solder sleeve that has an uninsulated integral wire on each inner cable. Refer to Figure 22 and Subject 20-10-15.

Make sure the shield ground wire is pointed back away from the end of the cable.



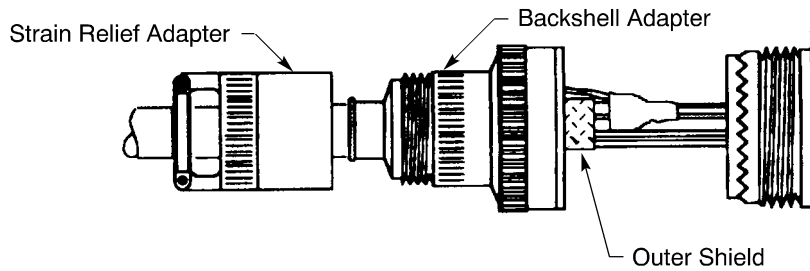
POSITION OF THE SOLDER SLEEVE AND SHIELD GROUND WIRE
Figure 22

- (7) Put the backshell adapter on the cable. Refer to Figure 23.

Make sure that the forward end of the adapter is against the shield of the primary cable.

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



POSITION OF THE BACKSHELL ADAPTER
Figure 23

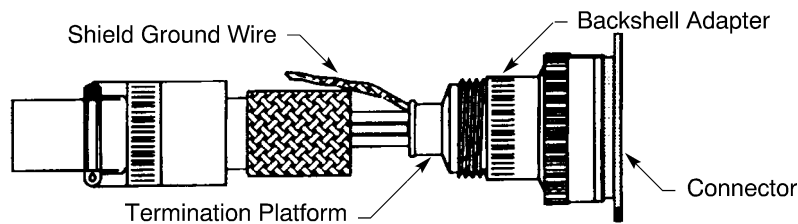
B. Connector Assembly

- (1) Assemble the connector. Refer to the applicable Subject for the connector.

C. Backshell Installation

- (1) Push the backshell adapter over the wires of the cables and the shield ground wires until the adapter is against the rear of the connector. Refer to Figure 24.

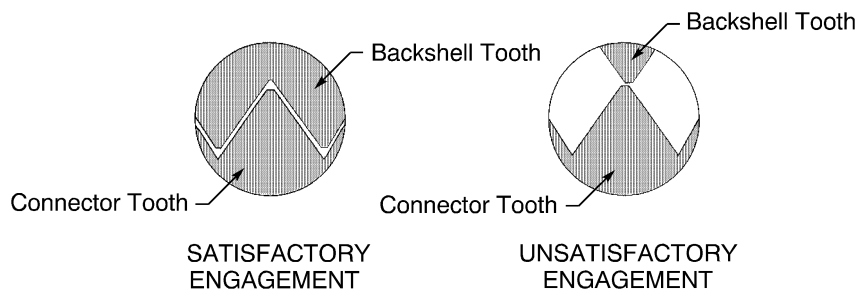
Make sure that the end of each shield ground wire is through the backshell adapter.



BACKSHELL ADAPTER AND SHIELD GROUND WIRES
Figure 24

- (2) Carefully, push and turn the backshell adapter until the teeth of the adapter are fully engaged with the teeth of the connector.
- (3) Look in the inspection hole of the backshell adapter. Refer to Figure 25.

Make sure that the teeth of the backshell adapter are fully engaged with the teeth of the MIL-C-26500 connector.



POSITION OF THE MIL-C-26500 TEETH AND THE BACKSHELL TEETH
Figure 25

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

- (4) Torque the backshell to the specified value in Table 11 with a torque wrench.

NOTE: Do not install lockwire to hold the backshell adapter in position on the connector.

**Table 11
BACKSHELL INSTALLATION TORQUE VALUES**

Shell Size	Torque (inch-pound)	
	Minimum	Maximum
28	120	130
24	115	125
22	115	125
20	115	125
18	105	115
16	80	90
14	70	80
12	55	65
10	40	50
8	32	42

D. Installation of the BACB42F() Shield Terminator Band

- (1) Fold each shield ground wire back over the termination platform of the backshell adapter.

Make sure that the shield ground wires:

- Are even and symmetrical around the platform
- Do not make an overlap with another shield ground wire.

- (2) Push the end of the shield or shields of the primary cable onto the termination platform.

Make sure that the end of the shield is:

- Aligned with the forward edge of the termination platform
- Over the shield ground wires
- Smooth.

- (3) Make a selection of a shield terminator band from Table 3.

- (4) Attach the shield terminator band to the backshell.

Refer to:

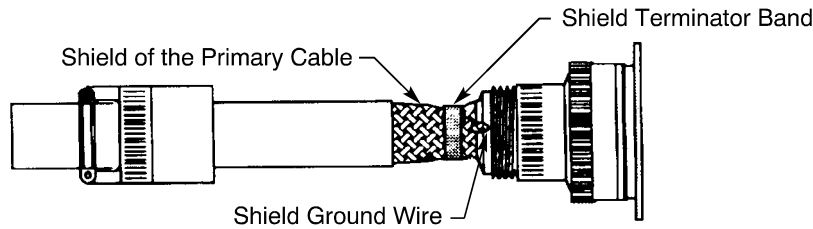
- Figure 26 for the location of the installation
- Paragraph 10. for the installation procedure.

Make sure that:

- The band is on the knurled or ribbed area of the termination platform
- The buckle of the band is not over a shield ground wire on the backshell.

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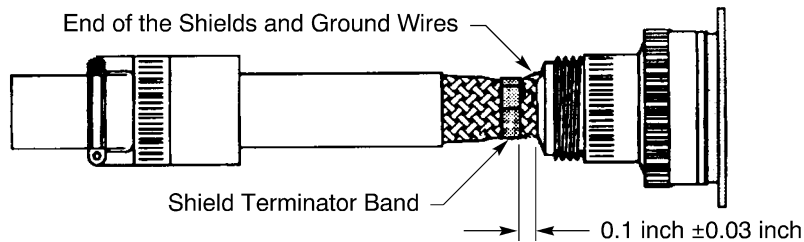


POSITION OF THE TERMINATOR BAND ON THE BACKSHELL ADAPTER

Figure 26

- (5) Cut the unwanted length of the shield or shields of the primary cable and the shield ground wires to make the distance from the forward edge of the band and the end of the shield and wires equal to 0.10 inch \pm 0.03 inch.

Refer to Figure 27.



POSITION OF THE SHIELD AND THE SHIELD GROUND WIRES

Figure 27

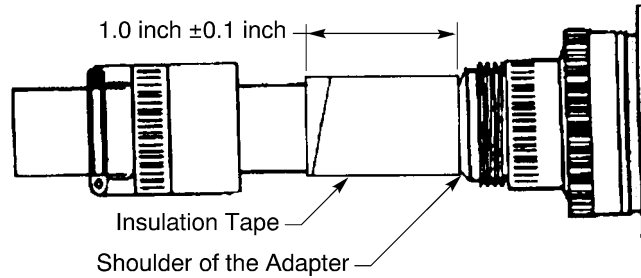
E. Insulation of the Shield Terminator Band

- (1) Clean these areas of the electrical connection of the shield terminator band with isopropyl alcohol:
 - The shoulder of the backshell adapter
 - The shield terminator band
 - The shield of the primary cable
 - The outer jacket of the primary cable.
- (2) Cut the sufficient length of Scotch 70 insulation tape to put a layer of the tape around the circumference of the area of the electrical connection.
- (3) Cut the length of tape again so that the width is 0.75 inch \pm 0.10 inch.
- (4) Put the layer of tape on the backshell so that the tape:
 - Makes a small overlap
 - Is on the band termination area
 - Extends 1.0 inch \pm 0.1 inch from the shoulder of the backshell adapter to the outer jacket of the primary cable.

Refer to Figure 28.

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



POSITION OF THE INSULATION TAPE ON THE BACKSHELL

Figure 28

- (5) Apply a 0.02 inch thick, continuous layer of DC 3145 RTV adhesive sealant on the electrical connection with a clean spatula.

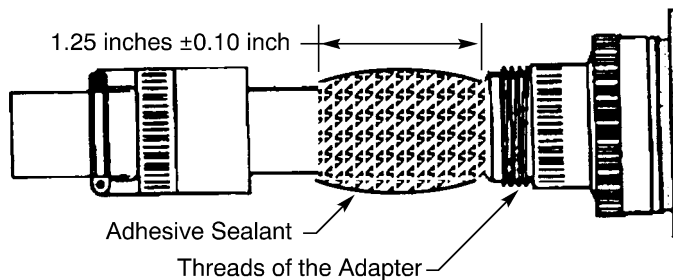
Refer to Figure 29.

Make sure that layer of adhesive sealant:

- Is on the surface and the edges of the insulation tape
- Increases the outside diameter of the cable to a size that is less than the inside diameter of the backshell
- Has no cracks or openings to the surface of the insulation tape or the surface of the backshell.

CAUTION: ADHESIVE SEALANT MUST NOT BE APPLIED ON THE THREADS OF THE BACKSHELL ADAPTER. THE THREADS OF STRAIN RELIEF ADAPTER WILL NOT ENGAGE THE THREADS OF THE BACKSHELL ADAPTER.

NOTE: It is acceptable if the layer of sealant is not smooth or symmetrical.



LOCATION OF THE ADHESIVE SEALANT

Figure 29

- (6) Cure the sealant at room temperature for 3 hours minimum.

NOTE: If the relative humidity is lower than 30 percent, the time for the sealant to fully cure will be longer than normal.

Until the sealant is fully cured, do not:

- Do any other work on the assembly
- Put the assembly in a package.

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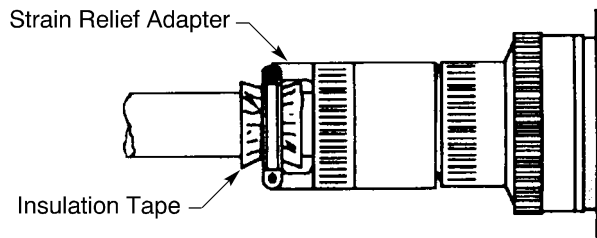
ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

F. Installation of the Strain Relief Adapter

- (1) Push the strain relief adapter until it is against the backshell adapter.
- (2) Engage the threads of the strain relief adapter and the threads of the backshell adapter.
- (3) Turn the strain relief adapter until it stops.
- (4) To prevent the abrasive movement of the cable under the clamp, install either of these types of protection at the location of the clamp on the cable or cables:
 - A BACI12Z insert
 - The sufficient layers of insulation tape.

If the protection is insulation tape, make sure that the outer diameter of the cable and the insulation tape is sufficient for the clamp to hold the cable tightly.

Refer to Figure 30.



POSITION OF THE INSULATION TAPE OR INSERT UNDER THE CABLE CLAMP

Figure 30

- (5) Tighten the cable clamps.

Make sure that the inner surface of the clamp is against the outer surface of the strain relief posts on the backshell.

6. ASSEMBLY OF THE S280W604 BACKSHELL WITH POTTING COMPOUND

This paragraph gives the procedure to assemble and seal each connector and backshell on both ends of the wire harness.

A. Necessary Materials

**Table 12
NECESSARY MATERIALS**

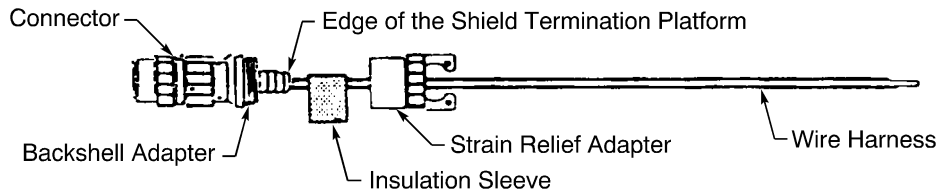
Material	Part Number or Specification
Potting Compound	MIL-PRF-8516 Type II Class 2
Shield Material	BAC3108
Sleeve, Insulation	DWP-125
Sleeve, Protection	TFE 4X
Sleeve, Fuel Resistant	DR-25

NOTE: For sizes and suppliers of shield materials and sleeves, refer to Subject 20-00-11.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

B. Assembly of the First Connector



CONNECTOR ASSEMBLY
Figure 31

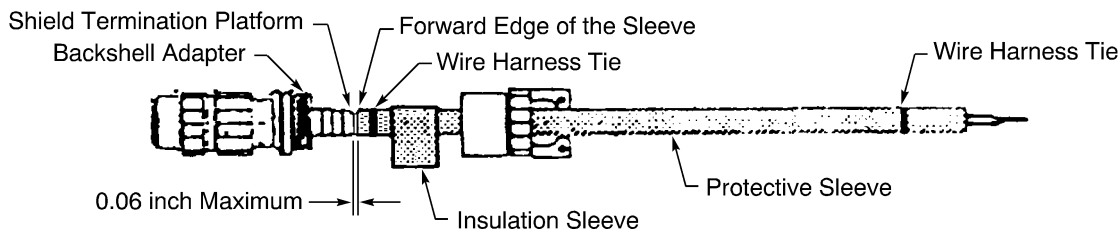
- (1) Prepare the cable. Refer to Paragraph 5.A..
- (2) Make a selection of an insulation sleeve from Table 12.
NOTE: For alternative insulation sleeves, refer to Subject 20-00-11.
- (3) Put the backshell on the cable.
- (4) Put a 1.25 inch \pm 0.06 inch length of 1 inch diameter insulation sleeve on the cable. Refer to Figure 31.
- (5) Assemble the connector. Refer to the applicable Subject for the connector.

C. Assembly of the First Backshell

- (1) Push the backshell adapter over the wires of the cable and each shield ground wire until the adapter is against the rear of the connector. Refer to Figure 24.
Make sure that the end of each shield ground wire is through the backshell adapter.
- (2) Carefully, push and turn the backshell adapter until the teeth of the adapter are fully engaged with the teeth of the connector.
- (3) Look in the inspection hole of the backshell adapter. Refer to Figure 25.
Make sure that the teeth of the backshell adapter are fully engaged with the teeth of the connector.
- (4) Torque the backshell to the specified value in Table 11 with a torque wrench.
NOTE: Do not install lockwire to hold the backshell adapter in position on the connector.

D. Installation of the Wire Harness Protection

- (1) Install a protective sleeve on the cable. Refer to Figure 32.



POSITION OF THE PROTECTIVE SLEEVE ON THE WIRE HARNESS
Figure 32

- (a) Make a selection of a protective sleeve from Table 12.

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Make sure that the protective sleeve has a diameter that is sufficiently large to move over the wire harness.

NOTE: For alternative protective sleeves, refer to Subject 20-00-11.

- (b) Cut the necessary length of the protective sleeve. Refer to Figure 36.

Make sure that the length of the protective sleeve is equal to the distance:

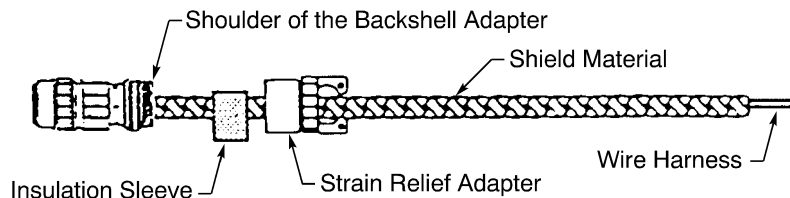
- From the edge of the shield termination platform of the backshell adapter at one end of the wire harness
- To the edge of the shield termination platform of the backshell adapter at the other end of the wire harness.

- (c) Put the protective sleeve on the wire harness through the strain relief adapter and the insulation sleeve.

Make sure that the distance between the edge of the shield termination platform and the protective sleeve is 0.06 inch maximum.

- (d) Assemble a temporary wire harness tie on each end of the protective sleeve.

- (2) Install a shield on the wire harness. Refer to Figure 33.



POSITION OF THE SHIELD MATERIAL ON THE WIRE HARNESS
Figure 33

- (a) Make a selection of a shield material from Table 12.

Make sure that the shield material has a diameter that is sufficiently large to move over the sleeve on the wire harness.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (b) Cut the necessary length of the shield material. Refer to Figure 36.

Make sure that the length of the shield material is 10 percent longer than the distance:

- From the shoulder of the backshell adapter on one end of the wire harness
- To the shoulder of the backshell adapter on the other end of the wire harness.

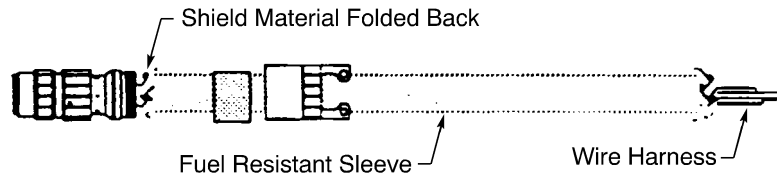
- (c) Put the shield material on the wire harness through the strain relief adapter and the adhesive sleeve.

Make sure that the shield termination platform is between the shield and the wire harness.

- (3) Install a fuel resistant sleeve on the wire harness. Refer to Figure 34.

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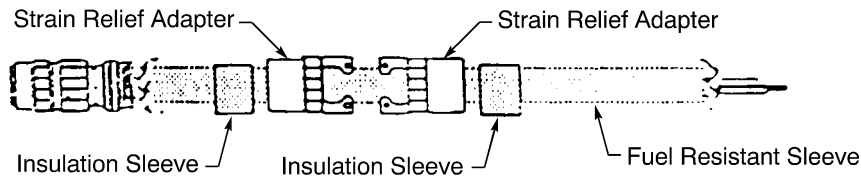
ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



POSITION OF THE FUEL RESISTANT SLEEVE ON THE WIRE HARNESS
Figure 34

- (a) Make a selection of a fuel resistant sleeve from Table 12. Make sure that the fuel resistant sleeve has a diameter that is sufficiently large to move over the shield.
- (b) Cut the necessary length of the fuel resistant sleeve. Refer to Figure 36.
 Make sure that the length of the fuel resistant sleeve is 10 percent longer than the distance:
 - From the shield termination platform of the backshell adapter at one end of the wire harness
 - To the shield termination platform of the backshell adapter at the other end of the wire harness.
- (c) Put the fuel resistant sleeve on the wire harness through the strain relief adapter and adhesive sleeve.
- (4) If the shield material is longer than the fuel resistant sleeve, fold the shield material back over the ends of the sleeve at both ends of the wire harness.

E. Assembly of the Second Connector



POSITION OF THE STRAIN RELIEF ADAPTERS ON THE WIRE HARNESS
Figure 35

- (1) Prepare the cable. Refer to Paragraph 5.A.
- (2) Make a selection of an insulation sleeve from Table 12.
NOTE: For alternative insulation sleeves, refer to Subject 20-00-11.
- (3) Put the backshell on the cable.
- (4) Put a 1.25 inch \pm 0.06 inch length of 1 inch diameter insulation sleeve on the cable. Refer to Figure 35.
- (5) Assemble the connector. Refer to the applicable Subject for the connector.

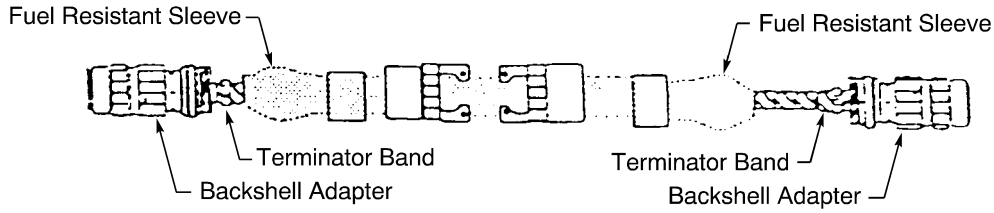
F. Assembly of the Second Backshell

- (1) Push both ends of the fuel resistant sleeve back approximately 2 inches from each end of the wire harness.
- (2) Remove the temporary wire harness ties at each end of the protective sleeve. Refer to Figure 32.
- (3) Assemble the backshell. Refer to Paragraph 6.C.

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

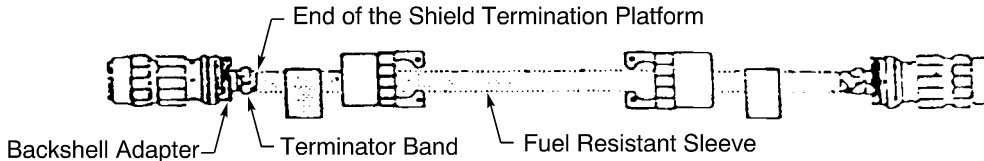
G. Installation of the Shield Terminator Bands



POSITION OF THE SHIELD TERMINATOR BANDS

Figure 36

- (1) Install the terminator band on the shield at each end of the wire harness.
Refer to Figure 36 and Paragraph 5.D.
- (2) Shrink the fuel resistant sleeve into its position. Refer to Subject 20-10-14.
Make sure that the heat is applied from the center of the wire harness toward the ends.
- (3) Remove the length of the fuel resistant sleeve that makes an overlap with the shield termination platform of the backshell adapters at each end of the wire harness.
Refer to Figure 37.

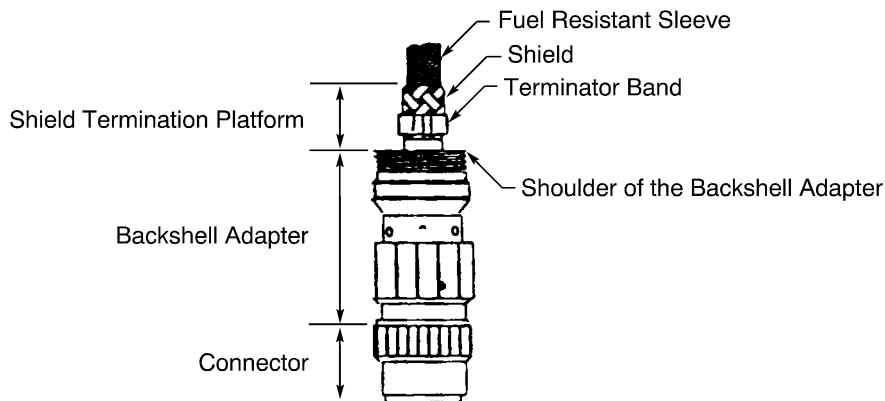


REMOVAL OF THE UNWANTED LENGTH OF THE FUEL RESISTANT SLEEVE

Figure 37

H. Seal of the Connector Assembly with Potting Compound

- (1) Put the connector and the wire harness in the vertical position with the forward end of the connector pointed down. Refer to Figure 38.



POSITION OF THE CONNECTOR AND THE WIRE HARNESS

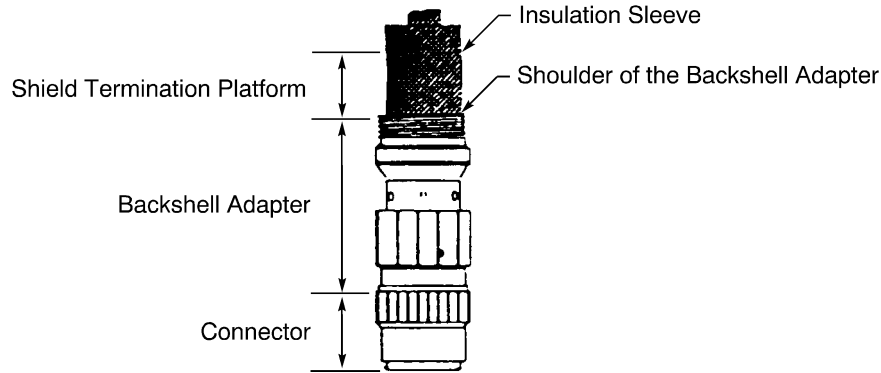
Figure 38

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

- (2) Push the insulation sleeve over the shield termination platform until the edge of the sleeve is against the shoulder of the backshell adapter.

Refer to Figure 39.



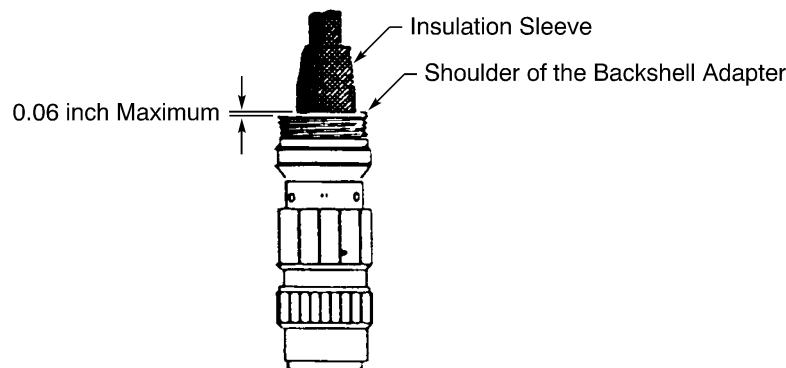
POSITION OF THE INSULATION SLEEVE BEFORE THE HEAT IS APPLIED

Figure 39

- (3) Shrink the insulation sleeve into its position. Refer to Subject 20-10-14 and Figure 40.

Make sure that:

- A downward force is lightly applied on the insulation sleeve as the heat is applied to keep the edge of the sleeve against the shoulder of the backshell adapter.
- The distance between the shoulder of the backshell adapter and the edge of the insulation sleeve is not greater than 0.06 inch.



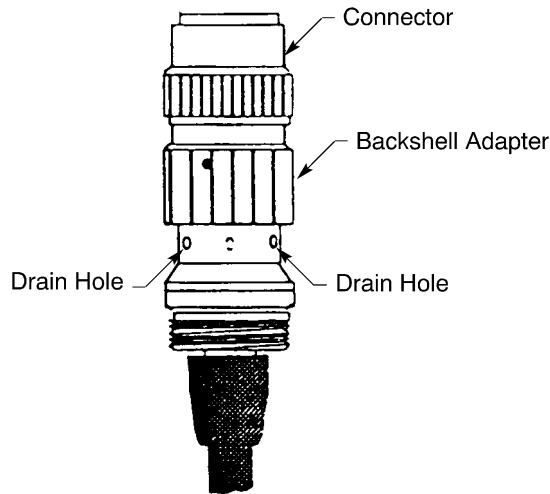
POSITION OF THE INSULATION SLEEVE AFTER THE HEAT IS APPLIED

Figure 40

- (4) Put the connector and the wire harness in the vertical position with the forward end of the connector pointed up. Refer to Figure 41.

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

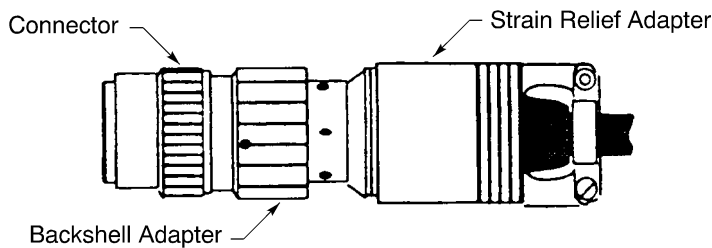


POSITION OF THE CONNECTOR AND THE WIRE HARNESS
Figure 41

- (5) Put a temporary layer of tape over one of the 3 drain holes in the side of the backshell adapter.
- (6) Make a selection of a potting compound from Table 12.
- (7) Put the potting compound into one of the remaining drain holes until the potting compound comes out the other remaining drain hole.
- (8) Remove the tape from the first drain hole.
- (9) Put more potting compound into the drain hole until the compound comes out all 3 drain holes.
- (10) Remove any unwanted potting compound from the assembly.
- (11) Let the potting compound cure for 24 hours.
 Make sure that the connector assembly stays in the vertical position.
- (12) Do Step (1) through Step (11) again for the connector assembly at the other end of the wire harness.

I. Installation of the Strain Relief Adapter

- (1) Install the strain relief adapter on the backshell adapter at each end of the wire harness. Refer to Figure 42 and Paragraph 5.F.



POTTED S280W604 BACKSHELL ASSEMBLY
Figure 42

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

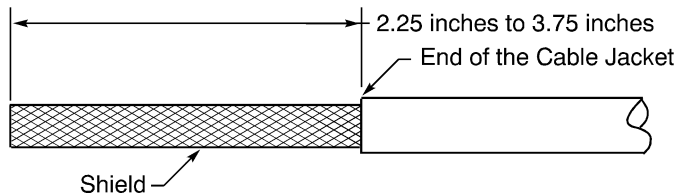
7. ASSEMBLY OF THE GLENAIR 527-187() BACKSHELL ON A SHELL SIZE 1 ARINC 600 PLUG CONNECTOR

A. Preparation of Shielded Cables

This procedure is applicable for cables with shields that must be attached to the backshell.

- (1) Remove 2.25 inches minimum, to 3.75 inches maximum, of the jacket from the end of a shielded cable. Refer to Figure 43.

Make sure that the jacket removal length is different for each cable in the group of cables that have routing to each connector insert. Refer to Figure 44.



CABLE PREPARATION
Figure 43

- (2) Assemble a solder sleeve with an integral uninsulated shield ground wire on the shielded cable. Make sure that the rear end of the solder sleeve is on the end of the cable jacket. Refer to Subject 20-10-15 for the procedure to assemble the solder sleeves.
- (3) Do Step (1) and Step (2) again for each shielded cable.

B. Backshell Assembly

Table 13
NECESSARY MATERIALS

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12 Class 5	An available source
	RT850	Raychem
	RW175	Raychem
	TFE 4X	Chemplast
Zeus		
Tape, Insulation	Scotch 70	3M

- (1) Make a selection of a shield terminator band from Table 3 for each backshell wire entrance that has shielded wires.
Use the outside diameter of the wire entrance of the backshell to make the selection.
- (2) Make a selection of an insulation tape from Table 13.
- (3) Make a selection of a heat shrinkable sleeve from Table 13.
NOTE: A satisfactory alternative to a heat shrinkable sleeve is a layer of insulation tape.
- (4) Put a 2.0 inch ±0.25 inch length of heat shrinkable sleeve on each group of wires at each backshell wire entrance.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS**

Make sure that the sleeve has the smallest diameter that can easily move on the backshell wire entrance after the terminator band, and the insulation tape are installed.

NOTE: The diameter of the backshell entrance will be increased by the terminator band, and the layers of insulation tape.

- (5) Prepare the ends of the specified shielded cables. Refer to Paragraph 7.A.
- (6) Assemble the contacts on the ends of the wires. Refer to Subject 20-71-14.
- (7) Install the contacts in the connector. Refer to Subject 20-71-14.
- (8) Remove the ten screws on the rear of the connector shell that hold the insert retainer plates on the shell.

NOTE: Do not remove the insert retainer plates or the connector inserts.

- (9) Discard the screws.

NOTE: These screws do not have the sufficient length.

- (10) Install one half of the backshell on the rear of the connector with the screws and lockwashers supplied with the backshell.

Make sure that the retainer plate is between the connector shell and the backshell.

- (a) Align a screw and lockwasher with the applicable backshell installation hole in the backshell.
 - (b) Tighten the screw.
 - (c) Do Step (a) and Step (b) again for each remaining backshell installation screw.
- (11) Wind a sufficient number of layers of tape around the wire harness at each backshell wire entrance to increase the harness diameter to the diameter of the backshell wire entrance hole.
 - (12) Install the other half of the backshell on the rear of the connector; Do Step (10) again.
 - (13) Put the shield ground wires against the backshell around the circumference of the band termination platform. Refer to Figure 44.

Make sure that:

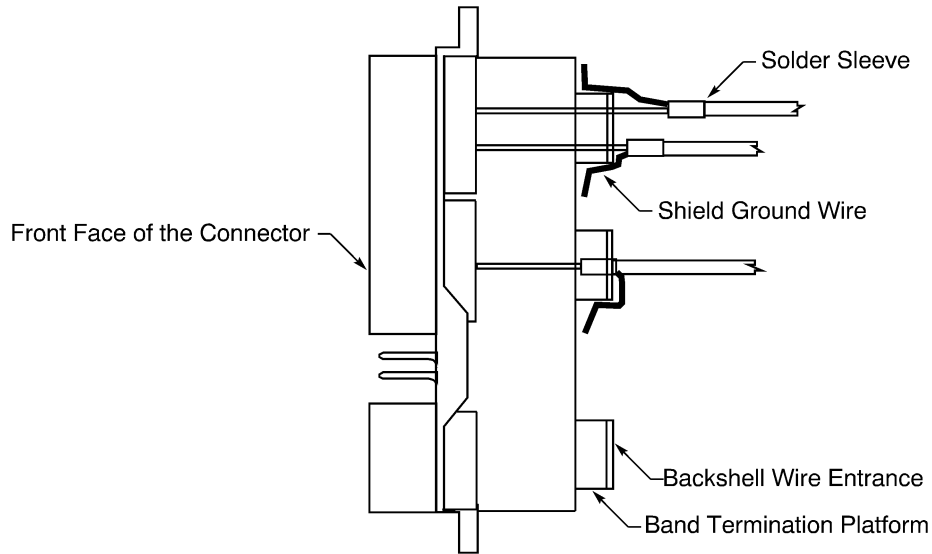
- The distance between each of the shield ground wires is equal around the band termination platform
- The shield ground wires do not make an overlap with each other.

NOTE: Tape can be used on the connector shell to temporarily hold the shield ground wires in their positions until the band is installed.

CAUTION: DO NOT PUT TAPE ON THE BAND TERMINATION PLATFORMS OF THE BACKSHELL.

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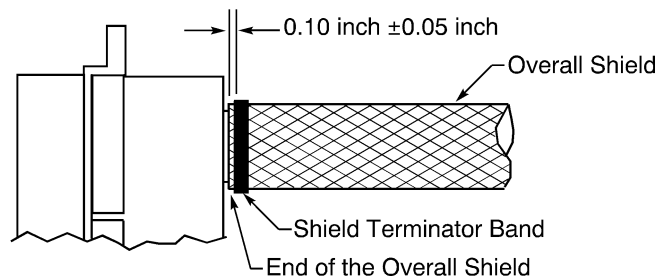
ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



CONFIGURATION OF THE SHIELD GROUND WIRES ON THE BAND TERMINATION PLATFORMS OF THE BACKSHELL

Figure 44

- (14) If the wire harness has an overall shield:
 - (a) If the wire harness has a protective sleeve below the overall shield, assemble a wire harness tie on the protective sleeve approximately 2 inches from the rear end of the shield terminations.
 - (b) Pull the end of the overall shield forward on the band termination platform.
 - (c) If the band termination platform has shield ground wires on it, put the end of the overall shield braid on the shield ground wires against the band termination platform.
- (15) Install a shield terminator band on the band termination platform. Refer to Paragraph 10.
Make sure that no tape is under the shield terminator band.
- (16) Remove the tape used to hold the shield ground wires in their positions.
- (17) Remove the unwanted length of the overall shield. Refer to Figure 45.
Make sure that the length of the remaining shield braid is 0.10 inch \pm 0.05 inch.



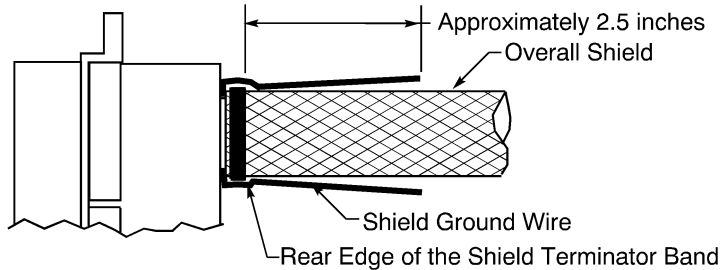
POSITION OF THE OVERALL SHIELD

Figure 45

STANDARD WIRING PRACTICES MANUAL

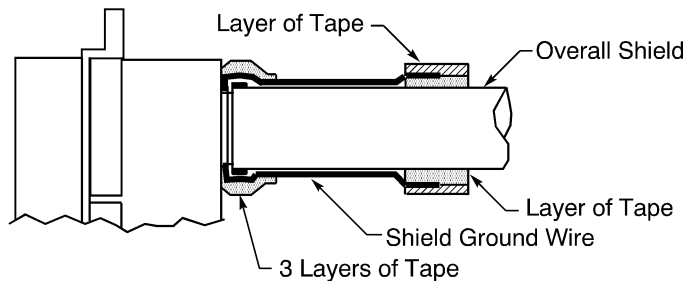
ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

- (18) If the band termination platform has shield ground wires installed, fold the shield ground wires back on the band and on the wire harness.
- (19) Cut the ends of the shield ground wires. Refer to Figure 46.
Make sure that the remaining length of the shield ground wires is approximately 2.5 inches from the rear edge of the band.



POSITION OF THE SHIELD GROUND WIRES
Figure 46

- (20) Wind a sufficient number of layers of insulation tape on the wire harness to hold the ends of the shield ground wires to the harness. Refer to Figure 47.
Make sure that the ends of the shield ground wires are between the layers of tape.



POSITION OF THE INSULATION TAPE
Figure 47

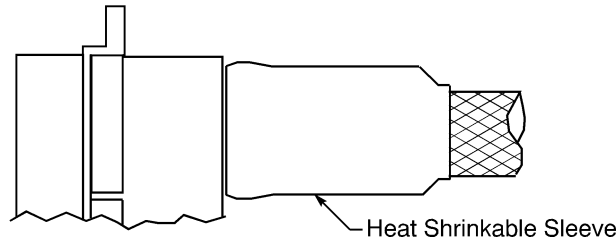
- (21) Wind a minimum of 3 layers of insulation tape on the shield terminator band. Refer to Figure 47.
- (22) If the wire harness has a protective sleeve on the overall shield:
 - (a) Pull the end of the protective sleeve forward on the band termination platform.
 - (b) Assemble a wire harness tie on the protective sleeve and the band termination platform. Refer to Subject 20-10-11.
- (23) If a length of heat shrinkable sleeve is on the harness:
 - (a) Push the length of heat shrinkable sleeve forward until it is against the rear of the backshell.
Make sure that the forward edge of the sleeve is against the rear surface of the backshell.
 - (b) Shrink the sleeve into its position.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

Refer to:

- Figure 48 for the location of the sleeve
- Subject 20-10-14 for the procedure to shrink a heat shrinkable sleeve.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 48

(24) If a length of heat shrinkable sleeve is not on the harness, wind another layer of insulation tape on the harness.

Make sure that:

- The insulation tape wrap has a 50 percent overlap
- The insulation tape layers extend a minimum of 0.5 inch farther rearward than the ends of the shield ground wires.

(25) Do Step (13) through Step (24) again for each backshell wire entrance.

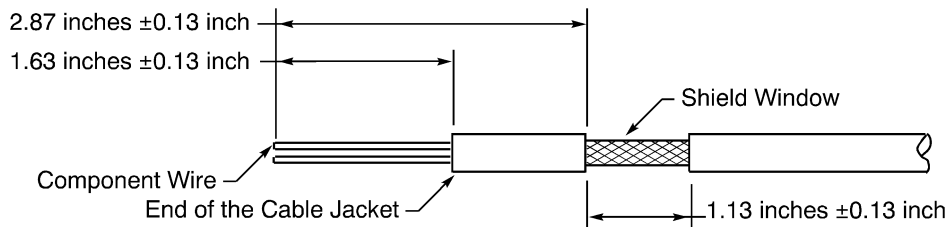
8. ASSEMBLY OF THE GLENAIR 527-212() BACKSHELL ON A SHELL SIZE 2 ARINC 600 PLUG CONNECTOR

A. Preparation of Wires and Cables

This procedure is applicable for specified wires, and cables with shields that must be attached to the backshell.

(1) Prepare the ends of the specified shielded cables:

Refer to Figure 49.



SHIELDED CABLE PREPARATION
Figure 49

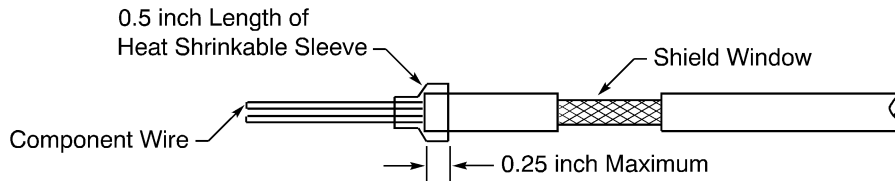
- At a distance of 2.87 inches ± 0.13 inch from the end of the cable, remove a 1.13 inch ± 0.13 inch length of the jacket from the shielded cable.
- Remove a 1.63 inches ± 0.13 inch length of the jacket and the shield from the end of the cable.
- Put a 0.5 inch ± 0.1 inch length of heat shrinkable sleeve on the forward end of the jacket. Refer to Figure 50.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

Make sure that:

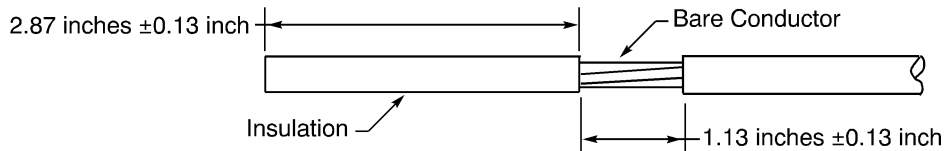
- The sleeve has the smallest diameter that can easily move on the cable
- The distance from the end of the jacket to the rear end of the sleeve is not more than 0.25 inch.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE SHIELDED CABLE

Figure 50

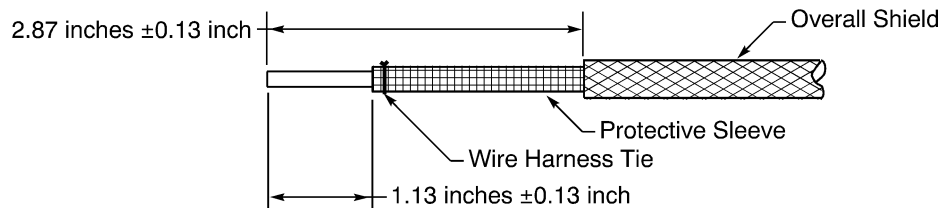
- (d) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (2) Prepare the specified single conductor wires:
- (a) At a distance of 2.87 inches \pm 0.13 inch from the end of the wire, remove a 1.13 inch \pm 0.13 inch length of the insulation from the wire. Refer to Figure 51.



SINGLE CONDUCTOR WIRE PREPARATION

Figure 51

- (3) Prepare the ends of the specified coax cables that have a protective sleeve, and an overall shield:
- (a) Remove the necessary length of the overall shield to make the distance from the end of the cable to the end of the overall shield equal to 2.87 inches \pm 0.13 inch. Refer to Figure 52.



PREPARATION OF COAX CABLE THAT HAS A PROTECTIVE SLEEVE AND AN OVERALL SHIELD

Figure 52

- (b) Remove the necessary length of the protective sleeve to make the distance from the end of the cable to the end of the protective sleeve equal to 1.13 inches \pm 0.13 inch. Refer to Figure 52.
- (c) Assemble a lacing tape wire harness tie near the end of the protective sleeve.

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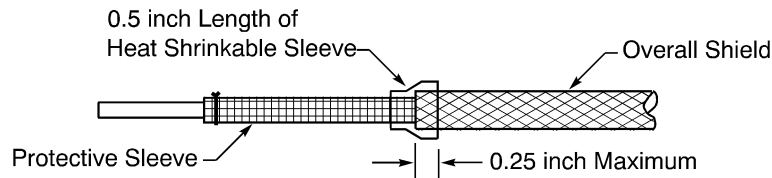
ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

Refer to:

- Figure 52 for the location of the wire harness tie
 - Refer to Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie.
- (d) Put a 0.5 inch \pm 0.1 inch length of heat shrinkable sleeve on the forward end of the shield. Refer to Figure 53.

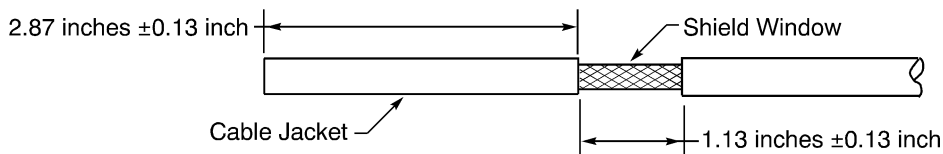
Make sure that:

- The sleeve has the smallest diameter that can easily move on the cable
- The distance from the end of the shield to the forward end of the sleeve is not more than 0.25 inch.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE COAX CABLE
Figure 53

- (e) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (4) Prepare the ends of the specified coax cables that do not have a protective sleeve, or an overall shield:
- (a) At a distance of 2.87 inches \pm 0.13 inch from the end of the cable, remove a 1.13 inch \pm 0.13 inch length of the jacket from the cable. Refer to Figure 54.



COAX CABLE PREPARATION
Figure 54

B. Backshell Assembly

Table 14
NECESSARY MATERIALS

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12 Class 5	An available source
	RT850	Raychem
	RW175	Raychem
	TFE 4X	Chemplast
		Zeus

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

Table 14 (continued)

Material	Part Number	Supplier
Tape, Insulation	P-440	Permacel
	Scotch 70	3M
	912-10	Arlon
Tape, Shield	Scotch 24	3M

Table 15

ALTERNATIVE SCREWS AND LOCKWASHERS

Description	Part Number	Supplier
Lockwasher	BACW10EC-04-CD	Boeing
Screw	NAS1801-04-5	An available source

Table 16

SUPPLIERS OF BOEING STANDARD LOCKWASHERS

Part Number	Supplier
BACW10EC()	Anillo
	Mellowes

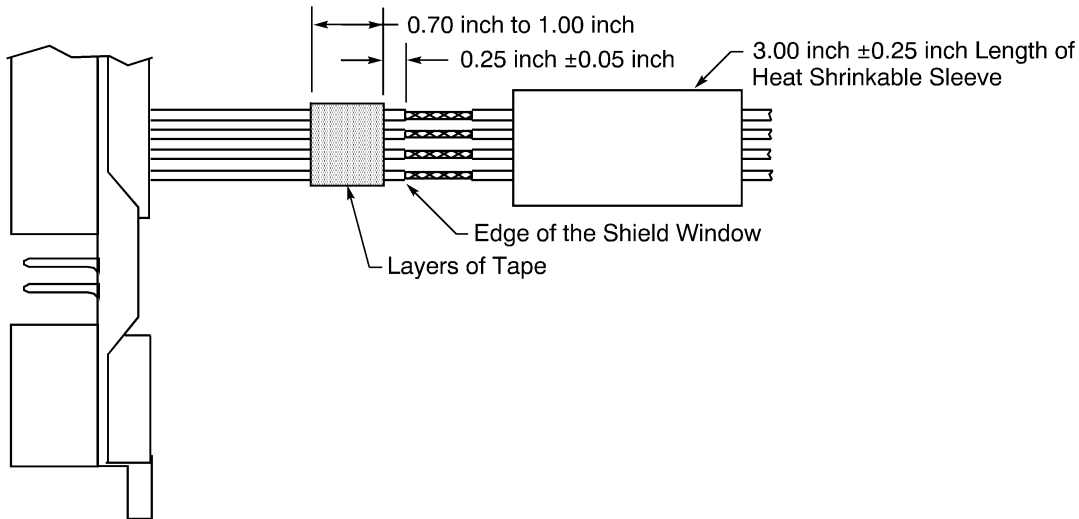
- (1) Make a selection of a shield terminator band from Table 3 for each backshell wire entrance.
Use the outside diameter of the wire entrance of the backshell to make the selection.
- (2) Make a selection of a insulation tape from Table 14.
- (3) Make a selection of a shield tape from Table 14.
- (4) Make a selection of a heat shrinkable sleeve from Table 14.
NOTE: A satisfactory alternative to a heat shrinkable sleeve is a layer of insulation tape.
- (5) Put a 3.00 inch ± 0.25 inch length of heat shrinkable sleeve on each group of wires at each backshell wire entrance.
Make sure that the sleeve has the smallest diameter that can easily move on the backshell wire entrance after the shield tape, the terminator band, and the insulation tape are installed.
NOTE: The diameter of the backshell entrance will be increased by the layers of shield tape, the terminator band, and the layers of insulation tape.
- (6) Prepare the ends of the specified wires and cables. Refer to Paragraph 8.A.
- (7) Assemble the contacts on the ends of the wires. Refer to Subject 20-71-14.
- (8) Install the contacts in the connector. Refer to Subject 20-71-14.
- (9) Wind a sufficient number of layers of insulation tape around the wire harness at each backshell wire entrance until the harness diameter is equal to the diameter of the backshell wire entrance hole. Refer to Figure 55.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

Make sure that:

- The distance from the rear edge of the layers of the insulation tape to the forward end of the shield windows is 0.25 inch \pm 0.05 inch.
- The width of the layers of tape is 0.70 inch to 1.00 inch.

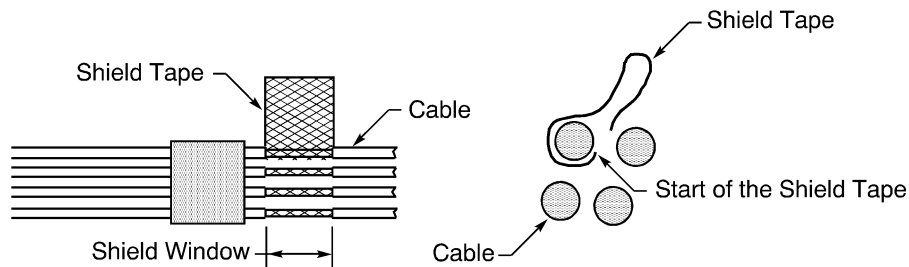


POSITION OF THE LAYERS OF INSULATION TAPE

Figure 55

- (10) Put the end of the shield tape on the shield window of one cable. Refer to Figure 56.

Make sure that the center of the shield tape is aligned with the center of the shield window.



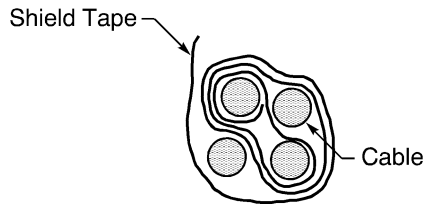
POSITION OF THE SHIELD TAPE ON ONE CABLE

Figure 56

- (11) Wind a layer of shield tape on the shield window of one wire. Refer to Figure 56.
- (12) Continue to wind the shield tape on the shield window of each wire. Refer to Figure 57.
- Make sure that the surface of the shield tape is against the shield of each cable.

STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



POSITION OF THE SHIELD TAPE IN THE HARNESS
Figure 57

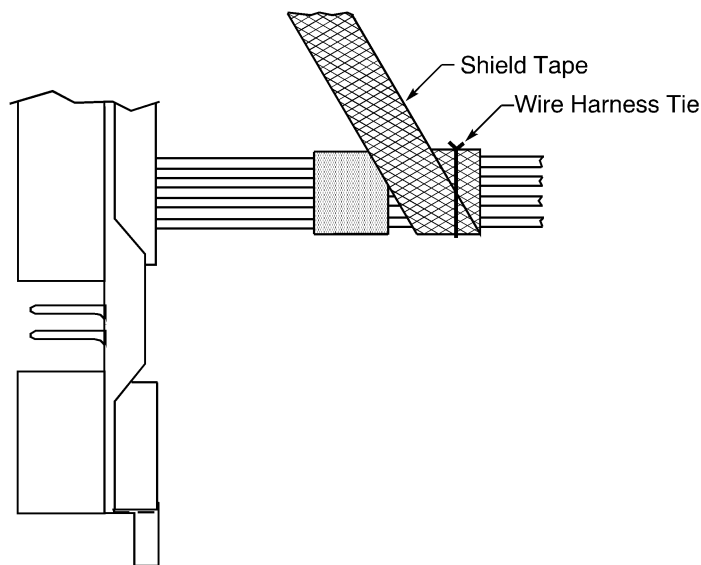
- (13) Wind two full layers of shield tape on all of the cables at the location of the shield windows.
- (14) Assemble a lacing tape wire harness tie on the shield tape.

Refer to:

- Figure 58 for the location of the wire harness tie
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

Make sure that the shield tape that comes out from below the wire harness tie:

- Points to the connector.
- Has sufficient length to do Step (22) through Step (25).



CONFIGURATION OF THE SHIELD TAPE ON THE SHIELD WINDOWS
Figure 58

- (15) Do Step (9) through Step (14) again for the harnesses that have routing to each connector insert.
- (16) Remove the ten screws on the rear of the connector shell that hold the insert retainer plates on the shell.

NOTE: Do not remove the insert retainer plates or the connector inserts.

- (17) Discard the screws.

NOTE: These screws do not have the sufficient length.

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- (18) Discard the backshell gaskets supplied with the backshell.
- (19) Install one half of the backshell on the rear of the connector with the screws and lockwashers supplied with the backshell.

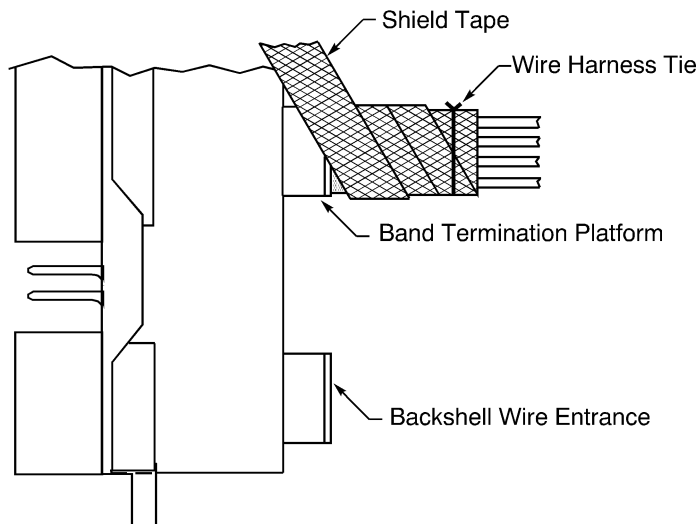
NOTE: The screws and lockwashers in Table 15 are a satisfactory alternative to the screws supplied with the backshell.

Make sure that the retainer plate is between the connector shell and the backshell.

- (a) Align a screw and lockwasher with the applicable backshell installation hole in the backshell.
 - (b) Tighten the screw.
 - (c) Do Step (a) and Step (b) again for each remaining backshell installation screw.
- (20) Install the other half of the backshell on the rear of the connector; Do Step (19) again.
 - (21) Wind more layers of shield tape on the harness until the diameter of the shield tape layers is the same as the diameter of the insulation tape layers.
 - (22) Continue to wind the shield tape on the harness forward to the backshell. Refer to Figure 59.

Make sure that:

- The shield tape wrap has a 50 percent overlap
- The shield tape tension is kept moderate and constant.

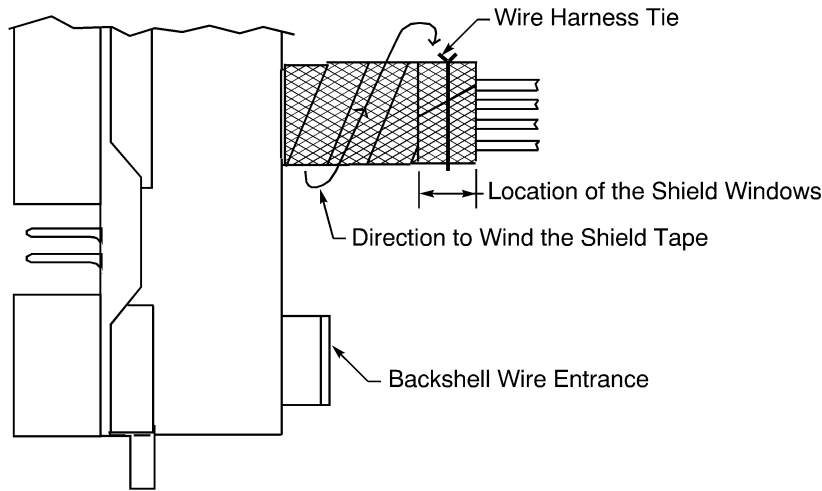


POSITION OF THE SHIELD TAPE LAYERS
Figure 59

- (23) At the backshell, wind two layers of shield tape on the band termination platform. Make sure that the forward edge of the shield tape layers is aligned with the rear surface of the backshell.
- (24) Continue to wind the shield tape rearward to the location of the shield windows. Refer to Figure 60. Make sure that:
 - The shield tape wrap has a 50 percent overlap
 - The shield tape tension is kept moderate and constant.

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POSITION OF THE LAST LAYER OF SHIELD TAPE
Figure 60

- (25) At the location of the shield windows, wind one full layer of shield tape on the harness.
- (26) Assemble a lacing tape wire harness tie on the shield tape at the center of the shield window area.

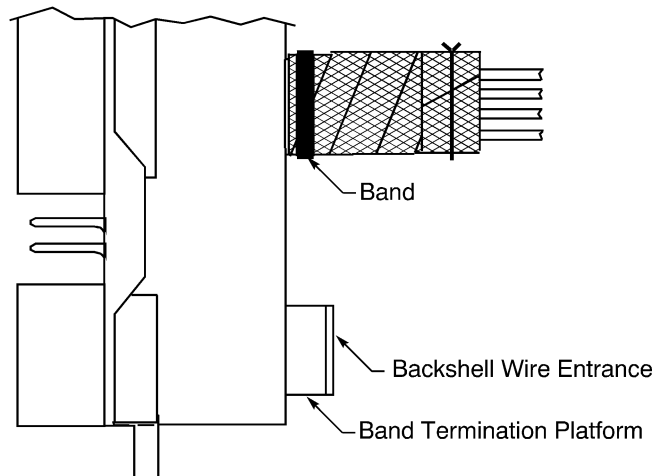
Refer to:

- Figure 60 for the location of the wire harness tie
- Refer to Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie.

- (27) Install a shield terminator band on the band termination platform.

Refer to:

- Figure 61
- Paragraph 10. for the procedure to install the shield terminator band.



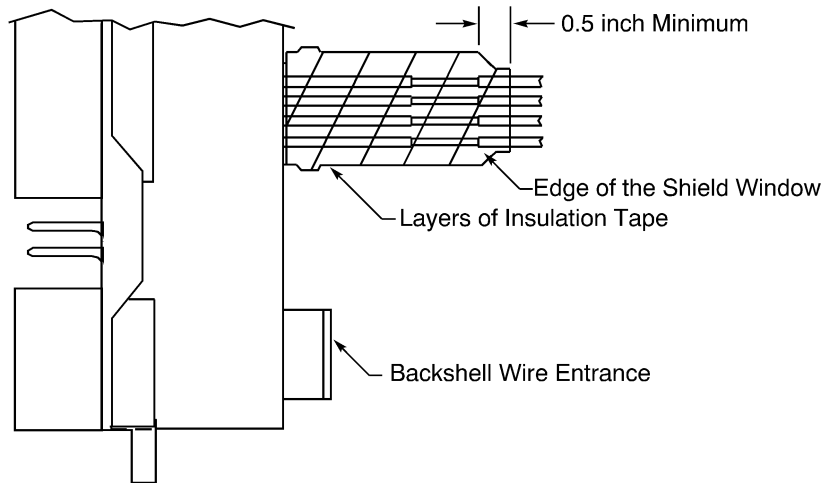
LOCATION OF THE WIRE HARNESS TIE AND THE SHIELD TERMINATOR BAND ON THE SHIELD TAPE
Figure 61

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS**

(28) Wind layers of insulation tape on the shield tape. Refer to Figure 62.

Make sure that:

- The insulation tape wrap has a 50 percent overlap
- The insulation tape layers extend a minimum of 0.5 inch farther rearward than the rear edge of the shield window.



CONFIGURATION OF THE INSULATION TAPE LAYERS

Figure 62

(29) Continue to wind layers of insulation tape until the diameter of the harness is approximately the same as the inside diameter of the heat shrinkable sleeve.

(30) If a length of heat shrinkable sleeve is on the harness:

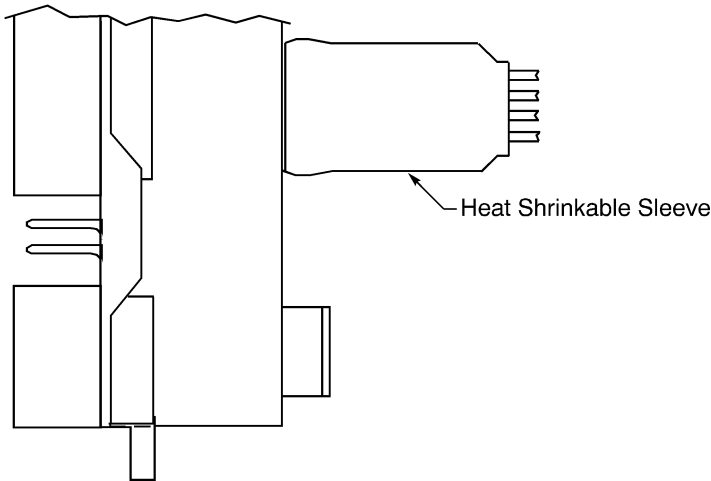
- (a) Push the length of heat shrinkable sleeve forward until it is against the rear of the backshell. Make sure that the forward edge of the sleeve is against the rear surface of the backshell.
- (b) Shrink the sleeve into its position.

Refer to:

- Figure 63 for the position of the sleeve
- Subject 20-10-14 for the procedure to shrink a heat shrinkable sleeve.

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 63

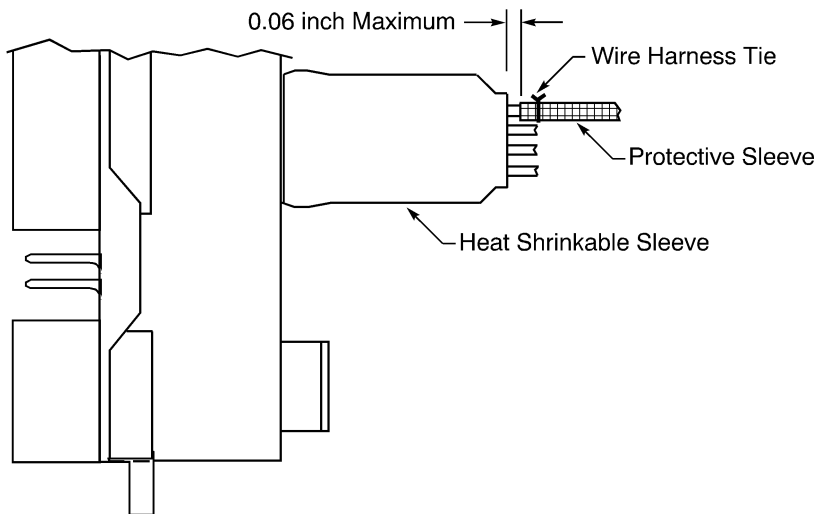
- (31) If a length of heat shrinkable sleeve is not on the harness, wind another layer of insulation tape on the harness.

Make sure that:

- The insulation tape wrap has a 50 percent overlap
- The insulation tape layers extend a minimum of 0.5 inch farther rearward than the shield window area.

- (32) If a coax cable has a protective sleeve, push the protective sleeve forward to the rear edge of the heat shrinkable sleeve. Refer to Figure 64.

Make sure that the forward edge of the protective sleeve is not more than 0.06 inch from the rear edge of the heat shrinkable sleeve.



POSITION OF THE PROTECTIVE SLEEVE OF THE COAX CABLE

Figure 64

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(33) Assemble a wire harness tie near on each protective sleeve near the end of the sleeve.

Refer to:

- Figure 64 for the location of the wire harness tie
- Subject 20-10-11 for the procedure to assemble the tie.

(34) Do Step (21) through Step (33) again for each backshell wire entrance.

9. ASSEMBLY OF THE GLENAIR 557-() BACKSHELL

This paragraph gives the procedure to assemble and attach the shield ground wires of these shields to a backshell:

- The shield of a wire or a cable
- The adjacent shields of a wire or a cable.

Refer to Table 17 for the applicable connector part numbers.

A. Connector Part Numbers

**Table 17
APPLICABLE M24308 CONNECTOR PART NUMBERS**

Part Number	Supplier
DBMA()	ITT Cannon
CAMA()	ITT Cannon
CBMA()	ITT Cannon
CCMA()	ITT Cannon

B. Wire Harness Preparation

NOTE: If the wire or the cable has two adjacent shields, the shields are prepared as one shield.

- (1) Make a selection of a solder sleeve with an uninsulated integral wire. Refer to Subject 20-10-15.
- (2) If it is necessary, remove the C-clips on the 2 jack screws of the backshell with a C-clip removal tool.
- (3) Remove the 2 jack screws from the backshell.
- (4) Put the jack screws and the C-clips, if any, in a safe place.

The screws and the clips are necessary to attach the backshell to the connector.

- (5) Make a selection of a heat shrinkable sleeve from Table 5.

Make sure that the diameter of the sleeve is greater than the outer diameter of the backshell cable exit.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

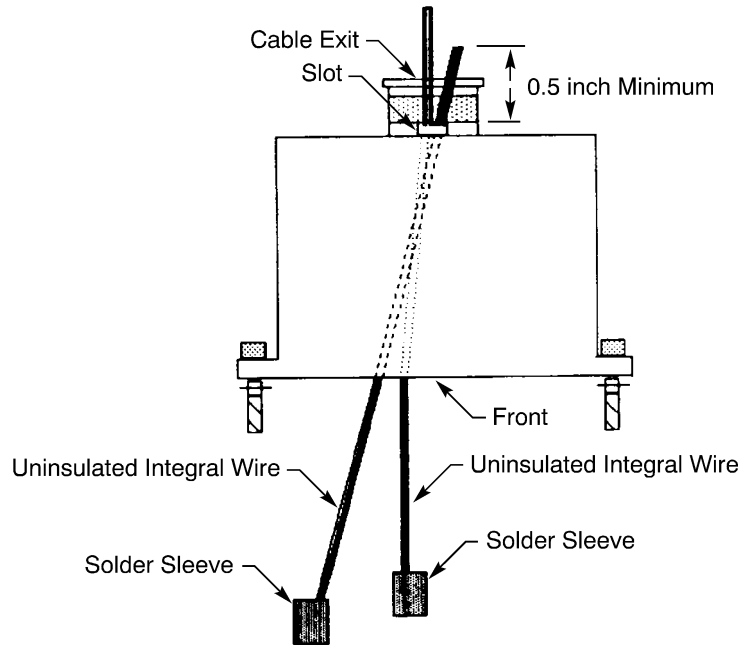
- (6) Put an approximate 4 inch length of the heat shrinkable sleeve on the wire harness.
- (7) For each shielded cable in the wire harness, put an uninsulated integral wire of a solder sleeve into the front of the backshell and through the slot in the cable exit.

Refer to Figure 65.

Make sure that approximately 0.5 inch of each uninsulated wire extends out of the slot.

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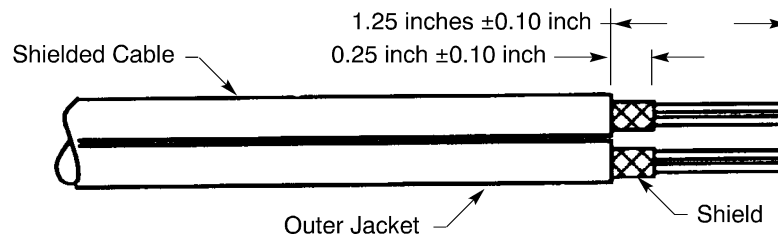
ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS



POSITION OF THE UNINSULATED INTEGRAL WIRES
Figure 65

- (8) Put the backshell on the wire harness.
 Make sure that the uninsulated wires stay in the slot in the cable exit.
- (9) Remove 1.25 inches ± 0.10 inch of the outer jacket from the end one of the shielded cables.
- (10) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the outer jacket equal to 0.25 inch ± 0.10 inch.

Refer to Figure 66.

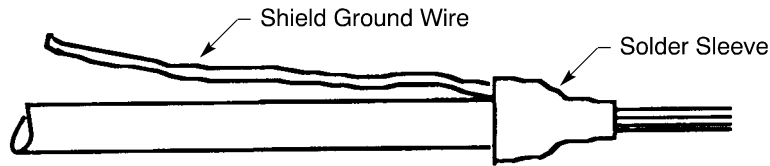


CABLE PREPARATION
Figure 66

- (11) Put the solder sleeve on the cable. Refer to Figure 67.
 Make sure that:
 - The end of the solder sleeve that has the integral wire is put on the cable first
 - The inner edge of the seal ring is aligned with the end of the outer jacket.

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POSITION OF THE SOLDER SLEEVE ON THE CABLE
Figure 67

(12) Shrink the solder sleeve into position. Refer to Subject 20-10-14.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of seventy-five percent of the indicator ring on top of the solder ring is melted.

(13) Do Step (9) through Step (12) for the remaining shielded cables in the wire harness.

C. Connector Assembly

(1) Assemble the connector. Refer to the applicable Subject for the connector.

D. Backshell Installation

- (1) Carefully pull the end of each shield ground wire until the slack in the wires is removed.
- (2) Turn the backshell to the specified clock position for the connector.

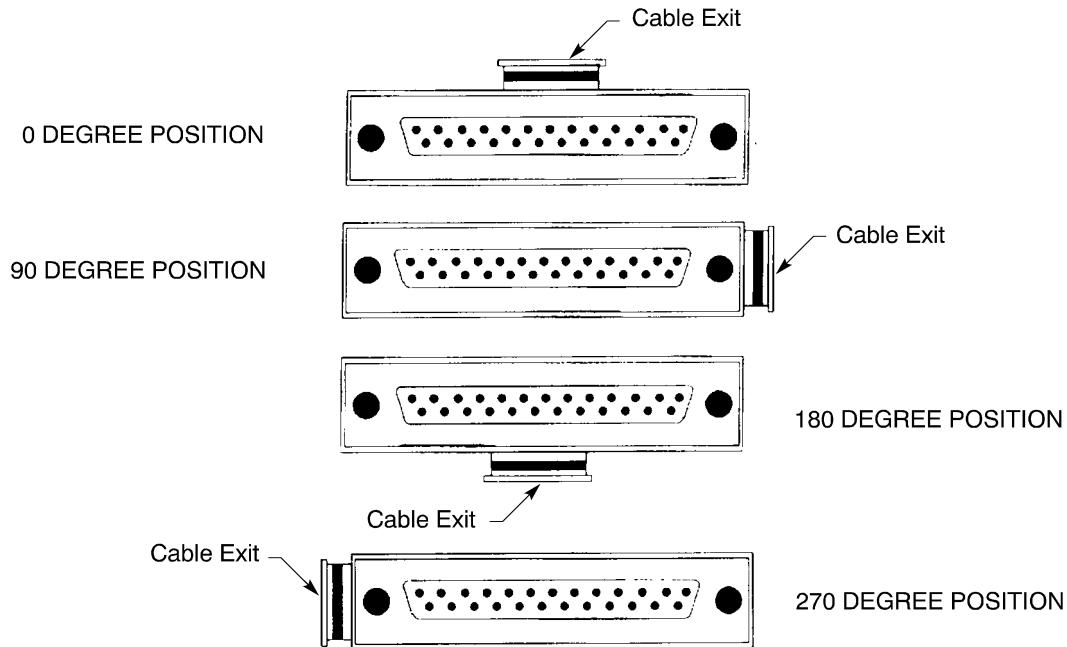
Refer to Table 18 and Figure 68.

Table 18
CLOCK POSITIONS OF THE GLENAIR 557-() BACKSHELL

Backshell	Clock Position (degree)	Cable Exit
557B()	90	End
	270	45 Degree
557E()	90	End
	270	45 Degree
557T()	0	Side
	180	

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CLOCK POSITIONS OF THE GLENAIR 557-() BACKSHELL

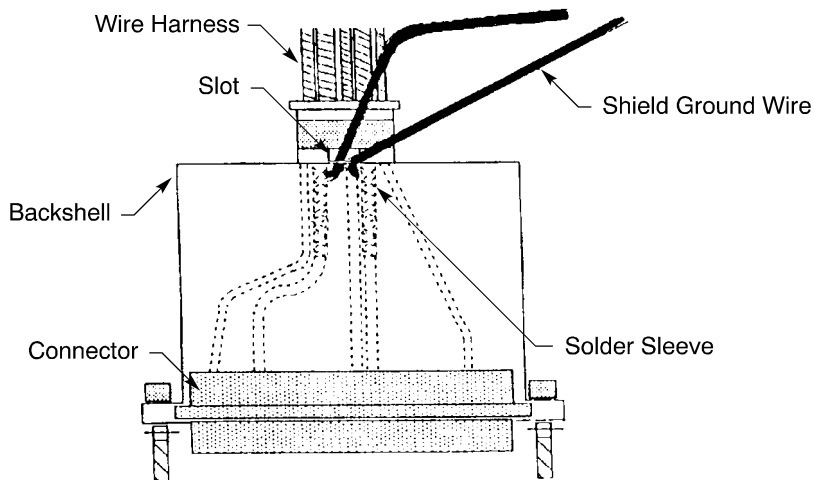
Figure 68

- (3) At the same time, carefully push the backshell until it is against the rear of the connector and pull the end of shield ground wires away from the backshell.
- (4) Align the screw holes in the backshell with the screw holes in the connector.
- (5) For a backshell with jack screws:
 - (a) Push the jack screws through the screw holes in the backshell and the screw holes in the connector.
 - (b) Install a C-clip on each jack screw where there are no threads.
- (6) For a backshell without jack screws:
 - (a) Put two 0.088 inch 4-40 screws into the two screw holes on the front of the connector.
 - (b) Tighten the screws with a screwdriver.
- (7) Carefully, pull each shield ground wire so that any unwanted length of the wire is removed from the backshell.

Refer to Figure 69.

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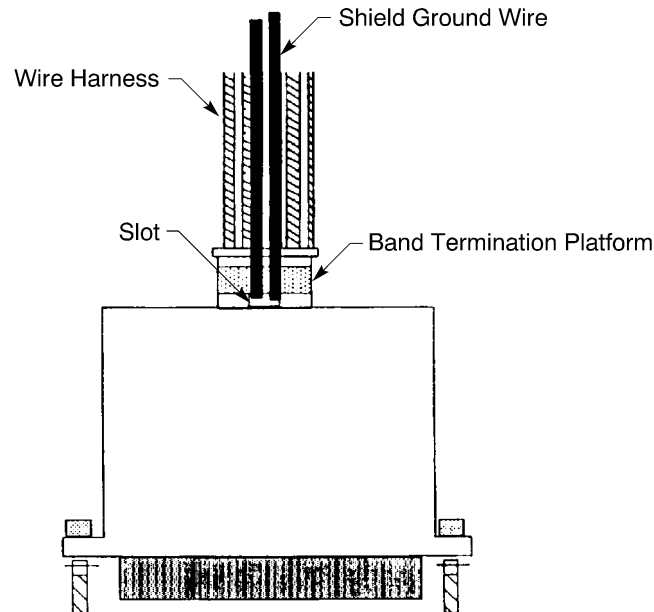


POSITION OF THE BACKSHELL ON THE CONNECTOR
Figure 69

E. Installation of the BACB42F() Shield Terminator Band

- (1) Put each shield ground wire against band termination platform on the cable exit of the backshell so that the shield ground wires:
 - Are tight, even, and symmetrical around the termination platform
 - Do not make an overlap with another shield ground wire.

Refer to Figure 70.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS****POSITION OF THE SHIELD GROUND WIRES****Figure 70**

- (2) Make a selection of a shield terminator band from Table 3.
- (3) Attach the shield terminator band to the backshell.

Refer to:

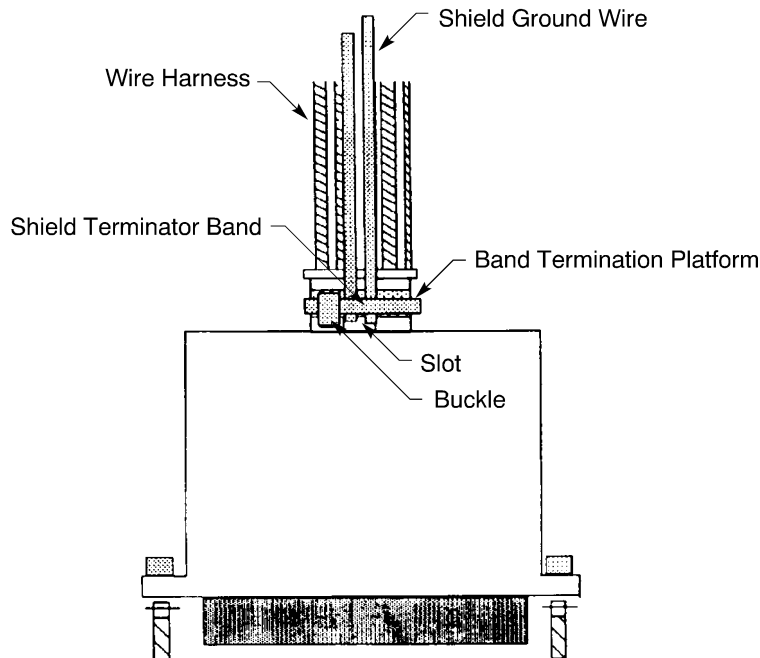
- Figure 71 for the location of the installation
- Paragraph 10. for the installation procedure.

Make sure that:

- The band is on the knurled or ribbed area of the band termination platform of the backshell
- There is no unwanted length of shield ground wire between the slot and the shield terminator band
- The buckle of the band is not over a shield ground wire on the backshell
- The buckle of the band is not over a slot in the backshell.

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POSITION OF THE SHIELD TERMINATOR BAND ON THE BACKSHELL
Figure 71

F. Insulation of the Shield Terminator Band

- (1) Cut each shield ground wire so that the distance from the end of the wire to the shield terminator band is approximately 2.5 inches.
- (2) Make a selection of a 0.19 inch diameter heat shrinkable sleeve from Table 5.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (3) Put a 3.0 inch ± 0.10 inch length of the heat shrinkable sleeve on each shield ground wire.
- (4) Shrink each sleeve in position. Refer to Subject 20-10-14.
- (5) Align the shield ground wires with the longitudinal axis of the wire harness.

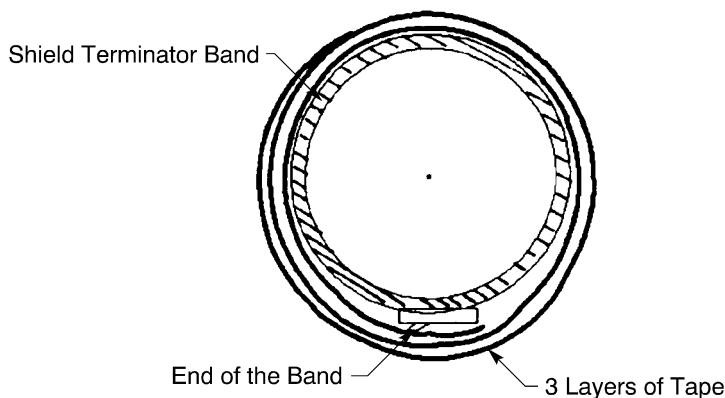
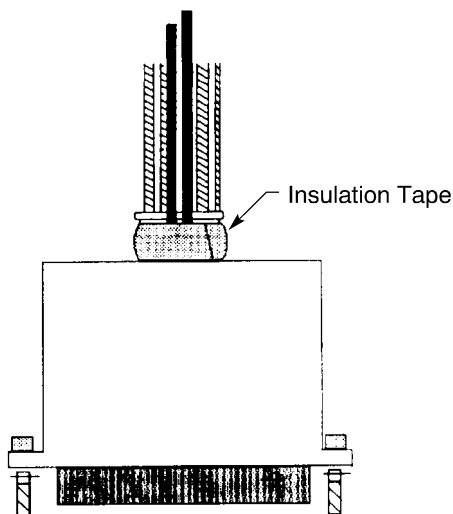
Make sure that the shield ground wire do not make any overlaps that are not necessary.

NOTE: An overlap is acceptable when these conditions occur:

- The diameter of the wire harness is so small that the shield ground wires automatically make an overlap
- A large number of shield ground wires does not permit them to lie along the wire harness without an overlap.

- (6) Cut a length of Scotch 70 insulation tape that is approximately 2.5 times the distance around the outer surface of the band termination platform.
- (7) Cut the length of tape again so that the width is 0.25 inch ± 0.03 inch.
- (8) Put one end of the tape on the end of the shield terminator band that was cut.
- (9) Apply the remaining tape around the band until all the tape is on the band.

Refer to Figure 72 and Figure 73.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS****SCOTCH 70 INSULATION TAPE IN POSITION ON THE BAND****Figure 72****POSITION OF THE INSULATION TAPE ON THE BAND TERMINATION PLATFORM****Figure 73**

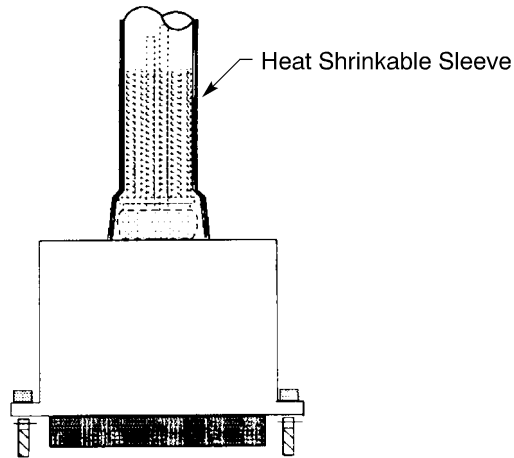
- (10) Push the 4 inch length of the heat shrinkable sleeve until the end of the sleeve is against the rear surface of the backshell.

Make sure that the all the wires that will be subsequently connected with a splice are in the harness.

NOTE: If it is necessary to install splice on any of the wires from the connector, put the splice approximately 1 inch from the rear end of the heat shrinkable sleeve.

- (11) Shrink the sleeve in position. Refer to Subject 20-10-14 and Figure 74.

Make sure that the sleeve does not have any cracks.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS****POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE WIRE HARNESS****Figure 74**

- (12) If the diameter of the heat shrinkable sleeve does not decrease to the diameter of the wire harness, assemble the necessary number of wire harness ties on the sleeve.
Refer to Subject 20-10-15 and Subject 20-10-11.
- (13) If the heat shrinkable sleeve is removed from the wire harness, replace the sleeve after the necessary work is done:
- Make a selection of a heat shrinkable sleeve from Table 5.
Make sure that the diameter of the sleeve is greater than the outer diameter of the backshell cable exit.
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
 - Cut an approximate 4 inch length of the heat shrinkable sleeve.
 - Cut the sleeve again along the longitudinal axis.
 - Put the sleeve on the cable exit of the backshell and the wire harness.
Make sure that the longitudinal axis of the sleeve is aligned with the longitudinal axis of the wire harness.
 - Assemble the necessary number of wire harness ties on the sleeve to hold it in position. Refer to Subject 20-10-15.

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ELECTRICAL CONNECTION OF SHIELDED CABLES AND CONNECTOR BACKSHELLS WITH SHIELD TERMINATOR BANDS

10. INSTALLATION OF THE BACB42F() SHIELD TERMINATOR BAND

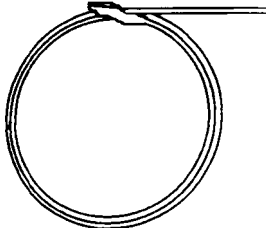
A. Installation Tools

**Table 19
BACB42F() SHIELD TERMINATOR BAND INSTALLATION TOOLS**

Shield Terminator Band	Installation Tool		
	Type	Part Number	Supplier
BACB42F3()	Manual	600-058	Glenair
		A40199	Band-It Idex
	Power	600-051	Glenair
		A75099	Band-It Idex
BACB42F4()	Manual	600-061	Glenair
		A30199	Band-It Idex

B. Shield Terminator Band Installation

- (1) Make a selection of an installation tool from Table 19.
- (2) If the shield terminator band is flat, make the band into a coil. Refer to Figure 75.

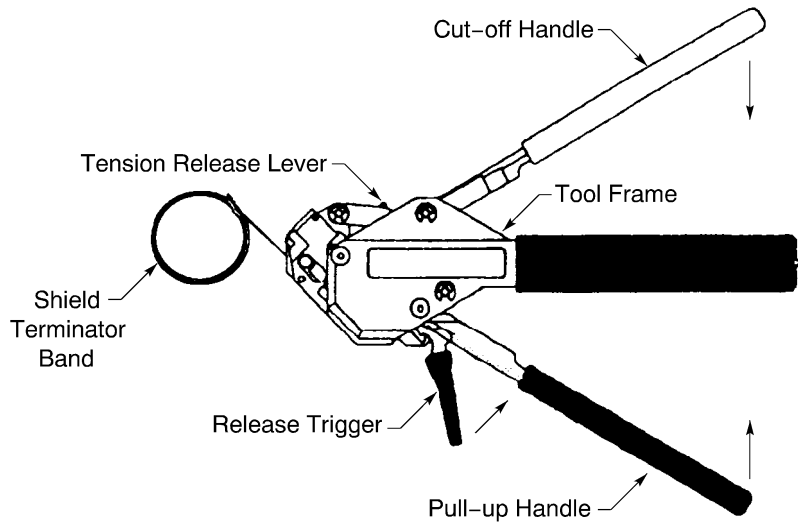


**INSTALLATION CONFIGURATION OF THE BACB42F() SHIELD TERMINATOR BAND
Figure 75**

- (a) Put the free end of the band through the thin slot in the buckle.
 - (b) Pull the free end through the buckle until the diameter of the loop is approximately the same size as the diameter of the backshell.
 - (c) Put the free end of the BACB42F() shield terminator band through the thin slot in the buckle again.
 - (d) Pull the free end through the buckle until the inner surface of the second loop touches the surface of the first loop.
- (3) Pull the release trigger of the tool in the direction of the pull-up handle.
 - (4) Put the free end of the terminator band into the tool. Refer to Figure 76.
Make sure that the loop is away from the tool.

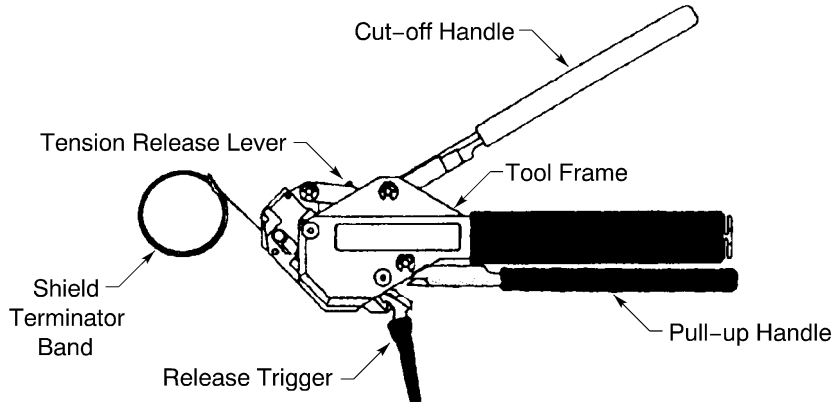
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POSITION OF THE BACB42F() SHIELD TERMINATOR BAND IN THE TOOL
Figure 76

- (5) Pull the pull-up handle toward the tool frame to complete one cycle so that the terminator band is held in the internal grip mechanism of the tool. Refer to Figure 77.

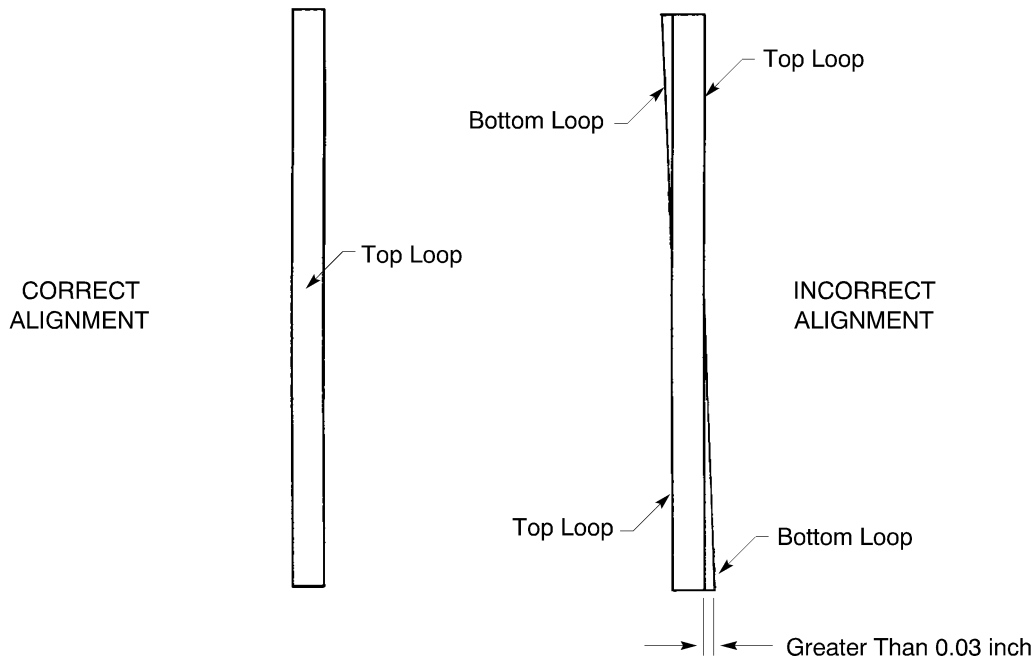


POSITION OF THE PULL-UP HANDLE AT THE END OF A CYCLE
Figure 77

- (6) Put the shield terminator band on the backshell at the location of the installation.
- (7) Align the edges of the two loops of the terminator band so that the edge of either loop is not more than 0.03 inch beyond the edge of the other. Refer to Figure 78.

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ALIGNMENT OF THE LOOPS OF THE SHIELD TERMINATOR BAND

Figure 78

- (8) Pull the pull-up handle through the necessary cycles until the terminator band is tight around the backshell.
Make sure that the position of pull-up handle is the position of the handle at the end of the last cycle.
- (9) If it is necessary to loosen or remove the terminator band after the band has been tightened:
 - (a) Hold the pull-up handle tightly.
 - (b) Push the tension release lever forward.
 - (c) Release the pull-up handle.
NOTE: The pull-up handle will open automatically.
 - (d) Pull the release trigger toward the tool frame.
 - (e) Loosen the band and do the installation again from Step (3).
 - (f) If it is necessary, remove the band and do the installation again from Step (3).
- (10) Pull the cut-off handle toward the tool frame.
- (11) Pull the release trigger of the tool to cut the band.
- (12) Remove the unwanted length of the band from the tool.



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ELECTRICAL CONNECTION OF EQUIPMENT

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1. GENERAL DATA

A. Phase Identification of Three Phase Power Wires

The phase potential of the three phase power wires that are attached to a single equipment item must be identified. Refer to Table 1 and Table 2.

These conditions are applicable:

- Each end of the wire must have a phase identification sleeve
- The wire can have one phase identification sleeve if the length of the wire between the connections is not sufficient for two sleeves.
- It is necessary to install a phase identification sleeve on preinsulated terminals where the identification sleeve fully includes the terminal insulation.
- On AWG 10 and smaller wire, the end of the phase identification sleeve must extend a maximum of 1/16 inch past the end of the terminal insulation.
- On AWG 8 and larger wire, the phase identification sleeve must be installed and tied over the PTFE insulation sleeve of the terminal.
- It is satisfactory to use one piece of heat shrink sleeve on uninsulated terminals for both the terminal insulation sleeve, and the phase identification sleeve.
- If a cold shrink sleeve is on a terminal or splice, the forward end of the phase identification sleeve must be against the rearward end of the cold shrink sleeve.

**Table 1
PHASE IDENTIFICATION SLEEVES FOR TEMPERATURE GRADES A AND B**

Area Temperature Range (Degrees F)	Phase Identification Sleeve	Supplier	Phase	Color
Less than 275	AMS-DTL-23053/5 Class 1	An available source	A	Red
			B	Yellow
			C	Blue
	Grade B, Class 1 Heat Shrinkable Sleeve	Refer to Subject 20-00-11.	A	Red
			B	Yellow
			C	Blue

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ELECTRICAL CONNECTION OF EQUIPMENT

**Table 2
PHASE IDENTIFICATION SLEEVES FOR TEMPERATURE GRADES C AND D**

Area Temperature Range (Degrees F)	Phase Identification Sleeve	Supplier	Phase	Phase Identification	
				Color	Mark
Greater than or equal to 275	AMS-DTL-23053/12-2()-2	QPL	A	Red	-
	AMS-DTL-23053/12-2()-4	QPL	B	Yellow	-
	AMS-DTL-23053/12-2()-6	QPL	C	Blue	-
	PTFE Heat-Shrink	Zeus	A	Red	-
			B	Yellow	-
			C	Blue	-
	BEN-HAR 1151-FRB	Bentley-Harris (Federal-Mogul)	A	-	Phase A
			B	-	Phase B
			C	-	Phase C
	Grade D, Class 1 Heat Shrinkable Sleeve	Refer to Subject 20-00-11.	A	Red	-
			B	Yellow	-
			C	Blue	-

2. NECESSARY CONDITIONS FOR THE INSTALLATION OF TERMINALS

A. General Data

Insulation of these wires is necessary before any system is energized:

- The end of a wire that has no termination
- The end of a wire that has a terminal, but is not connected.

Refer to Subject 20-30-11.

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These conditions are applicable:

- A minimum of 1-1/2 threads of the stud or the screw must go through the end of the nut
- The size of the stud hole in the terminal lug must be the same as the size of the stud.

If a terminal lug that has the same size hole as the stud is not available, these configurations of terminals lugs and studs are satisfactory alternatives:

- A terminal lug that has a size 10 hole on a size 8 stud
- A terminal lug that has a size 8 hole on a size 6 stud
- A terminal lug that has a size 6 hole on a size 4 stud
- A terminal lug that has a size 4 hole on a size 2 stud.

These conditions are applicable for studs that have more than one terminal lug:

- The maximum number of terminal lugs that can be attached to a stud is 4
- The largest terminal lug must be installed first at the base of the stud
- The remaining terminal lugs must be installed in order of decreasing size.

All electrical connections that are open to the air in the flammable leakage zones must be sealed. Refer to Paragraph 4.

NOTE: It is not necessary to seal insulated splices.

B. Permitted Bends of a Terminal

Uninsulated and preinsulated terminals can be bent:

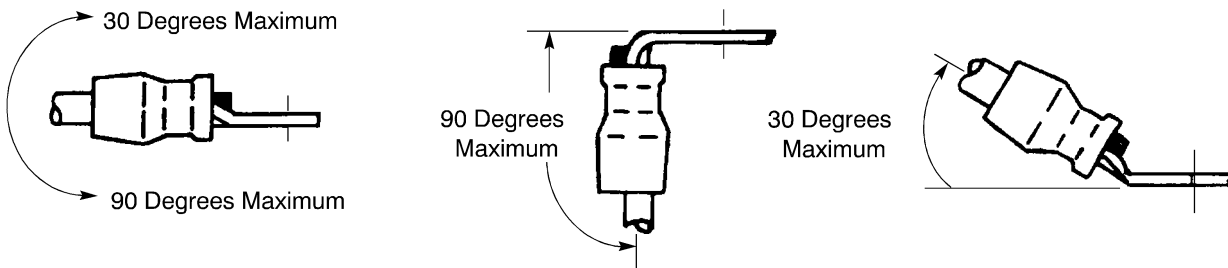
- A maximum of 90 degrees for installation in restricted spaces
- A maximum of 30 degrees for installation on a terminal block.

Refer to Figure 1.

CAUTION: A TERMINAL CAN BE BENT ONLY ONCE AND ONLY IN EITHER DIRECTION THAT IS SHOWN IN FIGURE 1. DO NOT USE TERMINALS THAT HAVE BEEN BENT BEFORE.

Make sure that:

- The bend radius is not greater than 5/32 inch ± 1/32 inch
- There are no cracks in the bend area.



PERMITTED DIRECTION AND ANGLE OF THE BEND OF A TERMINAL
Figure 1

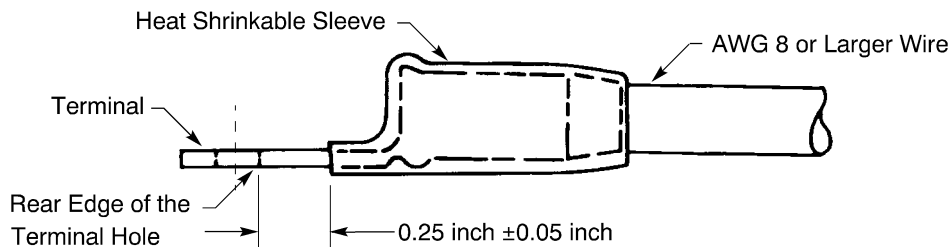
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C. Insulation of AWG 8 or Larger Terminals

Table 3
HEAT SHRINKABLE SLEEVES FOR SINGLE PHASE AND DC WIRES

Area Temperature Range (degrees F)	Heat Shrinkable Sleeve	
	Part Number or Description	Supplier
Less than or equal to 275	Grade B, Class 1 Heat Shrinkable Sleeve	Refer to Subject 20-00-11.
Greater than 275	Thermofit TFE	Raychem (Tyco)
	Thermofit TFE-R	Raychem (Tyco)
	Ben-Har 1151-FRB	Bentley-Harris (Federal-Mogul)



INSULATION OF AWG 8 AND LARGER WIRE WITH A TERMINAL
Figure 2

It is necessary to install a heat shrinkable sleeve on AWG 8 and larger wires that have a terminal attached. The sleeve:

- Must not be in between the different components of the terminal hardware
- Can extend over the pressure washer, but must not touch the terminal stud.
- Must be yellow for single phase and DC wires; refer to Table 3
- Must be installed on the terminal after the terminal is attached to the wire
- Must have the smallest possible diameter that can be installed over the wire barrel of the terminal
- Must be 1-1/2 inches to 2 inches in length.

NOTE: When two wires from a single terminal start to go in different directions within 1/2 inch of the terminal, the permitted length of the sleeve is 1 inch minimum.

When a Thermofit TFE heat shrinkable sleeve is used:

- The phase identification sleeve is installed over the Thermofit TFE sleeve
- The sleeve is held in position with a wire bundle tie on the wire barrel of the terminal or on the wire beyond the terminal.

NOTE: In fuel vapor areas, the sleeve can be held in position with a wire bundle tie.

When the terminal is attached to the equipment, these conditions are applicable:

- If it is necessary, the sleeve can be cut so that it is clear of the hardware
- If there is a barrier between phases or components, the sleeves of adjacent terminals must not touch each other.

STANDARD WIRING PRACTICES MANUAL**ELECTRICAL CONNECTION OF EQUIPMENT****D. Configuration of Terminals on an MS27212 Terminal Block**

When a terminal lug is installed on the terminal block, make sure that the terminal lug cannot be moved in the direction that loosens it.

For the MS27212-2 terminal block:

- The size of the stud hole in the terminal lug must be the same as the size of the stud
- The maximum number of terminal lugs that can be attached to a stud is 4
- A maximum of 2 terminal lugs that have 8 AWG or larger wire can be installed on one stud on each side of the terminal block
- The largest terminal lug must be installed first at the base of the stud
- The remaining terminal lugs must be installed in order of decreasing size.

Refer to:

- Figure 3 for more than one terminal on a stud
- Figure 4 for the different configurations of one or more terminals on a stud
- Figure 5 for the bus configuration.

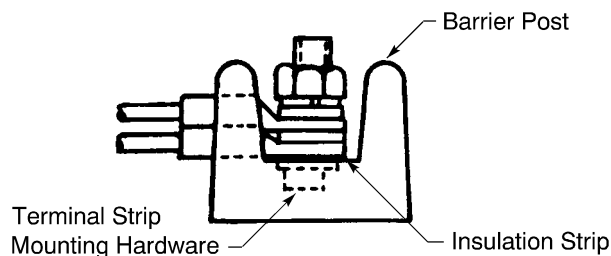
NOTE: To make the installation of one or more terminals easier, the top of the terminal can be turned toward the bottom of the stud.

For terminal block hardware that is not used, these conditions are applicable:

- A plain nut must be tightened sufficiently with a steel lock washer under the nut
- A plain nut must be held in position with a self-locking nut
- A self-locking nut must be tightened so that a minimum of one thread of the stud goes through the nut
- A terminal screw must be tightened sufficiently with a steel lock washer under the head of the screw.

NOTE: It is not necessary to install a self-lock nut at the bottom of a stud on the MS27212 terminal block.

NOTE: If it is necessary, the legs of an MS18029 terminal block cover can be cut to make a hole for the wire barrel of a terminal.

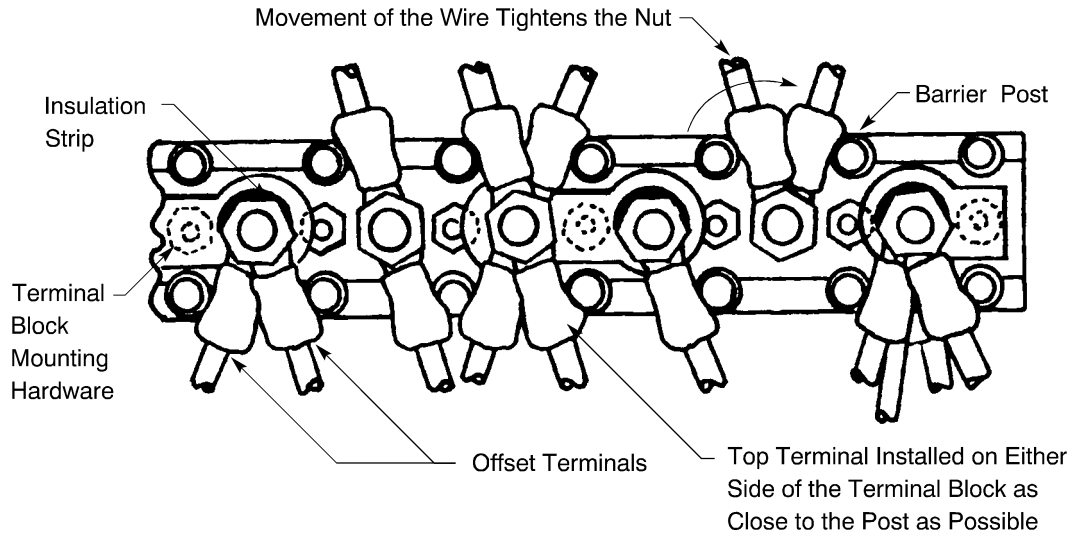


TERMINALS INSTALLED ON A TERMINAL BLOCK POST

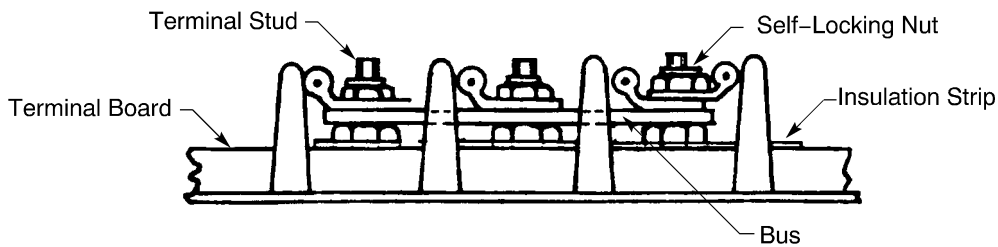
Figure 3

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CONFIGURATION OF TERMINALS ON AN MS27212 TERMINAL BLOCK
Figure 4



BUS CONFIGURATION OF A TERMINAL BOARD
Figure 5

E. Installation of a Terminal on a Circuit Breaker

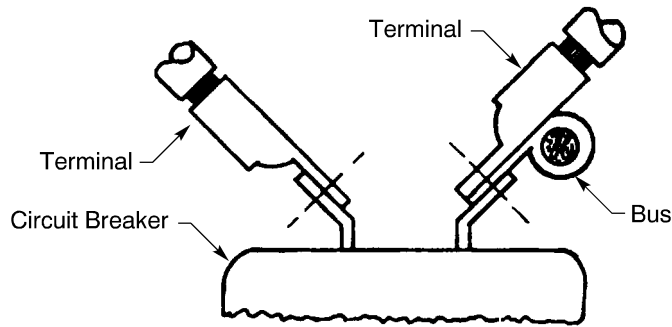
Refer to Figure 6.

NOTE: When a terminal, with a hole that is larger than the hole of the circuit breaker terminal, is attached to a circuit breaker:

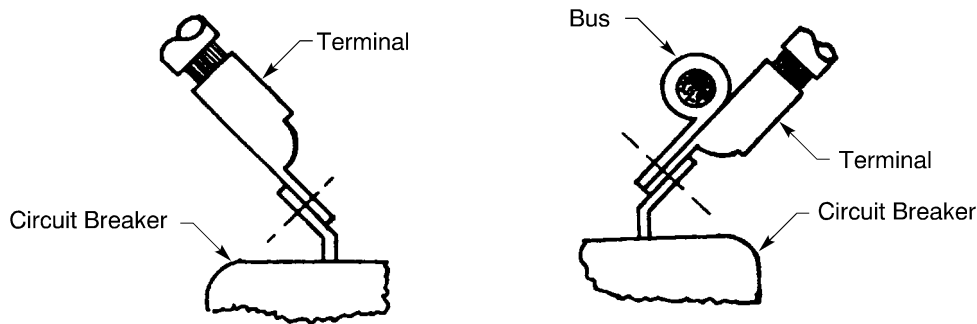
- An AN960 pressure washer is installed between the terminal and the lock washer
- The AN960 pressure washer has a hole that is the same size as the hole of the circuit breaker terminal; for example, an AN960-8 pressure washer is used when a size 10 terminal is attached to size 8 circuit breaker terminal.

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CONFIGURATION OF TERMINALS AND BUSES ON A CIRCUIT BREAKER
Figure 6



ALTERNATIVE CONFIGURATIONS OF TERMINALS AND BUSES ON A CIRCUIT BREAKER
Figure 7

3. TERMINAL INSTALLATION

A. Installation of Copper Terminals

CAUTION: DO NOT USE ANODIZED WASHERS OR STEEL WASHERS TO INSTALL A TERMINAL.

NOTE: Copper terminals are attached to:

- Either brass studs or brass screws with tin plated brass nuts
- Either steel studs or steel screws with self-locking steel nuts.

Table 4
INSTALLATION HARDWARE FOR COPPER TERMINALS

Hardware	Part Number	Supplier
Nut, Plain	MS35649- ()	QPL
	MS35650-()	QPL
Nut, Self Locking	BACN10JC ()	Boeing
	MS21042L ()	QPL
Washer, Lock, for Plain Nuts	MS35338-()	QPL

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Table 4 (continued)

Hardware	Part Number	Supplier
Washer, Lock, for Self Locking Nuts	BACW10EC4S	Boeing
Washer, Flat	NAS1149F()P	QPL
Washer, Spacer, Flat	AN961-()	QPL

**Table 5
INSTALLATION TORQUE FOR COPPER TERMINALS**

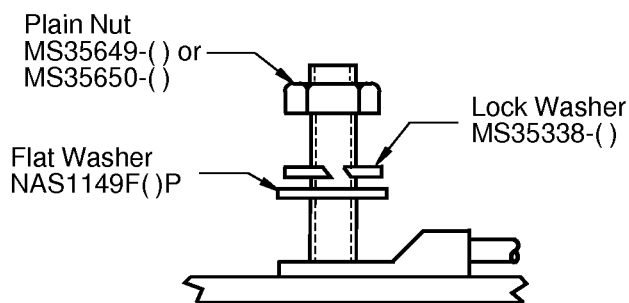
Stud Size	Hardware	Torque (inch-pound)	
		Minimum	Maximum
6-32	Nut, Plain	7	9
	Nut, Plain With Lockwasher	7	9
	Nut, Self-Locking	7	9
8-32	Nut, Plain	12	16
	Nut, Plain With Lockwasher	12	16
	Nut, Self-Locking	12	16
10-32	Nut, Plain	28	32
	Nut, Plain With Lockwasher	28	32
	Nut, Self-Locking	28	32
1/4	Nut, Plain	65	75
	Nut, Plain With Lockwasher	65	75
	Nut, Self-Locking	65	75
5/16	Nut, Plain	115	125
	Nut, Plain With Lockwasher	135	145
	Nut, Self-Locking	135	145
3/8	Nut, Plain	150	170
	Nut, Plain With Lockwasher	170	190
	Nut, Self-Locking	180	200
1/2	Nut, Plain With Lockwasher	480	520
	Nut, Self-Locking	480	520

(1) To install a single terminal on a stud, refer to Figure 8 and Table 4.

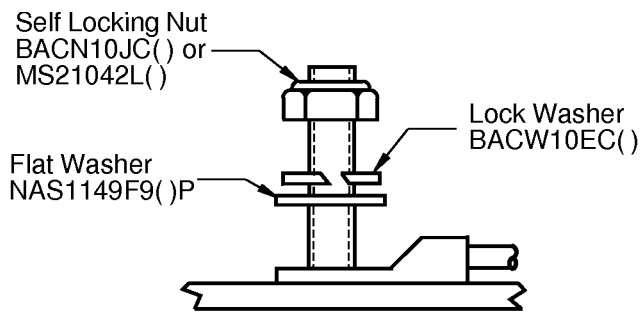
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A Single Terminal and a Plain Nut

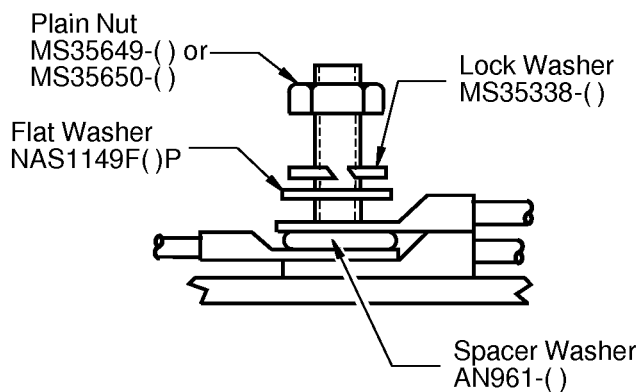


A Single Terminal and a Self-Locking Nut

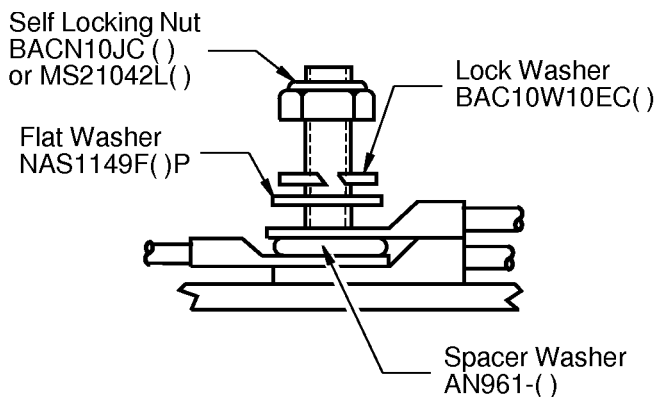
INSTALLATION OF A SINGLE TERMINAL

Figure 8

- (a) Put the terminal on the stud.
 - (b) Put these washers on the stud in this order:
 - An NAS1149F ()P flat washer
 - An MS35338- () lock washer for a plain nut
 - An BACW10EC () lock washer for a self locking nut.
- (2) To install more than one terminal on the same stud, refer to Figure 9 and Table 4.
- Put these washers on the stud in this order:
- An NAS1149F ()P flat washer
 - An MS35338- () lock washer for a plain nut
 - An BACW10EC () lock washer for a self locking nut.



Two or More Terminals and a Plain Nut



Two or More Terminals and a Self-Locking Nut

INSTALLATION OF TWO OR MORE TERMINALS

Figure 9

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- (a) Put the terminals on the stud so that the terminals with the larger holes are nearer to the bottom of the stud.

Make sure that the bottom face and the top face of the adjacent terminals are parallel.

- (b) Put AN961-() spacer washers between adjacent terminals when more than one terminal is installed. Refer to Figure 9.

NOTE: A MAXIMUM OF 4 TERMINALS CAN BE INSTALLED ON 1 STUD.

CAUTION: DO NOT USE ANODIZED WASHERS, DYED WASHERS, OR STEEL WASHERS BETWEEN ADJACENT TERMINALS.

- (c) Put these washers on the stud in this order:
 - An NAS1149F()P flat washer
 - An MS35338-() lock washer for a plain nut
 - An BACW10EC() lock washer for a self locking nut.

- (3) Put the nut on the stud.

- (4) Torque the nut. Refer to Table 5.

If the torque value is not specified in Table 7 for the terminal hardware, make sure that:

- The lock washer is fully compressed
- The terminal does not move on the stud.

B. Installation of Aluminum Terminals

CAUTION: DO NOT USE ANODIZED WASHERS OR STEEL WASHERS TO INSTALL A TERMINAL.

**Table 6
WASHERS FOR ALUMINUM TERMINALS**

Wire Size (AWG)	Stud Size	Washer	
		Standard or Specification	Supplier
8	1/4	BACW10P-70	Boeing
		MS25440-4	QPL
	3/8	BACW10P-12	Boeing
		MS25440-6	QPL
	5/16	BACW10P-14	Boeing
		MS25440-5	QPL
6	1/4	BACW10P-70	Boeing
		MS25440-4	QPL
	3/8	BACW10P-12	Boeing
		MS25440-6	QPL
	5/16	BACW10P-14	Boeing
		MS25440-5	QPL

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Table 6 (continued)

Wire Size (AWG)	Stud Size	Washer		
		Standard or Specification	Supplier	
4	1/4	BACW10P-70	Boeing	
		MS25440-4	QPL	
	3/8	BACW10P-12	Boeing	
		MS25440-6	QPL	
	5/16	BACW10P-14	Boeing	
		MS25440-5	QPL	
2	1/2	BACW10P-14	Boeing	
		MS25440-8	QPL	
	1/4	BACW10P-70	Boeing	
		MS25440-4A	QPL	
	3/8	BACW10P-12	Boeing	
		MS25440-6	QPL	
	5/16	BACW10P-14	Boeing	
		MS25440-5	QPL	
	1	1/2	BACW10P-14	Boeing
			MS25440-8	QPL
		1/4	BACW10P-70	Boeing
			MS25440-4A	QPL
3/8		BACW10P-12	Boeing	
		MS25440-6	QPL	
5/16		BACW10P-14	Boeing	
		MS25440-5	QPL	
1/0		1/2	BACW10P-14	Boeing
			MS25440-8	QPL
		1/4	BACW10P-70	Boeing
			MS25440-4A	QPL
	3/8	BACW10P-12	Boeing	
		MS25440-6	QPL	
	5/16	BACW10P-14	Boeing	
		MS25440-5	QPL	

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Table 6 (continued)

Wire Size (AWG)	Stud Size	Washer	
		Standard or Specification	Supplier
2/0	1/2	BACW10P-14	Boeing
		MS25440-8	QPL
	3/8	BACW10P-12	Boeing
		MS25440-6	QPL
	5/16	BACW10P-14	Boeing
		MS25440-5	QPL
3/0	1/2	BACW10P-14	Boeing
		MS25440-8	QPL
	3/8	BACW10P-12	Boeing
		MS25440-6A	QPL
4/0	1/2	BACW10P-14	Boeing
		MS25440-8	QPL
	3/8	BACW10P-12	Boeing
		MS25440-6A	QPL

**Table 7
INSTALLATION TORQUE FOR ALUMINUM TERMINALS**

Stud Size	Hardware	Torque (inch-pound)	
		Minimum	Maximum
10-()	Nut, Plain With Lockwasher	28	35
	Nut, Self-Locking	33	40
1/4-()	Nut, Plain With Lockwasher	70	85
	Nut, Self-Locking	75	90
5/16-()	Nut, Plain With Lockwasher	125	155
	Nut, Self-Locking	135	165
3/8-()	Nut, Plain With Lockwasher	180	210
	Nut, Self-Locking	220	250
1/2-()	Nut, Plain With Lockwasher	380	440
	Nut, Self-Locking	430	490

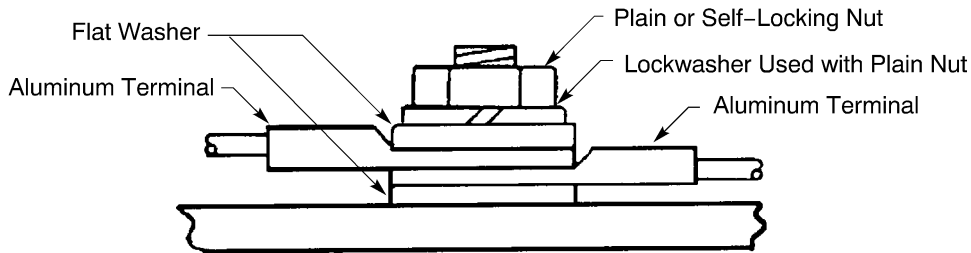
(1) Make a selection of a flat washer from Table 6.

NOTE: 2 washers are necessary.

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(2) Install one or more terminals. Refer to Figure 10.



POSITION OF THE WASHERS WITH ALUMINUM TERMINALS
Figure 10

- (a) Put a flat washer on the stud against the terminal board or equipment.
- (b) Put the terminal or terminals on the stud.
- (c) Put the other flat washer on the stud against the top terminal.
- (d) If a plain nut is used, put a lock washer on the stud against the last flat washer.
- (e) Put the nut on the stud.
- (f) Torque the nut. Refer to Table 7.

If the torque value is not specified in Table 7 for the terminal hardware, make sure that:

- The lock washer is fully compressed
- The terminal does not move on the stud.

C. Installation Torque for Circuit Breaker, Relay and Contactor Terminals

Table 8
INSTALLATION TORQUE FOR CIRCUIT BREAKER TERMINALS

Circuit Breaker			Torque (inch-pounds)	
Part Number	Current Rating (Amps)	Stud Size	Minimum	Maximum
170-006-140	140	1/4-28	40	45
10-60806-()	5 THROUGH 35	8-32	14	15
	35 THROUGH 50	8-32	25	27
	60 THROUGH 100	1/4-28	40	45
BACC18W()	ALL	8-32	14	15
BACC18Z()	ALL	8-32	14	15
BACC18AC()	ALL	8-32	14	15
BACC18AD()	ALL	8-32	14	15
BACC18AE()	ALL	8-32	14	15
BACC18AF()	5 THROUGH 25	10-32	18	20
	35 THROUGH 100	1/4-28	40	45

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Table 8 (continued)

Circuit Breaker			Torque (inch-pounds)	
Part Number	Current Rating (Amps)	Stud Size	Minimum	Maximum
BACC18R()	5 THROUGH 35	8-32	14	15
BACC18R() (Type C)	50 THROUGH 100	1/4-28	40	45
BACC18X()	5 THROUGH 35	8-32	14	15
	50 THROUGH 100	1/4-28	40	45

Table 9

INSTALLATION TORQUE FOR RELAY TERMINALS

Relay			Torque (inch-pounds)	
Part Number	Supplier	Stud Size	Minimum	Maximum
-	-	6-32	5.5	7.5
-	-	8-32	18	20
-	-	10-32	22	24
-	-	1/4-28	70	75
-	-	3/8-24	112	117
10-61445-21	Boeing	6-32	5.5	7.5
		10-32	22	24
HT-C7N-060	Leach	6-32	5.5	7.5
		10-32	22	24
MS27751-2	QPL	6-32	5.5	7.5
		10-32	22	24

NOTE: If the torque values are not specified on the MS27751-2 relay, use the values in Table 10.

Table 10

INSTALLATION TORQUE FOR MS27751-2 RELAY TERMINALS

Relay		Torque (inch-pounds)	
Relay Part	Stud Size	Minimum	Maximum
MS27751-2	6-32	5.5	7.5
	10-32	22	24



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**Table 11
INSTALLATION TORQUE FOR CONTACTOR TERMINALS**

Contactor			Torque (inch-pounds)	
Part Number	Supplier	Stud Size	Minimum	Maximum
60B00010-()	Boeing	3/8-24	115	125
60B40021-()	Boeing	3/8-24	115	125
D-25BD	Hartman	6-32	5.5	7.5
		1/4-28	46	56
D-31C	Hartman	6-32	5.5	7.5
		1/4-28	46	56

D. Installation Torque for ELCU Terminals

**Table 12
INSTALLATION TORQUE FOR ELCU TERMINALS**

ELCU		Torque (inch-pounds)	
Part Number	Stud Size	Minimum	Maximum
S281T003-()	3/8-24	180	190
60B00176-()	3/8-24	120	125

E. Installation Torque for External Power Connector Terminal Studs

**Table 13
INSTALLATION TORQUE FOR EXTERNAL POWER CONNECTOR TERMINALS**

External Power Connector			Torque (inch-pounds)	
Part Number	Stud Size	Terminal Number	Minimum	Maximum
MS90362-()	3/8-24	A	120	125
		B	120	125
		C	120	125
		N	120	125
	10-32	E	20	22
		F	20	22

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F. Installation Torque for the Fuel Quantity Probe Terminals

Table 14
INSTALLATION TORQUE FOR FUEL QUANTITY PROBE TERMINALS

Wire Color	Terminal Size	Maximum Torque (inch-pound)
Red	10-32	13
Black	8-32	10
White	6-32	10

G. Installation Torque for the IDG Generator Terminals

Table 15
INSTALLATION TORQUE FOR THE IDG GENERATOR TERMINALS

Generator Terminals	Torque			
	(foot-pounds)		(inch-pounds)	
	Minimum	Maximum	Minimum	Maximum
Power Output	12	14	144	168

H. Installation of Jay-El 10167 Time Delay Terminals

Table 16
PRESSURE WASHER FOR JAY-EL TIME DELAY TERMINALS

Description	Material	Plating	Part Number	Supplier
Pressure washer	Steel	Cadmium	AN960-6I	An available source

The terminal stud hardware buildup on the 10167-(-)(-) time delays includes a flat, cadmium plated steel pressure washer between the lock washer and the bottom nut.

- (1) Make a selection of a pressure washer from Table 16.
- (2) Put the pressure washer on the terminal between the lock washer and the bottom nut.
- (3) Do Step (1) through Step (2) for the remaining terminals of the Jay-El 10167 Time Delay.
- (4) Torque the terminals. Refer to Table 5.

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I. Installation Terminal Torque for MS27212-() Terminal Strip

**Table 17
INSTALLATION TORQUE FOR FOR MS27212-() TERMINAL STRIP TERMINALS**

Terminal Strip		Torque (inch-pounds)	
Part Number	Stud Size	Minimum	Maximum
MS27212-()-()	6-32	15	16
	8-32	20	22
	10-32	30	32
	1/4-28	70	75

J. Installation Torque for Transformer Terminals

**Table 18
INSTALLATION TORQUE FOR TRANSFORMER TERMINALS**

Stud Size	Torque (inch-pounds)	
	Minimum	Maximum
8-32	7	9
10-32	28	32

4. PROTECTION OF ELECTRICAL CONNECTIONS IN A FLAMMABLE LEAKAGE ZONE

This paragraph gives the applicable conditions for and the procedure to seal an electrical connection that is open to the air in a flammable leakage zone. Refer to Paragraph 4.B.

A. General Conditions for Electrical Connections in a Flammable Leakage Zone

CAUTION: THE SEAL OF AN ELECTRICAL CONNECTION IN A FUEL TANK IS NOT A STANDARD PROCEDURE. FOR FUEL SYSTEM WIRING REPAIRS THAT ARE PERMITTED, REFER TO SUBJECT 20-10-13.

The seal of these electrical connections in a flammable leakage zone is not necessary:

- A dual ground assembly
- A terminal lug on the engine
- A terminal lug on the APU
- A bond jumper
- A ground assembly that is not sealed initially

All other electrical connections in a flammable leakage zone must be sealed.

For the procedure to seal:

- A ground stud ground assembly that is in a flammable leakage zone, refer to Subject 20-20-00
- All other electrical connections, refer to Paragraph 4.C.

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B. Location of the Flammable Leakage Zones

For the locations of the flammable leakage zones, refer to Subject 20-02-10.

C. Seal of an Electrical Connection in a Flammable Leakage Zone

For the conditions that are applicable for this procedure, refer to Paragraph 4.A.

NOTE: The cure times and tack-free times that are specified in Table 19 are applicable for 77 degrees F \pm 5 degrees F and 50 percent relative humidity.

NOTE: The cure time and the tack free time:

- Increase at lower temperature and lower humidity
- Decrease at higher temperature and higher humidity.

**Table 19
RECOMMENDED SEALANTS FOR A FUEL VAPOR AREA**

Cure Time (Hours)	Tack Free Time (Hours)	Part Number	Supplier	Special Instructions
2	1	PR 1826 B-1/4	PRC-DeSoto International	Not applicable for clad aluminum
3	2	PR 1826 B-1/2	PRC-DeSoto International	Not applicable for clad aluminum
8	3	Proseal 860 B-1/6	PRC-DeSoto International	Not applicable for CRES or bare titanium
20	10	BMS5-95 B-1/2	Boeing	-
24	10	BMS5-142 B-1/2	Boeing	Not applicable for faying surfaces
	12	BMS5-37 B-2	Boeing	-
48	24	BMS5-26 B-2 Type II	Boeing	-
		BMS5-45 B-2	Boeing	-
		BMS5-142 B-2	Boeing	Not applicable for faying surfaces
	36	BMS5-95 B-2	Boeing	-
72	36	BMS5-26 A-2 Type II	Boeing	-

**Table 20
APPROVED SUPPLIERS OF BOEING STANDARD SEALANTS**

Boeing Standard	Supplier
BMS5-26 A-2 Type II	Courtaulds Aerospace
BMS5-26 B-2 Type II	Courtaulds Aerospace
BMS5-37 B-2	PRC-DeSoto International
BMS5-45 B-2	PRC-DeSoto International
BMS5-45 B-2	Le Joint Francais

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STANDARD WIRING PRACTICES MANUAL

ELECTRICAL CONNECTION OF EQUIPMENT

Table 20 (continued)

Boeing Standard	Supplier
BMS5-45 B-2	Yokohama Rubber
BMS5-95 B-1/2	PRC-DeSoto International
BMS5-95 B-2	PRC-DeSoto International
BMS5-95 B-2	Le Joint Francais
BMS5-95 B-2	Yokohama Rubber

- (1) Make a selection of a sealant from Table 19.
- (2) With a clean cloth and naphtha or an equivalent solvent, remove all contamination from:
 - The connection
 - The 1 inch minimum area around the connection.
- (3) Let the area dry for a minimum of 15 minutes.
- (4) For a lamp terminal, with or without a sleeve, apply one continuous layer of sealant with a brush on:
 - The end of the terminal
 - The hardware that is attached to the lamp.

Make sure that the sealant is not applied on:

- The shank of the terminal
- A soldered filament connection.

CAUTION: ANY SEALANT ON THE SHANK CAN PREVENT THE MOTION OF THE LAMP CONTACT. THE LAMP CAN BECOME TOO HOT WHICH CAN CAUSE THE FAILURE OF THE LIGHT ASSEMBLY.

- (5) For a switch terminal that is not connected, apply one continuous layer of sealant on the terminal with a brush.
- (6) For a switch lead wire that is not connected, assemble a crimp type end cap on the wire. Refer to Subject 20-30-16.
- (7) For all other connections, apply a layer of sealant on the connection with a brush.
Make sure that the sealant is fully applied on the outer surface of the connection.
- (8) Let the sealant cure.

NOTE: The full cure of a sealant is recommended, but the sealant is serviceable when:

- It is tack free
- It is in an area where wind shear does not occur.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

1. PART NUMBERS AND DESCRIPTION

A. General Data

Refer to Subject 20-30-14 for the assembly of Copalum and aluminum terminals.

Refer to Subject 20-30-00 for the:

- The procedures to attach terminal lugs to equipment
- The configuration of the terminal lugs attached to equipment
- The installation of colored identification sleeves on terminals on three phase power wires.

Refer to Subject 20-30-22 for the:

- Assembly of a terminal lug with more than one conductor
- Assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug
- Assembly of a terminal lug with a wire size that is not given in this Subject
- Assembly of a terminal lug with a wire that has an insulation O.D. that is smaller than the insulation grip of the terminal lug.

If a terminal lug that has the same size hole as the stud is not available, these configurations of terminals lugs and studs are satisfactory alternatives:

- A terminal lug that has a size 10 hole on a size 8 stud
- A terminal lug that has a size 8 hole on a size 6 stud
- A terminal lug that has a size 6 hole on a size 4 stud
- A terminal lug that has a size 4 hole on a size 2 stud.

For the Circular Area Units (CAU) of a conductor, refer to Table 1.

CAU can be calculated if the Circular Mil Area (CMA) of a conductor is known. Refer to Figure 1.

NOTE: The circular mils of a conductor can be found in all wire tables. If the tables are not available, the CMA can be calculated. Refer to Figure 1.

$$CAU = \frac{CMA}{100} = \frac{(1000 \times \text{Strand Diameter})^2}{100} \times \text{Number of Strands}$$

CIRCULAR AREA UNITS OF A CONDUCTOR
Figure 1

Table 1 gives the CAU of conductors of wire.

Refer to Paragraph 2.C. for the CAU of the shield of different shielded wires and cables.

Table 1
CAU OF CONDUCTORS OF WIRE

Wire Size (AWG)	Conductor		
	Type	Maximum O.D. (inch)	CAU
32	Solid	0.008	0.6
	Stranded	0.009	0.6

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 1 (continued)

Wire Size (AWG)	Conductor		
	Type	Maximum O.D. (inch)	CAU
30	Solid	0.010	1
	Stranded	0.012	1
28	Solid	0.013	1.6
	Stranded	0.015	1.6
26	Solid	0.016	3
	Stranded	0.019	3
24	Solid	0.020	5
	Stranded	0.024	5
22	Solid	0.025	8
	Stranded	0.030	8
20	Solid	0.032	12
	Stranded	0.038	12
18	Solid	0.040	19
	Stranded	0.046	19
16	Solid	0.051	24
	Stranded	0.059	24
15	Solid	0.057	33
	Stranded	0.065	33
14	Solid	0.064	38
	Stranded	0.074	38
13	Solid	0.072	52
	Stranded	0.082	52
12	Solid	0.081	59
	Stranded	0.093	59
10	Solid	0.102	99
	Stranded	0.117	99
8	Solid	0.129	170
	Stranded	0.148	170
6	Solid	0.162	268
	Stranded	0.186	268

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 1 (continued)

Wire Size (AWG)	Conductor		
	Type	Maximum O.D. (inch)	CAU
4	Solid	0.204	426
	Stranded	0.235	426
2	Solid	0.258	665
	Stranded	0.297	665
1	Solid	0.290	837
	Stranded	0.328	837
1/0	Solid	0.352	1045
	Stranded	0.374	1045
2/0	Solid	0.365	1330
	Stranded	0.420	1330
3/0	Solid	0.410	1665
	Stranded	0.472	1665
4/0	Solid	0.460	2109
	Stranded	0.530	2109

Table 2 gives the diameter in inches for the standard stud sizes.

**Table 2
STANDARD STUD SIZES**

Stud Size	Diameter (inch)
2	0.086
4	0.112
5	0.125
6	0.138
8	0.164
10	0.190
1/4	0.250
5/16	0.312
3/8	0.375
7/16	0.438
1/2	0.500
5/8	0.625

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 2 (continued)

Stud Size	Diameter (inch)
3/4	0.750
7/8	0.875

B. BACT12AC General Purpose Terminal Lugs

Refer to Paragraph 2.D. for the procedure to assemble these terminals.

Some BACT12AC terminal lugs have an insulation grip. Some of the larger size BACT12AC terminal lugs do not have an insulation grip.

BACT12AC insulated terminal lugs must be used:

- To terminate BMS 13-51 Grade B AWG 8 and larger wire
- To terminate BMS 13-48 AWG 8 and larger wire
- To terminate BMS 13-31 wire in Temperature Grade Zone A and Zone B.

**Table 3
BACT12AC GENERAL PURPOSE TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Insulation Color	Stud Hole Size	Boeing Standard
	Minimum	Maximum			
26 - 24	3	8	Yellow	2	BACT12AC43
				4	BACT12AC44
				6	BACT12AC45
				8	BACT12AC46
				10	BACT12AC47
22 - 18	7	24	Red	4	BACT12AC48
				6	BACT12AC1
					BACT12AC2
				8	BACT12AC49
				10	BACT12AC3
				1/4	BACT12AC50
				5/16	BACT12AC4
				3/8	BACT12AC5
1/2	BACT12AC51				

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 3 (continued)

Crimp Barrel Size	CAU Range		Insulation Color	Stud Hole Size	Boeing Standard
	Minimum	Maximum			
16 - 14	15	51	Blue	4	BACT12AC52
				6	BACT12AC6
					BACT12AC7
				8	BACT12AC53
				10	BACT12AC8
				1/4	BACT12AC54
				5/16	BACT12AC9
				3/8	BACT12AC10
1/2	BACT12AC55				
12 - 10	43	138	Yellow	6	BACT12AC11
				8	BACT12AC56
				10	BACT12AC12
				1/4	BACT12AC57
				5/16	BACT12AC13
				3/8	BACT12AC14
				1/2	BACT12AC58
8	132	208	Red	8	BACT12AC62
				10	BACT12AC15
				1/4	BACT12AC16
				5/16	BACT12AC17
				3/8	BACT12AC18
6	209	331	Blue	10	BACT12AC19
				1/4	BACT12AC20
				5/16	BACT12AC21
				3/8	BACT12AC22
4	332	526	Yellow	1/4	BACT12AC23
				5/16	BACT12AC24
				3/8	BACT12AC25
				1/2	BACT12AC61
2	527	837	Red	1/4	BACT12AC26
				3/8	BACT12AC27
				1/2	BACT12AC28

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 3 (continued)

Crimp Barrel Size	CAU Range		Insulation Color	Stud Hole Size	Boeing Standard
	Minimum	Maximum			
1/0	838	1195	Blue	1/4	BACT12AC32
				3/8	BACT12AC33
				1/2	BACT12AC34
2/0	1196	1505	Yellow	5/16	BACT12AC35
				3/8	BACT12AC36
				1/2	BACT12AC37
4/0	1901	2310	Blue	3/8	BACT12AC40
					BACT12AC60
				1/2	BACT12AC41
				5/8	BACT12AC59
			7/8	BACT12AC42	

Table 4

SUPPLIER PART NUMBERS FOR BACT12AC TERMINAL LUGS

Boeing Standard	Part Number	Supplier
BACT12AC1	36149	AMP
	AA-820-06	ETC
	R1881SN	Hollingsworth
BACT12AC10	320564	AMP
	BB-818-38	ETC
	R1908SN	Hollingsworth
BACT12AC11	320567	AMP
	C-828-06	ETC
	R5107N	Hollingsworth
BACT12AC12	36161	AMP
	C-828-10	ETC
	R5109N	Hollingsworth
BACT12AC13	320576	AMP
	C-830-56	ETC
	R5111N	Hollingsworth

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 4 (continued)

Boeing Standard	Part Number	Supplier
BACT12AC14	320577	AMP
	C-840-38	ETC
	R5112N	Hollingsworth
BACT12AC15	324043	AMP
	YAEV8C-L	Burndy
BACT12AC16	324082	AMP
	YAEV8C-L1	Burndy
BACT12AC17	324044	AMP
	YAEV8C-L2	Burndy
BACT12AC18	324045	AMP
	YAEV8C-L3	Burndy
BACT12AC19	324046	AMP
	YAEV6C-L1	Burndy
BACT12AC2	51863	AMP
	AA-832-06	ETC
	R1885SN	Hollingsworth
BACT12AC20	324047	AMP
	YAEV6C-L	Burndy
BACT12AC21	324048	AMP
	YAEV6C-L4	Burndy
BACT12AC22	324049	AMP
	YAEV6C-L2	Burndy
BACT12AC23	324050	AMP
	YAEV4C-L	Burndy
BACT12AC24	324051	AMP
	YAEVAC-L4	Burndy
BACT12AC25	324052	AMP
	YAEVAC-L2	Burndy
BACT12AC26	324053	AMP
	YAEV2C-L1	Burndy
BACT12AC27	324054	AMP
	YAEV2C-L	Burndy

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 4 (continued)

Boeing Standard	Part Number	Supplier
BACT12AC28	324055	AMP
	YAEV2C-L4	Burndy
BACT12AC3	36153	AMP
	AA-821-10	ETC
	R1891SN	Hollingsworth
BACT12AC32	324056	AMP
	YAEV25-G25	Burndy
BACT12AC33	324057	AMP
	YAEV25-G24	Burndy
BACT12AC34	324058	AMP
	YAEV25-G26	Burndy
BACT12AC35	324083	AMP
	YAEV26-L2	Burndy
BACT12AC36	324084	AMP
	YAEV26-L	Burndy
BACT12AC37	324085	AMP
	YAEV26-L3	Burndy
BACT12AC4	320572	AMP
	AA-822-56	ETC
	R1895SN	Hollingsworth
BACT12AC40	324187	AMP
	YAEV28-G1	Burndy
BACT12AC41	324188	AMP
	YAEV28-G2	Burndy
BACT12AC42	324189	AMP
	YAEV28-G4	Burndy
BACT12AC43	323912	AMP
BACT12AC44	323914	AMP
BACT12AC45	323915	AMP
BACT12AC46	323916	AMP
BACT12AC47	324075	AMP

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 4 (continued)

Boeing Standard	Part Number	Supplier
BACT12AC48	320553	AMP
	AA-820-04	ETC
	R1880SN	Hollingsworth
BACT12AC49	320551	AMP
	AA-821-08	ETC
	R1890SN	Hollingsworth
BACT12AC5	320573	AMP
	AA-826-38	ETC
	R1896SN	Hollingsworth
BACT12AC50	320571	AMP
	AA-822-14	ETC
	R1894SN	Hollingsworth
BACT12AC51	328975	AMP
BACT12AC52	324159	AMP
	BB-823-04	ETC
	R2441SN	Hollingsworth
BACT12AC53	51864-1	AMP
	BB-837-08	ETC
	R1902SN	Hollingsworth
BACT12AC54	320563	AMP
	BB-825-14	ETC
	R1906SN	Hollingsworth
BACT12AC55	328849	AMP
BACT12AC56	320568	AMP
	C-828-08	ETC
	R5108N	Hollingsworth
BACT12AC57	320569	AMP
	C-830-14	ETC
	R5110N	Hollingsworth
BACT12AC58	331467	AMP
	R5117N	Hollingsworth
BACT12AC59	329151	AMP
	YAEV28-G3	Burndy

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 4 (continued)

Boeing Standard	Part Number	Supplier
BACT12AC6	320561	AMP
	BB-823-06	ETC
	R2442SN	Hollingsworth
BACT12AC60	329150	AMP
	YAEV28-G5	Burndy
BACT12AC61	324114	AMP
	YAEVAC-L5	Burndy
BACT12AC62	53041	AMP
	YAEV8C-L14	Burndy
BACT12AC7	51864	AMP
	BB-837-06	ETC
	R1901SN	Hollingsworth
BACT12AC8	51864-2	AMP
	BB-839-10	ETC
	R1903SN	Hollingsworth
BACT12AC9	328998	AMP
	BB-825-56	ETC
	R1907SN	Hollingsworth

C. BACT12AL General Purpose Terminal Lugs

Refer to Paragraph 2.E. for the procedure to assemble these terminals.

BACT12AL terminal lugs:

- Are insulated
- Have no wire insulation grip.

**Table 5
BACT12AL GENERAL PURPOSE TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Insulation Color	Stud Hole Size	Boeing Standard
	Minimum	Maximum			
8	132	208	Red	8	BACT12AL2
				10	BACT12AL3
				1/4	BACT12AL4
				5/16	BACT12AL5
				3/8	BACT12AL6

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 5 (continued)

Crimp Barrel Size	CAU Range		Insulation Color	Stud Hole Size	Boeing Standard
	Minimum	Maximum			
6	209	331	Blue	8	BACT12AL9
				10	BACT12AL10
				1/4	BACT12AL11
				5/16	BACT12AL12
				3/8	BACT12AL13
4	332	526	Yellow	8	BACT12AL15
				10	BACT12AL16
				1/4	BACT12AL17
				5/16	BACT12AL18
				3/8	BACT12AL19

Table 6
SUPPLIER PART NUMBERS FOR BACT12AL TERMINAL LUGS

Boeing Standard	Part Number	Supplier
BACT12AL10	1-331460-0	AMP
	RE9261	Thomas & Betts
BACT12AL11	1-331460-1	AMP
	RE9711	Thomas & Betts
BACT12AL12	331461	AMP
	RE9721	Thomas & Betts
BACT12AL13	1-331461-0	AMP
	RE9731	Thomas & Betts
BACT12AL15	331456	AMP
	690-52622-3	Thomas & Betts
BACT12AL16	1-331456-0	AMP
	RF9261	Thomas & Betts
BACT12AL17	1-331456-1	AMP
	RF9711	Thomas & Betts
BACT12AL18	331457	AMP
	RF9721	Thomas & Betts
BACT12AL19	1-331457-0	AMP
	RF9731	Thomas & Betts

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 6 (continued)

Boeing Standard	Part Number	Supplier
BACT12AL2	331458	AMP
	690-52622-1	Thomas & Betts
BACT12AL3	1-331458-0	AMP
	RD9361	Thomas & Betts
BACT12AL4	1-331458-1	AMP
	RD9711	Thomas & Betts
BACT12AL5	331459	AMP
	RD9721	Thomas & Betts
BACT12AL6	1-331459-0	AMP
	RD9731	Thomas & Betts
BACT12AL9	331460	AMP
	690-52622-2	Thomas & Betts

D. BACT12AR Restrictive Entry Terminal Lugs

Refer to Paragraph 2.F. for the procedure to assemble these terminals.

BACT12AR terminal lugs have a wire insulation grip.

One BACT12AR terminal lug can be used to terminate only one wire.

An AWG 26 through AWG 10 wire can be terminated with a BACT12AR terminal lug.

NOTE: A BACT12AC terminal lug is a satisfactory alternative to a BACT12AR terminal lug for AWG 12 and smaller wire. Refer also to Table 9.

**Table 7
BACT12AR RESTRICTIVE ENTRY TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Insulation Color		Stud Hole Size	Boeing Standard
	Minimum	Maximum	Sleeve	Band		
24	4	5	Yellow	Blue	4	BACT12AR241
					6	BACT12AR242
					8	BACT12AR243
					10	BACT12AR244
						BACT12AR245

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 7 (continued)

Crimp Barrel Size	CAU Range		Insulation Color		Stud Hole Size	Boeing Standard
	Minimum	Maximum	Sleeve	Band		
22	5	8	Red	Green	4	BACT12AR221
					6	BACT12AR222
					8	BACT12AR223
					10	BACT12AR224
					1/4	BACT12AR225
					5/16	BACT12AR226
					3/8	BACT12AR227
20	8	12	Red	Red	4	BACT12AR201
					6	BACT12AR202
					8	BACT12AR203
					10	BACT12AR204
					1/4	BACT12AR205
					5/16	BACT12AR206
					3/8	BACT12AR207
18	12	19	Red	White	4	BACT12AR181
					6	BACT12AR182
					8	BACT12AR183
					10	BACT12AR184
					1/4	BACT12AR185
					5/16	BACT12AR186
					3/8	BACT12AR187
16	19	26	Blue	Blue	6	BACT12AR161
					8	BACT12AR162
					10	BACT12AR163
					1/4	BACT12AR164
					5/16	BACT12AR165
					3/8	BACT12AR166
14	27	41	Blue	Green	6	BACT12AR141
					8	BACT12AR142
					10	BACT12AR143
					5/16	BACT12AR144

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 7 (continued)

Crimp Barrel Size	CAU Range		Insulation Color		Stud Hole Size	Boeing Standard
	Minimum	Maximum	Sleeve	Band		
12	42	65	Yellow	Yellow	6	BACT12AR121
					8	BACT12AR122
					10	BACT12AR123
					1/4	BACT12AR124
					5/16	BACT12AR125
					3/8	BACT12AR126
10	66	105	Yellow	Brown	6	BACT12AR101
					8	BACT12AR102
					10	BACT12AR103
					1/4	BACT12AR104
					5/16	BACT12AR105
					3/8	BACT12AR106

Table 8
SUPPLIER PART NUMBERS FOR BACT12AR TERMINAL LUGS

Boeing Standard	Part Number	Supplier
BACT12AR101	2-36161-6	AMP
BACT12AR102	2-320568-3	AMP
BACT12AR103	2-36161-4	AMP
BACT12AR104	2-320569-6	AMP
BACT12AR105	2-320576-3	AMP
BACT12AR106	2-320577-2	AMP
BACT12AR121	2-36161-5	AMP
BACT12AR122	2-320568-2	AMP
BACT12AR123	2-36161-3	AMP
BACT12AR124	2-320569-5	AMP
BACT12AR125	2-320576-2	AMP
BACT12AR126	2-320577-1	AMP
BACT12AR141	51864-8	AMP
BACT12AR142	1-51864-1	AMP
BACT12AR143	51864-9	AMP
BACT12AR144	2-320575-3	AMP



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Table 8 (continued)

Boeing Standard	Part Number	Supplier
BACT12AR161	51864-6	AMP
BACT12AR162	1-51864-0	AMP
BACT12AR163	51864-7	AMP
BACT12AR164	2-320563-3	AMP
BACT12AR165	2-320575-2	AMP
BACT12AR166	3-320564-1	AMP
BACT12AR181	52273-2	AMP
BACT12AR182	51863-4	AMP
BACT12AR183	1-320551-4	AMP
BACT12AR184	2-36153-5	AMP
BACT12AR185	2-320571-5	AMP
BACT12AR186	2-320572-4	AMP
BACT12AR187	2-320573-3	AMP
BACT12AR201	52273-1	AMP
BACT12AR202	51863-3	AMP
BACT12AR203	1-320551-3	AMP
BACT12AR204	2-36153-4	AMP
BACT12AR205	2-320571-4	AMP
BACT12AR206	2-320572-3	AMP
BACT12AR207	2-320573-2	AMP
BACT12AR221	52273	AMP
BACT12AR222	51863-2	AMP
BACT12AR223	1-320551-2	AMP
BACT12AR224	2-36153-3	AMP
BACT12AR225	2-320571-3	AMP
BACT12AR226	2-320572-2	AMP
BACT12AR227	2-320573-1	AMP
BACT12AR241	53054	AMP
BACT12AR242	53055	AMP
BACT12AR243	53056	AMP
BACT12AR244	53057	AMP

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**Table 9
OBSOLETE BACT12AR TERMINAL LUGS**

Obsolete Terminal Lug		Replacement Terminal Lug	
Part Number	Supplier	Part Number	Supplier
BACT12AR241	Boeing	BACT12AC44	Boeing
BACT12AR242	Boeing	BACT12AC45	Boeing
BACT12AR243	Boeing	BACT12AC46	Boeing
BACT12AR244	Boeing	BACT12AC47	Boeing
BACT12AR245	Boeing	BACT12AC47	Boeing
BACT12AR246	Boeing	BACT12AC44	Boeing
BACT12AR247	Boeing	BACT12AC45	Boeing
BACT12AR248	Boeing	BACT12AC46	Boeing
BACT12AR249	Boeing	BACT12AC47	Boeing

NOTE: Refer to Paragraph 1.B. for the BACT12AC part numbers.

E. BACT12E 90 Degree Upright Terminal Lugs

Refer to Paragraph 2.G. for the procedure to assemble these terminals.

BACT12E terminal lugs do not have a wire insulation grip.

**Table 10
BACT12E 90 DEGREE UPRIGHT TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Boeing Standard
	Minimum	Maximum		
22-18	5	20	10	BACT12E18
16-14	21	42	10	BACT12E14
12-10	50	100	10	BACT12E10
			1/4	BACT12E11
8	131	181	10	BACT12E81
6	206	288	1/4	BACT12E6
4	327	457	1/4	BACT12E4
2	524	735	3/8	BACT12E2
1/0	831	1119	3/8	BACT12E101
			1/2	BACT12E102
2/0	1049	1458	3/8	BACT12E201
3/0	1323	1810	3/8	BACT12E300
4/0	1666	2257	3/8	BACT12E401
			1/2	BACT12E402



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Table 11
SUPPLIER PART NUMBERS FOR BACT12E TERMINAL LUGS

Boeing Standard	Part Number	Supplier
BACT12E10	C26U	Thomas and Betts
	YAV10-R	Burndy
	YAV10R	FCI
BACT12E101	YAV25-RS	Burndy
	YAV25RS	FCI
BACT12E102	YAV25-RS3	Burndy
	YAV25RS3	FCI
BACT12E11	YAV10-R3	Burndy
	YAV10R3	FCI
BACT12E14	B-36U	Thomas and Betts
	YAV14-R	Burndy
	YAV14R	FCI
BACT12E18	A-36U	Thomas and Betts
	YAV18-R	Burndy
	YAV18R	FCI
BACT12E2	YAV2C-RS	Burndy
	YAV2CRS	FCI
BACT12E201	YAV26-RS	Burndy
	YAV26RS	FCI
BACT12E300	YAV27-RS	Burndy
	YAV27RS	FCI
BACT12E4	YAV4C-RS	Burndy
	YAV4CRS	FCI
BACT12E401	YAV28-RS	Burndy
	YAV28RS	FCI
BACT12E402	YAV28-RS12	Burndy
	YAV28RS12	FCI
BACT12E6	YAV6C-RS	Burndy
	YAV6CRS	FCI
BACT12E81	YAV8C-RS	Burndy
	YAV8CRS	FCI

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F. BACT12G and Burndy YBM Series Flag Terminal Lugs

Refer to Paragraph 2.H. for the procedure to assemble these terminals.

BACT12G and Burndy YBM Series flag terminal lugs:

- Are not insulated
- Have no wire insulation grip.

**Table 12
BACT12G FLAG TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Boeing Standard
	Minimum	Maximum		
8	131	181	10	BACT12G81
			1/4	BACT12G82
6	206	288	1/4	BACT12G62
			5/16	BACT12G64
4	327	457	1/4	BACT12G42
			3/8	BACT12G44
2	524	735	1/4	BACT12G23
			3/8	BACT12G24
1/0	831	1119	3/8	BACT12G102
2/0	1049	1458	3/8	BACT12G202

**Table 13
OTHER BURNDY FLAG TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
1/0	831	1119	1/4	YBM25-L1	Burndy

**Table 14
SUPPLIER PART NUMBERS FOR BACT12G FLAG TERMINAL LUGS**

Boeing Standard	Part Number	Supplier
BACT12G102	YBM25-L	Burndy
	YBM25L	FCI
BACT12G202	YBM26-L	Burndy
	YBM26L	FCI
BACT12G23	YBM2C-L1	Burndy
	YBM2CL1	FCI

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Table 14 (continued)

Boeing Standard	Part Number	Supplier
BACT12G24	YBM2C-L	Burndy
	YBM2CL	FCI
BACT12G42	YBM4C-L	Burndy
	YBM4CL	FCI
BACT12G44	YBM4C-L2	Burndy
	YBM4CL2	FCI
BACT12G62	YBM6C-L	Burndy
	YBM6CL	FCI
BACT12G64	YBM6C-L2	Burndy
	YBM6CL2	FCI
BACT12G81	YBM8C	Burndy
	YBM8C	FCI
BACT12G82	YBM8CT2	FCI
	YBM8C-T2	Burndy

G. BACT12M and 280U0010-1 Nickel Plated High Temperature Terminal Lugs

Refer to Paragraph 2.i. for the procedure to assemble these terminals.

These terminal lugs do not have a wire insulation grip.

The 280U0010-1 terminal lug has the same configuration as BACT12M28-2 but has additional nickel plating.

These conditions are applicable:

- For AWG 14 and smaller wire, a BACT12M terminal lug with a hole that is one size larger than the specified stud size can be used
- When high temperature terminal lugs are used as ground lugs, it is not necessary to put insulation on the post
- When a terminal lug is specified for a high temperature area or a high vibration area or both, the terminal lug must be a BACT12M, 280U0010-1, or an AMP solid nickel terminal lug.

NOTE: A solid nickel terminal lug from Table 18 is a satisfactory alternative to a BACT12M terminal lug.



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**Table 15
BACT12M AND 280U0010-1 HIGH TEMPERATURE TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Boeing Standard
	Minimum	Maximum		
22 - 18	7	24	4	BACT12M2
			6	BACT12M130
			10	BACT12M4
			1/4	BACT12M5
16 - 14	15	51	4	BACT12M7
			6	BACT12M147
			8	BACT12M173
			10	BACT12M198
			1/4	BACT12M8
			3/8	BACT12M148
12 - 10	43	138	6	BACT12M139
			10	BACT12M140
			1/4	BACT12M141
			5/16	BACT12M144
			3/8	BACT12M145
8	131	181	8	BACT12M8-1
			10	BACT12M8-2
			1/4	BACT12M8-3
			5/16	BACT12M8-4
			3/8	BACT12M8-5
			1/2	BACT12M8-6
6	206	288	10	BACT12M6-1
			1/4	BACT12M6-2
			5/16	BACT12M6-3
			3/8	BACT12M6-4
			1/2	BACT12M6-5
4	327	457	10	BACT12M4-1
			1/4	BACT12M4-2
			5/16	BACT12M4-3
			3/8	BACT12M4-4
			1/2	BACT12M4-5

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Table 15 (continued)

Crimp Barrel Size	CAU Range		Stud Hole Size	Boeing Standard
	Minimum	Maximum		
2	524	735	10	BACT12M2-1
			1/4	BACT12M2-2
			5/16	BACT12M2-3
			3/8	BACT12M2-4
			1/2	BACT12M2-5
1	662	878	10	BACT12M1-1
			1/4	BACT12M1-2
			5/16	BACT12M1-3
			3/8	BACT12M1-4
			1/2	BACT12M1-5
1/0	831	1119	1/4	BACT12M25-1
			5/16	BACT12M25-2
			3/8	BACT12M25-3
			1/2	BACT12M25-4
			5/8	BACT12M25-5
2/0	1049	1458	1/4	BACT12M26-1
			5/16	BACT12M26-2
			3/8	BACT12M26-3
			1/2	BACT12M26-4
			5/8	BACT12M26-5
			3/4	BACT12M26-6
3/0	1323	1810	5/16	BACT12M27-1
			3/8	BACT12M27-2
			1/2	BACT12M27-3
			5/8	BACT12M27-4
4/0	1666	2257	5/16	BACT12M28-1
			3/8	BACT12M28-2
				280U0010-1
			1/2	BACT12M28-3
			5/8	BACT12M28-4
			3/4	BACT12M28-5
7/8	BACT12M28-6			

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**Table 16
SUPPLIER PART NUMBERS FOR BACT12M TERMINAL LUGS**

Boeing Standard	Part Number	Supplier
BACT12M1	322362	AMP
BACT12M1-1	YAV1C-L6NK	Burndy
BACT12M1-2	YAV1C-L1NK	Burndy
	YAV1CL1NK	FCI
BACT12M1-3	YAV1C-L2NK	Burndy
	YAV1CL2NK	FCI
BACT12M1-4	YAV1C-LNK	Burndy
	YAV1CLNK	FCI
BACT12M1-5	YAV1C-L3NK	Burndy
BACT12M130	323199	AMP
BACT12M139	323066	AMP
BACT12M140	325154	AMP
BACT12M141	323069	AMP
	325155	AMP
BACT12M142	325156	AMP
BACT12M143	325157	AMP
BACT12M144	323064	AMP
	323752	AMP
BACT12M145	323065	AMP
	323747	AMP
BACT12M147	322373	AMP
BACT12M148	322344	AMP
BACT12M173	322374	AMP
BACT12M198	322375	AMP
	YAV14G88	Burndy
BACT12M2	322363	AMP
BACT12M2-1	YAV2C-L3NK	Burndy
	YAV2CL3NK	FCI
BACT12M2-2	YAV2C-L1NK	Burndy
	YAV2CL1NK	FCI
BACT12M2-3	YAV2C-L2NK	Burndy
	YAV2CL2NK	FCI

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Table 16 (continued)

Boeing Standard	Part Number	Supplier
BACT12M2-4	YAV2C-LNK	Burndy
	YAV2CLNK	FCI
BACT12M2-5	YAV2C-L4NK	Burndy
	YAV2CL4NK	FCI
BACT12M25-1	YAV25-L1NK	Burndy
	YAV25L1NK	FCI
BACT12M25-2	YAV25-L2NK	Burndy
	YAV25L2NK	FCI
BACT12M25-3	YAV25-LNK	Burndy
	YAV25LNK	FCI
BACT12M25-4	YAV25-L3NK	Burndy
	YAV25L3NK	FCI
BACT12M25-5	YAV25-L4NK	Burndy
	YAV25L4NK	FCI
BACT12M26-1	YAV26-L1NK	Burndy
	YAV26L1NK	FCI
BACT12M26-2	YAV26-L2NK	Burndy
BACT12M26-3	YAV26-LNK	Burndy
	YAV26LNK	FCI
BACT12M26-4	YAV26-L3NK	Burndy
	YAV26L3NK	FCI
BACT12M26-5	YAV26-L12NK	Burndy
	YAV26L12NK	FCI
BACT12M26-6	YAV26-L22NK	Burndy
	YAV26L22NK	FCI
BACT12M27-1	YAV27-L20NK	Burndy
BACT12M27-2	YAV27-LNK	Burndy
	YAV27LNK	FCI
BACT12M27-3	YAV27-L1NK	Burndy
	YAV27L1NK	FCI
BACT12M27-4	YAV27-L15NK	Burndy
BACT12M28-5	YAV28L14NK	FCI
BACT12M28-1	YAV28-L56NK	Burndy

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Table 16 (continued)

Boeing Standard	Part Number	Supplier
BACT12M28-2	YAV28-LNK	Burndy
	YAV28LNK	FCI
BACT12M28-3	YAV28-L12NK	Burndy
	YAV28L12NK	FCI
BACT12M28-4	YAV28-L13NK	Burndy
BACT12M28-5	YAV28-L14NK	Burndy
	YAV28L14NK	FCI
BACT12M28-6	YAV28-L54NK	Burndy
BACT12M3	322364	AMP
BACT12M4	322366	AMP
	YAD18Hnk	Burndy
BACT12M4-1	YAV4C-L3NK	Burndy
	YAV4CL3NK	FCI
BACT12M4-2	YAV4C-LNK	Burndy
	YAV4CLNK	FCI
BACT12M4-3	YAV4C-L4NK	Burndy
BACT12M4-4	YAV4C-L2NK	Burndy
	YAV4CL2NK	FCI
BACT12M4-5	YAV4C-L5NK	Burndy
	YAV4CL5NK	FCI
BACT12M5	322367	AMP
BACT12M6	322369	AMP
BACT12M6-1	YAV6C-L1NK	Burndy
	YAV6CL1NK	FCI
BACT12M6-2	YAV6C-LNK	Burndy
	YAV6CLNK	FCI
BACT12M6-3	YAV6C-L4NK	Burndy
	YAV6CL4NK	FCI
BACT12M6-4	YAV6C-L2NK	Burndy
	YAV6CL2NK	FCI
BACT12M6-5	YAV6C-L10NK	Burndy
	YAV6CL10NK	FCI
BACT12M7	322371	AMP

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Table 16 (continued)

Boeing Standard	Part Number	Supplier
BACT12M8	322376	AMP
BACT12M8-1	YAV8C-L14NK	Burndy
	YAV8CL14NK	FCI
BACT12M8-2	280U0010-1	Boeing
	YAV8C-LNK	Burndy
	YAV8CLNK	FCI
BACT12M8-3	YAV8C-L1NK	Burndy
	YAV8CL1NK	FCI
BACT12M8-4	YAV8C-L2NK	Burndy
	YAV8CL2NK	FCI
BACT12M8-5	YAV8C-L3NK	Burndy
	YAV8CL3NK	FCI
BACT12M8-6	YAV8C-L4NK	Burndy
	YAV8CL4NK	FCI
BACT12M9	322378	AMP

Table 17

OBSOLETE BACT12M TERMINAL LUGS

Specified Boeing Standard	Replacement Boeing Standard
BACT12M1	-
BACT12M142	BACT12M144
BACT12M143	BACT12M145
BACT12M3	-
BACT12M6	-
BACT12M9	BACT12M148

H. AMP Solid Nickel High Temperature Terminal Lugs

Refer to Paragraph 2.J. for the procedure to assemble these terminals.

These terminal lugs do not have a wire insulation grip.

NOTE: A solid nickel terminal lug from Table 18 is a satisfactory alternative to a BACT12M terminal lug.

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Table 18
SOLID NICKEL HIGH TEMPERATURE TERMINAL LUG PART NUMBERS

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
22 - 18	7	24	6	321892	AMP
			8	321893	
				321897	
			10	321894	
				321898	
16 - 14	15	51	6	322332	AMP
			8	322337	
			10	322338	
			1/4	322341	
12 - 10	43	138	8	323749	AMP
			10	323750	
			1/4	323751	

I. M7928/1 Terminal Lugs

Refer to Paragraph 2.K. for the procedure to assemble these terminals.

M7928/1 terminal lugs have a wire insulation grip.

M7928/1 terminal lugs are available from AMP (Tyco).

Table 19
M7928/1 TERMINAL LUG PART NUMBERS

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
26	2	3	2	M7928/1-1	QPL
			4	M7928/1-2	
			6	M7928/1-3	
			8	M7928/1-4	
			10	M7928/1-5	

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Table 19 (continued)

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
24	4	5	2	M7928/1-6	QPL
			4	M7928/1-7	
			6	M7928/1-8	
			8	M7928/1-9	
			10	M7928/1-10	
22	5	8	2	M7928/1-70	QPL
			4	M7928/1-11	
			6	M7928/1-12	
				M7928/1-13	
			8	M7928/1-14	
			10	M7928/1-15	
			1/4	M7928/1-16	
			5/16	M7928/1-17	
			3/8	M7928/1-18	
1/2	M7928/1-19				
20	8	12	2	M7928/1-71	QPL
			4	M7928/1-20	
			6	M7928/1-21	
				M7928/1-22	
			8	M7928/1-23	
			10	M7928/1-24	
			1/4	M7928/1-25	
			5/16	M7928/1-26	
			3/8	M7928/1-27	
1/2	M7928/1-28				

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Table 19 (continued)

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
18	12	19	2	M7928/1-74	QPL
			4	M7928/1-29	
			6	M7928/1-30	
				M7928/1-31	
			8	M7928/1-32	
			10	M7928/1-33	
			1/4	M7928/1-34	
			5/16	M7928/1-35	
			3/8	M7928/1-36	
			1/2	M7928/1-37	
16	19	26	4	M7928/1-38	QPL
			6	M7928/1-39	
				M7928/1-40	
			8	M7928/1-41	
			10	M7928/1-42	
			1/4	M7928/1-43	
			5/16	M7928/1-44	
			3/8	M7928/1-45	
1/2	M7928/1-46				
14	27	41	4	M7928/1-47	QPL
			6	M7928/1-48	
				M7928/1-49	
			8	M7928/1-50	
			10	M7928/1-51	
			1/4	M7928/1-52	
			5/16	M7928/1-53	
			3/8	M7928/1-54	
1/2	M7928/1-55				

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Table 19 (continued)

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
12	42	65	6	M7928/1-56	QPL
			8	M7928/1-57	
			10	M7928/1-58	
			1/4	M7928/1-59	
			5/16	M7928/1-60	
			3/8	M7928/1-61	
			1/2	M7928/1-62	
10	66	105	6	M7928/1-63	QPL
			8	M7928/1-64	
			10	M7928/1-65	
			1/4	M7928/1-66	
			5/16	M7928/1-67	
			3/8	M7928/1-68	
			1/2	M7928/1-69	

J. MS20659 Terminal Lugs

Refer to Paragraph 2.L. for the procedure to assemble these terminals.

Some of the small MS20659 terminal lugs have a wire insulation grip. Most of the MS10659 terminal lugs do not have a wire insulation grip.

MS20659 terminal lugs are available from these suppliers:

- Burndy
- Thomas & Betts.

**Table 20
MS20659 TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
22-18	5	20	4	MS20659-138	QPL
			6	MS20659-101	
			10	MS20659-102	
			5/16	MS20659-161	
			3/8	MS20659-125	
			1/2	MS20659-162	

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Table 20 (continued)

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
16-14	21	42	4	MS20659-139	QPL
			6	MS20659-103	
			6	MS20659-126	
			10	MS20659-104	
			5/16	MS20659-163	
			3/8	MS20659-127	
			1/2	MS20659-164	
12-10	50	100	6	MS20659-165	QPL
			10	MS20659-105	
			5/16	MS20659-106	
			3/8	MS20659-128	
			1/2	MS20659-166	
8	131	181	8	MS20659-140	QPL
			10	MS20659-107	
			1/4	MS20659-141	
			5/16	MS20659-108	
			3/8	MS20659-129	
			1/2	MS20659-142	
6	206	288	10	MS20659-130	QPL
			1/4	MS20659-109	
			5/16	MS20659-131	
			3/8	MS20659-110	
			1/2	MS20659-143	
4	327	457	10	MS20659-144	QPL
			1/4	MS20659-111	
			5/16	MS20659-132	
			3/8	MS20659-112	
			1/2	MS20659-145	

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Table 20 (continued)

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
2	524	735	10	MS20659-146	QPL
			1/4	MS20659-113	
			5/16	MS20659-147	
			3/8	MS20659-114	
			7/16	MS20659-148	
			1/2	MS20659-133	
1	736	878	1/4	MS20659-115	QPL
			5/16	MS20659-149	
			3/8	MS20659-116	
			7/16	MS20659-150	
			1/2	MS20659-134	
1/0	879	1119	1/4	MS20659-117	QPL
			5/16	MS20659-151	
			3/8	MS20659-118	
			7/16	MS20659-152	
			1/2	MS20659-135	
2/0	1120	1345	1/4	MS20659-153	QPL
			5/16	MS20659-119	
			3/8	MS20659-120	
			7/16	MS20659-154	
			1/2	MS20659-136	
3/0	1346	1810	5/16	MS20659-155	QPL
			3/8	MS20659-121	
			7/16	MS20659-156	
			1/2	MS20659-122	
4/0	1811	2310	5/16	MS20659-157	QPL
			3/8	MS20659-123	
			7/16	MS20659-158	
			1/2	MS20659-124	
			5/8	MS20659-159	
			3/4	MS20659-160	
			7/8	MS20659-137	

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K. Burndy Dual Hole, Upright, and Heavy Duty YAV Terminal Lugs

Refer to Paragraph 2.M. for the procedure to assemble these terminals.

These terminal lugs do not have a wire insulation grip.

**Table 21
BURNDY DUAL HOLE YAV TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Configuration	Part Number	Supplier
	Minimum	Maximum				
6	206	288	3/8	Straight	YAV6C-2L38-NK	Burndy
4	327	457	3/8	30 Degree	YAV4C-2L38-30-NK	Burndy
				Straight	YAV4C-2L38-NK	
2	524	735	3/8	Straight	YAV2C-2L38-NK	Burndy
1/0	831	1119	3/8	Straight	YAV25-2L38-NK	Burndy
2/0	1049	1458	3/8	30 Degree	YAV26-2L38-30-NK	Burndy
				Straight	YAV26-2L38-NK	
3/0	1323	1810	3/8	30 Degree	YAV27-2L38-30-NK	Burndy
				Straight	YAV27-2L38-NK	

**Table 22
BURNDY UPRIGHT YAV TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
4	327	457	3/8	YAV4CRS2NK	Burndy
1/0	831	1119	3/8	YAV25RSNK	Burndy

**Table 23
BURNDY HEAVY DUTY YAV TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
16-14	21	42	8	YAV14G82	Burndy
			10	YAV14G88	Burndy
20-14	21	42	8	YAV14-H1	Burndy
			10	YAV14-H	Burndy
22-18	7	24	10	YAV18-H	Burndy

NOTE: When two 18 AWG wires are specified to be terminated to a YAV14G82 or a YAV14G88 terminal, an alternative terminal lug can be selected from Table 24.

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Table 24
ALTERNATIVE HEAVY DUTY TERMINAL LUG PART NUMBERS FOR TWO AWG 18 WIRES

Specified Terminal Lug		Alternative Terminal Lug	
Part Number	Supplier	Part Number	Supplier
YAV14G82	Burndy	323749	AMP
YAV14G88	Burndy	323750	AMP

L. BACT12AB, BACT12AM, BACT12S, Rolls-Royce, Thermocouple, 69B40570, and Other Terminal Lugs

Refer to Paragraph 2.N. for the procedure to assemble these terminals.

BACT12AB and BACT12AM terminal lugs do not have a wire insulation grip. BACT12S terminal lugs have a wire insulation grip.

Table 25
BACT12AB 90 DEGREE UPRIGHT TERMINAL LUG PART NUMBERS

Crimp Barrel Size	CAU Range		Material		Stud Hole Size	Boeing Standard
	Minimum	Maximum	Body	Plating		
22-18	7	24	Cu	Tin	1/4	BACT12AB1
					10	BACT12AB2

Table 26
SUPPLIER PART NUMBERS FOR BOEING STANDARD BACT12AB TERMINAL LUGS

Boeing Standard	Part Number	Supplier
BACT12AB1	328965	AMP
	A-326-14R90	Molex
BACT12AB2	329696	AMP
	A-321-10R90	Molex

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**Table 27
BACT12AM TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Insulation Color	Material		Stud Hole Size	Boeing Standard
	Minimum	Maximum		Body	Plating		
22-20	8	24	Green	Cu	Ni	4	BACT12AM04-20
						6	BACT12AM06-20
						8	BACT12AM08-20
						10	BACT12AM3-20
						1/4	BACT12AM4-20
						5/16	BACT12AM5-20
3/8	BACT12AM6-20						
12-10	52	131	Black	Cu	Ni	5/16	BACT12AM5-10

**Table 28
SUPPLIER PART NUMBERS FOR BOEING STANDARD BACT12AM TERMINAL LUGS**

Boeing Standard	Part Number	Supplier
BACT12AM04-20	50831	AMP
BACT12AM06-20	50831-1	AMP
BACT12AM08-20	50832	AMP
BACT12AM3-20	50832-1	AMP
BACT12AM4-20	50833	AMP
BACT12AM5-10	50847	AMP
BACT12AM5-20	50833-1	AMP
BACT12AM6-20	50833-2	AMP

**Table 29
BACT12S TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Material		Stud Hole Size	Boeing Standard
	Minimum	Maximum	Body	Plating		
24-20	4	13	Cu	Tin	4	BACT12S12
					8	BACT12S13
					6	BACT12S8
					10	BACT12S9

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**Table 30
SUPPLIER PART NUMBERS FOR BOEING STANDARD BACT12S TERMINAL LUGS**

Boeing Standard	Part Number	Supplier
BACT12S12	323985	AMP
BACT12S13	323989	AMP
BACT12S8	323986	AMP
BACT12S9	323990	AMP

**Table 31
ROLLS-ROYCE TERMINAL LUG PART NUMBERS**

Crimp Barrel Size	CAU Range		Stud Hole Size	Part Number	Supplier
	Minimum	Maximum			
20-16	8	27	5	1909156	Rolls Royce
22-16	8	26	4	2509293	Rolls Royce

**Table 32
ALTERNATIVE PART NUMBERS FOR ROLLS-ROYCE TERMINAL LUGS**

Specified Terminal Lug		Alternative Terminal Lug	
Part Number	Supplier	Part Number	Supplier
1909156	Rolls-Royce	150456	AMP
2509293	Rolls-Royce	150471	AMP

**Table 33
REPLACEMENT TERMINAL LUGS FOR ROLLS-ROYCE TERMINAL LUGS**

Rolls-Royce Terminal Lug	Wire Size (AWG)	Replacement Terminal Lug
1909156	20	BACT12M5
	18	BACT12M5
	16	BACT12M8
2509293	22	BACT12M130
	20	BACT12M130
	18	BACT12M130
	16	BACT12M147

NOTE: Refer to Paragraph 1.G. for the BACT12M part numbers.

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**Table 34
THERMOCOUPLE TERMINAL LUG PART NUMBERS**

Part Number	Crimp Barrel Size	Mark	Stud Hole Size	Material	Style	Supplier
1387-3	-	CR	-	Chromel	Ring	Thermo-Electric
1387-4	-	AL	-	Alumel	Ring	Thermo-Electric
1-321897-0	22-16	-	8	Chromel	Ring	AMP
1-321898-0	22-16	-	10	Alumel	Ring	AMP

**Table 35
69B40570 TERMINAL LUG PART NUMBERS**

Part Number	Crimp Barrel Size	Stud Hole Size	Body Material	Plating	Style	Supplier
69B40570-2	2/0	3/8	Cu	Tin	Ring	Boeing

**Table 36
OTHER TERMINAL LUG PART NUMBERS**

Part Number	Crimp Barrel Size	CAU Range		Insulation Color		Stud Hole Size	Material		Style	Supplier
		min	max	Sleeve	Band		Body	Plating		
2-320561-3	16	19	26	Blue	Blue	6	Cu	Ni	Ring	AMP
2-320561-4	14	27	41	Blue	Green	6	Cu	Ni	Ring	AMP
2-321670-2	6	206	288	-	-	8	-	-	Ring	AMP
2-321672-1	2	524	735	-	-	8	-	-	Ring	AMP
2-323914-2	24	4	5	Yellow	Blue	4	Cu	Ni	Ring	AMP
2-323916-3	24	4	5	Yellow	Blue	8	Cu	Tin	Ring	AMP
2-326875-4	24	4	5	Yellow	Blue	6	Cu	Tin	Ring	AMP
2-326875-5	24	4	5	Yellow	Blue	10	Cu	Ni	Ring	AMP
2-36149-3	22	6	8	Red	Green	6	Cu	Tin	Ring	AMP
2-36149-4	20	8	12	Red	Red	6	Cu	Tin	Ring	AMP
2-36149-5	18	12	19	Red	White	6	Cu	Tin	Ring	AMP
320381	16-14	15	51	Blue	-	6	Cu	Tin	Hook	AMP
320634	12-10	43	138	Yellow	-	6	Cu	Tin	Ring	AMP
322215	1/0	1196	1505	-	-	1/4	Cu	Tin	Flag	AMP
322220	4/0	1666	2257	-	-	3/8	-	-	Ring	AMP
323067	12-10	43	138	-	-	8	Cu	Ni	Ring	AMP
324111	4	327	457	Yellow	-	10	Cu	Tin	Ring	AMP

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Table 36 (continued)

Part Number	Crimp Barrel Size	CAU Range		Insulation Color		Stud Hole Size	Material		Style	Supplier
		min	max	Sleeve	Band		Body	Plating		
324112	2	527	837	Red	-	5/16	Cu	Tin	Ring	AMP
324113	1/0	1196	1505	Blue	-	5/16	Cu	Tin	Ring	AMP
324158	22-18	7	24	Red	-	2	Cu	Tin	Ring	AMP
32456	22-18	7	24	Red	-	8	Cu	Tin	Hook	AMP
328655	2	524	735	Red	-	10	Cu	Tin	Ring	AMP
329636	24-20	4	12	-	-	2	Cu	Tin	Ring	AMP
329951	26-22	3	8	Yellow	-	2	Cu	Tin	Ring	AMP
50847	12-10	52	131	-	-	5/16	Cu	Ni	Ring	AMP
51927	12-10	43	138	-	-	5/16	-	-	Ring	AMP
52124	26-22	3	8	-	-	8	Cu	Tin	Ring	AMP
52274	16	19	26	Blue	Blue	4	Cu	Tin	Ring	AMP
52307	22	6	8	Red	Green	2	Cu	Tin	Ring	AMP
52409	22-18	7	24	Red	-	6	Ph-Br	Tin	Spade	AMP
52420	16-14	15	51	Blue	-	6	Ph-Br	Tin	Spade	AMP
53057-1	24	4	5	Yellow	Blue	10	Cu	Tin	Ring	AMP
53580-1	16	19	26	Blue	-	6	Cu	Ni	Ring	AMP
54746-1	6	206	288	Blue	Blue	10	Cu	Tin	Ring	AMP

Table 37

OBSOLETE TERMINAL LUGS

Obsolete Terminal Lug		Replacement Terminal Lug	
Part Number	Supplier	Part Number	Supplier
51927	AMP	BACT12AM5-10	Boeing
		50847	AMP

2. ASSEMBLY OF TERMINAL LUGS

A. Crimp Tool Power Pumps and Heads

Table 38

CRIMP TOOL POWER PUMPS

Power Pump	Maximum Pressure (psi)
13597	10,000
13600	10,000

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Table 38 (continued)

Power Pump	Maximum Pressure (psi)
69120-()	8400
Y6NP	6000

NOTE: Other power pumps than those shown in Table 38 can be used. A power pump must obey the minimum and maximum pressures shown in Table 39 for the specified crimp tool head.

Table 39

SATISFACTORY PRESSURES FOR THE OPERATION OF CRIMP TOOL HEADS

Crimp Tool Head		Pressure (psi)	
Supplier	Part Number	Minimum	Maximum
AMP	58422-1	8000	8400
	69051	8000	8400
	69061	8000	8400
	69066	8000	8400
	69069	8000	8400
Boeing	ST970-12	8000	8400
Burndy	Y29B	5700	6000
	Y34A	5700	6000
	Y35BH	9500	10500
Daniels	BDHD1	8500	9000
	PPFC-1H	8500	9000
	TBHD1	8500	9000
Thomas & Betts	13642	9500	10000
	13642M	9500	10000
	TBM12	9500	10000

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS LESS THAN THE MINIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, THE CRIMP CONNECTION OF THE TERMINAL LUG AND THE WIRE IS NOT SATISFACTORY.

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B. Crimp Tools with an Insulation Crimp Adjustment

The insulation crimp part of the hand crimp tool has three positions:

- 1 for a tight crimp
- 2 for a medium crimp
- 3 for a loose crimp.

It is necessary to test each combination of a tool, a terminal lug, and a wire to find the correct adjustment:

- (1) Set the adjustment to the loose position.
- (2) Put a terminal lug in the crimp jaw of the crimp tool.
- (3) Push the end of the wire into the insulation grip of the terminal lug until it stops.

Make sure that:

- The insulation is not removed from the end of the wire
- The end of the wire insulation is against the forward end of the insulation grip of the terminal lug
- The wire insulation does not go into the crimp barrel of the terminal lug.

- (4) Crimp the terminal lug.
- (5) Examine the insulation support.
- (6) Bend the wire back and forward once to make sure that the wire does not come out of the terminal lug.
- (7) If the wire comes out of the terminal lug:
 - (a) Set the insulation adjustment to the subsequent position that is more tight.
 - (b) Use a new terminal lug to do Step (2) through Step (6) again.

Make sure that:

- The insulation adjustment pins are in the same position
- The adjustment is not more tight than is sufficient.

C. Assembly of a Cable Shield in a Terminal Lug

**Table 40
LOCATION OF THE CAU DATA FOR SHIELDS OF SHIELDED WIRES AND CABLES**

Wire Type Code	Location of the Shield CAU Data
C1	Table 48
C2	Table 48
C3	Table 48
C4	Table 48
C9	Table 41
DU	Table 41
D2	Table 41
D3	Table 41
D4	Table 41
D6	Table 41



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Table 40 (continued)

Wire Type Code	Location of the Shield CAU Data
D7	Table 41
D9	Table 41
FF	Table 41
GE	Table 42
GF	Table 42
GG	Table 42
GH	Table 42
GP	Table 42
GQ	Table 42
GR	Table 42
GT	Table 44
GU	Table 42
GV	Table 42
GW	Table 41
G2	Table 41
G7	Table 42
HE	Table 43
HF	Table 43
HG	Table 43
HP	Table 43
HQ	Table 43
HR	Table 43
HS	Table 43
HW	Table 41
HX	Table 41
H1	Table 44
H2	Table 44
H3	Table 44
H5	Table 41
H9	Table 43
M2	Table 41
M3	Table 41
M3	Table 41

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Table 40 (continued)

Wire Type Code	Location of the Shield CAU Data
OA	Table 47
OC	Table 47
QS	Table 42
QT	Table 42
QU	Table 42
QV	Table 42
QW	Table 42
QX	Table 42
RQ	Table 41
TA	Table 41
TK	Table 41
T2	Table 41
U4	Table 45
VF	Table 45
VG	Table 45
VH	Table 45
XQ	Table 45
Y6	Table 49
Y7	Table 49
Y8	Table 49
2Z	Table 41
4J	Table 41
46	Table 41
5T	Table 41
7J	Table 46
8Q	Table 45
8C	Table 46
8D	Table 46
8E	Table 46
8K	Table 46
9L	Table 41

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**Table 41
CAU OF THE SHIELD FOR SHIELDED WIRES**

Shielded Wire						CAU		
Supplier	Specification	Type	Class	AWG	Wire Type Code	Inner Shield	Outer Shield	
Boeing	10-60816-61	-	1	18	TK	24	32	
	65B47866-5	-	2	20	RQ	21	23	
	BMS 13-31	VII	2	18	FF	-	28	
				20	FF	-	24	
	BMS 13-48	32	2	24	46	-	10	
	BMS 13-55	IV	1	16	9L	-	16	
		III	2	20	C9	-	26	
	BMS 13-60	25		1	20	HW	10	13
				2	20	HX	13	18
		27		2	20	M2	13	18
					22	M2	11	15
				3	20	M3	12	16
		18	M3		18	23		
		15	2	24	G2	-	6	
		13			4	20	GW	-
1	20				H5	-	10	
Judd	C42016310902	-	1	18	T2	-	13	
	JW647-99	-	2	20	D9	13	17	
Raychem	CTC-0039-20-06090	-	2	20	DU	-	16	
	CTC-0039-22-06090	-	2	22	DU	-	15	
	55A6160-20-06090	-	2	20	2Z	13	23	
	55A6087-20-06090	-	1	20	4J	10	15	
	55PC6021-20-06090	-	2	20	D6	16	18	
	55PC6022-20-06090	-	3	20	D7	16	18	
	CTC-0062-20-9/5-9	-	2	20	TA	-	12	
Tensolite	20721/20087Q-2	-	2	20	5T	15	18	
Thermax	550-292	-	2	20	D2	28	36	
	551-292	-	3	20	D3	32	42	
	552-292	-	2	18	D4	28	42	



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Table 42

CAU OF THE SHIELD FOR BMS 13-60 TYPES 2 AND 5, WIRE TYPE CODES G7, GE, GF, GG, GH, GP, GQ, GR, GU, GV, QS, QT, QU, QV, QW AND QX

AWG	Class	CAU of the Shield
14	1	13
16	1	10
	2	15
	3	21
18	1	10
	2	15
	3	18
	4	21
20	1	10
	2	13
	3	15
	4	18
22	1	6
	2	11
	3	12

Table 43

CAU OF THE SHIELD FOR BMS 13-60 TYPES 8 AND 11, WIRE TYPE CODES H9, HE, HF, HG, HP, HQ, HR AND HS

AWG	Class	CAU of the Shield
12	1	14
	2	28
	3	31
14	1	13
	2	25
	3	27
16	1	10
	2	22
	3	24
18	1	10
	2	20
	3	22
	4	27

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Table 43 (continued)

AWG	Class	CAU of the Shield
20	1	9
	2	18
	3	19
	4	26
22	2	18
	3	20

Table 44

CAU OF THE SHIELD FOR BMS 13-60 TYPE 13, WIRE TYPE CODES GT, H1, H2 AND H3

AWG	Class	CAU of the Shield
18	1	8
	3	16
20	1	7
	2	12
	3	14
22	1	6
	3	12

Table 45

CAU OF THE SHIELD FOR BMS 13-48 TYPE 12, WIRE TYPE CODES U4, VF, VG, VH, XQ AND 8Q

AWG	Class	CAU of the Shield
10	1	21
12	1	17
	2	26
	3	31
14	1	14
	3	20
16	1	12
	2	18
	3	20
18	1	10
	2	17
	3	19
	4	23

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Table 45 (continued)

AWG	Class	CAU of the Shield
20	1	9
	2	14
	3	17
	4	19
22	1	8
	2	12
	3	14

Table 46

CAU OF THE SHIELD FOR BMS 13-48 TYPE 24, WIRE TYPE CODES 7J, 8C, 8D, 8E AND 8K

CAU	Class	CAU of the Shield
16	2	19
	3	23
18	1	12
	2	18
	3	21
	4	23
20	1	10
	2	15
	3	18
	4	21

Table 47

CAU OF THE SHIELD FOR BMS 13-48 TYPE 15, WIRE TYPE CODES OA AND OC

AWG	Class	CAU of the Shield
12	1	17
14	1	14
	3	28

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Table 48
CAU OF THE SHIELD FOR TLS-200-()-20NA, WIRE TYPE CODES C1, C2, C3 AND C4

AWG	Class	CAU	
		Inner Shield	Outer Shield
20	1	13	-
			18
	2	18	-
			4

Table 49
CAU OF THE SHIELD FOR BMS 13-48 TYPE 32, WIRE TYPE CODES Y6, Y7 AND Y8

AWG	Class	CAU of the Shield
16	1	12
	2	18
	3	20
18	1	10
	2	17
	3	19
20	1	9
	2	14
	3	17
22	1	8
	2	12
	3	14

Table 50
CAU OF THE DIFFERENT BAC3108 SHIELDS

Shield Part Number	CAU of the Shield	An Applicable Terminal Crimp Barrel Size
BAC3108-1B	6	18-22
BAC3108-1D	12	18-22
BAC3108-1E	18	16-14
BAC3108-1G	24	16-14
BAC3108-1	30	16-14
BAC3108-2C	42	16-14
BAC3108-2B	60	12-10

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Table 50 (continued)

Shield Part Number	CAU of the Shield	An Applicable Terminal Crimp Barrel Size
BAC3108-2E	76	12-10
BAC3108-2F	77	12-10
BAC3108-2	96	12-10
BAC3108-3	96	12-10
BAC3108-3D	96	12-10
BAC3108-4	132	8

- (1) Make shield ground wire from the end of the shield of the cable or shielded wire.
Refer to Subject 20-10-15 for the assembly of a shield ground wire with a shield pull-through.
- (2) Find the CAU of the shield.
Refer to:
 - Table 40 for the table that has the CAU data for the shielded wire or cable
 - Table 50 for the CAU data for the different BAC3108 shields.
- (3) Make a selection of a terminal lug.
Use the CAU of the shield and the stud hole size to make the selection.
- (4) Assemble the terminal lug. Refer to the paragraph applicable to the assembly of the terminal lug.

D. Assembly of BACT12AC Terminal Lugs

Refer to Paragraph 1.B. for the description of the BACT12AC terminal lugs.

**Table 51
CRIMP TOOLS FOR SMALL BACT12AC TERMINAL LUGS**

Crimp Barrel Size	Insulation Color	Crimp Tool				Special Instructions
		Basic Unit	Holder	Head	Die	
26-24	Yellow	59275	-	-	-	-

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Table 51 (continued)

Crimp Barrel Size	Insulation Color	Crimp Tool				Special Instructions
		Basic Unit	Holder	Head	Die	
22-18	Red	189721-1	356303-1	-	314270-1	For one AWG 24 wire, fold back the conductor
		314423-()	-	-	314270-1	
		314423-()	-	-	314270-2	
		314597-()	-	-	314270-1	
		314597-()	-	-	314270-2	
		46110	-	-	-	
		4B2-457540-6	-	687658-1	69872	
		59250	-	-	-	
		68075	-	-	69872	
		69004	-	-	47451	
		69005	-	47516	-	
		69118-()	-	-	45185-7	
		69365-()	-	-	47806-2	
		69875	-	-	69872	
16-14	Blue	189721-1	356303-1	-	314269-1	-
		314423-()	-	-	314269-1	
		314423-()	-	-	314269-2	
		314597-()	-	-	314269-1	
		314597-()	-	-	314269-2	
		46110	-	-	-	
		565435-5	-	567200-2	69872	
		565435-5	-	567200-2	69873	
		59250	-	-	-	
		68075	-	-	69873	
		69004	-	-	47852	
		69005	-	47517	-	
		69118-()	-	-	45225-2	
		69118-()	-	-	45225-5	
69365-()	-	-	47807-1			

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Table 51 (continued)

Crimp Barrel Size	Insulation Color	Crimp Tool				Special Instructions
		Basic Unit	Holder	Head	Die	
12-10	Yellow	189721-1	356302-1	-	679300-1	-
		314590-()	-	-	314268-1	
		314590-()	-	-	314268-2	
		314590-2	-	-	314268-1	
		314590-2	-	-	314268-2	
		314700-()	-	-	314268-1	
		314700-()	-	-	314268-2	
		565435-5	-	567200-2	69874	
		59239-()	-	-	-	
		68075	-	-	69874 Model C	
		69004	-	-	47453	
		69010	-	47518-1	-	
		69365	-	-	47808	
		69365-()	-	-	47808-6	
		69875	-	-	69874 Model C	

Table 52

CRIMP TOOLS FOR LARGE BACT12AC TERMINAL LUGS

Crimp Barrel Size	Insulation Color	Crimp Tool			
		Basic Unit	Holder	Head	Die Set
8	Red	189721-1	356443-1	-	904395-1
		69010	-	68285-1	-
		59974-1	-	-	47820
		Power Pump	-	69051	47820
			-	69061	47820
		-	ST970-12	47820	
6	Blue	59974-1	-	-	47821
		Power Pump	-	69051	47821
			-	69061	47821
			-	ST970-12	47821

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Table 52 (continued)

Crimp Barrel Size	Insulation Color	Crimp Tool			
		Basic Unit	Holder	Head	Die Set
4	Yellow	59974-1	-	-	47822
		Power Pump	-	69051	47822
			-	69061	47822
			-	ST970-12	47822
2	Red	59974-1	-	-	47823
		Power Pump	-	69051	47823
			-	69061	47823
			-	ST970-12	47823
1/0	Blue	Power Pump	-	58422-1	47824
			-	69066	47824
			-	PPFC-1H	47824
2/0	Yellow	Power Pump	-	58422-1	47825
			-	69066	47825
			-	PPFC-1H	47825
4/0	Blue	Power Pump	-	58422-1	47918
			-	69066	47918

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

- (1) Make a selection of a terminal lug from Table 3.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

- (2) Make a selection of a crimp tool from Table 51 or Table 52.
- (3) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

- (4) Remove the necessary length of the insulation from the end of the wire.

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Refer to Subject 20-00-15 for the insulation removal procedures.

To attach one AWG 24 wire to a terminal lug with a 22-18 size crimp barrel, remove twice the length of insulation and fold back the conductor.

Make sure that:

- When the wire is in the terminal lug, and the end of the wire insulation is in the insulation grip of the terminal lug, the end of the conductor extends farther than the end of the crimp barrel
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut
- The conductor does not have nicked or cut strands
- If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
- If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
- The remaining insulation is not frayed.

- (5) Put the conductor of the wire in the crimp barrel of the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

- (6) Crimp the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
- If the terminal lug has an insulation grip, the crimp tool is adjusted to give the correct insulation support. Refer to Paragraph 2.B.
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

E. Assembly of BACT12AL Terminal Lugs

Refer to Paragraph 1.C. for the description of the BACT12AL terminal lugs.

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

**Table 53
CRIMP TOOLS FOR BACT12AL TERMINAL LUGS**

Crimp Barrel Size	Insulation Color	Crimp Tool		
		Basic Unit	Head	Die Set
8	Red	59974-1	-	47820
		69010	68285-1	-
		Power Pump	69051	47820
			69061	47820
			ST970-12	47820
6	Blue	59974-1	-	47821
		Power Pump	69051	47821
			69061	47821
			ST970-12	47821
4	Yellow	59974-1	-	47822
		Power Pump	69051	47822
			69061	47822
			ST970-12	47822

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

- (1) Make a selection of a terminal lug from Table 5.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

- (2) Make a selection of a crimp tool from Table 77.
- (3) Remove the necessary length of the insulation from the end of the wire.
Refer to Subject 20-00-15 for the insulation removal procedures.

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Make sure that:

- When the wire is in the terminal lug, the end of the conductor extends farther than the end of the crimp barrel
 - The clearance from the end of the conductor is sufficient for the installation of the washer and the nut
 - The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
 - The conductor does not have nicked or cut strands
 - If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
 - If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
 - The remaining insulation is not frayed.
- (4) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

- (5) Put the conductor of the wire in the crimp barrel of the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
 - The end of the conductor extends farther than the end of the crimp barrel
 - The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
 - The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.
- (6) Crimp the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

F. Assembly of BACT12AR and Other Restrictive Entry Terminal Lugs

Refer to Paragraph 1.D. for the description of the BACT12AR terminal lugs.

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

**Table 54
CRIMP TOOLS FOR BACT12AR TERMINAL LUGS**

Wire Size	Terminal Lug			Crimp Tool			
	Crimp Barrel Size	Sleeve Color	Band Color	Basic Unit	Holder	Head	Die
26	24	Yellow	Blue	59275	-	-	-
24	24	Yellow	Blue	47907	-	-	-
				565435-5	-	567200-2	69878
				59275	-	-	-
				68075	-	-	69878
				69692-1	-	-	-
				69875	-	-	69878
22	22	Red	Green	189721-1	356303-1	-	314270-1
				314423-()	-	-	314270-1
							314270-2
				314597-()	-	-	314270-1
							314270-2
				46110	-	-	-
				4B2-457540-6	-	687658-1	69872
				59250	-	-	-
				68075	-	-	69872
				69004	-	-	47451
				69005	-	47516	-
				69118-()	-	-	45185-7
69365-()	-	-	47806-2				
69875	-	-	69872				

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Table 54 (continued)

Wire Size	Terminal Lug			Crimp Tool			
	Crimp Barrel Size	Sleeve Color	Band Color	Basic Unit	Holder	Head	Die
20	20	Red	Red	189721-1	356303-1	-	314270-1
				314423-()	-	-	314270-1
							314270-2
				314597-()	-	-	314270-1
							314270-2
				46110	-	-	-
				4B2-457540-6	-	687658-1	69872
				565435-5	-	567200-2	69872
				59250	-	-	-
				68075	-	-	69872
				69004	-	-	47451
				69005	-	47516	-
				69118-()	-	-	45185-7
				69365-()	-	-	47806-2
69692-1	-	-	-				
69875	-	-	69872				

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Table 54 (continued)

Wire Size	Terminal Lug			Crimp Tool			
	Crimp Barrel Size	Sleeve Color	Band Color	Basic Unit	Holder	Head	Die
18	18	Red	White	189721-1	356303-1	-	314270-1
				314423-()	-	-	314270-1
							314270-2
				314597-()	-	-	314270-1
							314270-2
				46110	-	-	-
				4B2-457540-6	-	687658-1	69872
				565435-5	-	567200-2	69872
				59250	-	-	-
				68075	-	-	69872
				69004	-	-	47451
				69005	-	47516	-
				69118-()	-	-	45185-7
				69319-1	-	-	47806-2
69365-()	-	-	47806-2				
69875	-	-	69872				
16	16	Blue	Blue	189721-1	356303-1	-	314269-1
				314423-()	-	-	314269-1
							314269-2
				314597-()	-	-	314269-1
							314269-2
				46110	-	-	-
				59250	-	-	-
				68075	-	-	69873
				69004	-	-	47852
				69005	-	47517	-
				69118-()	-	-	45225-2
							45225-5
				69365-()	-	-	47807-1
				69875	-	-	69873

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Table 54 (continued)

Wire Size	Terminal Lug			Crimp Tool			
	Crimp Barrel Size	Sleeve Color	Band Color	Basic Unit	Holder	Head	Die
14	14	Blue	Green	189721-1	356303-1	-	314269-1
				314423-()	-	-	314269-1
							314269-2
				314597-()	-	-	314269-1
							314269-2
				46110	-	-	-
				4B2-457540-6	-	687658-1	69872
				565435-5	-	567200-2	69872
				59250	-	-	-
				68075	-	-	69873
				69004	-	-	47852
				69005	-	47517	-
				69118-()	-	-	45225-2
							45225-5
69365-()	-	-	47807-1				
69693-1	-	-	-				
69875	-	-	69873				
12	12	Yellow	Yellow	189721-1	356302-1	-	679300-1
				314590-()	-	-	314268-1
							314268-2
				314700-()	-	-	314268-1
							314268-2
				59239-()	-	-	-
				68075	-	-	69874 Model C
				69004	-	-	47453
				69010	-	47518-1	-
				69365	-	-	47808
69365-()	-	-	47808-6				
69875	-	-	69874 Model C				

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Table 54 (continued)

Wire Size	Terminal Lug			Crimp Tool			
	Crimp Barrel Size	Sleeve Color	Band Color	Basic Unit	Holder	Head	Die
10	10	Yellow	Brown	189721-1	356302-1	-	679300-1
				314590-()	-	-	314268-1
							314268-2
				314700-()	-	-	314268-1
							314268-2
				565435-5	-	567200-2	69874
				59239-()	-	-	-
				68075	-	-	69874 Model C
				69004	-	-	47453
				69010	-	47518-1	-
				69365	-	-	47808
				69365-()	-	-	47807-1
47808-6							
69875	-	-	69874 Model C				

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

- (1) Make a selection of a terminal lug from Table 7.

Make sure that the crimp barrel size of the terminal lug is the same as the wire size.

NOTE: BACT12AR terminal lugs are intended to be terminated to only one wire. If more than one wire is to be terminated, refer to Subject 20-30-22.

- (2) Remove the necessary length of the insulation from the end of the wire.

Refer to Subject 20-00-15 for the insulation removal procedures.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS**

Make sure that:

- When the wire is in the terminal lug, and the end of the wire insulation is in the insulation grip of the terminal lug, the end of the conductor extends farther than the end of the crimp barrel
 - The clearance from the end of the conductor is sufficient for the installation of the washer and the nut
 - The conductor does not have nicked or cut strands
 - If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
 - If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
 - The remaining insulation is not frayed.
- (3) If a BACT12AR terminal lug for AWG 12 wire and smaller is not available, and a heat gun can be used:
- (a) Make a selection of a BACT12AC terminal lug from Table 3.
 - (b) Put a 0.5 inch to 0.75 inch length of heat shrinkable sleeve on the wire.
Make sure that:
 - The sleeve has the smallest diameter that will let the sleeve move easily on the wire
 - The end of the sleeve is aligned with the end of the wire insulation.
 - (c) Shrink the sleeve into its position.
- (4) If a BACT12AR terminal lug for AWG 12 wire and smaller is not available, and a heat gun cannot be used:
- (a) Make a selection of a BACT12AC terminal lug from Table 3.
 - (b) Make a selection of a Grade D TFE tape. Refer to Subject 20-00-11.
 - (c) Wind a sufficient number of layers of tape around the end of the wire insulation.
Make sure that:
 - The end of the tape layers is aligned with the end of the wire insulation
 - The outer diameter of the layers of tape and the inside diameter of the insulation grip of the terminal make a fit.
 - The tape layers make a 50 percent minimum overlap
 - The length of the tape layers on the wire insulation is approximately 1.0 inch.
 - (d) Assemble a wire harness tie near each end of the tape layers to hold the layers in their position.
- (5) Make a selection of a crimp tool from:
- Table 54 for a BACT12AR terminal lug
 - Table 51 for a BACT12AC terminal lug.
- (6) Put the conductor of the wire in the crimp barrel of the terminal lug.

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The end of the wire insulation is in the insulation grip of the terminal lug
- If a sleeve or tape is on the wire, the end the sleeve or tape is in the insulation grip of the terminal lug
- If a sleeve or tape is on the wire, the sleeve or tape does not go into the crimp barrel of the terminal lug
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

(7) Crimp the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The end of the wire insulation is in the insulation grip of the terminal lug
- The crimp tool is adjusted to give the correct insulation support. Refer to Paragraph 2.B.
- If a sleeve or tape is on the wire, the end the sleeve or tape is in the insulation grip of the terminal lug
- If a sleeve or tape is on the wire, the sleeve or tape does not go into the crimp barrel of the terminal lug
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

G. Assembly of BACT12E 90 Degree Upright Terminal Lugs

Refer to Paragraph 1.E. for the description of the BACT12E upright terminal lugs.

**Table 55
CRIMP TOOLS FOR BACT12E UPRIGHT TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Die		
			Primary	Secondary	Cavity
22 - 18	46447	-	-	-	-
	49935	-	-	-	-
16 - 14	49935	-	-	-	-
	M8ND	-	N14HT	-	-
	Y8ND	-	N14HT	-	-

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Table 55 (continued)

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Die		
			Primary	Secondary	Cavity
12 - 10	314700-1	-	314656-1	-	12-10
	46447	-	-	-	-
	49935	-	-	-	-
	59461	-	-	-	-
	M8ND	-	N10HT	-	-
	Power Pump	Y34A	V8L	34PL	-
	Y10MRF-4	-	-	-	-
	Y10MRF-5	-	-	-	-
	Y8ND	-	N10HT	-	-
8	M8ND	-	N8CT	-	-
	MR8-5	-	-	-	-
	Power Pump	13642M	ST2354-5	11732	-
		69069	47321	47322	-
		BDHD1	DV8L-1	Y29PL	-
		TBHD1	ST2354-5	11732	-
		TBM12	ST2354-5	11732	-
	Y29B	DV8L-1	Y29PL	-	
Y8ND	-	N8CT	-	-	
6	Power Pump	13642M	ST2354-6	-	-
		69069	47321	47322	-
		BDHD1	DV6L	Y29PL	-
		TBHD1	ST2354-6	-	-
		TBM12	ST2354-6	-	-
		Y29B	DV8L-1	Y29PL	-
4	Power Pump	13642	ST2354-2	11734	-
		13642M	ST2354-2	11734	-
		69069	47321	47322	-
		BDHD1	DV4L	Y29PL	-
		TBHD1	ST2354-2	11734	-
		TBM12	ST2354-2	11734	-
		Y29B	DV4L	Y29PL	-

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Table 55 (continued)

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Die		
			Primary	Secondary	Cavity
2	Power Pump	13642M	ST2354-1	-	-
		69069	47321	47322	-
		BDHD1	DV2L	Y29PL	-
		TBHD1	ST2354-1	-	-
		TBM12	ST2354-1	-	-
		Y29B	DV2L	Y29PL	-
1/0	Power Pump	13642	11738	11737	-
		13642M	11738	11737	-
		BDHD1	DV25L	Y29PR	-
		TBHD1	11738	-	-
		TBM12	11738	11737	-
		Y29B	DV25L	Y29PR	-
2/0	Power Pump	13642M	11739	11737	-
		BDHD1	DV26L	Y29PR	-
		TBHD1	11739	-	-
		TBM12	11739	11737	-
		Y29B	DV26L	Y29PR	-
3/0	Power Pump	13642M	ST2354-3	-	-
		BDHD1	DV27L	Y29PR	-
		TBHD1	ST2354-3	-	-
		TBM12	ST2354-3	-	-
		Y29B	DV27L	Y29PR	-
4/0	Power Pump	BDHD1	DV28L	Y29PR	-
		Y29B	DV28L	Y29PR	-

Table 56
INSULATION REMOVAL LENGTHS FOR BACTA12E UPRIGHT TERMINAL LUGS

Crimp Barrel Size	Insulation Removal Length (inch)	Stud Hole Size
22-18	0.25	10
16-14	0.25	10

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Table 56 (continued)

Crimp Barrel Size	Insulation Removal Length (inch)	Stud Hole Size
12-10	0.43	10
		1/4
8	0.43	10
6	0.50	1/4
4	0.50	1/4
2	0.63	3/8
1/0	0.69	3/8
		1/2
2/0	0.81	3/8
3/0	0.88	3/8
4/0	0.88	3/8
		1/2

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

- (1) Make a selection of a BACT12E upright terminal lug from Table 10.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

- (2) Make a selection of a crimp tool from Table 55.
- (3) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

- (4) Remove the necessary length of the insulation from the end of the wire.

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Refer to:

- Table 56 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures

Make sure that:

- When the wire is in the terminal lug, the end of the conductor extends farther than the end of the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The conductor does not have nicked or cut strands
- If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
- If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
- The remaining insulation is not frayed.

- (5) Put the conductor of the wire in the crimp barrel of the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger.

- (6) Crimp the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger.

- (7) If the crimp tool is a hex type tool and Table 10 gives a secondary die, crimp the terminal lug again with the secondary die:

NOTE: The second crimp removes the flash that is made by the first crimp.

NOTE: The removal of the plating from the terminal lug caused by the second crimp is permitted.

- (a) Put the secondary die in the crimp tool.
- (b) Turn the terminal lug one flat, approximately 60 degrees.
- (c) Crimp the terminal lug again.

Make sure that the second crimp is in the same location along crimp barrel as the first crimp.

H. Assembly of BACT12G and Burndy YBM Series Flag Terminal Lugs

Refer to Paragraph 1.F. for the description of these terminal lugs.

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**Table 57
CRIMP TOOLS FOR BACT12G AND BURNDY YBM SERIES FLAG TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Type	Head	Adapter	Nest	Indenter
8	BAT35	Battery Powered	-	Y35P3	UV8B-1	Y29PBL
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV8BL-1	Y29PBL-1
			Y29B	-	DV8BL	Y29PBL
			Y35BH	Y35P3	UV8B-1	Y29PBL
	Y29BH	Hydraulic Head	-	-	DV88	Y29PBL
	Y29NC	Pneumatic Head	-	-	DV88	Y29PBL
	Y35	Hydraulic Hand	-	Y35P3	UV8B-1	Y29PBL
Y6NP-5	-	Y29B	-	DV88	Y29PBL	
6	BAT35	Battery Powered	-	Y35P3	UV6B-1	Y29PBL
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV6BL	Y29PBL-1
			Y29B	-	DV6BL	Y29PBL
			Y35BH	Y35P3	UV6B-1	Y29PBL-1
	Y29BH	Hydraulic Head	-	-	DV6L	Y29PBL
	Y29NC	Pneumatic Head	-	-	DV6L	Y29PBL
	Y35	Hydraulic Hand	-	Y35P3	UV6B-1	Y29PBL
Y6NP-5	-	Y29B	-	DV6L	Y29PBL	
4	BAT35	Battery Powered	-	Y35P3	UV4B-1	Y29PL
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV4BL	Y29PBL
			Y29B	-	DV4BL	Y29PBL
			Y35BH	Y35P3	UV4B-1	Y29PL
	Y29BH	Hydraulic Head	-	-	DV4BL	Y29PBL
	Y29NC	Pneumatic Head	-	-	DV4BL	Y29PBL
	Y35	Hydraulic Hand	-	Y35P3	UV4B-1	Y29PL
Y6NP-5	-	Y29B	-	DV4BL	Y29PBL	

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Table 57 (continued)

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Type	Head	Adapter	Nest	Indenter
2	BAT35	Battery Powered	-	Y35P3	UV2B-1	Y29PA
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV2BL	Y29PBL
			Y29B	-	DV2BL	Y29PBL
			Y35BH	Y35P3	UV2B-1	Y29PA
	Y29BH	Hydraulic Head	-	-	DV2BL	Y29PL
	Y29NC	Pneumatic Head	-	-	DV2BL	Y29PL
	Y35	Hydraulic Hand	-	Y35P3	UV2B-1	Y29PA
	Y35BH	-	-	Y35P3	UV2B-1	Y29PA
Y6NP-5	-	Y29B	-	DV2BL	Y29PL	
1/0	BAT35	Battery Powered	-	Y35P3	UV25B-1	Y29PA-1
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV25BL-1	Y29PR
			Y29B	-	DV25BL	
			Y35BH	Y35P3	UV25B-1	
	Y29BH	Hydraulic Head	-	-	DV25BL	Y29PA
	Y29NC	Pneumatic Head	-	-	DV25BL	Y29PA-1
	Y35	Hydraulic Hand	-	Y35P3	UV25B-1	Y29PR
	Y6NP-5	-	Y29B	-	DV25BL	Y29PA
Y29BH	Hydraulic Head	-	-	DV25BL	Y29PA-1	
Y29NC	Pneumatic Head	-	-	DV25BL	Y29PR	
2/0	BAT35	Battery Powered	-	Y35P3	UV26B-1	Y29PA-1
	MY28	Large Adjustable Hand Tool	-	-	-	-
	Power Pump	-	BDHD1	-	DV26BL	Y29PR
			Y29B	-	DV26BL	Y29PR
			Y35BH	Y35P3	UV26B-1	Y29PA-1
Y35	Hydraulic Hand	-	Y35P3	UV26B-1	Y29PA-1	

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Table 58
GAGE PIN DIAMETER FOR THE CALIBRATION OF THE BURNDY MY28 CRIMP TOOL

Terminal Crimp Barrel Size	Gage Pin Diameter (inch)	
	Target	Tolerance
8	0.1360	0.0005
6	0.1360	0.0005
4	0.1960	0.0005
2	0.2950	0.0005
1/0	0.3906	0.0005
2/0	0.4375	0.0005

Table 59
INSULATION REMOVAL LENGTH FOR BACT12G AND BURNDY YBM FLAG TERMINAL LUGS

Crimp Barrel Size	Stud Hole Size	Insulation Removal Length (inch)	
		Target	Tolerance
8	10	0.44	0.06
	1/4	0.50	0.06
6	1/4	0.50	0.06
	5/16	0.56	0.06
4	1/4	0.50	0.06
	3/8	0.63	0.06
2	1/4	0.63	0.06
	3/8	0.63	0.06
1/0	1/4	0.63	0.06
	3/8	0.75	0.06
2/0	3/8	0.81	0.06

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

NOTE: Refer to Subject 20-20-12 for:

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- Information on the operation of the Burndy MY28 crimp tool
- The assembly of a dual ground that has two flag terminals.

(1) Make a selection of a BACT12G flag terminal lug from Table 12.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

(2) Make a selection of a crimp tool from Table 57.

(3) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

(4) Remove the necessary length of the insulation from the end of the wire.

Refer to:

- Table 59 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures

Make sure that:

- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The conductor does not have nicked or cut strands
- If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
- If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
- The remaining insulation is not frayed.

(5) If the wire has a braid jacket, put a 1.0 ± 0.06 length of heat shrinkable sleeve on the jacket.

(6) Put the conductor of the wire in the crimp barrel of the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger.

(7) If two flag terminals are to be attached to the end of a wire, put the conductor through the crimp barrels of both flag terminal lugs.

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Make sure that:

- All of the strands of the conductor go through both crimp barrels
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The distance between the terminal lugs is correct for the installation
- The end of the conductor extends farther than the end of the crimp barrel of the terminal lug nearest to the end of the wire.

(8) Crimp the terminal lug or lugs.

Make sure that:

- The end of the conductor extends farther than the end of the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- If two flag terminals are on the wire, the crimp of the flag terminal nearest to the end of the wire is made first
- If two flag terminals are on the wire, the distance between the terminal lugs is correct for the installation.

NOTE: If two flag terminals are on the wire, the crimp of the flag terminal at the end of the wire completed first, keeps the strands of the conductor together until the crimp of both flag terminals is completed.

(9) If a length of heat shrinkable sleeve is on the wire, shrink it into its position.

Make sure that the end of the heat shrinkable sleeve is aligned with the end of the wire insulation.

NOTE: This keeps the strands of the insulation braid together.

I. Assembly of BACT12M, and 280U0010-1 Terminal Lugs

Refer to Paragraph 1.G. for the description of the BACT12M, and the 280U0010-1 terminal lugs.

**Table 60
CRIMP TOOLS FOR SMALL BACT12M TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool			
	Basic Unit	Holder	Head	Die
22-18	189721-1	356302-1	356744-1	-
	314590-()	-	-	314542-1
	314590-()	-	-	314542-2
	314700-()	-	-	314542-1
	314700-()	-	-	314542-2
	46673	-	-	-
	69010	-	45175	-
	W400-5060	-	-	22-18 AWG

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Table 60 (continued)

Crimp Barrel Size	Crimp Tool			
	Basic Unit	Holder	Head	Die
16-14	189721-1	356302-1	356744-2	-
	314590-()	-	-	314543-1
	314590-()	-	-	314543-2
	314700-()	-	-	314543-1
	314700-()	-	-	314543-2
	46988	-	-	-
	59294-()	-	-	-
	69010	-	45176	-
	W400-5060	-	-	16-14 AWG
12-10	314937-1	-	-	314915-1
	59461	-	-	-
	PHRPU2	-	PHST-59461	-

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**Table 61
INDENTER TYPE CRIMP TOOLS FOR LARGE BACT12M AND 280U0010-1 TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool						
	Basic Unit	Head	Adapter	Nest	Indenter	Special Instructions	
8	59973-1	-	-	48126	48355	-	
	69020	-	-	48126	48355	-	
	BAT35	-	Y35P3	UV8L	Y34PL	Use for Burndy terminal lugs only	
	M8ND	-	-	-	N8CT	Use for Burndy terminal lugs only	
	MR8-5	-	-	-	-	-	
	Power Pump	69046	69046	-	47321	47322	-
		69069	69069	-	47321	47322	-
		BDHD1	BDHD1	-	DV8L-1	Y29PL	Use for Burndy terminal lugs only
		Y29B	Y29B	-	DV8L-1	Y29PL	Use for Burndy terminal lugs only
		Y35BH	Y35BH	Y35P3	UV8L	Y34PL	Use for Burndy terminal lugs only
	Y35	Y35	-	Y35P3	UV8L	Y34PL	Use for Burndy terminal lugs only
Y8ND	Y8ND	-	-	-	N8CT	Use for Burndy terminal lugs only	
6	59973-1	-	-	48128	48127	-	
	69020	-	-	48128	48127	-	
	BAT35	-	Y35P3	UV6L	Y34PLA	Use for Burndy terminal lugs only	
	Power Pump	69046	69046	-	47321	47322	-
		69069	69069	-	47321	47322	-
		BDHD1	BDHD1	-	DV6L	Y29PL	Use for Burndy terminal lugs only
		Y29B	Y29B	-	DV6L	Y29PL	Use for Burndy terminal lugs only
		Y35BH	Y35BH	Y35P3	UV6L	Y34PLA	Use for Burndy terminal lugs only
Y35	Y35	-	Y35P3	UV6L	Y34PLA	Use for Burndy terminal lugs only	

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Table 61 (continued)

Crimp Barrel Size	Crimp Tool						
	Basic Unit	Head	Adapter	Nest	Indenter	Special Instructions	
4	59973-1	-	-	48129	48127	-	
	69020	-	-	48129	48127	-	
	BAT35	-	Y35P3	UV4L	Y34PLA	Use for Burndy terminal lugs only	
	Power Pump	69046	-	-	47321	47322	-
		69069	-	-	47321	47322	-
		BDHD1	-	-	DV4L	Y29PL	Use for Burndy terminal lugs only
		Y29B	-	-	DV4L	Y29PL	Use for Burndy terminal lugs only
	Y35BH	Y35P3	UV4L	Y34PLA	Use for Burndy terminal lugs only		
Y35	-	Y35P3	UV4L	Y34PLA	Use for Burndy terminal lugs only		
2	59973-1	-	-	48130	48127	-	
	69020	-	-	48130	48127	-	
	BAT35	-	Y35P3	UV2L	Y34PLA	Use for Burndy terminal lugs only	
	Power Pump	69046	-	-	47321	47322	-
		69069	-	-	47321	47322	-
		BDHD1	-	-	DV2L	Y29PL	Use for Burndy terminal lugs only
		Y29B	-	-	DV2L	Y29PL	Use for Burndy terminal lugs only
	Y35BH	Y35P3	UV2L	Y34PLA	Use for Burndy terminal lugs only		
Y35	-	Y35P3	UV2L	Y34PLA	Use for Burndy terminal lugs only		

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Table 61 (continued)

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Head	Adapter	Nest	Indenter	Special Instructions
1/0	59973-1	-	-	48132	48131	-
	69020	-	-	48132	48131	-
	BAT35	-	Y35P3	UV25L	Y34PA	Use for Burndy terminal lugs only
	Power Pump	BDHD1	-	DV25L	Y29PR	Use for Burndy terminal lugs only
		Y29B	-	DV25L	Y29PR	Use for Burndy terminal lugs only
		Y35BH	Y35P3	UV25L	Y34PA	Use for Burndy terminal lugs only
Y35	-	Y35P3	UV25L	Y34PA	Use for Burndy terminal lugs only	
2/0	59973-1	-	-	48133	48131	-
	69020	-	-	48133	48131	-
	BAT35	-	Y35P3	UV26L	Y34PA	Use for Burndy terminal lugs only
	Power Pump	BDHD1	-	DV26L	Y29PR	Use for Burndy terminal lugs only
		Y29B	-	DV26L	Y29PR	Use for Burndy terminal lugs only
		Y35BH	Y35P3	UV26L	Y34PA	Use for Burndy terminal lugs only
Y35	-	Y35P3	UV26L	Y34PA	Use for Burndy terminal lugs only	
3/0	59973-1	-	-	48134	48131	-
	69020	-	-	48134	48131	-
	BAT35	-	Y35P3	UV27L	Y34PA	Use for Burndy terminal lugs only
	Power Pump	BDHD1	-	DV27L	Y29PR	Use for Burndy terminal lugs only
		Y29B	-	DV27L	Y29PR	Use for Burndy terminal lugs only
		Y35BH	Y35P3	UV27L	Y34PA	Use for Burndy terminal lugs only
Y35	-	Y35P3	UV27L	Y34PA	Use for Burndy terminal lugs only	

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Table 61 (continued)

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Head	Adapter	Nest	Indenter	Special Instructions
4/0	59973-1	-	-	300430	48131	-
	69020	-	-	300430	48131	-
	Power Pump	BDHD1	-	DV28L	Y29PR	Use for Burndy terminal lugs only
		Y29B	-	DV28L	Y29PR	Use for Burndy terminal lugs only

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

Table 62

HEX TYPE CRIMP TOOLS FOR LARGE BACT12M AND 280U0010-1 TERMINAL LUGS

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Adapter	Die Set	
				Primary	Secondary
8	Power Pump	13642	-	ST2354-5	11732
		13642M	-	ST2354-5	11732
		BDHD1	-	ST2354B-5	-
		TBHD1	-	ST2354-5	11732
		TBM12	TBM12D-AR	ST2354-5	11732
		Y29B	-	ST2354B-5	-
6	Power Pump	13642	-	ST2354-6	-
		13642M	-	ST2354-6	-
		BDHD1	-	ST2354B-6	-
		TBHD1	-	ST2354-6	-
		TBM12	TBM12D-AR	ST2354-6	-
		Y29B	-	ST2354B-6	-
4	Power Pump	13642	-	ST2354-2	-
		13642M	-	ST2354-2	-
		BDHD1	-	ST2354B-2	-
		TBHD1	-	ST2354-2	11734
		TBM12	TBM12D-AR	ST2354-2	11734
		Y29B	-	ST2354B-2	-

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 62 (continued)

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Adapter	Die Set	
				Primary	Secondary
2	Power Pump	13642	-	ST2354-1	-
		13642M	-	ST2354-1	-
		BDHD1	-	ST2354B-1	-
		TBHD1	-	ST2354-1	-
		TBM12	TBM12D-AR	ST2354-1	-
		Y29B	-	ST2354B-1	-
1/0	Power Pump	13642	-	11738	11737
		13642M	-	11738	11737
		TBHD1	-	11738	11737
		TBM12	TBM12D-AR	11738	11737
2/0	Power Pump	13642	-	11739	-
		13642M	-	11739	-
		TBHD1	-	11739	-
		TBM12	TBM12D-AR	11739	-
3/0	Power Pump	13642	-	ST2354-16	ST2354-3
		13642M	-	ST2354-16	ST2354-3
		BDHD1	-	ST2354B-3	-
		TBHD1	-	ST2354-16	ST2354-3
		TBM12	TBM12D-AR	ST2354-16	ST2354-3
		Y29B	-	ST2354B-3	-
4/0	Power Pump	13642	-	ST2354-13	-
		13642M	-	ST2354-13	-

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

(1) Make a selection of a terminal lug from Table 15.

NOTE: An AMP solid nickel terminal lug is a satisfactory alternative to a BACT12M terminal lug.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

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- (2) Make a selection of a crimp tool from:
 - Table 60 for small BACT12M terminal lugs
 - Table 61 or Table 62 for large BACT12M terminal lugs
- (3) If the tool has an insulation crimp adjustment, set the position of the adjustment. Refer to Paragraph 2.B.

Make sure to set the adjustment at position 2 for these wires:

- Champlain 24-00034 wire
 - Champlain 24-00523 wire
 - Filotex 85842 wire.
- (4) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

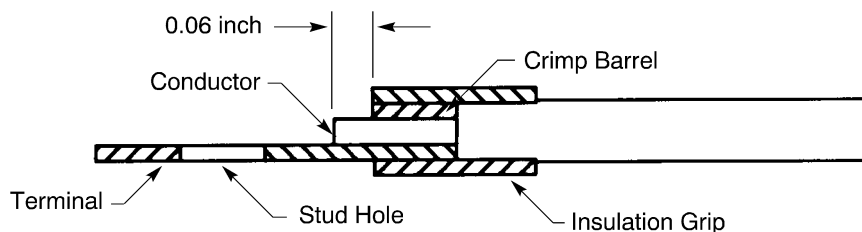
- (5) Remove the necessary length of the insulation from the end of the wire.

Refer to:

- Figure 2
- Subject 20-00-15 for the insulation removal procedures

Make sure that:

- When the wire is in the terminal lug, the end of the conductor extends 0.06 ± 0.03 inch farther than the end of the crimp barrel
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The conductor does not have nicked or cut strands
- If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
- If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
- The remaining insulation is not frayed.



INSULATION REMOVAL LENGTH
Figure 2

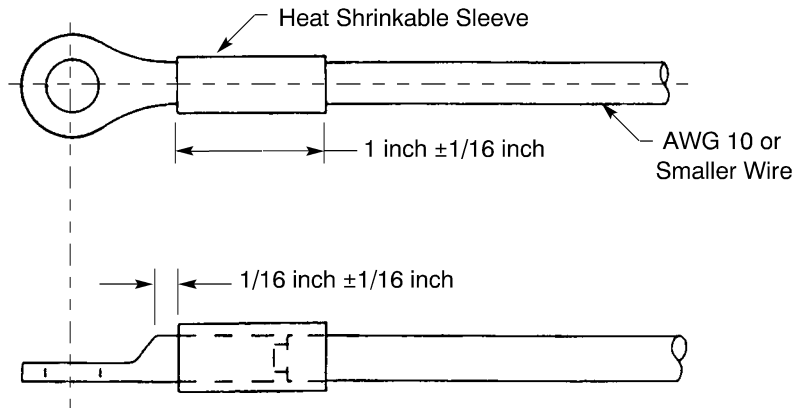
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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS**

- (6) For a terminal lug in a high temperature area or in a high vibration area, if a heat gun can be used, put a 1.00 inch \pm 0.06 inch length of TFE 2X heat shrinkable sleeve on the wire.
- Make sure that the sleeve has the smallest diameter that will let the sleeve move easily on the wire and on the crimp barrel of the terminal.
- (7) Put the conductor of the wire in the crimp barrel of the terminal lug. Refer to Figure 2.
- Make sure that:
- All of the strands of the conductor are in the crimp barrel
 - The end of the conductor extends 0.06 \pm 0.03 inch farther than the end of the crimp barrel
 - If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
 - If a sleeve is on the wire, the sleeve does not go into the insulation grip or the crimp barrel of the terminal
 - If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
 - The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.
- (8) Crimp the terminal lug.
- Make sure that:
- All of the strands of the conductor are in the crimp barrel
 - The end of the conductor extends 0.06 \pm 0.03 inch farther than the end of the crimp barrel
 - If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
 - If the terminal lug has an insulation grip, the crimp tool is adjusted to give the correct insulation support. Refer to Paragraph 2.B.
 - If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
 - The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.
- (9) If the crimp tool is a hex type tool from Table 62, crimp the terminal lug again with the secondary die.
- NOTE:** The second crimp removes the flash that is made by the first crimp.
- NOTE:** The removal of the plating from the terminal lug caused by the second crimp is permitted.
- (a) Put the secondary die in the crimp tool.
- (b) Turn the terminal lug one flat, approximately 60 degrees.
- (c) Crimp the terminal lug again.
- Make sure that the second crimp is in the same location along crimp barrel as the first crimp.
- (10) If a heat shrinkable sleeve is on the wire:
- (a) For terminal lugs on AWG 10 or smaller wire, push the sleeve over the terminal lug until the end of the sleeve is 1/16 inch \pm 1/16 inch from the forward end of the crimp barrel. Refer to Figure 3.

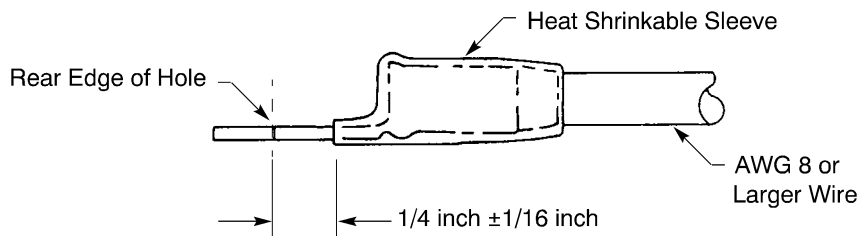
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS



POSITION OF THE SLEEVE FOR SIZE AWG 10 OR SMALLER WIRE
Figure 3

- (b) For terminal lugs on AWG 8 or larger wire, push the sleeve over the terminal lug until the end of the sleeve is 1/4 inch \pm 1/16 inch from the rear edge of the stud hole. Refer to Figure 4.



POSITION OF THE SLEEVE FOR SIZE AWG 8 OR LARGER WIRE
Figure 4

- (c) Shrink the sleeve into its position.
- (11) For a terminal lug in a high temperature area or in a high vibration area, if a heat gun cannot be used:
- Make a selection of a Grade D TFE tape. Refer to Subject 20-00-11.
 - Wind a sufficient number of layers of tape around the crimp barrel of the terminal and around the end of the wire insulation.
 Make sure that:
 - The tape layers include the crimp barrel of the terminal
 - The tape layers make a 50 percent minimum overlap
 - The length of the tape layers on the wire insulation is approximately 1.0 inch.
 - Assemble a wire harness tie near each end of the tape layers to hold the layers in their position.

J. Assembly of AMP Solid Nickel Terminal Lugs

Refer to Paragraph 1.H. for the description of the AMP solid nickel, high temperature terminal lugs.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

**Table 63
CRIMP TOOLS FOR AMP SOLID NICKEL TERMINAL LUGS**

Crimp Barrel Size	Wire Size	Crimp Tool			
		Basic Unit	Holder	Head	Die
22-18	22-18	189721-1	356302-1	356744-1	-
		314590-()	-	-	314542-1
		314590-()	-	-	314542-2
		314700-()	-	-	314542-1
		314700-()	-	-	314542-2
		46673	-	-	-
		69010	-	45175	-
	18	W400-5060	-	-	22-18 AWG
16-14	16-14	189721-1	356302-1	356744-2	-
		314590-()	-	-	314543-1
		314590-()	-	-	314543-2
		314700-()	-	-	314543-1
		314700-()	-	-	314543-2
		46988	-	-	-
		59294-()	-	-	-
		69010	-	45176	-
12-10	12-10	314937-1	-	-	314915-1
		59461	-	-	-
		PHRPU2	-	PHST-59461	-

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

- (1) Make a selection of a terminal lug from Table 18.

NOTE: An AMP solid nickel terminal lug is a satisfactory alternative to a BACT12M terminal lug.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

- (2) Make a selection of a crimp tool from Table 63.
- (3) If the tool has an insulation crimp adjustment, set the position of the adjustment. Refer to Paragraph 2.B.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS**

Make sure to set the adjustment at position 2 for these wires:

- Champlain 24-00034 wire
- Champlain 24-00523 wire
- Filotex 85842 wire.

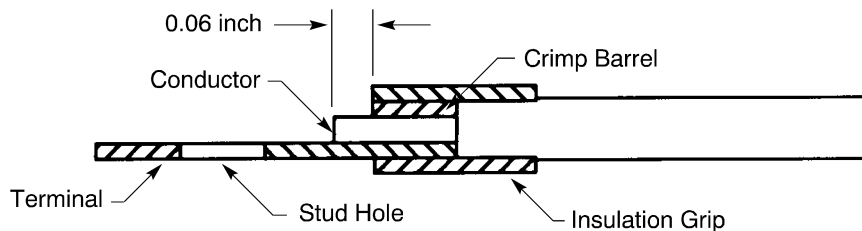
(4) Remove the necessary length of the insulation from the end of the wire.

Refer to:

- Figure 5
- Subject 20-00-15 for the insulation removal procedures

Make sure that:

- When the wire is in the terminal lug, the end of the conductor extends 0.06 ± 0.03 inch farther than the end of the crimp barrel
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The conductor does not have nicked or cut strands
- If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
- If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
- The remaining insulation is not frayed.



INSULATION REMOVAL LENGTH

Figure 5

(5) For a terminal lug in a high temperature area or in a high vibration area, if a heat gun can be used, put a 1.00 inch ± 0.06 inch length of TFE 2X heat shrinkable sleeve on the wire.

Make sure that the sleeve has the smallest diameter that will let the sleeve move easily on the wire and on the crimp barrel of the terminal.

(6) Put the conductor of the wire in the crimp barrel of the terminal lug. Refer to Figure 5.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends 0.06 ± 0.03 inch farther than the end of the crimp barrel
- If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- If a sleeve is on the wire, the sleeve does not go into the crimp barrel of the terminal lug
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

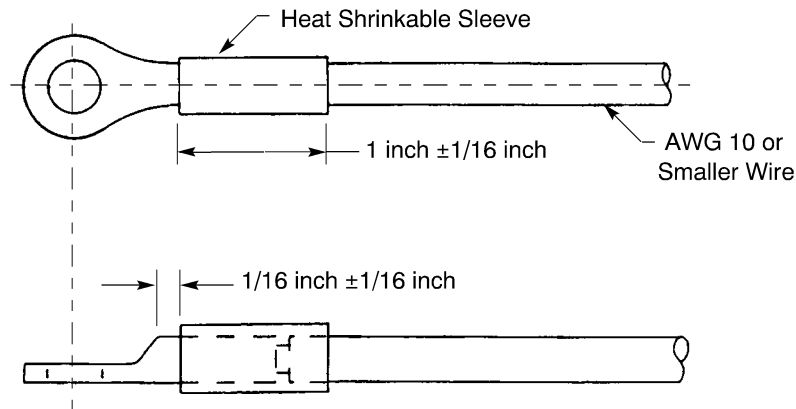
(7) Crimp the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends 0.06 ± 0.03 inch farther than the end of the crimp barrel
- If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
- If the terminal lug has an insulation grip, the crimp tool is adjusted to give the correct insulation support. Refer to Paragraph 2.B.
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

(8) If a heat shrinkable sleeve is on the wire:

(a) For terminal lugs on AWG 10 or smaller wire, push the sleeve over the terminal lug until the end of the sleeve is 1/16 inch ± 1/16 inch from the forward end of the crimp barrel. Refer to Figure 6.



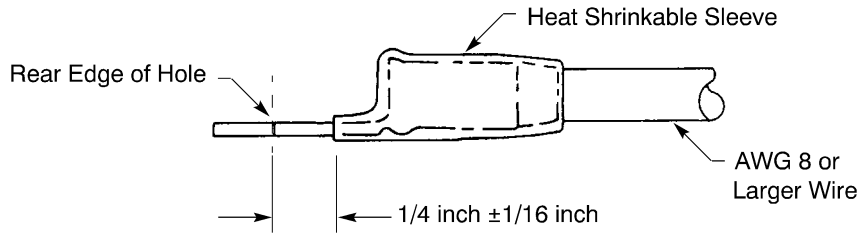
POSITION OF THE SLEEVE FOR SIZE AWG 10 OR SMALLER WIRE

Figure 6

(b) For terminal lugs on AWG 8 or larger wire, push the sleeve over the terminal lug until the end of the sleeve is 1/4 inch ± 1/16 inch from the rear edge of the stud hole. Refer to Figure 7.

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS



POSITION OF THE SLEEVE FOR SIZE AWG 8 OR LARGER WIRE
Figure 7

- (c) Shrink the sleeve into its position.
- (9) For a terminal lug in a high temperature area or in a high vibration area, if a heat gun cannot be used:
 - (a) Make a selection of a Grade D TFE tape. Refer to Subject 20-00-11.
 - (b) Wind a sufficient number of layers of tape around the crimp barrel of the terminal and around the end of the wire insulation.
 - Make sure that:
 - The tape layers include the crimp barrel of the terminal
 - The tape layers make a 50 percent minimum overlap
 - The length of the tape layers on the wire insulation is approximately 1.0 inch.
 - (c) Assemble a wire harness tie near each end of the tape layers to hold the layers in their position.

K. Assembly of M7928/1 Terminal Lugs

Refer to Paragraph 1.i. for the description of the M7928/1 terminal lugs.

Table 64
CRIMP TOOLS FOR M7928/1 TERMINAL LUGS

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Head	Die Set
26	59275	-	-
24	565435-5	567200-2	69878
	59275	-	-
	68075	-	69878
	69692-1	-	-
	69875	-	69878

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 64 (continued)

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Head	Die Set
22	46110	-	-
	4B2-457540-6	687658-1	69872
	59250	-	-
	68075	-	69872
	69004	-	47451
	69005	-	-
	69118-()	-	45185-7
	69365-()	-	47806-2
	69875	-	69872
20	565435-5	567200-2	69872
	59250	-	-
	69692-1	-	-
18	565435-5	567200-2	69872
	59250	-	-
	69319-1	-	47806-2
16	46110	-	-
	59250	-	-
	68075	-	69873
	69004	-	47852
	69005	47517	-
	69118-()	-	45225-2
	69118-()	-	45225-5
	69365-()	-	47807-1
	69875	-	69873
14	565435-5	567200-2	69872
	69693-1	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 64 (continued)

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Head	Die Set
12	59239-()	-	-
	68075	-	69874 Model C
	69004	-	47453
	69010	47518-1	-
	69365	-	47808
	69365-()	-	47808-6
	69875	-	69874 Model C
10	565435-5	567200-2	69874
	69365-()	-	47807-1

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

- (1) Make a selection of a terminal lug from Table 19.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

- (2) Make a selection of a crimp tool from Table 64.
- (3) Remove the necessary length of the insulation from the end of the wire.

Refer to Subject 20-00-15 for the insulation removal procedures.

Make sure that:

- When the wire is in the terminal lug, and the end of the wire insulation is in the insulation grip of the terminal lug, the end of the conductor extends farther than the end of the crimp barrel
 - The clearance from the end of the conductor is sufficient for the installation of the washer and the nut
 - The conductor does not have nicked or cut strands
 - If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
 - If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
 - The remaining insulation is not frayed.
- (4) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

- (5) Put the conductor of the wire in the crimp barrel of the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The end of the wire insulation is in the insulation grip of the terminal lug
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

- (6) Crimp the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The end of the wire insulation is in the insulation grip of the terminal lug
- The crimp tool is adjusted to give the correct insulation support. Refer to Paragraph 2.B.
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

L. Assembly of MS20659 Terminal Lugs

Refer to Paragraph 1.J. for the description of the MS20659 terminal lugs.

**Table 65
CRIMP TOOLS FOR SMALL MS20659 TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Head	Die Set	Nest	Indenter	Special Instructions
22 - 18	46673	-	-	-	-	-
	49900	-	-	-	-	-
	49935	-	-	-	-	-
	Bandolug SME	-	S18HT	-	-	-
	M8ND	-	N14HT	-	-	Use for Burndy terminal lugs only
	Y8ND	-	N14HT	-	-	Use for Burndy terminal lugs only

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 65 (continued)

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Head	Die Set	Nest	Indenter	Special Instructions
16 - 14	49900	-	-	-	-	-
	49935	-	-	-	-	-
	59294-()	-	-	-	-	-
	Bandolug SME	-	S14HT	-	-	-
	M8ND	-	N10HT	-	-	Use for Burndy terminal lugs only
	Y8ND	-	N10HT	-	-	Use for Burndy terminal lugs only
12 - 10	46447	-	-	-	-	-
	49900	-	-	-	-	-
	49935	-	-	-	-	-
	59461	-	-	-	-	-
	M8ND	-	N10HT	-	-	Use for Burndy terminal lugs only
	Power Pump	Y34A	-	V8L	34PL	-
		Y34A	-	V8L	34PL-2	-
	Y10MRF-4	-	-	-	-	-
	Y10MRF-5	-	-	-	-	-
	Y8ND	-	N10HT	-	-	Use for Burndy terminal lugs only



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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

**Table 66
INDENTER TYPE CRIMP TOOLS FOR LARGE MS20659 TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool						
	Basic Unit	Head	Adapter	Nest	Indenter	Special Instructions	
8	59973-1	-	-	48126	48355	-	
	69020	-	-	48126	48355	-	
	M8ND	-	-	-	N8CT	Use for Burndy terminal lugs only	
	MR8-5	-	-	-	-	-	
	Power Pump	69069	-	-	47321	47322	-
		BDHD1	-	-	DV8L-1	Y29PL	Use for Burndy terminal lugs only
		Y29B	-	-	DV8L-1	Y29PL	Use for Burndy terminal lugs only
		Y35BH	Y35P3	-	UV8L	Y34PLA	-
	Y35	-	Y35P3	UV8L	Y34PLA	Use for Burndy terminal lugs only	
Y8ND	-	-	-	N8CT	Use for Burndy terminal lugs only		
6	59973-1	-	-	48128	48127	-	
	69020	-	-	48128	48127	-	
	Power Pump	69069	-	-	47321	47322	-
		BDHD1	-	-	DV6L	Y29PL	Use for Burndy terminal lugs only
		Y29B	-	-	DV6L	Y29PL	Use for Burndy terminal lugs only
		Y35BH	Y35P3	-	UV6L	Y34PLA	-
Y35	-	Y35P3	UV6L	Y34PLA	Use for Burndy terminal lugs only		
4	59973-1	-	-	48129	48127	-	
	69020	-	-	48129	48127	-	
	Power Pump	69069	-	-	47321	47322	-
		BDHD1	-	-	DV4L	Y29PL	Use for Burndy terminal lugs only
		Y29B	-	-	DV4L	Y29PL	Use for Burndy terminal lugs only
		Y35BH	Y35P3	-	UV4L	Y34PLA	-
Y35	-	Y35P3	UV4L	Y34PLA	Use for Burndy terminal lugs only		

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 66 (continued)

Crimp Barrel Size	Crimp Tool						
	Basic Unit	Head	Adapter	Nest	Indenter	Special Instructions	
2	59973-1	-	-	48130	48127	-	
	69020	-	-	48130	48127	-	
	Power Pump	69069	-	-	47321	47322	-
		BDHD1	-	-	DV2L	Y29PL	Use for Burndy terminal lugs only
		Y29B	-	-	DV2L	Y29PL	Use for Burndy terminal lugs only
	Y35BH	Y35P3	-	UV2L	Y34PLA	-	
Y35	-	Y35P3	UV2L	Y34PLA	Use for Burndy terminal lugs only		
1	Power Pump	BDHD1	-	DV1L	Y29PL	Use for Burndy terminal lugs only	
		Y29B	-	DV1L	Y29PL	Use for Burndy terminal lugs only	
1/0	59973-1	-	-	48132	48131	-	
	69020	-	-	48132	48131	-	
	Power Pump	BDHD1	-	-	DV25L	Y29PR	Use for Burndy terminal lugs only
		Y29B	-	-	DV25L	Y29PR	Use for Burndy terminal lugs only
		Y35BH	Y35P3	-	UV25L	Y34PA	-
	Y35	-	Y35P3	UV25L	Y34PA	Use for Burndy terminal lugs only	
2/0	59973-1	-	-	48133	48131	-	
	69020	-	-	48133	48131	-	
	Power Pump	BDHD1	-	-	DV26L	Y29PR	Use for Burndy terminal lugs only
		Y29B	-	-	DV26L	Y29PR	Use for Burndy terminal lugs only
		Y35BH	Y35P3	-	UV26L	Y34PA	-
	Y35	-	Y35P3	UV26L	Y34PA	Use for Burndy terminal lugs only	

STANDARD WIRING PRACTICES MANUAL

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Table 66 (continued)

Crimp Barrel Size	Crimp Tool					
	Basic Unit	Head	Adapter	Nest	Indenter	Special Instructions
3/0	59973-1	-	-	48134	48131	-
	69020	-	-	48134	48131	-
	Power Pump	BDHD1	-	DV27L	Y29PR	Use for Burndy terminal lugs only
		Y29B	-	DV27L	Y29PR	Use for Burndy terminal lugs only
		Y35BH	Y35P3	UV27L	Y34PA	-
Y35	-	Y35P3	UV27L	Y34PA	Use for Burndy terminal lugs only	
4/0	59973-1	-	-	300430	48131	-
	69020	-	-	300430	48131	-
	Power Pump	BDHD1	-	DV28L	Y29PR	Use for Burndy terminal lugs only
		Y29B	-	DV28L	Y29PR	Use for Burndy terminal lugs only

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

Table 67

HEX TYPE CRIMP TOOLS FOR LARGE MS20659 TERMINAL LUGS

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Adapter	Die Set	
				Primary	Secondary
8	Power Pump	13642	TBM12D-AR	ST2354-5	11732
		13642M	TBM12D-AR	ST2354-5	11732
		BDHD1	-	ST2354B-5	-
		TBHD1	-	ST2354-5	11732
		TBM12	TBM12D-AR	ST2354-5	11732
		Y29B	-	ST2354B-5	-
6	Power Pump	13642	TBM12D-AR	ST2354-6	-
		13642M	TBM12D-AR	ST2354-6	-
		BDHD1	-	ST2354B-6	-
		TBHD1	-	ST2354-6	-
		TBM12	TBM12D-AR	ST2354-6	-
		Y29B	-	ST2354B-6	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS

Table 67 (continued)

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Adapter	Die Set	
				Primary	Secondary
4	Power Pump	13642	TBM12D-AR	ST2354-2	11734
		13642M	TBM12D-AR	ST2354-2	11734
		BDHD1	-	ST2354B-2	-
		TBHD1	-	ST2354-2	11734
		TBM12	TBM12D-AR	ST2354-2	11734
		Y29B	-	ST2354B-2	-
2	Power Pump	13642	TBM12D-AR	ST2354-1	-
		13642M	TBM12D-AR	ST2354-1	-
		BDHD1	-	ST2354B-1	-
		TBHD1	-	ST2354-1	-
		TBM12	TBM12D-AR	ST2354-1	-
		Y29B	-	ST2354B-1	-
1/0	Power Pump	13642	TBM12D-AR	11738	11737
		13642M	TBM12D-AR	11738	11737
		TBHD1	-	11738	11737
		TBM12	TBM12D-AR	11738	11737
2/0	Power Pump	13642	TBM12D-AR	11739	-
		13642M	TBM12D-AR	11739	-
		TBHD1	-	11739	-
		TBM12	TBM12D-AR	11739	-
3/0	Power Pump	13642	TBM12D-AR	ST2354-16	ST2354-3
		13642M	TBM12D-AR	ST2354-16	ST2354-3
		BDHD1	-	ST2354B-3	-
		TBHD1	-	ST2354-16	ST2354-3
		TBM12	TBM12D-AR	ST2354-16	ST2354-3
		Y29B	-	ST2354B-3	-

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS**

- (1) Make a selection of a terminal lug from Table 20.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

- (2) Make a selection of a crimp tool from:

- Table 65 for small MS20659 terminal lugs
- Table 66 or Table 67 for large MS20659 terminal lugs.

- (3) If the tool has an insulation crimp adjustment, set the adjustment of the tool. Refer to Paragraph 2.B.

- (4) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

- (5) Remove the necessary length of the insulation from the end of the wire.

Refer to:

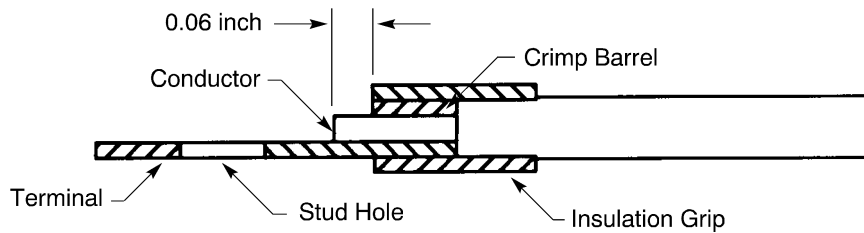
- Figure 8
- Subject 20-00-15 for the insulation removal procedures

Make sure that:

- When the wire is in the terminal lug, and the end of the wire insulation is in the insulation grip of the terminal lug, the end of the conductor extends 0.06 ± 0.03 inch farther than the end of the crimp barrel
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut
- The conductor does not have nicked or cut strands
- If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
- If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
- The remaining insulation is not frayed.

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ASSEMBLY OF INSULATED AND UNINSULATED TERMINAL LUGS



INSULATION REMOVAL LENGTH

Figure 8

- (6) Put the conductor of the wire in the crimp barrel of the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends 0.06 ± 0.03 inch farther than the end of the crimp barrel
- If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

- (7) Crimp the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends 0.06 ± 0.03 inch farther than the end of the crimp barrel
- If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
- If the terminal lug has an insulation grip, the crimp tool is adjusted to give the correct insulation support. Refer to Paragraph 2.B.
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

- (8) If the crimp tool is a hex type tool from Table 67, crimp the terminal lug again with the secondary die.

NOTE: The second crimp removes the flash that is made by the first crimp.

NOTE: The removal of the plating from the terminal lug caused by the second crimp is permitted.

- (a) Put the secondary die in the crimp tool.
- (b) Turn the terminal lug one flat, approximately 60 degrees.
- (c) Crimp the terminal lug again.

Make sure that the second crimp is in the same location along crimp barrel as the first crimp.

M. Assembly of Burndy Dual Hole, Upright, and Heavy Duty Terminal Lugs

Refer to Paragraph 1.K. for the description of the Burndy dual hole, upright, and heavy duty terminal lugs.

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**Table 68
INDENTER TYPE CRIMP TOOLS FOR BURNDY DUAL HOLE YAV TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Adapter	Nest	Indenter
6	BAT35	-	Y35P3	UV6L	Y34PLA
	Power Pump	Y29B	-	DV6L	Y29PL
		Y35BH	Y35P3	UV6L	Y34PLA
	Y35	-	Y35P3	UV6L	Y34PLA
4	BAT35	-	Y35P3	UV4L	Y34PLA
	Power Pump	69069	-	47321	47322
		Y29B	-	DV4L	Y29PL
		Y35BH	Y35P3	UV4L	Y34PLA
	Y35	-	Y35P3	UV4L	Y34PLA
2	BAT35	-	Y35P3	UV2L	Y34PLA
	Power Pump	Y29B	-	DV2L	Y29PL
		Y35BH	Y35P3	UV2L	Y34PLA
	Y35	-	Y35P3	UV2L	Y34PLA
1/0	BAT35	-	Y35P3	UV25L	Y34PA
	Power Pump	Y29B	-	DV25L	Y29PR
		Y35BH	Y35P3	UV25L	Y34PA
	Y35	-	Y35P3	UV25L	Y34PA
2/0	BAT35	-	Y35P3	UV26L	Y34PA
	Power Pump	Y29B	-	DV26L	Y29PR
		Y35BH	Y35P3	UV26L	Y34PA
	Y35	-	Y35P3	UV26L	Y34PA
3/0	BAT35	-	Y35P3	UV27L	Y34PA
	Power Pump	Y29B	-	DV27L	Y29PR
		Y35BH	Y35P3	UV27L	Y34PA
	Y35	-	Y35P3	UV27L	Y34PA

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

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Table 69
HEX TYPE CRIMP TOOLS FOR BURNDY DUAL HOLE YAV TERMINAL LUGS

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Adapter	Die Set	
				Primary	Secondary
6	Power Pump	13642	-	ST2354-6	-
		13642M	-	ST2354-6	-
4	Power Pump	13642	-	ST2354-2	11734
		13642M	-	ST2354-2	11734
		69069	-	47321	47322
		TBM12	TBM12D-AR	ST2354-2	11734
2	Power Pump	13642	-	ST2354-1	-
		13642M	-	ST2354-1	-
1/0	Power Pump	13642	-	11738	11737
		13642M	-	11738	11737
		TBM12	TBM12D-AR	11738	11737
2/0	Power Pump	13642	-	11739	-
		13642M	-	11739	-
3/0	Power Pump	13642	-	ST2354-3	-
		13642M	-	ST2354-3	-
		TBM12	TBM12D-AR	ST2354-3	-
		Y29B	-	ST2354B-3	-

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

Table 70
CRIMP TOOLS FOR BURNDY UPRIGHT YAV TERMINAL LUGS

Crimp Barrel Size	Crimp Tool			
	Basic Unit	Head	Die Set	
			Primary	Secondary
4	Power Pump	13642	ST2354-2	11734
		13642M	ST2354-2	11734
1/0	Power Pump	13642	11738	11737
		13642M	11738	11737

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

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Table 71
CRIMP TOOLS FOR BURNDY HEAVY DUTY YAV14 TERMINAL LUGS

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Die Set	Die Cavity
16 - 14	M8ND	N14HT	14
	MR8-4	-	-
	MR8G98	-	-
	WT130	-	-
	WT1300	-	-
	Y8ND	N14HT	14

Table 72
INSULATION REMOVAL LENGTH AND SPECIAL INSTRUCTIONS FOR YAV14G82 AND YAV14G88 TERMINAL LUGS

Crimp Barrel Size	Part Number	Conductors in the Crimp Barrel		Insulation Removal Length (inch)	Special Instructions
		First Wire (AWG)	Second Wire (AWG)		
16-14	YAV14G82	14	-	0.25 ± 0.03	-
		16	-	0.25 ± 0.03	-
		18	20	0.25 ± 0.03	-
		18	18	0.25 ± 0.03	-
		18	-	0.50 ± 0.03	Fold back the conductor
		20	-	0.50 ± 0.03	Fold back the conductor
	YAV14G88	14	-	0.25 ± 0.03	-
		16	-	0.25 ± 0.03	-
		18	20	0.25 ± 0.03	-
		18	18	0.25 ± 0.03	-
		18	-	0.50 ± 0.03	Fold back the conductor
		20	-	0.50 ± 0.03	Fold back the conductor

Table 73
INSULATION REMOVAL LENGTH

Crimp Barrel Size	Insulation Removal Length (inch)	Part Number
20-14	0.28 ± 0.03	YAV14-H
		YAV14-H1
22-18	0.28 ± 0.03	YAV18-H

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Table 73 (continued)

Crimp Barrel Size	Insulation Removal Length (inch)	Part Number
6	0.50 ± 0.03	YAV6C-2L38-NK
4	0.50 ± 0.03	YAV4C-2L38-NK
		YAV4C-2L38-30-NK
		YAV4CRS2NK
2	0.63 ± 0.03	YAV2C-2L38-NK
1/0	0.69 ± 0.03	YAV25-2L38-NK
		YAV25RSNK
2/0	0.81 ± 0.03	YAV26-2L38-NK
		YAV26-2L38-30-NK
3/0	0.81 ± 0.03	YAV27-2L38-NK
		YAV27-2L38-30-NK

NOTE: For the assembly of the Burndy heavy duty YAV terminal lugs with AWG 20 or AWG 18 wire, refer to Subject 20-30-22.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

- (1) Make a selection of a terminal lug from:
- Table 21 for dual hole YAV terminal lugs
 - Table 22 for upright YAV terminal lugs
 - Table 23 for heavy duty YAV terminal lugs.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

- (2) Make a selection of a crimp tool from:
- Table 68 or Table 69 for dual hole YAV terminal lugs
 - Table 70 for upright YAV terminal lugs
 - Table 71 for heavy duty YAV terminal lugs.
- (3) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

- (4) Remove the necessary length of the insulation from the end of the wire.

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Refer to:

- Table 72 for the insulation removal length for YAV14G82 and YAV14G88 terminal lugs
- Table 73 for the insulation removal length for the other terminal lug part numbers
- Subject 20-00-15 for the insulation removal procedures

Make sure that:

- The conductor does not have nicked or cut strands
- If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
- If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
- The remaining insulation is not frayed.

- (5) If it is specified, fold the conductor back.
- (6) Put the conductor of the wire in the crimp barrel of the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

- (7) Crimp the terminal lug.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

- (8) If the crimp tool is a hex type tool and a secondary die is specified, crimp the terminal lug again with the secondary die.

NOTE: The second crimp removes the flash that is made by the first crimp.

NOTE: The removal of the plating from the terminal lug caused by the second crimp is permitted.

- (a) Put the secondary die in the crimp tool.
- (b) Turn the terminal lug one flat, approximately 60 degrees.
- (c) Crimp the terminal lug again.

Make sure that the second crimp is in the same location along crimp barrel as the first crimp.

N. Assembly of BACT12AB, BACT12AM, BACT12S, Rolls-Royce, Thermocouple, 69B40570, and Other Terminal Lugs

Refer to Paragraph 1.L. for the description of the terminal lugs applicable to this procedure.

**Table 74
CRIMP TOOLS FOR BACT12AB TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool Basic Unit
22 - 18	49935

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**Table 75
CRIMP TOOLS FOR BACT12AM TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Head	Die
22 - 20	4B2-457450-6	687658-1	69936
	69692-1	-	-
	69875	-	69936
12 - 10	189721-2	318161-1	69735
	189722-2	318161-1	69735
	69710-1	-	69735

**Table 76
CRIMP TOOLS FOR BACT12S TERMINAL LUGS**

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Head	Die
24 - 20	565435-5	5672000-2	69878
	59275	-	-
	68075	-	69878
	69005	69957	-
	69118-()	-	69341
	69875	-	69878

**Table 77
CRIMP TOOLS FOR ROLLS-ROYCE TERMINAL LUGS**

Terminal Lug	Crimp Barrel Size	Crimp Tool	
		Basic Unit	Die
1909156	20 - 16	574191-8	574191-1
2509293	22 - 16	574191-8	574191-1

**Table 78
CRIMP TOOLS FOR THERMOCOUPLE TERMINAL LUGS**

Terminal Lug	Crimp Barrel Size	Crimp Tool					
		Basic Unit	Setting	Holder	Head	Nest	Die
1-321897-0	22-16	46673	Insulation Grip Setting 3	-	-	-	-
1-321898-0	22-16	46673	Insulation Grip Setting 3	-	-	-	-
1387-3	-	Y14MV	-	-	-	-	-

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Table 78 (continued)

Terminal Lug	Crimp Barrel Size	Crimp Tool					
		Basic Unit	Setting	Holder	Head	Nest	Die
1387-4	-	Y14MV	-	-	-	-	-

Table 79
CRIMP TOOLS FOR 69B40570-2 TERMINAL LUGS

Terminal Lug		Wire		Crimp Tool			
Part Number	Crimp Barrel Size	AWG	Quantity of Wires in the Crimp Barrel	Basic Unit	Head	Die	
						Primary	Secondary
69B40570-2	2/0	4	2	Power Pump	13642M	11738	11737
		1/0	1				

Table 80
INSULATION REMOVAL LENGTH FOR THERMOCOUPLE AND 69B40570 TERMINAL LUGS

Terminal Lug Part Number	Insulation Removal Length (inch)
1-321897-0	0.25 ± 0.03
1-321898-0	0.25 ± 0.03
1387-3	0.31 ± 0.06
1387-4	0.31 ± 0.06
69B40570-2	0.75 ± 0.03

Table 81
CRIMP TOOLS FOR OTHER TERMINAL LUGS

Terminal Lug	Crimp Barrel Size	Crimp Tool					
		Basic Unit	Setting	Holder	Head	Nest	Die
150456	20-16	574191-8	-	-	-	-	574191-1
150471	22-16	574191-8	-	-	-	-	574191-1
2-320561-3	16	59250	-	-	-	-	-
2-320561-4	14	59250	-	-	-	-	-
2-321670-2	6	Power Pump	-	-	69051	-	47821
2-321672-1	2	Power Pump	-	-	69051	-	47823
2-323914-2	24	59275	-	-	-	-	-
2-323916-3	24	59275	-	-	-	-	-
2-326875-4	24	59275	-	-	-	-	-

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Table 81 (continued)

Terminal Lug	Crimp Barrel Size	Crimp Tool					
		Basic Unit	Setting	Holder	Head	Nest	Die
2-326875-5	24	59275	-	-	-	-	-
2-36149-3	22	59250	-	-	-	-	-
2-36149-4	20	59250	-	-	-	-	-
2-36149-5	18	59250	-	-	-	-	-
320381	16-14	59250	-	-	-	-	Blue
320634	12-10	69694-1	-	-	-	-	-
322215	1/0	MY28	Size 2 Flag Terminal	-	-	-	-
		Y29BH	-	-	-	DV26LM1	Y29PA
322220	4/0	Power Pump	-	-	13642	-	ST2354-13
		Power Pump	-	-	13642M	-	ST2354-13
323067	12-10	314937-1	-	-	-	-	314915-1
		59461	-	-	-	-	-
		PHRPU2	-	-	PHST-59461	-	-
324111	4	Power Pump	-	-	69051	-	47822
324112	2	Power Pump	-	-	69051	-	47823
324113	1/0	Power Pump	-	-	69066	-	47824
32456	22-18	59250	-	-	-	-	Red
328655	2	Power Pump	-	-	69051	-	47823
329636	24-20	59275	-	-	-	-	-
329951	26-22	69692-1	-	-	-	-	-
50847	12-10	189721-2	-	-	318161-1	-	69735
		189722-2	-	-	318161-1	-	69735
		69710-1	-	-	-	-	69735
51927	12-10	59054	-	-	-	-	-
52124	26-22	59275	-	-	-	-	-
52274	16	59250	-	-	-	-	-
52307	22	59250	-	-	-	-	-

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Table 81 (continued)

Terminal Lug	Crimp Barrel Size	Crimp Tool					
		Basic Unit	Setting	Holder	Head	Nest	Die
52409	22-18	189721-1	-	356303-1	-	-	314270-1
		314597-()	-	-	-	-	-
		46110	-	-	-	-	-
		4B2-457540-6	-	-	687658-1	-	69872
		59250	-	-	-	-	Red
		59275	-	-	-	-	-
		69004	-	-	-	-	47451
		69005	-	-	47516	-	-
		69075	-	-	-	-	69872
		69118-()	-	-	-	-	45185-7
		69365-()	-	-	-	-	47806-2
69875	-	-	-	-	69872		
52420	16-14	59250	-	-	-	Blue	
53057-1	24	59250	-	-	-	-	
53580-1	16	59250	-	-	-	Blue	
		69875-H	-	-	69875	-	-
54746-1	6	59974-1	-	-	-	47822	
		Power Pump	-	-	69061	-	47821

NOTE: Refer to Table 38 for the part numbers of the recommended Power Pumps.

NOTE: Refer to Subject 20-30-22 for the assembly of a terminal lug with a conductor that is smaller than the crimp barrel size of the terminal lug.

(1) Make a selection of:

- A BACT12AB terminal lug from Table 25
- A BACT12AM terminal lug from Table 27
- A BACT12S terminal lug from Table 29
- A Rolls-Royce terminal lug from Table 31
- A thermocouple terminal lug from Table 34
- A 69B40570 terminal lug from Table 35.
- Another terminal lug from Table 36.

NOTE: For the selection of the terminal, use:

- The crimp barrel size, if one wire is to be terminated
- The CAU range, if more than one wire is to be terminated.

NOTE: Refer to Subject 20-30-22 if more than one wire is to be terminated.

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- (2) Make a selection of a crimp tool from:
- Table 74 for BACT12AB terminal lugs
 - Table 75 for BACT12AM terminal lugs
 - Table 76 for BACT12S terminal lugs
 - Table 77 for Rolls-Royce terminal lugs
 - Table 78 for thermocouple terminal lugs
 - Table 79 for a 69B40570-() terminal lug
 - Table 81 for other terminal lugs.
- (3) If the crimp tool basic unit is a power pump, adjust the pressure to make it satisfactory for the crimp tool head. Refer to Table 39.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

- (4) Remove the necessary length of the insulation from the end of the wire.

Refer to:

- Table 80 for the insulation removal length for thermocouple or 69B40570 terminal lugs
- Subject 20-00-15 for the insulation removal procedures.

Make sure that:

- When the wire is in the terminal lug, and the end of the wire insulation is in the insulation grip of the terminal lug, the end of the conductor extends farther than the end of the crimp barrel
 - The clearance from the end of the conductor is sufficient for the installation of the washer and the nut
 - If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
 - The conductor does not have nicked or cut strands
 - If the insulation is removed by the application of heat, the conductor has not moved from the center of the wire
 - If the insulation is removed by the application of heat, the remaining insulation does not have blisters or evidence of overheating
 - The remaining insulation is not frayed.
- (5) If the wire has a braid jacket, put a 1.0 ±0.06 length of heat shrinkable sleeve on the jacket.
- (6) If two flag terminals are to be attached to the end of a wire, put the conductor through the crimp barrels of both flag terminal lugs.
- Make sure that:
- All of the strands of the conductor go through both crimp barrels
 - The end of the conductor extends farther than the end of the crimp barrel of the terminal lug nearest to the end of the wire
 - The distance between the terminal lugs is correct for the installation.
- (7) Put the conductor of the wire in the crimp barrel of the terminal lug.

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If the terminal lug is a thermocouple terminal lug, make sure that:

- The Alumel wire that has green insulation attaches to the Alumel terminal lug
- The Chromel wire that has white insulation attaches to the Chromel terminal lug.

If the terminal is a flag terminal or an upright terminal, make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- The maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger

If the terminal is not a flag terminal or an upright terminal, make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- The clearance from the end of the conductor is sufficient for the installation of the washer and the nut.

(8) Crimp the terminal lug or lugs.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor extends farther than the end of the crimp barrel
- If the terminal lug has an insulation grip, the end of the wire insulation is in the insulation grip of the terminal lug
- If the terminal lug has an insulation grip, the crimp tool is adjusted to give the correct insulation support. Refer to Paragraph 2.B.
- If the terminal lug does not have an insulation grip, the maximum distance from the end of the wire insulation of a single wire to the end of the crimp barrel is 0.12 inch for AWG 10 and smaller, and 0.25 inch for AWG 8 and larger
- If the terminal lug is not a flag or an upright terminal, the clearance from the end of the conductor is sufficient for the installation of the washer and the nut
- If two flag terminals are assembled on the wire, the crimp of the flag terminal nearest to the end of the wire is made first
- If two flag terminals are assembled on the wire, the distance between the terminal lugs is correct for the installation.

NOTE: If two flag terminals are on the wire, the crimp of the flag terminal at the end of the wire first, keeps the strands of the conductor together until the crimp of both flag terminals is completed.

(9) If a secondary die is specified, crimp the terminal lug again with the secondary die.

NOTE: The second crimp removes the flash that is made by the first crimp.

NOTE: The removal of the plating from the terminal lug caused by the second crimp is permitted.

- (a) Put the secondary die in the crimp tool.
- (b) Turn the terminal lug one flat, approximately 60 degrees.

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- (c) Crimp the terminal lug again.
Make sure that the second crimp is in the same location along crimp barrel as the first crimp.
- (10) If the terminal is a Thermo-Electric thermocouple terminal lug part number 1387-3 or 1387-4:
 - (a) Make a selection of a flux and a high temperature silver/lead solder. Refer to Subject 20-00-11.
 - (b) Solder the terminal lug to the conductor.
- (11) If a length of heat shrinkable sleeve is on the wire, shrink it into its position on the end of the wire insulation.

NOTE: The heat shrinkable sleeve keeps the strands of the insulation braid together.

3. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 82
CRIMP TOOL SUPPLIERS**

Tool	Description	Supplier
11732	Crimp Die	Thomas & Betts
11734	Crimp Die	Thomas & Betts
11737	Crimp Die	Thomas & Betts
11738	Crimp Die	Thomas & Betts
11739	Crimp Die	Thomas & Betts
13597	Power Pump	Thomas & Betts
13600	Power Crimp Tool	Thomas & Betts
13642	Power Crimp Tool	Thomas & Betts
13642M	Head	Thomas & Betts
189721-1	Hand Actuated Pneumatic Power Crimp Tool	AMP
189721-2	Hand Actuated Pneumatic Power Crimp Tool	AMP
189722-2	Foot Actuated Pneumatic Power Crimp Tool	AMP
300430	Nest	AMP
314268-1	Fixed Die	AMP
314268-2	Fixed Die	AMP
314269-1	Fixed Die	AMP
314269-2	Fixed Die	AMP
314270-1	Fixed Die	AMP
314270-2	Fixed Die	AMP
314423-()	Power Crimp	AMP
314542-1	Fixed Die	AMP
314542-2	Fixed Die	AMP

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Table 82 (continued)

Tool	Description	Supplier
314543-1	Fixed Die	AMP
314543-2	Fixed Die	AMP
314590-()	Power Crimp	AMP
314590-2	Power Crimp	AMP
314597-()	Power Crimp	AMP
314656-1	Die	AMP
314700-()	Power Crimp	AMP
314700-1	Power Crimp	AMP
314915-1	Crimp Die	AMP
314937-1	Power Crimp	AMP
318161-1	Head	AMP
34PL	Indenter	Burndy
34PL-2	Indenter	Burndy
356302-1	Tool Holder	AMP
356303-1	Tool Holder	AMP
356443-1	Tool Holder	AMP
356744-1	Head	AMP
356744-2	Head	AMP
45175	Head	AMP
45176	Head	AMP
45185-7	Die Set	AMP
45225-2	Die	AMP
45225-5	Die Set	AMP
46110	Power Hand Crimp Tool	AMP
46447	Hand Crimp Tool	AMP
46673	Hand Crimp Tool	AMP
46988	Hand Crimp Tool	AMP
47321	Nest	AMP
47322	Indenter	AMP
47451	Die Set	AMP
47453	Die Set	AMP
47516	Head	AMP
47517	Head	AMP

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Table 82 (continued)

Tool	Description	Supplier
47518-1	Head	AMP
47806-2	Die Set	AMP
47807-1	Die Set	AMP
47808	Die Set	AMP
47808-6	Die Set	AMP
47820	Die Set	AMP
47821	Die Set	AMP
47822	Die Set	AMP
47823	Die Set	AMP
47824	Die Set	AMP
47825	Die Set	AMP
47852	Die Set	AMP
47907	Hand Crimp Tool	AMP
47918	Die Set	AMP
48126	Nest	AMP
48127	Indenter	AMP
48128	Nest	AMP
48129	Nest	AMP
48130	Nest	AMP
48131	Indenter	AMP
48132	Nest	AMP
48133	Nest	AMP
48134	Nest	AMP
48355	Indenter	AMP
49900	Hand Crimp Tool	AMP
49935	Hand Crimp Tool	AMP
4B2-457450-6	Power Bench Crimp Tool	AMP
4B2-457540-6	Power Bench Crimp Tool	AMP
565435-5	Power Bench Crimp Tool	AMP
567200-2	Fixed Crimp Head	AMP
5672000-2	Fixed Crimp Head	AMP
574191-1	Die	AMP
574191-8	Hand Crimp Tool	AMP

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Table 82 (continued)

Tool	Description	Supplier
58422-1	Head	AMP
59054	Hand Crimp Tool	AMP
59239-()	Hand Crimp Tool	AMP
59250	Hand Crimp Tool	AMP
59275	Hand Crimp Tool	AMP
59294-()	Hand Crimp Tool	AMP
59461	Hand Crimp Tool	AMP
59973-1	Hand Crimp Tool	AMP
59974-1	Power Crimp Tool - Use with Boeing Support Equipment.	AMP
679300-1	Fixed Die	AMP
68075	Power Bench Crimp Tool	AMP
68285-1	Adjustable Head or Die	AMP
687658-1	Fixed Crimp Head	AMP
69004	Power Bench Crimp Tool	AMP
69005	Power Hand Crimp Tool	AMP
69010	Power Hand Crimp Tool	AMP
69020	Crimp Tool	AMP
69046	Head	AMP
69051	Head - Use with Boeing support Equipment.	AMP
69061	Head - Use with Boeing support Equipment.	AMP
69066	Head	AMP
69069	Head	AMP
69075	Power Bench Crimp Tool	AMP
69118-()	Power Hand Crimp Tool	AMP
69120-()	Power Pump	AMP
69319-1	Power Hand Crimp Tool	AMP
69341	Die Set	AMP
69365	Power Hand Crimp Tool	AMP
69365-()	Power Hand Crimp Tool	AMP
69692-1	Hand Crimp Tool	AMP
69693-1	Hand Crimp Tool	AMP
69694-1	Hand Crimp Tool	AMP
69710-1	Crimp Tool	AMP

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Table 82 (continued)

Tool	Description	Supplier
69735	Die	AMP
69872	Die Set	AMP
69873	Die Set	AMP
69874	Die Set	AMP
69874 Model C	Die Set	AMP
69875	Power Bench Crimp Tool	AMP
69875-H	Power Bench Crimp Tool for Parts Packaged on Reel	AMP
69878	Die Set	AMP
69936	Fixed Adjustment Die Set	AMP
69957	Head	AMP
904395-1	Die Set	AMP
BAT35	Crimp Tool - Use with Burndy parts only	Burndy
BDHD1	Head	Daniels
Bandolug SME	Power Crimp Tool	Burndy
DV1L	Nest	Burndy
DV25L	Nest	Burndy
DV26L	Nest	Burndy
DV27L	Nest	Burndy
DV28L	Nest	Burndy
DV2BL	Nest	Burndy
DV2L	Nest	Burndy
DV25BL	Nest	Burndy
DV25BL-1	Nest	Burndy
DV26BL	Nest	Burndy
DV26LM1	Nest	Burndy
DV4BL	Nest	Burndy
DV4L	Nest	Burndy
DV6BL	Nest	Burndy
DV6L	Nest	Burndy
DV8BL	Nest	Burndy
DV8BL-1	Nest	Burndy
DV8L-1	Nest	Burndy
M8ND	Hand Crimp Tool - Use with Burndy parts only.	Burndy

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Table 82 (continued)

Tool	Description	Supplier
MR8-4	Hand Crimp Tool	Burndy
MR8-5	Hand Crimp Tool	Burndy
MR8G98	Hand Crimp Tool	Burndy
MY28	Hand Crimp Tool	Burndy
N10HT	Die Set	Burndy
N14HT	Die Set	Burndy
N8CT	Die Set	Burndy
PHRPU2	Power Hand Crimp Tool	Daniels
PHST-59461	Head	Daniels
PPFC-1H	Head	Daniels
S14HT	Die Set	Burndy
S18HT	Die Set	Burndy
ST2354-1	Die Set	Boeing
ST2354-13	Die	Boeing
ST2354-16	Die	Boeing
ST2354-2	Die Set	Boeing
ST2354-3	Die Set	Boeing
ST2354-5	Die	Boeing
ST2354-6	Die Set	Boeing
ST2354B-1	Die Set	Boeing
ST2354B-2	Die Set	Boeing
ST2354B-3	Die Set	Boeing
ST2354B-5	Die Set	Boeing
ST2354B-6	Die Set	Boeing
ST970-12	Head - Use with Boeing support Equipment.	Boeing
TBHD1	Die Set	Daniels
TBM12	Head - NOTE: A Crimp Tool that has the Thomas and Betts TBM12 head and the TBM12D-AR adapter is the same as the Thomas and Betts 13400 crimp tool.	Thomas & Betts
TBM12D-AR	Adapter - NOTE: A Crimp Tool that has the Thomas and Betts TBM12 head and the TBM12D-AR adapter is the same as the Thomas and Betts 13400 crimp tool.	Thomas & Betts
UV25B-1	Nest	Burndy
UV25L	Nest	Burndy

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Table 82 (continued)

Tool	Description	Supplier
UV26B-1	Nest	Burndy
UV26L	Nest	Burndy
UV27L	Nest	Burndy
UV2B-1	Nest	Burndy
UV2L	Nest	Burndy
UV4B-1	Nest	Burndy
UV4L	Nest	Burndy
UV6B-1	Nest	Burndy
UV6L	Nest	Burndy
UV8B-1	Nest	Burndy
UV8L	Nest	Burndy
V8L	Die	Burndy
W400-5060	Crimp Tool	Western Industrial Products
WT130	Crimp Tool	Thomas & Betts
WT1300	Crimp Tool	Thomas & Betts
Y10MRF-4	Crimp Tool	Burndy
Y10MRF-5	Crimp Tool	Burndy
Y14MV	Crimp Tool	Burndy
Y29B	Head	Burndy
Y29BH	Crimp Tool	Burndy
Y29PA	Indenter	Burndy
Y29PA-1	Indenter	Burndy
Y29PBL	Indenter	Burndy
Y29PBL-1	Indenter	Burndy
Y29PL	Indenter	Burndy
Y29PR	Indenter	Burndy
Y34A	Head	Burndy
Y34PA	Indenter	Burndy
Y34PL	Indenter	Burndy
Y34PLA	Indenter	Burndy
Y35	Power Hand Crimp Tool - Use with Burndy parts only.	Burndy
Y35BH	Use Y35P3 adapter for Y23() Series indentors with Y35, BAT35, and Y35BH heads.	Burndy

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Table 82 (continued)

Tool	Description	Supplier
Y35P3	Use Y35P3 adapter for Y23() Series indentors with Y35, BAT35, and Y35BH heads.	Burndy
Y6NP	Power Pump	Burndy
Y8ND	Power Hand Crimp Tool - Use with Burndy parts only.	Burndy



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1. GENERAL DATA

A. Applicable Conditions for the Assembly of Splices

For the conditions that are applicable for:

- The repair of a wire or cable, refer to Subject 20-10-13
- The repair of a splice assembly, refer to Subject 20-10-13
- The assembly of a wire harness that has a splice, refer to Subject 20-10-11
- The installation of a wire harness that has a splice, refer to Subject 20-10-11.

For the assembly of:

- A splice that connects aluminum wires or an aluminum wire to a copper wire, refer to Subject 20-30-13
- A specified splice, refer to Paragraph 1.B.
- A closed end splice, refer to Paragraph 5.A.
- An unsealed butt splice, refer to Paragraph 6.A.
- A sealed splice, refer to Paragraph 1.C.

B. Assembly of Specified Splices

Table 1 gives the location of the assembly procedure or the selection of the assembly procedure for the applicable splice assembly configuration of a specified splice.

**Table 1
ASSEMBLY PROCEDURES FOR SPECIFIED SPLICES**

Specified Splice	Supplier	Splice Assembly Configuration	Reference
34137	AMP	Sealed Closed End Splice	Paragraph 5.C.
		Unsealed Closed End Splice	Paragraph 5.E.
34138	AMP	Sealed Closed End Splice	Paragraph 5.C.
		Unsealed Closed End Splice	Paragraph 5.E.
48-7190	Amphenol	Removable Pin Contact Splice Plug	Paragraph 17.
48-7190-1	Amphenol	Removable Pin Contact Splice Plug	Paragraph 17.
48-7191	Amphenol	Removable Socket Contact Splice Receptacle	Paragraph 17.
48-7191-1	Amphenol	Removable Socket Contact Splice Receptacle	Paragraph 17.
BACT12C11	Boeing	High Temperature Butt Splice	Paragraph 8.A.
BACT12C15	Boeing	High Temperature Butt Splice	Paragraph 8.A.
BACT12C20	Boeing	High Temperature Butt Splice	Paragraph 8.A.
D-150-0251	Raychem	High Temperature Solder Sleeve Splice Kit	Paragraph 16.A.
D-150-0272	Raychem	Solder Shield Splice Kit	Paragraph 14.A.
D-436-36	Raychem	Sealed Butt Splice Kits - One to Two Wires	Paragraph 7.F.
		Sealed Butt Splice Kits - One to Five Wires	Paragraph 7.H.
D-436-37	Raychem	Sealed Butt Splice Kits - One to Two Wires	Paragraph 7.F.
		Sealed Butt Splice Kits - One to Five Wires	Paragraph 7.H.

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Table 1 (continued)

Specified Splice	Supplier	Splice Assembly Configuration	Reference
D-436-38	Raychem	Sealed Butt Splice Kits - One to Two Wires	Paragraph 7.F.
		Sealed Butt Splice Kits - One to Five Wires	Paragraph 7.H.
D-436-60	Raychem	Sealed Closed End Splice Kit	Paragraph 5.B.
NAS1387-()	QPL	Butt Splice With Sleeve - One Wire	Paragraph 6.D.
		Butt Splice With Sleeve - More Than One Wire	Paragraph 6.E.
NAS1388-()	QPL	Insulated Butt Splice - One Wire	Paragraph 6.B.
		Insulated Butt Splice - More Than One Wire	Paragraph 6.C.
NAS1389-()	QPL	Insulated Butt Splice - One Wire	Paragraph 6.B.
		Insulated Butt Splice - More Than One Wire	Paragraph 6.D.

C. Selection of a Sealed Splice Configuration

For the applicable splice assembly configurations for:

- Unshielded wire and unshielded cable, refer to Table 2
- Shielded wire and shielded cable, refer to Table 3.

Table 2

SEALED SPLICE CONFIGURATIONS FOR UNSHIELDED WIRE AND UNSHIELDED CABLE

Maximum Temperature Grade	Wire Size (AWG)		Reference
	Minimum	Maximum	
B	24	2	Paragraph 7.A.
D	24	10	Paragraph 8.A.
	8	2/0	Subject 20-30-13

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**Table 3
SEALED SPlice CONFIGURATIONS FOR SHIELDED WIRE AND SHIELDED CABLE**

Maximum Temperature Grade	Number of Shields	Shield Conductor	Applicable Area	Splice Assembly	
				Configuration	Reference
B	1	Flat	No Fuel Vapor	Solder Shield Splice Kit	Paragraph 14.A.
				Solder Sleeve Shield Splice	Paragraph 15.A.
		Round	Fuel Vapor	Mechanical Ferrule	Paragraph 10.A.
				Shield-Kon	Paragraph 12.A.
			No Fuel Vapor	Mechanical Ferrule	Paragraph 10.A.
				Shield-Kon	Paragraph 12.A.
	Solder Shield Splice Kit	Paragraph 14.A.			
		2	Flat Inner, Round Outer	No Fuel Vapor	Solder Shield Splice Kit
	Round Inner, Round Outer				Fuel Vapor
			Shield-Kon	Paragraph 12.A.	
			No Fuel Vapor	Mechanical Ferrule	Paragraph 10.A.
				Shield-Kon	Paragraph 12.A.
	Solder Shield Splice Kit		Paragraph 14.A.		
	D	1	Flat	No Fuel Vapor	Solder Sleeve Splice Kit
Round					Fuel Vapor
			Shield-Kon	Paragraph 13.A.	
			No Fuel Vapor	Mechanical Ferrule	Paragraph 11.A.
				Shield-Kon	Paragraph 13.A.
Solder Sleeve Splice Kit			Paragraph 16.A.		
2		Flat Inner, Round Outer	No Fuel Vapor	Solder Sleeve Splice Kit	Paragraph 16.A.
				Round Inner, Round Outer	Fuel Vapor
		Shield-Kon	Paragraph 13.A.		
		No Fuel Vapor	Mechanical Ferrule		Paragraph 11.A.
			Shield-Kon		Paragraph 13.A.
		Solder Sleeve Splice Kit	Paragraph 16.A.		



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D. Conductor CAU

This paragraph gives the procedure to find the CAU of the conductor or conductors.

Table 4
AWG TO CAU CONVERSION

Wire Size (AWG)	Circular Area Units (CAU)
32	0.6
30	1
28	1.6
26	3
24	5
22	8
20	12
18	19
16	24
14	38
12	59
10	99
8	170
6	268
4	426
2	665
1	837
1/0	1045
2/0	1330
3/0	1665
4/0	2109

- Find the CAU of each conductor. Refer to Table 4.
- For more than one conductor, add the CAU of each conductor for the total CAU of the conductors.

2. INCREASE OF CONDUCTOR CAU

A. Applicable Conditions

If the total CAU of the conductors is less than the minimum CAU of the conductor splice, increase the CAU of the conductor.

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For example, an AWG 20 wire can be assembled in a size 12-10 NAS1388 butt splice, but the CAU of the AWG 20 conductor must be increased by a minimum of 31 CAU and a maximum of 126 CAU because:

- The CAU of the AWG 20 conductor is 12
- The minimum CAU of the size 12-10 splice is 43
- The maximum CAU of the size 12-10 splice is 138.

Refer to:

- Paragraph 2.B. for the assembly of a conductor splice with a conductor that is folded back
- Paragraph 2.C. for the assembly of a conductor splice with a filler wire.

B. Assembly of a Conductor Splice with a Conductor that is Folded Back

- (1) Find the correct insulation removal length L for the conductor splice.
- (2) Remove two times the removal length L of the insulation from the end of the wire.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR. THE MECHANICAL STRENGTH OF THE WIRE CAN BE DECREASED.

CAUTION: MAKE SURE THAT THE END OF THE INSULATION IS EQUAL AND SYMMETRICAL AROUND THE CIRCUMFERENCE OF THE CONDUCTOR. UNWANTED INSULATION IN THE CRIMP CAN INCREASE THE ELECTRICAL RESISTANCE.

CAUTION: MAKE SURE THAT THE BASE METAL OF THE CONDUCTOR CANNOT BE SEEN. CORROSION OF THE CONDUCTOR CAN OCCUR.

- (3) Fold the conductor back.

Make sure that the distance from the end of the insulation to the end of the conductor is the removal length L.

- (4) Assemble the conductor splice.

Refer to the applicable paragraph for the procedure to assemble the specified splice.

C. Assembly of a Conductor Splice with a Filler Wire

- (1) Make a selection of a filler wire.
- (2) Remove the necessary length of insulation from the end of the filler wire.
- (3) Put the filler wire and the primary wire in the conductor splice at the same time.
- (4) Assemble the conductor splice.

Refer to the applicable paragraph for the procedure to assemble the specified splice.

- (5) After the conductor splice is crimped, remove the unwanted length of the filler wire as near as possible to the end of the splice.

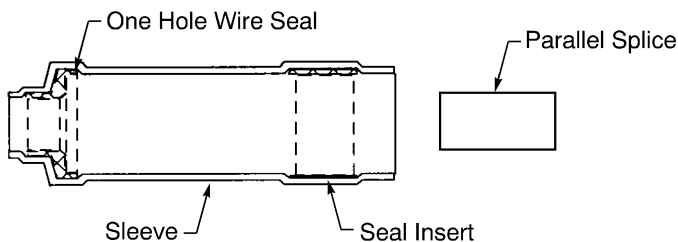
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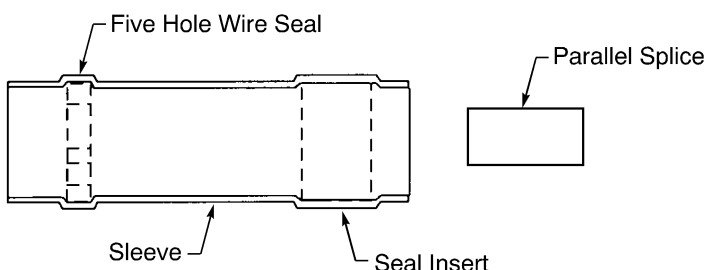
CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR. THE MECHANICAL STRENGTH OF THE WIRE CAN BE DECREASED.

3. PART NUMBERS AND DESCRIPTION

A. Closed End Splices



**CLOSED END SPLICE KIT WITH A 1 HOLE WIRE SEAL
Figure 1**



**CLOSED END SPLICE KIT WITH A 5 HOLE WIRE SEAL
Figure 2**

**Table 5
PART NUMBERS OF SEALED CLOSED END SPLICE KITS**

CAU Range		Maximum Number of Wires	Part Number	Number of Holes in Wire Seal	Supplier
Minimum	Maximum				
8	27	2	D-436-58	1	Raychem
		5	D-436-60	5	Raychem
19	67	2	D-436-59	1	Raychem
		5	D-436-61	5	Raychem

**Table 6
COMPONENT PART NUMBERS OF SEALED CLOSED END SPLICE KITS**

Splice Kit	Component	Part Number	Crimp Barrel Size	Color Strip	Supplier
D-436-58	Parallel Splice	D-609-04	20-16	Blue	Raychem
	Sleeve	D-436-45	-	-	Raychem

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Table 6 (continued)

Splice Kit	Component	Part Number	Crimp Barrel Size	Color Strip	Supplier
D-436-59	Parallel Splice	D-609-05	16-12	Yellow	Raychem
	Sleeve	D-436-45	-	-	Raychem
D-436-60	Parallel Splice	D-609-04	20-16	Blue	Raychem
	Sleeve	D-436-46	-	-	Raychem
D-436-61	Parallel Splice	D-609-05	16-12	Yellow	Raychem
	Sleeve	D-436-46	-	-	Raychem

Table 7

PART NUMBERS OF INSULATED CLOSED END SPLICES

CAU Range		Part Number	Crimp Barrel Size	Supplier
Minimum	Maximum			
20	52	35115	22-14	AMP
32	131	35653	18-10	AMP

Table 8

PART NUMBERS OF PARALLEL SPLICES

CAU Range		Part Number	Crimp Barrel Size	Color Stripe	Supplier
Minimum	Maximum				
8	27	D-609-04	20-16	Blue	Raychem
15	51	34137	16-14	-	AMP
19	67	D-609-05	16-12	Yellow	Raychem
43	138	34138	12-10	-	AMP

Table 9

SLEEVE PART NUMBERS FOR SEALED CLOSED END SPLICES

Parallel Splice	Maximum Number of Wires	Sleeve		
		Part Number	Number of Holes in Wire Seal	Supplier
D-609-04	2	D-436-0098	1	Raychem
		D-436-45	1	Raychem
		D-436-73	1	Raychem
	5	D-436-46	5	Raychem

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Table 9 (continued)

Parallel Splice	Maximum Number of Wires	Sleeve		
		Part Number	Number of Holes in Wire Seal	Supplier
D-609-05	2	D-436-0098	1	Raychem
		D-436-45	1	Raychem
		D-436-73	1	Raychem
	5	D-436-46	5	Raychem
34137	2	D-436-0098	1	Raychem
		D-436-45	1	Raychem
		D-436-73	1	Raychem
		DWP-125	1	Raychem
	MWSF	1	Remtek	
5	D-436-46	5	Raychem	
34138	2	D-436-73	1	Raychem
		DWP-125	1	Raychem
		MWSF	1	Remtek
	5	D-436-46	5	Raychem

B. Insulated Butt Splices

**Table 10
PART NUMBERS OF INSULATED BUTT SPLICES**

CAU Range		Part Number	Crimp Barrel Size	Description	Insulation Color	Supplier
Minimum	Maximum					
3	8	NAS1388-5	26-22	Insulation Grip	Yellow	QPL
4	12	NAS1388-4	24-20	Insulation Grip	White	QPL
7	24	NAS1388-1	22-18	Insulation Grip	Red	QPL
15	51	NAS1388-2	16-14	Insulation Grip	Blue	QPL
59	138	NAS1388-3	12-10	Insulation Grip	Yellow	QPL
132	208	NAS1389-1	8	No Insulation Grip	Red	QPL
209	331	NAS1389-4	6	No Insulation Grip	Blue	QPL
332	526	NAS1389-7	4	No Insulation Grip	Yellow	QPL
527	837	NAS1389-10	2	No Insulation Grip	Red	QPL
838	1195	NAS1389-13	1/0	No Insulation Grip	Blue	QPL



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Table 11
APPROVED SUPPLIERS OF INSULATED BUTT SPLICES

Splice	Supplier
NAS1388-1	AMP
NAS1388-2	AMP
NAS1388-3	AMP
NAS1388-4	AMP
NAS1388-5	AMP
NAS1389-1	AMP
NAS1389-4	AMP
NAS1389-7	AMP
NAS1389-10	AMP
NAS1389-13	AMP

C. Uninsulated Butt Splices

Table 12
PART NUMBERS OF BUTT SPLICES

CAU Range		Part Number	Crimp Barrel Size	Supplier
Minimum	Maximum			
3	15	BACS52K1	26-20	Boeing
7	24	NAS1387-4	22-18	QPL
8	27	BACS52K2	20-16	Boeing
15	51	NAS1387-5	16-14	QPL
19	67	BACS52K3	16-12	Boeing
43	138	BACT12C12	12-10	Boeing
		NAS1387-6	12-10	QPL
132	181	BACT12C8	8	Boeing
206	288	BACT12C6	6	Boeing
327	457	BACT12C4	4	Boeing
524	735	BACT12C21	2	Boeing
975	1119	BACT12C101	1/0	Boeing

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**Table 13
APPROVED SUPPLIERS OF BUTT SPLICES**

Splice	Supplier
BACS52K1	Raychem
BACS52K2	Raychem
BACS52K3	Raychem
BACT12C4	FCI-Burndy
BACT12C6	FCI-Burndy
BACT12C8	FCI-Burndy
BACT12C12	FCI-Burndy
BACT12C21	FCI-Burndy
BACT12C101	FCI-Burndy
NAS1387-4	AMP
NAS1387-5	AMP
NAS1387-6	AMP

**Table 14
PART NUMBERS OF RAYCHEM D-609-0() BUTT SPLICES**

CAU Range		Part Number	Crimp Barrel Size	Color Stripe	Supplier
Minimum	Maximum				
3	15	D-609-06	26-20	Red	Raychem
8	27	D-609-07	20-16	Blue	Raychem
23	67	D-609-08	16-12	Yellow	Raychem

**Table 15
PART NUMBERS OF BUTT SPLICES FOR HIGH TEMPERATURE**

CAU Range		Boeing Standard	Crimp Barrel Size	Type	Supplier
Minimum	Maximum				
7	24	BACT12C20	22-18	Insulation Grip	Boeing
15	51	BACT12C15	16-14	Insulation Grip	Boeing
43	138	BACT12C11	12-10	Insulation Grip	Boeing

**Table 16
APPROVED SUPPLIERS OF BOEING STANDARD BUTT SPLICES FOR HIGH TEMPERATURE**

Splice	Supplier
BACT12C11	AMP
BACT12C15	AMP

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ASSEMBLY OF SPLICES

Table 16 (continued)

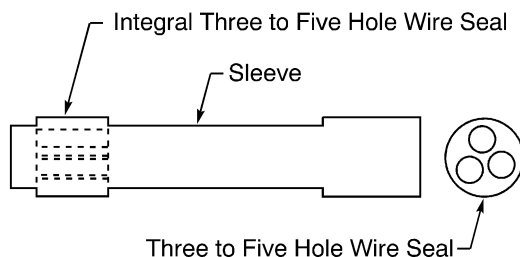
Splice	Supplier
BACT12C20	AMP

Table 17

PART NUMBERS OF RAYCHEM D-609-1() BUTT SPLICES FOR HIGH TEMPERATURE

CAU Range		Part Number	Crimp Barrel Size	Color Stripe	Supplier
Minimum	Maximum				
8	27	D-609-10	20-16	Blue	Raychem
23	67	D-609-11	16-12	Yellow	Raychem

D. Seal Sleeves for Butt Splices



SLEEVE WITH A 3 TO 5 HOLE WIRE SEAL

Figure 3

Table 18

SLEEVE PART NUMBERS FOR BUTT SPLICES

Splice	Sleeve				
	Maximum Number of Wires for the Seal of the End	Number of Holes in the Wire Seal	Part Number	Color Stripe	Supplier
BACT12C12	2	1	D-436-73	-	Raychem
	1	1	DWP-125	-	Raychem
	4	4	D-436-40	Yellow	Raychem
	5	5	D-436-39	Red	Raychem
BACT12C4	1	1	DWP-125	-	Raychem
	5	3	D-436-41	Blue	Raychem
BACT12C6	1	1	DWP-125	-	Raychem
	5	3	D-436-41	Blue	Raychem
BACT12C8	1	1	DWP-125	-	Raychem
	5	3	D-436-41	Blue	Raychem

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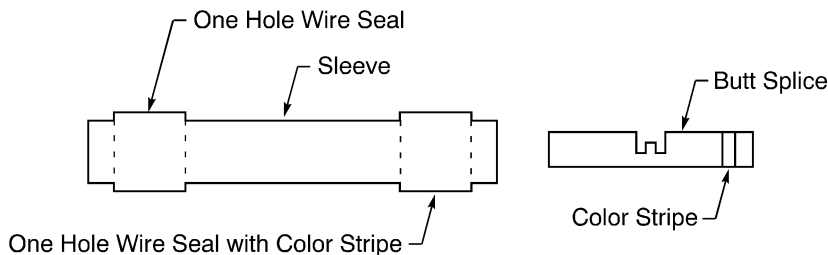
Table 18 (continued)

Splice	Sleeve				
	Maximum Number of Wires for the Seal of the End	Number of Holes in the Wire Seal	Part Number	Color Stripe	Supplier
D-609-06	2	1	D-436-0096	Red	Raychem
	5	3	D-436-95	Yellow	Raychem
D-609-07	2	1	D-436-0097	Blue	Raychem
	2	1	D-436-73	-	Raychem
	5	4	D-436-40	Yellow	Raychem
	5	5	D-436-39	Red	Raychem
	5	3	D-436-95	Yellow	Raychem
D-609-08	2	1	D-436-0098	Yellow	Raychem
	2	1	D-436-73	-	Raychem
	5	4	D-436-40	Yellow	Raychem
	5	5	D-436-39	Red	Raychem
	5	3	D-436-95	Yellow	Raychem
NAS1387-4	2	1	D-436-73	-	Raychem
	5	4	D-436-40	Yellow	Raychem
	5	5	D-436-39	Red	Raychem
NAS1387-5	2	1	D-436-73	-	Raychem
	5	4	D-436-40	Yellow	Raychem
	5	5	D-436-39	Red	Raychem
NAS1387-6	2	1	D-436-73	-	Raychem
	1	1	DWP-125	-	Raychem
	4	4	D-436-40	Yellow	Raychem
	5	5	D-436-39	Red	Raychem

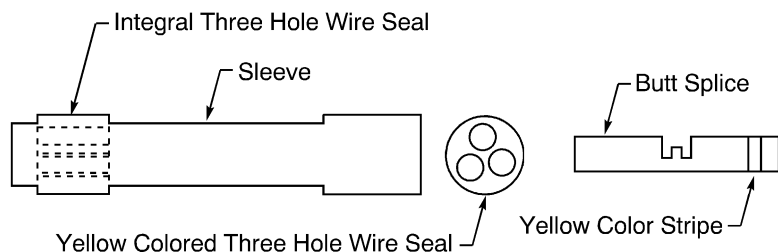
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ASSEMBLY OF SPLICES

E. Sealed Splice Kits for Unshielded Wire and Unshielded Cable



SEALED SPLICE KIT WITH A BUTT SPLICE AND A 1 HOLE WIRE SEAL
Figure 4



SEALED SPLICE KIT WITH A BUTT SPLICE AND A 3 HOLE WIRE SEAL
Figure 5

Table 19

PART NUMBERS OF SEALED SPLICE KITS FOR UNSHIELDED WIRE AND UNSHIELDED CABLE

Sleeve		CAU Range		Part Number	Supplier
Maximum Number of Wires for the Seal of the End	Number of Holes in the Wire Seal	Minimum	Maximum		
2	1	3	15	M81824/1-1	QPL
				D-436-36	Raychem
		8	27	M81824/1-2	QPL
				D-436-37	Raychem
		19	67	M81824/1-3	QPL
				D-436-38	Raychem
5	3	8	27	D-436-42	Raychem
		19	67	D-436-43	Raychem

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**Table 20
COMPONENT PART NUMBERS OF SEALED SPLICE KITS**

Splice Kit	Component	Part Number	Crimp Barrel Size	Color Stripe	Supplier
M81824/1-1	Butt Splice	BACS52K1	26-20	Red	Boeing
	Sleeve	BACS13CM1	-	Red	Boeing
M81824/1-2	Butt Splice	BACS52K2	20-16	Blue	Boeing
	Sleeve	BACS13CM2	-	Blue	Boeing
M81824/1-3	Butt Splice	BACS52K3	16-12	Yellow	Boeing
	Sleeve	BACS13CM3	-	Yellow	Boeing
D-436-36	Butt Splice	D-609-06	26-20	Red	Raychem
	Sleeve	D-436-0096	-	Red	Raychem
D-436-37	Butt Splice	D-609-07	20-16	Blue	Raychem
	Sleeve	D-436-0097	-	Blue	Raychem
D-436-38	Butt Splice	D-609-08	16-12	Yellow	Raychem
	Sleeve	D-436-0098	-	Yellow	Raychem
D-436-42	Butt Splice	D-609-07	20-16	Blue	Raychem
	Sleeve	D-436-95	-	-	Raychem
D-436-43	Butt Splice	D-609-08	16-12	Yellow	Raychem
	Sleeve	D-436-95	-	-	Raychem

**Table 21
APPROVED SUPPLIERS OF BOEING STANDARD COMPONENTS FOR SEALED SPLICE KITS**

Component	Supplier
BACS13CM1	Raychem
BACS13CM2	Raychem
BACS13CM3	Raychem
BACS52K1	Raychem
BACS52K2	Raychem
BACS52K3	Raychem

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ASSEMBLY OF SPLICES

F. Sealed Splice Kit for Shielded Wire and Shielded Cable

Table 22

PART NUMBERS OF SEALED SPLICE KITS FOR SHIELDED WIRE AND SHIELDED CABLE

CAU Range		Crimp Barrel Size	Part Number	Supplier
Minimum	Maximum			
3	15	26-20	D-150-0168	Raychem
			D-150-0174	Raychem
			D-150-0179	Raychem
8	27	20-16	D-150-0169	Raychem
			D-150-0175	Raychem
			D-150-0180	Raychem
19	67	16-12	D-150-0170	Raychem
			D-150-0176	Raychem
			D-150-0177	Raychem
			D-150-0181	Raychem
			D-150-0285	Raychem
43	138	12-10	D-150-0272	Raychem
			D-150-0273	Raychem

Table 23

COMPONENT PART NUMBERS OF SEALED SPLICE KITS

Splice Kit	Component	Quantity	Part Number	Supplier
D-150-0168	Butt Splice	1	D-609-06	Raychem
	Sleeve	1	D-436-0097	Raychem
	Solder Shield Splice	1	D-155-0350	Raychem
D-150-0169	Butt Splice	1	D-609-07	Raychem
	Sleeve	1	D-436-0098	Raychem
	Solder Shield Splice	1	D-155-0450	Raychem
D-150-0170	Butt Splice	1	D-609-08	Raychem
	Sleeve	1	D-436-0098	Raychem
	Solder Shield Splice	1	D-155-0550	Raychem
D-150-0174	Butt Splice	2	D-609-06	Raychem
	Sleeve	2	D-436-0096	Raychem
	Solder Shield Splice	1	D-155-0475	Raychem

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Table 23 (continued)

Splice Kit	Component	Quantity	Part Number	Supplier
D-150-0175	Butt Splice	2	D-609-07	Raychem
	Sleeve	2	D-436-0097	Raychem
	Solder Shield Splice	1	D-155-0575	Raychem
D-150-0176	Butt Splice	2	D-609-08	Raychem
	Sleeve	2	D-436-0098	Raychem
	Solder Shield Splice	1	D-155-0675	Raychem
D-150-0177	Butt Splice	2	D-609-08	Raychem
	Sleeve	2	D-436-0098	Raychem
	Solder Shield Splice	1	D-155-0975	Raychem
D-150-0179	Butt Splice	4	D-609-06	Raychem
	Sleeve	4	D-436-0096	Raychem
	Solder Shield Splice	1	D-155-0575	Raychem
D-150-0180	Butt Splice	4	D-609-07	Raychem
	Sleeve	4	D-436-0097	Raychem
	Solder Shield Splice	1	D-155-0675	Raychem
D-150-0181	Butt Splice	4	D-609-08	Raychem
	Sleeve	4	D-436-0098	Raychem
	Solder Shield Splice	1	D-155-0975	Raychem
D-150-0272	Butt Splice	1	NAS1387-6	QPL
	Sleeve	1	D-436-73	Raychem
	Solder Shield Splice	1	D-155-0650	Raychem
D-150-0273	Butt Splice	2	NAS1387-6	QPL
	Sleeve	2	D-436-73	Raychem
	Solder Shield Splice	1	D-155-0975	Raychem
D-150-0285	Butt Splice	1	D-609-08	Raychem
	Sleeve	1	D-436-73	Raychem
	Solder Shield Splice	1	D-155-0550	Raychem

Table 24

APPROVED SUPPLIERS OF COMPONENTS FOR SEALED SPLICE KITS

Component	Supplier
NAS1387-6	Raychem



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ASSEMBLY OF SPLICES

Table 25

PART NUMBERS OF SEALED SPlice KITS FOR HIGH TEMPERATURE SHIELDED WIRE AND SHIELDED CABLE

CAU Range		Crimp Barrel Size	Part Number	Supplier
Minimum	Maximum			
8	27	20-16	D-150-0250	Raychem
			D-150-0252	Raychem
19	67	16-12	D-150-0251	Raychem
			D-150-0253	Raychem

Table 26

COMPONENT PART NUMBERS OF SEALED SPlice KITS FOR HIGH TEMPERATURE

Splice Kit	Component	Quantity	Part Number	Special Features	Supplier
D-150-0250	Butt Splice	1	D-609-10	-	Raychem
	Splice Sleeve	1	ZDS-S-130	1.5 inch length	Zeus
	Shield	1	10494-9	-	Raychem
	Solder Splice	2	D-108-11	-	Raychem
	Outer Sleeve	1	ZDS-L-190	4.5 inch length	Zeus
D-150-0251	Butt Splice	1	D-609-11	-	Raychem
	Splice Sleeve	1	ZDS-S-160	1.5 inch length	Zeus
	Shield	1	10494-9	-	Raychem
	Solder Splice	1	D-108-11	-	Raychem
		1	D-108-12	-	Raychem
	Seal Insert	2	FEP Tubing, Lightweight	Size 7, 0.5 inch length	Zeus
	Outer Sleeve	1	ZDS-L-240	5 inch length	Zeus
D-150-0252	Butt Splice	2	D-609-10	-	Raychem
	Splice Sleeve	2	ZDS-S-130	1.5 inch length	Zeus
	Shield	1	10494-9	-	Raychem
	Solder Splice	2	D-108-12	-	Raychem
	Outer Sleeve	1	ZDS-L-240	6.5 inch length	Zeus

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ASSEMBLY OF SPLICES

Table 26 (continued)

Splice Kit	Component	Quantity	Part Number	Special Features	Supplier	
D-150-0253	Butt Splice	2	D-609-11	-	Raychem	
	Splice Sleeve	2	ZDS-S-160	1.5 inch length	Zeus	
	Shield	1	10494-7	-	Raychem	
	Solder Splice		1	D-108-12	-	Raychem
			1	D-108-0033	-	Raychem
	Seal Insert	2	FEP Tubing, Lightweight	Size 4, 0.5 inch length	Zeus	
Outer Sleeve	1	ZDS-L-350	6.5 inch length	Zeus		

G. Removable Contact Splices

Table 27

PART NUMBERS OF REMOVABLE CONTACT SPLICES

Splice Plug			Splice Receptacle		
Part Number	Contact Type	Supplier	Part Number	Contact Type	Supplier
48-7190	Pin	Amphenol	48-7191	Socket	Amphenol
48-7190-1	Pin	Amphenol	48-7191-1	Socket	Amphenol
AIS16P	Pin	AIE	AIS16R	Socket	AIE
AIS16P-1	Pin	AIE	AIS16R-1	Socket	AIE

Table 28

ALTERNATIVE REMOVABLE CONTACT SPLICES

Removable Splice	Alternative Removable Splice
48-7190	AIS16P
48-7190-1	AIS16P-1
48-7191	AIS16R
48-7191-1	AIS16R-1
AIS16P	AIS16P-1
AIS16R	AIS16R-1

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ASSEMBLY OF SPLICES

Table 29
CONTACT PART NUMBERS FOR REMOVABLE CONTACT SPLICES

Wire Size (AWG)	Contact Size		Contact Type	Part Number	Supplier
	Engaging End	Crimp Barrel			
16	16	16	Pin	BACC47CN2()	Boeing
			Socket	BACC47CP2()	Boeing
14	16	14	Pin	48-100-5021P-02	Amphenol
			Socket	248-136-1614S-02	Amphenol
				P-208575-S	Pyle-National

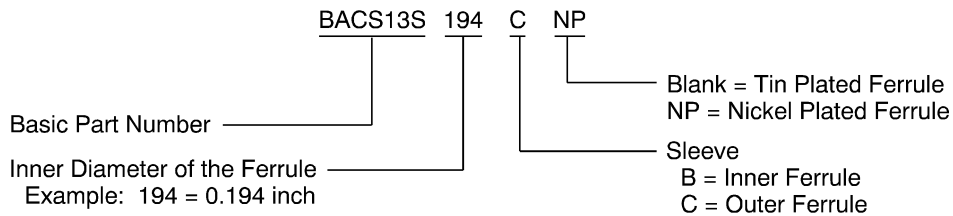
Table 30
APPROVED SUPPLIERS OF BOEING STANDARD CONTACTS FOR REMOVABLE CONTACT SPLICES

Contact	Supplier
BACC47CN2()	Amphenol
	Framatome
	Pyle-National
	Tri-Star
BACC47CP2()	Amphenol
	Framatome
	Pyle-National
	Tri-Star

H. Mechanical Ferrules

NOTE: A satisfactory alternative for the BACS13S()B ferrule is the MS21981-() ferrule that has the equivalent size.

NOTE: The nickel plated ferrules are not color coded.



BOEING FERRULE PART NUMBER STRUCTURE

Figure 6



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STANDARD WIRING PRACTICES MANUAL

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**Table 31
FERRULE TEMPERATURE GRADE**

Temperature Grade	Part Number
B	BACS13S()
D	BACS13S()NP

**Table 32
PART NUMBERS OF INNER AND OUTER FERRULES**

Inner Ferrule		Outer Ferrule	
Boeing Standard	Color	Boeing Standard	Color
BACS13S046B	Tin	BACS13S128C	Blue
BACS13S058B	Yellow	BACS13S149C	Purple
BACS13S063B	Red	BACS13S149C	Purple
		BACS13S156C	Yellow
BACS13S071B	Green	BACS13S156C	Yellow
BACS13S080B	Blue	BACS13S156C	Yellow
		BACS13S175C	Blue
BACS13S090B	Orange	BACS13S175C	Blue
BACS13S096B	Purple	BACS13S175C	Blue
		BACS13S187C	Orange
BACS13S101B	Yellow	BACS13S187C	Orange
BACS13S109B	Red	BACS13S187C	Orange
		BACS13S194C	Red
BACS13S124B	Green	BACS13S205C	Yellow
BACS13S128B	Tin	BACS13S219C	Green
BACS13S134B	Orange	BACS13S219C	Green
BACS13S149B	Blue	BACS13S232C	Orange
BACS13S175B	Green	BACS13S275C	Tin
		BACS13S281C	Purple
BACS13S187B	Yellow	BACS13S287C	Blue
BACS13S194B	Blue	BACS13S287C	Blue
BACS13S205B	Orange	BACS13S279C	Green
		BACS13S312C	Yellow
BACS13S219B	Tin	BACS13S312C	Yellow
		BACS13S327C	Tin

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Table 32 (continued)

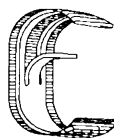
Inner Ferrule		Outer Ferrule	
Boeing Standard	Color	Boeing Standard	Color
BACS13S225B	Yellow	BACS13S312C	Yellow
		BACS13S327C	Tin
BACS13S250B	Green	BACS13S348C	Orange
BACS13S261B	Blue	BACS13S359C	Purple
BACS13S266B	Tin	BACS13S359C	Purple
BACS13S275B	Orange	BACS13S359C	Purple
		BACS13S375C	Yellow
BACS13S287B	Tin	BACS13S405C	Red
BACS13S312B	Purple	BACS13S425C	Tin
BACS13S375B	Blue	BACS13S460C	Tin

Table 33

APPROVED SUPPLIERS OF BOEING STANDARD MECHANICAL FERRULES

Ferrule	Supplier
BACS13S()	Thomas & Betts

I. RSK Shield-Kons



RSK SHIELD-KON
Figure 7

Table 34

PART NUMBERS OF RSK SHIELD-KONS

Temperature Grade	Shield Diameter (inch)		Part Number	Color	Plating	Supplier
	Minimum	Maximum				
B	0.050	0.090	RSK101	Red	Tin	Thomas & Betts
	0.090	0.145	RSK201	Blue	Tin	Thomas & Betts
	0.144	0.200	RSK301	Yellow	Tin	Thomas & Betts
	0.200	0.300	RSK401	Green	Tin	Thomas & Betts

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Table 34 (continued)

Temperature Grade	Shield Diameter (inch)		Part Number	Color	Plating	Supplier
	Minimum	Maximum				
D	0.301	0.325	SK501HT	-	Nickel	Thomas & Betts
	0.401	0.425	SK501HT	-	Nickel	Thomas & Betts

4. TOOLS AND MATERIALS

A. Conductor Splice Crimp Tools

**Table 35
CRIMP TOOLS FOR INSULATED CLOSED END SPLICES**

Crimp Barrel Size	Crimp Tool	
	Basic Unit	Die
22-14	45216	-
	46110	45218
18-10	45219	-
	45219-2	-
	46110	45221
	69365-()	45221
	69100	45221

**Table 36
CRIMP TOOLS FOR AMP 3413() PARALLEL SPLICES**

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Die	
		Part Number	Nest
16-14	49900	-	16-14
	49935	-	16-14
	69004	47452	-
	69365-()	47807-1	-
	69693-1	-	-
12-10	49900	-	12-10
	49935	-	12-10
	59239-()	-	-
	69365-()	47808-6	-

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ASSEMBLY OF SPLICES

Table 37
CRIMP TOOLS FOR RAYCHEM D-609-0() PARALLEL SPLICES

Crimp Barrel Size	Crimp Tool	
	Basic Unit	Nest
20-16	AD-1377	16-20
	ST956C	16-20
	ST956D	16-20
16-12	AD-1377	12-16
	ST956C	12-16
	ST956D	12-16

Table 38
CRIMP TOOLS FOR INSULATED BUTT SPLICES

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Locator Die	
		Part Number	Nest
24-20	59275	-	-
	69692-1	-	-
26-22	59275	-	-
	69692	-	-
22-18	47386	-	-
	59250	-	Red
	69692-1	-	-
16-14	47387	-	-
	59250	-	Blue
	69693-1	-	-
12-10	59239	-	-
8	59974-1	47820	-
	69061	47820	-
	69091	47820	-
6	59974-1	47821	-
	69061	47821	-
	69091	47821	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 38 (continued)

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Locator Die	
		Part Number	Nest
4	59974-1	47822	-
	69061	47822	-
	69091	47822	-
2	59974-1	47823	-
	69061	47823	-
	69091	47823	-
1/0	58422-1	47824	-
	69066	47824	-

Table 39

CRIMP TOOL POWER PUMPS

Power Pump	Maximum Pressure (psi)
13597	10,000
13600	10,000
69120-()	8400
Y6NP	6000

Table 40

SATISFACTORY PRESSURES FOR THE OPERATION OF CRIMP TOOL HEADS

Crimp Tool Head	Pressure (psi)	
	Minimum	Maximum
69069	8000	8400
Y29B	5700	6000
BDHD1	8500	9000
13642M	9500	10000

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PERMITTED PRESSURE FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PERMITTED PRESSURE FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP TOOL HEAD CAN OCCUR.

**Table 41
CRIMP TOOLS FOR BACT12C() UNINSULATED BUTT SPLICES**

Crimp Barrel Size	Crimp Tool				
	Basic Unit	Head	Die	Nest	Indenter
12-10	46447	-	-	12-10	-
	49900	-	-	12-10	-
	49935	-	-	12-10	-
	59461	-	-	-	-
	M8ND	-	N10HT	-	-
	Y10MRF-5	-	-	-	-
8	M8ND	-	N8CT	-	-
	MR8-5	-	-	-	-
	Power Pump	69069	-	47321	47322
		BDHD1	-	DV8L-1	Y29PL
		Y29B	-	DV8L-1	Y29PL
Y8ND	-	N8CT	-	-	
6	Power Pump	13642M	ST2354-6	-	-
		69069	-	47321	47322
		BDHD1	-	DV6L	Y29PL
		Y29B	-	DV6L	Y29PL
4	Power Pump	69069	-	47321	47322
		BDHD1	ST2354B-2	-	-
		Y29B	-	DV4L	Y29PL
2	Power Pump	13642M	ST2354-1	-	-
		69069	-	47321	47322
		BDHD1	-	DV2L	Y29PL
		Y29B	-	DV2L	Y29PL
1/0	Power Pump	13642M	11738	-	-
		BDHD1	-	DV25L	Y29PL
		Y29B	-	DV25L	Y29PR



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ASSEMBLY OF SPLICES

Table 42
CRIMP TOOLS FOR NAS1387-() UNINSULATED BUTT SPLICES

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Die	Nest
22-18	46673	-	-
	49900	-	22-18
	49935	-	22-18
	M22520/5-01	Y641	22-18
16-14	46988	-	-
	49900	-	16-14
	49935	-	16-14
	59294	-	-
	M22520/5-01	Y641	16-14
12-10	49900	-	12-10
	49935	-	12-10
	59461	-	-
	M22520/5-01	Y641	12-10

Table 43
CRIMP TOOLS FOR BACS52K() AND RAYCHEM D-609-() UNINSULATED BUTT SPLICES

Crimp Barrel Size	Crimp Tool	
	Basic Unit	Nest
26-20	AD-1377	20-26
	ST956C	20-26
	ST956D	20-26
20-16	AD-1377	16-20
	ST956C	16-20
	ST956D	16-20
16-12	AD-1377	12-16
	ST956C	12-16
	ST956D	12-16

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 44
CRIMP TOOLS FOR NICKEL PLATED UNINSULATED BUTT SPLICES**

Crimp Barrel Size	Crimp Tool	
	Basic Unit	Nest
22-18	46673	-
16-14	46988	-
	59294	-
12-10	59461	-

B. Mechanical Ferrule Crimp Tools

**Table 45
FERRULE CRIMP TOOLS**

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S101C	44-000	44-136	B
	612648	612734	-
	613214	613812	-
	620175	620304	B
	HX-4	Y136	B
	M22520/5-01	M22520/5-33	B
	ST2966M	-	-
	ST965-19	-	-
	ST965A-19	-	-
	ST965B	ST965B-19	-
	WT219	-	-
	WT419	-	-
	WT440	4419	-

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ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S128C	44-000	44-137	B
	612648	612778	-
	613214	613848	-
	620175	620305	B
	HX-4	Y137	B
	M22520/5-01	M22520/5-35	B
	ST2966M	-	1
	ST965-5	-	-
	ST965A-0	-	-
	ST965B	ST965B-0	-
	WT200	-	-
	WT200-12	-	S
	WT400	-	-
	WT440	4400	-
BACS13S149C	44-000	44-138	B
	612648	612981	-
	612648	613844	S
	613214	613003	-
	620175	620306	B
	HX-4	Y138	B
	M22520/5-01	M22520/5-37	B
	ST2966M	-	2
	ST965-4	-	S
	ST965A-1	-	-
	ST965B	ST965B-1	-
	WT201	-	-
	WT201-03-10	-	S
	WT401	-	-
WT440	4401	-	

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ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S156C	44-000	44-139	B
	612648	612661	-
	612648	613844	L
	613214	613847	-
	620175	620307	B
	HX-4	Y139	B
	M22520/5-01	M22520/5-39	B
	ST2966M	-	3
	ST965-1	-	S
	ST965A-2	-	-
	ST965B	ST965B-2	-
	WT202	-	-
	WT202-06-08	-	S
	WT402	-	-
	WT440	4402	-
BACS13S175C	44-000	44-140	B
	612648	612663	S
	612648	612742	-
	613214	613849	-
	620175	620308	B
	HX-4	Y140	B
	M22520/5-01	M22520/5-41	B
	ST2966M	-	4
	ST965-4	-	M
	ST965A-3	-	-
	ST965B	ST965B-3	-
	WT201-03-10	-	M
	WT203	-	-
	WT403	-	-
	WT440	4403	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S187C	44-000	44-141	B
	612648	612746	-
	612648	620467	S
	613214	613810	-
	620175	620309	B
	HX-4	Y141	B
	M22520/5-01	M22520/5-43	B
	ST2966M	-	5
	ST965-1	-	M
	ST965A-6	-	-
	ST965B	ST965B-6	-
	WT202-06-08	-	M
	WT206	-	-
	WT406	-	-
WT440	4406	-	
BACS13S194C	44-000	44-141	B
	612648	612746	-
	612648	620467	S
	613214	613810	-
	620175	620309	B
	HX-4	Y141	B
	M22520/5-01	M22520/5-43	B
	ST2966M	-	5
	ST965-1	-	M
	ST965A-6	-	-
	ST965B	ST965B-6	-
	WT202-06-08	-	M
	WT206	-	-
	WT406	-	-
WT440	4406	-	

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ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S199C	44-000	44-141	B
	612648	612746	-
	612648	620467	S
	613214	613810	-
	620175	620309	B
	HX-4	Y141	B
	M22520/5-01	M22520/5-43	B
	ST2966M	-	5
	ST965-1	-	M
	ST965A-6	-	-
	ST965B	ST965B-6	-
	WT202-06-08	-	M
	WT206	-	-
	WT406	-	-
	WT440	4406	-
BACS13S205C	44-000	44-142	B
	612648	612763	-
	612648	620467	L
	613214	613851	-
	620175	620299	B
	HX-4	Y142	B
	M22520/5-01	M22520/5-19	B
	ST2966M	-	6
	ST965-1	-	L
	ST965A-8	-	-
	ST965B	ST965B-8	-
	WT202-06-08	-	L
	WT208	-	-
	WT408	-	-
	WT440	4408	-

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ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S219C	44-000	44-142	B
	612648	612763	-
	612648	620467	L
	613214	613851	-
	620175	620299	B
	HX-4	Y142	B
	M22520/5-01	M22520/5-19	B
	ST2966M	-	6
	ST965-1	-	L
	ST965A-8	-	-
	ST965B	ST965B-8	-
	WT202-06-08	-	L
	WT208	-	-
	WT408	-	-
	WT440	4408	-
BACS13S225C	44-000	44-143	B
	612648	612971	-
	613214	613005	-
	620175	620310	B
	HX-4	Y143	B
	M22520/5-01	M22520/5-45	B
	ST2966M	-	-
	ST965-9	-	-
	ST965A-9	-	-
	ST965B	ST965B-9	-
	WT209	-	-
	WT409	-	-
	WT440	4409	-

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ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S232C	44-000	44-143	A
	612648	612663	L
	612648	612675	S
	612648	612748	-
	613214	613846	-
	620175	620310	A
	HX-4	Y143	A
	M22520/5-01	M22520/5-45	A
	ST2966M	-	7
	ST965-4	-	L
	ST965A-10	-	-
	ST965B	ST965B-10	-
	WT201-03-10	-	L
	WT210	-	-
	WT410	-	-
	WT440	4410	-
BACS13S261C	44-000	44-142	A
	612648	612675	L
	612648	612766	-
	613214	613850	-
	620175	620299	A
	HX-4	Y142	A
	M22520/5-01	M22520/5-19	A
	ST2966M	-	8
	ST965-2	-	S
	ST965A-11	-	-
	ST965B	ST965B-11	-
	WT211	-	-
	WT211-14	-	S
	WT411	-	-
WT440	4411	-	

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Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S275C	44-000	44-141	A
	612648	612776	-
	613214	613009	-
	620175	620309	A
	HX-4	Y141	A
	M22520/5-01	M22520/5-43	A
	ST2966M	-	9
	ST965-12	-	-
	ST965A-12	-	-
	ST965B	ST965B-12	-
	WT200-12	-	L
	WT212	-	-
	WT412	-	-
	WT440	4412	-
BACS13S281C	44-000	44-140	A
	612648	612893	-
	613214	613011	-
	620175	620308	A
	HX-4	Y140	A
	M22520/5-01	M22520/5-41	A
	ST2966M	-	10
	ST965-2	-	L
	ST965A-14	-	-
	ST965B	ST965B-14	-
	WT211-14	-	L
	WT214	-	-
	WT414	-	-
	WT440	4414	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S287C	44-000	44-140	A
	612648	612893	-
	613214	613011	-
	620175	620308	A
	HX-4	Y140	A
	M22520/5-01	M22520/5-41	A
	ST2966M	-	10
	ST965-2	-	L
	ST965A-14	-	-
	ST965B	ST965B-14	-
	WT211-14	-	L
	WT214	-	-
	WT414	-	-
	WT440	4414	-
BACS13S297C	44-000	44-140	A
	612648	612893	-
	613214	613011	-
	620175	620308	A
	HX-4	Y140	A
	M22520/5-01	M22520/5-41	A
	ST2966M	-	10
	ST965-2	-	L
	ST965A-14	-	-
	ST965B	ST965B-14	-
	WT211-14	-	L
	WT214	-	-
	WT414	-	-
	WT440	4414	-

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ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S312C	44-000	44-139	A
	612648	612973	-
	613214	613013	-
	620175	620307	A
	HX-4	Y139	A
	M22520/5-01	M22520/5-39	A
	ST2966M	-	11
	ST965-6	-	S
	ST965A-15	-	-
	ST965B	ST965B-15	-
	WT215	-	-
	WT215-16	-	S
	WT415	-	-
	WT440	4415	-
BACS13S327C	44-000	44-138	A
	612648	612899	-
	620175	620306	A
	HX-4	Y138	A
	M22520/5-01	M22520/5-37	A
	ST2966M	-	-
	ST965A-16	-	-
	ST965B	ST965B-16	-
	WT215-16	-	L
	WT216	-	-
	WT416	-	-
	WT440	4416	-

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ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S348C	44-000	44-137	A
	612648	612989	-
	620175	620305	A
	HX-4	Y137	A
	M22520/5-01	M22520/5-35	A
	ST2966M	-	12
	ST965-3	-	S
	ST965A-17	-	-
	ST965B	ST965B-17	-
	WT217	-	-
	WT217-18	-	S
	WT417	-	-
	WT440	4417	-
BACS13S359C	44-000	44-136	A
	612648	612992	-
	620175	620304	A
	HX-4	Y136	A
	M22520/5-01	M22520/5-33	A
	WT221	-	-
	WT221-22	-	S
WT540	5450	-	
BACS13S375C	44-000	44-144	-
	612648	612969	-
	620175	620311	-
	HX-4	Y144	-
	M22520/5-01	M22520/5-47	-
	WT221-22	-	L
	WT222	-	-
	WT540	5451	-

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ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S405C	44-000	44-145	-
	612648	612739	-
	620175	620301	-
	HX-4	Y145	-
	M22520/5-01	M22520/5-23	-
	ST2966M	-	13
	ST965-3	-	L
	WT217-18	-	L
	WT218	-	-
	WT540	5452	-
BACS13S415C	44-000	44-145	-
	612648	612739	-
	620175	620301	-
	HX-4	Y145	-
	M22520/5-01	M22520/5-23	-
	ST2966M	-	13
	ST965-3	-	L
	WT217-18	-	L
	WT218	-	-
	WT540	5452	-
BACS13S425C	44-000	44-178	-
	612648	612807	-
	620175	620316	-
	HX-4	Y178	-
	M22520/5-01	M22520/5-61	-
	ST2966M	-	16
	ST965-29	-	-
	WT229	-	-
	WT540	5454	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 45 (continued)

Outer Ferrule	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACS13S460C	44-000	44-148	-
	612648	612909	-
	620175	620314	-
	HX-4	Y148	-
	M22520/5-01	M22520/5-53	-
	ST2966M	-	14
	ST965-6	-	L
	WT215-20	-	L
	WT220	-	-
	WT540	5456	-
BACS13S500C	44-000	44-149	-
	612648	612977	-
	620175	620300	-
	HX-4	Y149	-
	M22520/5-01	M22520/5-21	-
	ST2966M	-	15
	ST965-23	-	-
	WT223	-	-
	WT540	5457	-

C. Shield-Kon Crimp Tools

**Table 46
CRIMP TOOLS FOR THE SHIELD-KON**

Shield Diameter (inch)		Shield-Kon	Crimp Tool		
Minimum	Maximum		Basic Unit		Die Set
			Part Number	Type	
0.050	0.070	RSK101	13300	Pneumatic	101A
			WT740	Hand	101A
0.070	0.090	RSK101	13300	Pneumatic	101B
			WT740	Hand	101B

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 46 (continued)

Shield Diameter (inch)		Shield-Kon	Crimp Tool		
Minimum	Maximum		Basic Unit		Die Set
			Part Number	Type	
0.090	0.100	RSK201	13300	Pneumatic	201C
			WT740	Hand	201C
0.100	0.118	RSK201	13300	Pneumatic	201D
			WT740	Hand	201D
0.119	0.131	RSK201	13300	Pneumatic	201E
			WT740	Hand	201E
0.132	0.143	RSK201	13300	Pneumatic	201F
			WT740	Hand	201F
0.143	0.185	RSK301	13300	Pneumatic	301H
			WT740	Hand	301H
0.144	0.162	RSK301	13300	Pneumatic	301G
			WT740	Hand	301G
0.186	0.201	RSK301	13300	Pneumatic	301J
			WT740	Hand	301J
0.200	0.230	RSK401	13300	Pneumatic	401K
			WT740	Hand	401K
0.231	0.250	RSK401	13300	Pneumatic	401L
			WT740	Hand	401L
0.251	0.275	RSK401	13300	Pneumatic	401M
			WT740	Hand	401M
0.276	0.300	RSK401	13300	Pneumatic	401N
			WT740	Hand	401N
0.301	0.325	SK501HT	HX4	Hand	501P
			M22520/5-01	Hand	501P
0.401	0.425	SK601HT	HX4	Hand	601Q
			M22520/5-01	Hand	601Q

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

D. Hot Air Guns

**Table 47
HOT AIR GUNS**

Type	Temperature Range (Degrees C)		Hot Air Gun			
	Minimum	Maximum	Basic Unit		Reflector	
			Part Number	Supplier	Part Number	Supplier
Standard Temperature	232	371	CV-5300	Raychem	MG-1	Raychem
	260	371	CV-5000 Model 500	Raychem	TG-135	Raychem
High Temperature	399	538	CV-5000 Model 750	Raychem	TG-33	Raychem

E. Splice Assembly Materials

**Table 48
HEAT SHRINKABLE SLEEVES**

Temperature Grade	Part Number	Supplier
B	AMS-DTL-23053/5 Class 1	Available source
	MIL-LT	Raychem
	PLF 100	Raychem
	Versafit	Raychem
D	AMS-DTL-23053/12 Class 2	Available source
	AMS-DTL-23053/12 Class 3	Available source
	Penntube I	Pennsylvania Fluorocarbon
	Penntube II	Pennsylvania Fluorocarbon
	TFE 2 to 1	Zeus Industrial Products
	TFE 2X Standard Wall	Chemplast
	TFE 2X Standard Wall	Zeus Industrial Products
	TFE 4X Standard Wall	Chemplast
	TFE 4X Standard Wall	Zeus Industrial Products

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 49
INSULATION TAPES**

Temperature Grade	Part Number	Supplier
B	Scotch 63	3M
	2242-2	Fluorglas
		Saint Gobain Performance Plastics
C	Mystick 7505	Fluorglas
		Saint Gobain Performance Plastics
	Scotch 61	3M
D	P-421	Permacel
	2045-5	Fluorglas
		Saint Gobain Performance Plastics
	2245-5	Fluorglas
Saint Gobain Performance Plastics		

**Table 50
INSULATION FILM STRIPS**

Temperature Grade	Part Number	Supplier
D	E125-2	Fluorglas
		Saint Gobain Performance Plastics
	E125-3	Fluorglas
		Saint Gobain Performance Plastics
	P-412	Permacel
	Scotch 48	3M
	Scotch 3082	3M
Scotch 4202	3M	

**Table 51
SOLDER SLEEVE PART NUMBERS**

Minimum O.D. of the Jacket (inch)	Minimum O.D. of the Shield (inch)	Solder Sleeve	
		Part Number	Supplier
0.095	0.020	D-144-25	Raychem
0.105	0.020	BACS13CT1N	Boeing
0.145	0.030	BACS13CT2N	Boeing
		M83519/1-2	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 51 (continued)

Minimum O.D. of the Jacket (inch)	Minimum O.D. of the Shield (inch)	Solder Sleeve	
		Part Number	Supplier
0.200	0.050	BACS13CT3N	Boeing
		M83519/1-3	QPL

Table 52

APPROVED SUPPLIERS OF BOEING STANDARD SOLDER SLEEVES

Boeing Standard	Supplier
BACS13CT	Raychem

Table 53

SHIELD MATERIALS

Temperature Grade	Boeing Standard
B	BAC3108-()
D	BAC3106-()

NOTE: For sizes and suppliers of shield materials, refer to Subject 20-00-11.

5. CLOSED END SPLICE CONFIGURATIONS

A. Splice Assembly Configurations

For the conditions that are applicable for a closed end splice, refer to Paragraph 1.A.

Table 54

CLOSED END SPLICE CONFIGURATIONS

Seal	Splice Assembly	
	Configuration	Procedure
Sealed	Splice Kit	Paragraph 5.B.
	Parallel Splice and a Sleeve	Paragraph 5.C.
Unsealed	Insulated Closed End Splice	Paragraph 5.D.
	Parallel Splice and a Sleeve	Paragraph 5.E.

B. Sealed Closed End Splice - Splice Kit

NOTE: A satisfactory alternative for a sealed closed end splice kit is a sealed closed end splice with a parallel splice and a sleeve. Refer to Paragraph 5.C.

- (1) Make a selection of a sealed closed end splice kit from Table 5.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the splice kit has:

- The smallest CAU range that can accept the total CAU of the conductors
- The correct maximum number of wires.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductors.

- (2) Find the part number of the parallel splice in the splice kit from Table 6.
- (3) Find the crimp barrel size of the splice from Table 6.
- (4) Make a selection of a crimp tool from Table 37.
- (5) For a sleeve with a 1 hole wire seal, put the sleeve on the wires. Refer to Figure 1.
Make sure to put the end of the sleeve with the wire seal on the wires first.
- (6) For a sleeve with a 5 hole wire seal, put the sleeve on the wires. Refer to Figure 2.

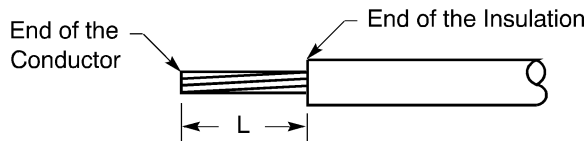
Make sure to:

- Put the end of the sleeve with the wire seal on the wires first
- Put one wire in each hole of the wire seal.

- (7) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 8
- Table 55 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 8

Table 55
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
D-609-04	0.28	± 0.03
D-609-05	0.28	± 0.03

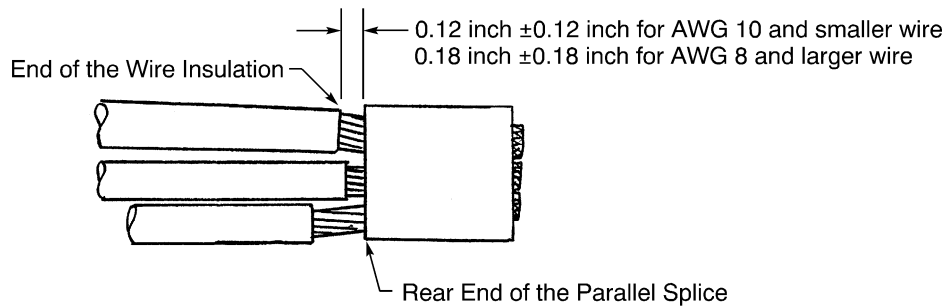
- (8) Put the splice in the crimp tool.
- (9) Hold the splice in position with light pressure.
- (10) Put each wire in the same end of the splice. Refer to Figure 9.

Make sure that the distance from the end of the wire insulation to the rear end of the splice is:

- 0.12 inch ±0.12 inch for wires AWG 10 and smaller
- 0.18 inch ±0.18 inch for wires AWG 8 and larger.

STANDARD WIRING PRACTICES MANUAL

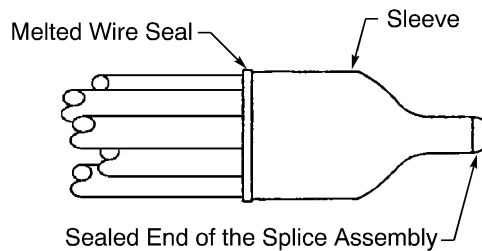
ASSEMBLY OF SPLICES



POSITION OF EACH WIRE IN THE PARALLEL SPLICE

Figure 9

- (11) Crimp the splice.
- (12) Align the center of the sleeve with the center of the splice.
- (13) Shrink the sleeve into position. Refer to Figure 10 and Subject 20-10-14.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 10

C. Sealed Closed End Splice - Parallel Splice, Sleeve

- (1) Make a selection of a parallel splice from Table 8.
Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductors. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductors.
- (2) Make a selection of a sleeve from Table 9.
Make sure the sleeve is for:
 - The applicable parallel splice
 - The maximum number of wires.
- (3) Find the crimp barrel size of the splice from Table 8.
- (4) Make a selection of a crimp tool from:
 - Table 36 for AMP 3413() parallel splices
 - Table 37 for Raychem D-609-0() parallel splices.
- (5) For a sleeve with a 5 hole wire seal, put the sleeve on the wires. Refer to Figure 2.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

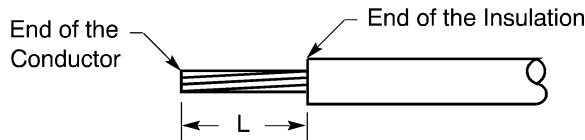
Make sure to:

- Put the end of the sleeve with the wire seal on the wires first
- Put one wire in each hole of the wire seal.

(6) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 11
- Table 57 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



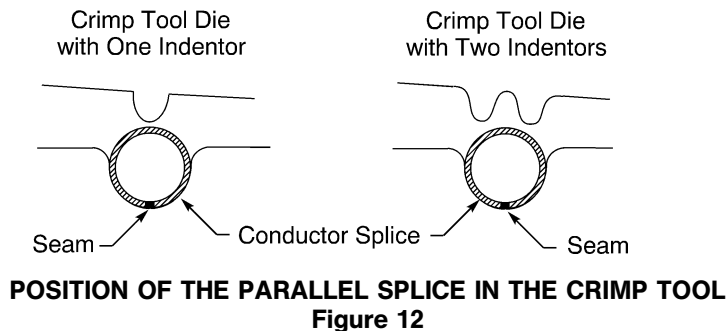
INSULATION REMOVAL LENGTH
Figure 11

Table 56
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
D-609-04	0.28	± 0.03
D-609-05	0.28	± 0.03
34137	0.34	± 0.03
34138	0.34	± 0.03

(7) Put the splice in the crimp tool.

(8) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 12.



POSITION OF THE PARALLEL SPLICE IN THE CRIMP TOOL
Figure 12

(9) Hold the splice in position with light pressure.

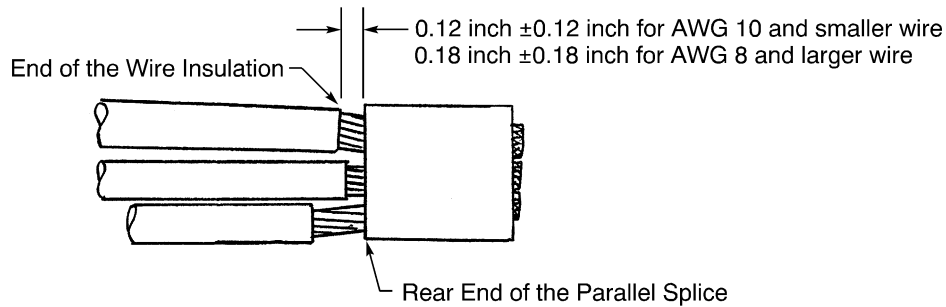
(10) Put each wire in the same end of the splice. Refer to Figure 13.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the distance from the end of the wire insulation to the rear end of the splice is:

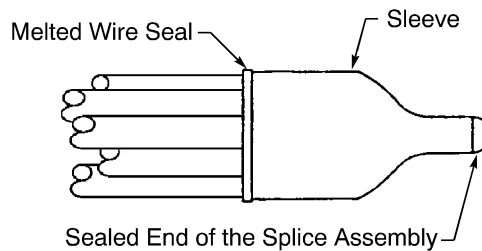
- 0.12 inch \pm 0.12 inch for wires AWG 10 and smaller
- 0.18 inch \pm 0.18 inch for wires AWG 8 and larger.



POSITION OF EACH WIRE IN THE PARALLEL SPLICE

Figure 13

- (11) Crimp the splice.
- (12) Put the sleeve on the splice assembly.
Make sure to align the center of the sleeve with the center of the splice.
- (13) Shrink the sleeve into position. Refer to Figure 14 and Subject 20-10-14.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 14

D. Unsealed Insulated Closed End Splice

NOTE: A satisfactory alternative for an unsealed closed end splice is a sealed closed end splice. Refer to Paragraph 5.B. or Paragraph 5.C.

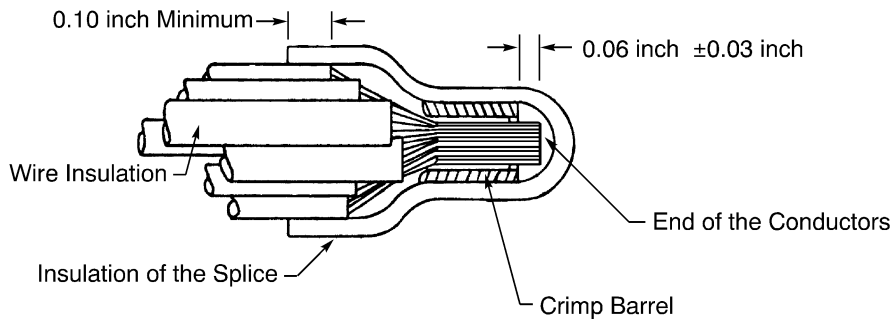
- (1) Make a selection of an insulated closed end splice from Table 7.
Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductors. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductors.
- (2) Find the crimp barrel size of the splice from Table 7.
- (3) Make a selection of a crimp tool from Table 35.
- (4) Remove the necessary length of insulation from the end of each wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

- Figure 15
- Subject 20-00-15 for the insulation removal procedures.



POSITION OF EACH WIRE IN THE SPLICE
Figure 15

(5) Put the wire in the splice. Refer to Figure 15.

Make sure that when the wire is in the splice:

- The insulation of the splice makes a 0.1 inch minimum overlap with the wire insulation
- The wire insulation is not in the crimp barrel of the splice
- The distance from the end of the conductor to the end of the crimp barrel of the splice is 0.06 inch \pm 0.03 inch.

NOTE: The wire insulation, the crimp barrel, and the conductor can be seen through the insulation of the closed end splice.

(6) If it is necessary, remove more insulation from the end of the wire to make a correct fit of the wire in the splice.

(7) Put the splice in the crimp tool.

(8) Hold the splice in position with light pressure.

(9) Put each wire in the splice. Refer to Figure 15.

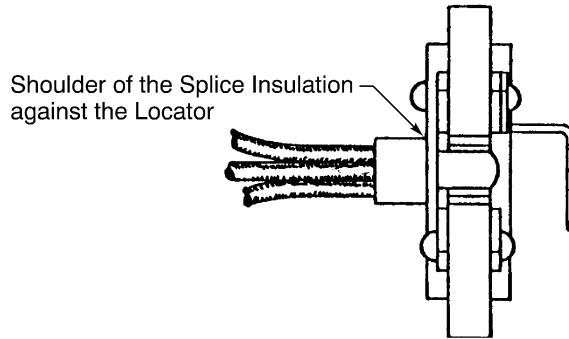
Make sure that each wire is in the correct position.

(10) Crimp the splice. Refer to Figure 16.

Make sure that the shoulder of the insulation on the splice is against the locator of the crimp tool.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE SPLICE IN THE CRIMP TOOL
Figure 16

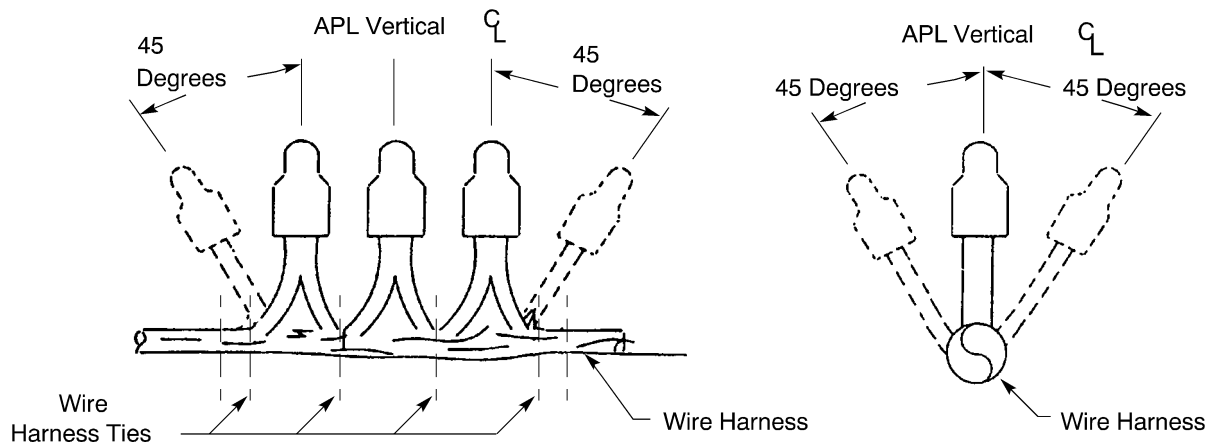
(11) After the wire harness assembly is installed, examine the splice assembly.

Make sure that:

- The start of each branch is near the top side of the harness
- The end of each closed end splice is pointed up
- Each closed end splice is in the position that is ± 45 degrees from the vertical.

Refer to Figure 17.

NOTE: This configuration is not necessary for splices that are in a module.



CONFIGURATION OF THE CLOSED END SPLICES
Figure 17

E. Unsealed Closed End Splice - Parallel Splice, Sleeve

NOTE: A satisfactory alternative for an unsealed closed end splice is a sealed closed end splice. Refer to Paragraph 5.B. or Paragraph 5.C.

(1) Make a selection of an uninsulated parallel splice from Table 8.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductors. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductors.

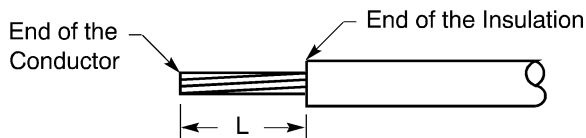
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (2) Find the crimp barrel size of the splice from Table 8.
- (3) Make a selection of a crimp tool from:
 - Table 36 for AMP 3413() parallel splices
 - Table 37 for Raychem D-609-0() parallel splices.
- (4) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 18
- Table 57 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

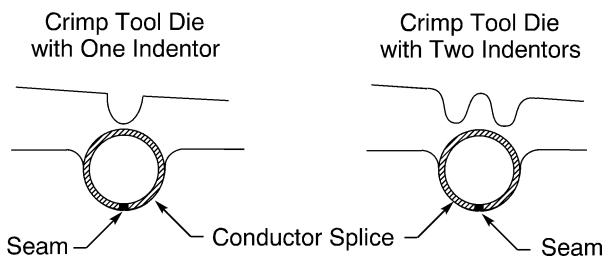


INSULATION REMOVAL LENGTH
Figure 18

Table 57
INSULATION REMOVAL LENGTH

Parallel Splice	Removal Length L (inch)	
	Target	Tolerance
D-609-04	0.28	± 0.03
D-609-05	0.28	± 0.03
34137	0.34	± 0.03
34138	0.34	± 0.03

- (5) Put the splice in the crimp tool.
- (6) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 19.



POSITION OF THE PARALLEL SPLICE IN THE CRIMP TOOL
Figure 19

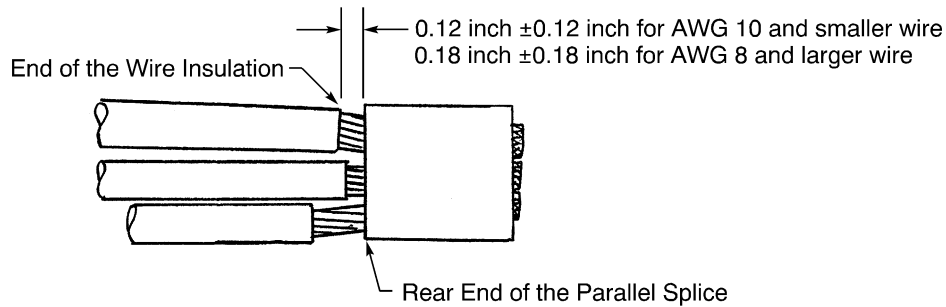
- (7) Hold the splice in position with light pressure.
- (8) Put each wire in the same end of the splice. Refer to Figure 20.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the distance from the end of the wire insulation to the forward end of the splice is:

- 0.12 inch \pm 0.12 inch for wires AWG 10 and smaller
- 0.18 inch \pm 0.18 inch for wires AWG 8 and larger.



POSITION OF EACH WIRE IN THE PARALLEL SPLICE

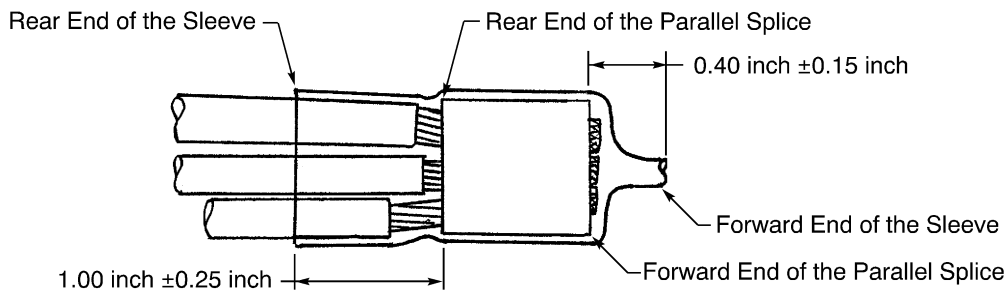
Figure 20

- (9) Crimp the splice.
- (10) Make a selection of a Temperature Grade B heat shrinkable sleeve from Table 48. Make sure that the sleeve has the smallest diameter that can be put on the splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (11) Cut the necessary length of the sleeve. Refer to Figure 21.

NOTE: The necessary length is a minimum of 2.0 inches plus the length of the splice.



POSITION OF THE SLEEVE ON THE SPLICE ASSEMBLY

Figure 21

- (12) Put the sleeve on the splice assembly. Refer to Figure 21.

Make sure that:

- The distance from the forward end of the sleeve to the forward end of the splice is 0.40 inch \pm 0.15 inch
- The distance from the rear end of the sleeve to the rear end of the splice is 1.00 inch \pm 0.25 inch.

- (13) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (14) After the wire harness assembly is installed, examine the splice assembly.

STANDARD WIRING PRACTICES MANUAL

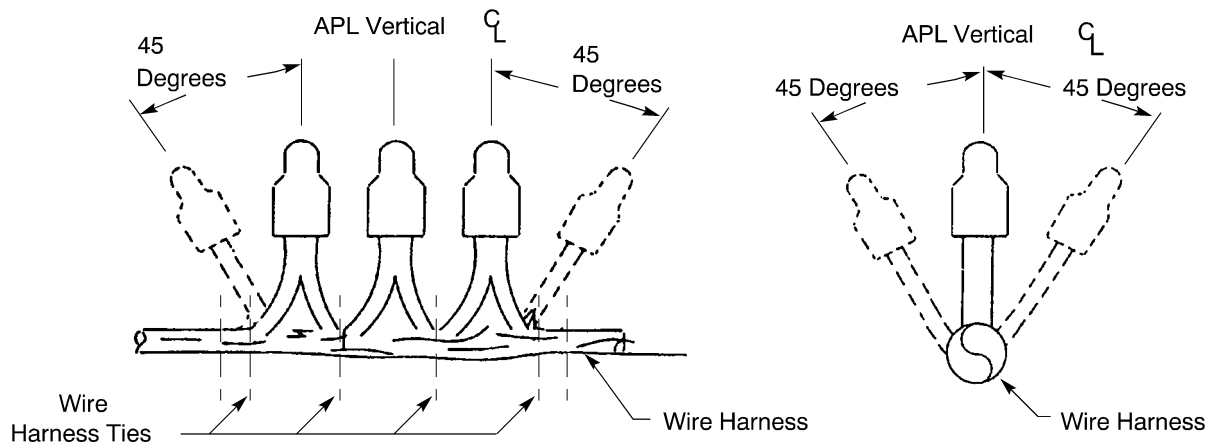
ASSEMBLY OF SPLICES

Make sure that:

- The start of each branch is near the top side of the harness
- The end of each splice is pointed up
- Each splice is in the position that is ± 45 degrees from the vertical.

Refer to Figure 22.

NOTE: This configuration is not necessary for splices that are in a module.



CONFIGURATION OF THE CLOSED END SPLICES

Figure 22

6. UNSEALED BUTT SPLICE CONFIGURATIONS

A. Splice Assembly Configurations

For the conditions that are applicable for an unsealed butt splice, refer to Paragraph 1.A.

**Table 58
UNSEALED BUTT SPLICE CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	Splice Assembly	
		Configuration	Procedure
One Wire	One Wire	Insulated Butt Splice	Paragraph 6.B.
		Uninsulated Butt Splice with Sleeve	Paragraph 6.D.
More Than One Wire	More Than One Wire	Insulated Butt Splice	Paragraph 6.C.
		Uninsulated Butt Splice with Sleeves	Paragraph 6.E.

B. One Wire to One Wire - Insulated Butt Splice

NOTE: A satisfactory alternative for an insulated butt splice on one wire is an uninsulated butt splice and sleeves on one wire. Refer to Paragraph 6.D.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (1) Make a selection of an insulated butt splice from Table 10.
Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.
- (2) Find the crimp barrel size of the splice from Table 10.
- (3) Make a selection of a crimp tool from Table 38.
- (4) Remove the necessary length of insulation from the end of each wire. Refer to Subject 20-00-15.
- (5) For butt splices with an insulation grip, put the wire in the splice.

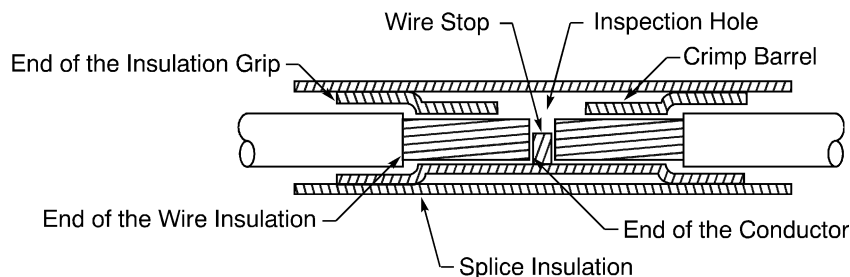
Refer to:

- Figure 23 for the position of the wire in the splice with the wire insulation in the insulation grip
- Figure 24 for the position of the wire in the splice with the wire insulation out of the insulation grip

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The wire insulation is not in the crimp barrel
- If the wire insulation can go into the insulation grip, the insulation grip makes an overlap with the wire insulation
- If the wire insulation cannot go into the insulation grip, the end of the wire insulation is a maximum of 0.13 inch from the end of the insulation grip
- The splice insulation makes an overlap with the wire insulation.

NOTE: The wire insulation, the crimp barrel, and the conductor can be seen through the insulation of the butt splice.

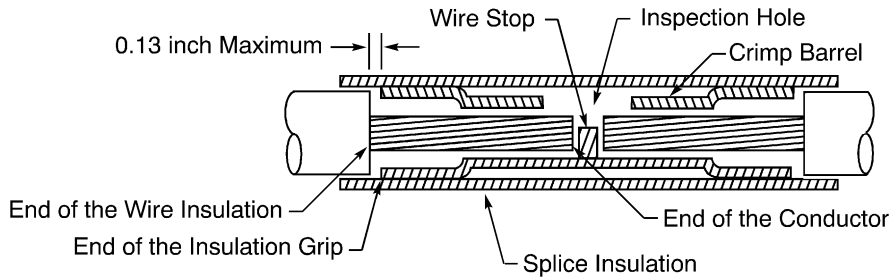


POSITION OF THE WIRE IN THE SPLICE WITH THE WIRE INSULATION IN THE INSULATION GRIP

Figure 23

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE WIRE IN THE SPLICE WITH THE WIRE INSULATION OUT OF THE INSULATION GRIP

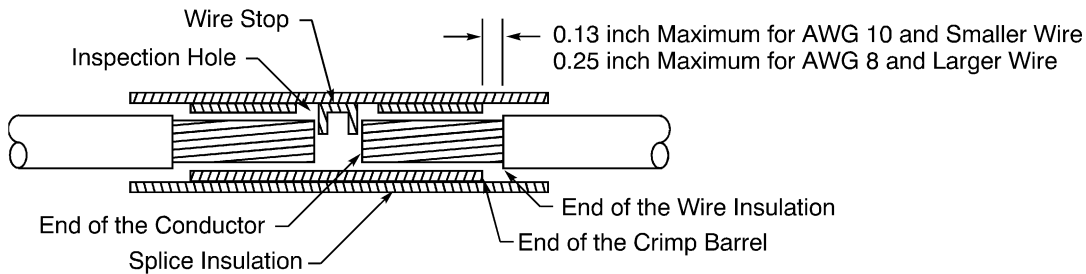
Figure 24

(6) For butt splices without an insulation grip, put the wire in the splice. Refer to Figure 25.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The wire insulation is not in the crimp barrel
- For AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel
- The splice insulation makes an overlap with the wire insulation.

NOTE: The wire insulation, the crimp barrel, and the conductor can be seen through the insulation of the butt splice.



POSITION OF THE WIRE IN THE INSULATED BUTT SPLICE

Figure 25

(7) If it is necessary, remove more insulation from the wire to make a correct fit of the wire in the splice.

(8) Assemble one end of the splice.

- (a) Put the splice in the crimp tool.
- (b) Hold the splice in position with light pressure.
- (c) Put the wire in the end of the splice.
Make sure that the wire is in the correct position.
- (d) Crimp the splice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

(9) Do Step (8) again to assemble the other end of the splice.

C. More Than One Wire to More Than One Wire - Insulated Butt Splice

NOTE: A satisfactory alternative for an insulated butt splice on more than one wire is an uninsulated butt splice and sleeves on more than one wire. Refer to Paragraph 6.E.

(1) Make a selection of an insulated butt splice from Table 10.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

(2) Find the crimp barrel size of the splice from Table 10.

(3) Make a selection of a crimp tool from Table 38.

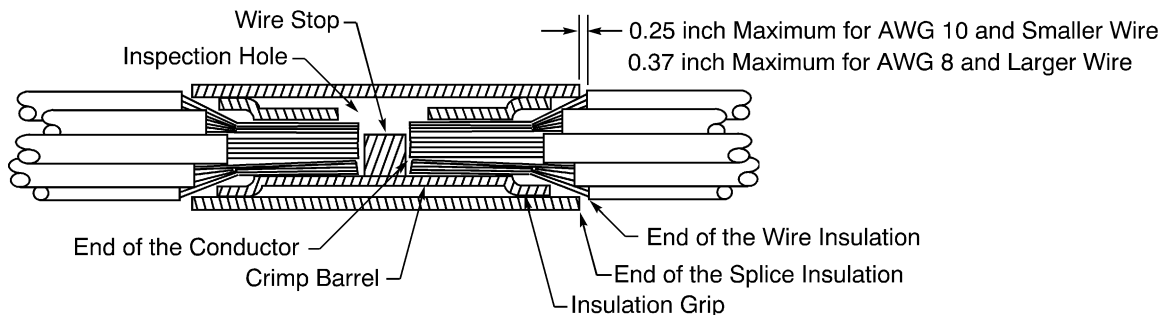
(4) Remove the necessary length of insulation from the end of each wire. Refer to Subject 20-00-15.

(5) For butt splices with an insulation grip, put the wires in the splice. Refer to Figure 26.

Make sure that for each wire:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The wire insulation is not in the crimp barrel
- If the wire insulation can go into the insulation grip, the insulation grip makes an overlap with the wire insulation
- If the wire insulation can go into the splice insulation, the splice insulation makes an overlap with the wire insulation
- If the wire insulation of a AWG 10 and smaller wire cannot go into the splice insulation, the end of the wire insulation is a maximum of 0.25 inch from the end of the splice insulation
- If the wire insulation of a AWG 8 and larger wire cannot go into the splice insulation, the end of the wire insulation is a maximum of 0.37 inch from the end of the splice insulation.

NOTE: The wire insulation, the crimp barrel, and the conductor can be seen through the insulation of the butt splice.



POSITION OF THE WIRES IN THE INSULATED BUTT SPLICE WITH AN INSULATION GRIP
Figure 26

(6) For butt splices without an insulation grip, put the wires in the splice. Refer to Figure 27.

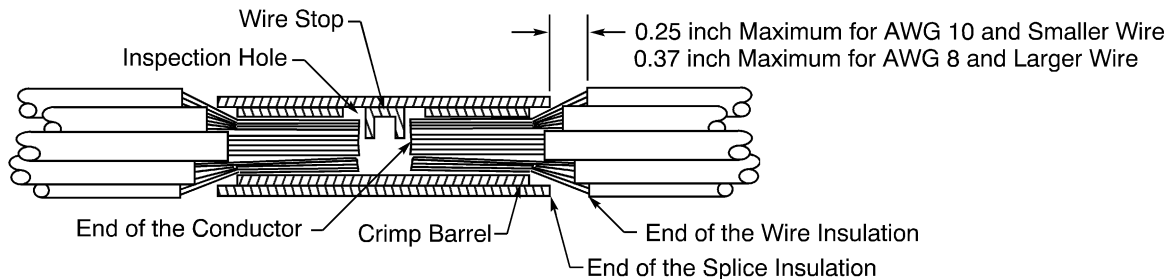
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that for each wire:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The wire insulation is not in the crimp barrel
- If the wire insulation can go into the splice insulation, the splice insulation makes an overlap with the wire insulation
- If the wire insulation of a AWG 10 and smaller wire cannot go into the splice insulation, the end of the wire insulation is a maximum of 0.25 inch from the end of the splice insulation
- If the wire insulation of a AWG 8 and larger wire cannot go into the splice insulation, the end of the wire insulation is a maximum of 0.37 inch from the end of the splice insulation.

NOTE: The wire insulation, the crimp barrel, and the conductor can be seen through the insulation of the butt splice.



POSITION OF THE WIRE IN THE INSULATED BUTT SPLICE
Figure 27

- (7) If it is necessary, remove more insulation from the wire to make a correct fit of the wire in the splice.
- (8) If the end of a wire insulation is not in the splice insulation, put a sleeve on the splice assembly.
 - (a) Make a selection of a Temperature Grade B sleeve. Refer to Table 48.
Make sure that the sleeve has the smallest diameter that can be put on the wires and the splice.
 - (b) Cut a length of the sleeve.
Make sure that the sleeve makes a 0.8 inch minimum overlap with the wire insulation on each wire on each end of the splice assembly.
 - (c) Put the sleeve on the wires on one side of the splice assembly.
- (9) Assemble one end of the splice.
 - (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wires in the end of the splice.
Make sure that the wires are in the correct position.
 - (d) Crimp the splice.
- (10) Do Step (9) again to assemble the other end of the splice.
- (11) If a sleeve is on the wires, install the sleeve on the splice assembly.
 - (a) Align the center of the sleeve with the center of the splice.
 - (b) Shrink the sleeve into position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

D. One Wire to One Wire - Butt Splice, Sleeves

NOTE: A satisfactory alternative for an uninsulated butt splice and sleeves on one wire is an insulated butt splice on one wire. Refer to Paragraph 6.B.

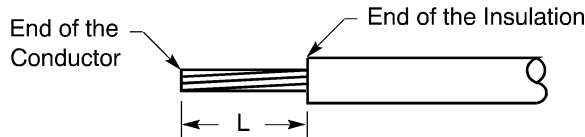
- (1) Make a selection of an uninsulated butt splice from Table 12 or Table 14.
Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.
- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (3) Make a selection of a crimp tool from Table 41.
- (4) Make a selection of a Temperature Grade B heat shrinkable sleeve from Table 48.
Make sure that the sleeve has the smallest diameter that can be put on the wire and the splice.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (5) Cut a 4.0 inch ± 0.2 inch length of the sleeve.
- (6) For an AWG 8 and larger wire, cut one more piece of the sleeve that is 2.4 inches ± 0.2 inch in length.
- (7) Put the sleeves on the end of one of the wires.
- (8) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 28
- Table 59 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 28

Table 59
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C12	0.35	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03

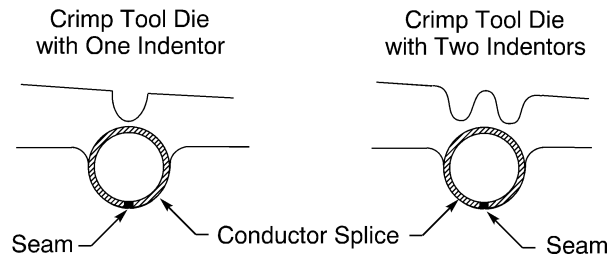
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 59 (continued)

Splice	Removal Length L (inch)	
	Target	Tolerance
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

- (9) Assemble one end of the butt splice:
 - (a) Put the splice in the crimp tool.
 - (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 29.

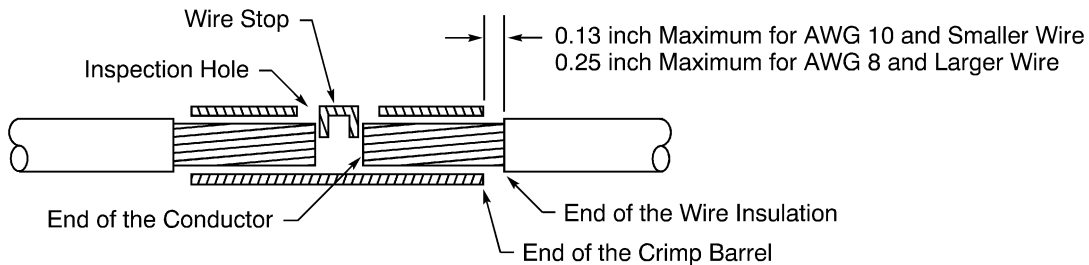


POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL
Figure 29

- (c) Hold the splice in position with light pressure.
- (d) Put the wire in the end of the splice. Refer to Figure 30.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The wire insulation is not in the crimp barrel
- For AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.

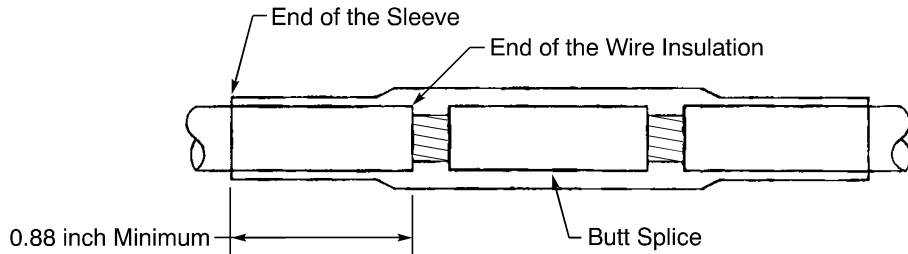


POSITION OF THE WIRE IN THE SPLICE
Figure 30

STANDARD WIRING PRACTICES MANUAL

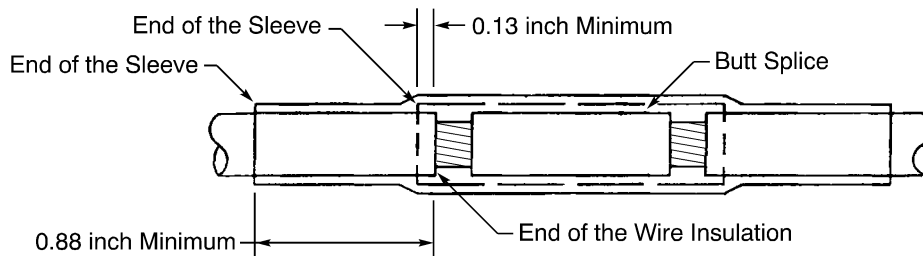
ASSEMBLY OF SPLICES

- (e) Crimp the splice.
- (10) Do Step (9) again to assemble the other end of the butt splice.
- (11) For an AWG 10 and smaller wire:
 - (a) Align the center of the sleeve with the center of the splice. Refer to Figure 31.
Make sure that the sleeve makes a 0.88 inch minimum overlap with the wire insulation on each end of the splice assembly.



POSITION OF THE SLEEVE ON THE SPLICE ASSEMBLY WITH AWG 10 AND SMALLER WIRE
Figure 31

- (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (12) For an AWG 8 and larger wire:
 - (a) Align the center of the short sleeve with the center of the splice. Refer to Figure 32.
Make sure that the short sleeve makes a 0.13 inch minimum overlap with the wire insulation on each end of the splice assembly.



POSITION OF THE SLEEVES ON THE SPLICE ASSEMBLY WITH AWG 8 AND LARGER WIRE
Figure 32

- (b) Shrink the short sleeve in position. Refer to Subject 20-10-14.
 - (c) Align the center of the long sleeve with the center of the splice. Refer to Figure 32.
Make sure that the long sleeve makes a 0.88 inch minimum overlap with the wire insulation on each end of the splice assembly.
 - (d) Shrink the long sleeve into position. Refer to Subject 20-10-14.
- E. More Than One Wire to More Than One Wire - Butt Splice, Sleeves**

NOTE: A satisfactory alternative for an uninsulated butt splice and sleeves on more than one wire is an insulated butt splice on more than one wire. Refer to Paragraph 6.C.

- (1) Make a selection of an uninsulated butt splice from Table 12 or Table 14.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the splice has the smallest CAU size that can accept the total CAU of the conductors. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductors.

- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (3) Make a selection of a crimp tool from Table 41.
- (4) Make a selection of a Temperature Grade B heat shrinkable sleeve from Table 48.

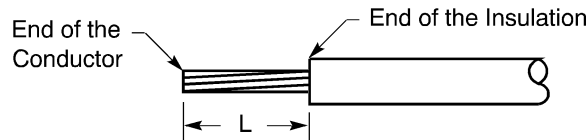
Make sure that the sleeve has the smallest diameter that can be put on the wires and the splice.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (5) Cut a 4.0 inch ± 0.2 inch length of the sleeve.
- (6) Cut one more piece of sleeve that is 2.4 inches ± 0.2 inch in length.
- (7) Put the sleeves on the end of one of the wires.
- (8) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 33
- Table 60 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 33

Table 60
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C12	0.47	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

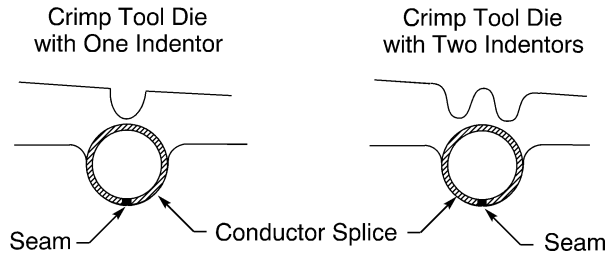
- (9) Assemble one end of the butt splice:

20-30-12

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (a) Put the splice in the crimp tool.
- (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 34.



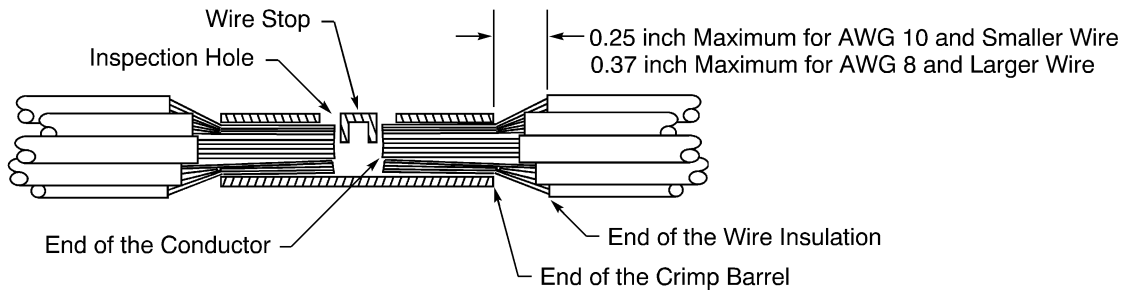
POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL

Figure 34

- (c) Hold the splice in position with light pressure.
- (d) Put the wires in the end of the splice. Refer to Figure 35.

Make sure that:

- The end of the each conductor can be seen in the inspection hole
- The end of the each conductor does not make an overlap with the wire stop
- The wire insulation is not in the crimp barrel
- For AWG 10 and smaller wires, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel
- For AWG 8 and larger wires, the end of the wire insulation is a maximum of 0.37 inch from the end of the crimp barrel.



POSITION OF THE WIRES IN THE BUTT SPLICE

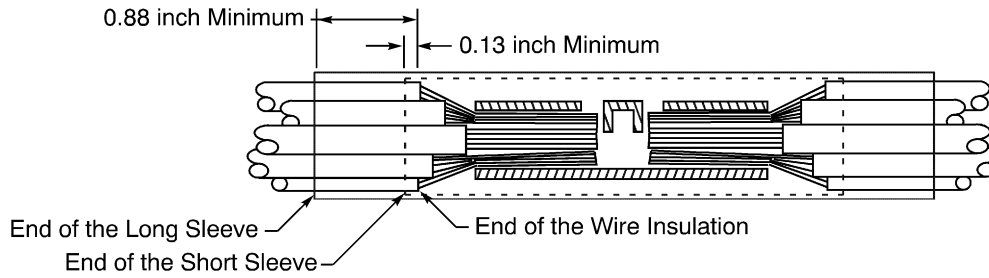
Figure 35

- (e) Crimp the splice.
- (10) Do Step (9) again to assemble the other end of the butt splice.
- (11) Align the center of the short sleeve with the center of the splice. Refer to Figure 36.

Make sure that the short sleeve makes a 0.13 inch minimum overlap with each wire insulation on each end of the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE SLEEVES ON THE SPLICE ASSEMBLY

Figure 36

- (12) Shrink the short sleeve into position. Refer to Subject 20-10-14.
- (13) Align the center of the long sleeve with the center of the splice. Refer to Figure 36.
Make sure that the long sleeve makes a 0.88 inch minimum overlap with the wire insulation on each end of the splice assembly.
- (14) Shrink the long sleeve into position. Refer to Subject 20-10-14.

7. SEALED SPLICE CONFIGURATIONS FOR UNSHIELDED WIRES AND UNSHIELDED CABLES

A. Splice Assembly Configurations

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

To calculate the CAU of the conductor, refer to Table 4.

**Table 61
SEALED SPLICE ASSEMBLY CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	CAU Range		Applicable Condition	Splice Assembly	
		Minimum	Maximum		Configuration	Procedure
One Wire	One Wire	3	457	Fuel Vapor	Tape, Ties	Paragraph 7.B.
				No Fuel Vapor	Tape, Ties	Paragraph 7.B.
				Fuel Vapor	Sealant, Sleeve, Ties	Paragraph 7.C.
				No Fuel Vapor	Sealant, Sleeve, Ties	Paragraph 7.C.
One Wire	Two Wires	3	457	Fuel Vapor	Tape, Ties	Paragraph 7.D.
				No Fuel Vapor	Tape, Ties	Paragraph 7.D.
Two Wires	Two Wires	3	457	Fuel Vapor	Tape, Ties	Paragraph 7.E.
				No Fuel Vapor	Tape, Ties	Paragraph 7.E.
One or Two Wires	One or Two Wires	3	67	No Fuel Vapor	Splice Kit	Paragraph 7.F.
		3	457	No Fuel Vapor	Sleeve	Paragraph 7.G.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

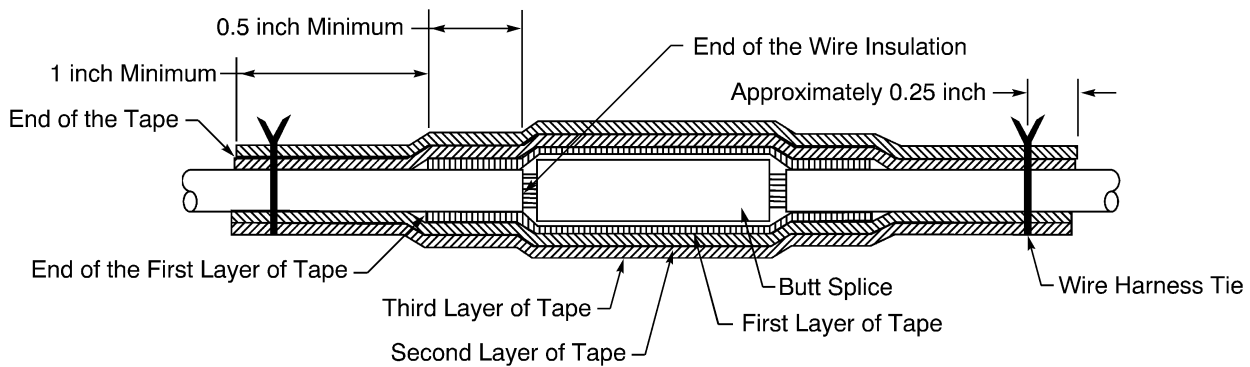
Table 61 (continued)

One End of Splice Assembly	Other End of Splice Assembly	CAU Range		Applicable Condition	Splice Assembly	
		Minimum	Maximum		Configuration	Procedure
One to Five Wires	One to Five Wires	3	457	No Fuel Vapor	Sleeve - 3 to 5 Hole Wire Seal	Paragraph 7.I.
		19	67	No Fuel Vapor	Splice Kit - 3 Hole Wire Seal	Paragraph 7.H.
One Cable	One Cable	3	457	Fuel Vapor	Tape, Ties	Paragraph 7.J.
				No Fuel Vapor	Tape, Ties	Paragraph 7.J.
					Tape, Sleeve	Paragraph 7.K.

B. One Wire to One Wire - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 37

Refer to Figure 37.

- (1) Make a selection of a butt splice from Table 12 or Table 14.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.

- (3) Make a selection of a crimp tool from:

- Table 41 for BACT12C() splices
- Table 42 for NAS1387-() splices
- Table 43 for BACS52K() splices
- Table 43 for Raychem D-609-0() splices.

- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.

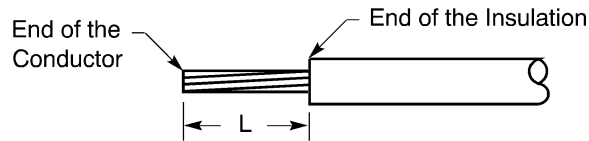
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

(5) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 38
- Table 62 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 38

Table 62
INSULATION REMOVAL LENGTH

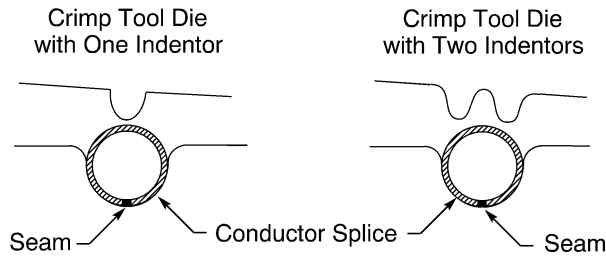
Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C101	0.72	± 0.03
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

(6) Assemble one end of the butt splice.

- (a) Put the splice in the crimp tool.
- (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 39.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



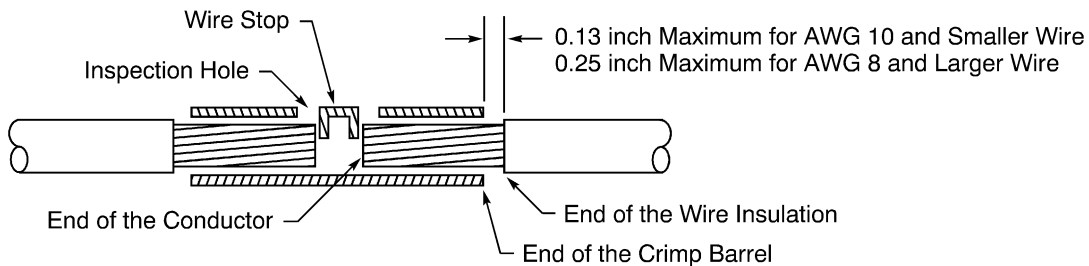
POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL

Figure 39

- (c) Hold the splice in position with light pressure.
- (d) Put the wire in the splice. Refer to Figure 40.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The insulation of the wire is not in the crimp barrel
- For an AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For an AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.



POSITION OF THE WIRE IN THE BUTT SPLICE

Figure 40

- (e) Crimp the splice.
- (7) Do Step (6) again to assemble the other end of the butt splice.
- (8) Put three layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

NOTE: An alternative to the first layer of tape is two layers of Temperature Grade D insulation film strip from Table 50.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that:

- The layer of tape or each layer of film strip starts 0.5 inch minimum farther than the end of the wire insulation
- The layer of tape or each layer of film strip stops 0.5 inch minimum farther than the end of the wire insulation at the other end of the splice assembly
- The layer of tape or each layer of film strip makes a 50 percent overlap
- The second layer of film strip is wound in the opposite direction of the first layer.

(b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than the end of the first layer of tape
- Stops 1 inch minimum farther than the end of the first layer of tape at the other end of the splice assembly
- Makes a minimum 50 percent overlap.

(c) Tightly wind the third layer of tape on the splice assembly in the opposite direction of the second layer.

Make sure that the layer:

- Starts where the second layer stops
- Stops where the second layer starts
- Makes a 50 percent overlap.

(9) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

C. One Wire to One Wire - Sealant, Sleeve, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

**Table 63
NECESSARY MATERIALS**

Material	Part Number	Diameter (inch)	Color	Supplier
Sleeve	Versafit	1/4	Yellow	Raychem
		5/16	Yellow	Raychem
Sealant	BMS 5-63, Type II, Class B-1/2, Form A	-	-	Boeing
	BMS 5-95, Type II, Class B-1/2	-	-	Boeing
	BMS 5-95, Type II, Class B-2	-	-	Boeing

(1) Make a selection of a sleeve from Table 63.

NOTE: An equivalent sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

(2) Make a selection of a sealant from Table 63.

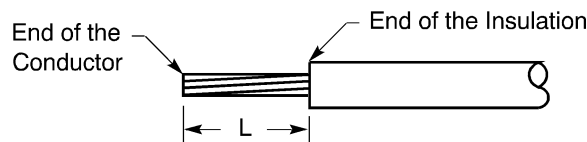
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (3) Make a selection of a butt splice from Table 12 or Table 14.
 Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.
 Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.
- (4) Cut a length of sleeve a minimum of 3.00 inches longer than the splice.
- (5) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (6) Make a selection of a crimp tool from:
 - Table 41 for BACT12C() splices
 - Table 42 for NAS1387-() splices
 - Table 43 for BACS52K() splices
 - Table 43 for Raychem D-609-0() splices.
- (7) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 41
- Table 64 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 41

Table 64
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C101	0.72	± 0.03
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03

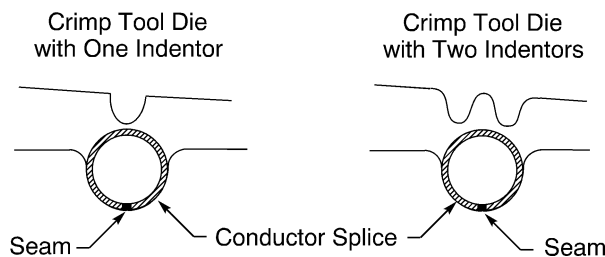
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 64 (continued)

Splice	Removal Length L (inch)	
	Target	Tolerance
NAS1387-6	0.28	± 0.03

- (8) Put the length of sleeve on one of the two wires that are to be spliced together.
- (9) Assemble one end of the butt splice.
 - (a) Put the splice in the crimp tool.
 - (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 42.



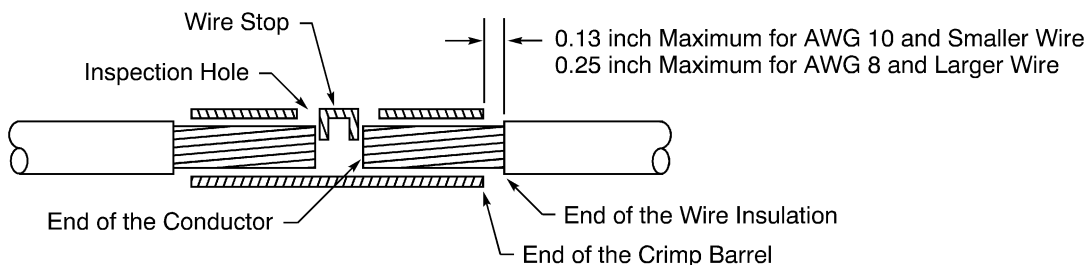
POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL

Figure 42

- (c) Hold the splice in position with light pressure.
- (d) Put the wire in the splice. Refer to Figure 43.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The insulation of the wire is not in the crimp barrel
- For an AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For an AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.



POSITION OF THE WIRE IN THE BUTT SPLICE

Figure 43

- (e) Crimp the splice.

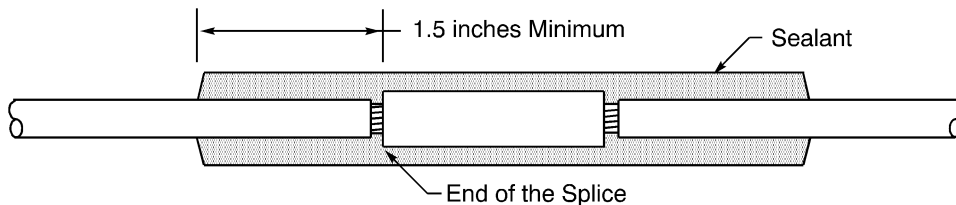
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (10) Do Step (9) again to assemble the other end of the butt splice.
- (11) Apply a continuous layer of the sealant on the area of the splice. Refer to Figure 44.

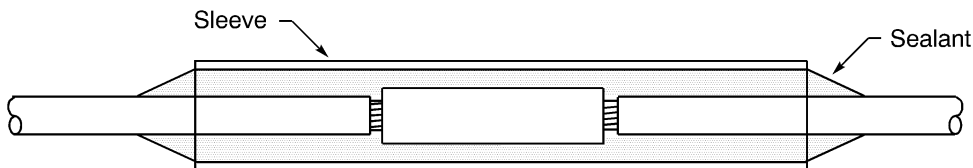
Make sure that:

- The splice has a full layer of sealant on the length and the circumference of the splice surface
- The sealant extends a minimum of 1.5 inches farther than each end of the splice.



CONFIGURATION OF THE SEALANT ON THE SPLICE
Figure 44

- (12) Slowly push the sleeve until the center of the sleeve is aligned with the center of the butt splice.



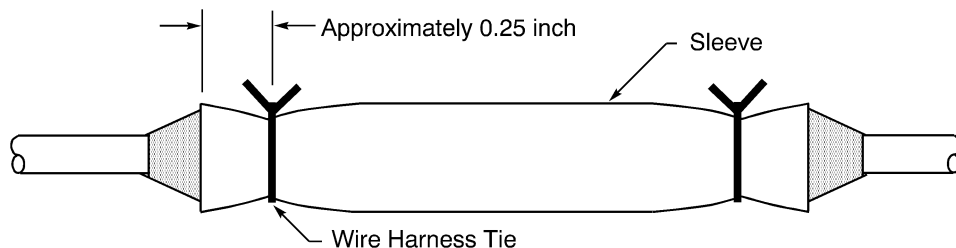
POSITION OF THE SLEEVE ON THE SEALANT
Figure 45

- (13) Apply pressure with the fingers to the sleeve to push the air bubbles out.
- (14) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the sleeve.

Refer to:

- Subject 20-10-11 for the procedure to assemble a wire harness tie
- Figure 46 for the position of the wire harness ties.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.



POSITION OF THE WIRE HARNESS TIES ON THE SLEEVE
Figure 46

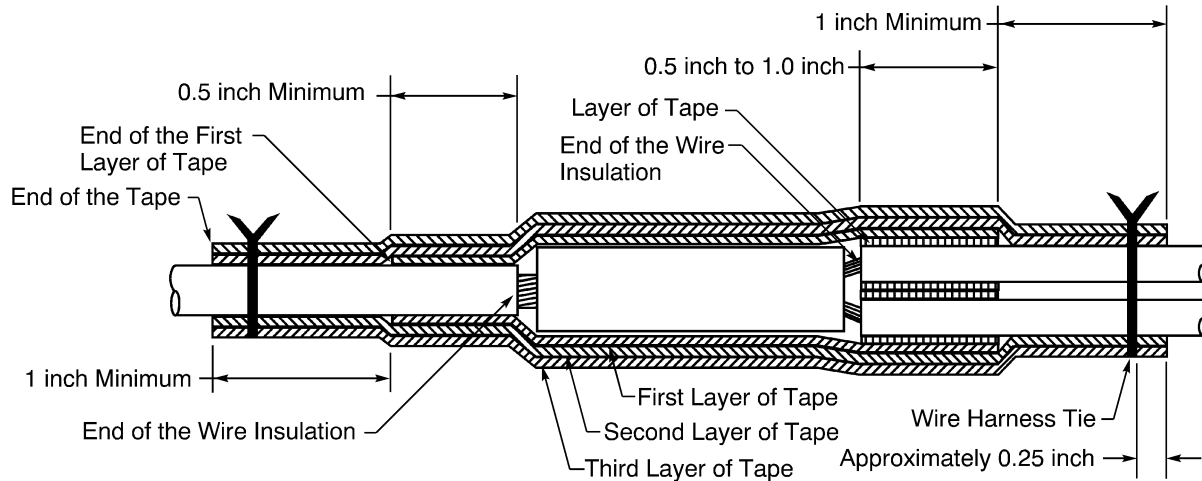
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

D. One Wire to Two Wires - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 47

Refer to Figure 47.

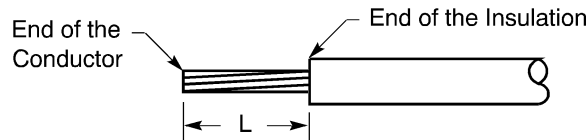
- (1) Make a selection of a butt splice from Table 12 or Table 14.
 Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.
 Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.
- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (3) Make a selection of a crimp tool from:
 - Table 41 for BACT12C() splices
 - Table 42 for NAS1387-() splices
 - Table 43 for BACS52K() splices
 - Table 43 for Raychem D-609-0() splices.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
 Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 48
- Table 65 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



INSULATION REMOVAL LENGTH

Figure 48

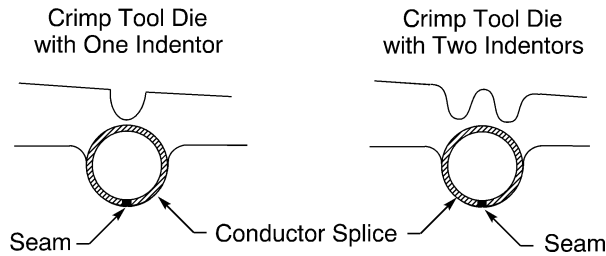
**Table 65
INSULATION REMOVAL LENGTH**

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C101	0.72	± 0.03
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

- (6) Wind a layer of the insulation tape on each of the two wires for the side of the splice with two wires. Make sure that:
 - The edge of the tape is aligned with the end of the wire insulation
 - The tape goes around the circumference of the wire a minimum of two times
 - The tape makes a 100 percent overlap.
- (7) Assemble one end of the butt splice.
 - (a) Put the splice in the crimp tool.
 - (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 49.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



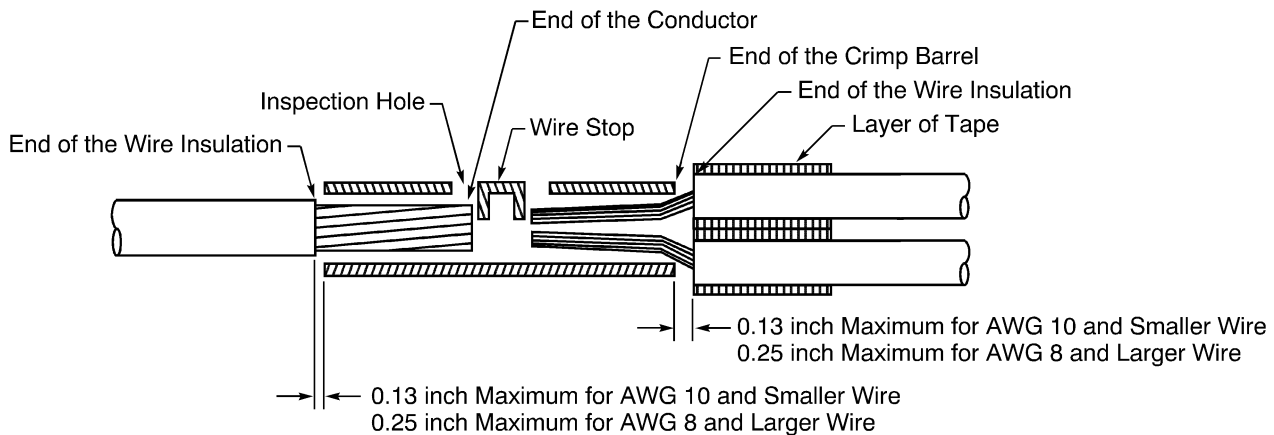
POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL

Figure 49

- (c) Hold the splice in position with light pressure.
- (d) Put the wire or wires in the splice. Refer to Figure 50.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The insulation of the wire is not in the crimp barrel
- For AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.



POSITION OF THE WIRES IN THE BUTT SPLICE

Figure 50

- (e) Crimp the splice.
- (8) Do Step (7) again to assemble the other end side of the butt splice.
- (9) Put three layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer:

- Starts 0.5 inch minimum farther than the end of the wire insulation on the side of the splice with one wire
- Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
- The layer of tape makes a 50 percent overlap.

- (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

- Starts 1 inch minimum farther than the end of the first layer
- Stops 1 inch minimum farther than the end of the first layer at the other end of the splice assembly
- Makes a minimum 50 percent overlap.

- (c) Tightly wind the third layer of tape on the splice assembly in the opposite direction of the second layer.

Make sure that the layer:

- Starts where the second layer stops
- Stops where the second layer starts
- Makes a 50 percent overlap.

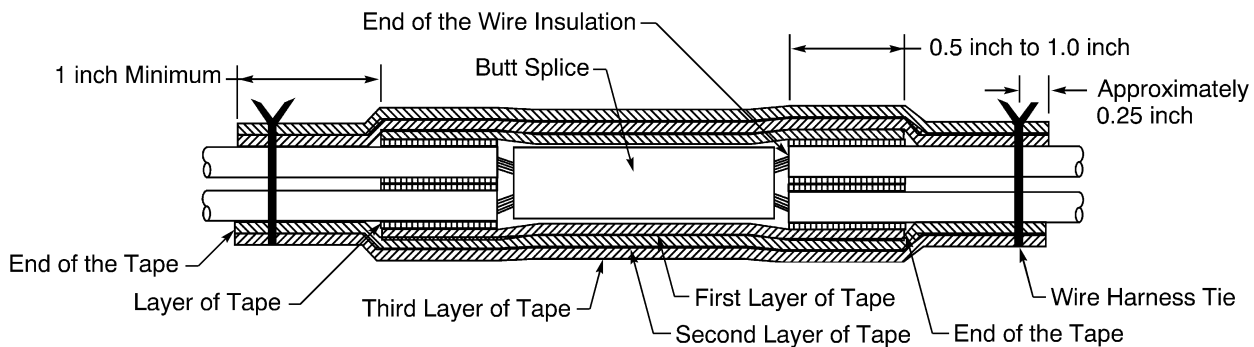
- (10) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

E. Two Wires to Two Wires - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 51

Refer to Figure 51.

- (1) Make a selection of a butt splice from Table 12 or Table 14.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.

STANDARD WIRING PRACTICES MANUAL

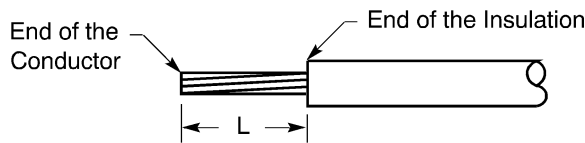
ASSEMBLY OF SPLICES

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (3) Make a selection of a crimp tool from:
 - Table 41 for BACT12C() splices
 - Table 42 for NAS1387-() splices
 - Table 43 for BACS52K() splices
 - Table 43 for Raychem D-609-0() splices.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 52
- Table 66 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 52

Table 66
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C101	0.72	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

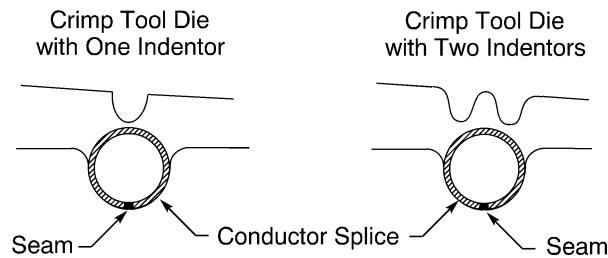
(6) Wind a layer of the insulation tape on each wire.

Make sure that:

- The edge of the tape is aligned with the end of the wire insulation
- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

(7) Assemble one end of the butt splice.

- (a) Put the splice in the crimp tool.
- (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 53.



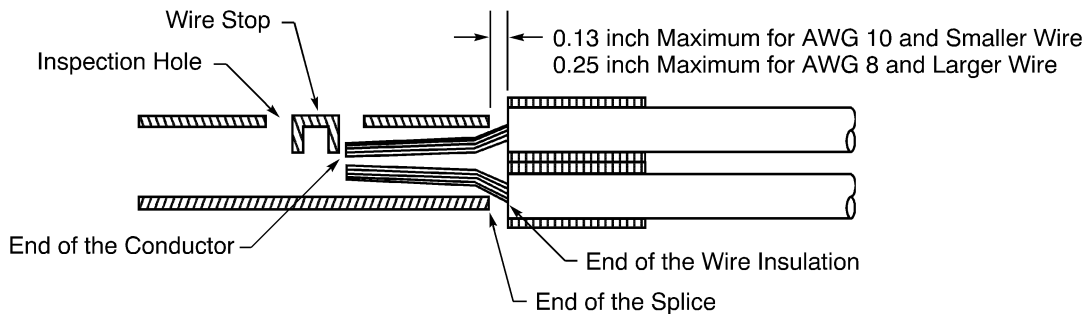
POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL
Figure 53

(c) Hold the splice in position with light pressure.

(d) Put the wire or wires in the splice. Refer to Figure 54.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The insulation of the wire is not in the crimp barrel
- For AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.



POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 54

(e) Crimp the splice.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (8) Do Step (7) again to assemble the other end side of the butt splice.
- (9) Put three layers of insulation tape on the splice assembly.
- (a) Tightly wind the first layer of tape on the splice assembly.
- Make sure that the layer:
- Starts at the rear end of the layers of tape on the two wires on one end of the splice assembly
 - Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
 - Makes a 50 percent overlap.
- (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.
- Make sure that the layer:
- Starts 1 inch minimum farther than where the first layer stops
 - Stops 1 inch minimum farther than where the first layer starts
 - Makes a 50 percent overlap.
- (c) Tightly wind the third layer of tape on the splice assembly in the opposite direction of the second layer.
- Make sure that the layer:
- Starts where the second layer stops
 - Stops where the second layer starts
 - Makes a 50 percent overlap.
- (10) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.
- Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

F. One or Two Wires to One or Two Wires - Splice Kit

For the conditions that are applicable for:

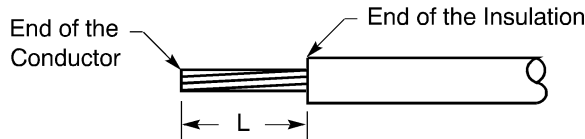
- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
 - The selection of the correct sealed splice configuration, refer to Paragraph 1.C.
- (1) Make a selection of a sealed splice kit with 1 hole in the wire seal from Table 19.
- Make sure that:
- The sleeve can make a seal on the number of wires in one end of the splice
 - The splice kit has the smallest CAU range that can accept the total CAU of the conductor.
- Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.
- (2) Find the part number of the butt splice in the splice kit from Table 20.
- (3) Find the crimp barrel size of the splice from Table 20.
- (4) Make a selection of a crimp tool from Table 43.
- (5) Put the sleeve on the one or two wires of one end of the splice assembly.
- (6) Remove the necessary length of insulation from the end of each wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

- Figure 55
- Table 67 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 55

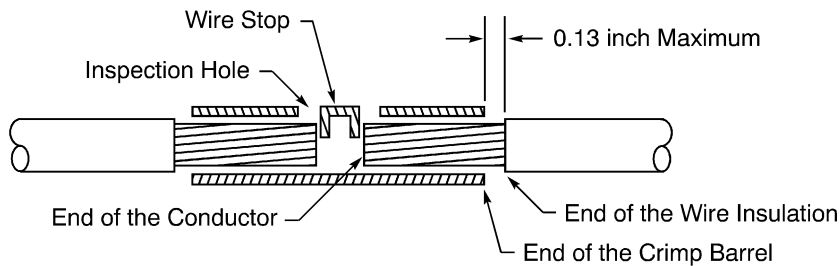
Table 67
INSULATION REMOVAL LENGTH

Butt Splice	Removal Length L (inch)	
	Target	Tolerance
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03

- (7) Assemble one end of the butt splice.
- Put the splice in the crimp tool.
 - Hold the splice in position with light pressure.
 - Put all of the wires for one end of the splice in the crimp barrel. Refer to Figure 56 and Figure 57.

Make sure that:

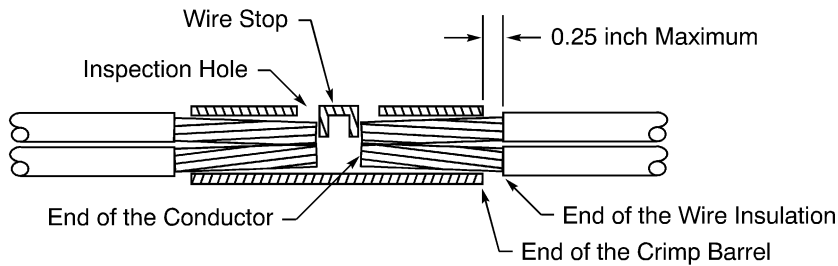
- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The insulation of each wire is not in the crimp barrel
- For one wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For two wires, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.



POSITION OF ONE WIRE IN THE BUTT SPLICE
Figure 56

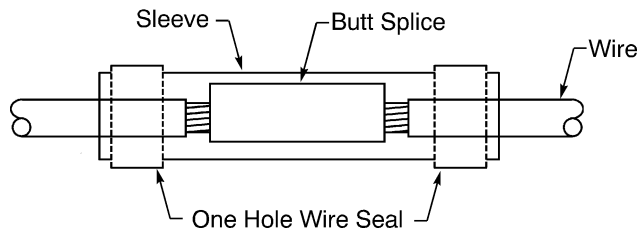
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

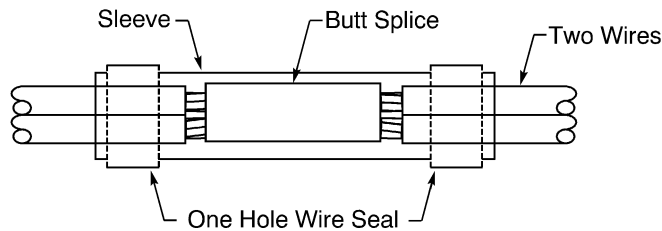


POSITION OF TWO WIRES IN THE BUTT SPLICE
Figure 57

- (d) Crimp the splice.
- (8) Do Step (7) again to assemble the other end of the butt splice.
- (9) Align the center of the sleeve with the center of the butt splice. Refer to Figure 58 and Figure 59.



POSITION OF THE SLEEVE ON ONE WIRE
Figure 58



POSITION OF THE SLEEVE ON TWO WIRES
Figure 59

- (10) Shrink the sleeve into position. Refer to Subject 20-10-14.
 Make sure that the seal material that comes out of the ends of the sleeve does not have rough edges.

G. One or Two Wires to One or Two Wires - Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

- (1) Make a selection of a butt splice from Table 12 or Table 14.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.
Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

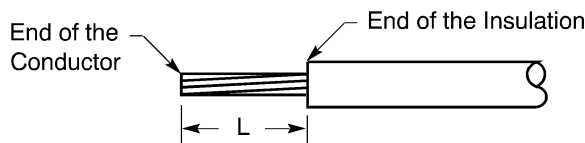
- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (3) Make a selection of a crimp tool from:
 - Table 41 for BACT12C() splices
 - Table 42 for NAS1387-() splices
 - Table 43 for BACS52K() splices
 - Table 43 for Raychem D-609-0() splices.
- (4) Make a selection of a sleeve with 1 hole in the wire seal from Table 18.

Make sure that:

- The sleeve can make a seal on the number of wires in one end of the splice
 - The sleeve has the smallest diameter that can be moved easily on the wires, if the sleeve is a DWP-125 sleeve.
- (5) If the sleeve is a DWP-125 sleeve, cut the sleeve to the necessary length.
Make sure that the sleeve extends a minimum of 0.8 inch farther than each end of the splice.
 - (6) Put the sleeve on all the wires of one end of the splice assembly.
 - (7) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 60
- Table 68 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 60

Table 68
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C101	0.72	± 0.03
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03

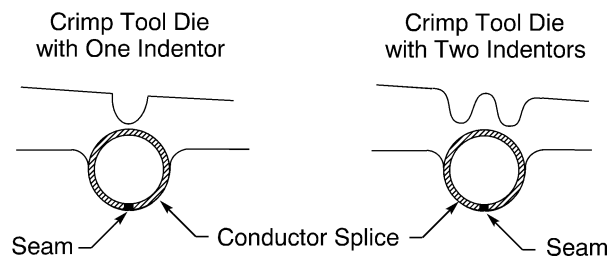
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 68 (continued)

Splice	Removal Length L (inch)	
	Target	Tolerance
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

- (8) Assemble one end of the butt splice.
- (a) Put the splice in the crimp tool.
 - (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 61.



POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL

Figure 61

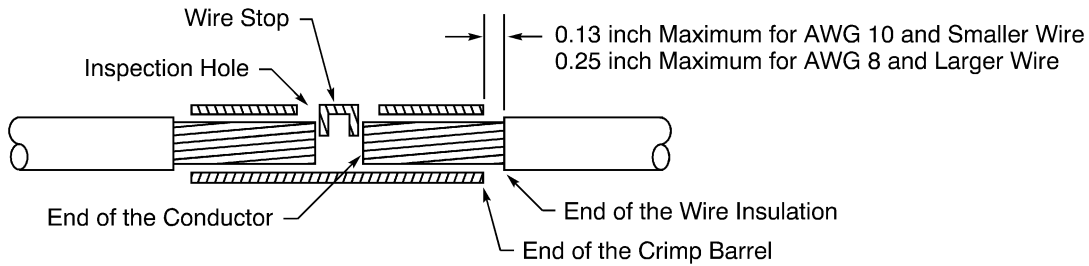
- (c) Hold the splice in position with light pressure.
- (d) Put the wire or wires for one end of the splice in the crimp barrel. Refer to Figure 62 and Figure 63.

Make sure that:

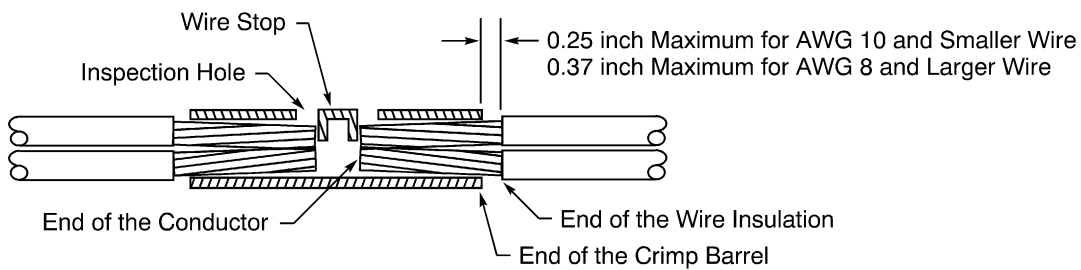
- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The insulation of each wire is not in the crimp barrel
- For one AWG 10 or smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For one AWG 8 or larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel
- For two wires, the end of the insulation of each AWG 10 or smaller wire is a maximum of 0.25 inch from the end of the crimp barrel
- For two wires, the end of the insulation of each AWG 8 or larger wire is a maximum of 0.37 inch from the end of the crimp barrel.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

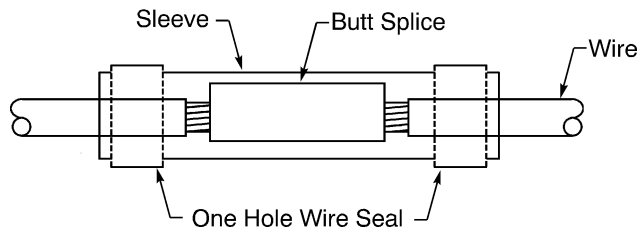


POSITION OF ONE WIRE IN THE BUTT SPLICE
Figure 62

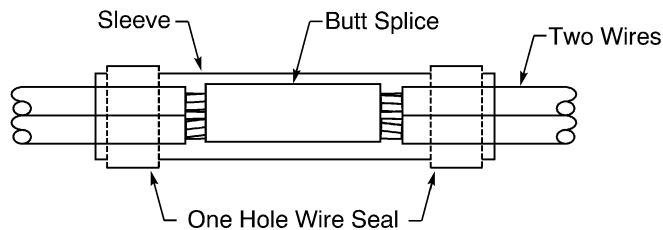


POSITION OF TWO WIRES IN THE BUTT SPLICE
Figure 63

- (e) Crimp the splice.
- (9) Do Step (8) again to assemble the other end of the butt splice.
- (10) Align the center of the sleeve with the center of the butt splice. Refer to Figure 64 and Figure 65.



POSITION OF THE SLEEVE ON ONE WIRE
Figure 64



POSITION OF THE SLEEVE ON TWO WIRES
Figure 65

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (11) Shrink the sleeve into position. Refer to Subject 20-10-14.

Make sure that the seal material that comes out of the ends of the sleeve does not have rough edges.

H. One to Five Wires to One to Five Wires - Splice Kit

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

- (1) Make a selection of a sealed splice kit with 3 holes in the wire seal from Table 19.

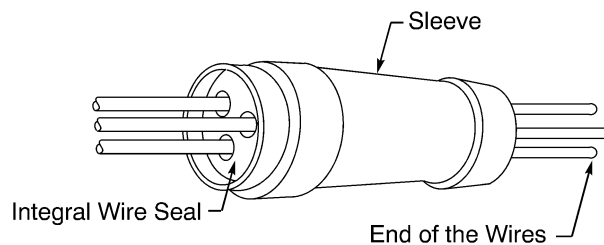
Make sure that the splice kit has the smallest CAU range that can accept the total CAU of the conductor.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) Find the part number of the butt splice in the splice kit from Table 20.
- (3) Find the crimp barrel size of the splice from Table 20.
- (4) Make a selection of a crimp tool from Table 43.
- (5) Put the sleeve on all the wires of one end of the splice assembly. Refer to Figure 5 and Figure 66.

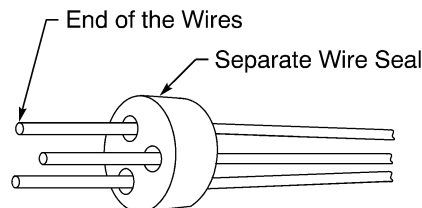
Make sure that:

- The end of the sleeve with the integral wire seal goes on the wires first
- No more than two wires are in one hole of the wire seal.

**SLEEVE ON THE WIRES****Figure 66**

- (6) Put the separate 3 hole wire seal on all the wires of the other end of the splice assembly. Refer to Figure 5 and Figure 67.

Make sure that no more than two wires are in one hole of the wire seal.

**SEPARATE WIRE SEAL ON THE WIRES****Figure 67**

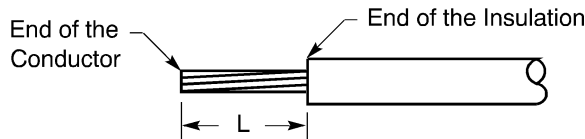
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

(7) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 68
- Table 69 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 68

Table 69
INSULATION REMOVAL LENGTH

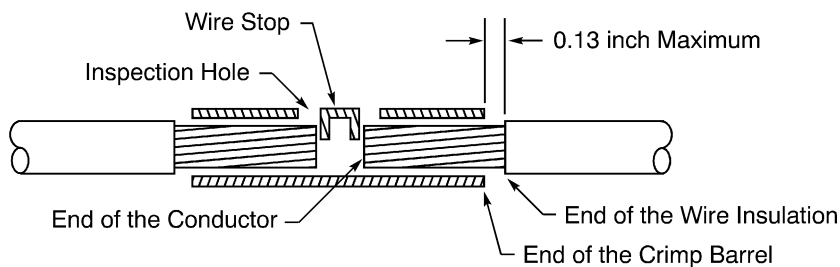
Butt Splice	Removal Length L (inch)	
	Target	Tolerance
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03

(8) Assemble one end of the butt splice.

- (a) Put the splice in the crimp tool.
- (b) Hold the splice in position with light pressure.
- (c) Put all of the wires for one end of the splice in the crimp barrel. Refer to Figure 69 and Figure 70.

Make sure that:

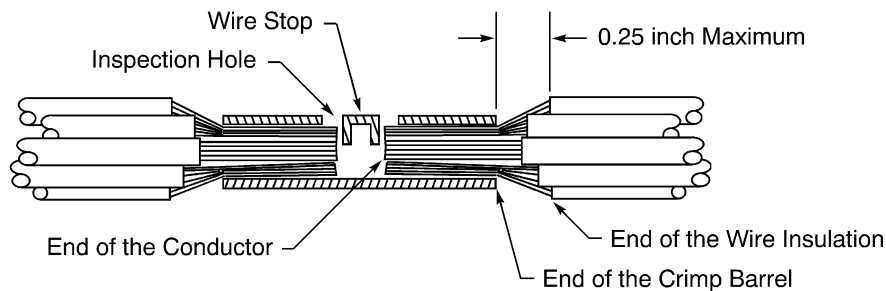
- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The insulation of each wire is not in the crimp barrel
- For one wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For more than one wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.



POSITION OF ONE WIRE IN THE BUTT SPLICE
Figure 69

STANDARD WIRING PRACTICES MANUAL

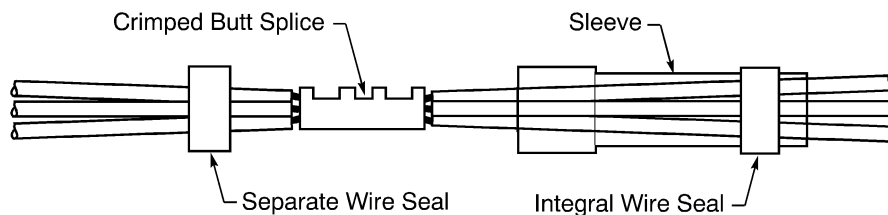
ASSEMBLY OF SPLICES



POSITION OF MORE THAN ONE WIRE IN THE BUTT SPLICE

Figure 70

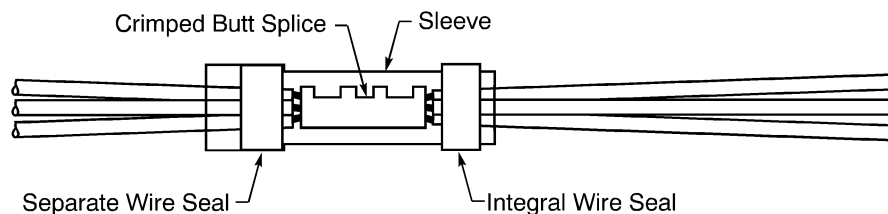
- (d) Crimp the splice.
- (9) Do Step (8) again to assemble the other end of the butt splice. Refer to Figure 71.



CRIMPED SPLICE ASSEMBLY

Figure 71

- (10) Align the center of the sleeve with the center of the butt splice.
- (11) Push the separate 3 hole wire seal fully into the sleeve until it is as near the splice as possible. Refer to Figure 72.



POSITION OF THE SLEEVE AND THE WIRE SEAL

Figure 72

- (12) Shrink the sleeve into position. Refer to Subject 20-10-14.
Make sure that the seal material that comes out of the ends of the sleeve does not have rough edges.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES****I. One to Five Wires to One to Five Wires - Sleeve**

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

- (1) Make a selection of a butt splice from Table 12 or Table 14.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.

- (3) Make a selection of a crimp tool from:

- Table 41 for BACT12C() splices
- Table 42 for NAS1387-() splices
- Table 43 for BACS52K() splices
- Table 43 for Raychem D-609-0() splices.

- (4) Make a selection of a sleeve with 3 to 5 holes in the wire seal from Table 18.

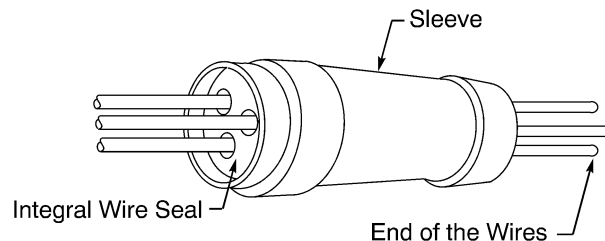
Make sure that the selection is for:

- The applicable splice
- The maximum number of wires in each end of the splice assembly.

- (5) Put the sleeve on all the wires of one end of the splice assembly. Refer to Figure 3 and Figure 73.

Make sure that:

- The end of the sleeve with the integral wire seal goes on the wires first
- No more than two wires are in one hole of the wire seal.

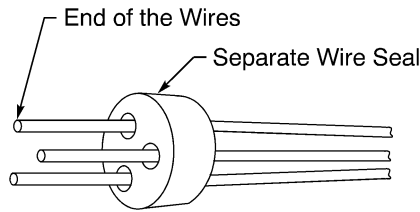
**SLEEVE ON THE WIRES****Figure 73**

- (6) Put the separate wire seal with 3 to 5 holes on all the wires of the other end of the splice assembly. Refer to Figure 3 and Figure 74.

Make sure that no more than two wires are in one hole of the wire seal.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

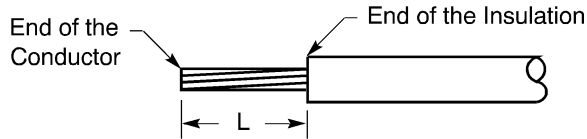


SEPARATE WIRE SEAL ON THE WIRES
Figure 74

(7) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 75
- Table 70 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 75

Table 70
INSULATION REMOVAL LENGTH

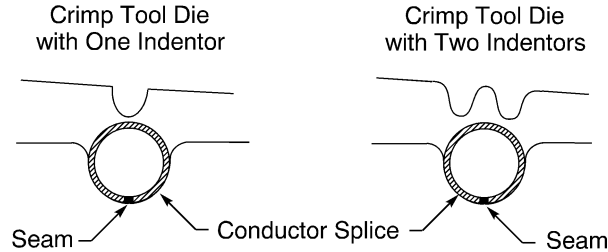
Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C101	0.72	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

(8) Assemble one end of the butt splice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (a) Put the splice in the crimp tool.
- (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 76.

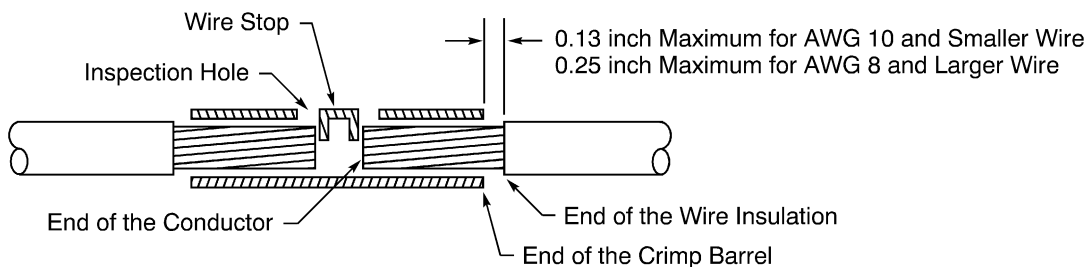


POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL
Figure 76

- (c) Hold the splice in position with light pressure.
- (d) Put all of the wires for one end of the splice in the crimp barrel. Refer to Figure 77 and Figure 78.

Make sure that:

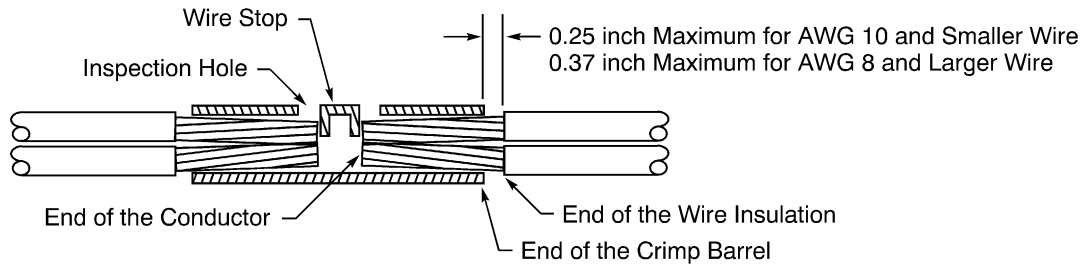
- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The insulation of each wire is not in the crimp barrel
- For one AWG 10 or smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For one AWG 8 or larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel
- For two wires, the end of the insulation of each AWG 10 or smaller wire is a maximum of 0.25 inch from the end of the crimp barrel
- For two wires, the end of the insulation of each AWG 8 or larger wire is a maximum of 0.37 inch from the end of the crimp barrel.



POSITION OF ONE WIRE IN THE BUTT SPLICE
Figure 77

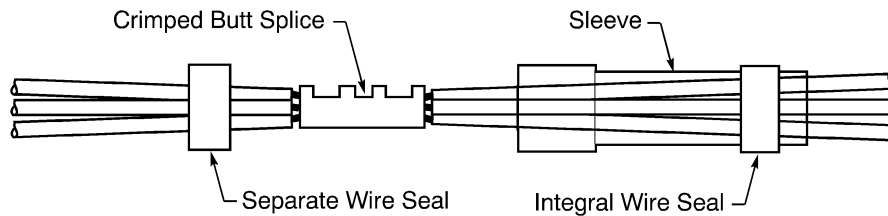
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



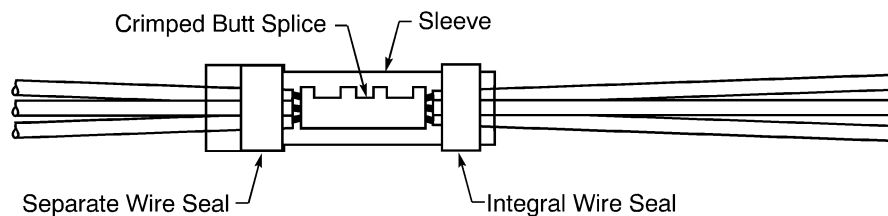
POSITION OF MORE THAN ONE WIRE IN THE BUTT SPLICE
Figure 78

- (e) Crimp the splice.
- (9) Do Step (8) again to assemble the other end of the butt splice.



CRIMPED SPLICE
Figure 79

- (10) Align the center of the sleeve with the center of the butt splice.
- (11) Push the wire seal with 3 to 5 holes fully into the sleeve until it is as near the splice as possible.



POSITION OF THE SLEEVE AND THE WIRE SEAL
Figure 80

- (12) Shrink the sleeve into position. Refer to Subject 20-10-14.
 Make sure that the seal material that comes out of the ends of the sleeve does not have rough edges.

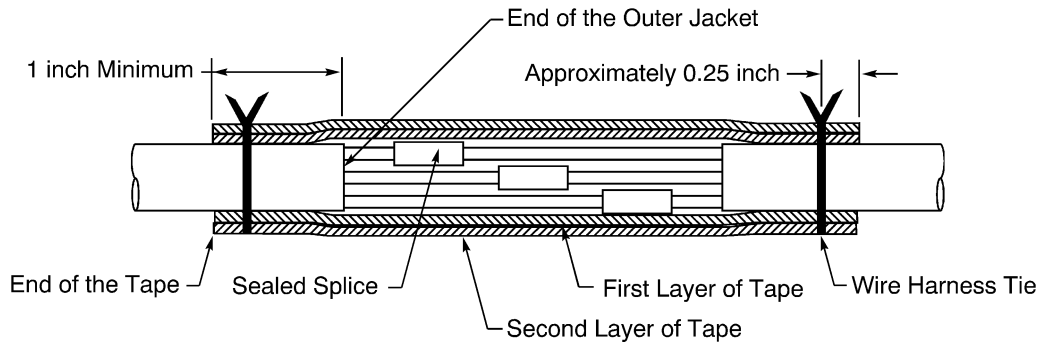
J. One Cable to One Cable - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE CABLE SPLICE ASSEMBLY
Figure 81

Refer to Figure 81.

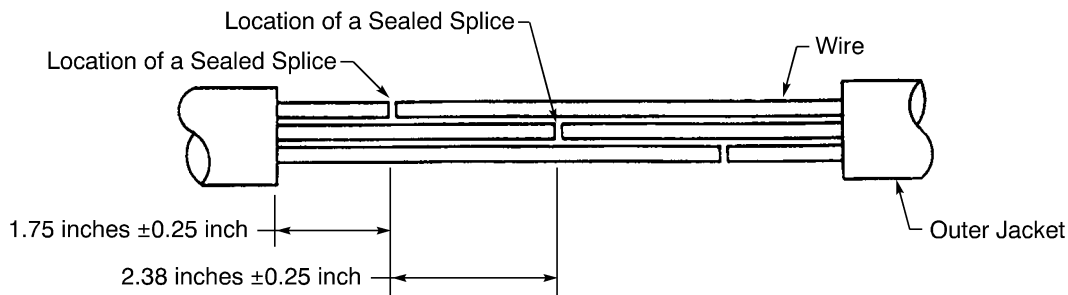
(1) Prepare the cable.

Refer to:

- Figure 82
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on a different wire is 2.38 inches \pm 0.25 inch.



CABLE PREPARATION
Figure 82

- (2) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (3) Assemble the sealed splices on the wires in the cable. Refer to Paragraph 7.B.
- (4) Put two layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer:

- Starts 1 inch minimum farther than the end of the outer jacket
- Stops 1 inch minimum farther than the end of the outer jacket at the other end of the splice assembly
- Makes a minimum 50 percent overlap.

- (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

- Starts where the first layer stops
- Stops where the first layer starts
- Makes a 50 percent overlap.

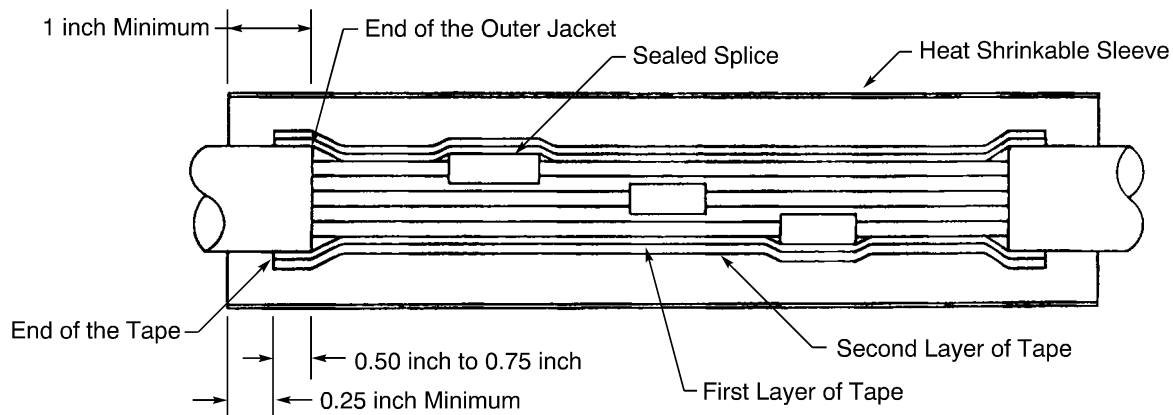
- (5) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

K. One Cable to One Cable - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE CABLE SPLICE ASSEMBLY

Figure 83

Refer to Figure 83.

- (1) Prepare the cable.

STANDARD WIRING PRACTICES MANUAL

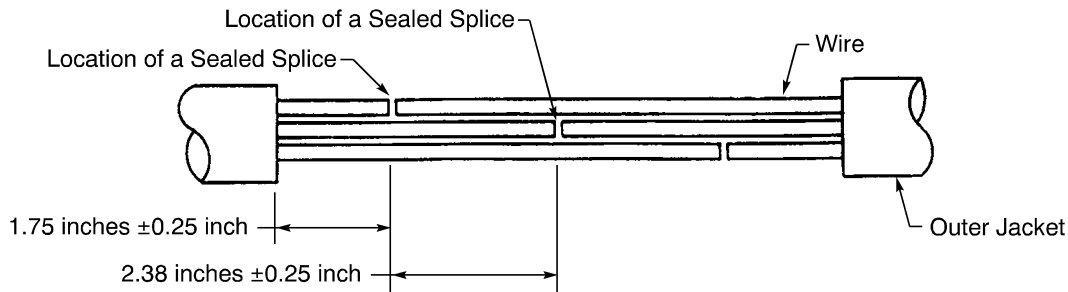
ASSEMBLY OF SPLICES

Refer to:

- Figure 84
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



CABLE PREPARATION
Figure 84

- (2) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (3) Make a selection of a Temperature Grade B heat shrinkable sleeve from Table 48.

Make sure that the sleeve has the smallest diameter that can move easily on the cable splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (4) Cut the necessary length of the sleeve.
Make sure that the sleeve can make a minimum overlap of 1 inch on each end of the outer jacket.
- (5) Put the sleeve on the cable of one end of the splice assembly.
- (6) Calculate the CAU of the conductors. Refer to Paragraph 1.D.
- (7) Assemble the sealed splices on the wires in the cable.
Refer to Table 61 for an applicable sealed splice configuration on wire.
- (8) Put two layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.
Make sure that the layer:
 - Makes an overlap between 0.50 inch and 0.75 inch on each end of the outer jacket
 - Makes a 50 percent overlap.
 - (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer:

- Starts where the first layer stops
- Stops where the first layer starts
- Makes a 50 percent overlap.

(9) Align the center of the sleeve with the center of the splice assembly.

Make sure that on each end of the splice assembly, the distance from the end of the layer of tape to the end of the sleeve is 0.25 inch minimum.

(10) Shrink the sleeve into position. Refer to Subject 20-10-14.

8. SEALED SPLICE CONFIGURATIONS FOR UNSHIELDED WIRES AND UNSHIELDED CABLES FOR HIGH TEMPERATURE

A. Splice Assembly Configurations

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

To calculate the CAU of the conductor, refer to Table 4.

**Table 71
SEALED SPLICE ASSEMBLY CONFIGURATIONS FOR HIGH TEMPERATURE**

One End of Splice Assembly	Other End of Splice Assembly	CAU Range		Applicable Condition	Splice Assembly	
		Minimum	Maximum		Configuration	Procedure
One Wire	One Wire	5	138	Fuel Vapor	Tape, Ties	Paragraph 8.B.
				No Fuel Vapor	Tape, Sleeve	Paragraph 8.C.
					Tape, Ties	Paragraph 8.B.
One Wire	Two Wires	5	138	Fuel Vapor	Tape, Ties	Paragraph 8.D.
				No Fuel Vapor	Tape, Sleeve	Paragraph 8.E.
					Tape, Ties	Paragraph 8.D.
Two Wires	Two Wires	5	138	Fuel Vapor	Tape, Ties	Paragraph 8.F.
				No Fuel Vapor	Tape, Sleeve	Paragraph 8.G.
					Tape, Ties	Paragraph 8.F.
One Cable	One Cable	5	138	Fuel Vapor	Tape, Ties	Paragraph 8.H.
				No Fuel Vapor	Tape, Sleeve	Paragraph 8.I.
					Tape, Ties	Paragraph 8.H.

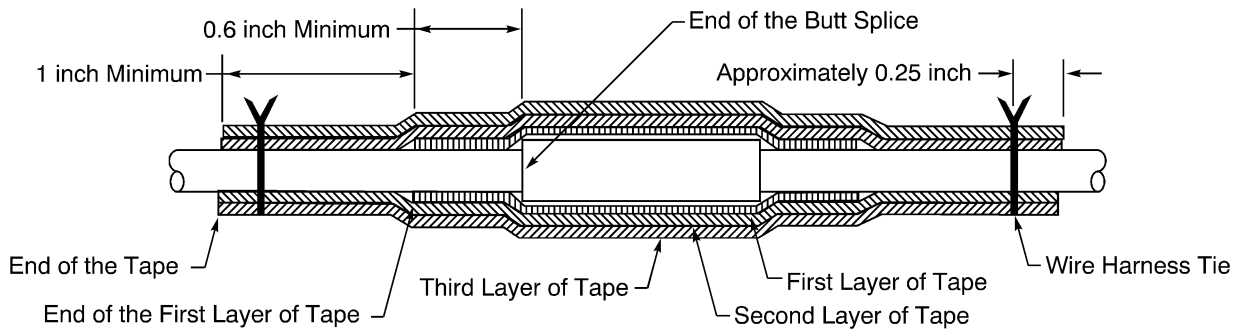
B. One Wire to One Wire - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 85

Refer to Figure 85.

- (1) Find the CAU of the conductor.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) If the CAU of the conductor is less than the minimum CAU for the butt splice, increase the CAU of the conductor.

Refer to:

- Table 15 for the minimum CAU of the butt splice
- Paragraph 2. for the applicable conditions and procedures for the increase of the CAU.

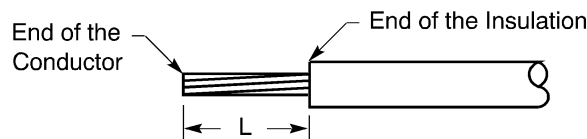
- (3) Make a selection of a butt splice from Table 15.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.

- (4) Find the crimp barrel size of the splice from Table 15.
- (5) Make a selection of a crimp tool from Table 44.
- (6) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (7) Remove the necessary length of insulation from the end of the wires.

Refer to:

- Figure 86
- Table 72 for the insulation removal length for a wire that can go into the insulation grip
- Table 73 for the insulation removal length for a wire that cannot go into the insulation grip
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 86

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 72
INSULATION REMOVAL LENGTH FOR A WIRE THAT CAN GO INTO THE INSULATION GRIP**

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.37	± 0.02
BACT12C15	0.23	± 0.02
BACT12C20	0.23	± 0.02

**Table 73
INSULATION REMOVAL LENGTH FOR A WIRE THAT CANNOT GO INTO THE INSULATION GRIP**

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02

- (8) Assemble one end of the butt splice.
- (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wire in the splice.

Refer to:

- Figure 87 for the position of the wire in the splice with the wire insulation in the insulation grip
- Figure 88 for the position of the wire in the splice with the wire insulation out of the insulation grip.

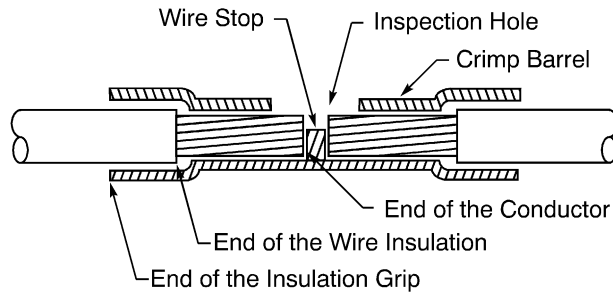
Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- If the wire insulation can go into the insulation grip, the end of the wire insulation is in the insulation grip
- If the wire insulation cannot go into the insulation grip, the end of the wire insulation is a maximum of 0.13 inch from the end of the insulation grip
- The wire insulation is not in the crimp barrel.

NOTE: The insulation removal length can be changed to make these conditions satisfactory.

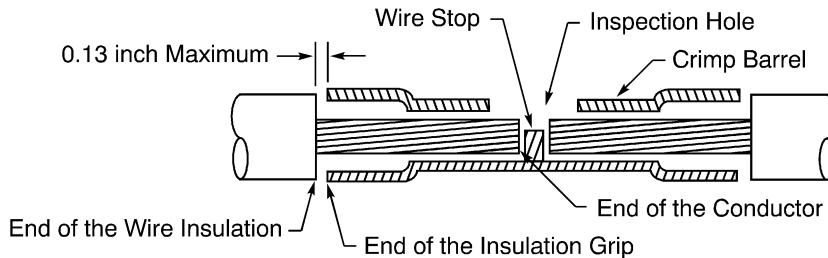
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION IN THE INSULATION GRIP

Figure 87



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION OUT OF THE INSULATION GRIP

Figure 88

- (d) Crimp the splice.
- (9) Do Step (8) again to assemble the other end of the butt splice.
- (10) Put three layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

NOTE: An alternative to the first layer of tape is two layers of Temperature Grade D insulation film strip from Table 50.

Make sure that:

- The layer of tape or each layer of film strip starts 0.6 inch minimum farther than the end of the splice
 - The layer of tape or each layer of film strip stops 0.6 inch minimum farther than the end of the splice at the other end of the splice assembly
 - The layer of tape or each layer of film strip makes a 50 percent overlap
 - The second layer of film strip is wound in the opposite direction of the first layer.
- (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer of tape:

- Starts 1 inch minimum farther than the end of the first layer of tape
- Stops 1 inch minimum farther than the end of the first layer of tape at the other end of the splice assembly
- Makes a minimum 50 percent overlap.

- (c) Tightly wind the third layer of tape on the splice assembly in the opposite direction of the second layer.

Make sure that the layer of tape:

- Starts where the second layer of tape stops
- Stops where the second layer of tape starts
- Makes a 50 percent overlap.

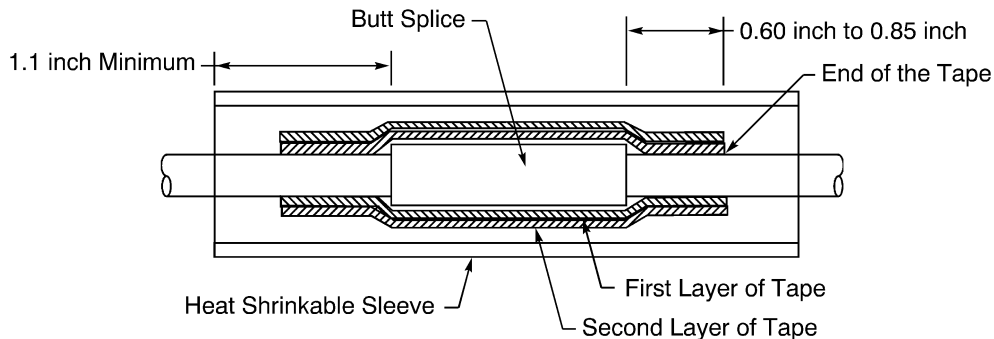
- (11) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

C. One Wire to One Wire - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 89

Refer to Figure 89.

- (1) Find the CAU of the conductor.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) If the CAU of the conductor is less than the minimum CAU for the butt splice, increase the CAU of the conductor.

Refer to:

- Table 15 for the minimum CAU of the butt splice
- Paragraph 2. for the applicable conditions and procedures for the increase of the CAU.

- (3) Make a selection of a butt splice from Table 15.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.

- (4) Find the crimp barrel size of the splice from Table 15.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

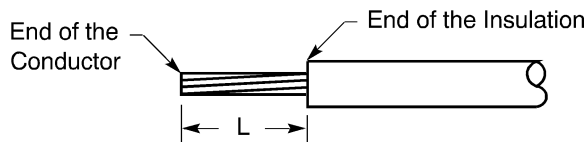
- (5) Make a selection of a crimp tool from Table 44.
- (6) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (7) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.
Make sure that the sleeve has the smallest diameter that can be put on the splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (8) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1.1 inches farther than each end of the splice.
- (9) Put the sleeve on the wire of one end of the splice assembly.
- (10) Remove the necessary length of insulation from the end of the wires.

Refer to:

- Figure 90
- Table 74 for the insulation removal length for a wire that can go into the insulation grip
- Table 75 for the insulation removal length for a wire that cannot go into the insulation grip
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 90

Table 74
INSULATION REMOVAL LENGTH FOR A WIRE THAT CAN GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.37	± 0.02
BACT12C15	0.23	± 0.02
BACT12C20	0.23	± 0.02

Table 75
INSULATION REMOVAL LENGTH FOR A WIRE THAT CANNOT GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02

- (11) Assemble one end of the butt splice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (a) Put the splice in the crimp tool.
- (b) Hold the splice in position with light pressure.
- (c) Put the wire in the splice.

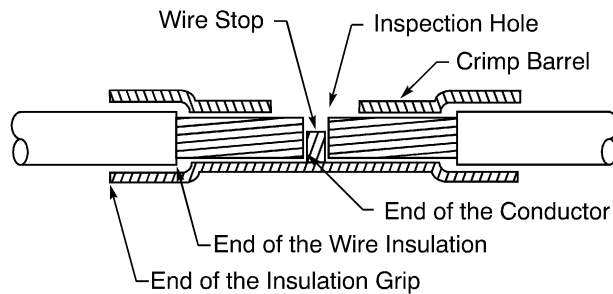
Refer to:

- Figure 91 for the position of the wire in the splice with the wire insulation in the insulation grip
- Figure 92 for the position of the wire in the splice with the wire insulation out of the insulation grip.

Make sure that:

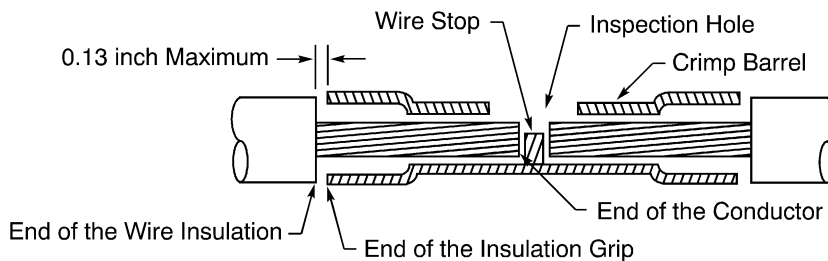
- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- If the wire insulation can go into the insulation grip, the end of the wire insulation is in the insulation grip
- The end of the wire insulation is a maximum of 0.13 inch from the end of the insulation grip
- The wire insulation is not in the crimp barrel.

NOTE: The insulation removal length can be changed to make these conditions satisfactory.



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION IN THE INSULATION GRIP

Figure 91



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION OUT OF THE INSULATION GRIP

Figure 92

- (d) Crimp the splice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (12) Do Step (11) again to assemble the other end of the butt splice.
- (13) Put two layers of insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

Make sure that the layer:

 - Starts 0.6 inch minimum to 0.85 inch maximum farther than the end of the splice
 - Stops 0.6 inch minimum to 0.85 inch maximum farther than the other end of the splice
 - Makes a 50 percent overlap.
 - (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

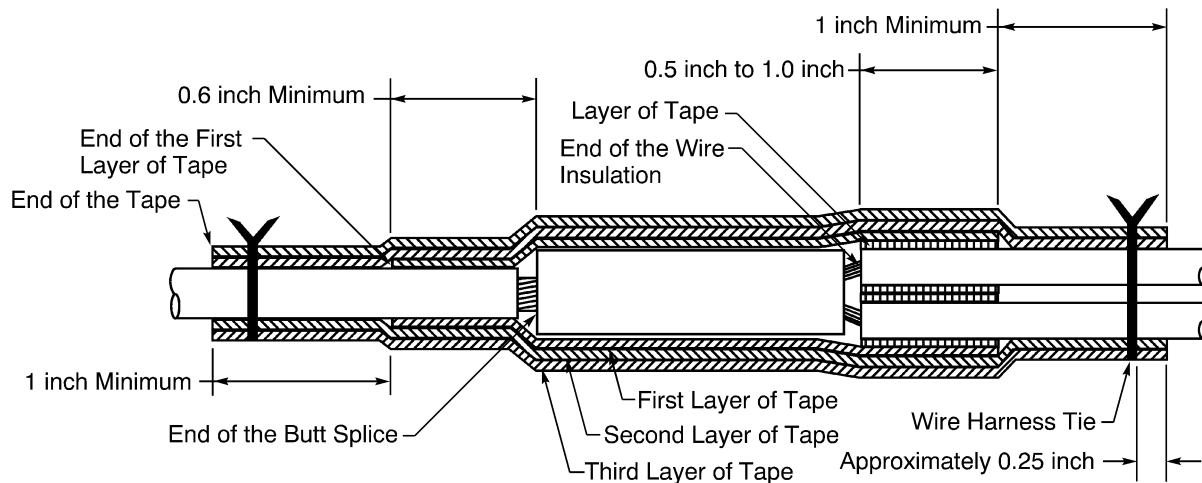
Make sure that the layer:

 - Starts where the first layer stops
 - Stops where the first layer starts
 - Makes a 50 percent overlap.
- (14) Align the center of the sleeve with the center of the butt splice.
- (15) Shrink the sleeve into position. Refer to Subject 20-10-14.

D. One Wire to Two Wires - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 93

Refer to Figure 93.

- (1) Find the CAU of the conductor.

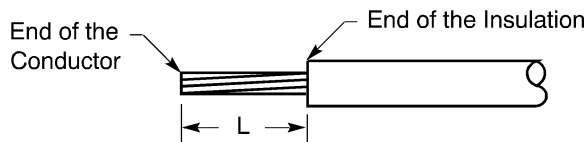
Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.
- (2) If the CAU of the conductor is less than the minimum CAU for the butt splice, increase the CAU of the conductor.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

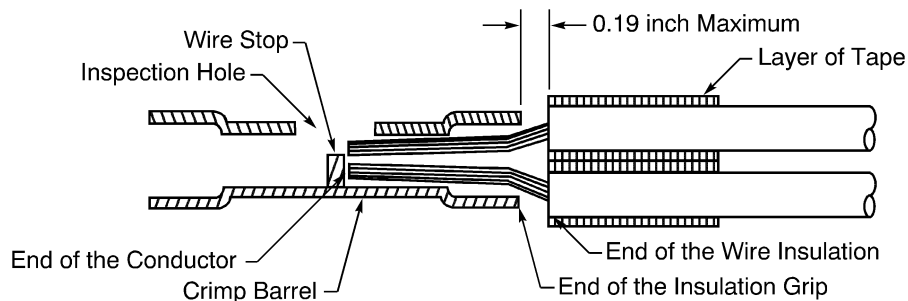
- Table 15 for the minimum CAU of the butt splice
 - Paragraph 2. for the applicable conditions and procedures for the increase of the CAU.
- (3) Make a selection of a butt splice from Table 15.
Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.
 - (4) Find the crimp barrel size of the splice from Table 15.
 - (5) Make a selection of a crimp tool from Table 44.
 - (6) Make a selection of a Temperature Grade D insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
 - (7) Prepare each wire for the side of the splice assembly with two wires.



INSULATION REMOVAL LENGTH
Figure 94

Table 76
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02



POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 95

- (a) Remove the necessary length of insulation from the end of each wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

- Figure 94
- Table 76 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

(b) Put the wires in the splice. Refer to Figure 95.

Make sure that:

- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The end of each wire insulation is a maximum of 0.19 inch from the end of the insulation grip.

(c) If it is necessary, remove more insulation from the end of the wire to make the wire fit correctly in the splice.

(d) Wind a layer of the insulation tape on each wire. Refer to Figure 95.

Make sure that:

- The edge of the tape is aligned with the end of the wire insulation
- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

(8) Remove the necessary length of insulation from the end of the wire for the side of the splice assembly with one wire.

Refer to:

- Figure 94
- Table 77 for the insulation removal length for a wire that can go into the insulation grip
- Table 78 for the insulation removal length for a wire that cannot go into the insulation grip
- Subject 20-00-15 for the insulation removal procedures.

Table 77
INSULATION REMOVAL LENGTH FOR A WIRE THAT CAN GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.37	± 0.02
BACT12C15	0.23	± 0.02
BACT12C20	0.23	± 0.02

Table 78
INSULATION REMOVAL LENGTH FOR A WIRE THAT CANNOT GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 78 (continued)

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C20	0.30	± 0.02

- (9) Assemble the end of the butt splice with two wires.
 - (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wires in the splice. Refer to Figure 95.
Make sure that the wires are in the correct position.
 - (d) Crimp the splice.
- (10) Assemble the end of the butt splice with one wire.
 - (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wire in the splice.

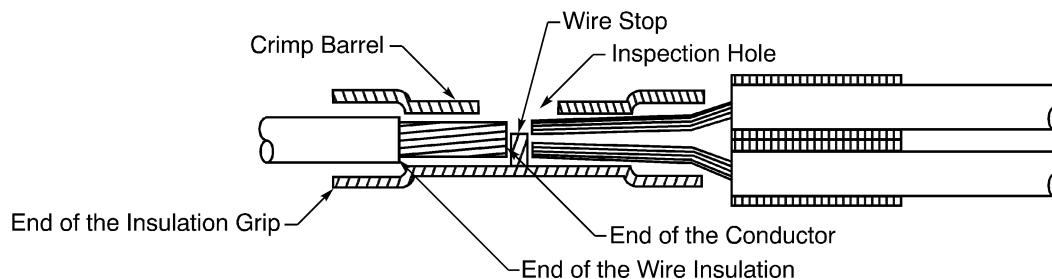
Refer to:

- Figure 96 for the position of the wire in the splice with the wire insulation in the insulation grip
- Figure 97 for the position of the wire in the splice with the wire insulation out of the insulation grip.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- If the wire insulation can go into the insulation grip, the end of the wire insulation is in the insulation grip
- If the wire insulation cannot go into the insulation grip, the end of the wire insulation is a maximum of 0.13 inch from the end of the insulation grip
- The wire insulation is not in the crimp barrel.

NOTE: The insulation removal length can be changed to make these conditions satisfactory.

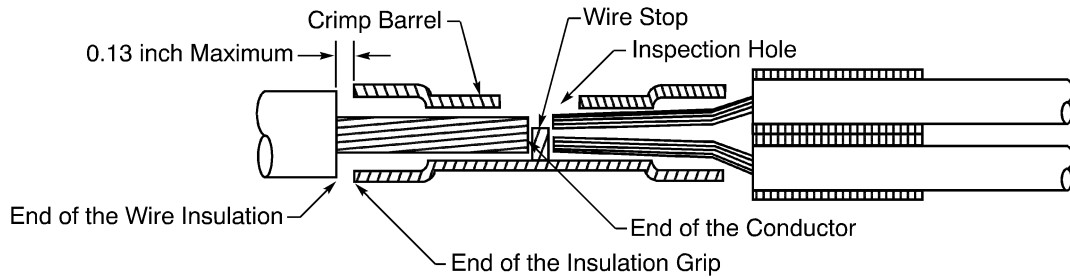


POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION IN THE INSULATION GRIP

Figure 96

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION OUT OF THE INSULATION GRIP

Figure 97

- (d) Crimp the splice.
- (11) Put three layers of insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

Make sure that the layer:

 - Starts 0.6 inch minimum farther than the end of the splice on the side with one wire
 - Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
 - Makes a 50 percent overlap.
 - (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

 - Starts 1 inch minimum farther than where the first layer stops on the side with two wires
 - Stops 1 inch minimum farther than where the first layer starts on the side with one wire
 - Makes a 50 percent overlap.
 - (c) Tightly wind the third layer of tape on the splice assembly in the opposite direction of the second layer.

Make sure that the layer:

 - Starts where the second layer stops
 - Stops where the second layer starts
 - Makes a 50 percent overlap.
- (12) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

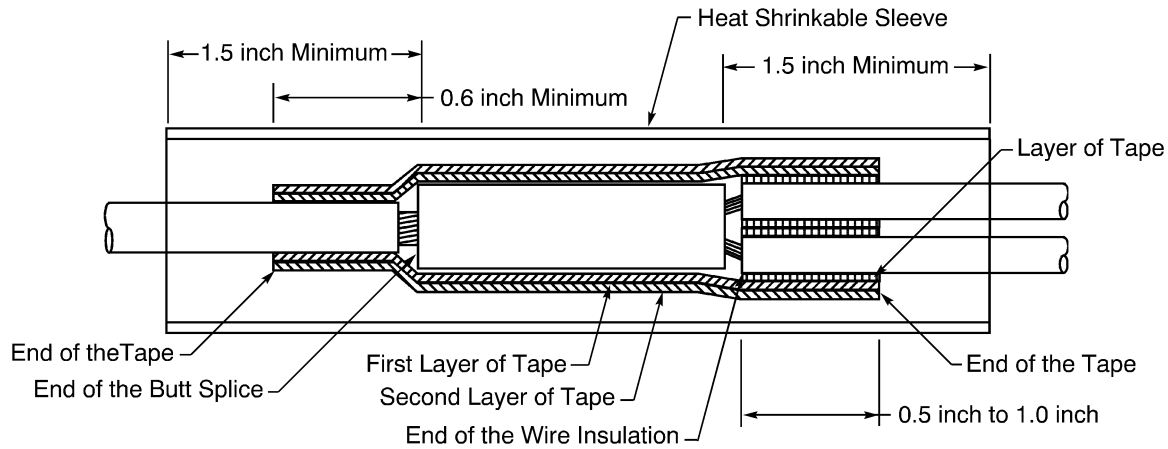
E. One Wire to Two Wires - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 98

Refer to Figure 98.

- (1) Find the CAU of the conductor.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) If the CAU of the conductor is less than the minimum CAU for the butt splice, increase the CAU of the conductor.

Refer to:

- Table 15 for the minimum CAU of the butt splice
- Paragraph 2. for the applicable conditions and procedures for the increase of the CAU.

- (3) Make a selection of a butt splice from Table 15.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.

- (4) Find the crimp barrel size of the splice from Table 15.

- (5) Make a selection of a crimp tool from Table 44.

- (6) Make a selection of a Temperature Grade D insulation tape from Table 49.

Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.

- (7) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

Make sure that the sleeve has the smallest diameter that can be put on the splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (8) Cut the necessary length of the sleeve.

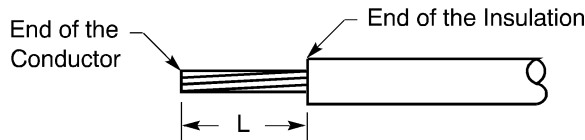
Make sure that the sleeve extends a minimum of 1.5 inches farther than each end of the splice.

- (9) Put the sleeve on the wires of one end of the splice assembly.

- (10) Prepare each wire for the side of the splice assembly with two wires.

STANDARD WIRING PRACTICES MANUAL

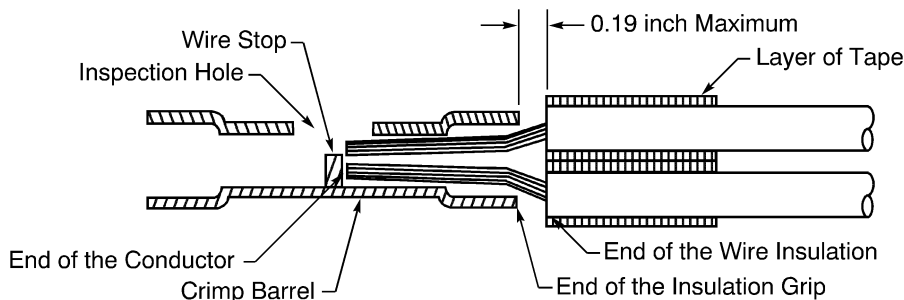
ASSEMBLY OF SPLICES



INSULATION REMOVAL LENGTH
Figure 99

Table 79
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02



POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 100

(a) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 99
- Table 79 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

(b) Put the wires in the splice. Refer to Figure 100.

Make sure that:

- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The end of each wire insulation is a maximum of 0.19 inch from the end of the insulation grip.

(c) If it is necessary, remove more insulation from the end of the wire to make the wire fit correctly in the splice.

(d) Wind a layer of the insulation tape on each wire. Refer to Figure 100.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that:

- The edge of the tape is aligned with the end of the wire insulation
- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

- (11) Remove the necessary length of insulation from the end of the wire for the side of the splice assembly with one wire.

Refer to:

- Figure 99
- Table 80 for the insulation removal length for a wire that can go into the insulation grip
- Table 81 for the insulation removal length for a wire that cannot go into the insulation grip
- Subject 20-00-15 for the insulation removal procedures.

Table 80

INSULATION REMOVAL LENGTH FOR A WIRE THAT CAN GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.37	± 0.02
BACT12C15	0.23	± 0.02
BACT12C20	0.23	± 0.02

Table 81

INSULATION REMOVAL LENGTH FOR A WIRE THAT CANNOT GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02

- (12) Assemble the end of the butt splice with two wires.
- (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wires in the splice. Refer to Figure 100.
Make sure that the wires are in the correct position.
 - (d) Crimp the splice.
- (13) Assemble the end of the butt splice with one wire.
- (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wire in the splice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

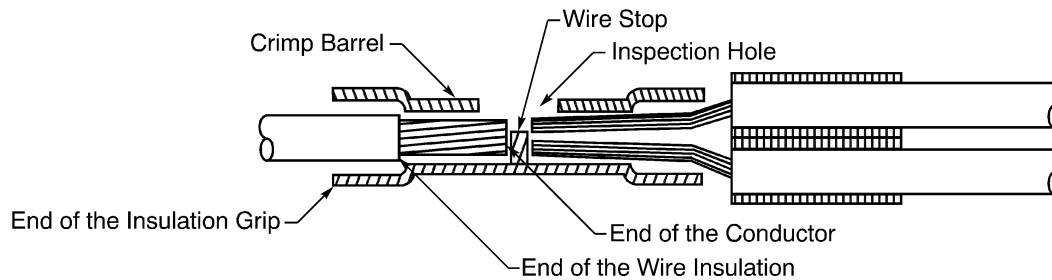
Refer to:

- Figure 101 for the position of the wire in the splice with the wire insulation in the insulation grip
- Figure 102 for the position of the wire in the splice with the wire insulation out of the insulation grip.

Make sure that:

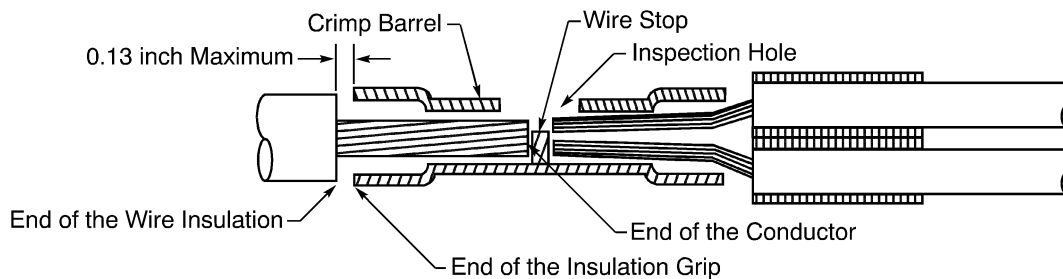
- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- If the wire insulation can go into the insulation grip, the end of the wire insulation is in the insulation grip
- If the wire insulation cannot go into the insulation grip, the end of the wire insulation is a maximum of 0.13 inch from the end of the insulation grip
- The wire insulation is not in the crimp barrel.

NOTE: The insulation removal length can be changed to make these conditions satisfactory.



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION IN THE INSULATION GRIP

Figure 101



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION OUT OF THE INSULATION GRIP

Figure 102

- (d) Crimp the splice.
- (14) Put two layers of insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer:

- Starts 0.6 inch minimum farther than the end of the splice on the side with one wire
- Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
- Makes a 50 percent overlap.

(b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

- Starts where the first layer stops
- Stops where the first layer starts
- Makes a 50 percent overlap.

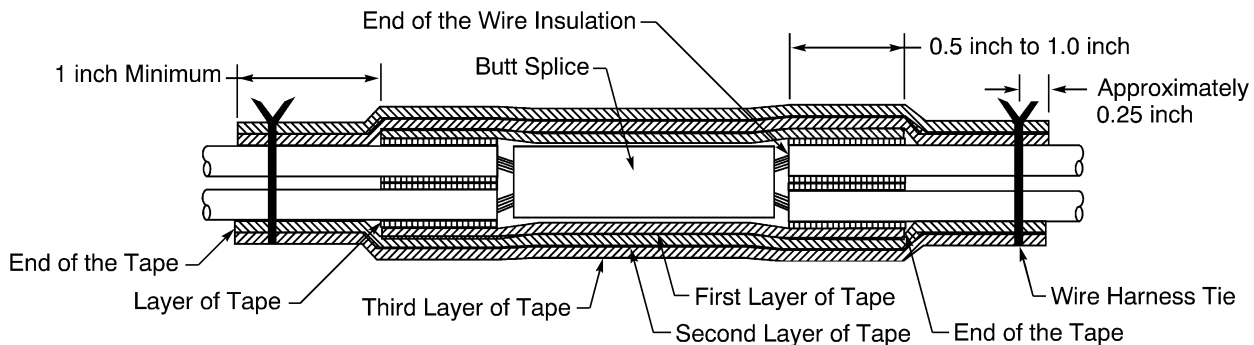
(15) Align the center of the sleeve with the center of the butt splice.

(16) Shrink the sleeve into position. Refer to Subject 20-10-14.

F. Two Wires to Two Wires - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 103

Refer to Figure 103.

(1) Make a selection of a butt splice from Table 15.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductors.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

(2) Find the crimp barrel size of the splice from Table 15.

(3) Make a selection of a crimp tool from Table 44.

(4) Make a selection of a Temperature Grade D insulation tape from Table 49.

Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.

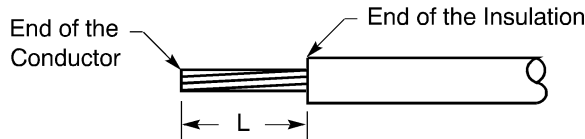
(5) Remove the necessary length of insulation from the end of each wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

- Figure 104
- Table 82 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 104

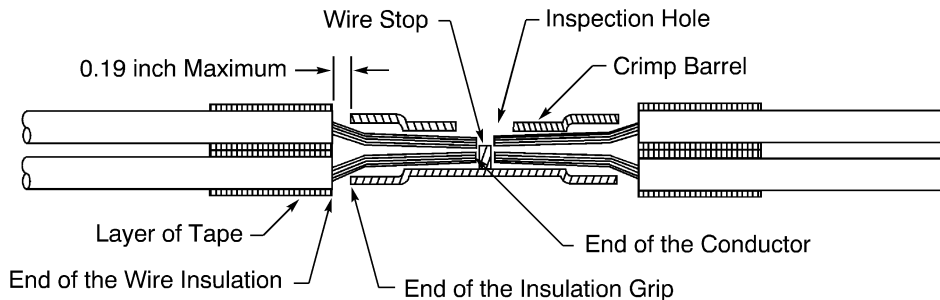
Table 82
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02

(6) Put the wires in the splice. Refer to Figure 105.

Make sure that:

- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The end of each wire insulation is a maximum of 0.19 inch from the end of the insulation grip.



POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 105

- (7) If it is necessary, remove more insulation from the end of the wire to make the wire fit correctly in the splice.
- (8) Wind a layer of the insulation tape on each wire. Refer to Figure 105.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

Make sure that:

- The edge of the tape is aligned with the end of the wire insulation
- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

(9) Assemble one end of the butt splice.

- (a) Put the splice in the crimp tool.
- (b) Hold the splice in position with light pressure.
- (c) Put the wires in the splice. Refer to Figure 105.

Make sure that the wires are in the correct position.

(d) Crimp the splice.

(10) Do Step (9) again to assemble the other end of the butt splice.

(11) Put three layers of insulation tape on the splice assembly.

(a) Tightly wind the first layer of tape on the splice assembly.

Make sure that the layer:

- Starts at the rear end of the layers of tape on the two wires on one end of the splice assembly
- Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
- Makes a 50 percent overlap.

(b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

- Starts 1 inch minimum farther than where the first layer stops
- Stops 1 inch minimum farther than where the first layer starts
- Makes a 50 percent overlap.

(c) Tightly wind the third layer of tape on the splice assembly in the opposite direction of the second layer.

Make sure that the layer:

- Starts where the second layer stops
- Stops where the second layer starts
- Makes a 50 percent overlap.

(12) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

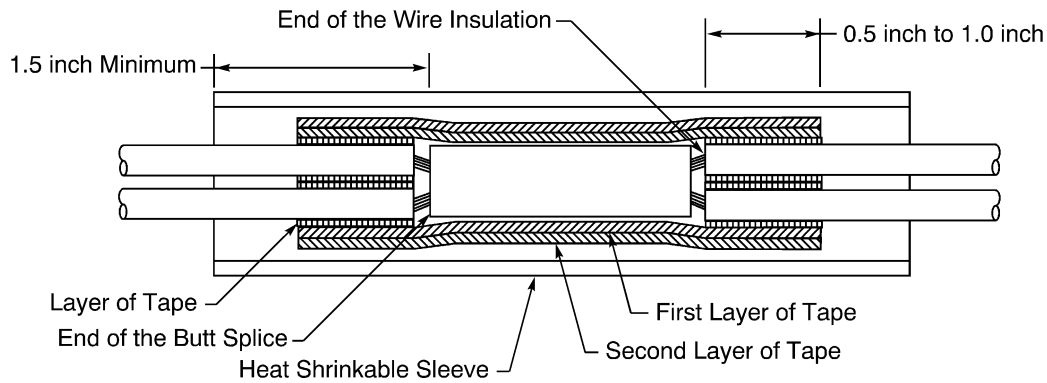
G. Two Wires to Two Wires - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 106

Refer to Figure 106.

- (1) Make a selection of a butt splice from Table 15.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductors. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) Find the crimp barrel size of the splice from Table 15.
- (3) Make a selection of a crimp tool from Table 44.
- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (5) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

Make sure that the sleeve has the smallest diameter that can be put on the splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

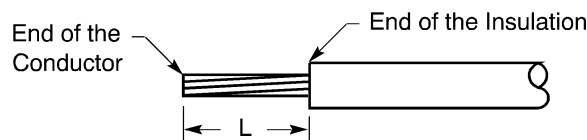
- (6) Cut the necessary length of the sleeve.

Make sure that the sleeve extends a minimum of 1.5 inches farther than each end of the splice.

- (7) Put the sleeve on the wires of one end of the splice assembly.
- (8) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 107
- Table 83 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH

Figure 107

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

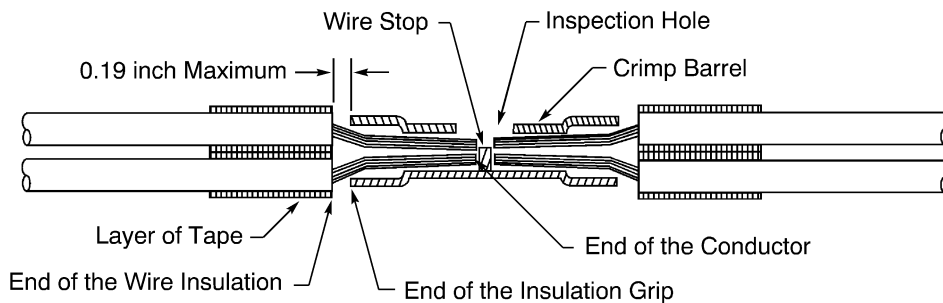
**Table 83
INSULATION REMOVAL LENGTH**

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02

(9) Put the wires in the splice. Refer to Figure 108.

Make sure that:

- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The end of each wire insulation is a maximum of 0.19 inch from the end of the insulation grip.



**POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 108**

(10) If it is necessary, remove more insulation from the end of the wire to make the wire fit correctly in the splice.

(11) Wind a layer of the insulation tape on each wire. Refer to Figure 108.

Make sure that:

- The edge of the tape is aligned with the end of the wire insulation
- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

(12) Assemble one end of the butt splice.

- Put the splice in the crimp tool.
- Hold the splice in position with light pressure.
- Put the wires in the splice. Refer to Figure 108.

Make sure that the wires are in the correct position.

(d) Crimp the splice.

(13) Do Step (12) again to assemble the other end of the butt splice.

(14) Put two layers of insulation tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (a) Tightly wind the first layer of tape on the splice assembly.

Make sure that the layer:

- Starts at the rear end of the layers of tape on the two wires on one end of the splice assembly
- Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
- Makes a 50 percent overlap.

- (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

- Starts where the first layer stops
- Stops where the first layer starts
- Makes a 50 percent overlap.

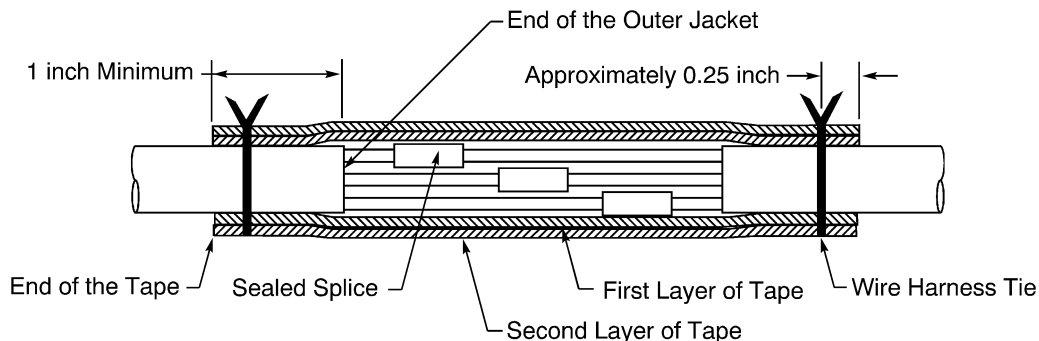
- (15) Align the center of the sleeve with the center of the butt splice.

- (16) Shrink the sleeve in position. Refer to Subject 20-10-14.

H. One Cable to One Cable - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE CABLE SPLICE ASSEMBLY
Figure 109

Refer to Figure 109.

- (1) Prepare the cable.

STANDARD WIRING PRACTICES MANUAL

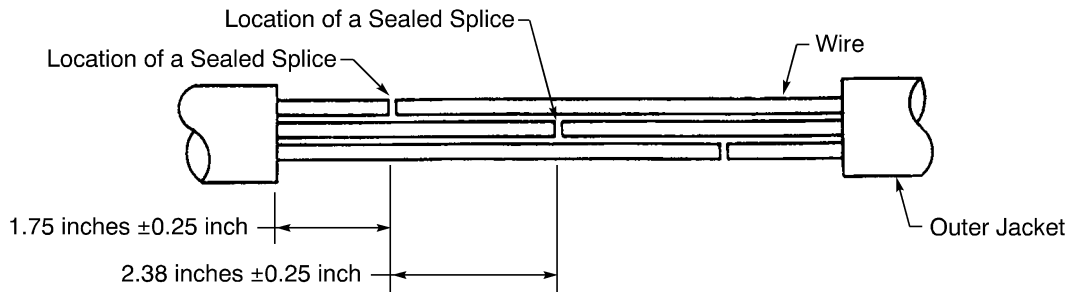
ASSEMBLY OF SPLICES

Refer to:

- Figure 110
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



CABLE PREPARATION
Figure 110

- (2) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (3) Assemble the sealed splices on the wires in the cable. Refer to Paragraph 8.B.
- (4) Put two layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

Make sure that the layer:

 - Starts 1 inch minimum farther than the end of the outer jacket
 - Stops 1 inch minimum farther than the end of the outer jacket at the other end of the splice assembly
 - Makes a minimum 50 percent overlap.
 - (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

 - Starts where the first layer stops
 - Stops where the first layer starts
 - Makes a 50 percent overlap.
- (5) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

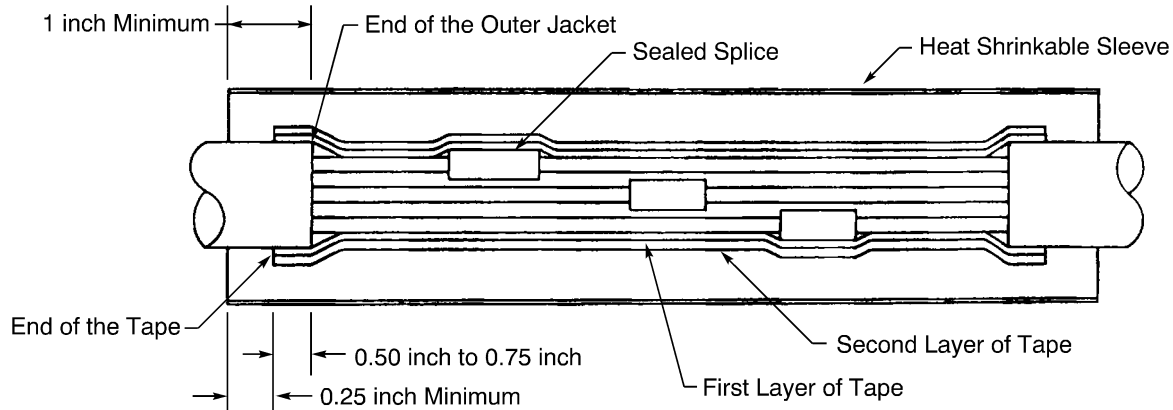
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

I. One Cable to One Cable - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE CABLE SPLICE ASSEMBLY
Figure 111

Refer to Figure 111.

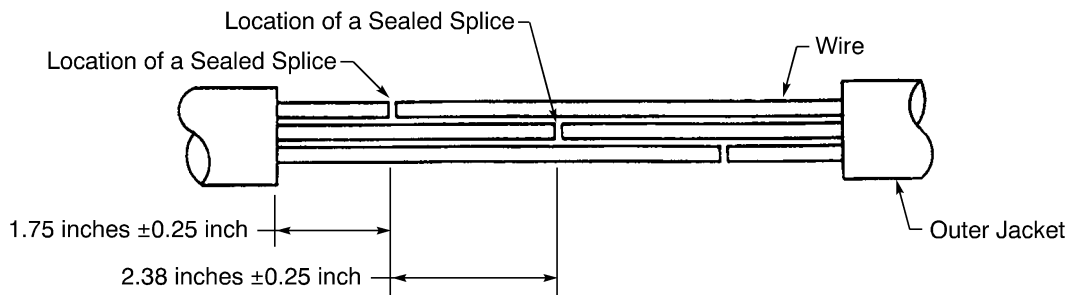
(1) Prepare the cable.

Refer to:

- Figure 112
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



CABLE PREPARATION
Figure 112

(2) Make a selection of a Temperature Grade D insulation tape from Table 49.

(3) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

Make sure that the sleeve has the smallest diameter that can be put on the cable splice assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (4) Cut the necessary length of the sleeve.

Make sure that the sleeve has a minimum overlap of 1 inch on each end of the outer jacket.

- (5) Put the sleeve on the cable of one end of the splice assembly.

- (6) Assemble the sealed splices on the wires in the cable.

Refer to Table 71 for an applicable sealed splice configuration on wire.

- (7) Put two layers of insulation tape on the splice assembly.

- (a) Tightly wind the first layer of tape on the splice assembly.

Make sure that the layer:

- Makes an overlap of 0.50 inch minimum to 0.75 inch maximum on each end of the outer jacket
- Makes a 50 percent overlap.

- (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

- Starts where the first layer stops
- Stops where the first layer starts
- Makes a 50 percent overlap.

- (8) Align the center of the sleeve with the center of the splice assembly.

Make sure that on each end of the splice assembly, the distance from the end of the layer of tape to the end of the sleeve is 0.25 inch minimum.

- (9) Shrink the sleeve in position. Refer to Subject 20-10-14.

9. CONDUCTOR SPLICE CONFIGURATIONS FOR SHIELDED WIRES AND SHIELDED CABLES**A. Splice Assembly Configurations**

The splice assembly configurations in Table 84 are for the conductor splice of a sealed splice assembly for shielded wire and shielded cable.

To calculate the CAU of the conductor, refer to Table 4.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

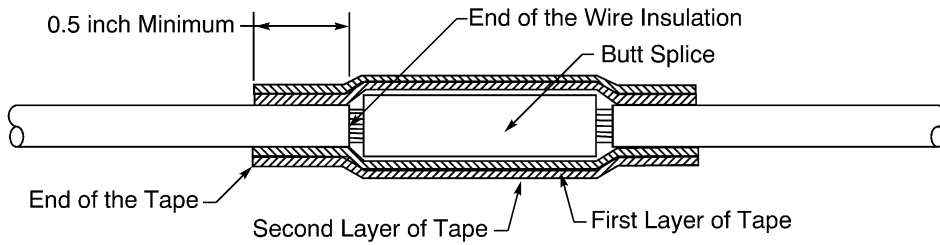
**Table 84
CONDUCTOR SPLICE ASSEMBLY CONFIGURATIONS**

Maximum Temperature Grade	One End of Splice Assembly	Other End of Splice Assembly	CAU Range		Applicable Condition	Splice Assembly	
			Minimum	Maximum		Components	Procedure
B	One Wire	One Wire	3	457	Fuel Vapor	Tape	Paragraph 9.B.
					No Fuel Vapor	Tape	Paragraph 9.B.
	One Wire	Two Wires	3	457	Fuel Vapor	Tape	Paragraph 9.C.
					No Fuel Vapor	Tape	Paragraph 9.C.
	One or Two Wires	One or Two Wires	3	67	No Fuel Vapor	Splice Kit	Paragraph 7.F.
			3	457	No Fuel Vapor	Sleeve	Paragraph 7.G.
	One to Five Wires	One to Five Wires	3	457	No Fuel Vapor	Sleeve	Paragraph 7.I.
			19	67	No Fuel Vapor	Splice Kit	Paragraph 7.H.
	Two Wires	Two Wires	3	457	Fuel Vapor	Tape	Paragraph 9.D.
					No Fuel Vapor	Tape	Paragraph 9.D.
D	One Wire	One Wire	5	138	Fuel Vapor	Tape	Paragraph 9.E.
					No Fuel Vapor	Tape	Paragraph 9.E.
	One Wire	Two Wires	5	138	Fuel Vapor	Tape	Paragraph 9.F.
					No Fuel Vapor	Tape	Paragraph 9.F.
	Two Wires	Two Wires	5	138	Fuel Vapor	Tape	Paragraph 9.G.
					No Fuel Vapor	Tape	Paragraph 9.G.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

B. One Wire to One Wire - Tape



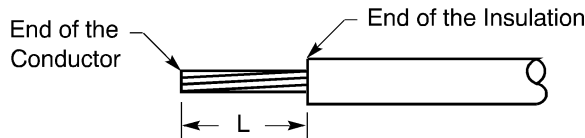
CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 113

Refer to Figure 113.

- (1) Make a selection of a butt splice from Table 12 or Table 14.
 Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.
 Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.
- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (3) Make a selection of a crimp tool from:
 - Table 41 for BACT12C() splices
 - Table 42 for NAS1387-() splices
 - Table 43 for BACS52K() splices
 - Table 43 for Raychem D-609-0() splices.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (5) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 114
- Table 85 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 114

Table 85
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C101	0.72	± 0.03

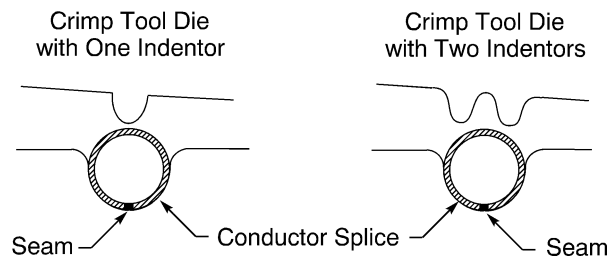
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 85 (continued)

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

- (6) Assemble one end of the butt splice.
- (a) Put the splice in the crimp tool.
- (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 115.



POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL
Figure 115

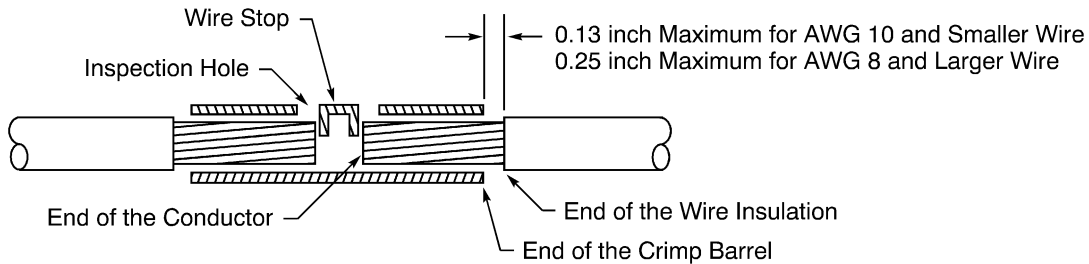
- (c) Hold the splice in position with light pressure.
- (d) Put the wire in the splice. Refer to Figure 116.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The insulation of the wire is not in the crimp barrel
- For an AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For an AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.

STANDARD WIRING PRACTICES MANUAL

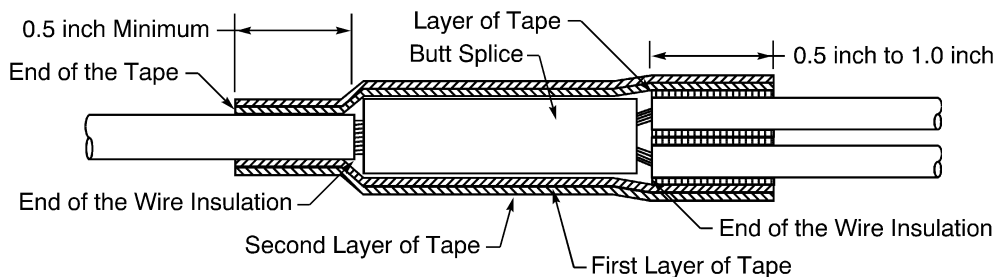
ASSEMBLY OF SPLICES



POSITION OF THE WIRE IN THE BUTT SPLICE
Figure 116

- (e) Crimp the splice.
- (7) Do Step (6) again to assemble the other end of the butt splice.
- (8) Put two layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.
 - Make sure that the layer:
 - Starts 0.5 inch minimum farther than the end of the wire insulation
 - Stops 0.5 inch minimum farther than the end of the wire insulation at the other end of the splice assembly
 - Makes a 50 percent overlap.
 - (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.
 - Make sure that the layer:
 - Starts where the first layer stops
 - Stops where the first layer starts
 - Makes a minimum 50 percent overlap.

C. One Wire to Two Wires - Tape



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 117

Refer to Figure 117.

- (1) Make a selection of a butt splice from Table 12 or Table 14.
 - Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.
 - Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

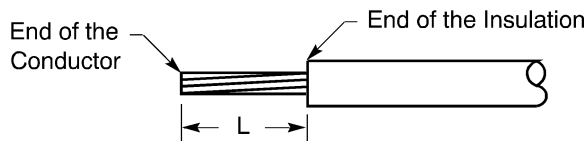
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (3) Make a selection of a crimp tool from:
 - Table 41 for BACT12C() splices
 - Table 42 for NAS1387-() splices
 - Table 43 for BACS52K() splices
 - Table 43 for Raychem D-609-0() splices.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 118
- Table 86 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 118

Table 86
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C101	0.72	± 0.03
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

- (6) Wind a layer of the insulation tape on each of the two wires for the side of the splice with two wires.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

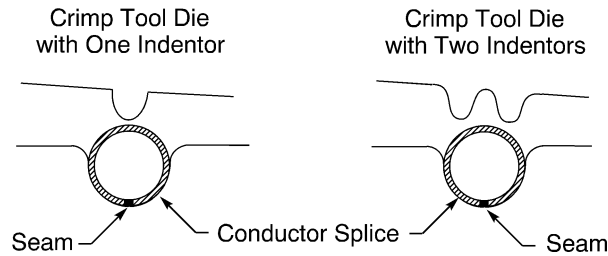
Make sure that:

- The edge of the tape is aligned with the end of the wire insulation
- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

(7) Assemble one end of the butt splice.

(a) Put the splice in the crimp tool.

(b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 119.



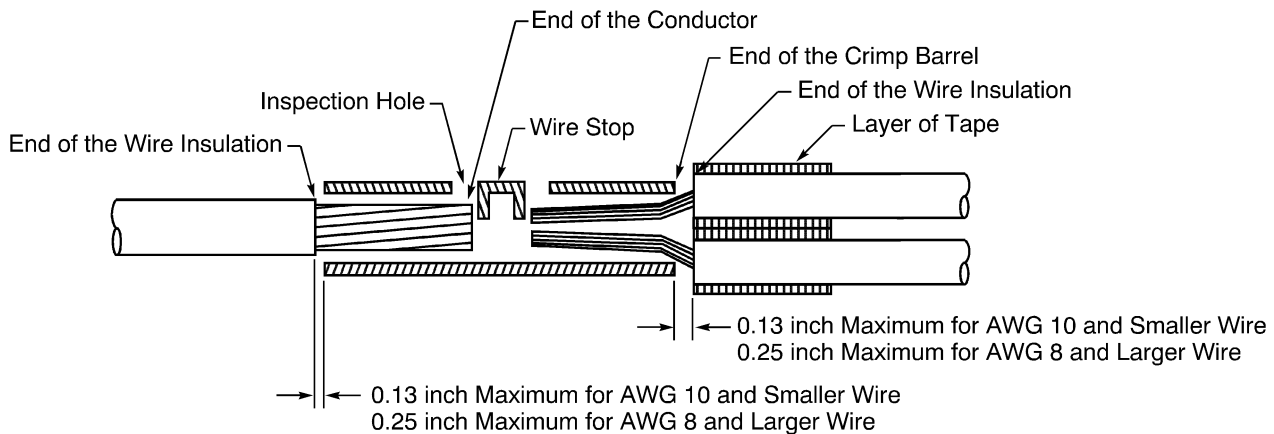
POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL
Figure 119

(c) Hold the splice in position with light pressure.

(d) Put the wire or wires in the splice. Refer to Figure 120.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The insulation of the wire is not in the crimp barrel
- For AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.



POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 120

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (e) Crimp the splice.
- (8) Do Step (7) again to assemble the other end side of the butt splice.
- (9) Put two layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

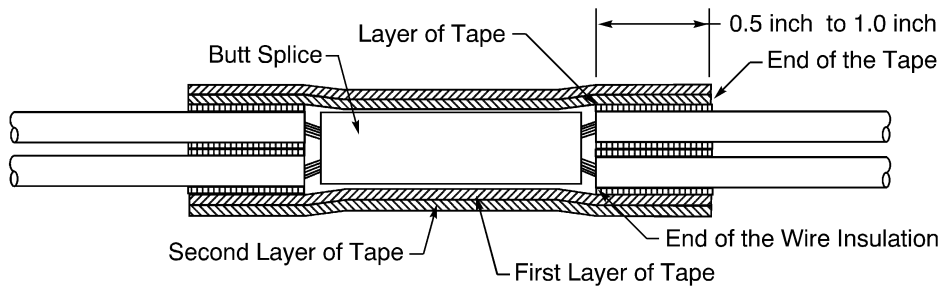
Make sure that the layer:

 - Starts 0.5 inch minimum farther than the end of the wire insulation on the side of the splice with one wire
 - Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
 - Makes a 50 percent overlap.
 - (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

Make sure that the layer:

 - Starts where the first layer stops
 - Stops where the first layer starts
 - Makes a minimum 50 percent overlap.

D. Two Wires to Two Wires - Tape



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 121

Refer to Figure 121.

- (1) Make a selection of a butt splice from Table 12 or Table 14.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.
 Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.
- (2) Find the crimp barrel size of the splice from Table 12 or Table 14.
- (3) Make a selection of a crimp tool from:
 - Table 41 for BACT12C() splices
 - Table 42 for NAS1387-() splices
 - Table 43 for BACS52K() splices
 - Table 43 for Raychem D-609-0() splices.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.

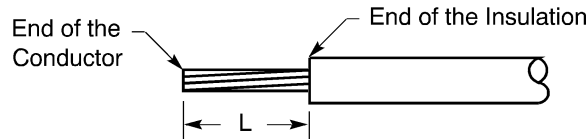
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Remove the necessary length of insulation from the end of each wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

- Figure 122
- Table 87 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 122

Table 87
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C101	0.72	± 0.03
BACT12C12	0.34	± 0.03
BACT12C21	0.65	± 0.03
BACT12C4	0.53	± 0.03
BACT12C6	0.53	± 0.03
BACT12C8	0.47	± 0.03
D-609-06	0.28	± 0.03
D-609-07	0.28	± 0.03
D-609-08	0.28	± 0.03
NAS1387-4	0.28	± 0.03
NAS1387-5	0.28	± 0.03
NAS1387-6	0.28	± 0.03

(6) Wind a layer of the insulation tape on each wire.

Make sure that:

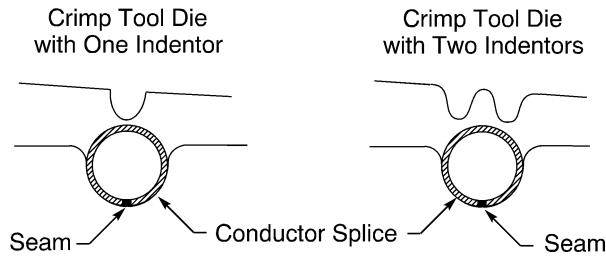
- The edge of the tape is aligned with the end of the wire insulation
- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

(7) Assemble one end of the butt splice.

- (a) Put the splice in the crimp tool.
- (b) If the splice has a seam, align the seam opposite the indenter. Refer to Figure 123.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

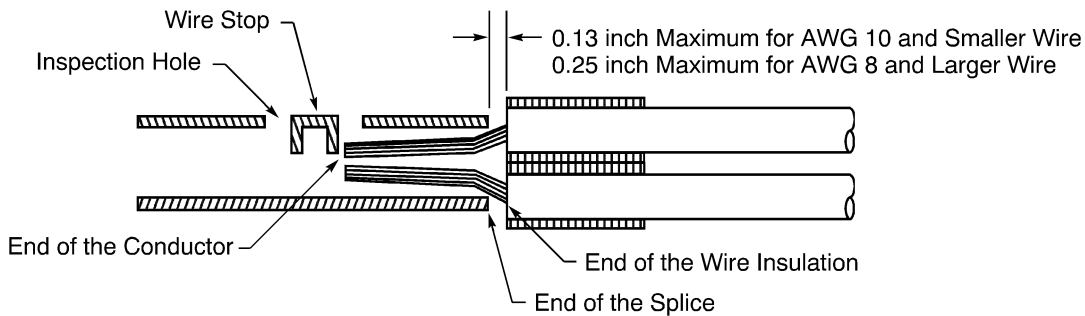


POSITION OF THE BUTT SPLICE IN THE CRIMP TOOL
Figure 123

- (c) Hold the splice in position with light pressure.
- (d) Put the wire or wires in the splice. Refer to Figure 124.

Make sure that:

- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- The insulation of the wire is not in the crimp barrel
- For AWG 10 and smaller wire, the end of the wire insulation is a maximum of 0.13 inch from the end of the crimp barrel
- For AWG 8 and larger wire, the end of the wire insulation is a maximum of 0.25 inch from the end of the crimp barrel.



POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 124

- (e) Crimp the splice.
- (8) Do Step (7) again to assemble the other end side of the butt splice.
- (9) Put two layers of insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer:

- Starts at the rear end of the layers of tape on the two wires on one end of the splice assembly
- Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
- Makes a 50 percent overlap.

- (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

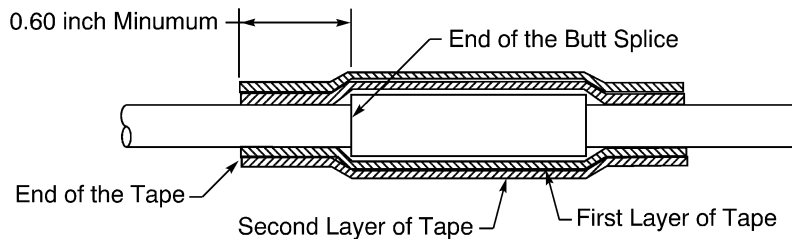
Make sure that the layer:

- Starts where the first layer stops
- Stops where the first layer starts
- Makes a 50 percent overlap.

E. One Wire to One Wire for High Temperature - Tape

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 125

Refer to Figure 125.

- (1) Find the CAU of the conductor.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

- (2) If the CAU of the conductor is less than the minimum CAU for the butt splice, increase the CAU of the conductor.

Refer to:

- Table 15 for the minimum CAU of the butt splice
- Paragraph 2. for the applicable conditions and procedures for the increase of the CAU.

- (3) Make a selection of a butt splice from Table 15.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.

- (4) Find the crimp barrel size of the splice from Table 15.

- (5) Make a selection of a crimp tool from Table 44.

- (6) Make a selection of a Temperature Grade D insulation tape from Table 49.

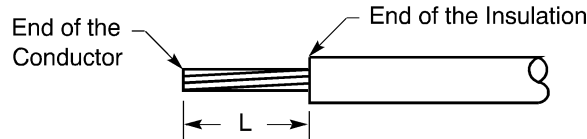
- (7) Remove the necessary length of insulation from the end of the wires.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

- Figure 126
- Table 88 for the insulation removal length for a wire that can go into the insulation grip
- Table 89 for the insulation removal length for a wire that cannot go into the insulation grip
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH

Figure 126

Table 88

INSULATION REMOVAL LENGTH FOR A WIRE THAT CAN GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.37	± 0.02
BACT12C15	0.23	± 0.02
BACT12C20	0.23	± 0.02

Table 89

INSULATION REMOVAL LENGTH FOR A WIRE THAT CANNOT GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02

- (8) Assemble one end of the butt splice.
- (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wire in the splice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

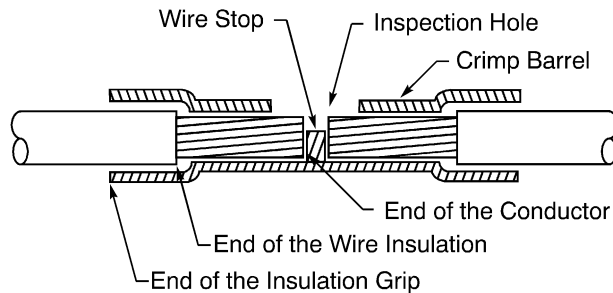
Refer to:

- Figure 127 for the position of the wire in the splice with the wire insulation in the insulation grip
- Figure 128 for the position of the wire in the splice with the wire insulation out of the insulation grip.

Make sure that:

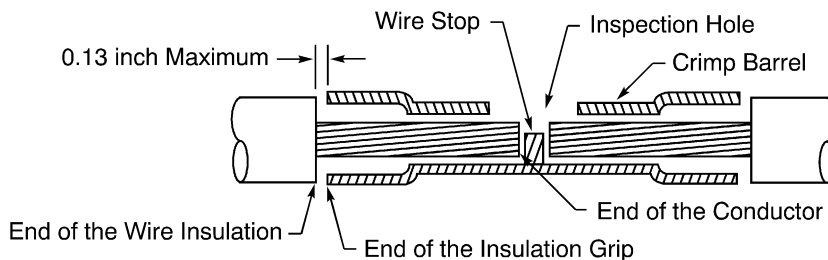
- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- If the wire insulation can go into the insulation grip, the end of the wire insulation is in the insulation grip
- If the wire insulation cannot go into the insulation grip, the end of the wire insulation is a maximum of 0.13 inch from the end of the insulation grip
- The wire insulation is not in the crimp barrel.

NOTE: The insulation removal length can be changed to make these conditions satisfactory.



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION IN THE INSULATION GRIP

Figure 127



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION OUT OF THE INSULATION GRIP

Figure 128

- (d) Crimp the splice.
- (9) Do Step (8) again to assemble the other end of the butt splice.
- (10) Put two layers of the insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer:

- Starts 0.6 inch minimum farther than the end of the splice
- Stops 0.6 inch minimum farther than the end of the splice at the other end of the splice assembly
- Makes a 50 percent overlap.

(b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

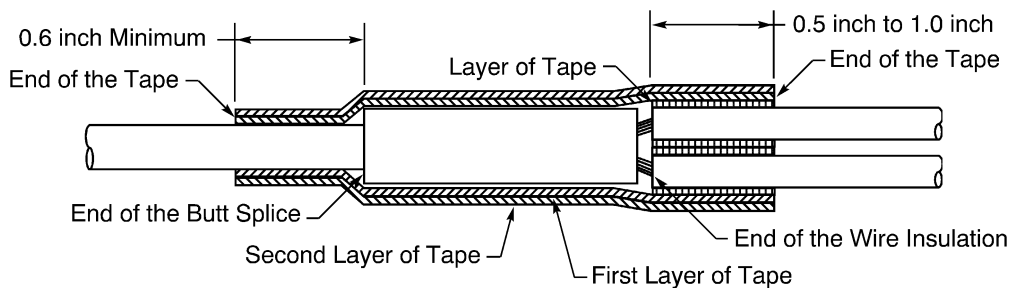
Make sure that the layer:

- Starts where the first layer stops
- Stops where the first layer starts
- Makes a minimum 50 percent overlap.

F. One Wire to Two Wires for High Temperature - Tape

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 129

Refer to Figure 129.

(1) Find the CAU of the conductor.

Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

(2) If the CAU of the conductor is less than the minimum CAU for the butt splice, increase the CAU of the conductor.

Refer to:

- Table 15 for the minimum CAU of the butt splice
- Paragraph 2. for the applicable conditions and procedures for the increase of the CAU.

(3) Make a selection of a butt splice from Table 15.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductor.

(4) Find the crimp barrel size of the splice from Table 15.

(5) Make a selection of a crimp tool from Table 44.

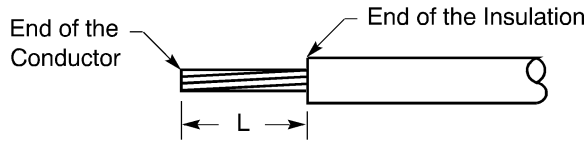
(6) Make a selection of a Temperature Grade D insulation tape from Table 49.

Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.

(7) Prepare each wire for the side of the splice assembly with two wires.

STANDARD WIRING PRACTICES MANUAL

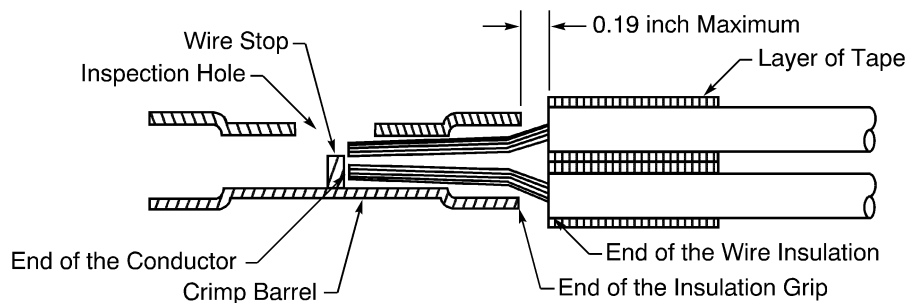
ASSEMBLY OF SPLICES



INSULATION REMOVAL LENGTH
Figure 130

Table 90
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02



POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 131

(a) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 130
- Table 90 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

(b) Put the wires in the splice. Refer to Figure 131.

Make sure that:

- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The end of each wire insulation is a maximum of 0.19 inch from the end of the insulation grip.

(c) If it is necessary, remove more insulation from the end of the wire.

(d) Wind a layer of the insulation tape on each wire. Refer to Figure 131.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that:

- The edge of the tape is aligned with the end of the wire insulation
 - The tape goes around the circumference of the wire a minimum of two times
 - The tape makes a 100 percent overlap.
- (8) Remove the necessary length of insulation from the end of the wire for the side of the splice assembly with one wire.

Refer to:

- Figure 130
- Table 91 for the insulation removal length for a wire that can go into the insulation grip
- Table 92 for the insulation removal length for a wire that cannot go into the insulation grip
- Subject 20-00-15 for the insulation removal procedures.

Table 91

INSULATION REMOVAL LENGTH FOR A WIRE THAT CAN GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.37	± 0.02
BACT12C15	0.23	± 0.02
BACT12C20	0.23	± 0.02

Table 92

INSULATION REMOVAL LENGTH FOR A WIRE THAT CANNOT GO INTO THE INSULATION GRIP

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02

- (9) Assemble the end of the butt splice with two wires.
- (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wires in the splice. Refer to Figure 131.
Make sure that the wires are in the correct position.
 - (d) Crimp the splice.
- (10) Assemble the end of the butt splice with one wire.
- (a) Put the splice in the crimp tool.
 - (b) Hold the splice in position with light pressure.
 - (c) Put the wire in the splice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

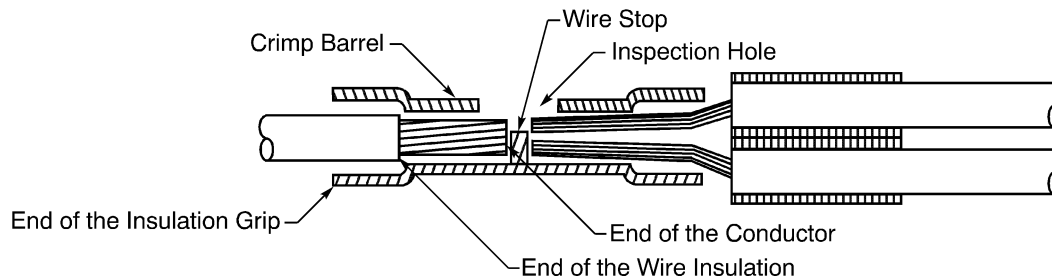
Refer to:

- Figure 132 for the position of the wire in the splice with the wire insulation in the insulation grip
- Figure 133 for the position of the wire in the splice with the wire insulation out of the insulation grip.

Make sure that:

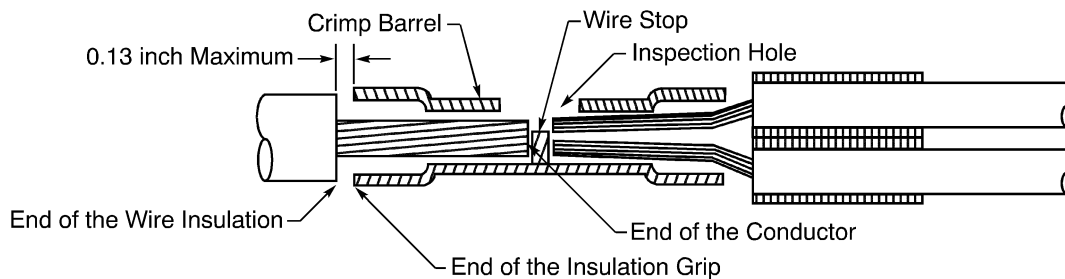
- The end of the conductor can be seen in the inspection hole
- The end of the conductor does not make an overlap with the wire stop
- If the wire insulation can go into the insulation grip, the end of the wire insulation is in the insulation grip
- If the wire insulation cannot go into the insulation grip, the end of the wire insulation is a maximum of 0.13 inch from the end of the insulation grip
- The wire insulation is not in the crimp barrel.

NOTE: The insulation removal length can be changed to make these conditions satisfactory.



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION IN THE INSULATION GRIP

Figure 132



POSITION OF THE WIRE IN THE BUTT SPLICE WITH THE WIRE INSULATION OUT OF THE INSULATION GRIP

Figure 133

- (d) Crimp the splice.
- (11) Put two layers of insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.

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ASSEMBLY OF SPLICES

Make sure that the layer:

- Starts 0.6 inch minimum farther than the end of the splice on the side with one wire
- Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
- Makes a 50 percent overlap.

(b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.

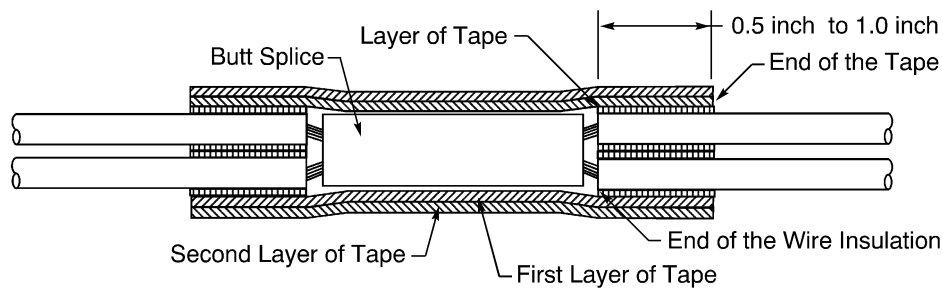
Make sure that the layer:

- Starts where the first layer stops
- Stops where the first layer starts
- Makes a minimum 50 percent overlap.

G. Two Wires to Two Wires for High Temperature - Tape

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 134

Refer to Figure 134.

(1) Make a selection of a butt splice from Table 15.

Make sure that the splice has the smallest CAU range that can accept the total CAU of the conductors. Refer to Paragraph 1.D. for the procedure to calculate the CAU of the conductor.

(2) Find the crimp barrel size of the splice from Table 15.

(3) Make a selection of a crimp tool from Table 44.

(4) Make a selection of a Temperature Grade D insulation tape from Table 49.

Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.

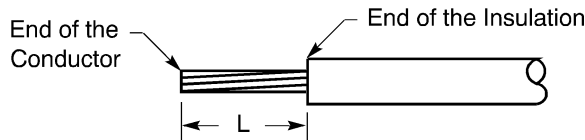
(5) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 135
- Table 93 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



INSULATION REMOVAL LENGTH
Figure 135

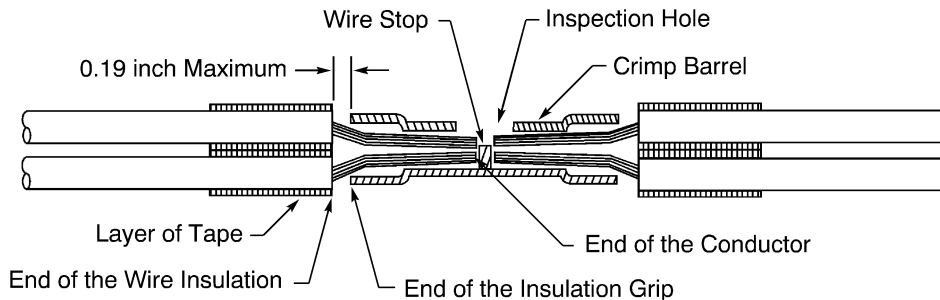
Table 93
INSULATION REMOVAL LENGTH

Splice	Removal Length L (inch)	
	Target	Tolerance
BACT12C11	0.46	± 0.02
BACT12C15	0.30	± 0.02
BACT12C20	0.30	± 0.02

(6) Put the wires in the splice. Refer to Figure 136.

Make sure that:

- The end of each conductor can be seen in the inspection hole
- The end of each conductor does not make an overlap with the wire stop
- The end of each wire insulation is a maximum of 0.19 inch from the end of the insulation grip.



POSITION OF THE WIRES IN THE BUTT SPLICE
Figure 136

(7) If it is necessary, remove more insulation from the end of the wire.

(8) Wind a layer of the insulation tape on each wire. Refer to Figure 136.

Make sure that:

- The edge of the tape is aligned with the end of the wire insulation
- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

(9) Assemble one end of the butt splice.

- Put the splice in the crimp tool.
- Hold the splice in position with light pressure.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (c) Put the wires in the splice. Refer to Figure 136.
Make sure that the wires are in the correct position.
- (d) Crimp the splice.
- (10) Do Step (9) again to assemble the other end of the butt splice.
- (11) Put two layers of insulation tape on the splice assembly.
 - (a) Tightly wind the first layer of tape on the splice assembly.
Make sure that the layer:
 - Starts at the rear end of the layers of tape on the two wires on one end of the splice assembly
 - Stops at the rear end of the layers of tape on the two wires on the other end of the splice assembly
 - Makes a 50 percent overlap.
 - (b) Tightly wind the second layer of tape on the splice assembly in the opposite direction of the first layer.
Make sure that the layer:
 - Starts where the first layer stops
 - Stops where the first layer starts
 - Makes a minimum 50 percent overlap.

10. SEALED SPlice CONFIGURATIONS WITH MECHANICAL FERRULES FOR SHIELDED WIRE AND SHIELDED CABLE

A. Splice Assembly Configurations

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

**Table 94
SPlice ASSEMBLY CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	Quantity of Conductor Splices	Applicable Condition	Splice Assembly	
				Configuration	Procedure
One Shielded Wire	One Shielded Wire	1	Fuel Vapor	Tape, Ties	Paragraph 10.B.
			No Fuel Vapor	Tape, Sleeve	Paragraph 10.C.
				Tape, Ties	Paragraph 10.B.
Shielded Wire	Two Shielded Wires	1	Fuel Vapor	Tape, Ties	Paragraph 10.D.
			No Fuel Vapor	Tape, Sleeve	Paragraph 10.E.
				Tape, Ties	Paragraph 10.D.
Two Shielded Wires	Two Shielded Wires	1	Fuel Vapor	Tape, Ties	Paragraph 10.F.
			No Fuel Vapor	Tape, Sleeve	Paragraph 10.G.
				Tape, Ties	Paragraph 10.F.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

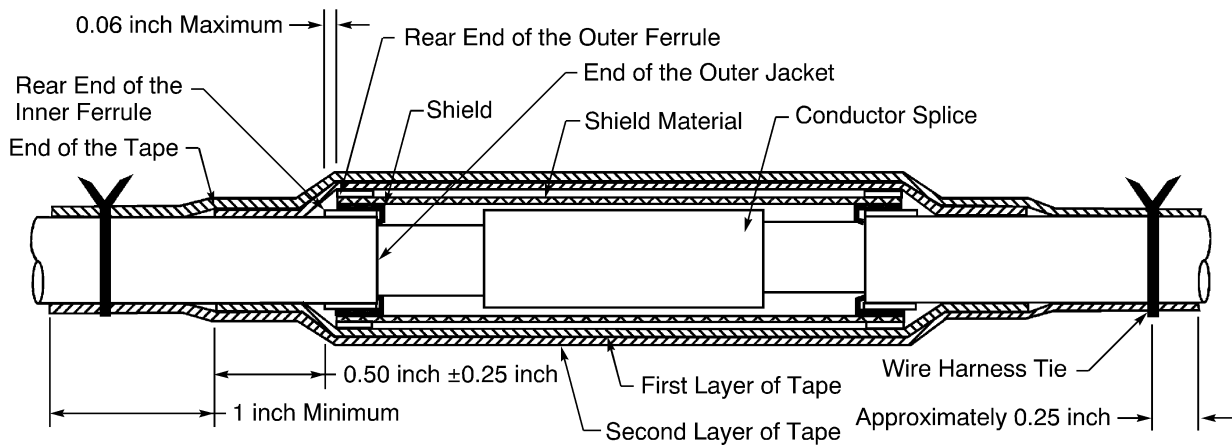
Table 94 (continued)

One End of Splice Assembly	Other End of Splice Assembly	Quantity of Conductor Splices	Applicable Condition	Splice Assembly	
				Configuration	Procedure
One Shielded Cable	One Shielded Cable	-	Fuel Vapor	Tape, Ties	Paragraph 10.H.
			No Fuel Vapor	Tape, Sleeve	Paragraph 10.I.
				Tape, Ties	Paragraph 10.H.

B. One Shielded Wire to One Shielded Wire - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 137

Refer to Figure 137.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade B or higher inner ferrules and outer ferrules.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

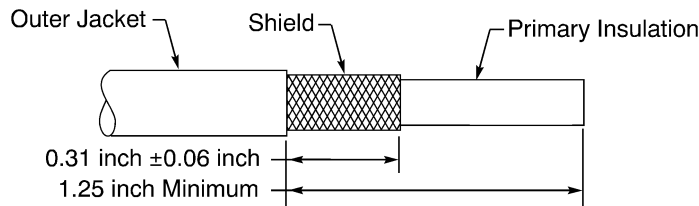
Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (5) Prepare each end of the shielded wire.

Refer to:

- Figure 138
- Subject 20-00-15 for the outer jacket removal procedures.

**SHIELDED WIRE PREPARATION****Figure 138**

- (a) Remove a 1.25 inch minimum length of the outer jacket from the end of the wire.
 - (b) Remove the necessary length of the shield from the end of the wire.
Make sure that the remaining shield is 0.31 inch \pm 0.06 inch.
- (6) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the ferrules on each end of the shield splice.
 - (7) Put these components on the end of one wire:
 - The outer ferrule
 - The inner ferrule.
 - (8) Put these components on the end of the other wire:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.
- (9) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
 - (10) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (11) Assemble the end of the shield splice opposite the end with the shield material.
- Move the outer ferrule on the shield material.
 - Move the strands of the shield apart and make them straight.
 - Align the forward end of the inner ferrule with the end of the outer jacket.
 - Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
 - Align the end of the shield material with the end of the strands of the shield that are folded back.
 - Align the rear end of the outer ferrule with the rear end of the inner ferrule.
- Make sure that:
- The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (g) Crimp the ferrules.
- (12) Do Step (11) again to assemble the other end of the shield splice.
Make sure that the shield material is pulled tight before the ferrules are crimped.
- (13) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
- (14) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
 - Makes a 50 percent overlap.
- (15) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
- Starts 1 inch minimum farther than where the first layer of tape stops
 - Stops 1 inch minimum farther than where the first layer of tape starts
 - Makes a 50 percent overlap.
- (16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.
Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

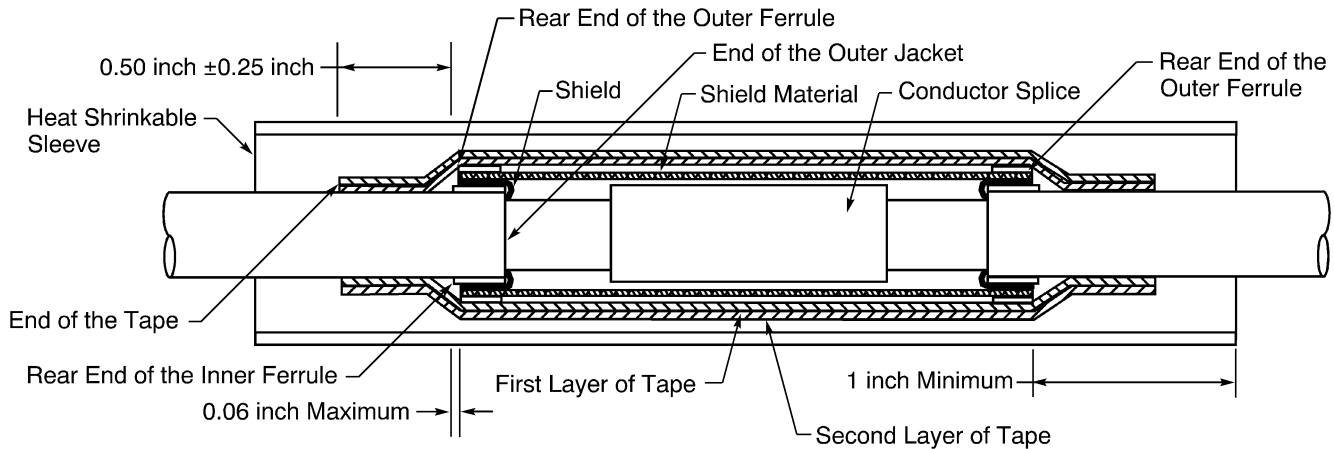
C. One Shielded Wire to One Shielded Wire - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 139

Refer to Figure 139.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade B or higher inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (5) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

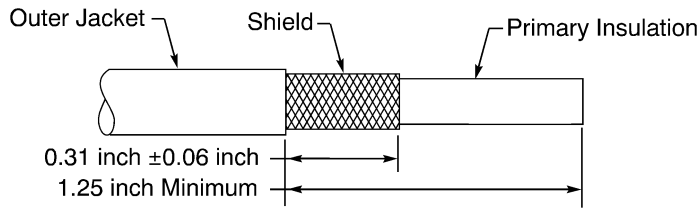
- (6) Prepare each end of the shielded wire.

Refer to:

- Figure 140
- Subject 20-00-15 for the outer jacket removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



SHIELDED WIRE PREPARATION

Figure 140

- (a) Remove a 1.25 inch minimum length of the outer jacket from the end of the wire.
 - (b) Remove the necessary length of the shield from the end of the wire.
Make sure that the remaining shield is 0.31 inch ±0.06 inch.
 - (7) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1 inch farther than the rear end of the ferrules on each end of the shield splice.
 - (8) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the ferrules on each end of the shield splice.
 - (9) Put these components on the end of one wire:
 - The sleeve
 - The outer ferrule
 - The inner ferrule.
 - (10) Put these components on the end of the other wire:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.
- (11) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
 - (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
 - (13) Assemble the end of the shield splice opposite the end with the shield material.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shield apart and make them straight.
 - (c) Align the forward end of the inner ferrule with the end of the outer jacket.
 - (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
 - (e) Align the end of the shield material with the end of the strands of the shield that are folded back.
 - (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

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Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

(g) Crimp the ferrules.

(14) Do Step (13) again to assemble the other end of the shield splice.

Make sure that the shield material is pulled tight before the ferrules are crimped.

(15) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.

(16) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
- Makes a 50 percent overlap.

(17) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

(18) Align the center of the sleeve with the center of the splice assembly.

(19) Shrink the sleeve into position. Refer to Subject 20-10-14.

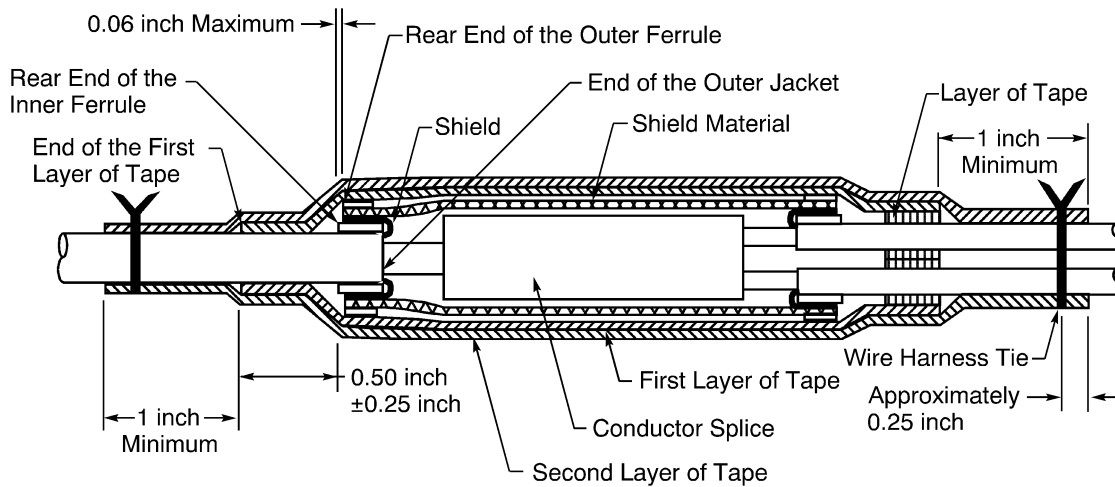
D. One Shielded Wire to Two Shielded Wires - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 141

Refer to Figure 141.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shields of the two wires.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade B or higher inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jackets
- The outer ferrule is the smallest ferrule that can move freely on the shields, the shield material, and the inner ferrule.

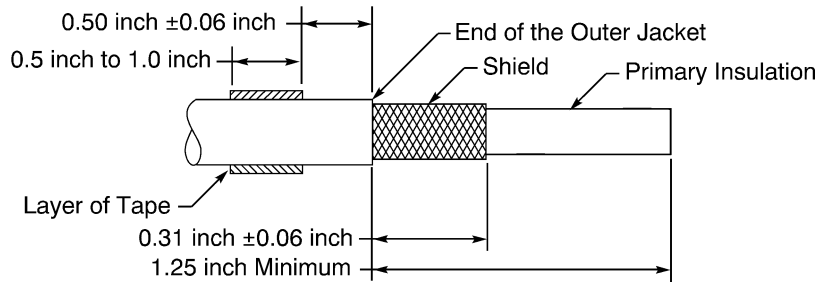
- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Prepare each shielded wire for the side of the splice assembly with two shielded wires.

Refer to:

- Figure 142
- Subject 20-00-15 for the outer jacket removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



SHIELDED WIRE PREPARATION
Figure 142

- (a) Remove a 1.25 inch minimum length of the outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure that the remaining shield is $0.31 \text{ inch} \pm 0.06 \text{ inch}$.
- (c) Wind a layer of the insulation tape on the outer jacket of each wire $0.50 \text{ inch} \pm 0.06 \text{ inch}$ farther than the end of the outer jackets.

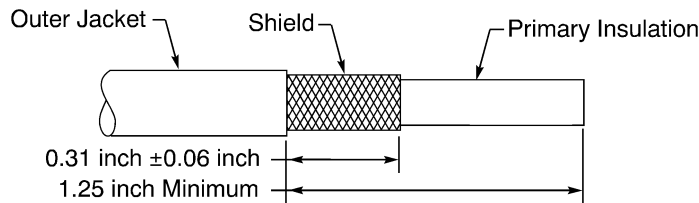
Make sure that:

- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

- (6) Prepare the end of the shielded wire for the side of the splice assembly with one shielded wire.

Refer to:

- Figure 143
- Subject 20-00-15 for the outer jacket and insulation removal procedures.



SHIELDED WIRE PREPARATION
Figure 143

- (a) Remove a 1.25 inch minimum length of the outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure that the remaining shield is $0.31 \text{ inch} \pm 0.06 \text{ inch}$.
- (7) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the ferrules on each end of the shield splice.

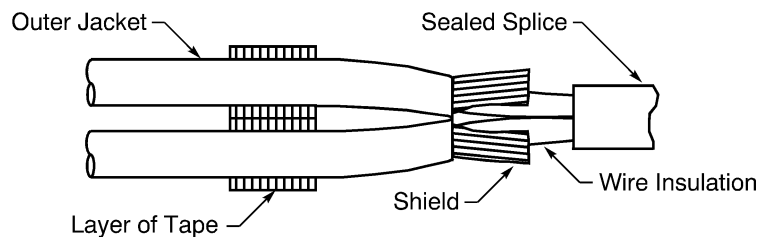
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- (8) Put these components on the side of the splice assembly with one shielded wire:
 - The outer ferrule
 - The inner ferrule.
- (9) Put these components on the side of the splice assembly with two shielded wires:
 - The outer ferrule
 - The inner ferrule
 - The shield material.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.

- (10) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to two wires. Refer to Paragraph 9.A.
- (11) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (12) Assemble the side of the shield splice with two shielded wires.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shields apart and make them straight.
 - (c) Move the strands of each shield away from the adjacent wire. Refer to Figure 144.



POSITION OF THE SHIELDS
Figure 144

- (d) Align the forward end of the inner ferrule with each end of the outer jackets.
- (e) Fold the strands of the shields back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (f) Align the end of the shield material with the end of the strands of the shields that are folded back.
- (g) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (h) Crimp the ferrules.
- (13) Assemble the side of the shield splice with one shielded wire.
 - (a) Move the outer ferrule on the shield material.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (b) Move the strands of the shields apart and make them straight.
- (c) Align the forward end of the inner ferrule with each end of the outer jackets.
- (d) Fold the strands of the shields back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (e) Align the end of the shield material with the end of the strands of the shields that are folded back.

Make sure that the shield material is pulled tight before the ferrules are crimped.

- (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

- (g) Crimp the ferrules.

- (14) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.

- (15) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts at the rear end of the layer of tape on the outer jacket on the side with two shielded wires
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule on the side with one shielded wire
- Makes a 50 percent overlap.

- (16) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

- (17) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

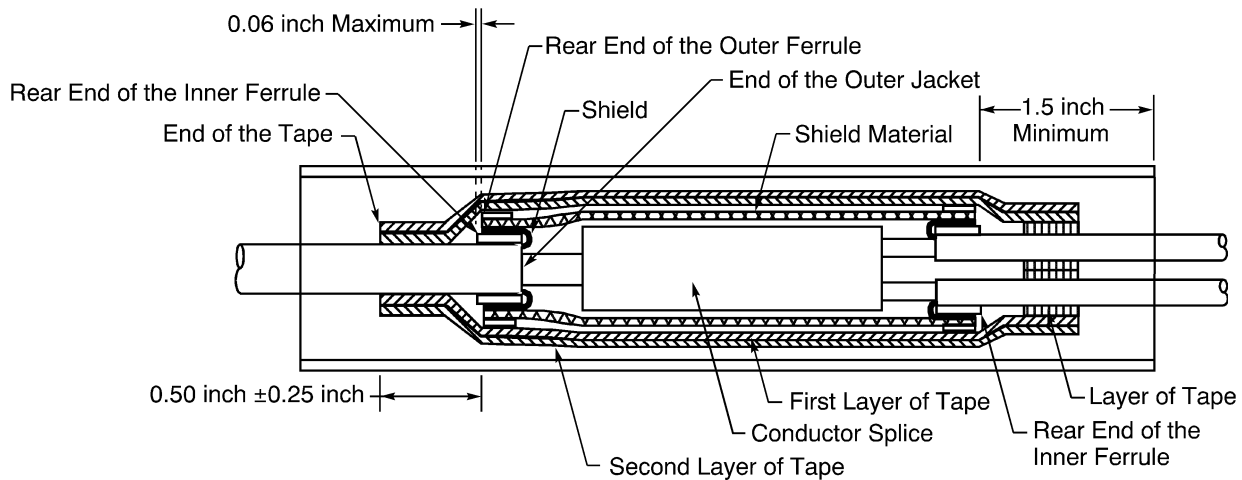
E. One Shielded Wire to Two Shielded Wires - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

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ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 145

Refer to Figure 145.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.
Make sure that the shield material has the smallest diameter that can go on the folded back shields of the two wires.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade B or higher inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jackets
- The outer ferrule is the smallest ferrule that can move freely on the shields, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

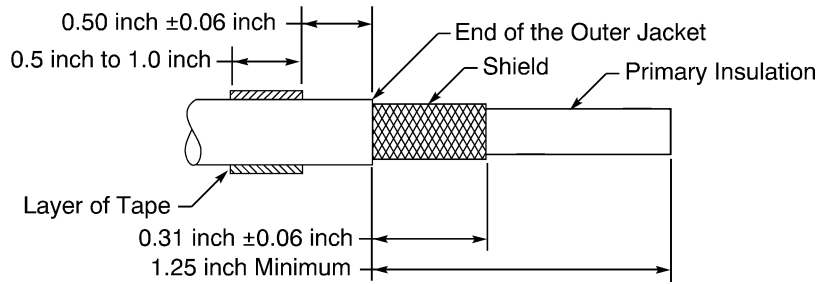
- (6) Prepare each shielded wire for the side of the splice assembly with two shielded wires.

Refer to:

- Figure 146
- Subject 20-00-15 for the outer jacket removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



SHIELDED WIRE PREPARATION
Figure 146

- (a) Remove a 1.25 inch minimum length of the outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
 Make sure that the remaining shield is 0.31 inch \pm 0.06 inch.
- (c) Wind a layer of the insulation tape on the outer jacket of each wire 0.50 inch \pm 0.06 inch farther than the end of the outer jackets.

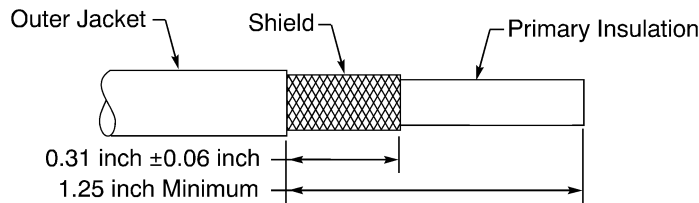
Make sure that:

- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

- (7) Prepare the end of the shielded wire for the side of the splice assembly with one shielded wire.

Refer to:

- Figure 147
- Subject 20-00-15 for the outer jacket and insulation removal procedures.



SHIELDED WIRE PREPARATION
Figure 147

- (a) Remove a 1.25 inch minimum length of the outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
 Make sure that the remaining shield is 0.31 inch \pm 0.06 inch.
- (8) Cut the necessary length of the shield material.
 Make sure that the ends of the shield material extend farther than the rear end of the ferrules on each end of the shield splice.
- (9) Cut the necessary length of the sleeve.
 Make sure that the sleeve extends a minimum of 1.5 inch farther than the rear end of the ferrules on each end of the shield splice.

STANDARD WIRING PRACTICES MANUAL

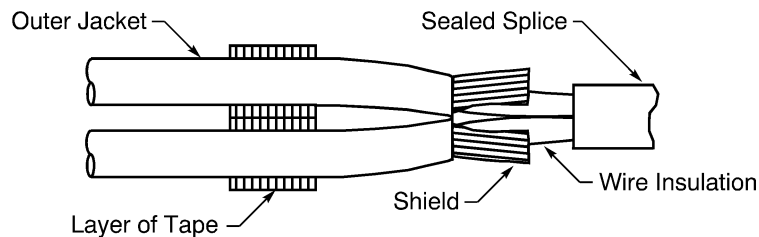
ASSEMBLY OF SPLICES

- (10) Put these components on the side of the splice assembly with one shielded wire:
 - The sleeve
 - The outer ferrule
 - The inner ferrule.

- (11) Put these components on the side of the splice assembly with two shielded wires:
 - The outer ferrule
 - The inner ferrule
 - The shield material.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.

- (12) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to two wires. Refer to Paragraph 9.A.
- (13) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (14) Assemble the side of the shield splice with two shielded wires.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shields apart and make them straight.
 - (c) Move the strands of each shield away from the adjacent wire. Refer to Figure 148.



POSITION OF THE SHIELDS
Figure 148

- (d) Align the forward end of the inner ferrule with each end of the outer jackets.
- (e) Fold the strands of the shields back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (f) Align the end of the shield material with the end of the strands of the shields that are folded back.
- (g) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (h) Crimp the ferrules.
- (15) Assemble the side of the shield splice with one shielded wire.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (a) Move the outer ferrule on the shield material.
- (b) Move the strands of the shields apart and make them straight.
- (c) Align the forward end of the inner ferrule with each end of the outer jackets.
- (d) Fold the strands of the shields back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (e) Align the end of the shield material with the end of the strands of the shields that are folded back.

Make sure that the shield material is pulled tight before the ferrules are crimped.

- (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

- (g) Crimp the ferrules.

- (16) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.

- (17) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts at the rear end of the layer of tape on the outer jacket on the side with two shielded wires
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule on the side with one shielded wire
- Makes a 50 percent overlap.

- (18) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

- (19) Align the center of the sleeve with the center of the splice assembly.

- (20) Shrink the sleeve into position. Refer to Subject 20-10-14.

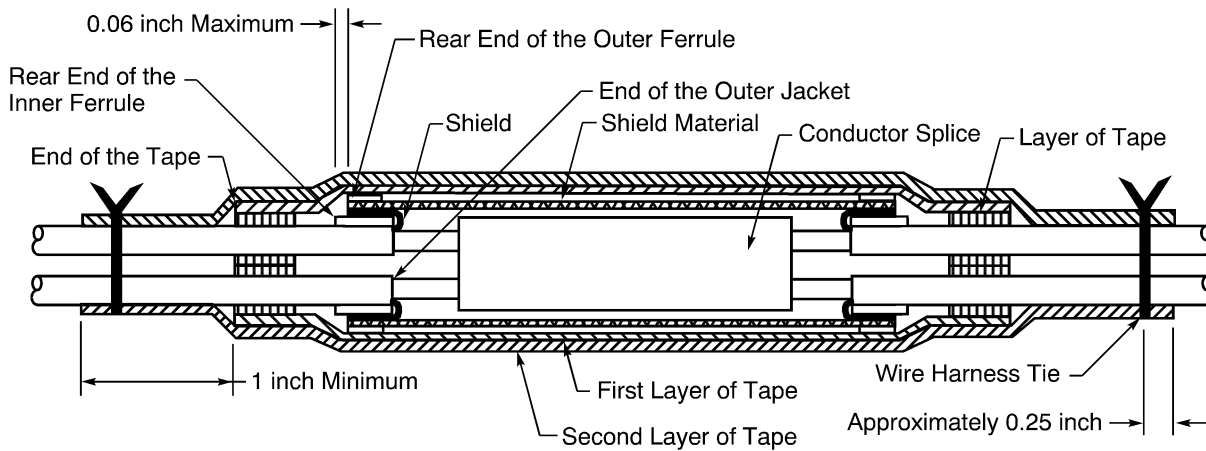
F. Two Shielded Wires to Two Shielded Wires - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 149

Refer to Figure 149.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.
 Make sure that the shield material has the smallest diameter that can go on the folded back shields of the two wires.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade B or higher inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the two outer jackets
- The outer ferrule is the smallest ferrule that can move freely on the shields, the shield material, and the inner ferrule.

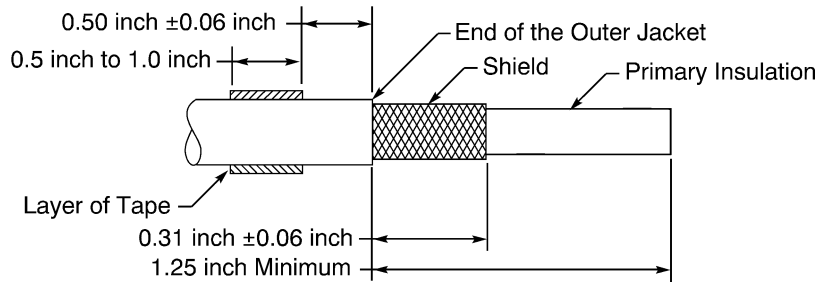
- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
 Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Prepare each end of the shielded wires.

Refer to:

- Figure 150
- Subject 20-00-15 for the outer jacket removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

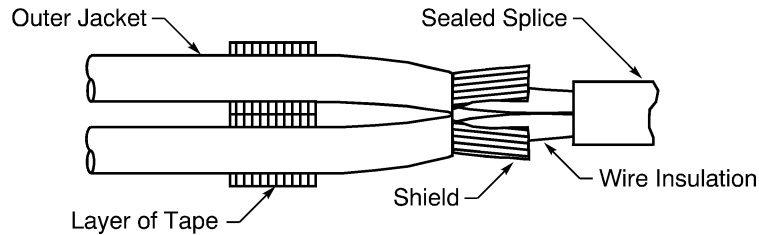


SHIELDED WIRE PREPARATION
Figure 150

- (a) Remove a 1.25 inch minimum length of the outer jacket from the end of the wire.
 - (b) Remove the necessary length of the shield from the end of the wire.
Make sure that the remaining shield is 0.31 inch ±0.06 inch.
 - (c) Wind a layer of the insulation tape on the outer jacket of each wire 0.50 inch ±0.06 inch farther than the end of the outer jackets.
Make sure that:
 - The tape goes around the circumference of the wire a minimum of two times
 - The tape makes a 100 percent overlap.
- (6) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the ferrules on each end of the shield splice.
 - (7) Put these components on the end of one pair of shielded wires:
 - The outer ferrule
 - The inner ferrule.
 - (8) Put these components on the end of the other pair of shielded wires:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.
- (9) Make a selection of an applicable Temperature Grade B conductor splice configuration for two wires to two wires. Refer to Paragraph 9.A.
 - (10) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
 - (11) Assemble the end of the shield splice opposite the end with the shield material.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shields apart and make them straight.
 - (c) Move the strands of each shield away from the adjacent wire. Refer to Figure 151.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE SHIELDS

Figure 151

- (d) Align the forward end of the inner ferrule with each end of the outer jackets.
- (e) Fold the strands of the shields back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (f) Align the end of the shield material with the end of the strands of the shields that are folded back.
- (g) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
 Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (h) Crimp the ferrules.
- (12) Do Step (11) again to assemble the other end of the shield splice.
 Make sure that the shield material is pulled tightly before the ferrules are crimped.
- (13) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
- (14) Tightly wind a layer of the tape on the splice assembly.
 Make sure that the layer of tape:
 - Starts at the rear end of the layer of tape on the outer jacket
 - Stops at the rear end of the layer of tape on the outer jacket at the other end of the splice
 - Makes a 50 percent overlap.
- (15) Tightly wind a second layer of the tape on the splice assembly.
 Make sure that the layer of tape:
 - Starts 1 inch minimum farther than where the first layer of tape stops
 - Stops 1 inch minimum farther than where the first layer of tape starts
 - Makes a 50 percent overlap.
- (16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.
 Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

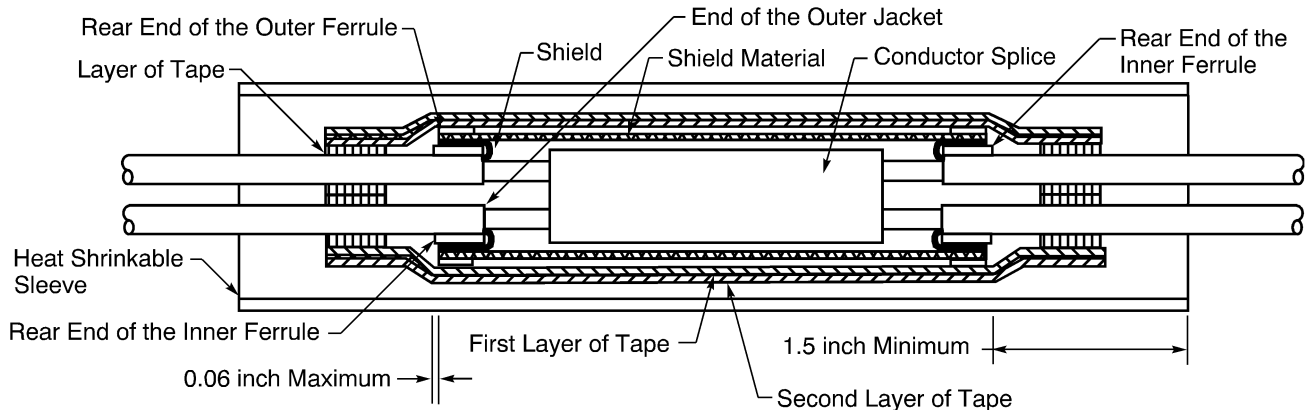
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

G. Two Shielded Wires to Two Shielded Wires - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 152

Refer to Figure 152.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shields of the two wires.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade B or higher inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the two outer jackets
- The outer ferrule is the smallest ferrule that can move freely on the shields, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

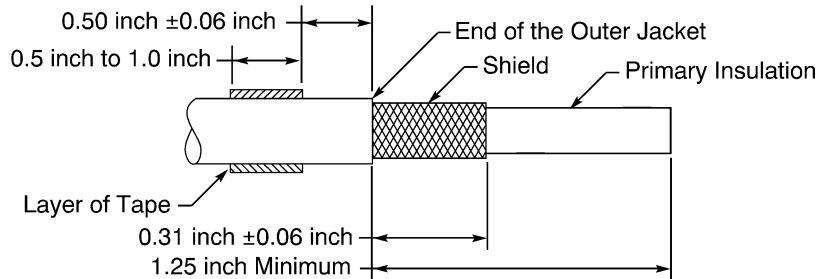
- (6) Prepare each end of the shielded wires.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

- Figure 153
- Subject 20-00-15 for the outer jacket removal procedures.



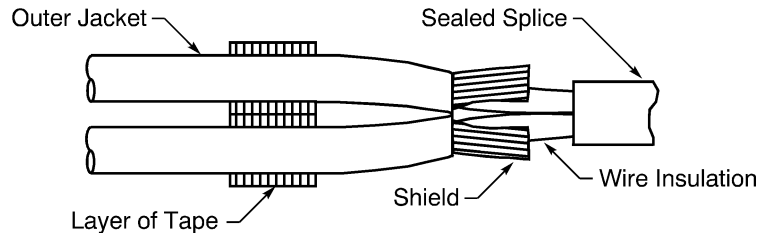
SHIELDED WIRE PREPARATION
Figure 153

- (a) Remove a 1.25 inch minimum length of the outer jacket from the end of the wire.
 - (b) Remove the necessary length of the shield from the end of the wire.
Make sure that the remaining shield is 0.31 inch ±0.06 inch.
 - (c) Wind a layer of the insulation tape on the outer jacket of each wire 0.50 inch ±0.06 inch farther than the end of the outer jackets.
Make sure that:
 - The tape goes around the circumference of the wire a minimum of two times
 - The tape makes a 100 percent overlap.
- (7) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1.5 inches farther than the rear end of the ferrules on each end of the shield splice.
 - (8) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the ferrules on each end of the shield splice.
 - (9) Put these components on the end of one pair of shielded wires:
 - The sleeve
 - The outer ferrule
 - The inner ferrule.
 - (10) Put these components on the end of the other pair of shielded wires:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.
- (11) Make a selection of an applicable Temperature Grade B conductor splice configuration for two wires to two wires. Refer to Paragraph 9.A.
 - (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (13) Assemble the end of the shield splice opposite the end with the shield material.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shields apart and make them straight.
 - (c) Move the strands of each shield away from the adjacent wire. Refer to Figure 154.



POSITION OF THE SHIELDS
Figure 154

- (d) Align the forward end of the inner ferrule with each end of the outer jackets.
- (e) Fold the strands of the shields back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (f) Align the end of the shield material with the end of the strands of the shields that are folded back.
- (g) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (h) Crimp the ferrules.
- (14) Do Step (13) again to assemble the other end of the shield splice.
Make sure that the shield material is pulled tightly before the ferrules are crimped.
- (15) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
- (16) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts at the rear end of the layer of tape on the outer jacket
 - Stops at the rear end of the layer of tape on the outer jacket at the other end of the splice
 - Makes a 50 percent overlap.
- (17) Tightly wind a second layer of the tape on the splice assembly.

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ASSEMBLY OF SPLICES

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

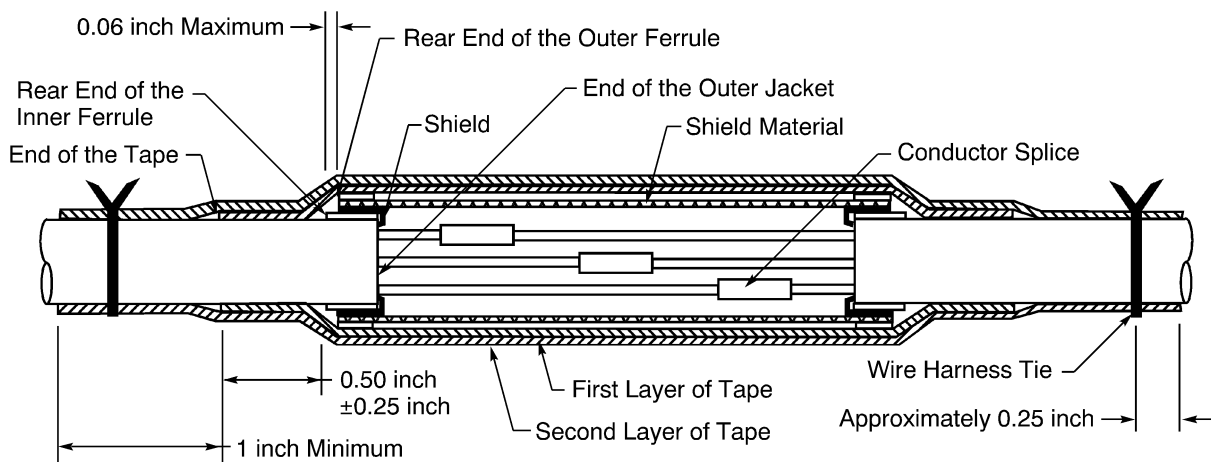
(18) Align the center of the sleeve with the center of the splice assembly.

(19) Shrink the sleeve into position. Refer to Subject 20-10-14.

H. One Shielded Cable to One Shielded Cable - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 155

Refer to Figure 155.

(1) Make a selection of a Temperature Grade B shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

(2) Make a selection of two sets of Temperature Grade B or higher inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

(3) Make a selection of a ferrule crimp tool from Table 45.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

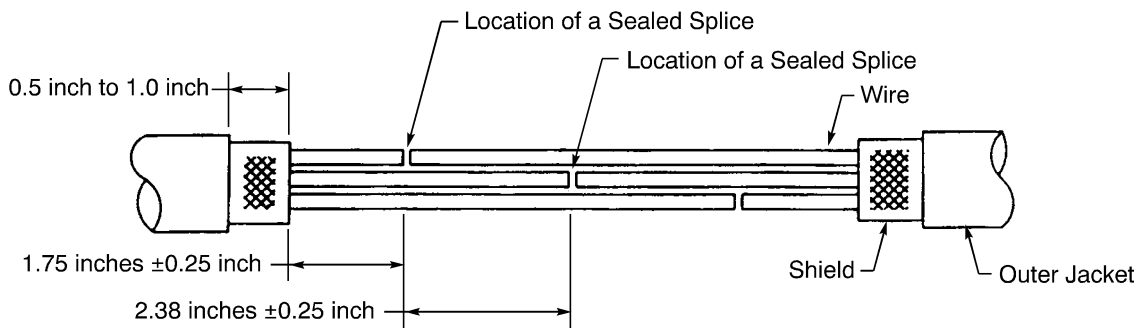
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (5) Prepare the shielded cable.

Refer to:

- Figure 156
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the shield is 0.5 inch to 1.0 inch
- The distance from the end of the shield to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



PREPARATION OF THE SHIELDED CABLE

Figure 156

- (6) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the ferrules on each end of the shield splice.
 - (7) Put these components on the end of one cable:
 - The outer ferrule
 - The inner ferrule.
 - (8) Put these components on the end of the other cable:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.
- (9) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
 - (10) Assemble each conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
 - (11) Assemble the end of the shield splice opposite the end with the shield material.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shield apart and make them straight.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (c) Align the forward end of the inner ferrule with the end of the outer jacket.
 - (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
 - (e) Align the end of the shield material with the end of the strands of the shield that are folded back.
 - (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
 - (g) Crimp the ferrules.
- (12) Do Step (11) again to assemble the other end of the shield splice.
Make sure that the shield material is pulled tightly before the ferrules are crimped.
- (13) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
- (14) Tightly wind a layer of the tape on the splice assembly that:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
 - Makes a 50 percent overlap.
- (15) Tightly wind a second layer of the tape on the splice assembly that:
 - Starts 1 inch minimum farther than where the first layer of tape stops
 - Stops 1 inch minimum farther than where the first layer of tape starts
 - Makes a 50 percent overlap.
- (16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.
Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

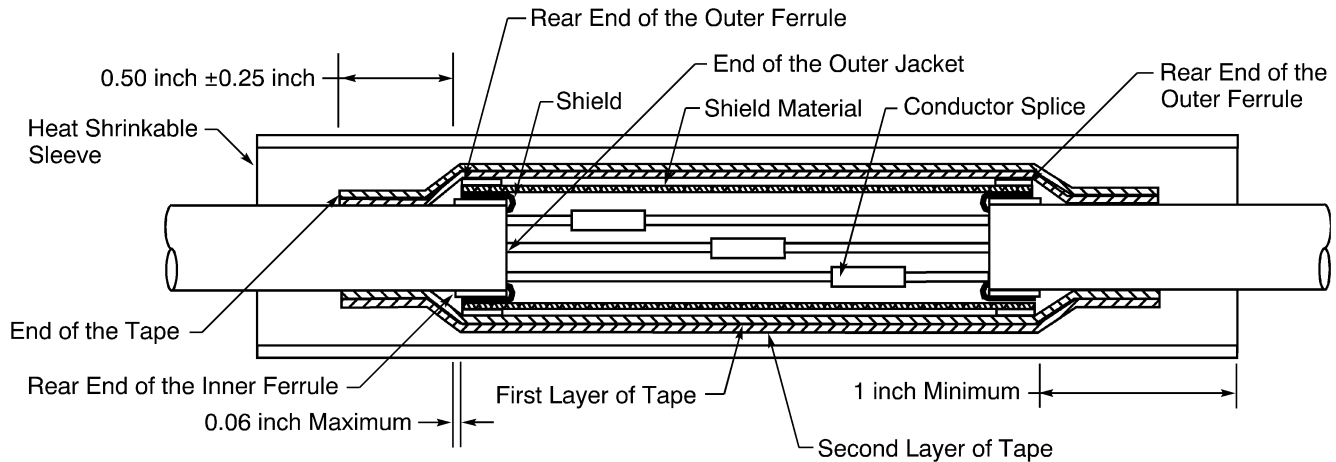
I. One Shielded Cable to One Shielded Cable - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 157

Refer to Figure 157.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade B or higher inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (5) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (6) Prepare the shielded cable.

STANDARD WIRING PRACTICES MANUAL

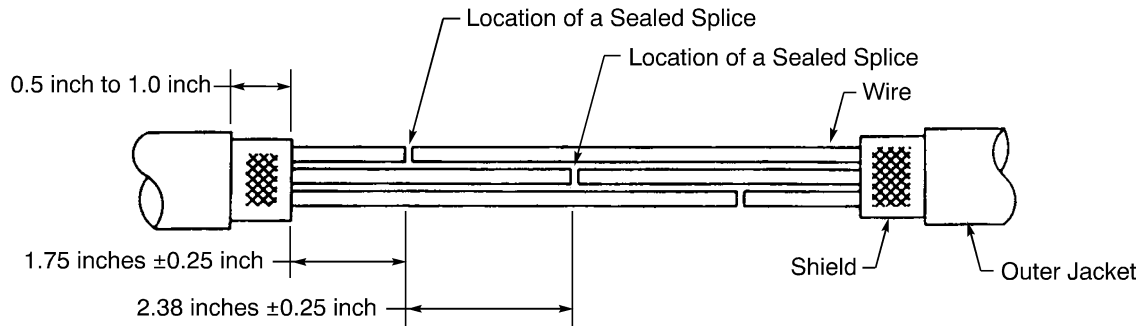
ASSEMBLY OF SPLICES

Refer to:

- Figure 158
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the shield is 0.5 inch to 1.0 inch
- The distance from the end of the shield to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



PREPARATION OF THE SHIELDED CABLE

Figure 158

- (7) Cut the necessary length of the sleeve.

Make sure that the sleeve extends a minimum of 1 inch farther than the rear end of the ferrules on each end of the shield splice.

- (8) Cut the necessary length of the shield material.

Make sure that the ends of the shield material extend farther than the rear end of the ferrules on each end of the shield splice.

- (9) Put these components on the end of one cable:

- The sleeve
- The outer ferrule
- The inner ferrule.

- (10) Put these components on the end of the other cable:

- The outer ferrule
- The inner ferrule
- The shield material.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.

- (11) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (12) Assemble each conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (13) Assemble the end of the shield splice opposite the end with the shield material.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (a) Move the outer ferrule on the shield material.
- (b) Move the strands of the shield apart and make them straight.
- (c) Align the forward end of the inner ferrule with the end of the outer jacket.
- (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (e) Align the end of the shield material with the end of the strands of the shield that are folded back.
- (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (g) Crimp the ferrules.
- (14) Do Step (13) again to assemble the other end of the shield splice.
Make sure that the shield material is pulled tightly before the ferrules are crimped.
 - (15) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
 - (16) Tightly wind a layer of the tape on the splice assembly that:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the ferrule at the other end of the splice
 - Makes a 50 percent overlap.
 - (17) Tightly wind a second layer of the tape on the splice assembly that:
 - Starts where the first layer of tape stops
 - Stops where the first layer of tape starts
 - Makes a 50 percent overlap.
 - (18) Align the center of the sleeve with the center of the splice assembly.
 - (19) Shrink the sleeve into position. Refer to Subject 20-10-14.

11. SEALED SPLICE CONFIGURATIONS WITH MECHANICAL FERRULES FOR SHIELDED WIRE AND SHIELDED CABLE FOR HIGH TEMPERATURE**A. Splice Assembly Configurations**

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

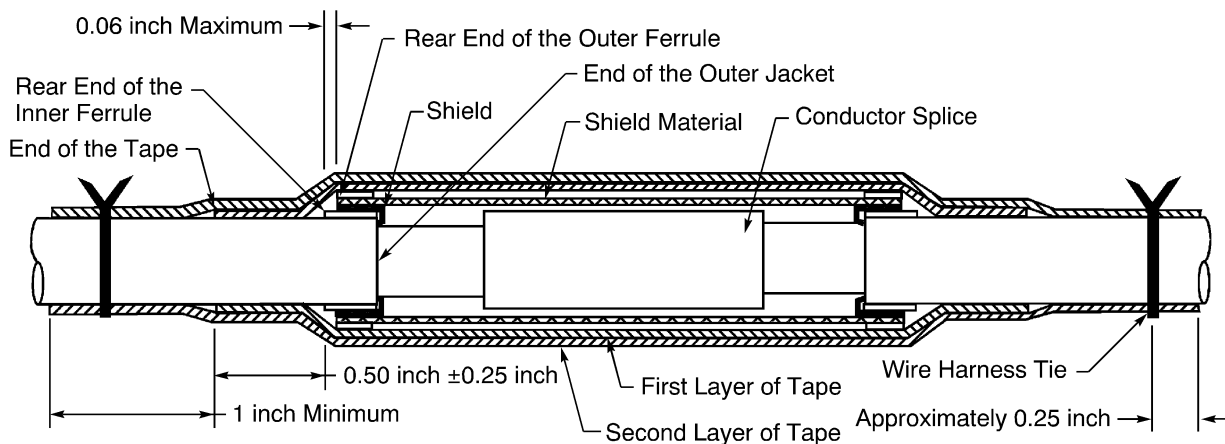
**Table 95
SPLICE ASSEMBLY CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	Quantity of Conductor Splices	Applicable Condition	Splice Assembly	
				Configuration	Procedure
One Shielded Wire	One Shielded Wire	1	Fuel Vapor	Tape, Ties	Paragraph 11.B.
			No Fuel Vapor	Tape, Sleeve	Paragraph 11.C.
				Tape, Ties	Paragraph 11.B.
Shielded Wire	Two Shielded Wires	1	Fuel Vapor	Tape, Ties	Paragraph 11.D.
			No Fuel Vapor	Tape, Sleeve	Paragraph 11.E.
				Tape, Ties	Paragraph 11.D.
Two Shielded Wires	Two Shielded Wires	1	Fuel Vapor	Tape, Ties	Paragraph 11.F.
			No Fuel Vapor	Tape, Sleeve	Paragraph 11.G.
				Tape, Ties	Paragraph 11.F.
One Shielded Cable	One Shielded Cable	-	Fuel Vapor	Tape, Ties	Paragraph 11.H.
			No Fuel Vapor	Tape, Sleeve	Paragraph 11.I.
				Tape, Ties	Paragraph 11.H.

B. One Shielded Wire to One Shielded Wire - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



**CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 159**

Refer to Figure 159.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

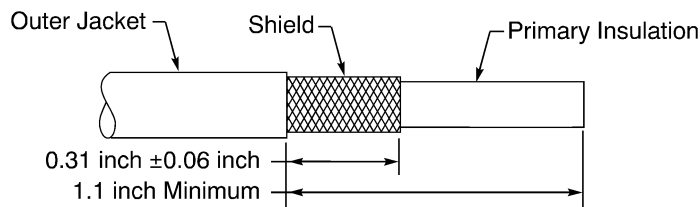
- (3) Make a selection of a ferrule crimp tool from Table 45.

- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.

- (5) Prepare each end of the shielded wire.

Refer to:

- Figure 160
- Subject 20-00-15 for the outer jacket removal procedures.



SHIELDED WIRE PREPARATION

Figure 160

- (a) Remove 1.1 inch minimum length of outer jacket from the end of the wire.

- (b) Remove the necessary length of the shield from the end of the wire.

Make sure the remaining shield is 0.31 inch \pm 0.06 inch.

- (6) Cut the necessary length of the shield material.

Make sure that the end of the shield material extends farther than the rear end of the inner ferrule on each end of the shield splice.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (7) Put these components on the end of one wire:
- The outer ferrule
 - The inner ferrule.
- (8) Put these components on the other end of the shielded wire:
- The outer ferrule
 - The inner ferrule
 - The shield material.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.

- (9) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (10) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (11) Assemble the end of the shield splice opposite the end with the shield material.
- (a) Move the outer ferrule on the shield material.
- (b) Move the strands of the shield apart and make them straight.
- (c) Align the forward end of the inner ferrule with the end of the outer jacket.
- (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (e) Align the end of the shield material with the end of the strands of the shield that are folded back.
- (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
- Make sure that:
- The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (g) Crimp the ferrules.
- (12) Do Step (11) again to assemble the other end of the shield splice.
- Make sure that the shield material is pulled tight before the ferrules are crimped.
- (13) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
- (14) Tightly wind a layer of the tape on the splice assembly.
- Make sure that the layer of tape:
- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule at the other end of the splice
 - Makes a 50 percent overlap.
- (15) Tightly wind a second layer of the tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

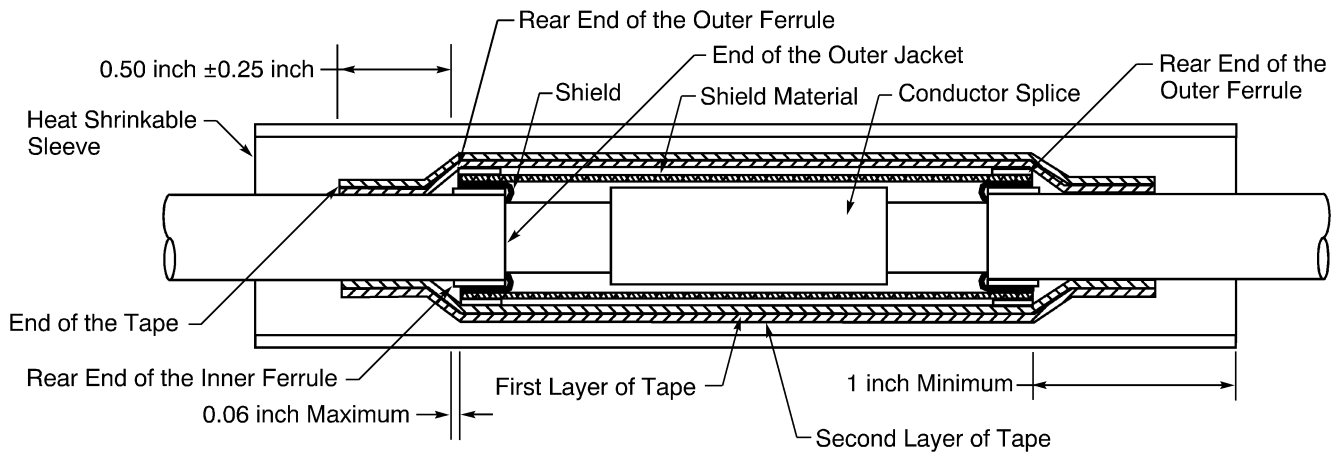
(16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

C. One Shielded Wire to One Shielded Wire - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 161

Refer to Figure 161.

(1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

(2) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

(3) Make a selection of a ferrule crimp tool from Table 45.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

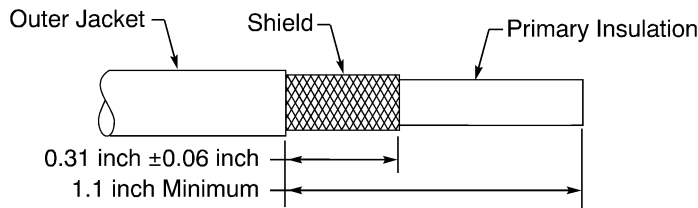
- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (5) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (6) Prepare each end of the shielded wire.

Refer to:

- Figure 162
- Subject 20-00-15 for the outer jacket removal procedures.



SHIELDED WIRE PREPARATION
Figure 162

- (a) Remove 1.1 inch minimum length of outer jacket from the end of the wire.
 - (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.31 inch ±0.06 inch.
 - (7) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1 inch farther than the rear end of the inner ferrule on each end of the shield splice.
 - (8) Cut the necessary length of the shield material.
Make sure that the end of the shield material extends farther than the rear end of the inner ferrule on each end of the shield splice.
 - (9) Put these components on the end of one wire:
 - The sleeve
 - The outer ferrule
 - The inner ferrule.
 - (10) Put these components on the other end of the shielded wire:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.
- (11) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
 - (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
 - (13) Assemble the end of the shield splice opposite the end with the shield material.
 - (a) Move the outer ferrule on the shield material.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (b) Move the strands of the shield apart and make them straight.
- (c) Align the forward end of the inner ferrule with the end of the outer jacket.
- (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (e) Align the end of the shield material with the end of the strands of the shield that are folded back.
- (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

(g) Crimp the ferrules.

- (14) Do Step (13) again to assemble the other end of the shield splice.

Make sure that the shield material is pulled tight before the ferrules are crimped.

- (15) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.

- (16) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule at the other end of the splice
- Makes a 50 percent overlap.

- (17) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

- (18) Align the center of the sleeve with the center of the splice assembly.

- (19) Shrink the sleeve into position. Refer to Subject 20-10-14.

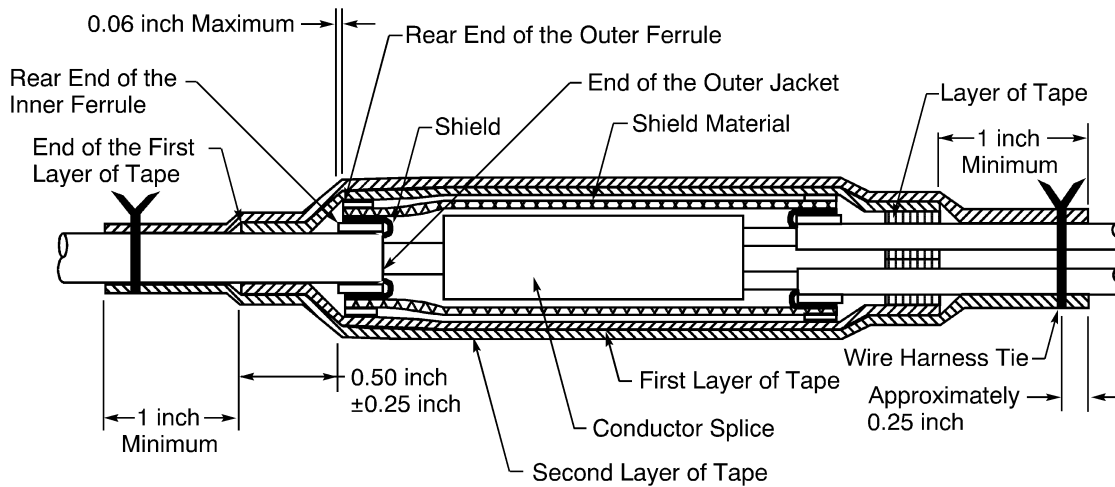
D. One Shielded Wire to Two Shielded Wires - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



FINAL CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 163

Refer to Figure 163.

- (1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shields of the wires.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.

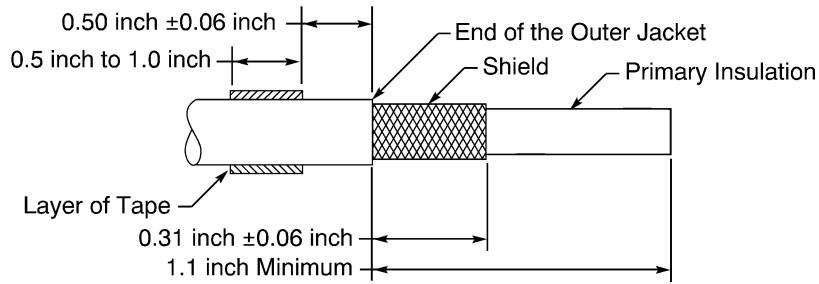
- (5) Prepare each shielded wire for the side of the splice assembly with two shielded wires.

Refer to:

- Figure 164
- Subject 20-00-15 for the outer jacket removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



SHIELDED WIRE PREPARATION
Figure 164

- (a) Remove 1.1 inch minimum length of outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.31 inch ± 0.06 inch.
- (c) Wind a layer of the insulation tape on the outer jacket of each wire 0.50 inch ± 0.06 inch farther than the end of the outer jackets.

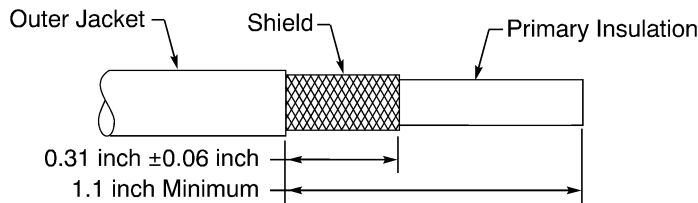
Make sure that:

- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

- (6) Prepare the shielded wire for the side of the splice assembly with one shielded wire.

Refer to:

- Figure 165
- Subject 20-00-15 for the outer jacket removal procedures.



SHIELDED WIRE PREPARATION
Figure 165

- (a) Remove 1.1 inch minimum length of outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.31 inch ± 0.06 inch.
- (7) Cut the necessary length of the shield material.
Make sure that the end of the shield material extends farther than the rear end of the inner ferrule on each end of the shield splice.

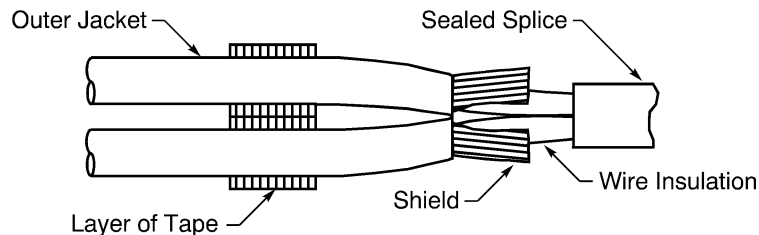
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (8) Put these components on the side of the splice assembly with one shielded wire:
 - The outer ferrule
 - The inner ferrule.
- (9) Put these components on the side of the splice assembly with two shielded wires:
 - The outer ferrule
 - The inner ferrule
 - The shield material.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wires.

- (10) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to two wires. Refer to Paragraph 9.A.
- (11) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (12) Assemble the sealed splice of the wires. Refer to Paragraph 8.D.
- (13) Assemble the end of the shield splice with two shielded wires.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shield apart and make them straight.
 - (c) Move the strands of each shield away from the adjacent wire. Refer to Figure 166.



POSITION OF THE SHIELDS
Figure 166

- (d) Align the forward end of the inner ferrule with the end of the outer jackets.
- (e) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (f) Align the end of the shield material with the end of the strands of the shields that are folded back.
- (g) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (h) Crimp the ferrules.
- (14) Assemble the end of the shield splice with one shielded wire.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (a) Move the outer ferrule on the shield material.
- (b) Move the strands of the shield apart and make them straight.
- (c) Align the forward end of the inner ferrule with the end of the outer jackets.
- (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (e) Align the end of the shield material with the end of the strands of the shields that are folded back.

Make sure that the shield material is pulled tight before the ferrules are crimped.

- (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

- (g) Crimp the ferrules.

- (15) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.

- (16) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts at the rear end of the layer of tape on the outer jacket on the side with two shielded wires
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule on the side with one shielded wire
- Makes a 50 percent overlap.

- (17) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

- (18) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

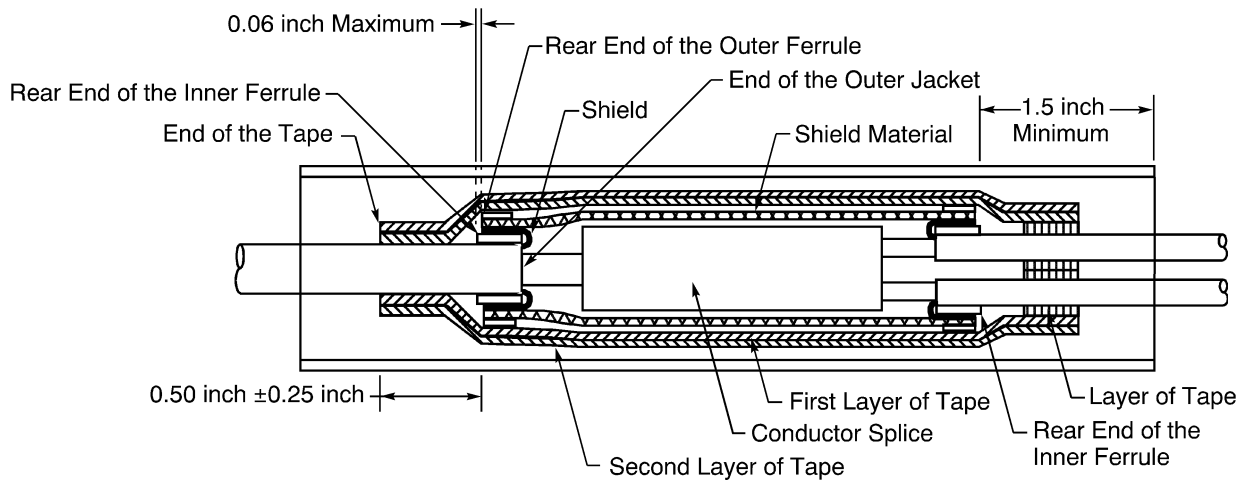
E. One Shielded Wire to Two Shielded Wires - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



FINAL CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 167

Refer to Figure 167.

- (1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shields of the wires.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

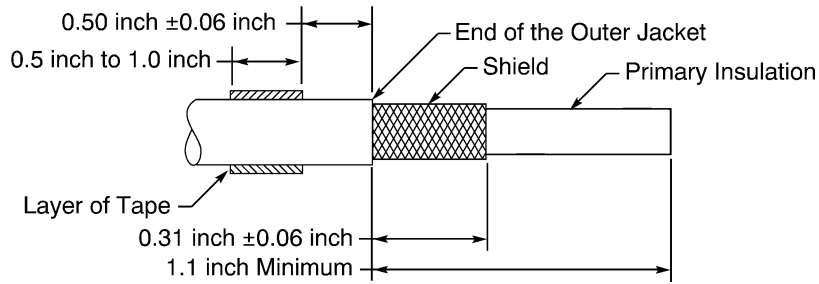
- (6) Prepare each shielded wire for the side of the splice assembly with two shielded wires.

Refer to:

- Figure 168
- Subject 20-00-15 for the outer jacket removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



SHIELDED WIRE PREPARATION
Figure 168

- (a) Remove 1.1 inch minimum length of outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.31 inch \pm 0.06 inch.
- (c) Wind a layer of the insulation tape on the outer jacket of each wire 0.50 inch \pm 0.06 inch farther than the end of the outer jackets.

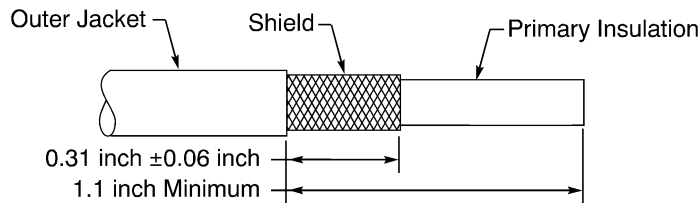
Make sure that:

- The tape goes around the circumference of the wire a minimum of two times
- The tape makes a 100 percent overlap.

- (7) Prepare the shielded wire for the side of the splice assembly with one shielded wire.

Refer to:

- Figure 169
- Subject 20-00-15 for the outer jacket removal procedures.



SHIELDED WIRE PREPARATION
Figure 169

- (a) Remove 1.1 inch minimum length of outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.31 inch \pm 0.06 inch.
- (8) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1.5 inch farther than the rear end of the inner ferrule on each end of the shield splice.
- (9) Cut the necessary length of the shield material.
Make sure that the end of the shield material extends farther than the rear end of the inner ferrule on each end of the shield splice.

STANDARD WIRING PRACTICES MANUAL

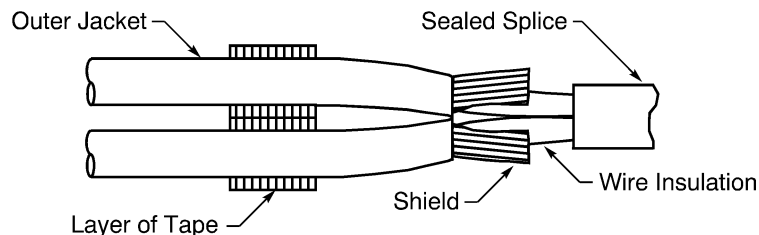
ASSEMBLY OF SPLICES

- (10) Put these components on the side of the splice assembly with one shielded wire:
- The sleeve
 - The outer ferrule
 - The inner ferrule.

- (11) Put these components on the side of the splice assembly with two shielded wires:
- The outer ferrule
 - The inner ferrule
 - The shield material.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wires.

- (12) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to two wires. Refer to Paragraph 9.A.
- (13) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (14) Assemble the end of the shield splice with two shielded wires.
- (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shield apart and make them straight.
 - (c) Move the strands of each shield away from the adjacent wire. Refer to Figure 170.



POSITION OF THE SHIELDS
Figure 170

- (d) Align the forward end of the inner ferrule with the end of the outer jackets.
 - (e) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
 - (f) Align the end of the shield material with the end of the strands of the shields that are folded back.
 - (g) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
 - (h) Crimp the ferrules.
- (15) Assemble the end of the shield splice with one shielded wire.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (a) Move the outer ferrule on the shield material.
- (b) Move the strands of the shield apart and make them straight.
- (c) Align the forward end of the inner ferrule with the end of the outer jackets.
- (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (e) Align the end of the shield material with the end of the strands of the shields that are folded back.

Make sure that the shield material is pulled tight before the ferrules are crimped.

- (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

- (g) Crimp the ferrules.

- (16) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.

- (17) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts at the rear end of the layer of tape on the outer jacket on the side with two shielded wires
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule on the side with one shielded wire
- Makes a 50 percent overlap.

- (18) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

- (19) Align the center of the sleeve with the center of the splice assembly.

- (20) Shrink the sleeve into position. Refer to Subject 20-10-14.

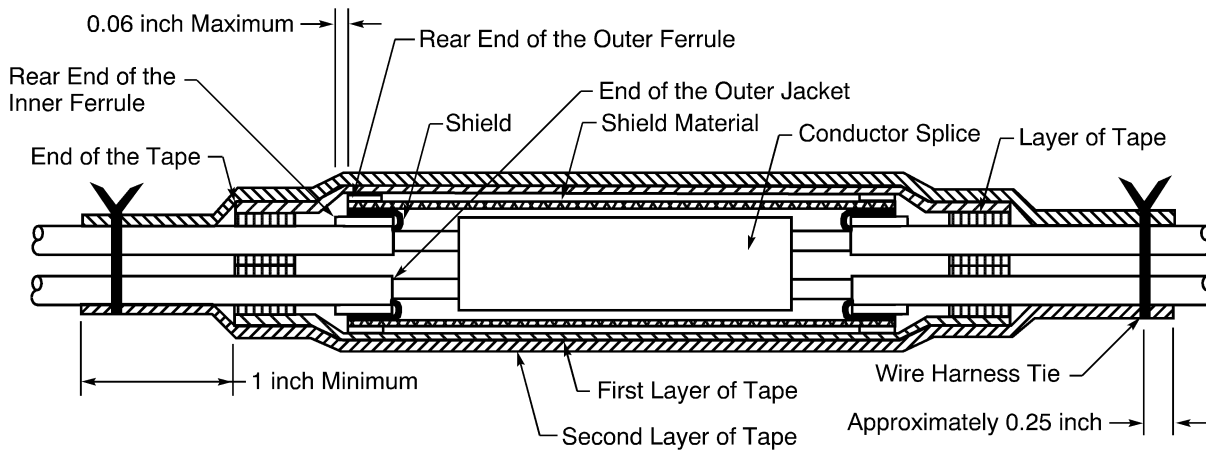
F. Two Shielded Wires to Two Shielded Wires - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



FINAL CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 171

Refer to Figure 171.

- (1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shields of the two wires.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

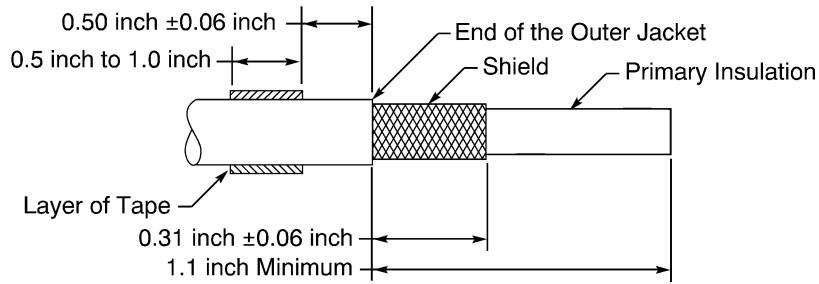
- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.
Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Prepare each end of the shielded wires.

Refer to:

- Figure 172
- Subject 20-00-15 for the outer jacket removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

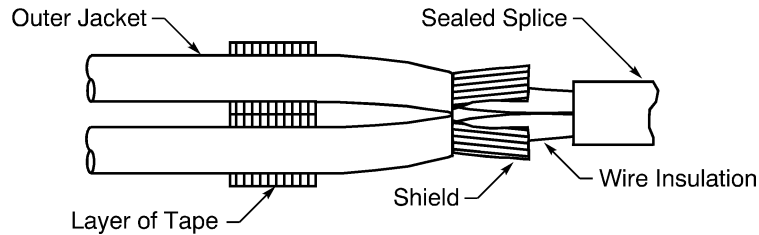


SHIELDED WIRE PREPARATION
Figure 172

- (a) Remove 1.1 inch minimum length of outer jacket from the end of the wire.
 - (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.31 inch ± 0.06 inch.
 - (c) Wind a layer of the insulation tape on the outer jacket of each wire 0.50 inch ± 0.06 inch farther than the end of the outer jackets.
Make sure that:
 - The tape goes around the circumference of the wire a minimum of two times
 - The tape makes a 100 percent overlap.
 - (6) Cut the necessary length of the shield material.
Make sure that the end of the shield material extends farther than the rear end of the inner ferrule on each end of the shield splice.
 - (7) Put these components on one pair of the shielded wires:
 - The outer ferrule
 - The inner ferrule.
 - (8) Put these components on the end of the other pair of shielded wires:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wires.
- (9) Make a selection of an applicable Temperature Grade D conductor splice configuration for two wires to two wires. Refer to Paragraph 9.A.
 - (10) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
 - (11) Assemble the end of the shield splice opposite the end with the shield material.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shield apart and make them straight.
 - (c) Move the strands of each shield away from the adjacent wire. Refer to Figure 173.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE SHIELDS

Figure 173

- (d) Align the forward end of the inner ferrule with the end of the outer jackets.
- (e) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (f) Align the end of the shield material with the end of the strands of the shields that are folded back.
- (g) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (h) Crimp the ferrules.
- (12) Do Step (11) again to assemble the other end of the shield splice.
Make sure that the shield material is pulled tight before the ferrules are crimped.
- (13) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
- (14) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts at the rear end of the layer of tape on the outer jacket.
 - Stops at the rear end of the layer of tape on the outer jacket at the other end of the splice
 - Makes a 50 percent overlap.
- (15) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 1 inch minimum farther than where the first layer of tape stops
 - Stops 1 inch minimum farther than where the first layer of tape starts
 - Makes a 50 percent overlap.
- (16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.
Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

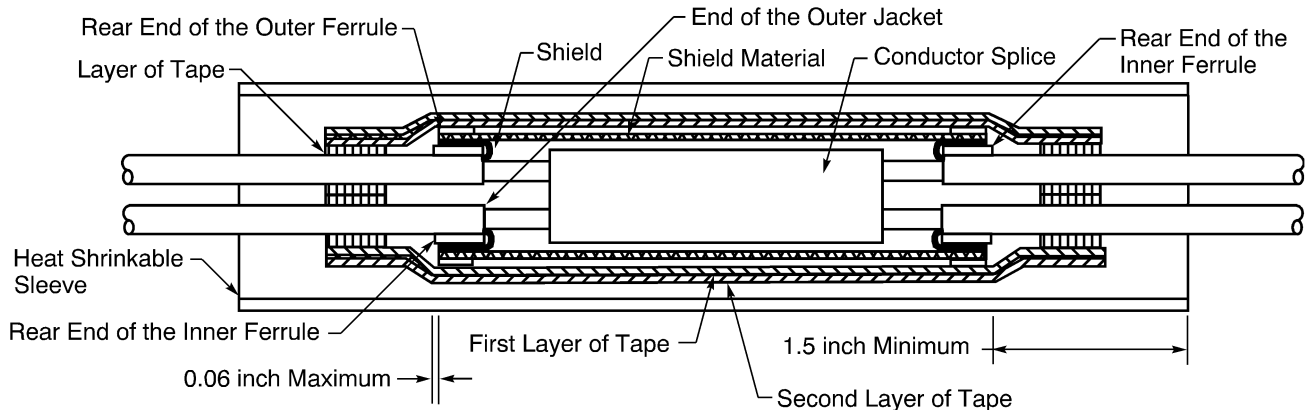
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

G. Two Shielded Wires to Two Shielded Wires - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



FINAL CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 174

Refer to Figure 174.

- (1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shields of the two wires.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.
 Make sure that the tape has a width of 0.5 inch minimum to 1.0 inch maximum.
- (5) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

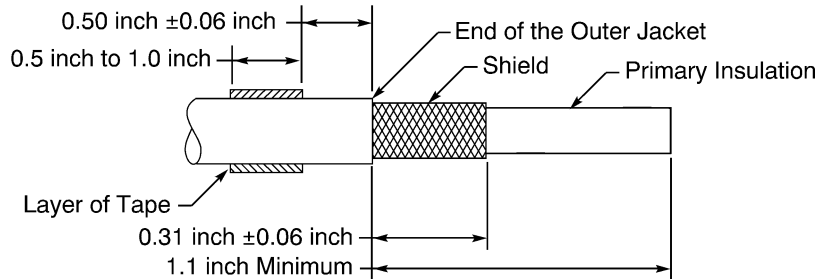
- (6) Prepare each end of the shielded wires.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Refer to:

- Figure 175
- Subject 20-00-15 for the outer jacket removal procedures.



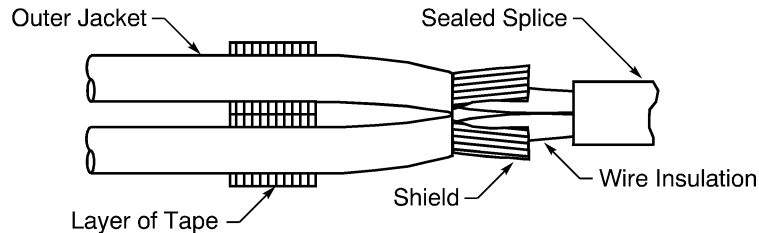
SHIELDED WIRE PREPARATION
Figure 175

- (a) Remove 1.1 inch minimum length of outer jacket from the end of the wire.
 - (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.31 inch ±0.06 inch.
 - (c) Wind a layer of the insulation tape on the outer jacket of each wire 0.50 inch ±0.06 inch farther than the end of the outer jackets.
Make sure that:
 - The tape goes around the circumference of the wire a minimum of two times
 - The tape makes a 100 percent overlap.
- (7) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1.5 inch farther than the rear end of the inner ferrule on each end of the shield splice.
 - (8) Cut the necessary length of the shield material.
Make sure that the end of the shield material extends farther than the rear end of the inner ferrule on each end of the shield splice.
 - (9) Put these components on one pair of the shielded wires:
 - The sleeve
 - The outer ferrule
 - The inner ferrule.
 - (10) Put these components on the end of the other pair of shielded wires:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wires.
- (11) Make a selection of an applicable Temperature Grade D conductor splice configuration for two wires to two wires. Refer to Paragraph 9.A.
 - (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (13) Assemble the end of the shield splice opposite the end with the shield material.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shield apart and make them straight.
 - (c) Move the strands of each shield away from the adjacent wire. Refer to Figure 176.



POSITION OF THE SHIELDS
Figure 176

- (d) Align the forward end of the inner ferrule with the end of the outer jackets.
- (e) Fold the strands of the shield back over the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (f) Align the end of the shield material with the end of the strands of the shields that are folded back.
- (g) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
- (h) Crimp the ferrules.
- (14) Do Step (13) again to assemble the other end of the shield splice.
Make sure that the shield material is pulled tight before the ferrules are crimped.
- (15) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
- (16) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts at the rear end of the layer of tape on the outer jacket.
 - Stops at the rear end of the layer of tape on the outer jacket at the other end of the splice
 - Makes a 50 percent overlap.
- (17) Tightly wind a second layer of the tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

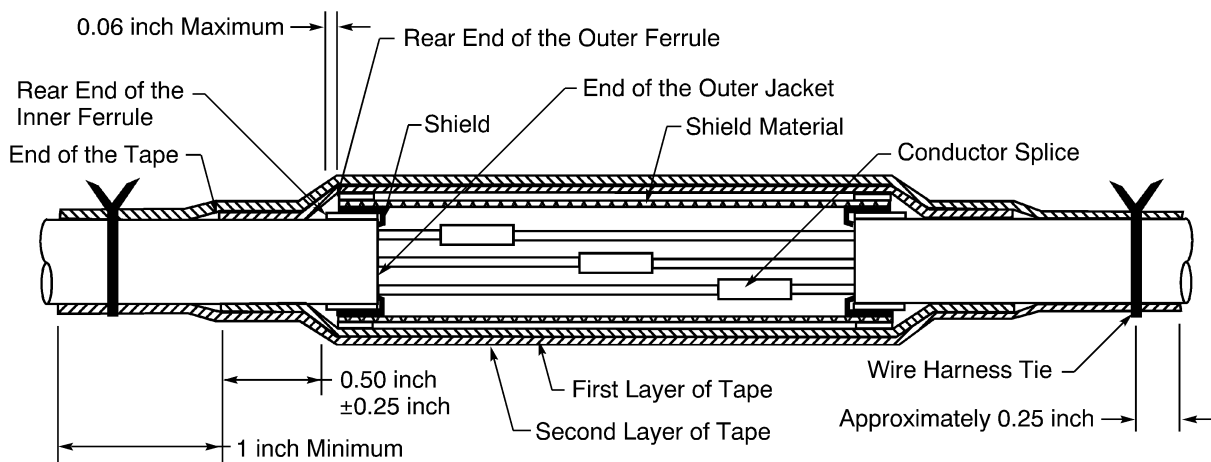
(18) Align the center of the sleeve with the center of the splice assembly.

(19) Shrink the sleeve into position. Refer to Subject 20-10-14.

H. One Shielded Cable to One Shielded Cable - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 177

Refer to Figure 177.

(1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

(2) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

(3) Make a selection of a ferrule crimp tool from Table 45.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

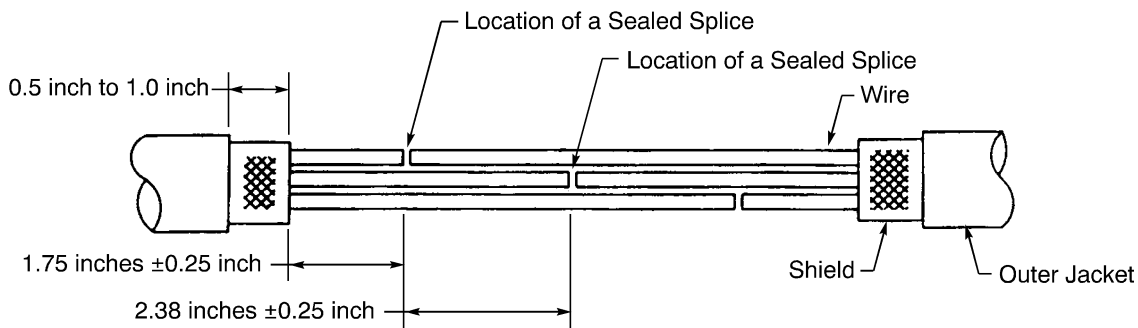
- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (5) Prepare the shielded cable.

Refer to:

- Figure 178
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the shield is 0.5 inch to 1.0 inch
- The distance from the end of the shield to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



PREPARATION OF THE SHIELDED CABLE

Figure 178

- (6) Cut the necessary length of the shield material.
Make sure that the end of the shield material extends farther than the rear end of the inner ferrule on each end of the shield splice.
 - (7) Put these components on the end of one cable:
 - The outer ferrule
 - The inner ferrule.
 - (8) Put these components on the end of the other cable:
 - The outer ferrule
 - The inner ferrule
 - The shield material.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.
- (9) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
 - (10) Assemble the conductor splices. Refer to the applicable procedure given in Paragraph 9.A.
 - (11) Assemble the end of the shield splice opposite the end with the shield material.
 - (a) Move the outer ferrule on the shield material.
 - (b) Move the strands of the shield apart and make them straight.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (c) Align the forward end of the inner ferrule with the end of the outer jacket.
 - (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
 - (e) Align the end of the shield material with the end of the strands of the shield that are folded back.
 - (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.
Make sure that:
 - The outer ferrule goes around the shield material
 - The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
 - The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.
 - (g) Crimp the ferrules.
- (12) Do Step (11) again to assemble the other end of the shield splice.
Make sure that the shield material is pulled tightly before the ferrules are crimped.
- (13) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.
- (14) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule at the other end of the splice
 - Makes a 50 percent overlap.
- (15) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 1 inch minimum farther than where the first layer of tape stops
 - Stops 1 inch minimum farther than where the first layer of tape starts
 - Makes a 50 percent overlap.
- (16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.
Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

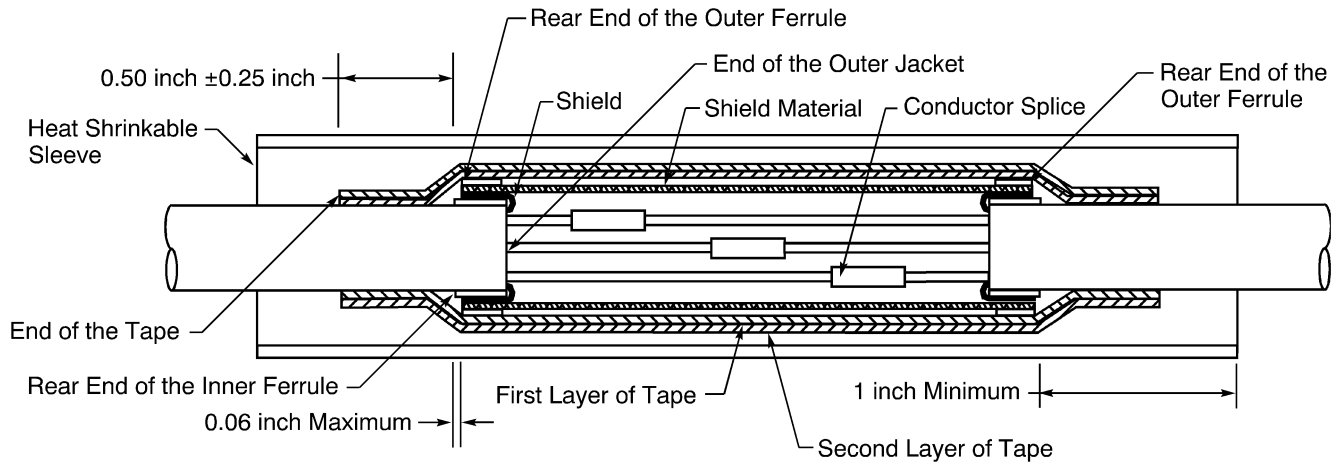
I. One Shielded Cable to One Shielded Cable - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 179

Refer to Figure 179.

- (1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of two sets of Temperature Grade D inner ferrules and outer ferrules.

Refer to:

- Figure 6 for the ferrule size
- Table 31 for the Temperature Grade
- Table 32 for the ferrule part numbers.

Make sure that:

- The inner ferrule is the smallest ferrule that can move freely on the outer jacket
- The outer ferrule is the smallest ferrule that can move freely on the shield, the shield material, and the inner ferrule.

- (3) Make a selection of a ferrule crimp tool from Table 45.
- (4) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (5) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (6) Prepare the shielded cable.

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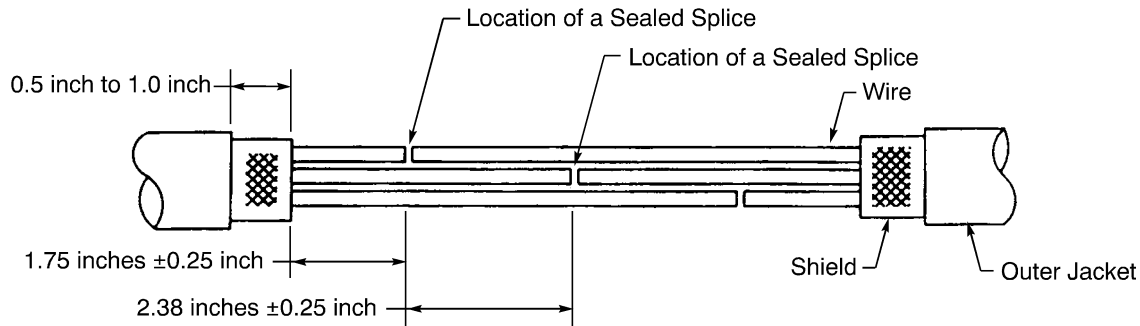
ASSEMBLY OF SPLICES

Refer to:

- Figure 180
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the shield is 0.5 inch to 1.0 inch
- The distance from the end of the shield to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



PREPARATION OF THE SHIELDED CABLE

Figure 180

- (7) Cut the necessary length of the sleeve.

Make sure that the sleeve extends a minimum of 1 inch farther than the rear end of the inner ferrule on each end of the shield splice.

- (8) Cut the necessary length of the shield material.

Make sure that the end of the shield material extends farther than the rear end of the inner ferrule on each end of the shield splice.

- (9) Put these components on the end of one cable:

- The sleeve
- The outer ferrule
- The inner ferrule.

- (10) Put these components on the end of the other cable:

- The outer ferrule
- The inner ferrule
- The shield material.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.

- (11) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (12) Assemble the conductor splices. Refer to the applicable procedure given in Paragraph 9.A.
- (13) Assemble the end of the shield splice opposite the end with the shield material.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (a) Move the outer ferrule on the shield material.
- (b) Move the strands of the shield apart and make them straight.
- (c) Align the forward end of the inner ferrule with the end of the outer jacket.
- (d) Fold the strands of the shield back on the inner ferrule to make the strands of the shield symmetrical around the circumference of the ferrule.
- (e) Align the end of the shield material with the end of the strands of the shield that are folded back.
- (f) Align the rear end of the outer ferrule with the rear end of the inner ferrule.

Make sure that:

- The outer ferrule goes around the shield material
- The rear end of the outer ferrule does not extend farther than the rear end of the inner ferrule
- The rear end of the outer ferrule is a maximum of 0.06 inch from the rear end of the inner ferrule.

- (g) Crimp the ferrules.

- (14) Do Step (13) again to assemble the other end of the shield splice.

Make sure that the shield material is pulled tightly before the ferrules are crimped.

- (15) Remove the shield and the shield material that extend farther than the rear end of the inner ferrule on each end of the shield splice.

- (16) Tightly wind a layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the inner ferrule at the other end of the splice
- Makes a 50 percent overlap.

- (17) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

- (18) Align the center of the sleeve with the center of the splice assembly.

- (19) Shrink the sleeve into position. Refer to Subject 20-10-14.

12. SEALED SPLICE CONFIGURATIONS WITH SHIELD-KONS FOR SHIELDED WIRE AND SHIELDED CABLE**A. Splice Assembly Configurations**

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

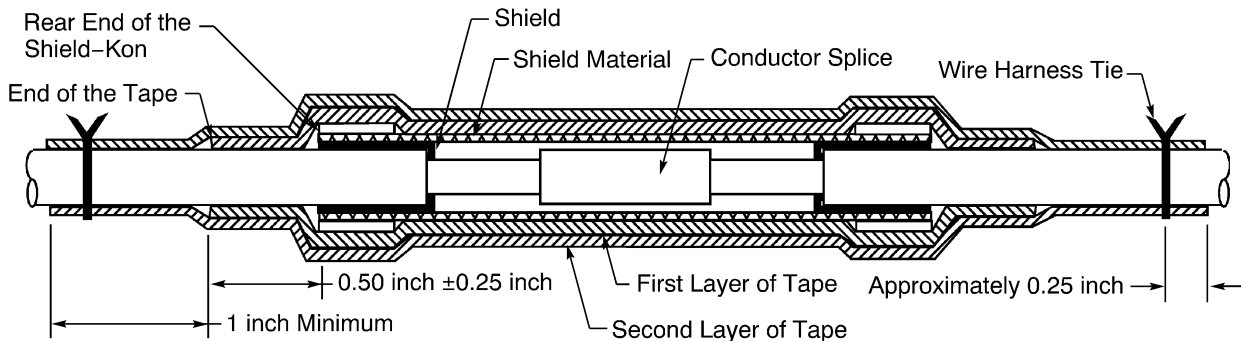
**Table 96
SPLICE ASSEMBLY CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	Quantity of Conductor Splices	Applicable Condition	Splice Assembly	
				Configuration	Procedure
One Shielded Wire	One Shielded Wire	1	Fuel Vapor	Tape, Ties	Paragraph 12.B.
			No Fuel Vapor	Tape, Sleeves	Paragraph 12.C.
				Tape, Ties	Paragraph 12.B.
One Shielded Cable	One Shielded Cable	-	Fuel Vapor	Tape, Ties	Paragraph 12.D.
			No Fuel Vapor	Tape, Sleeves	Paragraph 12.E.
				Tape, Ties	Paragraph 12.D.

B. One Shielded Wire to One Shielded Wire - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



**CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 181**

Refer to Figure 181.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

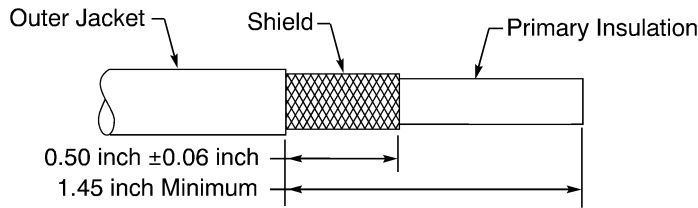
- (2) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (3) Prepare each end of the shielded wire.

Refer to:

- Figure 182
- Subject 20-00-15 for the outer jacket removal procedures.

STANDARD WIRING PRACTICES MANUAL

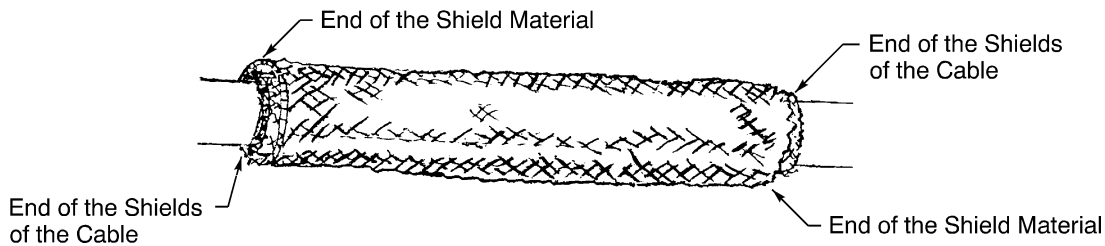
ASSEMBLY OF SPLICES



SHIELDED WIRE PREPARATION

Figure 182

- (a) Remove 1.45 inch minimum length of outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.50 inch \pm 0.06 inch.
- (4) Fold the end of the shield against the outer jacket.
- (5) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (6) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the Shield-Kons on each end of the shield splice.
- (7) Put the shield material on the end of the other wire.
NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.
- (8) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (9) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (10) Align one end of the shield material with the end of the folded back shield. Refer to Figure 183.



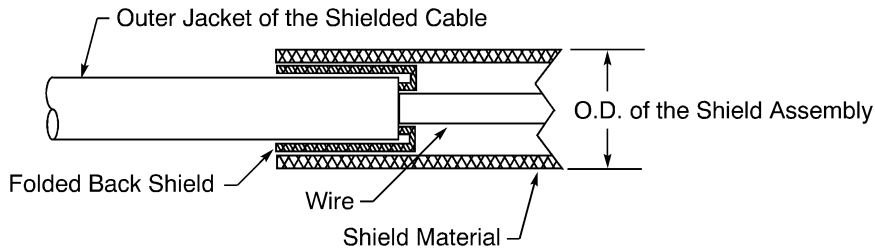
POSITION OF THE SHIELD MATERIAL ON THE WIRE

Figure 183

- (11) Measure the outer diameter of the shield assembly. Refer to Figure 184.

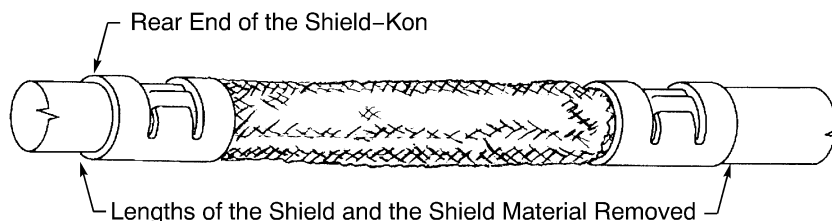
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 184

- (12) Make a selection of the correct size of two Temperature Grade B or higher Shield-Kons from Table 34.
- (13) Assemble the splice of the shield:
 - (a) Make a selection of a Shield-Kon crimp tool from Table 46.
 - (b) Remove the temporary layer of tape around the end of each shield.
 - (c) Align one end of the shield material with the end of the shield. Refer to Figure 183.
 - (d) Put one of the Shield-Kons into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (e) Put the crimp tool and the Shield-Kon on the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (f) Crimp the Shield-Kon.
 - (g) Put the other Shield-Kon into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (h) Make the shield material smooth and tight.
 - (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (j) Crimp the Shield-Kon.
 - (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 185.



SHIELD SPLICE ASSEMBLY
Figure 185

- (14) Tightly wind a layer of the tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
- Makes a 50 percent overlap.

(15) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

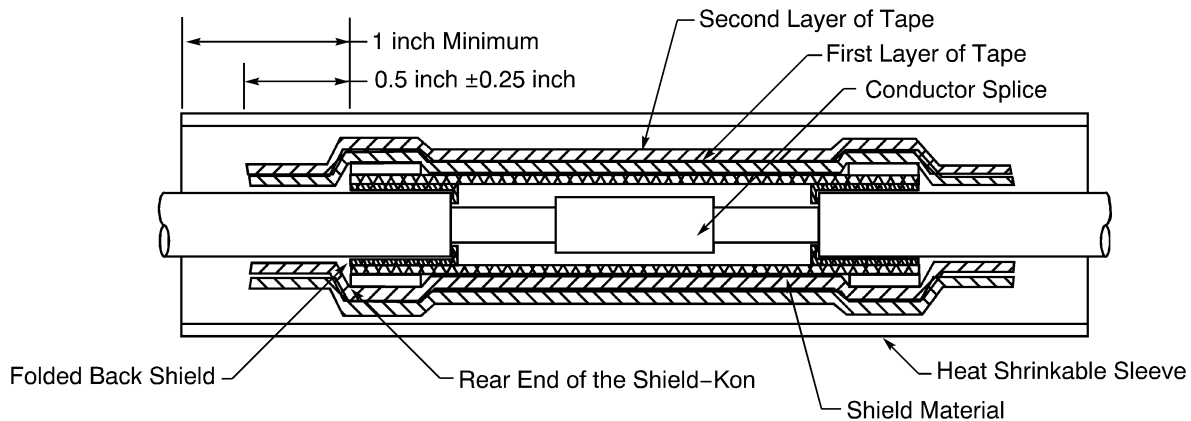
(16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

C. One Shielded Wire to One Shielded Wire - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 186

Refer to Figure 186.

(1) Make a selection of a Temperature Grade B shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

(2) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.

(3) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

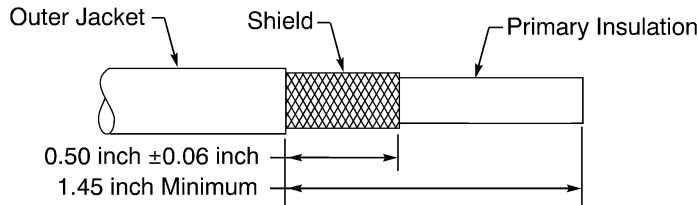
(4) Prepare each end of the shielded wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

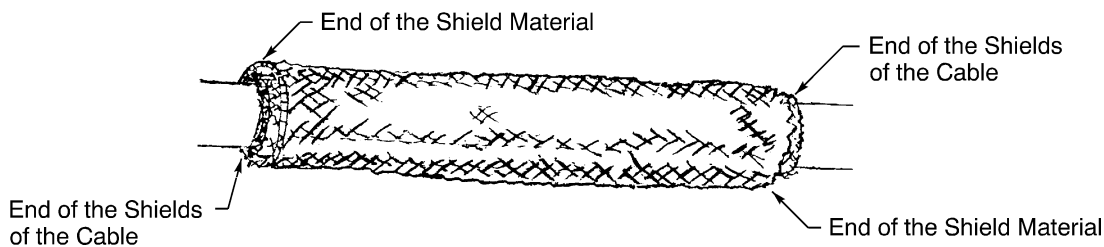
Refer to:

- Figure 187
- Subject 20-00-15 for the outer jacket removal procedures.



SHIELDED WIRE PREPARATION
Figure 187

- (a) Remove 1.45 inch minimum length of outer jacket from the end of the wire.
 - (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.50 inch ±0.06 inch.
 - (5) Fold the end of the shield against the outer jacket.
 - (6) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
 - (7) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1 inch farther than the rear end of the Shield-Kons on each end of the shield splice.
 - (8) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the Shield-Kons on each end of the shield splice.
 - (9) Put the sleeve on one end of the wire.
 - (10) Put the shield material on the end of the other wire.
- NOTE:** If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.
- (11) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
 - (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
 - (13) Align one end of the shield material with the end of the folded back shield. Refer to Figure 188.

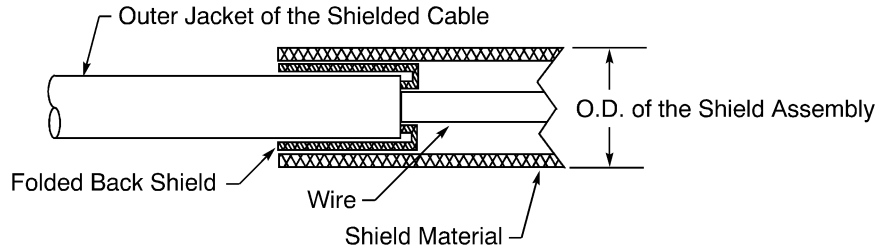


POSITION OF THE SHIELD MATERIAL ON THE WIRE
Figure 188

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (14) Measure the outer diameter of the shield assembly. Refer to Figure 189.

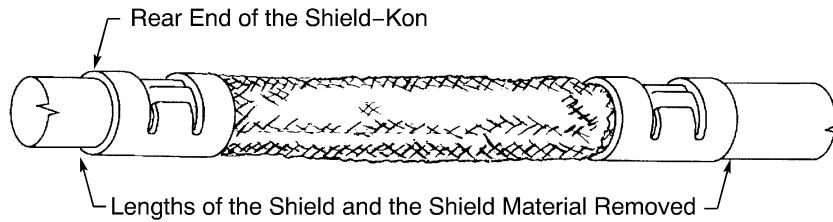


MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 189

- (15) Make a selection of the correct size of two Temperature Grade B or higher Shield-Kons from Table 34.
- (16) Assemble the splice of the shield:
- (a) Make a selection of a Shield-Kon crimp tool from Table 46.
 - (b) Remove the temporary layer of tape around the end of each shield.
 - (c) Align one end of the shield material with the end of the shield. Refer to Figure 188.
 - (d) Put one of the Shield-Kons into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (e) Put the crimp tool and the Shield-Kon on the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (f) Crimp the Shield-Kon.
 - (g) Put the other Shield-Kon into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (h) Make the shield material smooth and tight.
 - (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (j) Crimp the Shield-Kon.
 - (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 190.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



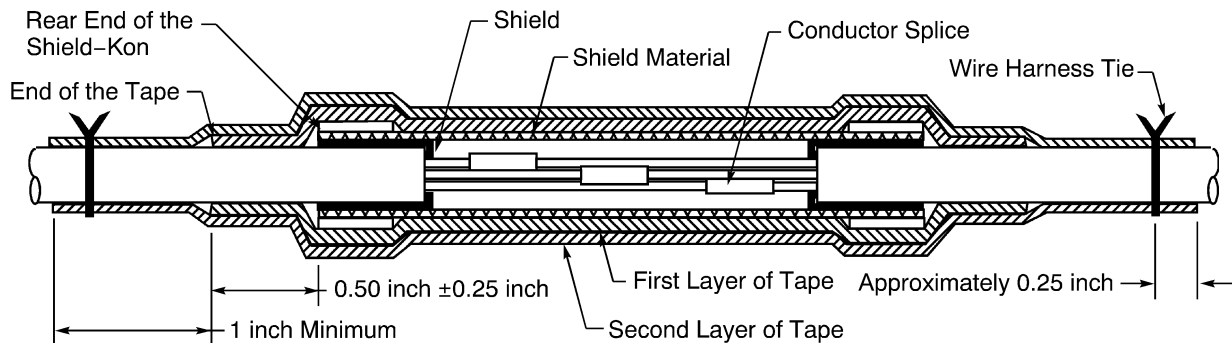
SHIELD SPLICE ASSEMBLY
Figure 190

- (17) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
 - Makes a 50 percent overlap.
- (18) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts where the first layer of tape stops
 - Stops where the first layer of tape starts
 - Makes a 50 percent overlap.
- (19) Align the center of the sleeve with the center of the splice assembly.
- (20) Shrink the sleeve into position. Refer to Subject 20-10-14.

D. One Shielded Cable to One Shielded Cable - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 191

Refer to Figure 191.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

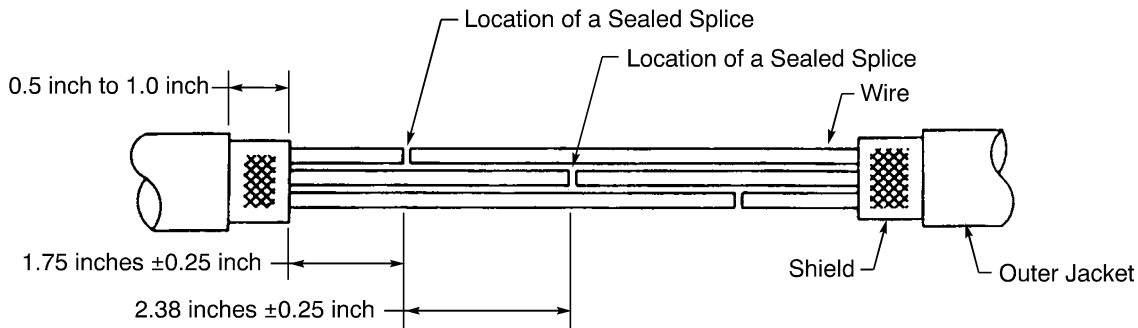
- (2) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (3) Prepare the shielded cable.

Refer to:

- Figure 192
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the shield is 0.5 inch to 1.0 inch
- The distance from the end of the shield to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



PREPARATION OF THE SHIELDED CABLE

Figure 192

- (4) Fold the end of the shield against the outer jacket.
- (5) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (6) Cut the necessary length of the shield material.

Make sure that the ends of the shield material extend farther than the rear end of the Shield-Kons on each end of the shield splice.

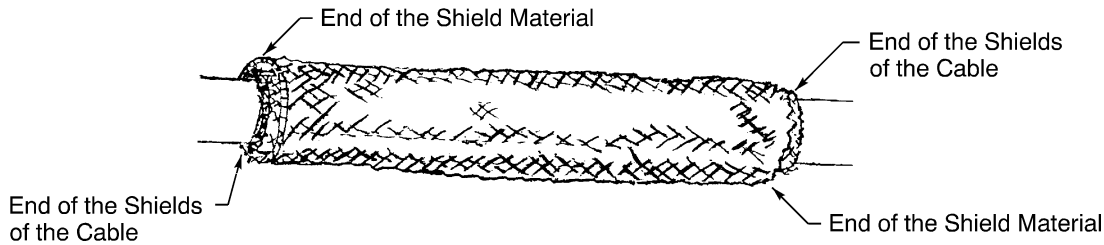
- (7) Put the shield material on the end of the other cable.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.

- (8) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (9) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (10) Align one end of the shield material with the end of the folded back shield. Refer to Figure 193.

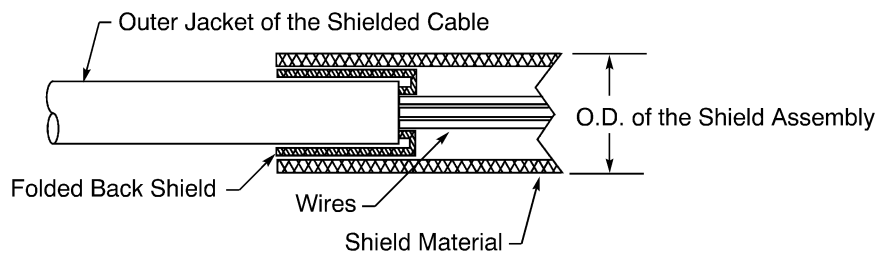
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE SHIELD MATERIAL ON THE CABLE
Figure 193

- (11) Measure the outer diameter of the shield assembly. Refer to Figure 194.

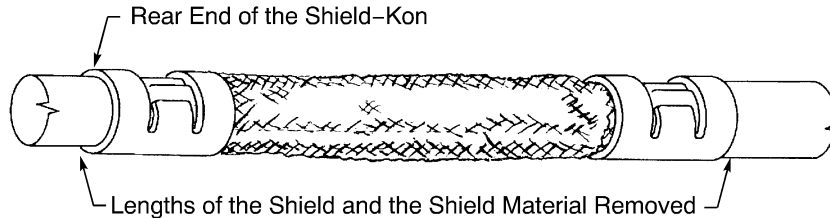


MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 194

- (12) Make a selection of the correct size of two Temperature Grade B or higher Shield-Kons from Table 34.
- (13) Assemble the splice of the shield:
- (a) Make a selection of a Shield-Kon crimp tool from Table 46.
 - (b) Remove the temporary layer of tape around the end of each shield.
 - (c) Align one end of the shield material with the end of the shield. Refer to Figure 193.
 - (d) Put one of the Shield-Kons into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (e) Put the crimp tool and the Shield-Kon on the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (f) Crimp the Shield-Kon.
 - (g) Put the other Shield-Kon into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (h) Make the shield material smooth and tight.
 - (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (j) Crimp the Shield-Kon.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 195.



SHIELD SPLICE ASSEMBLY
Figure 195

- (14) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
 - Makes a 50 percent overlap.
- (15) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
- Starts 1 inch minimum farther than where the first layer of tape stops
 - Stops 1 inch minimum farther than where the first layer of tape starts
 - Makes a 50 percent overlap.
- (16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.
Make sure that the Temperature Grade of the lacing tape is Temperature Grade B or higher.

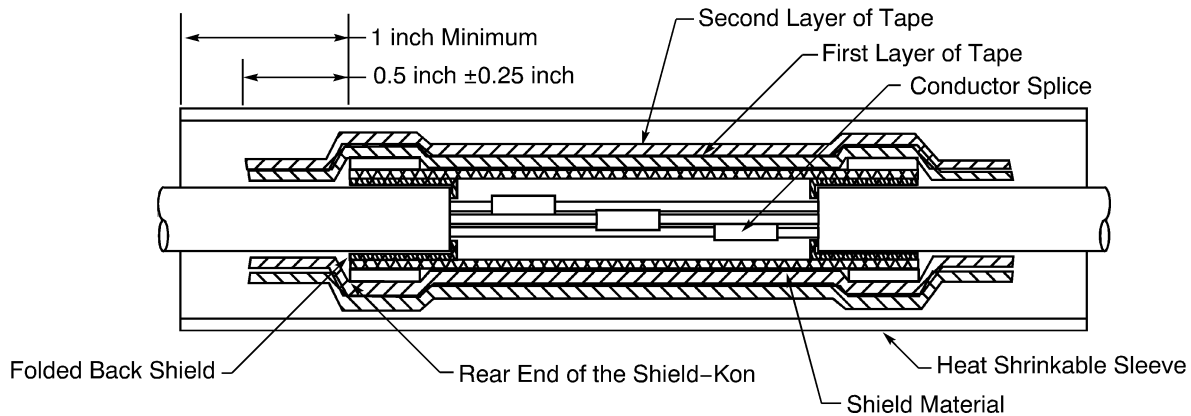
E. One Shielded Cable to One Shielded Cable - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 196

Refer to Figure 196.

- (1) Make a selection of a Temperature Grade B shield material from Table 53.
Make sure that the shield material has the smallest diameter that can go on the folded back shield of the cable.
NOTE: For alternative shield materials, refer to Subject 20-00-11.
- (2) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (3) Make a selection of a Temperature Grade B or higher heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (4) Prepare the shielded cable.

Refer to:

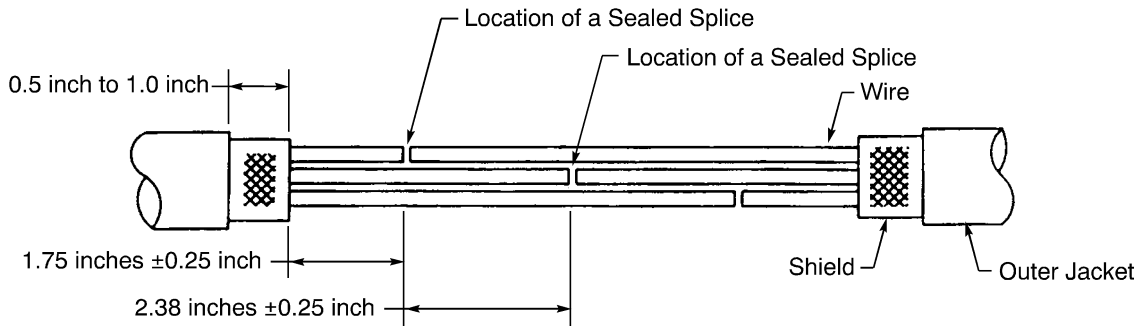
- Figure 197
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the shield is 0.5 inch to 1.0 inch
- The distance from the end of the shield to the center of the nearest sealed splice is 1.75 inches ± 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches ± 0.25 inch.

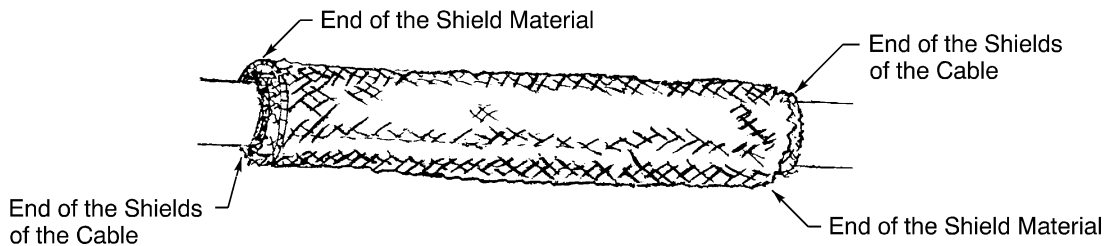
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



PREPARATION OF THE SHIELDED CABLE
Figure 197

- (5) Fold the end of the shield against the outer jacket.
- (6) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (7) Cut the necessary length of the sleeve.
 Make sure that the sleeve extends a minimum of 1 inch farther than the rear end of the Shield-Kons on each end of the shield splice.
- (8) Cut the necessary length of the shield material.
 Make sure that the ends of the shield material extend farther than the rear end of the Shield-Kons on each end of the shield splice.
- (9) Put the sleeve on one end of the cable.
- (10) Put the shield material on the end of the other cable.
NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.
- (11) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (13) Align one end of the shield material with the end of the folded back shield. Refer to Figure 198.

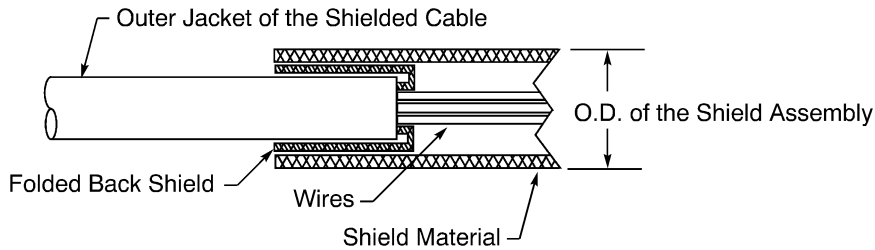


POSITION OF THE SHIELD MATERIAL ON THE CABLE
Figure 198

- (14) Measure the outer diameter of the shield assembly. Refer to Figure 199.

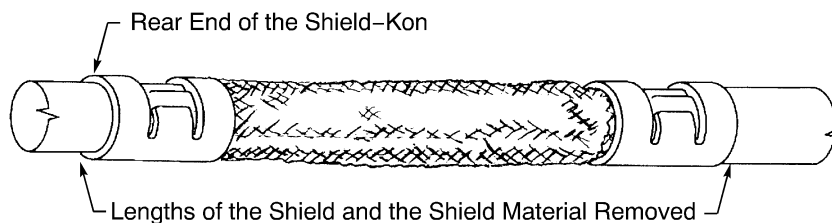
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 199

- (15) Make a selection of the correct size of two Temperature Grade B or higher Shield-Kons from Table 34.
- (16) Assemble the splice of the shield:
 - (a) Make a selection of a Shield-Kon crimp tool from Table 46.
 - (b) Remove the temporary layer of tape around the end of each shield.
 - (c) Align one end of the shield material with the end of the shield. Refer to Figure 198.
 - (d) Put one of the Shield-Kons into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (e) Put the crimp tool and the Shield-Kon on the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (f) Crimp the Shield-Kon.
 - (g) Put the other Shield-Kon into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (h) Make the shield material smooth and tight.
 - (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (j) Crimp the Shield-Kon.
 - (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 200.



SHIELD SPLICE ASSEMBLY
Figure 200

- (17) Tightly wind a layer of the tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer of tape:

- Starts 0.50 inch ± 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
- Stops 0.50 inch ± 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
- Makes a 50 percent overlap.

(18) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts where the first layer of tape stops
- Stops where the first layer of tape starts
- Makes a 50 percent overlap.

(19) Align the center of the sleeve with the center of the splice assembly.

(20) Shrink the sleeve into position. Refer to Subject 20-10-14.

13. SEALED SPlice CONFIGURATIONS WITH SHIELD-KONS FOR SHIELDED WIRE AND SHIELDED CABLE FOR HIGH TEMPERATURE

A. Splice Assembly Configurations

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

**Table 97
SPlice ASSEMBLY CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	Applicable Condition	Splice Assembly	
			Configuration	Procedure
One Shielded Wire	One Shielded Wire	Fuel Vapor	Tape, Ties	Paragraph 13.B.
		No Fuel Vapor	Tape, Sleeves	Paragraph 13.C.
			Tape, Ties	Paragraph 13.B.
One Shielded Cable	One Shielded Cable	Fuel Vapor	Tape, Ties	Paragraph 13.D.
		No Fuel Vapor	Tape, Sleeves	Paragraph 13.E.
			Tape, Ties	Paragraph 13.D.

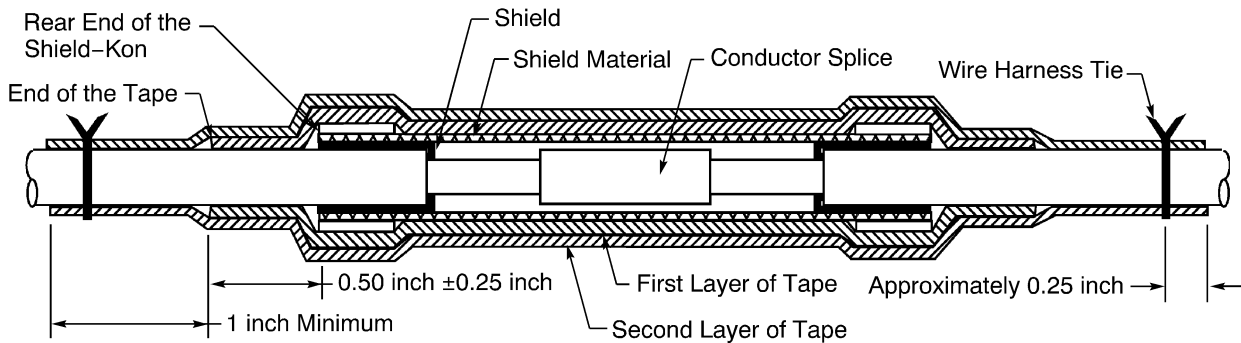
B. One Shielded Wire to One Shielded Wire - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 201

Refer to Figure 201.

- (1) Make a selection of a Temperature Grade D shield material from Table 53.

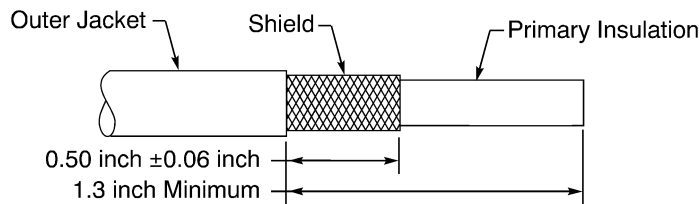
Make sure that the shield material has the smallest diameter that can go on the folded back shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (3) Prepare each end of the shielded wire.

Refer to:

- Figure 202
- Subject 20-00-15 for the outer jacket removal procedures.



SHIELDED WIRE PREPARATION

Figure 202

- (a) Remove 1.3 inch minimum length of outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.50 inch \pm 0.06 inch.
- (4) Fold the end of the shield against the outer jacket.
- (5) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (6) Cut the necessary length of the shield material.

Make sure that the ends of the shield material extend farther than the rear end of the Shield-Kons on each end of the shield splice.

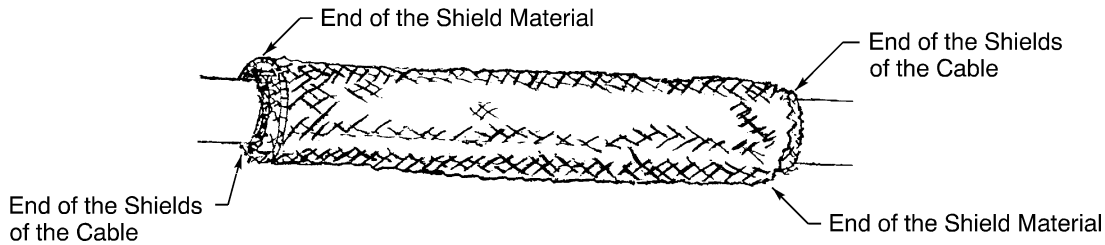
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (7) Put the shield material on the end of the other wire.

NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.

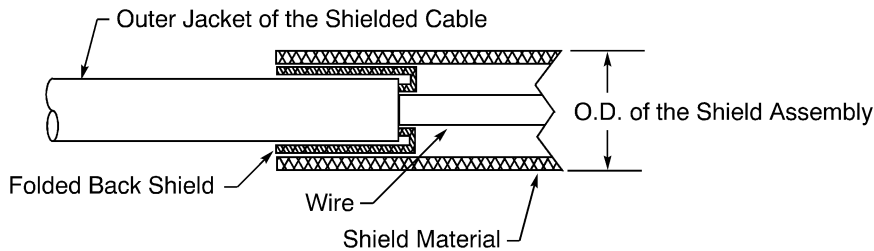
- (8) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (9) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (10) Align one end of the shield material with the end of the folded back shield. Refer to Figure 203.



POSITION OF THE SHIELD MATERIAL ON THE WIRE

Figure 203

- (11) Measure the outer diameter of the shield assembly. Refer to Figure 204.



MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER

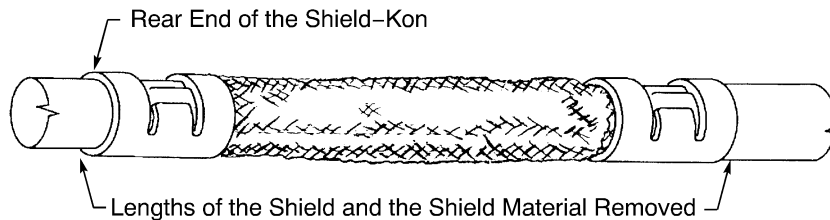
Figure 204

- (12) Make a selection of the correct size of two Temperature Grade D Shield-Kons from Table 34.
- (13) Assemble the splice of the shield:
 - (a) Make a selection of a Shield-Kon crimp tool from Table 46.
 - (b) Remove the temporary layer of tape around the end of each shield.
 - (c) Align one end of the shield material with the end of the shield. Refer to Figure 203.
 - (d) Put one of the Shield-Kons into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (e) Put the crimp tool and the Shield-Kon on the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (f) Crimp the Shield-Kon.
 - (g) Put the other Shield-Kon into the die of the crimp tool.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

Make sure that the center of the Shield-Kon is aligned with the center of the die.

- (h) Make the shield material smooth and tight.
- (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
- (j) Crimp the Shield-Kon.
- (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 205.



SHIELD SPLICE ASSEMBLY
Figure 205

- (14) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
 - Makes a 50 percent overlap.
- (15) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 1 inch minimum farther than where the first layer of tape stops
 - Stops 1 inch minimum farther than where the first layer of tape starts
 - Makes a 50 percent overlap.
- (16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.
Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

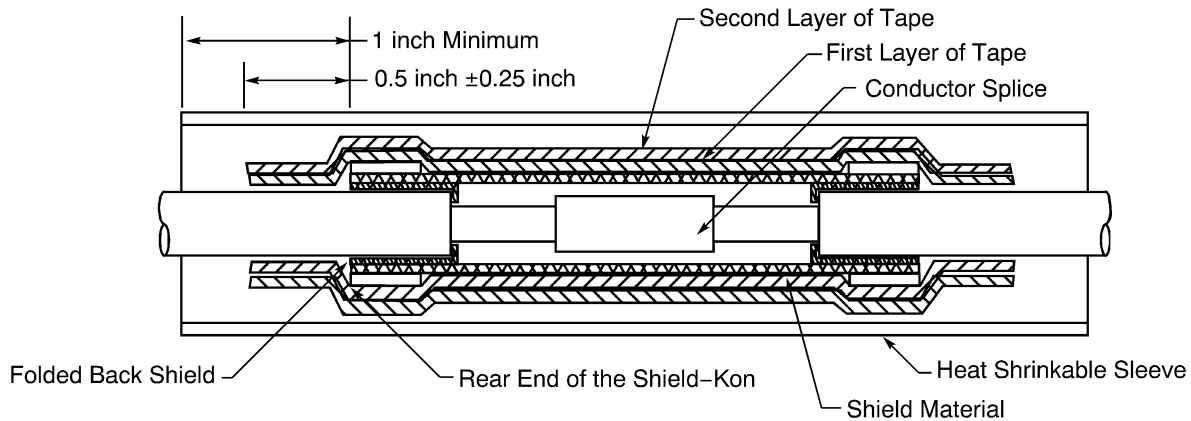
C. One Shielded Wire to One Shielded Wire - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 206

Refer to Figure 206.

- (1) Make a selection of a Temperature Grade D shield material from Table 53.
Make sure that the shield material has the smallest diameter that can go on the folded back shield of the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

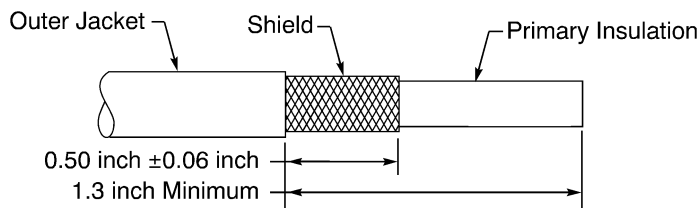
- (2) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (3) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (4) Prepare each end of the shielded wire.

Refer to:

- Figure 207
- Subject 20-00-15 for the outer jacket removal procedures.



SHIELDED WIRE PREPARATION

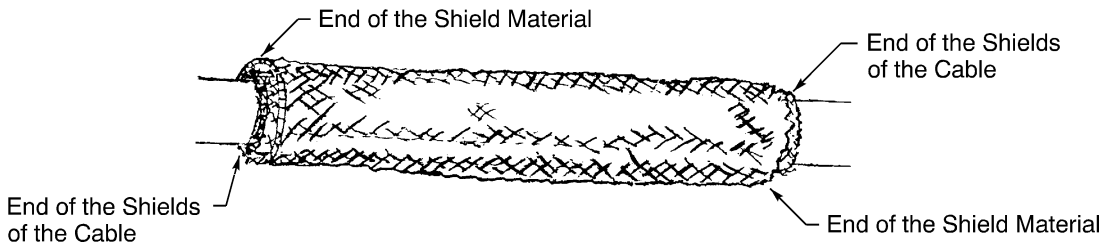
Figure 207

- (a) Remove 1.3 inch minimum length of outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield from the end of the wire.
Make sure the remaining shield is 0.50 inch \pm 0.06 inch.
- (5) Fold the end of the shield against the outer jacket.

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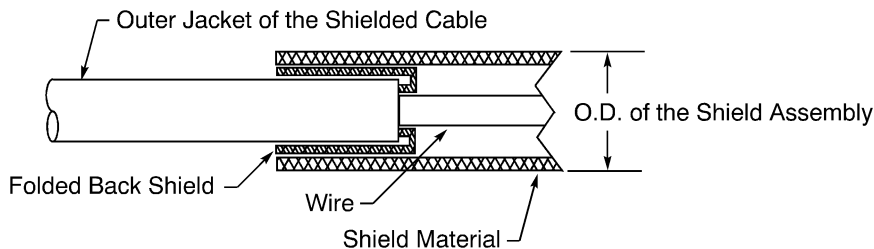
ASSEMBLY OF SPLICES

- (6) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (7) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1 inch farther than the rear end of the Shield-Kons on each end of the shield splice.
- (8) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the Shield-Kons on each end of the shield splice.
- (9) Put the sleeve on one end of the wire.
- (10) Put the shield material on the end of the other wire.
NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the wire.
- (11) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (13) Align one end of the shield material with the end of the folded back shield. Refer to Figure 208.



POSITION OF THE SHIELD MATERIAL ON THE WIRE
Figure 208

- (14) Measure the outer diameter of the shield assembly. Refer to Figure 209.

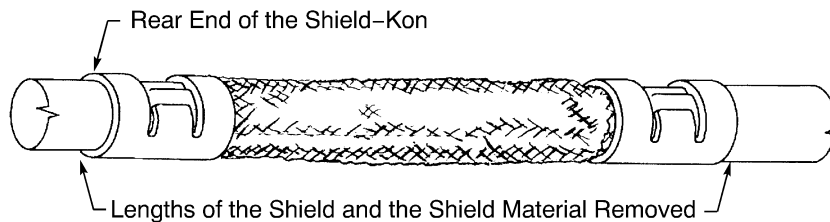


MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 209

- (15) Make a selection of the correct size of two Temperature Grade D Shield-Kons from Table 34.
- (16) Assemble the splice of the shield:
 - (a) Make a selection of a Shield-Kon crimp tool from Table 46.
 - (b) Remove the temporary layer of tape around the end of each shield.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (c) Align one end of the shield material with the end of the shield. Refer to Figure 208.
- (d) Put one of the Shield-Kons into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
- (e) Put the crimp tool and the Shield-Kon on the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
- (f) Crimp the Shield-Kon.
- (g) Put the other Shield-Kon into the die of the crimp tool.
Make sure that the center of the Shield-Kon is aligned with the center of the die.
- (h) Make the shield material smooth and tight.
- (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
- (j) Crimp the Shield-Kon.
- (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 210.



SHIELD SPLICE ASSEMBLY
Figure 210

- (17) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
 - Makes a 50 percent overlap.
- (18) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts where the first layer of tape stops
 - Stops where the first layer of tape starts
 - Makes a 50 percent overlap.
- (19) Align the center of the sleeve with the center of the splice assembly.
- (20) Shrink the sleeve into position. Refer to Subject 20-10-14.

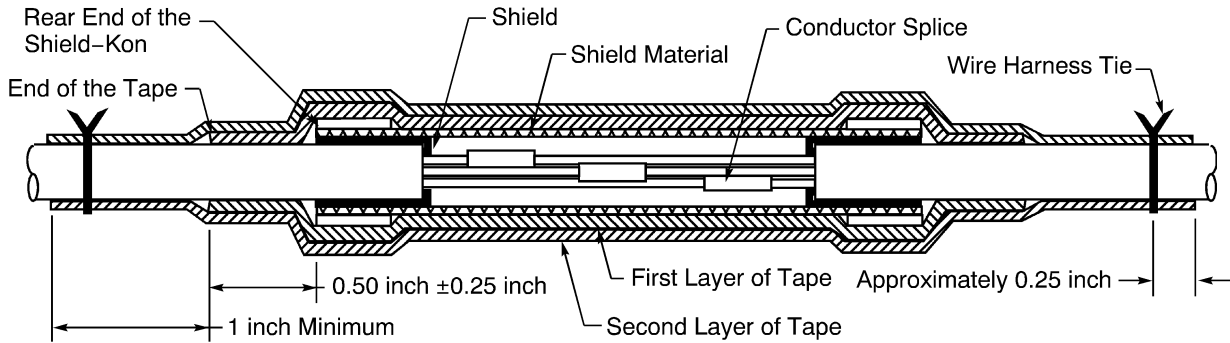
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

D. One Shielded Cable to One Shielded Cable - Tape, Ties

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 211

Refer to Figure 211.

- (1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of a Temperature Grade D insulation tape from Table 49.
- (3) Prepare the shielded cable.

Refer to:

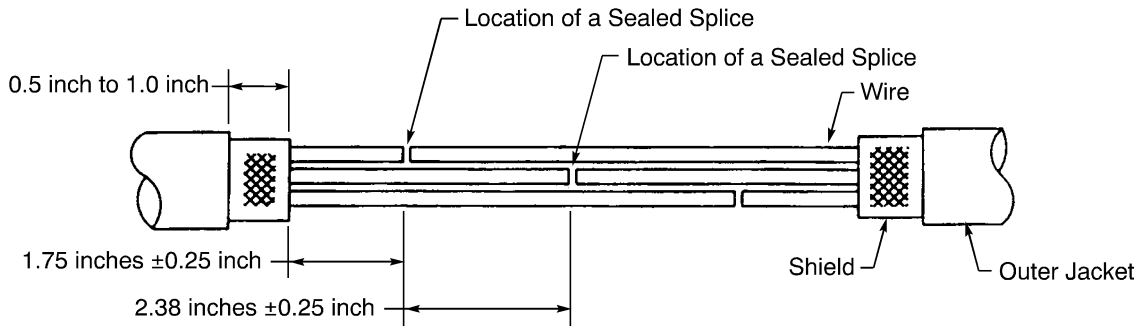
- Figure 212
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the shield is 0.5 inch to 1.0 inch
- The distance from the end of the shield to the center of the nearest sealed splice is 1.75 inches ± 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches ± 0.25 inch.

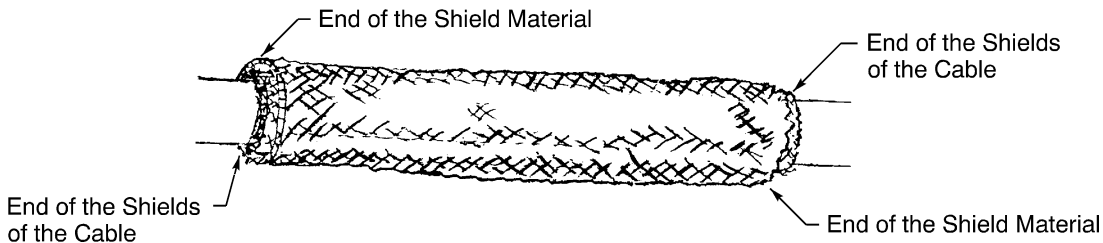
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



PREPARATION OF THE SHIELDED CABLE
Figure 212

- (4) Fold the end of the shield against the outer jacket.
- (5) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (6) Cut the necessary length of the shield material.
 Make sure that the ends of the shield material extend farther than the rear end of the Shield-Kons on each end of the shield splice.
- (7) Put the shield material on the end of the other cable.
NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.
- (8) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (9) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (10) Align one end of the shield material with the end of the folded back shield. Refer to Figure 213.

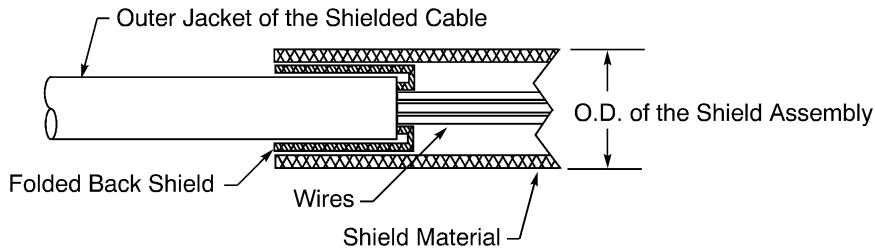


POSITION OF THE SHIELD MATERIAL ON THE CABLE
Figure 213

- (11) Measure the outer diameter of the shield assembly. Refer to Figure 214.

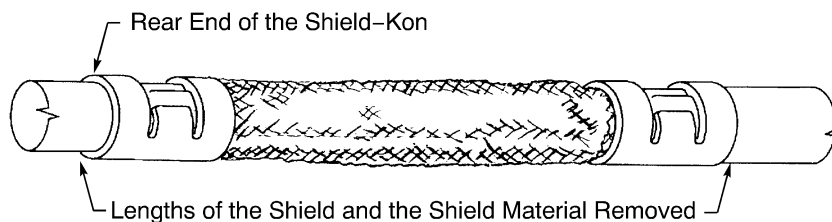
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 214

- (12) Make a selection of the correct size of two Temperature Grade D Shield-Kons from Table 34.
- (13) Assemble the splice of the shield:
 - (a) Make a selection of a Shield-Kon crimp tool from Table 46.
 - (b) Remove the temporary layer of tape around the end of each shield.
 - (c) Align one end of the shield material with the end of the shield. Refer to Figure 213.
 - (d) Put one of the Shield-Kons into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (e) Put the crimp tool and the Shield-Kon on the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (f) Crimp the Shield-Kon.
 - (g) Put the other Shield-Kon into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
 - (h) Make the shield material smooth and tight.
 - (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
 - (j) Crimp the Shield-Kon.
 - (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 215.



SHIELD SPLICE ASSEMBLY
Figure 215

- (14) Tightly wind a layer of the tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
- Makes a 50 percent overlap.

(15) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

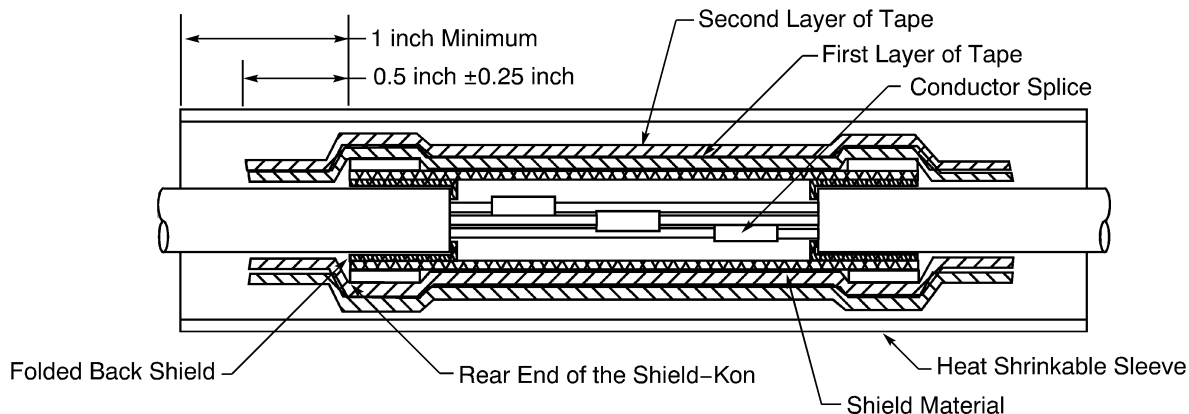
(16) Assemble a lacing tape wire harness tie on each end of the splice assembly approximately 0.25 inch from the end of the tape. Refer to Subject 20-10-11.

Make sure that the Temperature Grade of the lacing tape is Temperature Grade D.

E. One Shielded Cable to One Shielded Cable - Tape, Sleeve

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



CONFIGURATION OF THE SPLICE ASSEMBLY
Figure 216

Refer to Figure 216.

(1) Make a selection of a Temperature Grade D shield material from Table 53.

Make sure that the shield material has the smallest diameter that can go on the folded back shield of the cable.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

(2) Make a selection of a Temperature Grade D insulation tape from Table 49.

(3) Make a selection of a Temperature Grade D heat shrinkable sleeve from Table 48.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

(4) Prepare the shielded cable.

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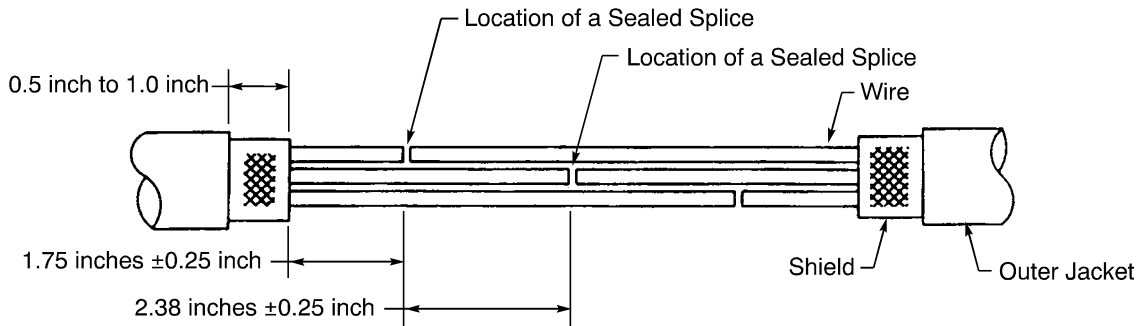
ASSEMBLY OF SPLICES

Refer to:

- Figure 217
- Subject 20-00-15 for the outer jacket removal procedures.

Make sure that:

- The distance from the end of the outer jacket to the end of the shield is 0.5 inch to 1.0 inch
- The distance from the end of the shield to the center of the nearest sealed splice is 1.75 inches \pm 0.25 inch
- The distance from the center of a sealed splice on one wire to the center of the nearest sealed splice on another wire is 2.38 inches \pm 0.25 inch.



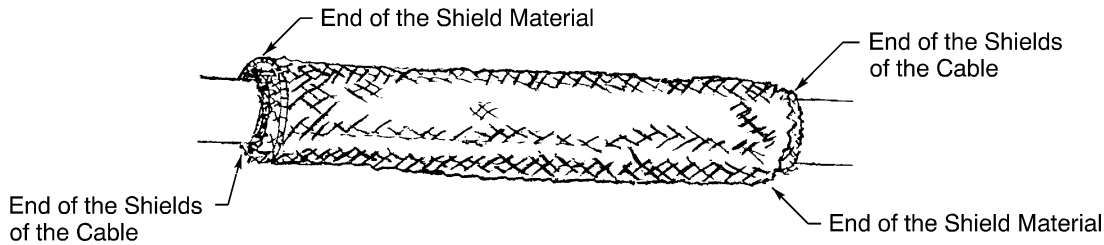
PREPARATION OF THE SHIELDED CABLE

Figure 217

- (5) Fold the end of the shield against the outer jacket.
- (6) Put a temporary layer of tape around the end of each shield to make sure that the shields do not move.
- (7) Cut the necessary length of the sleeve.
Make sure that the sleeve extends a minimum of 1 inch farther than the rear end of the Shield-Kons on each end of the shield splice.
- (8) Cut the necessary length of the shield material.
Make sure that the ends of the shield material extend farther than the rear end of the Shield-Kons on each end of the shield splice.
- (9) Put the sleeve on one end of the cable.
- (10) Put the shield material on the end of the other cable.
NOTE: If it is necessary, the strands at the end of the shield material can be moved apart to make it easier to put the shield material on the cable.
- (11) Make a selection of an applicable Temperature Grade D conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (13) Align one end of the shield material with the end of the folded back shield. Refer to Figure 218.

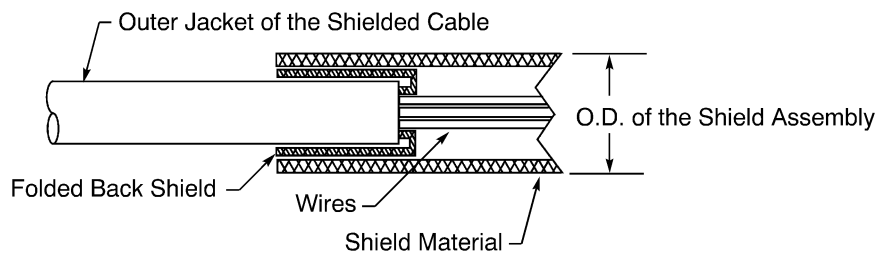
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



POSITION OF THE SHIELD MATERIAL ON THE CABLE
Figure 218

(14) Measure the outer diameter of the shield assembly. Refer to Figure 219.



MEASUREMENT OF THE SHIELD ASSEMBLY OUTER DIAMETER
Figure 219

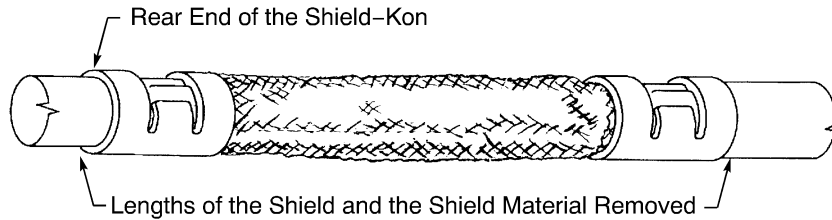
(15) Make a selection of the correct size of two Temperature Grade D Shield-Kons from Table 34.

(16) Assemble the splice of the shield:

- (a) Make a selection of a Shield-Kon crimp tool from Table 46.
- (b) Remove the temporary layer of tape around the end of each shield.
- (c) Align one end of the shield material with the end of the shield. Refer to Figure 218.
- (d) Put one of the Shield-Kons into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
- (e) Put the crimp tool and the Shield-Kon on the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
- (f) Crimp the Shield-Kon.
- (g) Put the other Shield-Kon into the die of the crimp tool.
 Make sure that the center of the Shield-Kon is aligned with the center of the die.
- (h) Make the shield material smooth and tight.
- (i) Put the crimp tool and the Shield-Kon on the other end of the shield material.
 Make sure that the rear end of the Shield-Kon is aligned with the ends of the shield and the shield material.
- (j) Crimp the Shield-Kon.
- (k) Remove the shield and the shield material that extend farther than the rear end of the Shield-Kon on each end of the shield splice. Refer to Figure 220.

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ASSEMBLY OF SPLICES



SHIELD SPLICE ASSEMBLY
Figure 220

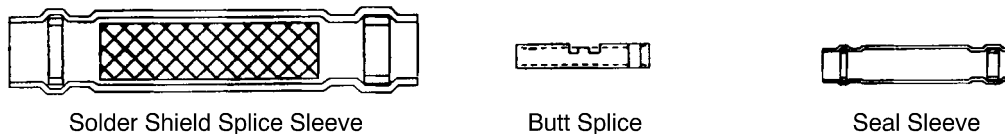
- (17) Tightly wind a layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at one end of the splice
 - Stops 0.50 inch \pm 0.25 inch farther than the rear end of the Shield-Kon at the other end of the splice
 - Makes a 50 percent overlap.
- (18) Tightly wind a second layer of the tape on the splice assembly.
Make sure that the layer of tape:
 - Starts where the first layer of tape stops
 - Stops where the first layer of tape starts
 - Makes a 50 percent overlap.
- (19) Align the center of the sleeve with the center of the splice assembly.
- (20) Shrink the sleeve into position. Refer to Subject 20-10-14.

14. SEALED SPLICE CONFIGURATIONS WITH SOLDER SHIELD SPLICE KITS FOR SHIELDED WIRE AND SHIELDED CABLE

A. Splice Assembly Configurations

For the conditions that are applicable for:

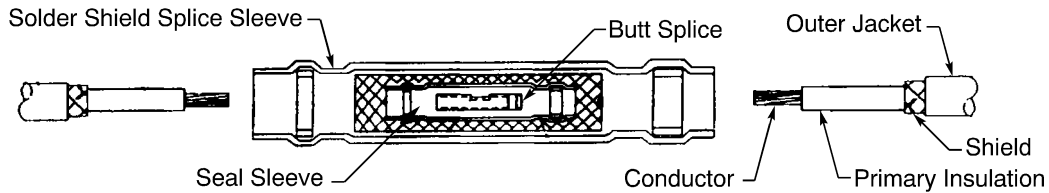
- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.



COMPONENTS OF THE RAYCHEM SOLDER SHIELD SPLICE KIT
Figure 221

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



ASSEMBLY CONFIGURATION OF THE SOLDER SHIELD SPLICE

Figure 222

**Table 98
SPLICE ASSEMBLY CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	Quantity of Conductor Splices	Paragraph
One Shielded Wire	One Shielded Wire	1	Paragraph 14.B.
	One Shielded Wire and One Wire	1	Paragraph 14.D.
Three Shielded Wires	Three Shielded Wires	1	Paragraph 14.E.
	One Class 3 Shielded Cable	3	Paragraph 14.L.
Four Shielded Wires	Four Shielded Wires	1	Paragraph 14.F.
One Shielded Wire and One Wire	One Shielded Wire	1	Paragraph 14.D.
One Class 2 Shielded Cable	One Class 2 Shielded Cable	2	Paragraph 14.G.
	One Class 2 Shielded Cable and One Wire	2	Paragraph 14.H.
Two Class 2 Shielded Cables	Two Class 2 Shielded Cables	2	Paragraph 14.I.
	Three Class 2 Shielded Cables	2	Paragraph 14.J.
Three Class 2 Shielded Cables	Two Class 2 Shielded Cables	2	Paragraph 14.J.
	Three Class 2 Shielded Cables	2	Paragraph 14.K.
One Class 2 Shielded Cable and One Wire	One Class 2 Shielded Cable	2	Paragraph 14.H.
One Class 3 Shielded Cable	Three Shielded Wires	3	Paragraph 14.L.
	One Class 3 Shielded Cable	3	Paragraph 14.M.
	Two Class 3 Shielded Cables	3	Paragraph 14.N.
	Three Class 3 Shielded Cables	3	Paragraph 14.O.
Two Class 3 Shielded Cables	One Class 3 Shielded Cable	3	Paragraph 14.N.
	Two Class 3 Shielded Cables	3	Paragraph 14.P.
	Three Class 3 Shielded Cables	3	Paragraph 14.Q.
Three Class 3 Shielded Cables	One Class 3 Shielded Cable	3	Paragraph 14.O.
	Two Class 3 Shielded Cables	3	Paragraph 14.Q.
One Class 4 Shielded Cable	One Class 4 Shielded Cable	4	Paragraph 14.R.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (1) Find the paragraph for the splice assembly configuration in Table 98.

Make sure the paragraph is applicable for:

- The configuration of the wiring
- The quantity of conductor splices.

- (2) Make a selection of a splice kit. Refer to the applicable paragraph for the splice assembly configuration.

NOTE: The specified splice kit can have more splices and sleeves than are necessary. Discard the unwanted parts.

- (a) Measure these dimensions of the wire or cable on each side of the splice:

- The jacket O.D.
- The shield O.D.

- (b) Calculate the total CAU of the conductors for each end of each conductor splice. Refer to Paragraph 1.D.

- (c) If the jackets do not have the correct O.D. for the splice kit, make a selection of an alternative splice configuration. Refer to Paragraph 1.C.

- (d) If the shields do not have the correct O.D. for the splice kit, the shield O.D. can be increased as specified in Step (9).

- (e) If the CAU of the conductors are not the correct size for the splice kit, the conductors can be increased.

Refer to:

- Paragraph 2.B. to assemble the conductor splice with a conductor that is folded back
- Paragraph 2.C. to assemble the conductor splice with a filler wire.

NOTE: As an alternative, make a selection of a different splice configuration. Refer to Paragraph 1.C.

- (3) Find the part number of the butt splice in the splice kit. Refer to Table 23.

- (4) Find the crimp barrel size of the butt splice.

Refer to:

- Table 12 for NAS1387-() splices
- Table 14 for D-609-() splices.

- (5) Make a selection of a crimp tool.

Refer to:

- Table 42 for crimp tools for NAS1387-() splices
- Table 43 for crimp tools for Raychem D-609-() splices.

- (6) Make a selection of a standard temperature hot air gun from Table 47.

- (7) Put the solder shield splice sleeve on each of the cables on one side of the splice assembly.

- (8) Remove these specified lengths from the end of the cable or the wire:

- The outer jacket
- The shield
- The primary insulation
- The conductor.

Refer to the applicable paragraph for the splice assembly configuration.

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ASSEMBLY OF SPLICES

(9) If it is necessary to increase the O.D. of the shield:

CAUTION: THIS PROCEDURE IS APPLICABLE ONLY FOR CABLES THAT HAVE ROUND CONDUCTOR STRANDS IN THE SHIELD. IF THE CABLE HAS A SHIELD WITH FLAT, RECTANGULAR CONDUCTOR STRANDS, DAMAGE TO THE SHIELD CAN OCCUR.

- (a) Remove the necessary length of the outer jacket.
Make sure that the distance from the end of the jacket to the end of the conductor is D2.
 - (b) Remove the necessary length of the shield.
Make sure that the distance from the end of the shield to the end of the outer jacket is D3 minus D2.
 - (c) Fold the shield back on the outer jacket of the cable.
- (10) Assemble the splice of each wire.
- (a) Put the seal sleeve on the wire or wires.
Make sure that the large end of the sleeve is pointed toward the end of the cable.
 - (b) Put the necessary conductors in one end of the butt splice.
Make sure that the end of each conductor is against the wire stop at the center of the splice.
 - (c) Crimp the splice.
 - (d) Put the necessary conductors in the other end of the splice.
Make sure that the end of each conductor is against the notch at the center of the splice.
 - (e) Crimp the splice.
 - (f) Align the center of the seal sleeve with the center of the butt splice.
 - (g) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (11) Align the center of the shield splice sleeve with the middle of the distance between the ends of the outer jackets of the cable on both sides of the splice assembly.
- (12) Shrink one end of the shield splice sleeve:
- (a) Apply heat at the center of the sleeve until the solder melts and the sleeve begins to shrink.
 - (b) Continue to apply heat from the center of the sleeve toward one end of the sleeve until the solder ring melts and flows.
- (13) Do Step (12) again for the other end of the sleeve.

B. One Shielded Wire to One Shielded Wire

If the splice is for one shielded 10 AWG wire to one shielded 16 AWG wire used on a pass thru bulkhead, refer to Paragraph 14.C..

**Table 99
SPLICE KITS FOR ONE SHIELDED WIRE TO ONE SHIELDED WIRE**

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.12	0.06	3	15	D-150-0168	Raychem
0.15	0.08	8	27	D-150-0169	Raychem
0.18	0.10	19	67	D-150-0170	Raychem

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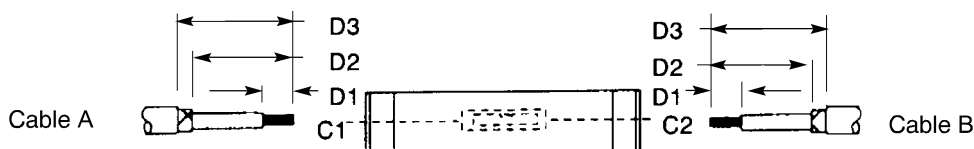
ASSEMBLY OF SPLICES

Table 99 (continued)

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.22	0.14	43	138	D-150-0272	Raychem

For an AWG 16 conductor in the splice of the D-150-0272 splice kit, these conditions are applicable:

- A filler wire must be used
- The shield must be folded back.



ONE SHIELDED WIRE TO ONE SHIELDED WIRE

Figure 223

Table 100
CABLE TRIM DIMENSIONS

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	0.70	± 0.02
		D3	1.08	± 0.02
B	C1	D1	0.28	± 0.02
		D2	0.70	± 0.02
		D3	1.08	± 0.02

C. One 10 AWG Shielded Wire to One 16 AWG Shielded Wire Used on Pass Thru Bulkheads

Table 101
NECESSARY MATERIALS

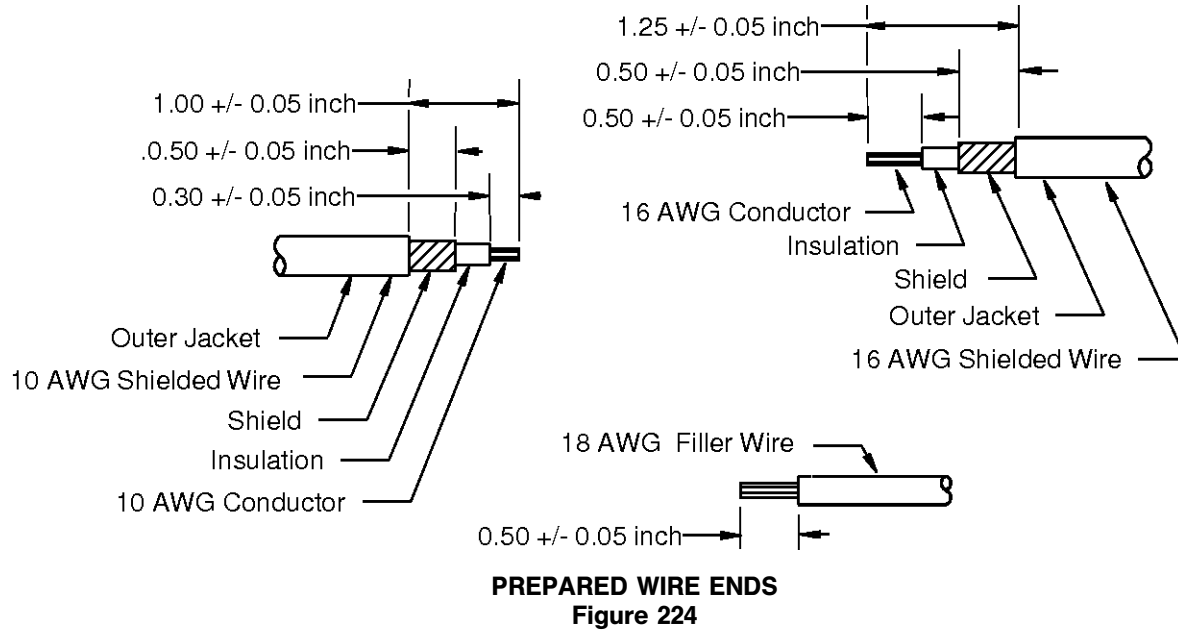
Part Number	Description	Quantity or Length Required	Supplier
D-150-0272	Splice Kit	1	Raychem
BACS13CT3N	solder sleeve	2	Boeing
BAC3108-2C	shield overbraid	2.5 inches ± 0.1 inch	Boeing
M23053/5-108-4	1/2 inch diameter heat shrinkable sleeve	4.0 inches ± 0.1 inch	An available source
M23053/12-102-C	1/4 inch diameter heat shrinkable sleeve	2.0 inches ± 0.1 inch	An available source

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

(1) Prepare the end of each wire Refer to Figure 224.

Make sure that the 18 AWG filler wire is the same wire type as the 16 AWG wire.



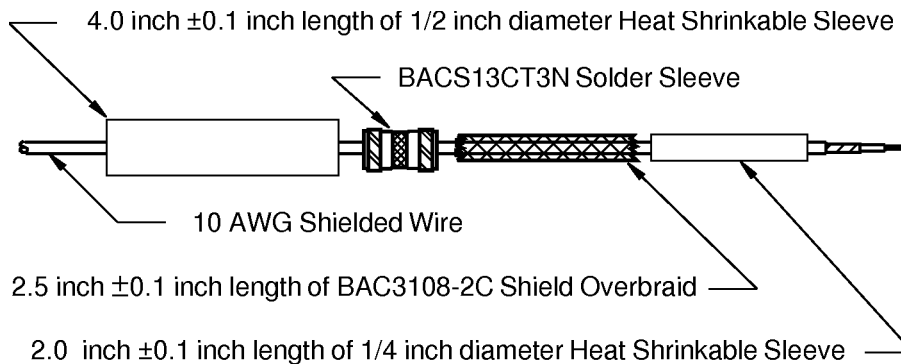
(2) Make a selection of a splice kit from Table 101.

NOTE: In this procedure, the D-150-0675 large overall solder shield in the D-150-0272 splice kit is not used.

(3) Put these components on the 10 AWG wire in this order:

- A 4.0 inch ± 0.1 inch length of 1/2 inch diameter M23053/5-108-4 heat shrinkable sleeve
- A BACS13CT3N solder sleeve
- A 2.5 inch ± 0.1 inch length of BAC3108-2C shield overbraid
- A 2.0 inch ± 0.1 inch length of 1/4 inch diameter M23053/12-102-C heat shrinkable sleeve.

Refer to Figure 225.



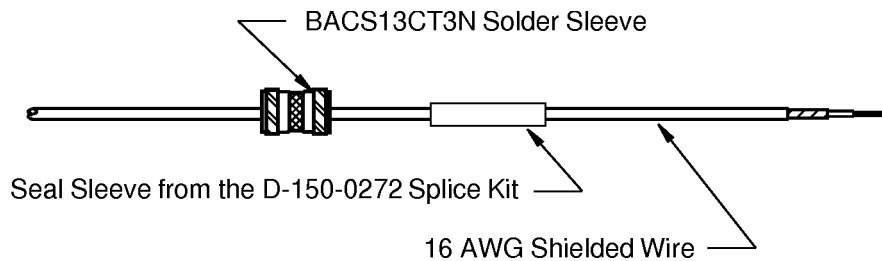
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

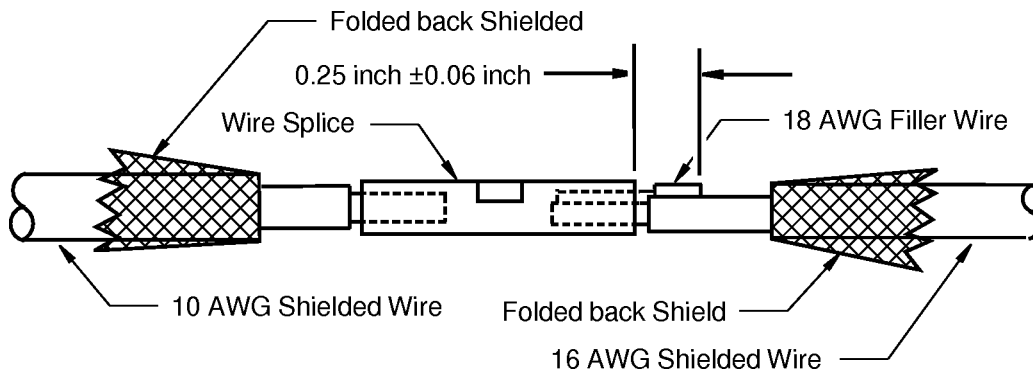
(4) Put these components on the 16 AWG wire in this order:

- A BACS13CT3N solder sleeve
- A seal sleeve from the D-150-0272 splice kit.

Refer to Figure 226.



COMPONENTS ON THE 16 AWG SHIELDED WIRE
Figure 226



POSITION OF THE CONDUCTORS IN THE SPLICE
Figure 227

Refer to Figure 227:

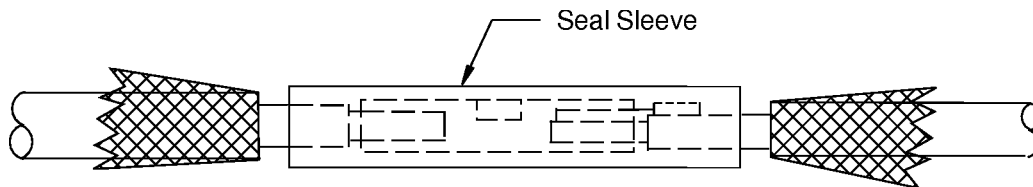
- (5) Fold back 0.5 inch \pm 0.06 inch of the shield on the 10 AWG wire.
- (6) Fold back 0.5 inch \pm 0.06 inch of the shield on the 16 AWG wire.
- (7) Put the conductor of the 10 AWG wire in the crimp barrel of one end of the NAS1387-6 wire splice from the D-150-0272 splice kit.
- (8) Make a selection of a crimp tool from Table 42 for a size 12-10 crimp barrel for the NAS1387-6 splice.
- (9) Crimp the end of the splice that has the 10 AWG wire.
- (10) Put the conductor of the 16 AWG wire and the conductor of the 18 AWG filler wire in the crimp barrel of the other end of the splice.
- (11) Crimp the end of the splice that has the 16 AWG conductor and the 18 AWG filler wire conductor.
- (12) Remove the unwanted length of the 18 AWG filler wire. Refer to Figure 227.

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ASSEMBLY OF SPLICES

Make sure that the distance from the end of the filler wire to the end of the crimp barrel of the splice is 0.25 inch \pm 0.06 inch.

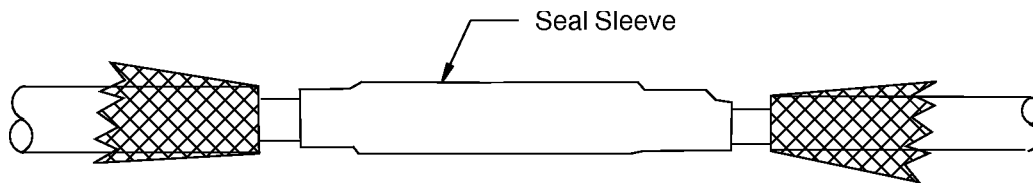
- (13) Put the seal sleeve from the 16 AWG wire on the splice and on the filler wire. Refer to Figure 228.



INITIAL POSITION OF THE SEAL SLEEVE ON THE SPLICE
Figure 228

- (14) Shrink the seal sleeve into its position. Refer to Figure 229.

Make sure that the seal sleeve is on the splice and on the end of the filler wire.



POSITION OF THE SEAL SLEEVE
Figure 229

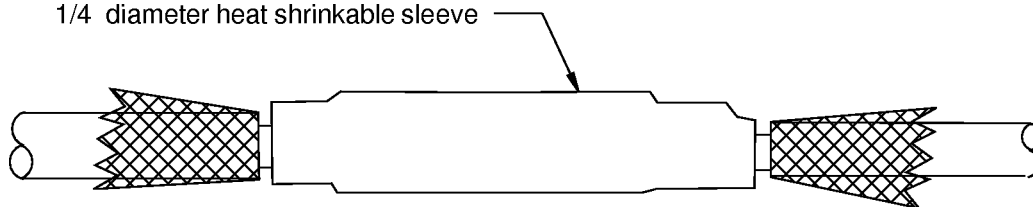
- (15) Put the 2 inch length of 1/4 inch diameter heat shrinkable sleeve from the 10 AWG wire on the seal sleeve.

- (16) Shrink the 1/4 inch diameter sleeve into its position. Refer to Figure 230.

Make sure that:

- The sleeve is on the seal sleeve
- The center of the sleeve is located at the center of the seal sleeve
- The ends of the sleeve are not on the folded back shields of the wires.

1/4 diameter heat shrinkable sleeve



POSITION OF THE SMALLER HEAT SHRINKABLE SLEEVE
Figure 230

- (17) Put the shield overbraid on the sleeve. Refer to Figure 231.

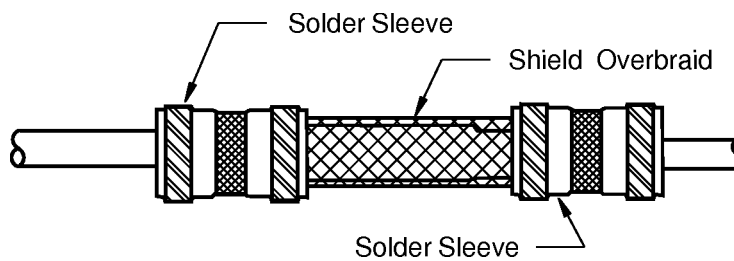
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

Make sure that on both sides of the splice assembly, the shield overbraid makes an overlap on:

- The folded back shields
- The edges of the outer cable jacket.

**INITIAL POSITION OF THE SHIELD OVERBRAID****Figure 231**

(18) Put the two BACS13CT3N solder sleeves on the shield overbraid. Refer to Figure 232 and Figure 233.

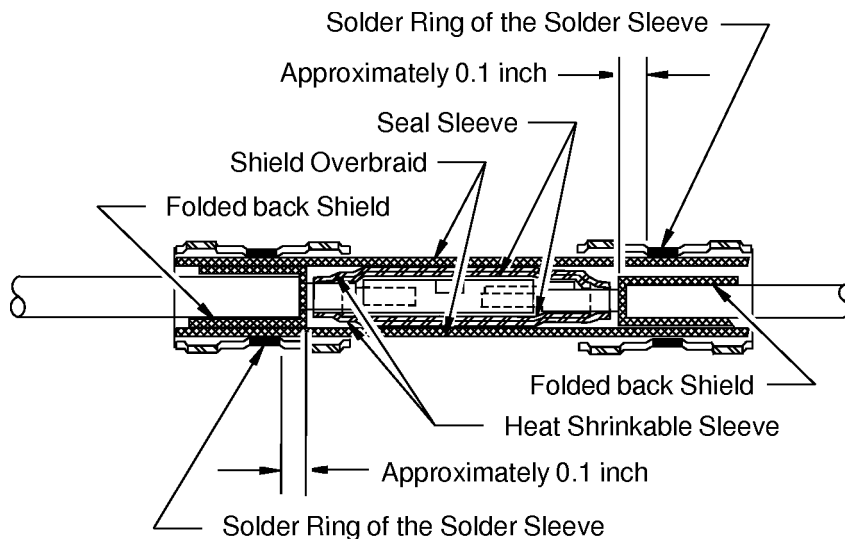
**POSITION OF THE SOLDER SLEEVES****Figure 232**

Make sure that for the solder ring in each solder sleeve:

- The solder ring is on the shield overbraid and on the folded back shield of the cable
- The distance from the edge of the solder ring to the end of the shield overbraid is approximately 0.1 inch.

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ASSEMBLY OF SPLICES



POSITION OF THE SOLDER RINGS OF THE SOLDER SLEEVES AND THE SHIELDS
Figure 233

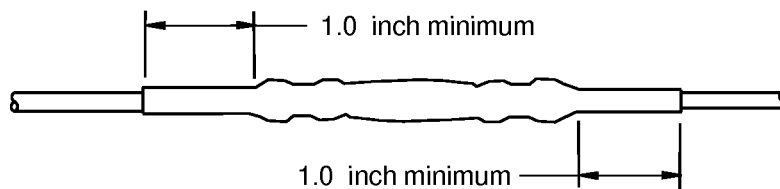
- (19) Apply heat to each solder sleeve until the solder flows into the shield overbraid and into the folded back shield of each shielded wire. Refer to Figure 234.



POSITION OF THE SOLDER SLEEVES AND THE SHIELD OVERBRAID
Figure 234

- (20) If it is necessary, remove the unwanted length of the shields that extend farther than the far ends of the solder sleeves.
- (21) Put the 4 inch length of 1/2 inch diameter heat shrinkable sleeve on the splice assembly.
- (22) Shrink the sleeve into its position. Refer to Figure 235.

Make sure that the sleeve and approximately 1.0 inch of the cable jacket on each side of the splice assembly make an overlap.



POSITION OF THE LARGER HEAT SHRINKABLE SLEEVE
Figure 235

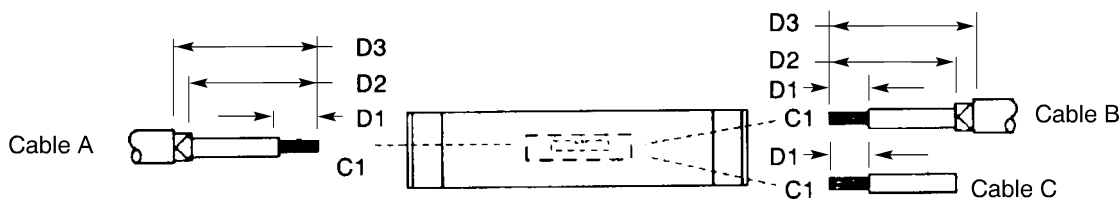
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

D. One Shielded Wire to One Shielded Wire and One Unshielded Wire

**Table 102
SPLICE KITS FOR ONE SHIELDED WIRE TO ONE SHIELDED WIRE**

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.12	0.06	3	15	D-150-0168	Raychem
0.15	0.08	8	27	D-150-0169	Raychem
0.18	0.10	19	67	D-150-0170	Raychem
0.22	0.14	43	138	D-150-0272	Raychem



**ONE SHIELDED WIRE TO ONE SHIELDED WIRE AND ONE WIRE
Figure 236**

**Table 103
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
B	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
C	C1	D1	0.28	± 0.02

STANDARD WIRING PRACTICES MANUAL

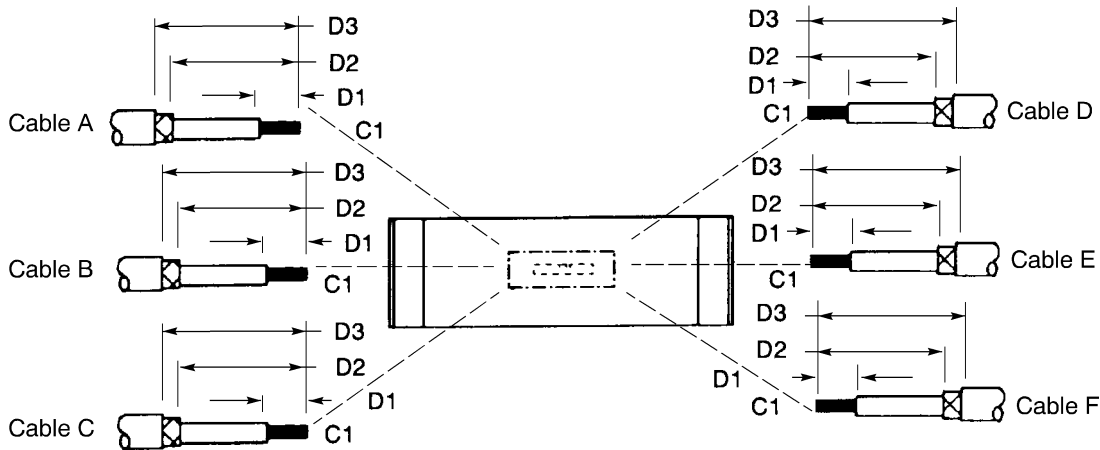
ASSEMBLY OF SPLICES

E. Three Shielded Wires to Three Shielded Wires

Table 104

SPLICE KITS FOR THREE SHIELDED WIRES TO THREE SHIELDED WIRES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	19	67	D-150-0285	Raychem



THREE SHIELDED WIRES TO THREE SHIELDED WIRES

Figure 237

Table 105

CABLE TRIM DIMENSIONS

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
B	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
C	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 105 (continued)

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
D	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
E	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
F	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	

F. Four Shielded Wires to Four Shielded Wires

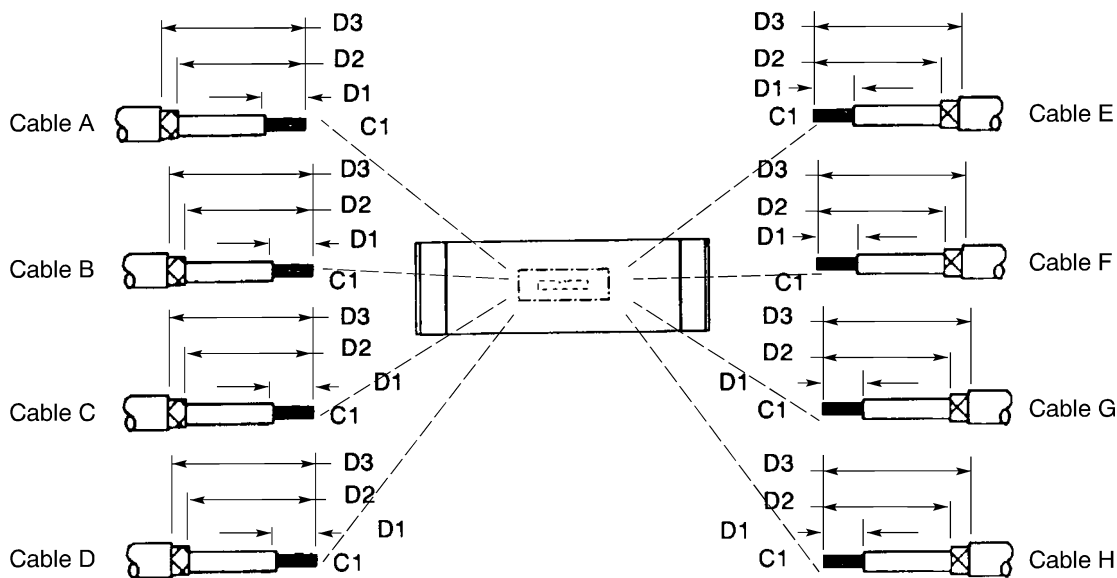
Table 106

SPLICE KITS FOR FOUR SHIELDED WIRES TO FOUR SHIELDED WIRES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	19	67	D-150-0285	Raychem

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



FOUR SHIELDED WIRES TO FOUR SHIELDED WIRES

Figure 238

**Table 107
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
B	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
C	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
D	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
E	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	

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ASSEMBLY OF SPLICES

Table 107 (continued)

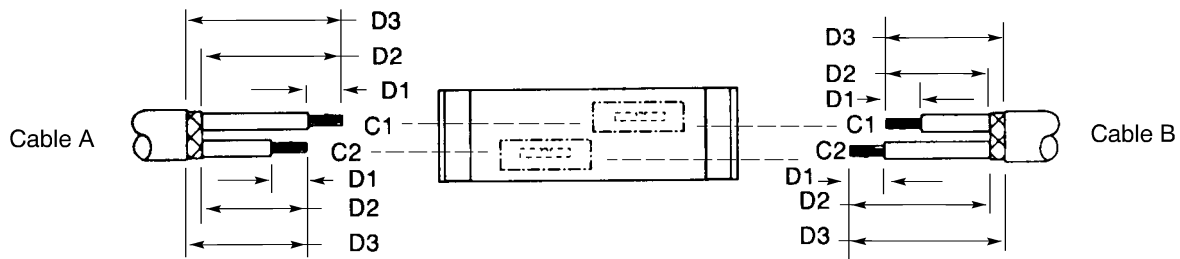
Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
F	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
G	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	
H	C1	D1	0.28	± 0.02
		D2	0.70	
		D3	1.08	

G. One Class 2 Shielded Cable to One Class 2 Shielded Cable

Table 108

SPLICE KITS FOR ONE CLASS 2 SHIELDED CABLE TO ONE CLASS 2 SHIELDED CABLE

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.15	0.08	3	15	D-150-0174	Raychem
0.18	0.10	8	27	D-150-0175	Raychem
0.34	0.19	19	67	D-150-0177	Raychem



ONE CLASS 2 SHIELDED CABLE TO ONE CLASS 2 SHIELDED CABLE
Figure 239

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 109
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

H. One Class 2 Shielded Cable to One Class 2 Shielded Cable and One Unshielded Wire

Table 110

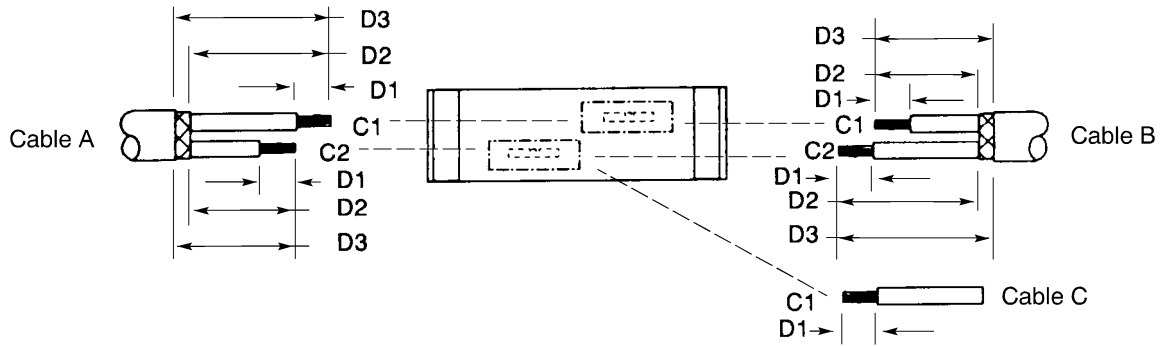
SPLICE KITS FOR ONE CLASS 2 SHIELDED CABLE TO ONE CLASS 2 SHIELDED CABLE AND ONE CLASS 1 WIRE

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.15	0.08	3	15	D-150-0174	Raychem
0.18	0.10	8	27	D-150-0175	Raychem
0.34	0.19	19	67	D-150-0177	Raychem

NOTE: The CAU of the shield of Cable B must be increased.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



ONE CLASS 2 SHIELDED CABLE TO ONE CLASS 2 SHIELDED CABLE AND ONE CLASS 1 WIRE
Figure 240

Table 111
CABLE TRIM DIMENSIONS

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
C	C1	D1	0.28	± 0.02

I. Two Class 2 Shielded Cables to Two Class 2 Shielded Cables

Table 112
SPLICE KITS FOR TWO CLASS 2 SHIELDED CABLES TO TWO CLASS 2 SHIELDED CABLES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	8	27	D-150-0175	Raychem

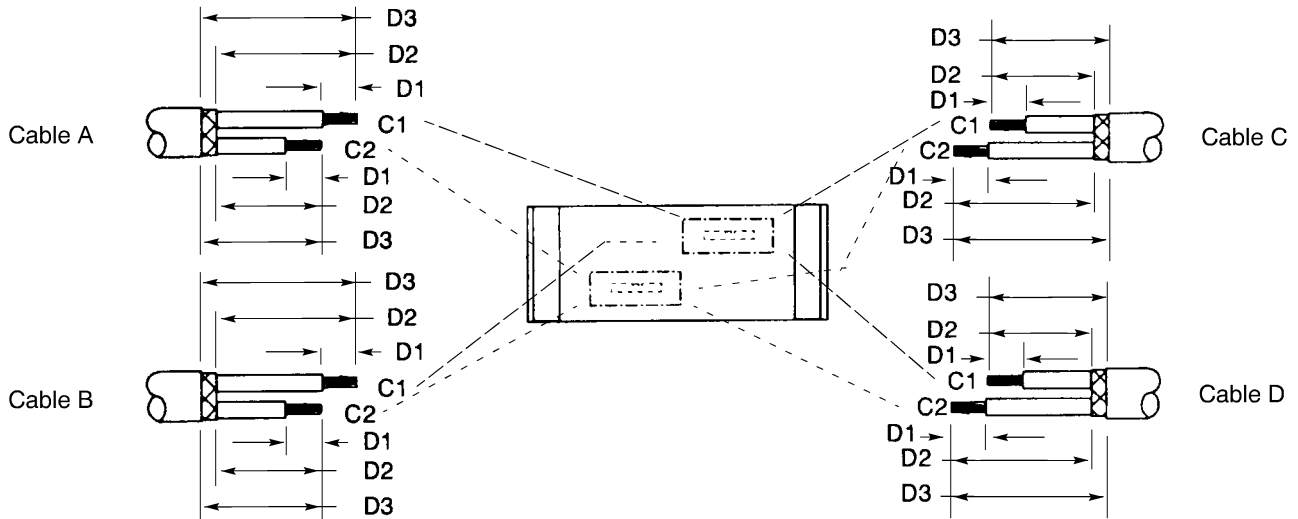
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 112 (continued)

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.22	0.14	19	67	D-150-0176	Raychem
0.34	0.19	43	138	D-150-0273	Raychem



TWO CLASS 2 SHIELDED CABLES TO TWO CLASS 2 SHIELDED CABLES
Figure 241

Table 113
CABLE TRIM DIMENSIONS

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 113 (continued)

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
B	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
C	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
D	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

J. Two Class 2 Shielded Cables to Three Class 2 Shielded Cables

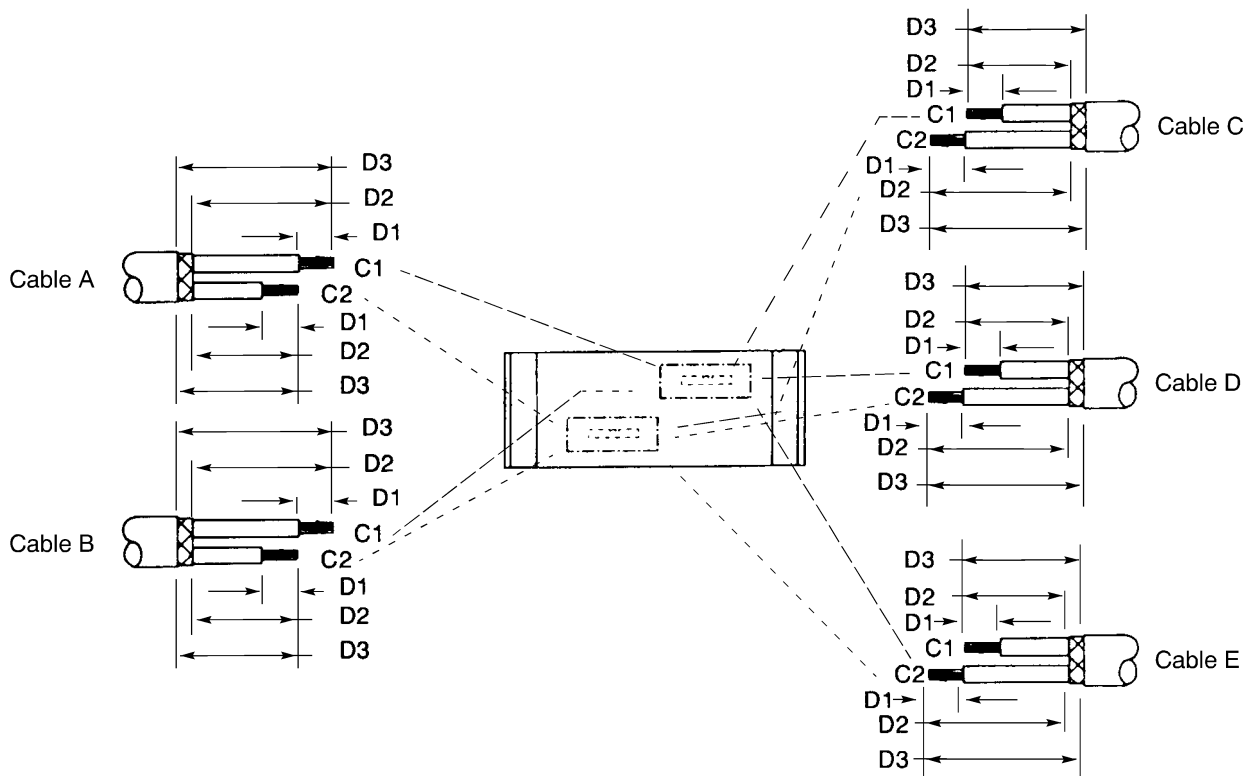
Table 114

SPLICE KITS FOR TWO CLASS 2 SHIELDED CABLES TO THREE CLASS 2 SHIELDED CABLES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	8	27	D-150-0175	Raychem
0.22	0.14	19	67	D-150-0176	Raychem
0.34	0.19	43	138	D-150-0273	Raychem

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



TWO CLASS 2 SHIELDED CABLES TO THREE CLASS 2 SHIELDED CABLES

Figure 242

**Table 115
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 115 (continued)

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
B	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
C	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
D	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
E	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

K. Three Class 2 Shielded Cables to Three Class 2 Shielded Cables

Table 116

SPLICE KITS FOR THREE CLASS 2 SHIELDED CABLES TO THREE CLASS 2 SHIELDED CABLES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	8	27	D-150-0175	Raychem

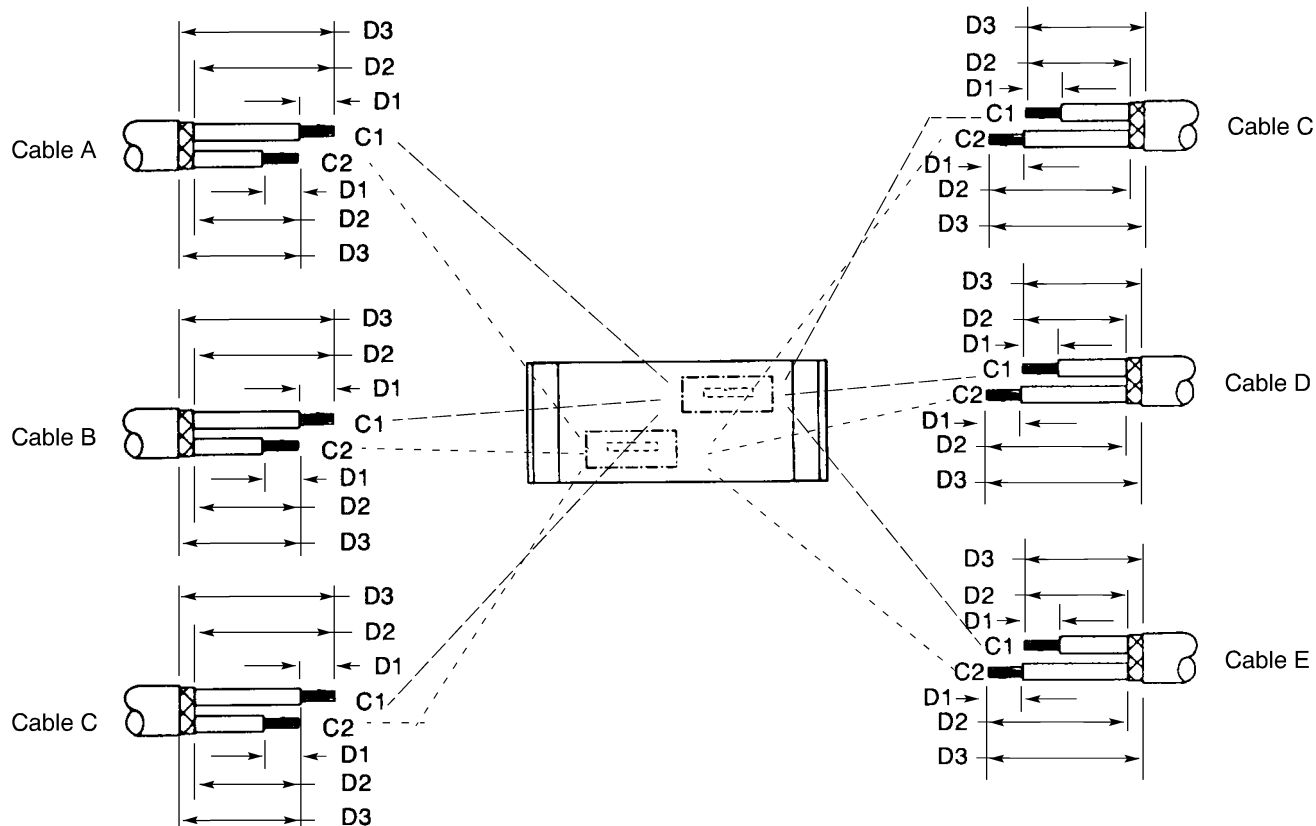
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 116 (continued)

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.22	0.14	19	67	D-150-0176	Raychem
0.34	0.19	43	138	D-150-0273	Raychem



THREE CLASS 2 SHIELDED CABLES TO THREE CLASS 2 SHIELDED CABLES

Figure 243

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 117
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
C	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
D	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
E	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

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ASSEMBLY OF SPLICES

Table 117 (continued)

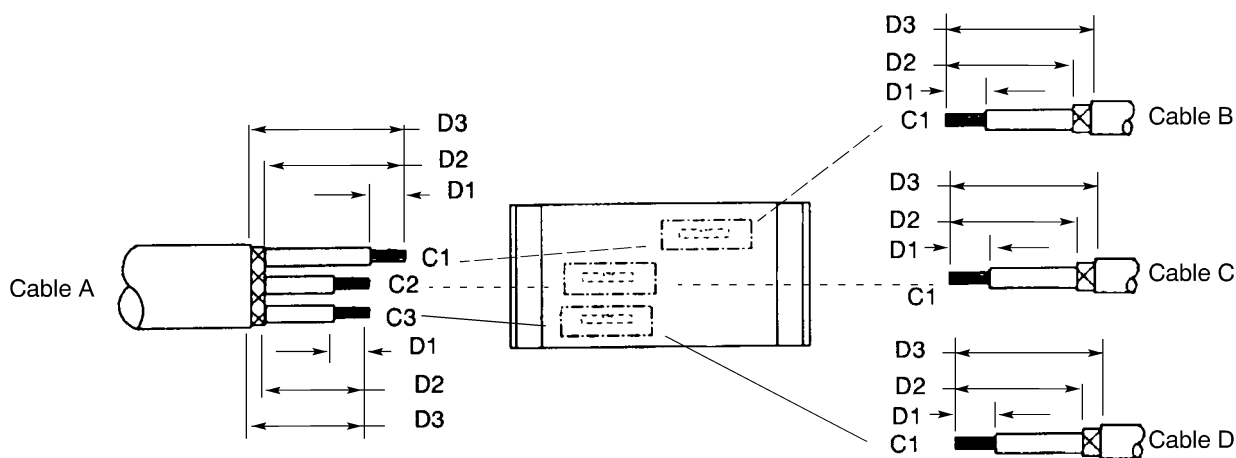
Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
F	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

L. One Class 3 Shielded Cable to Three Shielded Wires

Table 118

SPLICE KITS FOR ONE CLASS 3 SHIELDED CABLE TO THREE SHIELDED WIRES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	3	15	D-150-0179	Raychem
0.22	0.14	8	27	D-150-0180	Raychem
0.34	0.19	19	67	D-150-0181	Raychem



ONE CLASS 3 SHIELDED CABLE TO THREE SHIELDED WIRES

Figure 244

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 119
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
C	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
D	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

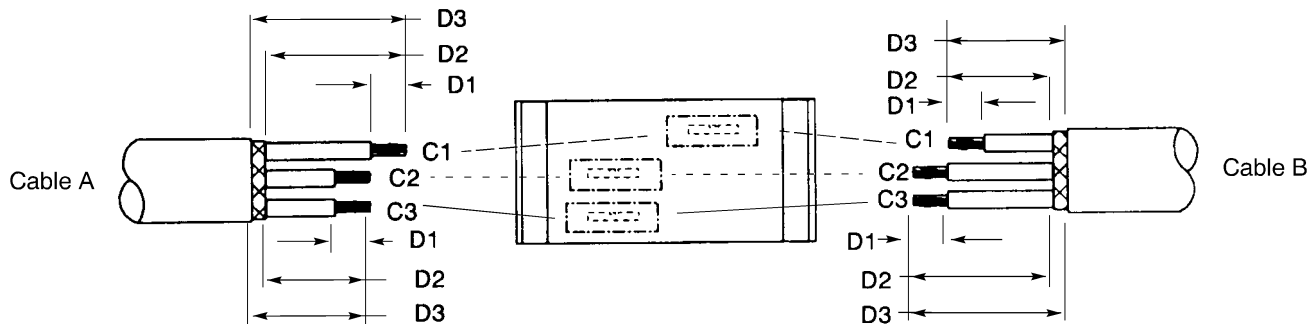
M. One Class 3 Shielded Cable to One Class 3 Shielded Cable

**Table 120
SPLICE KITS FOR ONE CLASS 3 SHIELDED CABLE TO ONE CLASS 3 SHIELDED CABLE**

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	3	15	D-150-0179	Raychem
0.22	0.14	8	27	D-150-0180	Raychem
0.34	0.19	19	67	D-150-0181	Raychem

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



ONE CLASS 3 SHIELDED CABLE TO ONE CLASS 3 SHIELDED CABLE
Figure 245

Table 121
CABLE TRIM DIMENSIONS

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

STANDARD WIRING PRACTICES MANUAL

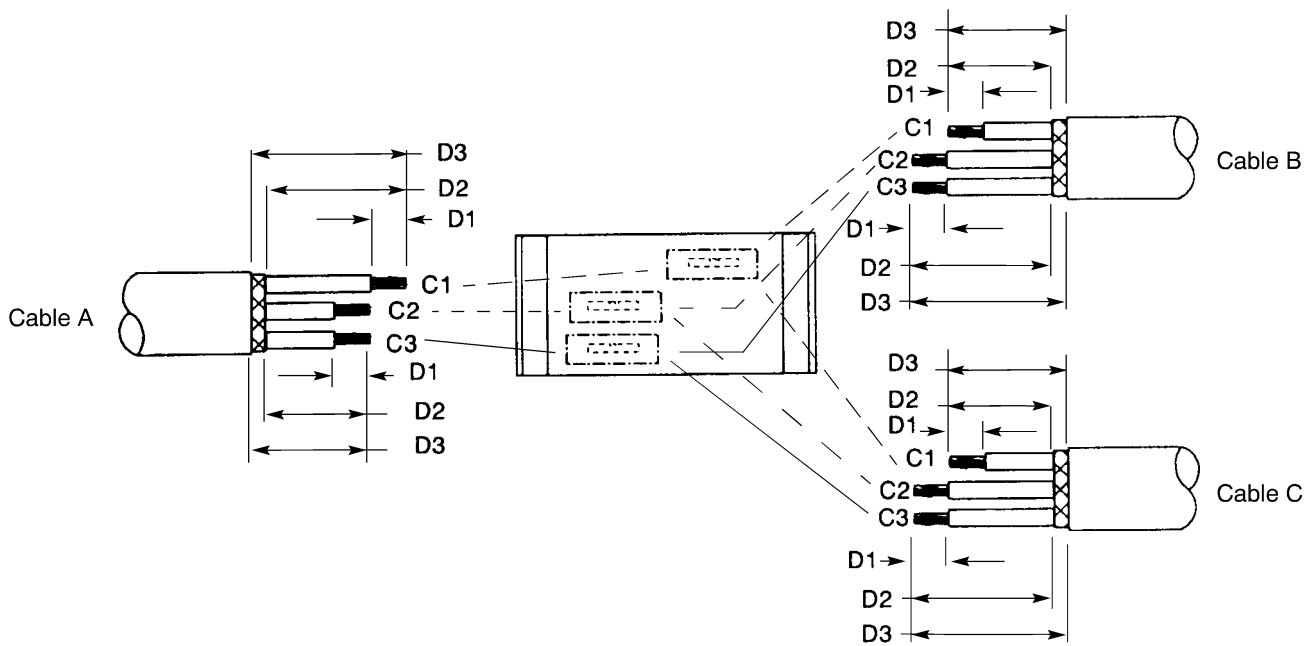
ASSEMBLY OF SPLICES

N. One Class 3 Shielded Cable to Two Class 3 Shielded Cables

Table 122

SPLICE KITS FOR ONE CLASS 3 SHIELDED CABLE TO TWO CLASS 3 SHIELDED CABLES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	3	15	D-150-0179	Raychem
0.22	0.14	8	27	D-150-0180	Raychem
0.34	0.19	19	67	D-150-0181	Raychem



ONE CLASS 3 SHIELDED CABLE TO TWO CLASS 3 SHIELDED CABLES

Figure 246

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 123
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
C	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

STANDARD WIRING PRACTICES MANUAL

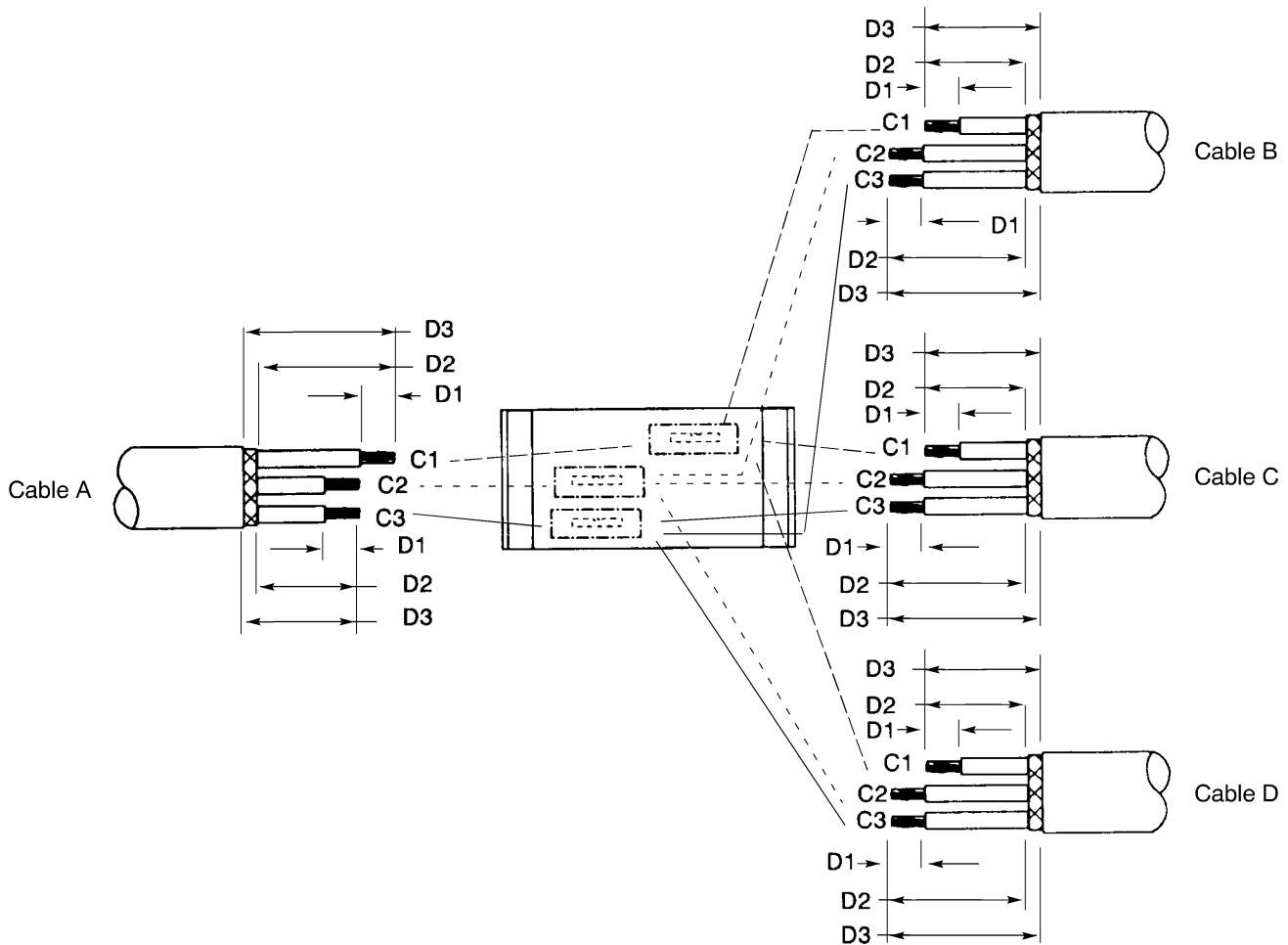
ASSEMBLY OF SPLICES

O. One Class 3 Shielded Cable to Three Class 3 Shielded Cables

Table 124

SPLICE KITS FOR ONE CLASS 3 SHIELDED CABLE TO THREE CLASS 3 JACKETED CABLES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	3	15	D-150-0179	Raychem
0.22	0.14	8	27	D-150-0180	Raychem
0.34	0.19	19	67	D-150-0181	Raychem



ONE CLASS 3 SHIELDED CABLE TO THREE CLASS 3 SHIELDED CABLES
Figure 247

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 125
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
C	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 125 (continued)

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
D	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

P. Two Class 3 Shielded Cables to Two Class 3 Shielded Cables

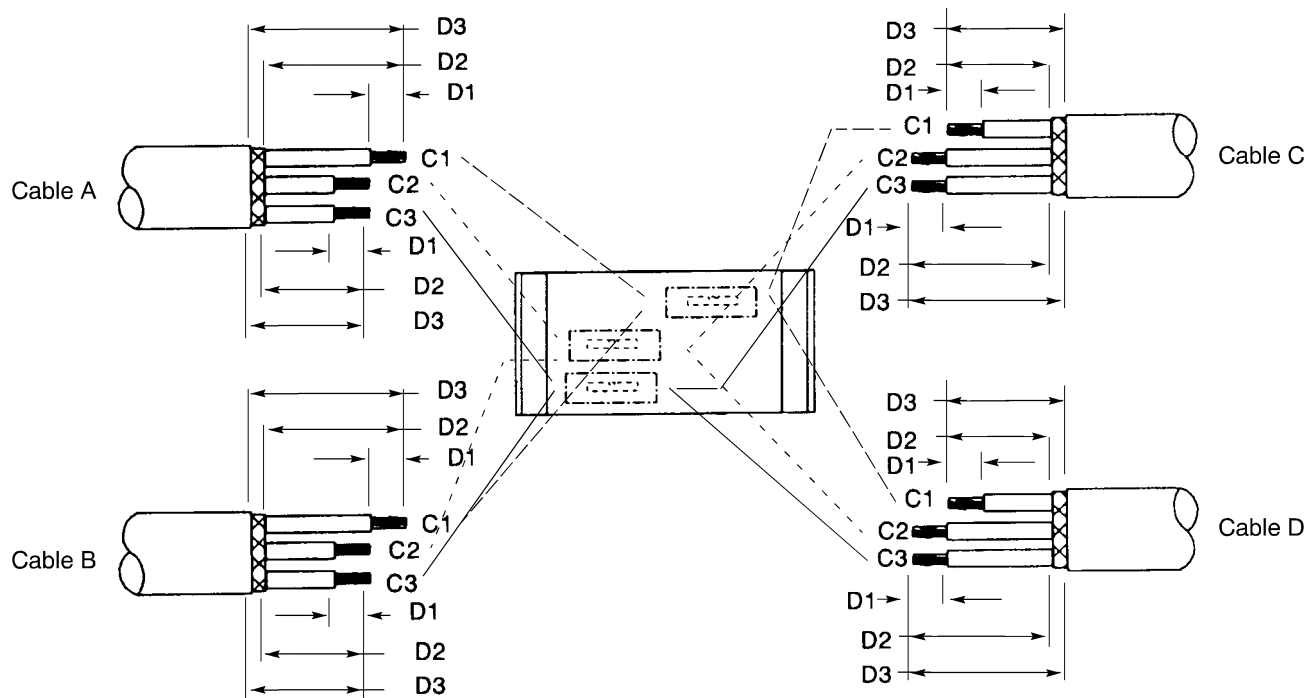
Table 126

SPLICE KITS FOR TWO CLASS 3 SHIELDED CABLES TO TWO CLASS 3 SHIELDED CABLES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	3	15	D-150-0179	Raychem
0.22	0.14	8	27	D-150-0180	Raychem
0.34	0.19	19	67	D-150-0181	Raychem

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



TWO CLASS 3 SHIELDED CABLES TO TWO CLASS 3 SHIELDED CABLES

Figure 248

**Table 127
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 127 (continued)

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
B	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
C	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
D	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

STANDARD WIRING PRACTICES MANUAL

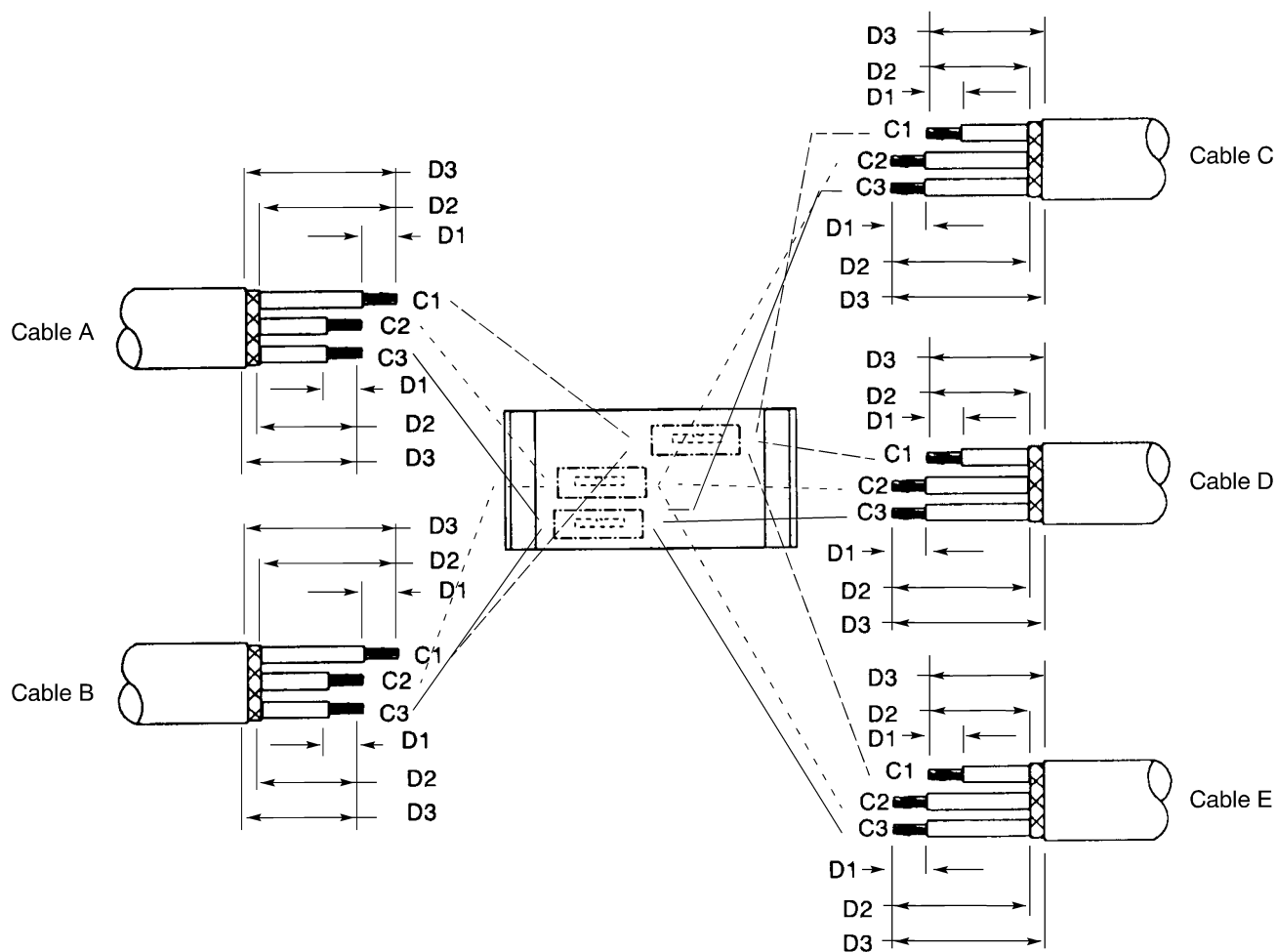
ASSEMBLY OF SPLICES

Q. Two Class 3 Shielded Cables to Three Class 3 Shielded Cables

Table 128

SPLICE KITS FOR TWO CLASS 3 SHIELDED CABLES TO THREE CLASS 3 SHIELDED CABLES

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	3	15	D-150-0179	Raychem
0.22	0.14	8	27	D-150-0180	Raychem
0.34	0.19	19	67	D-150-0181	Raychem



TWO CLASS 3 SHIELDED CABLES TO THREE CLASS 3 SHIELDED CABLES

Figure 249

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 129
CABLE TRIM DIMENSIONS**

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
B	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
C	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 129 (continued)

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
D	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
E	C1	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	

R. One Class 4 Shielded Cable to One Class 4 Shielded Cable

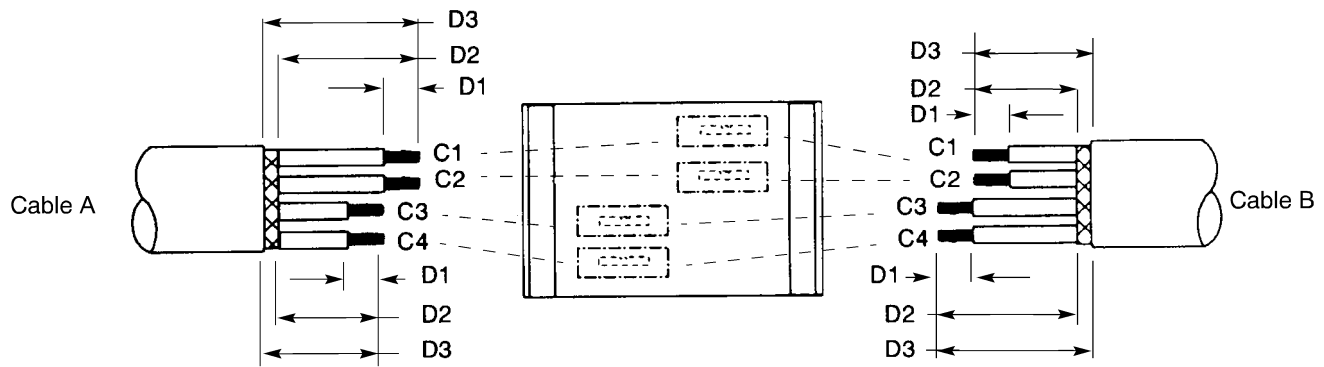
Table 130

SPLICE KITS FOR ONE CLASS 4 SHIELDED CABLE TO ONE CLASS 4 SHIELDED CABLE

Jacket Maximum O.D.	Shield Minimum O.D.	Conductor CAU Range		Solder Shield Splice Kit	
		Minimum	Maximum	Part Number	Supplier
0.18	0.10	3	15	D-150-0179	Raychem

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



ONE CLASS 4 SHIELDED CABLE TO ONE CLASS 4 SHIELDED CABLE
Figure 250

Table 131
CABLE TRIM DIMENSIONS

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
A	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C4	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Table 131 (continued)

Cable	Conductor	Trim Dimension (inch)		
		Dimension	Target	Tolerance
B	C1	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C2	D1	0.28	± 0.02
		D2	1.92	
		D3	2.20	
	C3	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	
	C4	D1	0.28	± 0.02
		D2	0.77	
		D3	1.05	

15. SEALED SPLICE CONFIGURATIONS WITH SOLDER SLEEVE SHIELD SPLICES FOR SHIELDED WIRE AND SHIELDED CABLE

A. Splice Assembly Configurations

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

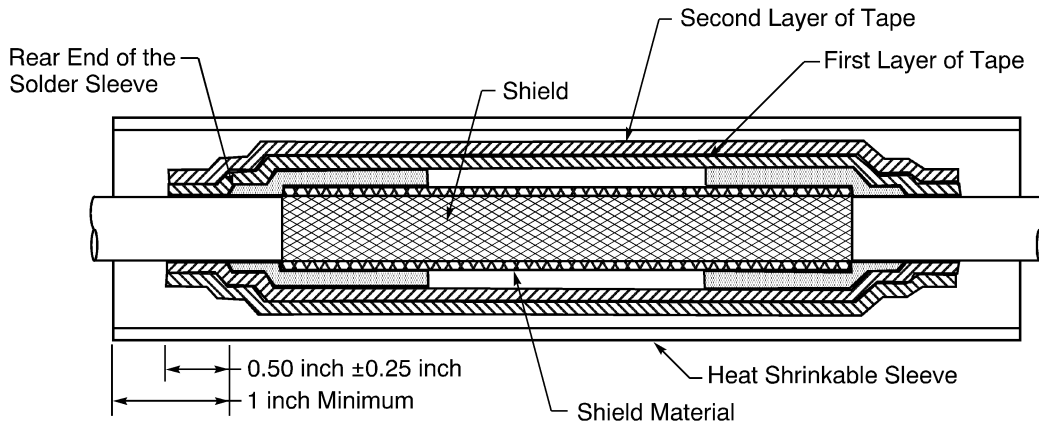
**Table 132
SPLICE ASSEMBLY CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	Quantity of Conductor Splices	Applicable Condition	Splice Assembly	
				Configuration	Procedure
One Shielded Wire	One Shielded Wire	1	No Fuel Vapor	Tape, Sleeve	Paragraph 15.B.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

B. One Shielded Wire to One Shielded Wire



SPLICE OF THE SHIELD
Figure 251

Refer to Figure 251.

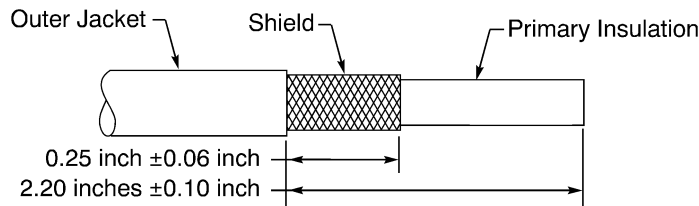
- (1) Make a selection of a Temperature Grade B shield material from Table 53.
Make sure that the shield material has the smallest diameter that can go on the wire.

NOTE: For alternative shield materials, refer to Subject 20-00-11.

- (2) Make a selection of a Temperature Grade B or higher insulation tape from Table 49.
- (3) Make a selection of two solder sleeves from Table 51.
- (4) Prepare the wire.

Refer to:

- Figure 252
- Subject 20-00-15 for the outer jacket removal procedures.



WIRE PREPARATION
Figure 252

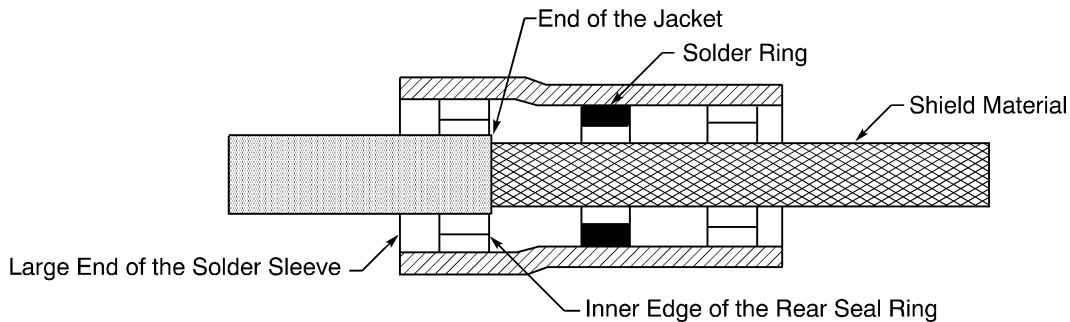
- (a) Remove 2.20 inches ± 0.10 inch of the outer jacket from the end of each wire.
- (b) Remove the necessary length of shield from the wire that makes the distance from the end of the shield to the end of the jacket equal to 0.25 inch ± 0.06 inch.
- (5) Cut the necessary length of the shield material.

Make sure that length is sufficient to extend from the end of the outer jacket on one wire to the end of the outer jacket on the other wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (6) Cut the necessary length of the heat shrinkable sleeve.
Make sure that length is sufficient to extend a minimum of 1 inch farther than the rear end of the solder sleeve on each wire after the solder sleeves are installed.
- (7) Clean the jacket with isopropyl alcohol.
Make sure:
 - To clean the area from each end of the jacket to a minimum of 3 inches to the rear
 - That the cleaned area is dry.
- (8) Put the heat shrinkable sleeve on one end of the wire.
- (9) Put a solder sleeve on each end of the wire.
- (10) Put the shield material on one end of the wire.
- (11) Make a selection of an applicable Temperature Grade B conductor splice configuration for one wire to one wire. Refer to Paragraph 9.A.
- (12) Assemble the conductor splice. Refer to the applicable procedure given in Paragraph 9.A.
- (13) Align the ends of the shield material with the ends of the cable jacket.
- (14) If it is necessary, trim the length of the shield material to make a fit between the ends of the jacket.
- (15) Assemble one end of the shield splice.
 - (a) Move the solder sleeve on the jacket and the shield material. Refer to Figure 253.
Make sure that:
 - The end of the shield material is a maximum of 0.1 inch from the end of the jacket
 - The inner edge of the rear seal ring is aligned with the end of the jacket
 - The seal ring does not make an overlap with the shield.



POSITION OF THE SOLDER SLEEVE ON THE SHIELD MATERIAL
Figure 253

- (b) Shrink the solder sleeve into its position.
Make sure that:
 - The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (16) Do Step (15) again to assemble the other end of the shield splice.
Make sure that the shield material is pulled tight before the splice is assembled.
- (17) Tightly wind a layer of the tape on the splice assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

Make sure that the layer of tape:

- Starts 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at one end of the splice
- Stops 0.50 inch \pm 0.25 inch farther than the rear end of the solder sleeve at the other end of the splice
- Makes a 50 percent overlap.

(18) Tightly wind a second layer of the tape on the splice assembly.

Make sure that the layer of tape:

- Starts 1 inch minimum farther than where the first layer of tape stops
- Stops 1 inch minimum farther than where the first layer of tape starts
- Makes a 50 percent overlap.

(19) Align the center of the heat shrinkable sleeve with the center of the splice assembly.

(20) Shrink the sleeve into its position. Refer to Subject 20-10-14.

16. SEALED SPLICE CONFIGURATIONS WITH SOLDER SLEEVE SPLICE KITS FOR SHIELDED WIRE AND SHIELDED CABLE FOR HIGH TEMPERATURE

A. Splice Assembly Configurations

For the conditions that are applicable for:

- The repair of a wire or a cable with a splice, refer to Subject 20-10-13
- The selection of the correct sealed splice configuration, refer to Paragraph 1.C.

CAUTION: THESE SPLICE ASSEMBLY CONFIGURATIONS CONTAIN SOLDER SLEEVES THAT ARE APPLICABLE FOR WIRE AND CABLE WITH NICKEL PLATED SHIELDS. ASSEMBLY OF THE SPLICE ON WIRE AND CABLE WITHOUT NICKEL PLATED SHIELDS CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE SPLICE. REFER TO SUBJECT 20-00-13 FOR THE CONFIGURATION OF THE WIRE OR CABLE.

**Table 133
WIRE AND CABLE CONFIGURATIONS**

One End of Splice Assembly	Other End of Splice Assembly	Quantity of Conductor Splices	Splice Kit
One Shielded Wire	One Shielded Wire	1	D-150-0250
	Two Shielded Wires	1	D-150-0251
Two Shielded Wires	One Shielded Wire	1	D-150-0251
One Class 2 Shielded Cable	One Class 2 Shielded Cable	2	D-150-0252
	Two Class 2 Shielded Cables	2	D-150-0253
Two Class 2 Shielded Cables	One Class 2 Shielded Cable	2	D-150-0253

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

**Table 134
DIMENSIONS OF THE SPLICE KITS**

Splice Kit	One End of Splice Assembly		Other End of Splice Assembly		Conductor CAU Range		Conductor Splice Crimp Barrel Size
	Jacket Maximum O.D. (inch)	Shield Minimum O.D. (inch)	Jacket Maximum O.D. (inch)	Shield Minimum O.D. (inch)	Minimum	Maximum	
D-150-0250	0.18	0.10	0.18	0.10	8	27	20-16
D-150-0251	0.18	0.10	0.28	0.16	19	67	16-12
D-150-0252	0.28	0.16	0.28	0.16	8	27	20-16
D-150-0253	0.28	0.16	0.35	0.20	19	67	16-12

**Table 135
SPLICE ASSEMBLY CONFIGURATION PROCEDURES**

Splice Kit	Procedure
D-150-0250	Paragraph 16.B.
D-150-0251	Paragraph 16.C.
D-150-0252	Paragraph 16.D.
D-150-0253	Paragraph 16.E.

- (1) Make a selection of the applicable splice kit for the wire or cable configuration from Table 133.
- (2) Measure these dimensions of the wire or cable on each side of the splice:
 - The jacket O.D.
 - The shield O.D.
- (3) Compare these dimensions with the applicable dimensions of the splice kit in Table 134:
 - The jacket O.D.
 - The shield O.D.
- (4) If the O.D. of the jackets or the shields are not the correct dimension for the splice kit, make a selection of an alternative splice configuration. Refer to Paragraph 1.C.
- (5) Calculate the total CAU of the conductors for each end of each conductor splice. Refer to Paragraph 1.D.
- (6) Compare the total conductor CAU with the applicable conductor CAU of the splice kit in Table 134.
- (7) If the CAU of the conductors are not the correct size for the splice kit, the conductors can be increased.

Refer to:

- Paragraph 2.B. to assemble the conductor splice with a conductor that is folded back
- Paragraph 2.C. to assemble the conductor splice with a filler wire.

NOTE: As an alternative, make a selection of a different splice configuration. Refer to Paragraph 1.C.

- (8) Make a selection of a crimp tool from Table 43.

Refer to Table 134 for the crimp barrel size of the conductor splice.

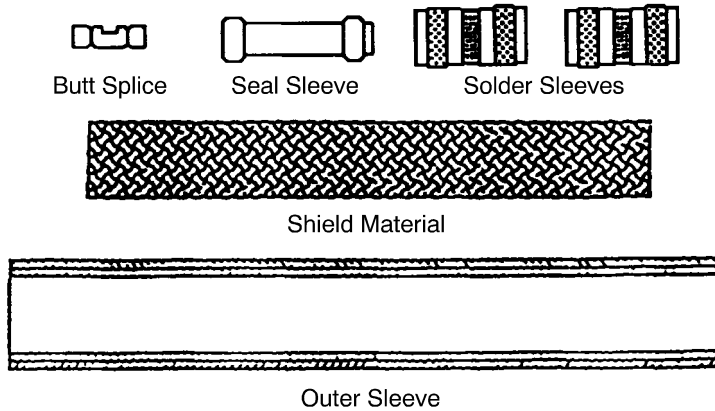
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

- (9) Make a selection of a high temperature type, hot air gun from Table 47.
- (10) Assemble the splice. Refer to Table 135 for the procedure.

B. One Shielded Wire to One Shielded Wire

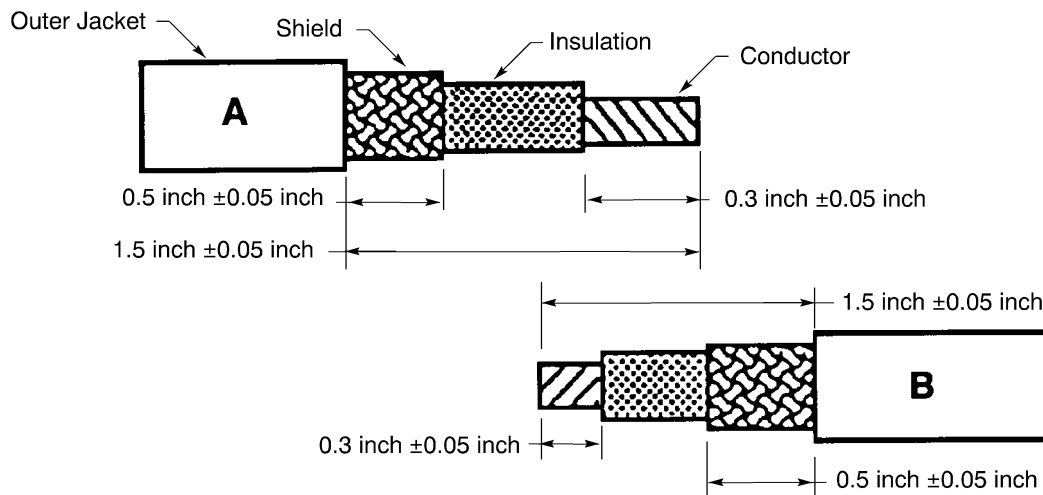
Refer to Paragraph 16.A. first to start this procedure.



COMPONENTS OF THE RAYCHEM D-150-0250 SOLDER SLEEVE SPLICE KIT
Figure 254

Refer to Figure 254.

- (1) Prepare the end of each cable. Refer to Figure 255.



CABLE PREPARATION
Figure 255

- (a) Remove 1.50 inches ± 0.05 inch of the outer jacket from the end of the cable.
- (b) Remove the necessary length of the shield so that the distance from the end of the shield to the end of the outer jacket is 0.50 inch ± 0.05 inch.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (c) Remove the necessary length of the insulation so that the distance from the end of the insulation to the end of the conductor is 0.30 inch \pm 0.05 inch.
- (2) Remove a short length of each end of the shield tube so that the diameter of the tube can be increased.
- (3) In this order, put these components on Cable A:
 - The outer sleeve
 - A solder sleeve
 - The shield tube.
- (4) In this order, put these components on Cable B:
 - A solder sleeve
 - The seal sleeve.
- (5) Assemble the Cable A end of the splice:
 - (a) Put the conductor in the splice so that the end of the conductor is aligned with the center of the splice.
 - (b) Crimp the splice.
- (6) Do Step (5) again for the Cable B end of the splice.
- (7) Align the center of the seal sleeve with the center of the splice.
- (8) Apply heat to shrink the seal sleeve into position.
- (9) Push the shield tube to Cable B so that the forward end of the tube is against the end of the cable jacket of Cable B.
- (10) Attach the end of the shield tube to the shield of Cable B:
 - (a) Twist the end of the shield tube down so that the end of the tube is tight against the shield of the cable.
 - (b) Push the solder sleeve toward the end of the cable until the rear edge of the solder ring is 0.10 inch from the end of the cable jacket.
 - (c) Apply heat to the center of the solder sleeve until the solder melts and flows into the shield tube and the shield of the cable.
- (11) Attach the remaining free end of the shield tube to the shield of the Cable A:
 - (a) Pull the shield tube across the splice so that it is tight.
 - (b) Remove the length of the shield tube that makes an overlap with the end of the outer jacket of the Cable A.
 - (c) Do Step (10) again.
- (12) Align the center of the outer sleeve with the center of the seal sleeve.

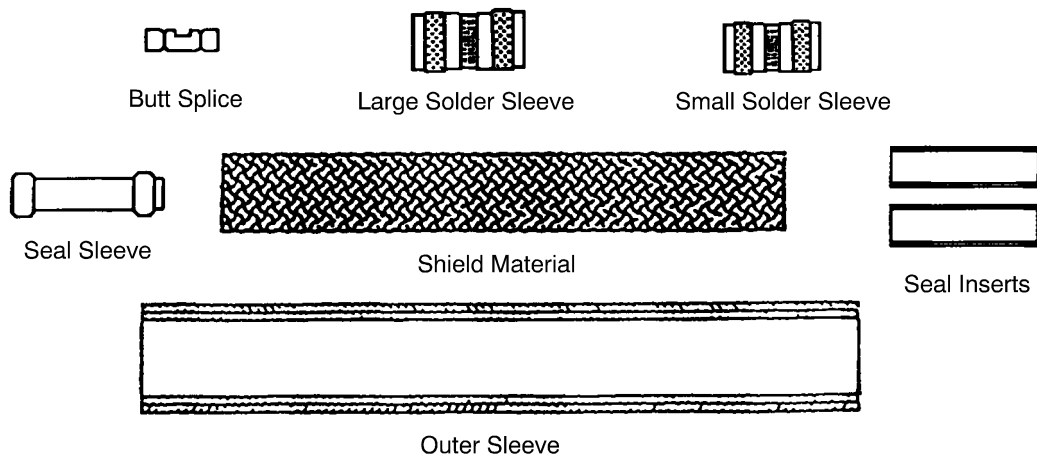
NOTE: On each end of the splice assembly, the outer sleeve should make approximately a 1.0 inch overlap with the cable jacket.
- (13) To shrink the outer sleeve into position:
 - (a) Apply heat from the center of the sleeve toward one end of the sleeve until the longitudinal line cannot be seen.
 - (b) Apply heat from the center of the sleeve toward the other end of the sleeve until the longitudinal line cannot be seen.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES

C. One Shielded Wire to Two Shielded Wires

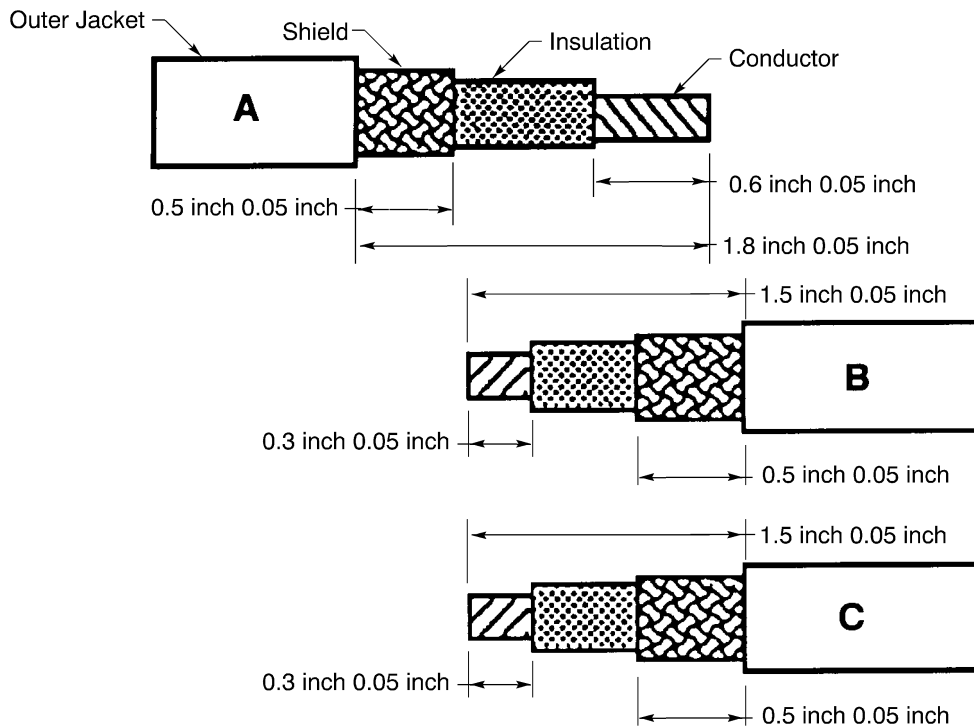
Refer to Paragraph 16.A. first to start this procedure.



**COMPONENTS OF THE RAYCHEM D-150-0251 SOLDER SLEEVE SPLICE KIT
Figure 256**

Refer to Figure 256.

(1) Prepare the end of each cable. Refer to Figure 257.



**CABLE PREPARATION
Figure 257**

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

- (a) Remove the necessary length of the outer jacket so that the distance from the end of the outer jacket to the end of the conductor is:
 - 1.80 inches ± 0.05 inch for Cable A
 - 1.50 inches ± 0.05 inch for Cable B and Cable C.
- (b) Remove the necessary length of the shield so that the distance from the end of the shield to the end of the outer jacket is 0.50 inch ± 0.05 inch for each cable.
- (c) Remove the necessary length of the insulation so that the distance from the end of the insulation to the end of the conductor is:
 - 0.60 inch ± 0.05 inch for Cable A
 - 0.30 inch ± 0.05 inch for Cable B and Cable C.
- (2) Remove a short length of each end of the shield tube so that the diameter of the tube can be increased.
- (3) In this order, put these components on cable A:
 - The outer sleeve
 - A seal insert
 - The large solder sleeve so that the end of the sleeve with the larger diameter is pointed toward the end of the wire
 - The small solder sleeve so that the end of the sleeve with the larger diameter is pointed toward the end of the wire
 - The shield tube
 - The seal sleeve.
- (4) Put a seal insert on Cable B or Cable C.
- (5) Assemble the Cable A end of the splice:
 - (a) Fold the conductor of Cable A back on itself so that the end of the conductor is aligned with the end of the insulation.
 - (b) Push the conductor into one end of the splice so that the end of the conductor is aligned with the center of the splice.
 - (c) Crimp the splice.
- (6) Assemble the other end of the splice:
 - (a) At the same time, push the conductors of Cable B and Cable C into the other end of the splice so that the end of the conductors is aligned with the center of the splice.
 - (b) Crimp the splice.
- (7) Align the center of the seal sleeve with the center of the splice.
- (8) Shrink the seal sleeve into position.
- (9) Push the shield tube toward Cable B and Cable C so that the rear end of the tube is against the end of the cable jacket of Cable A.
- (10) Attach the end of the shield tube to the shield of Cable A:
 - (a) Twist the end of the shield tube down so that the end of the tube is tight against the shield of the cable.
 - (b) Push the small solder sleeve toward the end of the cable until the rear edge of the solder ring is 0.10 inch from the end of the cable jacket.

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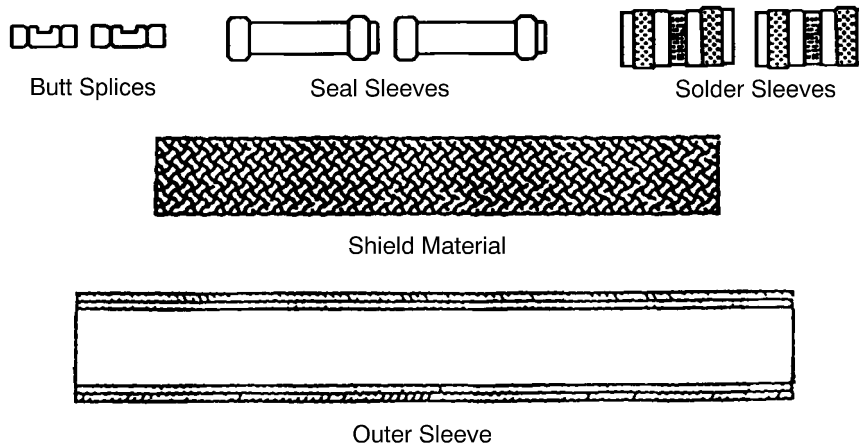
ASSEMBLY OF SPLICES

- (c) Apply heat to the center of the solder sleeve until the solder melts and flows into the shield tube and the shield of the cable.
- (11) Attach the remaining free end of the shield tube to the shields of the Cable B and Cable C:
 - (a) Pull the shield tube across the splice so that it is tight.
 - (b) Remove the length of the shield tube that makes an overlap with the end of the outer jackets of the Cable B and Cable C.
 - (c) Twist the end of the shield tube down so that the end of the tube is tight against the shields of the cables.
 - (d) Push the large solder sleeve toward Cable B and Cable C until the rear edge of the solder ring is 0.10 inch from the end of the cable jacket.
 - (e) Apply heat to the center of the solder sleeve until the solder melts and flows into the shield tube and the shield of the cable.
- (12) Push each seal insert toward the splice until the forward end is against each solder sleeve on each side of the splice.
- (13) Align the center of the outer sleeve with the center of the seal sleeve.

NOTE: On each end of the splice assembly, the outer sleeve should make approximately a 1.0 inch overlap with the seal insert.
- (14) To shrink the outer sleeve into position:
 - (a) Apply heat from the center of the sleeve toward one end of the sleeve until the longitudinal line cannot be seen.
 - (b) Apply heat from the center of the sleeve toward the other end of the sleeve until the longitudinal line cannot be seen.

D. One Class 2 Shielded Cable to One Class 2 Shielded Cable

Refer to Paragraph 16.A. first to start this procedure.



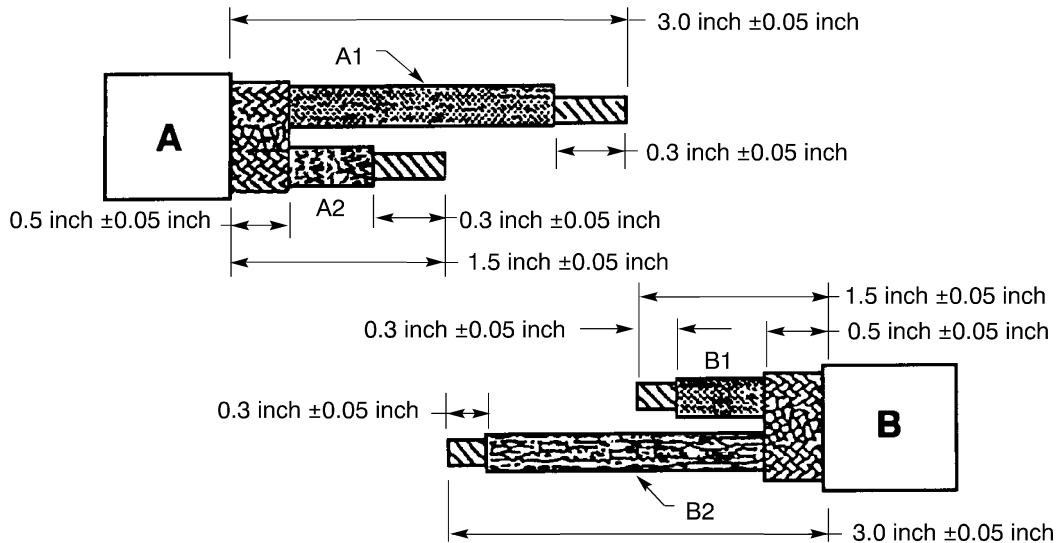
COMPONENTS OF THE RAYCHEM D-150-0252 SOLDER SLEEVE SPLICE KIT
Figure 258

Refer to Figure 258.

- (1) Prepare the end of each cable. Refer to Figure 259.

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CABLE PREPARATION
Figure 259

- (a) Remove the necessary length of the outer jacket from each cable so that the distance from the end of the outer jacket to the end of the cable is 3.00 inches ± 0.05 inch.
 - (b) Remove the necessary length of the shield from each cable so that the distance from the end of the shield to the end of the outer jacket is 0.50 inch ± 0.05 inch.
 - (c) Cut the wires so that the distance from the end of the wire to the end of the outer jacket is 1.50 inches ± 0.05 inch:
 - Wire A2 of Cable A
 - Wire B1 of Cable B.
 - (d) Remove the necessary length of insulation from each wire so that the distance from the end of the insulation to the end of the conductor is 0.30 inch ± 0.05 inch.
- (2) Remove a short length of each end of the shield tube so that the diameter of the tube can be increased.
 - (3) In this order, put these components on cable A:
 - The outer sleeve
 - Two solder sleeves so that the end of each sleeve with the larger diameter points toward the end of the wire
 - The shield tube.
 - (4) Put a seal sleeve on:
 - Wire A1 of Cable A
 - Wire B2 of Cable B.
 - (5) Assemble the Cable A side of the splice configuration:
 - (a) Put the conductor of Wire A1 in one of the splices so that the end of the conductor is aligned with the center of the splice.
 - (b) Crimp the splice.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF SPLICES**

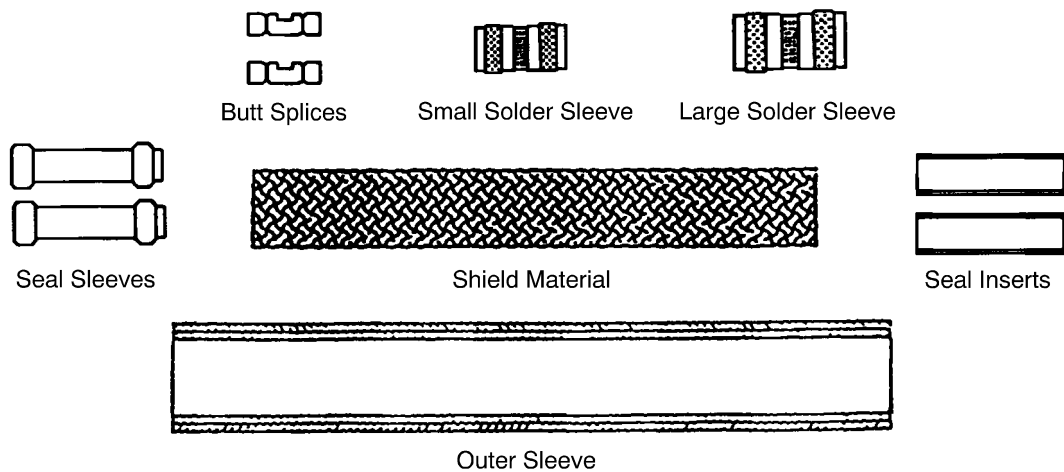
- (c) Put the conductor of Wire A2 in the other splice so that the end of the conductor is aligned with the center of the splice.
- (d) Crimp the splice.
- (6) Assemble the Cable B side of the splice configuration:
 - (a) Put the conductor of Wire B1 in the open end of the splice that has Wire A1 of Cable A so that the end of the conductor is aligned with the center of the splice.
 - (b) Crimp the splice.
 - (c) Put the conductor of Wire B2 in the open end of the splice that has Wire A2 of Cable A so that the end of the conductor is aligned with the center of the splice.
 - (d) Crimp the splice.
- (7) Align the center of each seal sleeve with the center of each splice.
- (8) Shrink each sleeve into position.
- (9) Push the shield tube toward Cable B until the forward end of the tube is against the end of the cable jacket of Cable B.
- (10) Attach the end of the shield tube to the shield of Cable B:
 - (a) Twist the end of the shield tube down so that the end of the tube is tight against the shield of the cable.
 - (b) Push one of the solder sleeves toward Cable B until the rear edge of the solder ring is 0.10 inch from the end of the outer jacket of the cable.
 - (c) Apply heat to the center of the solder sleeve until the solder melts and flows into the shield tube and the shield of the cable.
- (11) Attach the remaining free end of the shield tube to the shield of the Cable A:
 - (a) Pull the shield tube across the splice so that it is tight.
 - (b) Remove the length of the shield tube that makes an overlap with the end of the outer jacket of the Cable A.
 - (c) Do Step (10) again.
- (12) Align the center of the outer sleeve with the center of the seal sleeves.
NOTE: On each end of the splice assembly, the outer sleeve should make approximately a 1.0 inch overlap with the cable jacket.
- (13) To shrink the outer sleeve into position:
 - (a) Apply heat from the center of the sleeve toward one end of the sleeve until the longitudinal line cannot be seen.
 - (b) Apply heat from the center of the sleeve toward the other end of the sleeve until the longitudinal line cannot be seen.

E. One Class 2 Shielded Cable to Two Class 2 Shielded Cables

Refer to Paragraph 16.A. first to start this procedure.

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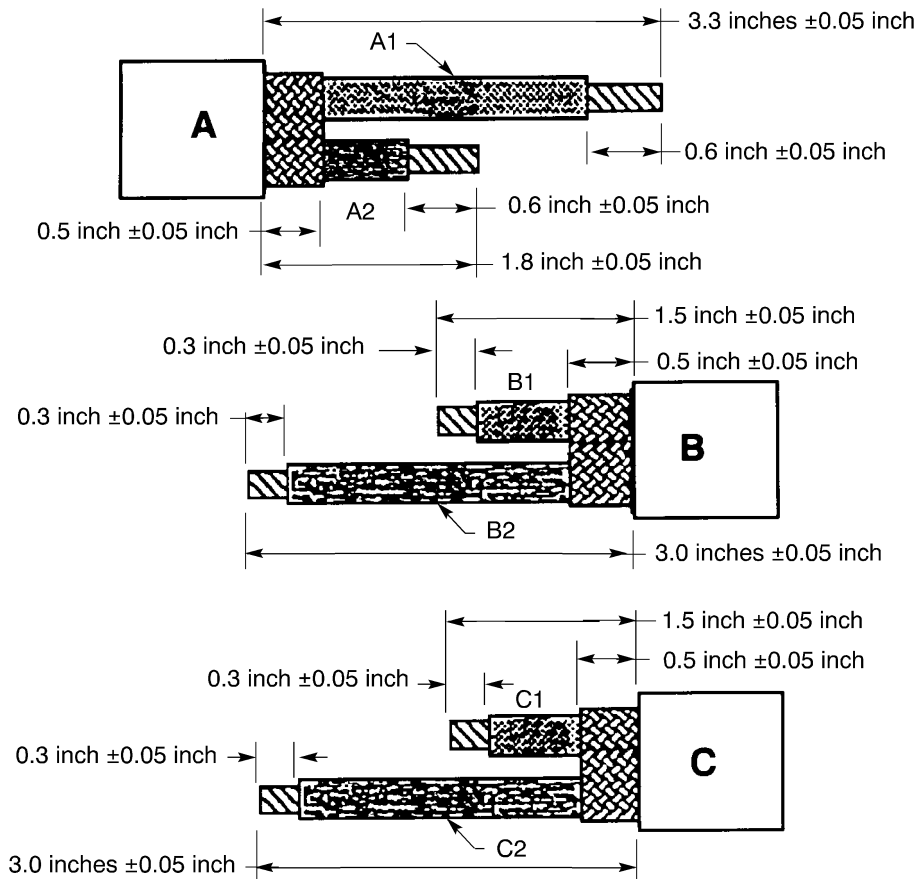
COMPONENTS OF THE RAYCHEM D-150-0253 SOLDER SLEEVE SPLICE KIT
Figure 260

Refer to Figure 260.

- (1) Prepare the end of each cable. Refer to Figure 261.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF SPLICES



CABLE PREPARATION
Figure 261

- (a) Remove the necessary length of the outer jacket so that the distance from the end of the outer jacket to the end of the cable is:
 - 3.30 inches \pm 0.05 inch for Cable A
 - 3.00 inches \pm 0.05 inch for Cable B
 - 3.00 inches \pm 0.05 inch for Cable C.
- (b) Remove the necessary length of the shield from each cable so that the distance from the end of the shield to the end of the outer jacket is 0.5 inch \pm 0.05 inch.

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- (c) Cut the wires so that the distance from the end of the wire to the end of the outer jacket is:
 - 1.80 inches \pm 0.05 inch for Wire A2 of Cable A
 - 1.50 inches \pm 0.05 inch for Wire B1 of Cable B
 - 1.50 inches \pm 0.05 inch for Wire C1 of Cable C.
- (d) Remove the necessary length of the insulation from each wire so that the distance from the end of the insulation to the end of the conductor is:
 - 0.60 inch \pm 0.05 inch for Wire A1 and Wire A2 of Cable A
 - 0.30 inch \pm 0.05 inch for Wire B1 and Wire B2 of Cable B
 - 0.30 inch \pm 0.05 inch for Wire C1 and Wire C2 of Cable C.
- (2) Remove a short length of each end of the shield tube so that the diameter of the tube can be increased.
- (3) If it is necessary, remove a length from each end of the shield tube.
- (4) In this order, put these components on Cable A:
 - A seal insert
 - The small solder sleeve so that the end of the sleeve with the larger diameter is pointed toward the end of the wire
 - The large solder sleeve so that the end of the sleeve with the larger diameter is pointed toward the end of the wire
 - The shield tube.
- (5) Put one seal insert on each of these cables:
 - Cable B
 - Cable C.
- (6) Put a seal sleeve on each of these wires:
 - Wire A1 of Cable A
 - Wire A2 of Cable A.
- (7) Assemble the Cable A side of the splice configuration:
 - (a) Fold the conductor of Wire A1 back on itself so that the end of the conductor is aligned with the end of the insulation.
 - (b) Put the conductor of Wire A1 in one of the splices so that the end of the conductor is aligned with the center of the splice.
 - (c) Crimp the splice.
 - (d) Fold the conductor of Wire A2 back on itself so that the end of the conductor is aligned with the end of the insulation.
 - (e) Put the conductor of Wire A2 in the other splice so that the end of the conductor is aligned with the center of the splice.
 - (f) Crimp the splice.
- (8) Assemble the Cable B and Cable C side of the splice configuration:
 - (a) Put the conductor of Wire B1 and Wire C1 in the open end of the splice that has Wire A1 of Cable A so that the end of the conductor is aligned with the center of the splice.
 - (b) Crimp the splice.
 - (c) Put the conductor of Wire B2 and Wire C2 in the open end of the splice that has Wire A2 of Cable A so that the end of the conductor is aligned with the center of the splice.

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- (d) Crimp the splice.
- (9) Align the center of one seal sleeve with the center of the splice on that wire.
- (10) Shrink the sleeve into position.
- (11) Align the center of the other seal sleeve with the center of the splice on that wire.
- (12) Shrink the sleeve into position.
- (13) Push the shield tube toward Cable B and Cable C until the forward end of the tube is against the end of the cable jacket of Cable B.
- (14) Attach the end of the shield tube to the shields of Cable B and Cable C:
 - (a) Twist the end of the shield tube down so that the end of the tube is tight against the shields of both cables.
 - (b) Push the large solder sleeve toward Cable B and Cable C until the forward edge of the solder ring is 0.10 inch from the end of the outer jackets of both cables.
 - (c) Apply heat to the center of the solder sleeve until the solder melts and flows into the shield tube and the shields of both cables.
- (15) Attach the remaining free end of the shield tube to the shield of the Cable A:
 - (a) Pull the shield tube across the splice so that it is tight.
 - (b) Remove the length of the shield tube that makes an overlap with the end of the outer jacket of the Cable A.
 - (c) Push the small solder sleeve toward the end of the cable until the rear edge of the solder ring is 0.10 inch from the end of the outer jacket of the cable.
 - (d) Apply heat to the center of the solder sleeve until the solder melts and flows into the shield tube and the shield of the cable.
- (16) Push each seal insert toward the splice until the forward end is against each solder sleeve on each side of the splice.
- (17) Align the center of the outer sleeve with the center of the seal sleeves.

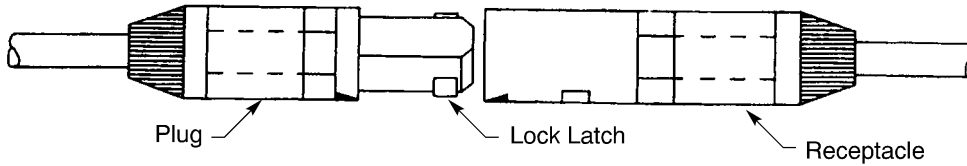
NOTE: On each end of the splice assembly, the outer sleeve should make approximately a 1.0 inch overlap with the cable jacket.
- (18) To shrink the outer sleeve into position:
 - (a) Apply heat from the center of the sleeve toward one end of the sleeve until the longitudinal line cannot be seen.
 - (b) Apply heat from the center of the sleeve toward the other end of the sleeve until the longitudinal line cannot be seen.

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ASSEMBLY OF SPLICES

17. REMOVABLE CONTACT SPLICES

A. Splice Separation



SPLICE SEPARATION
Figure 262

- (1) Hold both ends of the splice at the same time.
- (2) Turn one end of the splice approximately 1/4 turn.
- (3) Pull each end until the plug is disconnected from the receptacle.

B. Contact Removal

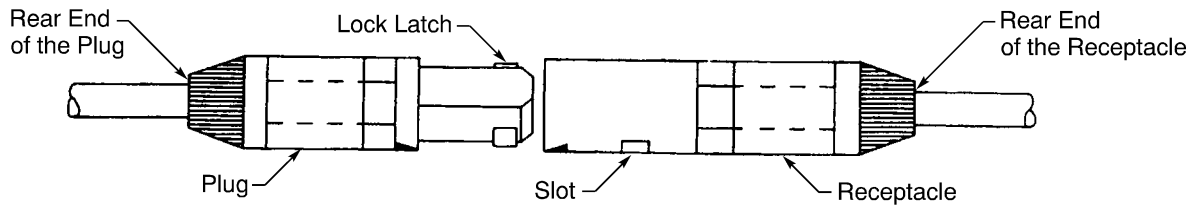
- (1) Make a selection of a size 16 contact removal tool. Refer to Subject 20-61-11.

NOTE: The contact is removed from the front face of the splice.

- (2) Remove the contact from each end of the splice.

C. Splice Assembly

For the applicable conditions for the assembly of a splice, refer to Paragraph 1.A.



SPLICE ASSEMBLY
Figure 263

Refer to Figure 263.

- (1) Make a selection of a splice plug and a splice receptacle from Table 27.
- (2) Make a selection of the contacts for the plug and receptacle from Table 29.
- (3) Make a selection of a contact crimp tool. Refer to Subject 20-61-11.
- (4) Make a selection of a size 16 contact insertion tool. Refer to Subject 20-61-11.
- (5) Remove 0.28 inch \pm 0.03 inch of insulation from the each end of the wire.
- (6) Assemble the receptacle side of the splice:
 - (a) Put the wire in the crimp barrel of the socket contact.

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ASSEMBLY OF SPLICES

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

- (b) Crimp the contact.
- (c) At the rear of the receptacle, axially align the contact and the tool with the contact cavity.
- (d) Push the tool into the contact cavity until it stops.
- (e) Remove the tool from the contact cavity.
- (f) Lightly pull the wire to make sure that the contact is locked in its position.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE SPLICE OR THE CONTACT.

- (7) Do Step (6) again for the plug side of the splice with a pin contact.
- (8) Push the plug straight into the receptacle until it stops.
- (9) Twist each half of the splice in opposite directions until the lock latches in the plug are fully engaged with the slots in the receptacle.

18. APPROVED TOOL SUPPLIERS

A. Splice Crimp Tools

**Table 136
CRIMP TOOL SUPPLIERS**

Crimp Tools	Suppliers
11738	Thomas & Betts
13597	Thomas & Betts
13600	Thomas & Betts
13642M	Thomas & Betts
45216	AMP
45218	AMP
45219	AMP
45219-2	AMP
45221	AMP
46110	AMP
46447	AMP
46673	AMP
46988	AMP
47321	AMP
47322	AMP
47386	AMP

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ASSEMBLY OF SPLICES

Table 136 (continued)

Crimp Tools	Suppliers
47387	AMP
47452	AMP
47807-1	AMP
47808-6	AMP
47820	AMP
47821	AMP
47822	AMP
47823	AMP
47824	AMP
49900	AMP
49935	AMP
58422-1	AMP
59239	AMP
59239-()	AMP
59250	AMP
59275	AMP
59294	AMP
59461	AMP
59973-1	AMP
59974-1	AMP
69004	AMP
69020	AMP
69061	AMP
69066	AMP
69069	AMP
69091	AMP
69100	AMP
69120-()	AMP
69692	AMP
69692-1	AMP
69365-()	AMP
69693-1	AMP
AD-1377	Raychem

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ASSEMBLY OF SPLICES

Table 136 (continued)

Crimp Tools	Suppliers
BDHD1	Daniels
DV25L	Burndy
DV2L	Burndy
DV4L	Burndy
DV6L	Burndy
DV8L-1	Burndy
M8ND	Burndy
MR8-5	Burndy
N10HT	Burndy
N8CT	Burndy
PMTB-232	Daniels
ST2354-1	Boeing
ST2354-6	Boeing
ST2354B-2	Boeing
ST956C	Boeing
ST956D	Boeing
ST959-A	Boeing
WT130	Thomas & Betts
WT1300	Thomas & Betts
Y10MRF-5	Burndy
Y29B	Burndy
Y29BH	Burndy
Y29PL	Burndy
Y29PR	Burndy
Y8ND	Burndy
Y6NP	Burndy
Y641	Daniels

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B. Ferrule Crimp Tools

Table 137
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
44-000	Balmar
44-136	Balmar
44-137	Balmar
44-138	Balmar
44-139	Balmar
44-140	Balmar
44-141	Balmar
44-142	Balmar
44-143	Balmar
44-144	Balmar
44-145	Balmar
44-148	Balmar
44-149	Balmar
44-178	Balmar
4400	Thomas & Betts
4401	Thomas & Betts
4402	Thomas & Betts
4403	Thomas & Betts
4406	Thomas & Betts
4408	Thomas & Betts
4409	Thomas & Betts
4410	Thomas & Betts
4411	Thomas & Betts
4412	Thomas & Betts
4414	Thomas & Betts
4415	Thomas & Betts
4416	Thomas & Betts
4417	Thomas & Betts
4419	Thomas & Betts
5450	Thomas & Betts
5451	Thomas & Betts

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ASSEMBLY OF SPLICES

Table 137 (continued)

Crimp Tool	Supplier
5452	Thomas & Betts
5454	Thomas & Betts
5456	Thomas & Betts
5457	Thomas & Betts
612648	Buchanan
612661	Buchanan
612663	Buchanan
612675	Buchanan
612734	Buchanan
612739	Buchanan
612742	Buchanan
612746	Buchanan
612748	Buchanan
612763	Buchanan
612766	Buchanan
612776	Buchanan
612778	Buchanan
612807	Buchanan
612893	Buchanan
612899	Buchanan
612909	Buchanan
612969	Buchanan
612971	Buchanan
612973	Buchanan
612977	Buchanan
612981	Buchanan
612989	Buchanan
612992	Buchanan
613003	Buchanan
613005	Buchanan
613009	Buchanan
613011	Buchanan
613013	Buchanan

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ASSEMBLY OF SPLICES

Table 137 (continued)

Crimp Tool	Supplier
613214	Buchanan
613810	Buchanan
613812	Buchanan
613844	Buchanan
613846	Buchanan
613847	Buchanan
613848	Buchanan
613849	Buchanan
613850	Buchanan
613851	Buchanan
620175	Buchanan
620299	Buchanan
620300	Buchanan
620301	Buchanan
620304	Buchanan
620305	Buchanan
620306	Buchanan
620307	Buchanan
620308	Buchanan
620309	Buchanan
620310	Buchanan
620311	Buchanan
620314	Buchanan
620316	Buchanan
620467	Buchanan
HX-4	Daniels
M22520/5-01	QPL
M22520/5-19	QPL
M22520/5-21	QPL
M22520/5-23	QPL
M22520/5-33	QPL
M22520/5-35	QPL
M22520/5-37	QPL

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Table 137 (continued)

Crimp Tool	Supplier
M22520/5-39	QPL
M22520/5-41	QPL
M22520/5-43	QPL
M22520/5-45	QPL
M22520/5-47	QPL
M22520/5-53	QPL
M22520/5-61	QPL
ST2966M	Boeing
ST965-1	Boeing
ST965-12	Boeing
ST965-19	Boeing
ST965-2	Boeing
ST965-23	Boeing
ST965-29	Boeing
ST965-3	Boeing
ST965-4	Boeing
ST965-5	Boeing
ST965-6	Boeing
ST965-9	Boeing
ST965A-0	Boeing
ST965A-1	Boeing
ST965A-10	Boeing
ST965A-11	Boeing
ST965A-12	Boeing
ST965A-14	Boeing
ST965A-15	Boeing
ST965A-16	Boeing
ST965A-17	Boeing
ST965A-19	Boeing
ST965A-2	Boeing
ST965A-3	Boeing
ST965A-6	Boeing
ST965A-8	Boeing

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Table 137 (continued)

Crimp Tool	Supplier
ST965A-9	Boeing
ST965B	Boeing
ST965B-0	Boeing
ST965B-1	Boeing
ST965B-10	Boeing
ST965B-11	Boeing
ST965B-12	Boeing
ST965B-14	Boeing
ST965B-15	Boeing
ST965B-16	Boeing
ST965B-17	Boeing
ST965B-19	Boeing
ST965B-2	Boeing
ST965B-3	Boeing
ST965B-6	Boeing
ST965B-8	Boeing
ST965B-9	Boeing
WT200	Thomas & Betts
WT200-12	Thomas & Betts
WT201	Thomas & Betts
WT201-03-10	Thomas & Betts
WT202	Thomas & Betts
WT202-06-08	Thomas & Betts
WT203	Thomas & Betts
WT206	Thomas & Betts
WT208	Thomas & Betts
WT209	Thomas & Betts
WT210	Thomas & Betts
WT211	Thomas & Betts
WT211-14	Thomas & Betts
WT212	Thomas & Betts
WT214	Thomas & Betts
WT215	Thomas & Betts

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ASSEMBLY OF SPLICES

Table 137 (continued)

Crimp Tool	Supplier
WT215-16	Thomas & Betts
WT215-20	Thomas & Betts
WT216	Thomas & Betts
WT217	Thomas & Betts
WT217-18	Thomas & Betts
WT218	Thomas & Betts
WT219	Thomas & Betts
WT220	Thomas & Betts
WT221	Thomas & Betts
WT221-22	Thomas & Betts
WT222	Thomas & Betts
WT223	Thomas & Betts
WT229	Thomas & Betts
WT400	Thomas & Betts
WT401	Thomas & Betts
WT402	Thomas & Betts
WT403	Thomas & Betts
WT406	Thomas & Betts
WT408	Thomas & Betts
WT409	Thomas & Betts
WT410	Thomas & Betts
WT411	Thomas & Betts
WT412	Thomas & Betts
WT414	Thomas & Betts
WT415	Thomas & Betts
WT416	Thomas & Betts
WT417	Thomas & Betts
WT419	Thomas & Betts
WT440	Thomas & Betts
WT540	Thomas & Betts
Y136	Daniels
Y137	Daniels
Y138	Daniels

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ASSEMBLY OF SPLICES

Table 137 (continued)

Crimp Tool	Supplier
Y139	Daniels
Y140	Daniels
Y141	Daniels
Y142	Daniels
Y143	Daniels
Y144	Daniels
Y145	Daniels
Y148	Daniels
Y149	Daniels
Y178	Daniels

C. Shield-Kon Crimp Tools

Table 138
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
101A	Thomas & Betts
101B	Thomas & Betts
201C	Thomas & Betts
201D	Thomas & Betts
201E	Thomas & Betts
201F	Thomas & Betts
301H	Thomas & Betts
301G	Thomas & Betts
301J	Thomas & Betts
301H	Thomas & Betts
401K	Thomas & Betts
401L	Thomas & Betts
401M	Thomas & Betts
401N	Thomas & Betts
501P	Thomas & Betts
601Q	Thomas & Betts
13300	Thomas & Betts

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ASSEMBLY OF SPLICES

Table 138 (continued)

Crimp Tool	Supplier
M22520/5-01	QPL
HX4	Daniels
WT740	Thomas & Betts

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY AND REPAIR OF COPALUM SPLICES**

This Subject gives the procedures:

- To assemble a copalum splice with stranded aluminum and stranded copper wire
- To repair the insulation of a copalum splice
- To replace a copalum splice.

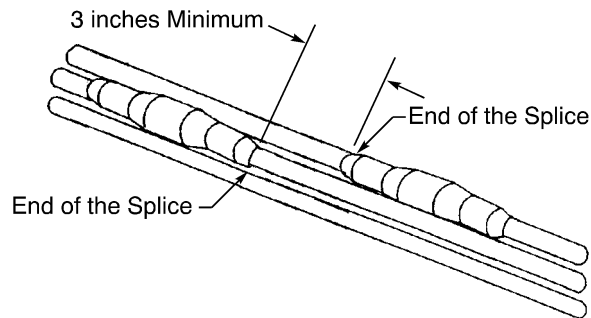
1. GENERAL DATA**A. General Conditions**

For the conditions that are applicable for the repair of wiring, refer to Subject 20-10-13.

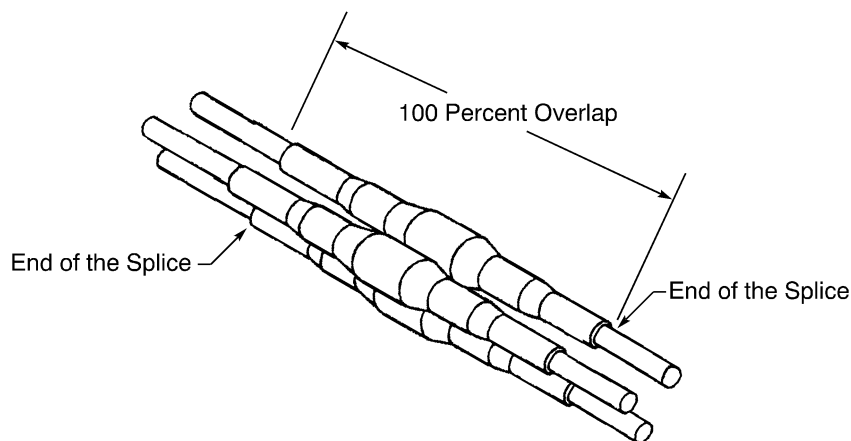
B. Configuration of Splices on Adjacent Power Feeder Wires

These conditions are applicable:

- If more than one splice in a power feeder harness is necessary, the recommended configuration is to install splices intervals along the longitudinal axis of the wire harness; refer to Figure 1
- If it is not possible to install the splices at intervals, the splices can make 100 percent overlap; refer to Figure 2.



CONFIGURATION OF SPLICES AT INTERVALS
Figure 1



CONFIGURATION OF SPLICES WITH A 100 PERCENT OVERLAP
Figure 2

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Refer to Subject 20-10-11 for the necessary conditions that are applicable for:

- The installation of a power feeder wire harness
- The installation of a power feeder wire harness with splices on adjacent wires.

2. SELECTION OF SPLICES

A. Selection of Standard Butt Splices

Standard butt splices can be used to attach:

- An aluminum wire to a aluminum wire
- A copper wire to a copper wire
- A copper wire to an aluminum wire.

**Table 1
PERMITTED WIRE COMBINATIONS FOR THE STANDARD BUTT SPLICES**

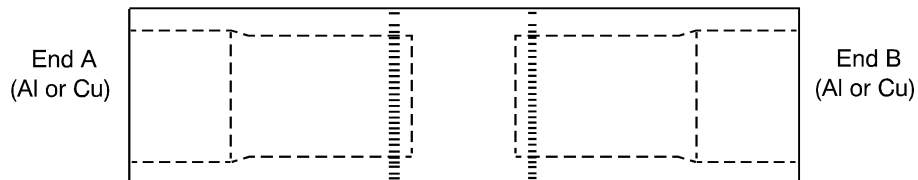
Standard Butt Splice	Wire Combination					
	First Wire		Second Wire		O.D. of the Wire Insulation (inch)	
	Size (AWG)	Type	Size (AWG)	Type	Minimum	Maximum
277156-1	10	Cu	10	Cu	0.182	0.200
	8	Al	10	Cu	0.182	0.200
			8	Al	0.182	0.200
277157-1	8	Cu	8	Cu	0.225	0.250
	6	Al	10	Cu	0.225	0.250
			8	Cu	0.225	0.250
			6	Al	0.225	0.250
277158-1	6	Cu	6	Cu	0.276	0.305
	4	Al	6	Cu	0.276	0.305
			4	Al	0.276	0.305
277159-1	4	Cu	4	Cu	0.340	0.380
	2	Cu	4	Cu	0.340	0.380
	2	Al	2	Al	0.340	0.380
			4	Cu	0.340	0.380
277160-1	2	Cu	2	Cu	0.425	0.470
	1	Al	2	Cu	0.425	0.470
	1/0	Al	2	Cu	0.425	0.470
			1/0	Al	0.425	0.470

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Table 1 (continued)

Standard Butt Splice	Wire Combination					
	First Wire		Second Wire		O.D. of the Wire Insulation (inch)	
	Size (AWG)	Type	Size (AWG)	Type	Minimum	Maximum
277161-1	1/0	Cu	1/0	Cu	0.500	0.550
	2/0	Al	2/0	Cu	0.500	0.550
			1/0	Cu	0.500	0.550
			2/0	Al	0.500	0.550
			1/0	Al	0.500	0.550
277162-1	2/0	Cu	2/0	Cu	0.520	0.645
	3/0	Cu	2/0	Cu	0.520	0.645
	3/0	Al	2/0	Cu	0.520	0.645
			3/0	Al	0.520	0.645



CONFIGURATION OF A STANDARD BUTT SPLICE
Figure 3

NOTE: The size of the wire barrel of standard butt splices is the same at each end.

Refer to Figure 3.

- (1) Find the size of each wire that must have a splice. Refer to the WDM.
- (2) Find the conductor material type of each wire that must have a splice. Refer to the WDM and Subject 20-00-13.
- (3) Make a selection of a splice from Table 1, with the first wire to be installed in either end of the splice and the second wire to be installed in the other end of the splice.

B. Selection of Transitional Butt Splices

Transitional butt splices can be used to attach:

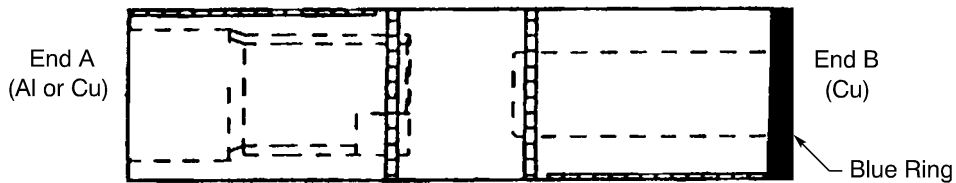
- An aluminum wire to a copper wire
- A larger copper wire to a smaller copper wire.

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Table 2
PERMITTED WIRE COMBINATIONS FOR THE TRANSITIONAL BUTT SPLICES

Transitional Splice	First Wire				Second Wire			
	Size (AWG)	Type	O.D. of the Wire Insulation (inch)		Size (AWG)	Type	O.D. of the Wire Insulation (inch)	
			Minimum	Maximum			Minimum	Maximum
277163-1	1/0	Cu	0.425	0.470	4	Cu	0.276	0.305
		Al	0.425	0.470	4	Cu	0.276	0.305
277164-1	4	Cu	0.276	0.305	8	Cu	0.210	0.255
		Al	0.276	0.305	8	Cu	0.210	0.255
277165-1	4	Cu	0.276	0.305	4	Cu	0.276	0.305
		Al	0.276	0.305	4	Cu	0.276	0.305
277168-1	3/0	Cu	0.520	0.645	1/0	Cu	0.430	0.495
		Al	0.520	0.645	1/0	Cu	0.430	0.495



CONFIGURATION OF A TRANSITIONAL BUTT SPLICE
Figure 4

Refer to Figure 4.

- (1) Find the size of each wire that must have a splice. Refer to the WDM.
- (2) Find the conductor material type of each wire that must have a splice. Refer to the WDM and Subject 20-00-13.

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(3) Make a selection of a splice from Table 2, with the first wire to be installed in End A and the second wire to be installed in End B.

NOTE: Transitional butt splices are designed to be assembled as follows:

- If one wire is aluminum and the other wire is copper, the end of the splice with the blue ring, End B, is for the copper wire
- If each wire is copper, the end of the splice with the larger wire barrel is for the larger copper wire.

3. PART NUMBERS AND DESCRIPTION

A. Copalum Splice Part Numbers

**Table 3
COPALUM SPLICE PART NUMBERS**

Splice	Mark on Splice	Type	Supplier
277156-1	AMP 8 AL - 10 CU	Standard Butt	AMP
277157-1	AMP 6 AL - 8 CU	Standard Butt	AMP
277158-1	AMP 4 AL - 6 CU	Standard Butt	AMP
277159-1	AMP 2 AL - 4 CU	Standard Butt	AMP
277160-1	AMP 1/0 AL - 2 CU	Standard Butt	AMP
277161-1	AMP 2/0 AL - 1/0 CU	Standard Butt	AMP
277162-1	AMP 3/0 AL - 2/0 CU	Standard Butt	AMP
277163-1	AMP 1/0 AL - 4 CU	Transitional Butt	AMP
277164-1	AMP 4 AL - 8 CU	Transitional Butt	AMP
277165-1	AMP 4 AL - 4 CU	Transitional Butt	AMP
277168-1	AMP 3/0 AL - 1/0 CU	Transitional Butt	AMP

**Table 4
OBSOLETE COPALUM SPLICE PART NUMBERS**

Obsolete Splice		Replacement Splice		
Part Number	Supplier	Part Number	Supplier	Notes
277050-1	AMP	277168-1	AMP	-
277027-1	AMP	277162-1	AMP	For all wire combinations but AWG 3/0 Aluminum wire to AWG 1/0 Copper wire
	AMP	277168-1	AMP	For AWG 3/0 Aluminum wire to AWG 1/0 Copper wire only
277082-1	AMP	277164-1	AMP	-
52522	AMP	277156-1	AMP	-
52523	AMP	277157-1	AMP	-
52524	AMP	277158-1	AMP	-

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Table 4 (continued)

Obsolete Splice		Replacement Splice		
Part Number	Supplier	Part Number	Supplier	Notes
52525	AMP	277159-1	AMP	-
52526	AMP	277160-1	AMP	-
52527	AMP	277161-1	AMP	-
53527-1	AMP	277165-1	AMP	-
53528-1	AMP	277163-1	AMP	-

4. ASSEMBLY OF COPALUM SPLICES

A. Necessary Materials

Table 5
NECESSARY MATERIALS

Material	Temperature Grade	Part Number	Description	Supplier
Release Agent	-	MS-122AD	-	Miller-Stephen~ son Chemical
		MS-122DF	-	Miller-Stephen~ son Chemical
		MS-122N/CO2	-	Miller-Stephen~ son Chemical
		MS-122SD	-	Miller-Stephen~ son Chemical
		MS-122V	-	Miller-Stephen~ son Chemical
		MS-122XD	-	Miller-Stephen~ son Chemical
Solvent	-	TT-I-735, Grade A or Grade B	Isopropyl Alcohol	An available source
		TT-N-95, Type II	Aliphatic Naptha	An available source
		TT-T-226	Lacquer Thinner	An available source
Sleeve, Heat Shrinkable	C	AMS-DTL-23053/10	Silicone	QPL
		RT-1140	Silicone	Raychem
	D	AMS-DTL-23053/12, Class 2	TFE, Standard Wall Thickness	QPL
		AMS-DTL-23053/12, Class 3	TFE, Thin Wall Thickness	QPL

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Table 5 (continued)

Material	Temperature Grade	Part Number	Description	Supplier
Tape, Insulation	D	Scotch 70	Silicone, Self-Bonding, 1 inch width	3M
		A-A-59163, Type 1	Silicone, Self-Bonding, 1 inch width	QPL
Tape, PTFE	D	P-421	PTFE, Silicone Adhesive, 1 inch width	Permacel
		SG26-03	PTFE, Silicone Adhesive, 1 inch width	Saint-Gobain Performance Plastics

**Table 6
COLD SHRINK SLEEVES**

Splice	Wire Size Combinations (AWG)	Cold Shrinkable Sleeve		
		Part Number	Quantity	Supplier
277157-1	6-8	8443-6.5	1	3M
277158-1	4-6	8443-6.5	1	3M
277159-1	2-4	8443-6.5	1	3M
277160-1	1/0-2	8445-7.5	1	3M
277161-1	2/0-1/0	8447-8	1	3M
277162-1	3/0-2/0	8447-8	1	3M
277163-1	4-1/0	8445-7.5	1	3M
277164-1	4-8	8443-6.5	1	3M
277165-1	4-4	8443-6.5	1	3M
277168-1	3/0-1/0	8447-8	1	3M

B. Wire Preparation - AMP 277156-1 and AMP 277157-1 Splices with AWG 10 Wire

**Table 7
INSULATION REMOVAL LENGTH**

Splice	Removal Length (inch)	
	Target	Tolerance
277156-1	0.44	± 0.03
277157-1	0.50	± 0.03

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- (1) Measure the O.D. of the wire insulation on each wire that must have a splice.
- (2) Make a selection of one of these splices:
 - A standard butt splice; refer to Paragraph 2.A.
 - A transitional butt splice; refer to Paragraph 2.B.

CAUTION: THE O.D. OF THE WIRE INSULATION IS VERY IMPORTANT. MAKE SURE THAT FOR THE SPECIFIED SPLICE IN TABLE 1 OR TABLE 2, THE O.D OF THE WIRE INSULATION IS NOT MORE THAN THE MAXIMUM O.D. SPECIFIED.

CAUTION: IF THE O.D. OF THE WIRE IS LESS THAN THE MINIMUM O.D SPECIFIED, THE O.D. OF THE INSULATION MUST BE INCREASED TO MAKE A SEAL IN THE SPLICE.

- (3) Make a selection of a heat shrinkable sleeve from Table 5.

NOTE: A satisfactory alternative is layers of self-bonding silicone tape that are applied after the splice is assembled. Refer to Paragraph 4.H.

- (4) Put a 1.5 inch length of 1/4 inch diameter sleeve on one wire.
- (5) Put a 1.5 inch length of 1/4 inch diameter sleeve on the other wire.
- (6) Put the 5 inch length of 1/2 inch diameter sleeve on a wire.
- (7) Remove the necessary length of the insulation from the end of each wire.

Refer to:

- Table 7
- Subject 20-00-15 for the insulation removal procedures.

Make sure that the end of each wire has not been crimped before.

- (8) If the O.D. of the wire insulation is less than the minimum O.D. specified in Table 1 or Table 2, increase the O.D. of the wire.

For the procedure to increase the O.D. of the wire insulation with:

- Layers of tape, refer to Paragraph 4.E.
- Heat shrinkable sleeves, refer to Paragraph 4.F.

C. Wire Preparation - AMP 277156-1 Splices with AWG 8 Wire

**Table 8
INSULATION REMOVAL LENGTH**

Splice	Removal Length (inch)	
	Target	Tolerance
277156-1	0.44	± 0.03

- (1) Measure the O.D. of the wire insulation on each wire that must have a splice.
- (2) Make a selection of one of these splices:
 - A standard butt splice; refer to Paragraph 2.A.
 - A transitional butt splice; refer to Paragraph 2.B.

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CAUTION: THE O.D. OF THE WIRE INSULATION IS VERY IMPORTANT. MAKE SURE THAT FOR THE SPECIFIED SPLICE IN TABLE 1 OR TABLE 2, THE O.D. OF THE WIRE INSULATION IS NOT MORE THAN THE MAXIMUM O.D. SPECIFIED.

CAUTION: IF THE O.D. OF THE WIRE IS LESS THAN THE MINIMUM O.D. SPECIFIED, THE O.D. OF THE INSULATION MUST BE INCREASED TO MAKE A SEAL IN THE SPLICE.

- (3) Remove the necessary length of the insulation from the end of each wire.

Refer to:

- Table 8
- Subject 20-00-15 for the insulation removal procedures.

Make sure that the end of each wire has not been crimped before.

- (4) If the O.D. of the wire insulation is less than the minimum O.D. specified in Table 1 or Table 2, increase the O.D. of the wire.

For the procedure to increase the O.D. of the wire insulation with:

- Layers of tape, refer to Paragraph 4.E.
- Heat shrinkable sleeves, refer to Paragraph 4.F.

D. Wire Preparation - Splices with other Wire Size Combinations

**Table 9
INSULATION REMOVAL LENGTH**

Splice	Removal Length (inch)	
	Target	Tolerance
277156-1	0.44	± 0.03
277157-1	0.50	± 0.03
277158-1	0.69	± 0.03
277159-1	0.75	± 0.03
277160-1	0.88	± 0.03
277161-1	1.00	± 0.03
277162-1	1.00	± 0.03
277163-1	1.00	± 0.03
277164-1	0.69	± 0.03
277165-1	0.69	± 0.03
277168-1	1.00	± 0.03

- (1) Measure the O.D. of the wire insulation on each wire that must have a splice.
- (2) Make a selection of one of these splices:
- A standard butt splice; refer to Paragraph 2.A.
 - A transitional butt splice; refer to Paragraph 2.B.

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CAUTION: THE O.D. OF THE WIRE INSULATION IS VERY IMPORTANT. MAKE SURE THAT FOR THE SPECIFIED SPLICE IN TABLE 1 OR TABLE 2, THE O.D. OF THE WIRE INSULATION IS NOT MORE THAN THE MAXIMUM O.D. SPECIFIED.

CAUTION: IF THE O.D. OF THE WIRE IS LESS THAN THE MINIMUM O.D. SPECIFIED, THE O.D. OF THE INSULATION MUST BE INCREASED TO MAKE A SEAL IN THE SPLICE.

- (3) Make a selection of a cold shrink sleeve from Table 6.

NOTE: A satisfactory alternative is a minimum of two layers of self-bonding silicone tape that are applied after the splice is assembled. Refer to Paragraph 4.J.

- (4) If a cold shrink sleeve is used, put the cold shrink sleeves on one end of the wire.
(5) Remove the necessary length of the insulation from the end of each wire.

Refer to:

- Table 9
- Subject 20-00-15 for the insulation removal procedures.

Make sure that the end of each wire has not been crimped before.

- (6) If the O.D. of the wire insulation is less than the minimum O.D. specified in Table 1 or Table 2, increase the O.D. of the wire.

For the procedure to increase the O.D. of the wire insulation with:

- Layers of tape, refer to Paragraph 4.E.
- Heat shrinkable sleeves, refer to Paragraph 4.F.

E. Increase of the O.D. of the Wire with Layers of Tape

This paragraph gives the procedure to increase the outer diameter of the wire insulation to make a seal in the crimp barrel of the splice if the outer diameter is less than the minimum diameter specified in Table 1 or Table 2.

- (1) Make a selection of a solvent from Table 5.
- (2) Make a selection of a TFE tape from Table 5.
- (3) With a clean wiper and solvent, clean the wire insulation a minimum of 2.5 inches from the end of the wire.
- (4) Dry the clean area with clean wiper.
- (5) Wind the necessary number of layers of tape on the wire insulation to make the O.D. of the wire between the minimum and the maximum O.D. of the wire.

Make sure that the layers of tape make a 100 percent overlap.

F. Increase of the O.D. of the Wire with Heat Shrinkable Sleeves

This paragraph gives the procedure to increase the outer diameter of the wire insulation to make a seal in the crimp barrel of the splice if the outer diameter is less than the minimum diameter specified in Table 1 or Table 2.

- (1) Make a selection of a solvent from Table 5.
- (2) Make a selection of a heat shrinkable sleeve from Table 5.
- (3) With a clean wiper and solvent, clean the wire insulation a minimum of 2.5 inches from the end of the wire.
- (4) Dry the clean area with clean wiper.

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- (5) Put a 1.25 inch length of heat shrinkable sleeve on the wire.
- (6) Push the heat shrinkable sleeve to the end of the wire until the forward end of the heat shrinkable sleeve is aligned with the end of the wire insulation.
- (7) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (8) Measure the O.D. of the wire.
- (9) If the diameter is less than the minimum diameter for the splice, do Step (5) through Step (8) again.

G. Splice Assembly

**Table 10
SPLICE CRIMP TOOLS**

Splice	Crimp Tool		
	Head	Die Set	Supplier
277156-1	58422-1	68006	AMP
	69066	68006	AMP
	PPFC-1H	68006	Daniels
277157-1	58422-1	68007	AMP
	69066	68007	AMP
	PPFC-1H	68007	Daniels
277158-1	58422-1	68008	AMP
	69066	68008	AMP
	PPFC-1H	68008	Daniels
277159-1	58422-1	68009	AMP
	69066	68009	AMP
	PPFC-1H	68009	Daniels
277160-1	58422-1	68010	AMP
	69066	68010	AMP
	PPFC-1H	68010	Daniels
277161-1	58422-1	68011-1	AMP
	69066	314964-1	AMP
	PPFC-1H	68011-1	Daniels
277162-1	58422-1	59877-1	AMP
277163-1	58422-1	68010	AMP
	69066	68010	AMP
	PPFC-1H	68010	Daniels

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Table 10 (continued)

Splice	Crimp Tool		
	Head	Die Set	Supplier
277164-1	58422-1	68008	AMP
	69066	68008	AMP
	PPFC-1H	68008	Daniels
277165-1	58422-1	68008	AMP
	69066	68008	AMP
	PPFC-1H	68008	Daniels
277168-1	58422-1	59877-1	AMP

Table 11

CRIMP TOOL POWER PUMPS

Power Pump	Supplier
122271-1	AMP
69120-()	AMP

Table 12

SATISFACTORY PRESSURES FOR THE OPERATION OF CRIMP HEADS

Crimp Head	Pressure (psi)	
	Minimum	Maximum
58422-1	8000	8400
69066	8000	8400
PPFC-1H	8500	9000

- (1) Make a selection of a splice crimp tool from Table 10.

CAUTION: COPALUM SPLICES MUST BE CRIMPED WITH THE SPECIFIED TOOLS FOR THE SPLICE. IF THE SPECIFIED TOOLS ARE NOT USED, UNSATISFACTORY PERFORMANCE OF THE SPLICE CAN OCCUR.

- (2) Make a selection of a power pump from Table 11.

Make sure that the power pump pressure is satisfactory for the crimp tool head. Refer to Table 12.

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CAUTION: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, DAMAGE TO THE CRIMP HEAD CAN OCCUR.

WARNING: IF THE PRESSURE OF THE POWER PUMP IS MORE THAN THE MAXIMUM PRESSURE PERMITTED FOR THE CRIMP TOOL HEAD, AN INJURY TO PERSONNEL CAN OCCUR.

NOTE: A satisfactory alternative is a power pump that can make a minimum pressure of 8000 PSI to a maximum pressure of 8400 PSI for AMP heads and minimum pressure of 8500 PSI to a maximum pressure of 9000 PSI for Daniels heads.

- (3) Make a selection of a release agent from Table 5.
- (4) Examine the crimp tool equipment.
 - (a) Do a check of the operation of the crimp tool and power pump as specified by the manufacturers instructions.
 - (b) Release the hydraulic pressure from the crimp head.
 - (c) Examine the crimp head for:
 - Contamination
 - Cracks
 - Damage
 - Worn parts
 - Leaks

Make sure that:

- The crimp head is clean
- The crimp head and crimp dies do not have damage
- The crimp tool equipment does not have worn parts

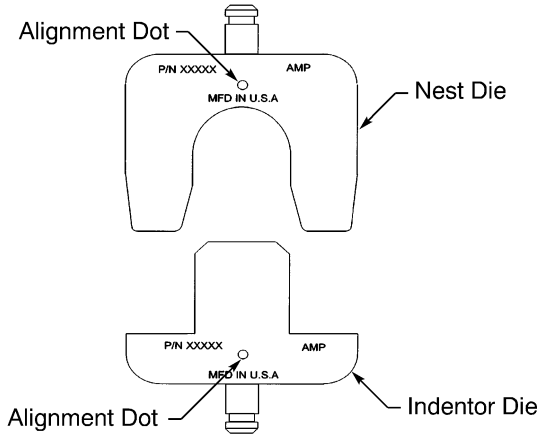
CAUTION: CRIMP TOOLS THAT HAVE DAMAGE, ARE DIRTY, OR HAVE WORN PARTS MUST NOT BE USED. UNSATISFACTORY PERFORMANCE OF THE SPLICE CAN OCCUR.

- (5) Examine the dies for the correct alignment in the crimp head.

Make sure that the alignment dot on the nest die and the alignment dot on the indenter die are on the same side of the crimp head.

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POSITION OF THE NEST DIE AND INDENTOR DIE

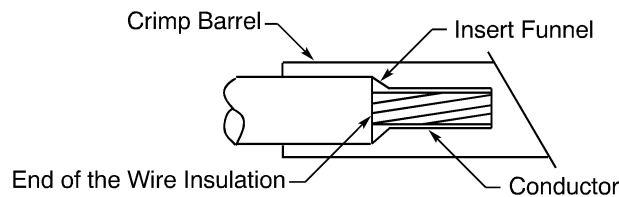
Figure 5

- (6) Put a small quantity of release agent on the crimp area of the dies.
- (7) Put the end of one of the wires in the crimp barrel of the splice. Refer to Figure 6.

Make sure that:

- If the end of the splice has a blue ring, the wire in that end of the splice is a copper wire
- All of the conductor strands are in the crimp barrel
- The end of the wire insulation is against the insert funnel.

CAUTION: DO NOT TURN THE WIRE DURING OR AFTER THE INSERTION OF THE WIRE INTO THE SPLICE.



POSITION OF THE WIRE IN THE COPALUM SPLICE

Figure 6

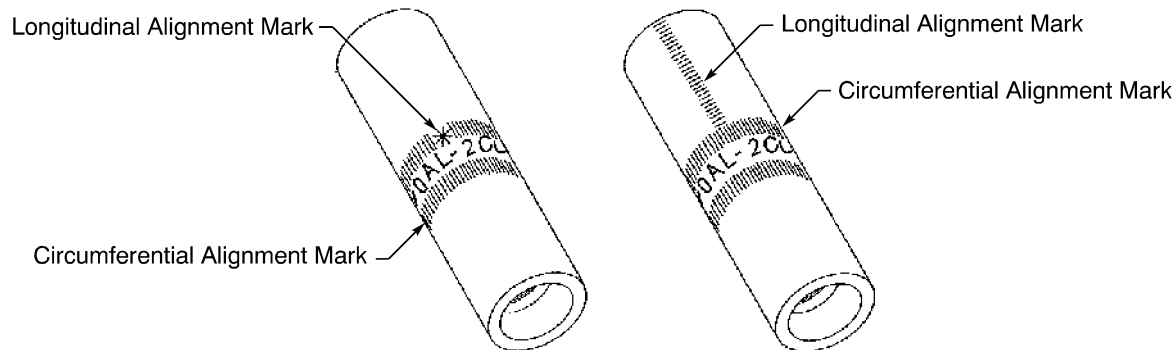
- (8) Put the wire and the splice in the crimp tool dies.
- (9) Align the splice in the die.

Refer to:

- Figure 7 for the location of the alignment marks on the splice
- Figure 8 for the front view of the position of the splice in the dies
- Figure 9 for the side view of the position of the splice in the dies.

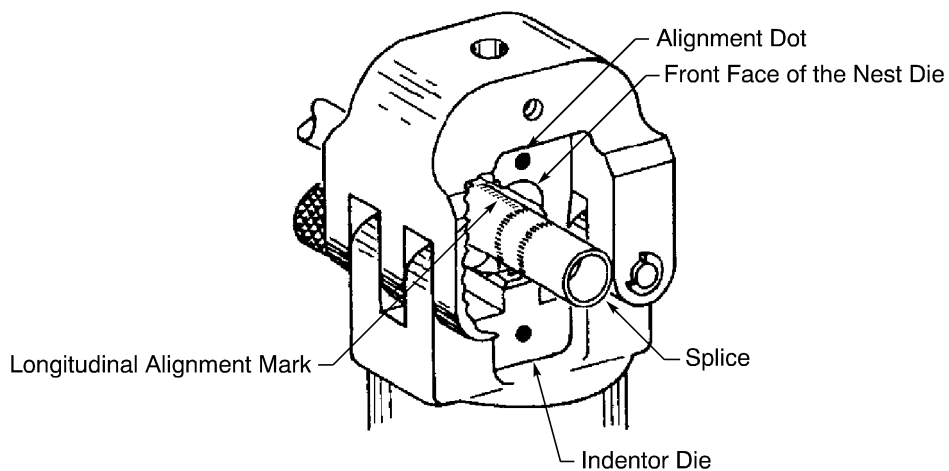
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES



LOCATION OF THE ALIGNMENT MARKS ON THE SPLICE

Figure 7

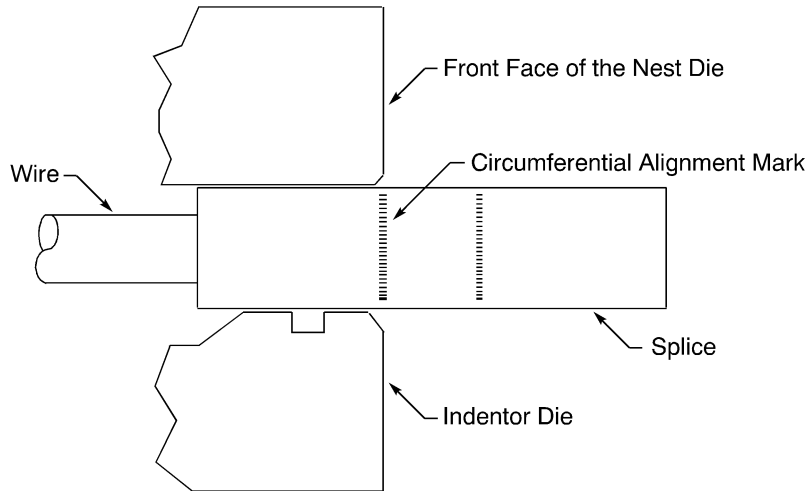


POSITION OF THE SPLICE IN THE CRIMP TOOL - FRONT VIEW

Figure 8

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES



POSITION OF THE SPLICE IN THE CRIMP TOOL - SIDE VIEW
Figure 9

- (a) Align the center of the circumferential splice crimp alignment mark with the edge of the nest die.
- (b) Align the longitudinal crimp alignment mark with the alignment dot on the nest die.
- (10) Crimp the splice.
 Make sure that the alignment of the splice in the die does not change.
- (11) Remove the splice from the crimp tool.
- (12) Remove all the flash and the sharp edges on the splice.
- (13) Examine the splice.

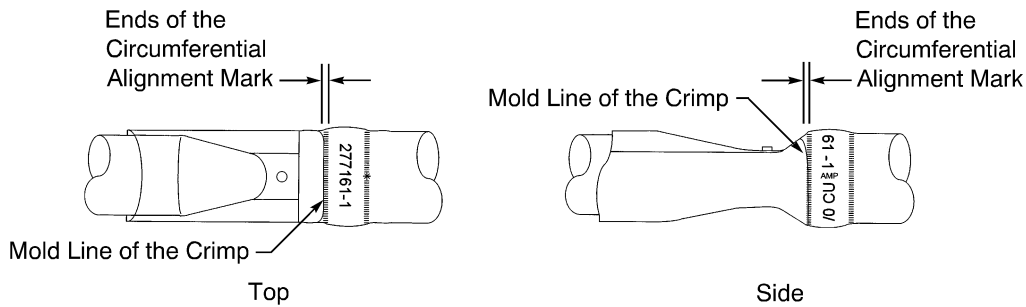
Make sure that:

- The edge of the mold line from the die is between the ends of the circumferential alignment mark on the splice; refer to Figure 10
- The side of the splice with the longitudinal alignment mark is opposite the side of the splice with the certification mark
- The certification mark can be seen in the bottom and the center of the crimp dent; refer to Figure 11
- The certification mark is a clearly formed, cylindrical button; refer to Figure 12
- If the indentor die has a symmetrical pap in the certification mark, the certification mark on the splice has a circular, symmetrical pap at the center of mark; refer to Figure 11.

NOTE: It is usual for some base metal to be seen in the crimp area. This is not a cause to reject the splice.

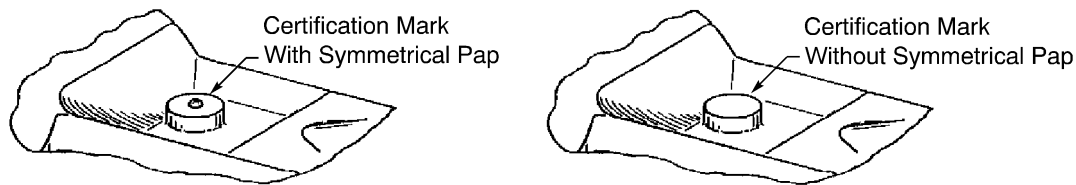
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ASSEMBLY AND REPAIR OF COPALUM SPLICES



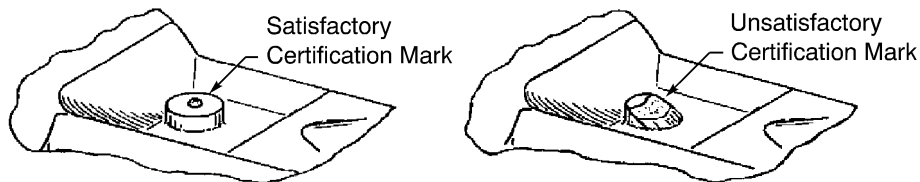
INSPECTION OF THE SPLICE ASSEMBLY

Figure 10



CERTIFICATION MARK

Figure 11



SATISFACTORY AND UNSATISFACTORY CERTIFICATION MARKS

Figure 12

- (14) Turn the splice assembly approximately 180 degrees longitudinally.
- (15) Put the end of the other wire in the empty crimp barrel of the splice. Refer to Figure 6.

Make sure that:

- If the end of the splice has a blue ring, the wire in that end of the splice is a copper wire
- All of the conductor strands are in the crimp barrel
- The end of the wire insulation is against the insert funnel.

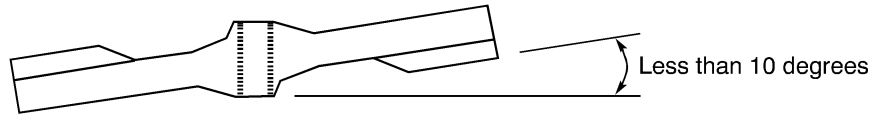
CAUTION: DO NOT TURN THE WIRE DURING OR AFTER THE INSERTION OF THE WIRE INTO THE SPLICE.

- (16) Do again Step (8) through Step (13) again for the other end of the splice.
- (17) Examine the angle of the splice. Refer to Figure 13.

Make sure the angle of the crimped end of the splice to the longitudinal axis is less than 10 degrees.

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ASSEMBLY AND REPAIR OF COPALUM SPLICES



CONFIGURATION OF THE SPLICE

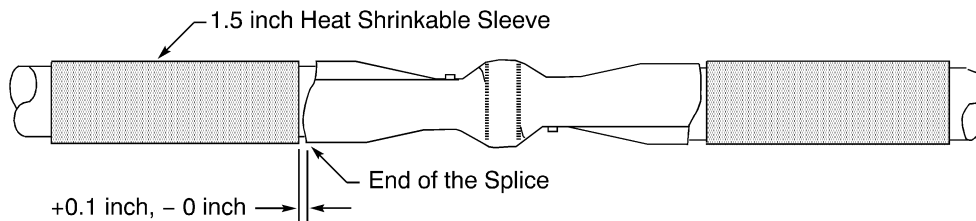
Figure 13

H. Insulation of the Splice - AMP 277156-1 and AMP 277157-1 Splices with AWG 10 Wire

- (1) Make a selection of a solvent from Table 5.
- (2) With a clean wiper and solvent, clean the splice and a minimum of two inches of the wire from each end of the splice.
- (3) Dry the cleaned area with a clean wiper.
- (4) If heat shrinkable sleeves are used for splice insulation, install the sleeves.
 - (a) On one of the wires, push the 1/4 inch diameter sleeve to the splice until the forward end of the sleeve is against the end of the splice. Refer to Figure 14.

Make sure that:

- The end of the sleeve is a maximum of 0.1 inch from the end of the splice.
- The sleeve does not make an overlap with the splice.

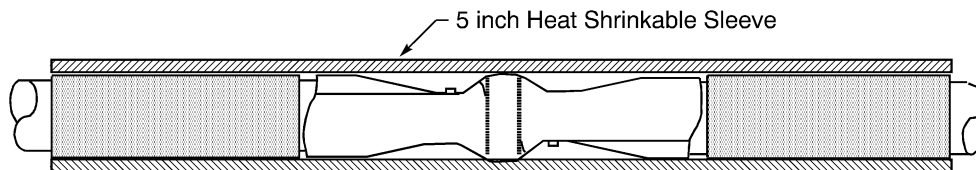


POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 14

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (c) On the other wire, push the 1/4 inch diameter sleeve to the splice until the forward end of the sleeve is against the end of the splice. Refer to Figure 14.

Make sure that the end of the sleeve is a maximum of 0.1 inch from the end of the splice.
- (d) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (e) Align the center of the 1/2 inch diameter sleeve with the center of the splice. Refer to Figure 15.



POSITION OF THE SLEEVES ON THE SPLICE ASSEMBLY

Figure 15

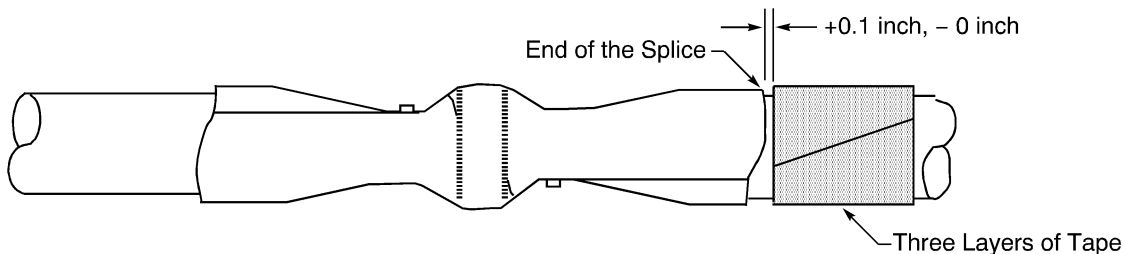
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES

- (f) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (5) If layers of tape will be used for the splice insulation, install the layers of tape.
 - (a) Make a selection of an insulation tape from Table 5.
 - (b) Wind three layers of tape on the wire insulation at one end of the splice. Refer to Figure 16.

Make sure that:

- The end of the layer of tape is a maximum of 0.1 inch from the end of the splice
- The layers of tape do not make an overlap with the splice
- The layers of tape have 100 percent overlap.

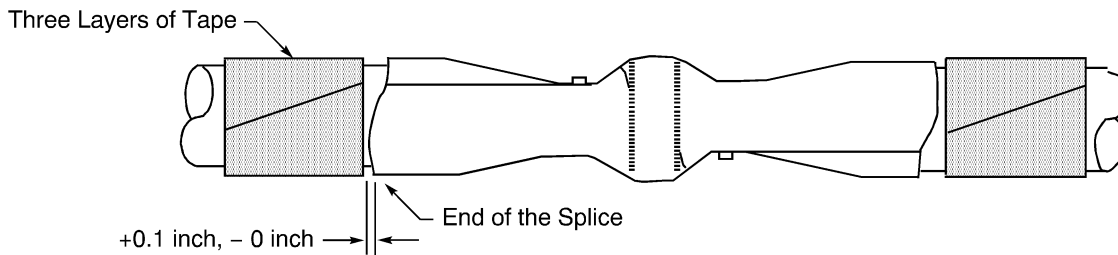


POSITION OF THE TAPE ON THE WIRE
Figure 16

- (c) Wind three layers of tape on the wire insulation at the other end of the splice. Refer to Figure 17.

Make sure that:

- The end of the layer of tape is a maximum of 0.1 inch from the end of the splice
- The layers of tape do not make an overlap with the splice
- The layers of tape have 100 percent overlap.



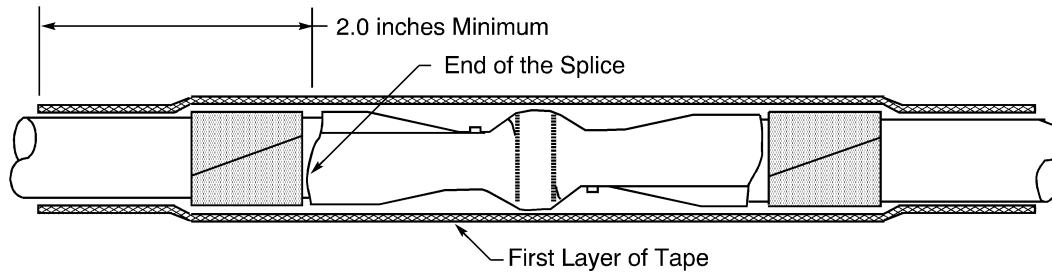
POSITION OF THE TAPE ON THE WIRE
Figure 17

- (d) Start the first layer of tape a minimum of 2 inches from the end of the splice.
- (e) Wind the tape on the splice and a minimum of 2 inches farther than the other end of the splice. Refer to Figure 18.

Make sure that each edge of the tape makes a 50 percent overlap with the tape below it.

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ASSEMBLY AND REPAIR OF COPALUM SPLICES

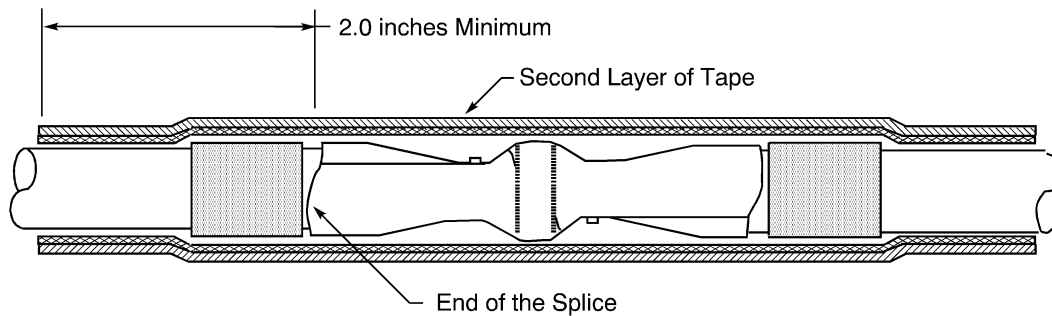


POSITION OF THE FIRST LAYER OF TAPE ON THE SPLICE ASSEMBLY
Figure 18

- (f) Start the second layer a tape where the first layer of tape ends.
- (g) Wind the tape on the first layer of tape in the direction of the start of the first layer of tape. Refer to Figure 19.

Make sure that:

- Each edge of the tape makes a 50 percent overlap with the tape below it
- The second layer of tape is wound in the opposite direction of the first layer of tape
- The second layer of tape stops where the first layer of tape starts.



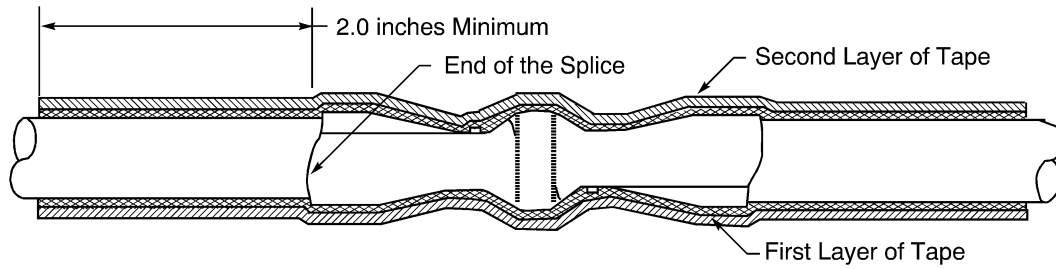
POSITION OF THE FIRST LAYER OF TAPE ON THE SPLICE ASSEMBLY
Figure 19

I. Insulation of the Splice - AMP 277156-1 Splices with AWG 8 Wire

- (1) Make a selection of an insulation tape from Table 5.
- (2) Make a selection of a solvent from Table 5.
- (3) With a clean wiper and solvent, clean the splice and a minimum of two inches of the wire from each end of the splice.
- (4) Dry the clean area with a clean wiper.
- (5) Wind two layers of tape on the splice. Refer to Figure 20.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES



CONFIGURATION OF THE SPLICE ASSEMBLY

Figure 20

- (a) Start the first layer of tape a minimum of 2 inches from the end of the splice.
- (b) Wind the tape on the splice and a minimum of 2 inches farther than the other end of the splice. Make sure that each edge of the tape makes a 50 percent overlap with the tape below it.
- (c) Start the second layer a tape where the first layer of tape stops.
- (d) Wind the tape on the first layer of tape in the direction of the start of the first layer of tape. Make sure that:
 - Each edge of the tape makes a 50 percent overlap with the tape below it
 - The second layer of tape is wound in the opposite direction of the first layer of tape
 - The second layer of tape stops where the first layer of tape starts.

J. Insulation of the Splice - Splices with other Wire Size Combinations

**Table 13
SPLICES THAT MUST HAVE LAYERS OF BUILDUP TAPE**

Splice	Wire Size (AWG)		Layers of Buildup Tape
	Splice End A	Splice End B	
277157-1	8	8	Three Layers
	8	6	Three Layers
	6	6	Three Layers
277158-1	6	6	Three Layers
	6	4	Three Layers
	4	4	-
277159-1	4	4	-
	4	2	Three Layers
	2	2	-
277160-1	2	2	-
	2	1/0	-
	1/0	1/0	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES

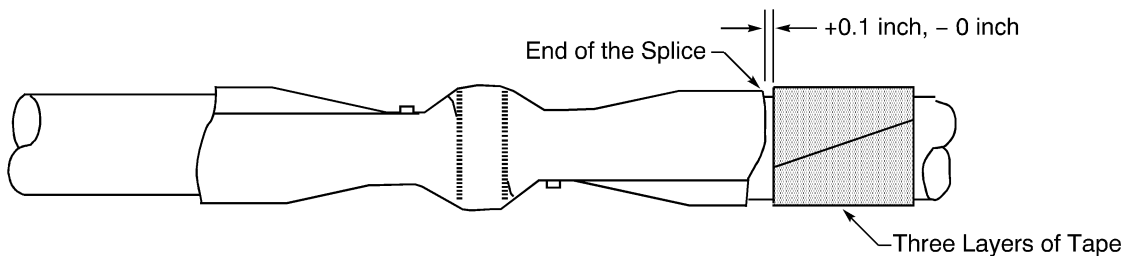
Table 13 (continued)

Splice	Wire Size (AWG)		Layers of Buildup Tape
	Splice End A	Splice End B	
277161-1	1/0	1/0	-
	1/0	2/0	-
	2/0	2/0	-
277162-1	2/0	2/0	-
	2/0	3/0	-
	3/0	3/0	-
277163-1	4	1/0	Three Layers
277164-1	4	8	Three Layers
277165-1	4	4	-
277168-1	3/0	1/0	-

- (1) Make a selection of a solvent from Table 5.
- (2) With a clean wiper and solvent, clean the splice and a minimum of two inches of the wire from each end of the splice.
- (3) Dry the clean area with a clean wiper.
- (4) Find if layers of tape are necessary to fill the area between the cold shrink sleeve and the wire insulation. Refer to Table 13.
- (5) If layers of buildup tape are necessary to fill the area between the cold shrink sleeve and the wire insulation, install a minimum of three layers of tape on the wire insulation.
 - (a) Make a selection of an insulation tape from Table 5.
 - (b) Wind three layers of tape on the wire insulation at one end of the splice. Refer to Figure 21.

Make sure that:

- The end of the layer of tape is a maximum of 0.1 inch from the end of the splice
- The layers of tape do not make an overlap with the splice
- The layers of tape have 100 percent overlap.



POSITION OF THE LAYERS OF TAPE ON THE WIRE

Figure 21

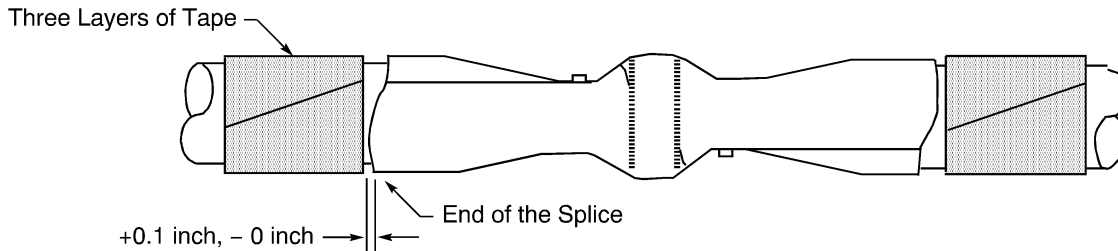
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES

- (c) Wind three layers of tape on the wire insulation at the other end of the splice. Refer to Figure 22.

Make sure that:

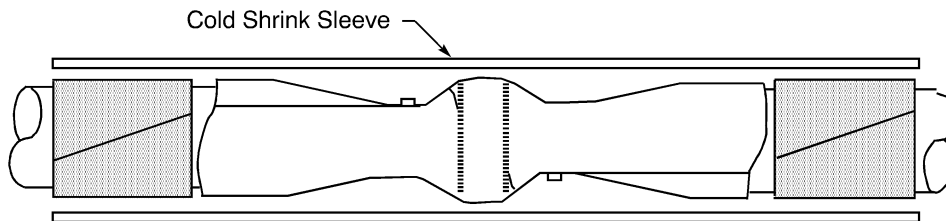
- The end of the layer of tape is a maximum of 0.1 inch from the end of the splice
- The layers of tape do not make an overlap with the splice
- The layers of tape have 100 percent overlap.



POSITION OF THE LAYERS OF TAPE ON THE WIRE
Figure 22

- (6) Install the cold shrink sleeve. Refer to Figure 23.

NOTE: If the specified cold shrink sleeve is not available, the a satisfactory alternative insulation is to install two layers of self-bonding silicone tape and wire harness ties. Refer to Step (7).



INSULATION OF THE SPLICE WITH A COLD SHRINKABLE SLEEVE
Figure 23

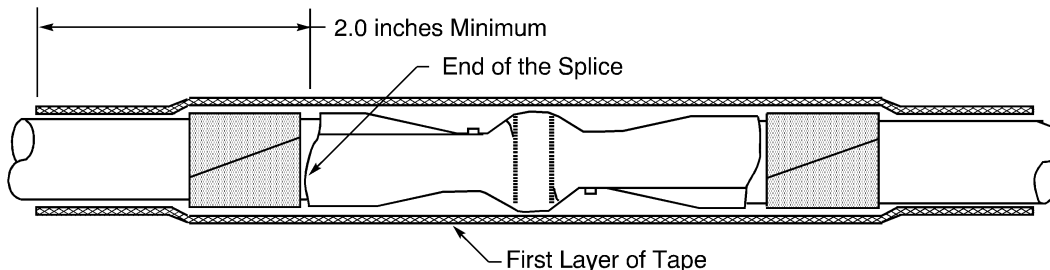
- (a) Align the center of the sleeve with the center of the splice.
 - (b) Hold the sleeve in its position.
 - (c) Pull the core of the sleeve in the direction that is parallel to the longitudinal axis of the sleeve until the core is fully removed.
 - (d) Examine the cold shrink sleeve for a tight fit on the splice.
 - (e) If the cold shrink sleeve does not make a tight fit, assemble a wire harness tie approximately 0.5 inch from each end of the sleeve.
- Refer to Subject 20-10-11 for the procedure to assemble a wire harness tie.
 Make sure that the lacing tape is a Temperature Grade D material.
- (7) If a cold shrink sleeve is not available:
- (a) Make a selection of a tape from Table 5.
 - (b) Start the first layer of tape a minimum of 2 inches from the end of the splice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES

- (c) Wind the tape on the splice and a minimum of 2 inches farther than the other end of the splice. Refer to Figure 24.

Make sure that each edge of the tape makes a 50 percent overlap with the tape below it.

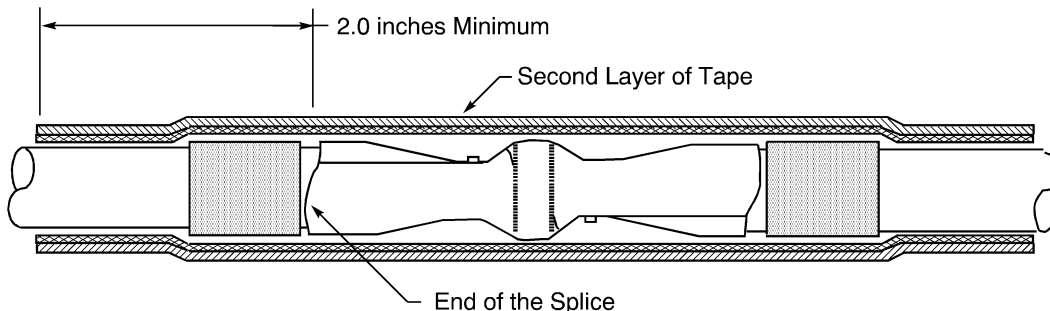


POSITION OF THE FIRST LAYER OF TAPE ON THE SPLICE ASSEMBLY
Figure 24

- (d) Start the second layer a tape where the first layer of tape ends.
(e) Wind the tape on the first layer of tape in the direction of the start of the first layer of tape. Refer to Figure 25.

Make sure that:

- Each each edge of the tape makes a 50 percent overlap with the tape below it
- The second layer of tape is wound in the opposite direction of the first layer of tape
- The second layer of tape stops where the first layer of tape starts.



POSITION OF THE FIRST LAYER OF TAPE ON THE SPLICE ASSEMBLY
Figure 25

5. REPAIR OF COPALUM SPLICES

A. Repair of the Insulation of a Splice Assembly

Table 14
NECESSARY MATERIALS

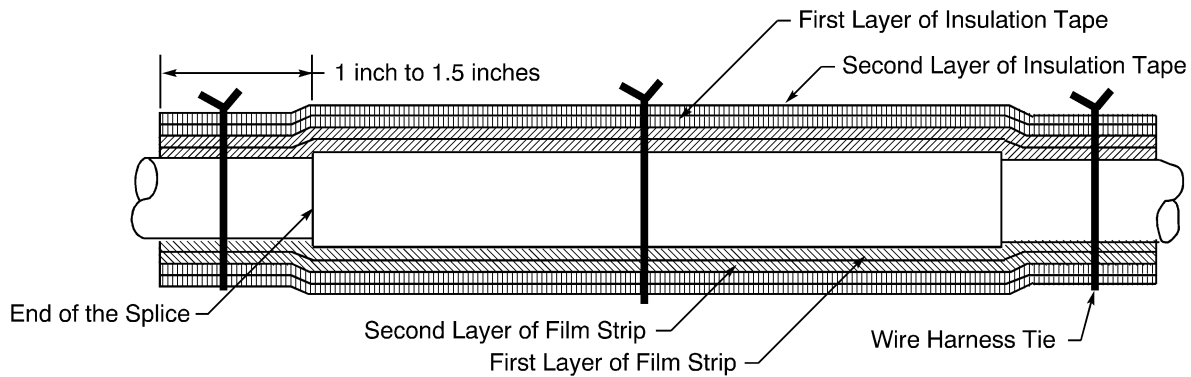
Material	Part Number or Specification	Description	Supplier
Film Strip	P-412	PTFE	Permacel
	Scotch 48	PTFE	3M

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY AND REPAIR OF COPALUM SPLICES

Table 14 (continued)

Material	Part Number or Specification	Description	Supplier
Solvent	TT-I-735	Isopropyl Alcohol	An available source
	TT-N-95	Aliphatic Naptha	An available source
Tape, Insulation	A-A-59474 Type 1	Self-Bonding Tape, Silicone	QPL
	P-421	Adhesive Tape, PTFE	Permacel
	Scotch 61	Adhesive Tape, PTFE	3M
	Scotch 70	Self-Bonding Tape, Silicone	3M



CONFIGURATION OF A SPLICE INSULATION REPAIR

Figure 26

Refer to Figure 26.

- (1) Make a selection of a solvent from Table 14.
- (2) Make a selection of these materials from Table 14:
 - A film strip
 - An insulation tape.
- (3) With a clean wiper and solvent, clean the splice assembly and the wire a minimum of 2 inches farther than the end of the splice.
- (4) Dry the cleaned area with a clean wiper.
- (5) Wind two layers of film strip on the splice assembly.
 - (a) Start the first layer of tape one inch to 1.5 inches from the end of the splice.
 - (b) Wind the tape on the splice 1 to 1.5 inches farther than the other end of the splice. Make sure that each edge of the tape makes a 50 percent overlap with the tape below it.
 - (c) Start the second layer of film strip where the first layer of film strip ends.
 - (d) Wind the tape on the first layer of tape in the direction of the start of the first layer of tape.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY AND REPAIR OF COPALUM SPLICES**

Make sure that:

- Each edge of the film strip makes a 50 percent overlap with the film strip below it
- The second layer of film strip is wound in the opposite direction of the first layer of film strip
- The second layer of film strip ends where the first layer of film strip starts.

(6) Wind two layers of insulation tape on the layers of film strip.

(a) Start the first layer of tape one inch to 1.5 inches from the end of the splice.

(b) Wind the tape on the splice 1 to 1.5 inches farther than the other end of the splice.

Make sure that each edge of the tape makes a 50 percent overlap with the tape below it.

(c) Start the second layer a tape where the first layer of tape ends.

(d) Wind the tape on the first layer of tape in the direction of the start of the first layer of tape.

Make sure that:

- Each edge of the tape makes a 50 percent overlap with the tape below it
- The second layer of tape is wound in the opposite direction of the first layer of tape
- The second layer of tape ends where the first layer of tape starts.

(7) Assemble three lacing tape wire harness ties on the layers of tape.

Refer to Subject 20-10-11 for the procedure to assemble a wire harness tie.

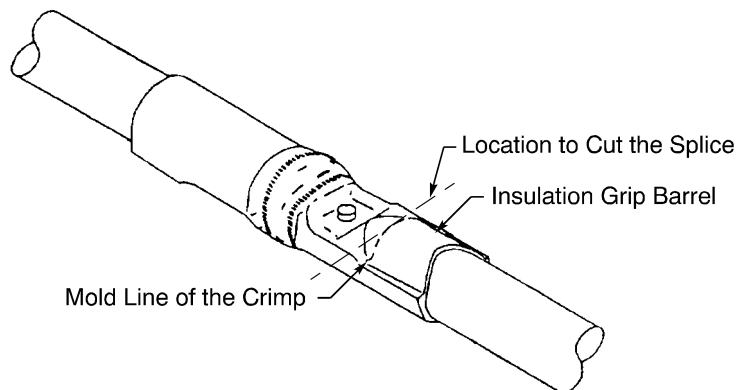
Make sure that:

- The lacing tape is Temperature Grade D material
- A wire harness tie is assembled at each end of the layers of tape
- A wire harness tie is assembled at the center of the layers of tape.

B. Splice Removal

(1) Remove the insulation sleeves or layers of insulation tape from the splice.

(2) Remove one end of the splice from the wire. Refer to Figure 27.



LOCATION TO CUT THE SPLICE
Figure 27

(a) Cut one end the splice with a saw at the mold line of the crimp next to the insulation grip barrel.

(b) Cut the remaining insulation grip barrel of the splice.

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ASSEMBLY AND REPAIR OF COPALUM SPLICES

CAUTION: MAKE SURE TO PREVENT DAMAGE TO:

- THE INDIVIDUAL STRANDS OF THE CONDUCTOR
- THE REMAINING WIRE INSULATION.

- (c) Remove the barrel from the wire.
- (3) Do Step (2) again for the other end of the splice.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS

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20-30-14 CONTENTS

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS

This Subject gives the procedures to assemble these terminals with aluminum or copper wire:

- AMP copalum terminals
- MS25435-() aluminum terminals
- Thomas & Betts aluminum terminals.

1. PART NUMBERS AND DESCRIPTION

A. Copalum Terminal Part Numbers

**Table 1
COPALUM TERMINAL PART NUMBERS**

Copper Wire Size (AWG)	Aluminum Wire Size (AWG)	Stud Size	Tongue Configuration	Terminal	
				Part Number	Supplier
10	8	10	Standard	277147-1	TYCO/AMP
			Narrow	277147-5	TYCO/AMP
		1/4	Standard	277147-3	TYCO/AMP
		5/16	Standard	277147-4	TYCO/AMP
8	6	8	Standard	277148-5	TYCO/AMP
		10	Standard	277148-1	TYCO/AMP
			Narrow	277154-1	TYCO/AMP
		1/4	Standard	277148-2	TYCO/AMP
			Narrow	277148-7	TYCO/AMP
			Two Stud Holes	55832-1	TYCO/AMP
		5/16	Standard	277148-3	TYCO/AMP
		3/8	Standard	277148-4	TYCO/AMP
Two Stud Holes	55832-2		TYCO/AMP		
6	4	8	Standard	277149-5	TYCO/AMP
		10	Standard	277149-1	TYCO/AMP
		1/4	Standard	277149-2	TYCO/AMP
			Two Stud Holes	55833-1	TYCO/AMP
			Two Stud Holes	55834-1	TYCO/AMP
		5/16	Standard	277149-3	TYCO/AMP
		3/8	Standard	277149-4	TYCO/AMP
			Two Stud Holes	55833-2	TYCO/AMP
			Two Stud Holes	55834-2	TYCO/AMP

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS

Table 1 (continued)

Copper Wire Size (AWG)	Aluminum Wire Size (AWG)	Stud Size	Tongue Configuration	Terminal	
				Part Number	Supplier
4	2	1/4	Standard	277150-1	TYCO/AMP
			Narrow	227155-1	TYCO/AMP
			Two Stud Holes	55835-1	TYCO/AMP
			Two Stud Holes	55836-1	TYCO/AMP
		5/16	Standard	277150-2	TYCO/AMP
		3/8	Standard	277150-3	TYCO/AMP
			Two Stud Holes	55835-2	TYCO/AMP
			Two Stud Holes	55836-2	TYCO/AMP
		2	1/0	1/4	Short
1/4	Long			277151-5	TYCO/AMP
3/8	Short			277151-1	TYCO/AMP
3/8	Long			277151-2	TYCO/AMP
3/8	Two Stud Holes			55837-1	TYCO/AMP
3/8	Two Stud Holes			55838-1	TYCO/AMP
1/2	Short			277151-5	TYCO/AMP
	Long			277151-6	TYCO/AMP
	Modified 277151-5			280U0021	Boeing
1/0	2/0	5/16	Standard	277152-3	TYCO/AMP
		3/8	Short	277152-2	TYCO/AMP
			Long	277152-4	TYCO/AMP
			Two Stud Holes	55839-1	TYCO/AMP
		1/2	Long	277152-5	TYCO/AMP
2/0	3/0	3/8	Standard	277153-1	TYCO/AMP
			Two Stud Holes	55840-1	TYCO/AMP
3/0	4/0	3/8	Standard	55995-1	TYCO/AMP

**Table 2
SUPERSEDED COPALUM TERMINAL PART NUMBERS**

Superseded Terminal		Copalum Terminal
Part Number	Supplier	
1-52521-0	TYCO/AMP	277152-4
1-52521-1	TYCO/AMP	277152-5

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS

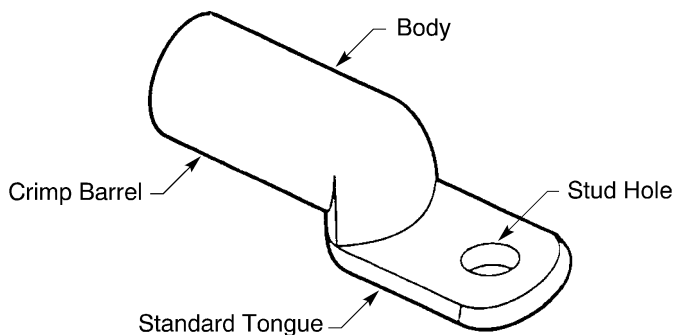
Table 2 (continued)

Superseded Terminal		Copalum Terminal
Part Number	Supplier	
277028-2	TYCO/AMP	277153-1
52516	TYCO/AMP	277147-1
52517	TYCO/AMP	277148-5
52517-1	TYCO/AMP	277148-1
52517-2	TYCO/AMP	277148-2
52517-3	TYCO/AMP	277148-3
52517-4	TYCO/AMP	277148-4
52518	TYCO/AMP	277149-1
52518-1	TYCO/AMP	277149-2
52518-2	TYCO/AMP	277149-3
52518-3	TYCO/AMP	277149-4
52518-4	TYCO/AMP	277149-5
52519	TYCO/AMP	277150-1
52519-1	TYCO/AMP	277150-2
52519-2	TYCO/AMP	277150-3
52520	TYCO/AMP	277151-3
52520-1	TYCO/AMP	277151-1
52520-2	TYCO/AMP	277151-4
52520-3	TYCO/AMP	277151-5
52520-4	TYCO/AMP	277151-2
52520-5	TYCO/AMP	277151-6
52521-7	TYCO/AMP	277152-2
52521-9	TYCO/AMP	277152-3
52834-1	TYCO/AMP	277154-1

20-30-14

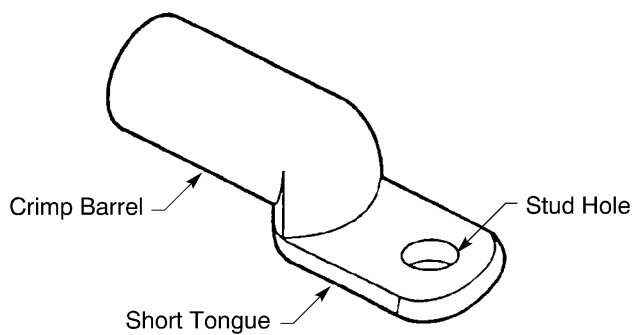
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS



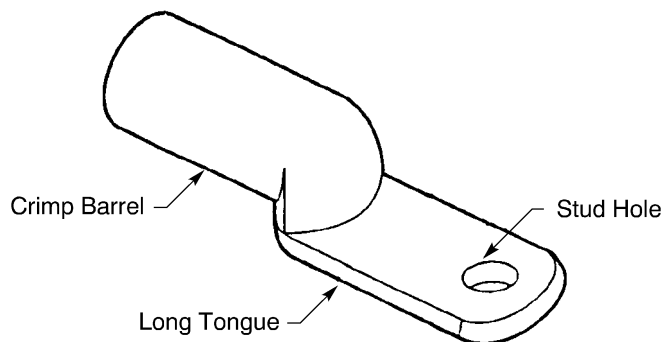
TYCO/AMP COPALUM STANDARD TERMINAL

Figure 1



TYCO/AMP COPALUM TERMINAL WITH A SHORT TONGUE

Figure 2

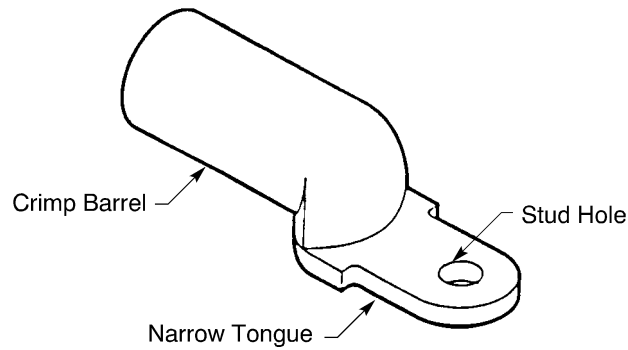


TYCO/AMP COPALUM TERMINAL WITH A LONG TONGUE

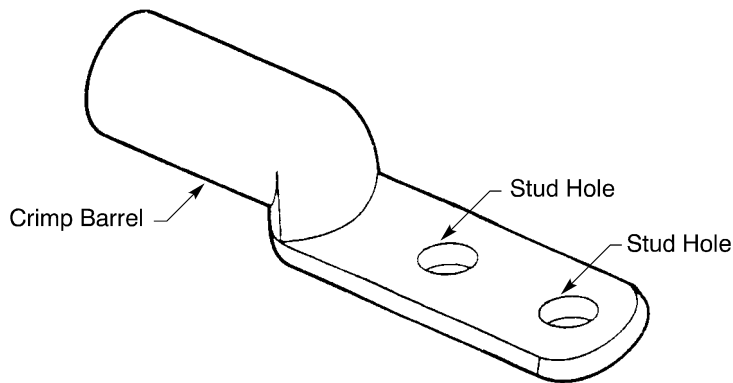
Figure 3

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS



TYCO/AMP COPALUM TERMINAL WITH A NARROW TONGUE
Figure 4



TYCO/AMP COPALUM TERMINAL WITH TWO STUD HOLES
Figure 5

B. Aluminum Terminal Part Numbers

NOTE: To replace the MS25435-() and the Thomas & Betts aluminum terminals, the TYCO/AMP copalum terminals are recommended.

Table 3
ALUMINUM TERMINAL PART NUMBERS

Wire Size (AWG)	Stud Size	Aluminum Terminal		Replacement Terminal	
		Part Number	Supplier	Part Number	Supplier
6	5/16	MS25435-7	QPL	277148-3	TYCO/AMP
		65007	Thomas & Betts		
4	5/16	MS25435-11	QPL	277149-3	TYCO/AMP
		65011	Thomas & Betts		
1	3/8	60124	Thomas & Betts	277151-1	TYCO/AMP

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS

2. TERMINAL ASSEMBLY

A. Wire Preparation

**Table 4
JACKET AND INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Removal Length		
	Dimension	Minimum (inch)	Maximum (inch)
8	A	0.94	1.06
	B	0.41	0.47
6	A	0.94	1.06
	B	0.47	0.53
4	A	0.94	1.06
	B	0.66	0.72
2	A	1.32	1.44
	B	0.72	0.78
1/0	A	1.32	1.44
	B	0.97	1.03
2/0	A	1.32	1.44
	B	0.97	1.03
3/0	A	1.32	1.44
	B	0.97	1.03
4/0	A	1.34	1.40
	B	0.97	1.03

**Table 5
3M COLD SHRINKABLE SLEEVES**

Wire Size (AWG)	Cold Shrinkable Sleeve		Special Instructions
	Part Number	Supplier	
6	8443-2.0	3M	3 layers of tape are necessary before the cold shrinkable sleeve is installed
4	8443-3.0	3M	-
2	8445-2.5	3M	-
2/0	8447-3.2	3M	-
3/0	8447-3.2	3M	-
4/0	8447-3.2	3M	-

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS**

- (1) Make a selection of one of these types of insulation sleeves:
 - A heat shrinkable sleeve
 - A cold shrinkable sleeve.

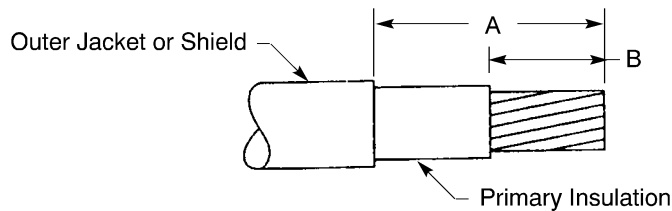
NOTE: A heat gun is necessary to install a heat shrinkable sleeve.

- (2) If the selection is a heat shrinkable sleeve:
 - (a) Cut a length of a Raychem PD or Remtek MWSF heat shrinkable sleeve that is equal to the length of the crimp area of the terminal plus 0.5 inch.
Make sure that the sleeve has the smallest diameter that can move over the terminal and the wire.
 - (b) Put the sleeve on the wire.
- (3) If the selection is a cold shrinkable sleeve:
 - (a) Make a selection of a cold shrinkable sleeve from Table 5.

NOTE: If the wire size is not given in Table 5, a heat shrinkable sleeve must be used. Refer to Step (2).

NOTE: The number after the dash in the part number is the length of the sleeve after the sleeve is installed.

- (b) Put the sleeve on the wire.
- (4) Prepare the wire. Refer to Table 4 and Figure 6.



WIRE PREPARATION
Figure 6

- (a) If the wire has an outer jacket or shield, remove the necessary length of the jacket or shield so that the distance from the end of the jacket or shield to the end of the wire is dimension A. Refer to Subject 20-00-15.
- (b) Remove the necessary length of the primary insulation so that the distance from the end of the insulation to the end of the wire is dimension B. Refer to Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS

B. Terminal Assembly

**Table 6
COPALUM TERMINAL CRIMP TOOLS**

Copper Wire Size (AWG)	Aluminum Wire Size (AWG)	Crimp Tool		
		Basic Unit	Head	Die Set
10	8	122271-1	69066	68006
			58422-1	68006
		69120	69066	68006
			58422-1	68006
8	6	122271-1	69066	68007
			58422-1	68007
		69120	69066	68007
			58422-1	68007
6	4	122271-1	69066	68008
			58422-1	68008
		69120	69066	68008
			58422-1	68008
4	2	122271-1	69066	68009
			58422-1	68009
		69120	69066	68009
			58422-1	68009
2	1/0	122271-1	69066	68010
			58422-1	68010
		69120	69066	68010
			58422-1	68010
1/0	2/0	69120	58422-1	68011-1
2/0	3/0	69120	58422-1	59877-1
3/0	4/0	69120	58422-1	314948-1

**Table 7
NECESSARY MATERIALS**

Material	Description	Part Number	Supplier
Tape, Insulation	1.0 inch wide	Scotch 70	3M
		A-A-59163	QPL

(1) Make a selection of a terminal from Table 1 or Table 3.

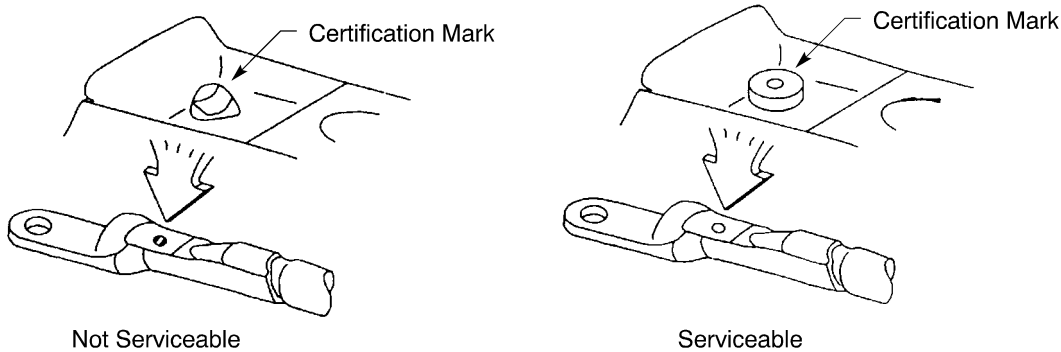
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS

- (2) Make a selection of a crimp tool from Table 6.
- (3) Put the wire in the crimp barrel of the terminal so that the end of the wire is against the bottom of the crimp barrel.
- (4) Crimp the terminal. Refer to Figure 7 and Figure 8.

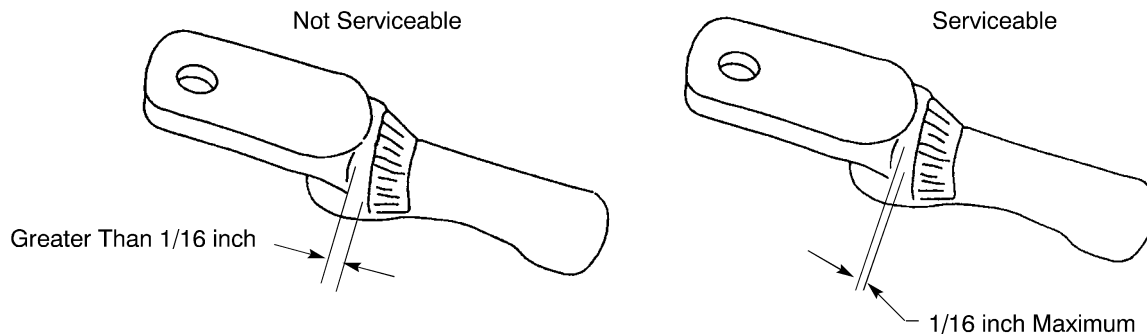
Make sure that the crimp certification mark:

- Is in the correct position
- Has the correct shape.



TOP VIEW OF THE CRIMP CERTIFICATION MARKS

Figure 7



BOTTOM VIEW OF THE CRIMP CERTIFICATION MARKS

Figure 8

- (5) Remove any sharp edges from the terminal.

NOTE: The condition where the base metal of the terminal can be seen:

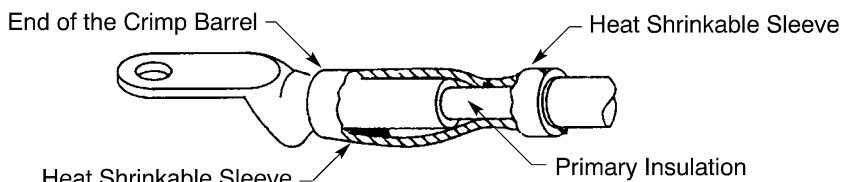
- Is not recommended
- Is permitted.

- (6) If the insulation is a heat shrinkable sleeve:

- (a) Push the sleeve over the end of the insulation so that the sleeve makes an overlap with the crimp barrel of the terminal. Refer to Figure 9.

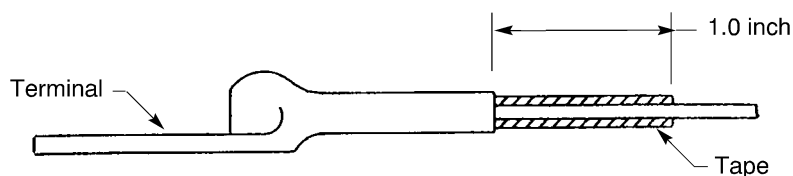
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE TERMINAL AND THE WIRE
Figure 9

- (b) Shrink the sleeve in position. Refer to Subject 20-10-14.
- (7) If the insulation is a cold shrink sleeve:
 - (a) For AWG 6 wire, make a selection of an insulating tape from Table 7.



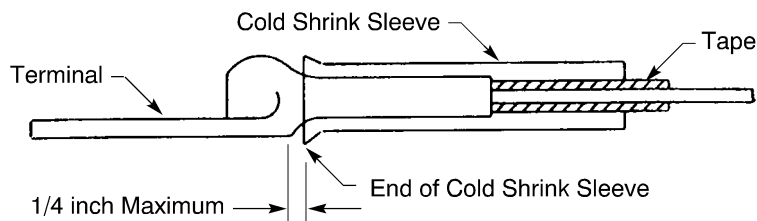
POSITION OF THE LAYERS OF TAPE ON THE WIRE
Figure 10

- (b) Put 3 layers of insulating tape on the wire so that:
 - One end of the tape is aligned with the rear end of the crimp barrel
 - The other end of the tape is 1 inch from the rear end of the crimp barrel.

Refer to Figure 10.

Make sure that:

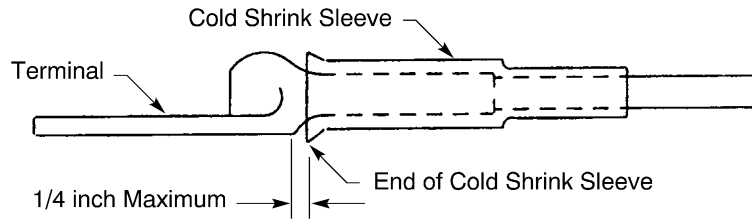
- The tape is not tightened more than necessary
- The contour of the wire is visible under the tape.
- (c) Push the cold shrink sleeve toward the terminal until the end of the sleeve is aligned with the end of the crimp barrel. Refer to Figure 11 and Figure 12.



POSITION OF THE COLD SHRINK SLEEVE AND THE TAPE ON THE TERMINAL ASSEMBLY
Figure 11

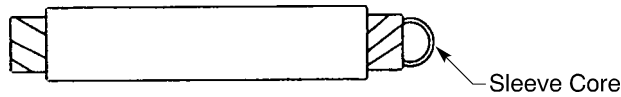
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COPALUM AND ALUMINUM TERMINALS



POSITION OF THE COLD SHRINK SLEEVE ON THE TERMINAL ASSEMBLY
Figure 12

- (d) Hold the sleeve in position.
- (e) Pull the sleeve core out from the rear end of the sleeve. Refer to Figure 13.



LOCATION OF THE SLEEVE CORE
Figure 13

3. APPROVED TOOL SUPPLIERS

A. Crimp Tools

Table 8
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
122271-1	TYCO/AMP
58422-1	TYCO/AMP
59877-1	TYCO/AMP
68006	TYCO/AMP
68007	TYCO/AMP
68008	TYCO/AMP
68009	TYCO/AMP
68010	TYCO/AMP
68011-1	TYCO/AMP
69066	TYCO/AMP
69120	TYCO/AMP
314948-1	TYCO/AMP



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP FASTON TERMINALS

<u>Paragraph</u>		<u>Page</u>
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	B. Terminal Housings	1
2.	<u>FASTON TERMINAL ASSEMBLY</u>	1
	A. Terminal Assembly	1
	B. Terminal Insulation	5

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP FASTON TERMINALS

1. PART NUMBERS AND DESCRIPTION

A. Terminals

**Table 1
FASTON TERMINALS**

Terminal	Tab Width (inch)	Supplier
41729	0.250	AMP
42628-2	0.250	AMP
42640-2	0.250	AMP
42888-1	0.205	AMP
61048-1	0.110	AMP
61048-2	0.110	AMP
61873-1	0.250	AMP
640903-1	0.250	AMP
640909-1	0.205	AMP
641877-1	0.110	AMP

B. Terminal Housings

**Table 2
FASTON TERMINAL HOUSINGS**

Faston Terminal	Terminal Housing		PSU System
	Part Number	Supplier	
61873-1	1-480416-0	AMP	Passenger Information Signal Section
42640-2	1-480416-3	AMP	Speaker Terminal Blue Wire
42640-2	1-480416-4	AMP	Speaker Terminal Red Wire

2. FASTON TERMINAL ASSEMBLY

A. Terminal Assembly

**Table 3
INSULATION REMOVAL LENGTH**

Faston Terminal	Wire Size (AWG)	Removal Length L (inch)	
		Target	Tolerance
41729	16	1/4	± 1/32

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP FASTON TERMINALS

Table 3 (continued)

Faston Terminal	Wire Size (AWG)	Removal Length L (inch)	
		Target	Tolerance
42628-2	24	1/2	± 1/32
	22	1/2	± 1/32
	20	1/4	± 1/32
	18	1/4	± 1/32
42640-2	24	1/4	± 1/32
	22	1/4	± 1/32
42888-1	24	1/2	± 1/32
	22	1/2	± 1/32
	20	1/4	± 1/32
	18	1/4	± 1/32
61048-1	22	3/16	± 1/32
	20	3/16	± 1/32
	18	3/16	± 1/32
61048-2	22	3/16	± 1/32
	20	3/16	± 1/32
	18	3/16	± 1/32
61873-1	16	1/4	± 1/32
640903-1	22	1/2	± 1/32
	20	1/4	± 1/32
	18	1/4	± 1/32
640909-1	22	1/2	± 1/32
	20	1/4	± 1/32
	18	1/4	± 1/32
641877-1	16	3/16	± 1/32

**Table 4
FASTON TERMINAL CRIMP TOOLS**

Terminal	Wire Size (AWG)	Crimp Tool			Special Instructions
		Basic Unit	Position	Supplier	
41729	16	90165-1	-	AMP	-

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ASSEMBLY OF AMP FASTON TERMINALS

Table 4 (continued)

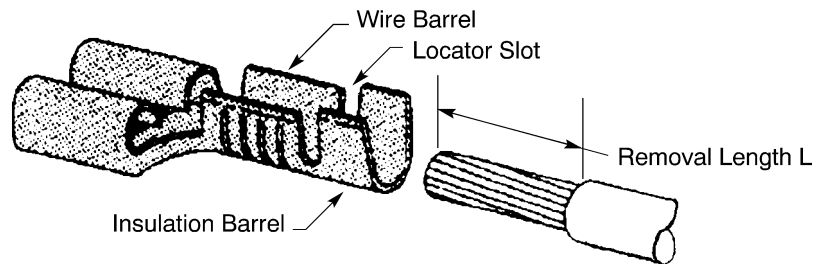
Terminal	Wire Size (AWG)	Crimp Tool			Special Instructions
		Basic Unit	Position	Supplier	
42628-2	24	59250	-	AMP	Fold the Conductor Back
		59824-1	-	AMP	Fold the Conductor Back
	22	59250	-	AMP	Fold the Conductor Back
		59824-1	-	AMP	Fold the Conductor Back
	20	59250	-	AMP	-
		59824-1	-	AMP	-
	18	59250	-	AMP	-
		59824-1	-	AMP	-
42640-2	24	90116-1	1	AMP	-
		90166-1	-	AMP	-
	22	90116-1	1	AMP	-
		90166-1	-	AMP	-
42888-1	24	59250	-	AMP	Fold the Conductor Back
		59824-1	-	AMP	Fold the Conductor Back
	22	59250	-	AMP	Fold the Conductor Back
		59824-1	-	AMP	Fold the Conductor Back
	20	59250	-	AMP	-
		59824-1	-	AMP	-
	18	59250	-	AMP	-
		59824-1	-	AMP	-
61048-1	22	59275	-	AMP	Increase the Wire Diameter
		90185-1	-	AMP	Increase the Wire Diameter
	20	59275	-	AMP	Increase the Wire Diameter
		90185-1	-	AMP	Increase the Wire Diameter
	18	59275	-	AMP	-
		90185-1	-	AMP	-
61048-2	22	59275	-	AMP	Increase the Wire Diameter
		90185-1	-	AMP	Increase the Wire Diameter
	20	59275	-	AMP	Increase the Wire Diameter
		90185-1	-	AMP	Increase the Wire Diameter
	18	59275	-	AMP	-
		90185-1	-	AMP	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP FASTON TERMINALS

Table 4 (continued)

Terminal	Wire Size (AWG)	Crimp Tool			Special Instructions
		Basic Unit	Position	Supplier	
61873-1	16	90226-1	3	AMP	-
640903-1	22	59250	-	AMP	Fold the Conductor Back
		59824-1	-	AMP	Fold the Conductor Back
	20	59250	-	AMP	-
		59824-1	-	AMP	-
	18	59250	-	AMP	-
		59824-1	-	AMP	-
640909-1	22	59250	-	AMP	Fold the Conductor Back
		59824-1	-	AMP	Fold the Conductor Back
	20	59250	-	AMP	-
		59824-1	-	AMP	-
	18	59250	-	AMP	-
		59824-1	-	AMP	-
641877-1	16	90009-9	3	AMP	-



USUAL FASTON TERMINAL
Figure 1

- (1) Remove the necessary length of insulation from the end of the wire. Refer to Table 3 and Figure 1.
- (2) If it is specified, fold the wire back. Refer to Table 4 and Figure 2.



CONDUCTOR FOLDED BACK
Figure 2

- (3) If it is specified, increase the diameter of the wire. Refer to Table 4 and Subject 20-30-22.
- (4) Make a selection of a crimp tool from Table 4.

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMP FASTON TERMINALS**

- (5) Put the terminal in the crimp tool.
- (6) Lightly apply pressure to hold the terminal in the tool.
Make sure that the shape of these parts of the terminal are not changed:
 - The insulation barrel
 - The wire barrel.
- (7) Put the wire in the terminal so that:
 - The end of the wire is aligned with the forward end of the wire barrel
 - The end of the insulation is aligned with the forward end of the insulation barrel.

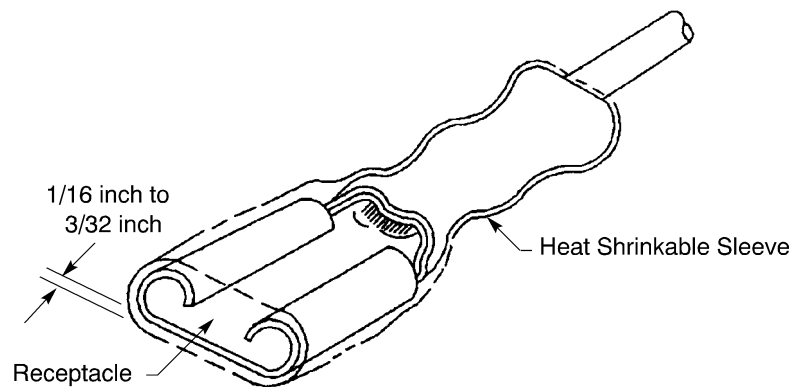
Refer to Figure 1.

- (8) Crimp the terminal.
- (9) Install a terminal housing on these terminals:
 - The 42640-2 terminal for the Speaker Terminal wires
 - The 61873-1 terminal for the Passenger Information Signal section of the PSU.

B. Terminal Insulation

- (1) Install insulation on these terminals for the Passenger Address Speaker terminals:
 - The 42628-2
 - The 42888-1
 - The 61048-1.

Refer to Figure 3.

**POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE TERMINAL****Figure 3**

- (a) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (b) Put a 1.0 inch ± 0.06 inch length of the heat shrinkable sleeve on the terminal.
Make sure that the end of the sleeve extends 0.06 inch to 0.09 inch beyond the end of the terminal.



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ASSEMBLY OF AMP FASTON TERMINALS

(c) Shrink the end of the sleeve that is on:

- The wire
- The insulation barrel of the terminal
- The wire barrel of the terminal.

Make sure that no heat is applied to the part of the sleeve that is on the terminal receptacle.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF END CAPS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF END CAPS

1. GENERAL DATA

A. General Conditions

Refer to Subject 20-10-11 for the conditions that are applicable for the insulation of the free end of a wire or cable.

2. PART NUMBER AND DESCRIPTION

A. End Cap Part Numbers

**Table 1
END CAP PART NUMBERS**

Part Number	Description	Supplier
324484	Crimp type, without insulation removal	AMP
324485	Crimp type, without insulation removal	AMP
324486	Crimp type, without insulation removal	AMP
324487	Crimp type, without insulation removal	AMP
328307	Crimp type, with insulation removal	AMP
328308	Crimp type, with insulation removal	AMP
328309	Crimp type, with insulation removal	AMP
328854	Crimp type, without insulation removal	AMP
328855	Crimp type, without insulation removal	AMP
328856	Crimp type, without insulation removal	AMP
328857	Crimp type, without insulation removal	AMP
328858	Crimp type, without insulation removal	AMP
328859	Crimp type, without insulation removal	AMP
328860	Crimp type, without insulation removal	AMP
328861	Crimp type, without insulation removal	AMP
329638	Crimp type, without insulation removal	AMP
BACT63D1	Heat Shrinkable	Boeing
BACT63D2	Heat Shrinkable	Boeing
BACT63D3	Heat Shrinkable	Boeing

**Table 2
CRIMP TYPE END CAPS WITHOUT INSULATION REMOVAL**

Wire O.D. (inch)		End Cap			
Minimum	Maximum	Temperature Grade	Class	Part Number	Color
0.036	0.043	D	1	328854	Red and Green

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF END CAPS

Table 2 (continued)

Wire O.D. (inch)		End Cap			
Minimum	Maximum	Temperature Grade	Class	Part Number	Color
0.044	0.051	D	1	328855	Blue and Green
0.048	0.075	A	2	324484	Transparent (White)
0.052	0.056	D	1	328856	Yellow and Green
0.056	0.064	D	1	328857	Brown and Green
0.065	0.074	D	1	328858	Violet and Green
0.075	0.087	D	1	328859	Black and Orange
0.080	0.115	A	2	324485	Red
0.088	0.110	D	1	328860	Gray and Orange
0.111	0.150	A	1	329638	Brown
0.120	0.145	A	2	324486	Blue
0.125	0.138	D	1	328861	Nickel and Nickel
0.150	0.210	A	2	324487	Yellow

Table 3

CRIMP TYPE END CAPS FOR A WIRE WITH INSULATION REMOVAL

Wire Size (AWG)		Maximum Wire O.D. (inch)	End Cap			
Minimum	Maximum		Temperature Grade	Class	Part Number	Color
22	18	0.124	A	2	328307	Red
16	14	0.149	A	2	328308	Blue
12	10	0.210	A	2	328309	Yellow

Table 4

HEAT SHRINKABLE END CAPS

Wire O.D. (inch)		End Cap			
Minimum	Maximum	Temperature Grade	Class	Boeing Standard	Color
0.030	0.063	B	2	BACT63D1	White
0.050	0.125	B	2	BACT63D2	Red
0.100	0.250	B	2	BACT63D3	Grey



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF END CAPS

**Table 5
APPROVED SUPPLIERS OF BOEING STANDARD HEAT SHRINKABLE END CAPS**

Heat Shrinkable End Cap	Supplier
BACT63D()	Raychem

B. Necessary Materials

**Table 6
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sealant	BMS 5-63 Class B-4	Boeing
	DC-3145	Dow Corning

3. ASSEMBLY OF CRIMP TYPE END CAPS

A. Assembly of a Crimp Type End Cap without Insulation Removal

**Table 7
END CAP CRIMP TOOLS**

End Cap	Crimp Tool		
	Basic Unit		Die
	Part Number	Color	
324484	46063	-	-
	59250	-	-
	DCT4-101	-	58573-1
324485	46063	-	-
	59250	-	-
	DCT4-101	-	58573-1
	MR8-49	-	-
324486	46063	-	-
	DCT4-101	-	58573-1
	MR8-49	-	-
324487	46063	-	-
	DCT4-101	-	58573-1
	MR8-49	-	-
324854	69272-1	Green	-
	WA27XE-EP	Green	-

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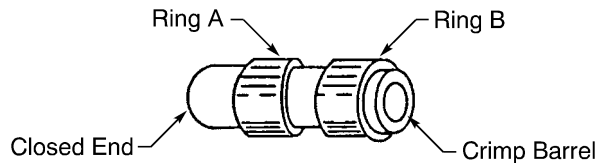
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF END CAPS

Table 7 (continued)

End Cap	Crimp Tool		
	Basic Unit		Die
	Part Number	Color	
328855	69272-1	Green	-
	WA27XE-EP	Green	-
328856	69272-1	Green	-
	WA27XE-EP	Green	-
328857	69272-1	Green	-
	WA27XE-EP	Green	-
328858	69272-1	Green	-
	WA27XE-EP	Green	-
328859	69272-1	Orange	-
	WA27XE-EP	Orange	-
328860	69272-1	Orange	-
	WA27XE-EP	Orange	-
328861	69272-1	White	-
	WA27XE-EP	White	-
329638	69260-1	Brown	-

- (1) Make a selection of an end cap from Table 2.
- (2) Make a selection of a crimp tool from Table 7.
- (3) Make a selection of a sealant from Table 6.
- (4) If it is necessary, cut the wire to make the end perpendicular to the longitudinal axis of the wire.
Make sure that the end of the wire insulation is aligned with the end of the conductor.
- (5) Put a small quantity of sealant in the crimp barrel of the end cap. Refer to Figure 1.



LOCATION OF THE COLOR CODED RING ON THE END CAP
Figure 1

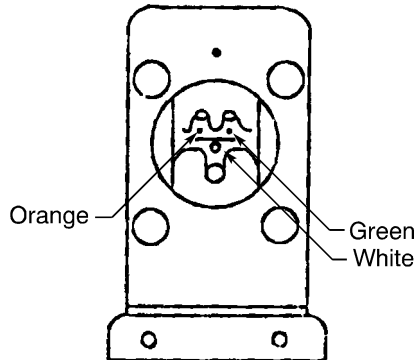
- (6) Put the end cap in the crimp tool.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF END CAPS

Make sure that:

- The closed end of the end cap is against the crimp tool locator
- The end cap is correctly aligned in the crimp tool dies
- If it is applicable, the color of Ring B of the end cap is the same as the color code of the crimp tool die; refer to Figure 1 and Figure 2.



COLOR CODE OF THE CRIMP TOOL DIES

Figure 2

- (7) Apply the minimum pressure necessary to close the handles of the crimp tool to hold the end cap in position.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY PRESSURE TO HOLD THE CAP IN POSITION. DAMAGE TO THE END CAP CAN OCCUR.

- (8) Put the end cap on the wire.
Make sure that the end of the wire is against the closed end of the end cap.
- (9) Crimp the end cap.
- (10) Remove the remaining sealant.
- (11) Hold the wire tight and lightly pull the end cap.
- (12) If the end cap does not stay on the end of the wire, do Step (5) through Step (11) again.

B. Assembly of a Crimp Type End Cap with Insulation Removal

**Table 8
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Removal Length (inch)	
	Minimum	Maximum
22	0.31	0.34
20	0.31	0.34
18	0.31	0.34
16	0.31	0.34
14	0.31	0.34

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF END CAPS

Table 8 (continued)

Wire Size (AWG)	Removal Length (inch)	
	Minimum	Maximum
12	0.34	0.37
10	0.34	0.37

**Table 9
END CAP CRIMP TOOLS**

End Cap	Crimp Tool	
	Part Number	Setting
328307	59250	4
328308	59250	4
328309	59239-4	3

- (1) Make a selection of an end cap from Table 3.
- (2) Make a selection of a crimp tool from Table 9.
- (3) Make a selection of a sealant from Table 6.
- (4) Remove the necessary length of the insulation from the end of the wire. Refer to Table 8 and Subject 20-00-15.
- (5) Put a small quantity of sealant in the crimp barrel of the end cap.
- (6) Put the end cap in the tool.
Make sure that the closed end of the end cap is against the locator.
- (7) Apply the minimum pressure necessary to close the handles of the crimp tool to hold the end cap in position.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY PRESSURE TO HOLD THE CAP IN POSITION. DAMAGE TO THE END CAP CAN OCCUR.

- (8) Put the end cap on the wire.
Make sure that the end of the wire is against the closed end of the end cap.
- (9) Crimp the end cap.
- (10) Remove the remaining sealant.
- (11) Hold the wire tight and lightly pull the end cap.
- (12) If the end cap does not stay on the end of the wire, do Step (5) through Step (11) again.

4. ASSEMBLY OF HEAT SHRINKABLE END CAPS

A. Assembly of a Heat Shrinkable End Cap with a Wire

- (1) Make a selection of a heat shrinkable end cap from Table 4.
Make sure that the cap is the smallest size that can move easily on the wire.
- (2) Put the end cap on the wire.

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ASSEMBLY OF END CAPS

Make sure that the end of the wire is against the closed end of the end cap.

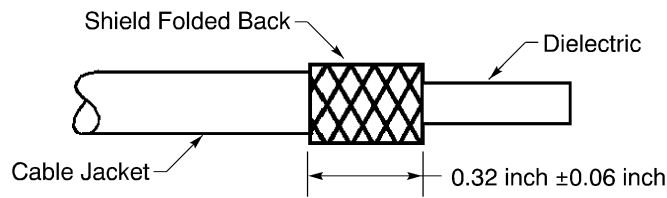
- (3) Shrink the end cap into position. Refer to Subject 20-10-14.

B. Assembly of a Heat Shrinkable End Cap with a Coax Cable

- (1) Make a selection of a heat shrinkable end cap from Table 4.

Make sure that the cap is the smallest size that can move easily on the cable.

- (2) If it is necessary, cut the cable to make the end perpendicular to the longitudinal axis of the cable.
- (3) Prepare the cable. Refer to Figure 3.



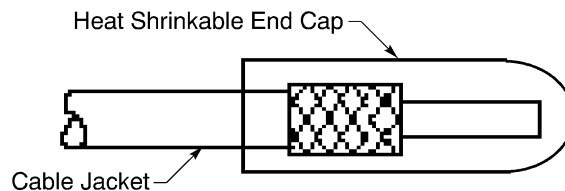
COAX CABLE PREPARATION
Figure 3

- (a) Remove 0.45 inch \pm 0.05 inch of the outer jacket.
- (b) Fold the shield back against the outer jacket.
- (c) Remove the necessary length of the shield to make the distance from the end of the shield to end of the outer jacket equal to 0.32 inch \pm 0.06 inch.

CAUTION: DO NOT CUT AGAINST THE OUTER JACKET WITH A KNIFE. DAMAGE TO THE JACKET CAN OCCUR.

- (4) Put the end cap on the cable. Refer to Figure 4.

Make sure that the end of the cable is against the closed end of the end cap.



POSITION OF THE HEAT SHRINKABLE END CAP ON THE COAX CABLE
Figure 4

- (5) Shrink the end cap in position. Refer to Subject 20-10-14.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF END CAPS

5. APPROVED TOOL SUPPLIERS

A. Crimp Tools

Table 10
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
46063	AMP
58573-1	AMP
59239-4	AMP
59250	AMP
69260-1	AMP
69272-1	AMP
DCT4-101	Daniels
MR8-49	Burndy
WA27XE-EP	Daniels

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STANDARD WIRING PRACTICES MANUAL

AMP PRINTED CIRCUIT BOARD TERMINAL RECEPTACLES

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STANDARD WIRING PRACTICES MANUAL

AMP PRINTED CIRCUIT BOARD TERMINAL RECEPTACLES

This Subject gives the procedure to:

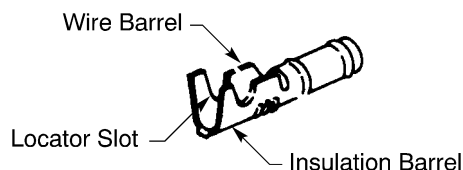
- Assemble the terminal receptacle
- Install the wired receptacle on the terminal pin.

1. PART NUMBERS AND DESCRIPTION

A. Printed Circuit Board Terminal Receptacle Part Numbers

**Table 1
TERMINAL RECEPTACLE PART NUMBERS**

Part Number	Wire Size (AWG)		Supplier
	Minimum	Maximum	
60789-2	24	20	AMP
60790-1	28	26	AMP
60790-2	28	26	AMP
60888-4	26	22	AMP
60983-3	26	22	AMP
640024-1	24	18	AMP



**AMP PRINTED CIRCUIT BOARD TERMINAL RECEPTACLE
Figure 1**

2. ASSEMBLY AND INSTALLATION OF THE TERMINAL RECEPTACLE

A. Terminal Receptacle Assembly

NOTE: AMP 90131-2 crimp tool is no longer available.

**Table 2
TERMINAL RECEPTACLE CRIMP TOOLS**

Wire Size (AWG)	Receptacle	Crimp Tool		Special Instructions
		Basic Unit	Supplier	
28	60790-1	90205-2	AMP	-
	60790-2	90205-2	AMP	-

STANDARD WIRING PRACTICES MANUAL

AMP PRINTED CIRCUIT BOARD TERMINAL RECEPTACLES

Table 2 (continued)

Wire Size (AWG)	Receptacle	Crimp Tool		Special Instructions
		Basic Unit	Supplier	
26	60790-1	90205-2	AMP	-
	60790-2	90205-2	AMP	-
	60888-4	90131-2	AMP	-
		90131-4	AMP	-
	60983-3	90131-2	AMP	-
		90131-4	AMP	-
24	60789-2	90204-4	AMP	-
	60888-4	90131-2	AMP	-
		90131-4	AMP	-
	60983-3	90131-2	AMP	-
		90131-4	AMP	-
	640024-1	90314-1	AMP	2 wires must be used
22	60789-2	90204-4	AMP	-
	60888-4	90131-2	AMP	-
		90131-4	AMP	-
	60983-3	90131-2	AMP	-
		90131-4	AMP	-
	640024-1	90314-1	AMP	1 or 2 wires can be used
20	60789-2	90204-4	AMP	-
	640024-1	90314-1	AMP	1 or 2 wires can be used
18	640024-1	90314-1	AMP	-

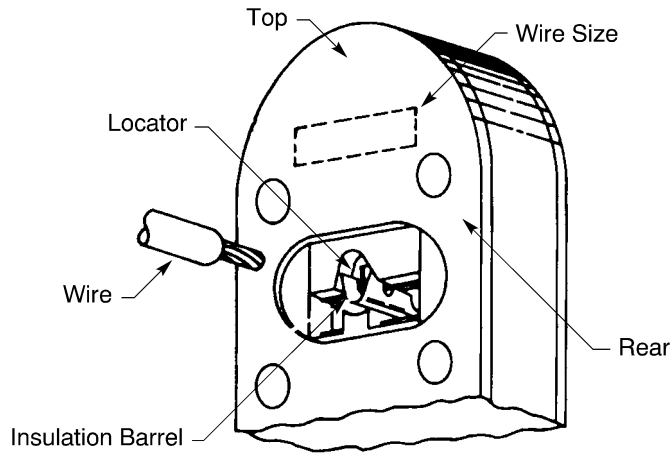
- (1) Remove 5/32 inch ± 1/32 inch of the insulation from the end of the wire.
- (2) Make a selection of a crimp tool from Table 2.
- (3) Fully open the handles of the crimp tool.
- (4) Put the insulation barrel of the receptacle into the front side of the crimp tool so that the locator slot of the receptacle is pointed toward the top of the tool.

NOTE: The front side of the crimp tool is marked with the crimp tool part number.

Refer to Figure 1 and Figure 2.

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AMP PRINTED CIRCUIT BOARD TERMINAL RECEPTACLES



POSITION OF THE RECEPTACLE IN THE CRIMP TOOL
Figure 2

- (5) To hold the receptacle in position, move the handles of the crimp tool together until one click is made.

CAUTION: DO NOT CHANGE THE SHAPE OF THE INSULATION BARREL OR WIRE BARREL OF THE RECEPTACLE. THE WIRE WILL NOT GO INTO THE RECEPTACLE CORRECTLY.

- (6) Put the wire into the receptacle so that the end of the insulation is against the insulation stop.
- (7) Close the handles tool of the until the ratchet releases.

B. Terminal Receptacle Installation

Table 3
TERMINAL RECEPTACLE INSERTION TOOLS

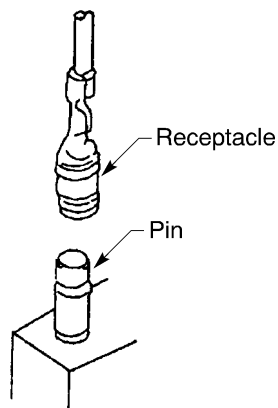
Insertion Tool	Supplier
452383-1	AMP

- (1) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (2) Put a 0.60 inch length of the heat shrinkable sleeve on the wire.
- (3) Make a selection of an insertion tool from Table 3.
- (4) Put the insertion tool on the wire between the heat shrinkable sleeve and the receptacle.
- (5) Move the insertion tool toward the end of the wire until it is against the rear end of the receptacle.
- (6) Push the receptacle onto the pin until the ring on the inside of the receptacle is in the groove on the pin. Refer to Figure 3.

CAUTION: THE INSERTION TOOL MUST STAY PARALLEL WITH THE PIN SO THAT DAMAGE TO THE PIN OR THE RECEPTACLE DOES NOT OCCUR.

STANDARD WIRING PRACTICES MANUAL

AMP PRINTED CIRCUIT BOARD TERMINAL RECEPTACLES



POSITION OF THE RECEPTACLE IN RELATION TO THE PIN

Figure 3

- (7) Push the heat shrinkable sleeve forward so that the both ends of the sleeve make an overlap with both ends of the receptacle.
- (8) Shrink the sleeve into position. Refer to Subject 20-10-14.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

This Subject gives the procedures to assemble terminals and splices when:

- The wire size is smaller than the crimp barrel of the terminal or splice
- The size of the wire insulation is smaller than the insulation grip of the terminal or splice
- The terminal or splice is assembled with more than one wire.

1. CIRCULAR AREA UNITS

A. Circular Area Units of Conductors

For the Circular Area Units (CAU) of a conductor, refer to Table 1.

CAU can be calculated if the Circular Mil Area (CMA) of a conductor is known. Refer to Figure 1.

NOTE: The circular mils of a conductor can be found in all wire tables. If the tables are not available, the CMA can be calculated. Refer to Figure 1.

$$CAU = \frac{CMA}{100} = \frac{(1000 \times \text{Strand Diameter})^2}{100} \times \text{Number of Strands}$$

CIRCULAR AREA UNITS OF A CONDUCTOR
Figure 1

Table 1
CAU OF CONDUCTORS

Wire Size (AWG)	Conductor		
	Type	Maximum O.D. (inch)	CAU
32	Solid	0.008	0.6
	Stranded	0.009	0.6
30	Solid	0.010	1
	Stranded	0.012	1
28	Solid	0.013	1.6
	Stranded	0.015	1.6
26	Solid	0.016	3
	Stranded	0.019	3
24	Solid	0.020	5
	Stranded	0.024	5
22	Solid	0.025	8
	Stranded	0.030	8
20	Solid	0.032	12
	Stranded	0.038	12
18	Solid	0.040	19
	Stranded	0.046	19

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 1 (continued)

Wire Size (AWG)	Conductor		
	Type	Maximum O.D. (inch)	CAU
16	Solid	0.051	24
	Stranded	0.059	24
15	Solid	0.057	33
	Stranded	0.065	33
14	Solid	0.064	38
	Stranded	0.074	38
13	Solid	0.072	52
	Stranded	0.082	52
12	Solid	0.081	59
	Stranded	0.093	59
10	Solid	0.102	99
	Stranded	0.117	99
8	Solid	0.129	170
	Stranded	0.148	170
6	Solid	0.162	268
	Stranded	0.186	268
4	Solid	0.204	426
	Stranded	0.235	426
2	Solid	0.258	665
	Stranded	0.297	665
1	Solid	0.290	837
	Stranded	0.328	837
1/0	Solid	0.352	1045
	Stranded	0.374	1045
2/0	Solid	0.365	1330
	Stranded	0.420	1330
3/0	Solid	0.410	1665
	Stranded	0.472	1665
4/0	Solid	0.460	2109
	Stranded	0.530	2109

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

B. Circular Area Units of Terminals

**Table 2
CAU OF TERMINALS**

Crimp Barrel Size	CAU		Terminal		
	Minimum	Maximum	Type	Specification or Standard	Description
26	2	3	Insulated	BACT12AR()	With Insulation Grip
26-22	3	8	Insulated	BACT12AC()	With Insulation Grip
24	4	5	Insulated	BACT12AR()	With Insulation Grip
22	6	8	Insulated	BACT12AR()	With Insulation Grip
22-18	7	24	Insulated	BACT12AC()	With Insulation Grip
	5	20	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				MS20659-()	With Insulation Grip
20	8	11	Insulated	BACT12AR()	With Insulation Grip
18	12	18	Insulated	BACT12AR()	With Insulation Grip
16	19	26	Insulated	BACT12AR()	With Insulation Grip
16-14	15	51	Insulated	BACT12AC()	With Insulation Grip
	21	42	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				MS20659-()	With Insulation Grip
14	27	41	Insulated	BACT12AR()	With Insulation Grip
12	42	65	Insulated	BACT12AR()	With Insulation Grip
12-10	43	138	Insulated	BACT12AC()	With Insulation Grip
	50	100	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				MS20659-()	With Insulation Grip
10	66	105	Insulated	BACT12AR()	With Insulation Grip
8	132	208	Insulated	BACT12AC()	With Insulation Grip
	131	181	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 2 (continued)

Crimp Barrel Size	CAU		Terminal		
	Minimum	Maximum	Type	Specification or Standard	Description
6	209	331	Insulated	BACT12AC()	With Insulation Grip
	206	288	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip
4	332	526	Insulated	BACT12AC()	With Insulation Grip
	327	457	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip
2	527	837	Insulated	BACT12AC()	With Insulation Grip
	524	735	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip
1	662	878	Uninsulated	BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip
1/0	838	1195	Insulated	BACT12AC()	With Insulation Grip
	831	1119	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip
2/0	1196	1505	Insulated	BACT12AC()	With Insulation Grip
	1049	1458	Uninsulated	BACT12E()	No Insulation Grip
				BACT12G()	No Insulation Grip
				BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip
3/0	1323	1810	Uninsulated	BACT12E()	No Insulation Grip
				BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 2 (continued)

Crimp Barrel Size	CAU		Terminal		
	Minimum	Maximum	Type	Specification or Standard	Description
4/0	1901	2310	Insulated	BACT12AC()	With Insulation Grip
	1666	2257	Uninsulated	BACT12E()	No Insulation Grip
				BACT12M()	No Insulation Grip
				MS20659-()	With Insulation Grip

C. Circular Area Units of Splices

**Table 3
CAU OF BUTT SPLICES**

Crimp Barrel Size	CAU		Splice		
	Minimum	Maximum	Type	Specification or Standard	Description
26-22	3	8	Insulated	NAS1388-()	With Insulation Grip
24-20	4	12	Insulated	NAS1388-()	With Insulation Grip
22-18	7	24	Insulated	NAS1388-()	With Insulation Grip
	5	20	Uninsulated	BACT12C()	No Insulation Grip
	7	24		NAS1387-()	No Insulation Grip
16-14	15	51	Insulated	NAS1388-()	With Insulation Grip
			Uninsulated	BACT12C()	No Insulation Grip
				NAS1387-()	No Insulation Grip
12-10	43	138	Insulated	NAS1388-()	With Insulation Grip
			Uninsulated	BACT12C()	No Insulation Grip
				NAS1387-()	No Insulation Grip
8	132	208	Insulated	NAS1389-()	No Insulation Grip
		181	Uninsulated	BACT12C()	No Insulation Grip
6	209	331	Insulated	NAS1389-()	No Insulation Grip
	206	288	Uninsulated	BACT12C()	No Insulation Grip
4	332	526	Insulated	NAS1389-()	No Insulation Grip
	327	457	Uninsulated	BACT12C()	No Insulation Grip
2	527	837	Insulated	NAS1389-()	No Insulation Grip
	524	735	Uninsulated	BACT12C()	No Insulation Grip

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 3 (continued)

Crimp Barrel Size	CAU		Splice		
	Minimum	Maximum	Type	Specification or Standard	Description
1/0	838	1195	Insulated	NAS1389-()	No Insulation Grip
	975	1119	Uninsulated	BACT12C()	No Insulation Grip
2/0	1049	1458	Uninsulated	BACT12C()	No Insulation Grip
3/0	1323	1810	Uninsulated	BACT12C()	No Insulation Grip
4/0	1666	2257	Uninsulated	BACT12C()	No Insulation Grip

**Table 4
CAU OF PARALLEL SPLICES**

Crimp Barrel Size	CAU		Splice		
	Minimum	Maximum	Type	Part Number	Supplier
22-16	7	24	Uninsulated	34130	AMP
16-14	15	51	Uninsulated	34137	AMP
12-10	43	138	Uninsulated	34138	AMP
300 MCM	2750	3250	Uninsulated	324448	AMP

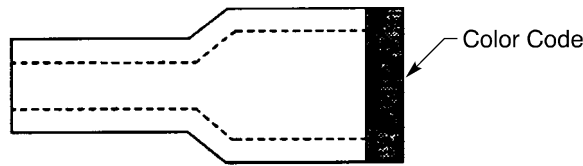
D. Circular Area Units of Adapters

**Table 5
CAU OF SPLICE ADAPTERS**

Crimp Barrel Size	Wire Size (AWG)	Splice Adapter				
		CAU	Boeing Standard	Color Code	Part Number	Supplier
16-14	22	37	BACA14AN1	Red	327635	AMP
	20					
	18					
12-10	22	100	BACA14AN2	Red	327636	AMP
	20					
	18					
	16	94	BACA14AN3	Blue	327637	AMP
	14					

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS



BACA14AN() SPLICE ADAPTER
Figure 2

Table 6
CAU OF SLEEVE ADAPTERS

CAU	Boeing Standard	Color
36	BACS13S063B	Red
65	BACS13S128C	Blue
138	BACS13S156C	Yellow

2. ASSEMBLY WHEN THE WIRE SIZE IS SMALLER THAN THE CRIMP BARREL SIZE

A. CAU of the Conductor and the Crimp Barrel

- (1) Find the CAU of the conductor. Refer to Table 1.
- (2) Find the CAU of the crimp barrel.

Refer to:

- Table 2 for the CAU of a terminal
- Table 3 for the CAU of a butt splice
- Table 4 for the CAU of a parallel splice.

- (3) If the CAU of the conductor is not within the minimum and maximum CAU of the crimp barrel, it is necessary to increase the CAU of the conductor.

For example, an AWG 20 wire and an AWG 12 wire can be spliced in a NAS1388 size 12-10 butt splice. However, the CAU of the AWG 20 conductor must be increased by a minimum of 31 CAU and a maximum of 126 CAU because:

- The CAU of the AWG 20 conductor is 12
- The minimum CAU of the size 12-10 splice is 43
- The maximum CAU of the size 12-10 splice is 138.

Refer to:

- Paragraph 2.B. for the assembly with the conductor folded back
- Paragraph 2.C. for the assembly with a splice adapter
- Paragraph 2.D. for the assembly with a filler wire stub
- Paragraph 2.E. for the assembly with a filler wire loop.

B. Assembly with the Conductor Folded Back

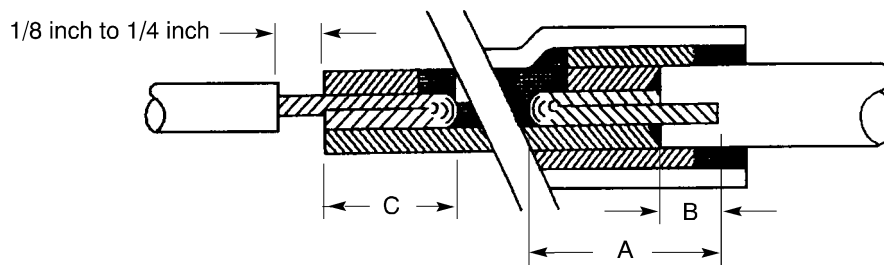
NOTE: Usually, a conductor that is folded back on itself does not sufficiently increase the CAU of the conductor. For the example in Paragraph 2.A., an AWG 20 conductor that is folded back has a CAU of 24 which is less than the necessary CAU for a size 12-10 splice.

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Table 7
CONDITIONS FOR A CONDUCTOR THAT IS FOLDED BACK

Crimp Barrel Size	Length		
	Dimension	Minimum (inch)	Maximum (inch)
22-18	A	15/32	17/32
	B	7/32	9/32
	C	7/32	9/32
16-14	A	7/16	1/2
	B	3/16	1/4
	C	7/32	9/32
12-10	A	21/32	23/32
	B	1/4	5/16
	C	3/8	7/16



DIMENSIONS FOR A CONDUCTOR THAT IS FOLDED BACK
Figure 3

- (1) Remove the necessary length of insulation from the end of the wire so that the conductor can be folded back.

Refer to Figure 3 and Table 7.

- (2) Fold the conductor back on itself.
- (3) Assemble the terminal or splice.

Refer to the applicable Subject for the assembly.

C. Assembly with a BACA14AN() Splice Adapter

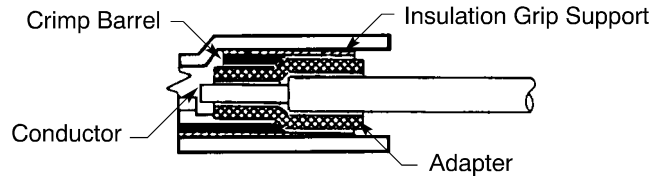
- (1) To make a selection of a splice adapter from Table 5, add the CAU of the conductor to the CAU of the adapter.

Make sure that the total CAU is within the minimum and maximum CAU of the crimp barrel.

- (2) Put the wire into the adapter so that the end of the insulation is against the bottom of the insulation grip support of the adapter. Refer to Figure 4.

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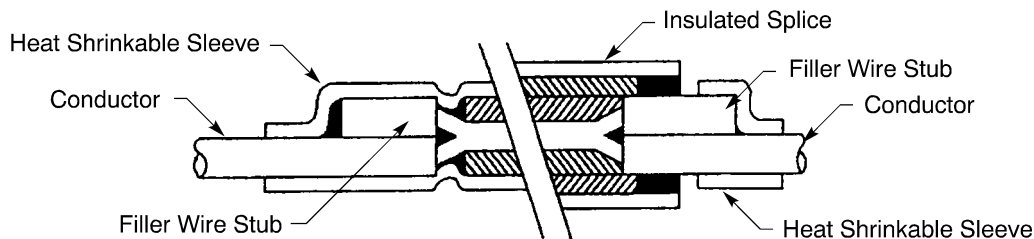


POSITION OF THE WIRE AND SPLICE ADAPTER IN THE CRIMP BARREL
Figure 4

- (3) Assemble the terminal or splice. Refer to the applicable Subject for the assembly.
 Make sure that the end of the adapter is against the bottom of the crimp barrel. Refer to Figure 4.

D. Assembly with a Filler Wire Stub

CAUTION: ONLY ONE FILLER WIRE STUB CAN BE USED TO INCREASE THE CAU OF A CONDUCTOR.



CONFIGURATION OF AN ASSEMBLY WITH FILLER WIRE STUBS
Figure 5

- (1) Make a selection of a filler wire that will give the necessary CAU for the crimp barrel when the CAU of the filler wire is added to the CAU of the conductor.
- (2) Assemble the terminal or splice.
 Refer to:
 - Figure 5
 - The applicable Subject for the assembly
 - Subject 20-30-11 to install the necessary insulation on the free end of the stub wire.

E. Assembly with a Filler Wire Loop

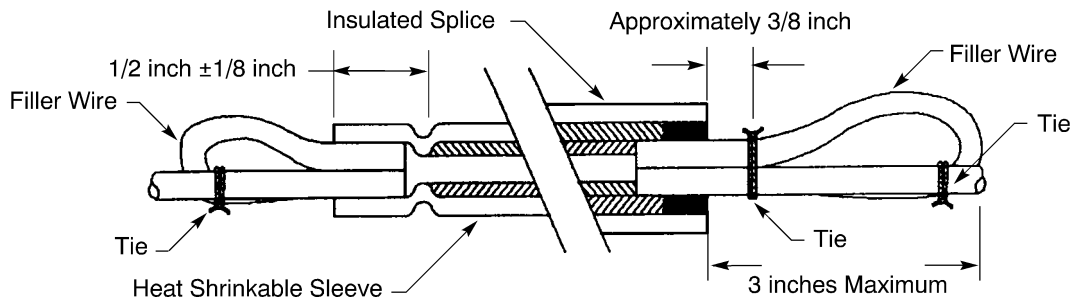
- (1) Make a selection of a filler wire that will give the necessary CAU for the crimp barrel when the CAU of the filler wire is added to itself and to the CAU of the conductor.
- (2) Assemble the terminal or splice.

NOTE: A heat shrinkable sleeve or a tie, or both must be used to attach the filler loop to the conductor.

- Refer to:
- Figure 6
 - The applicable Subject for the assembly.

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CONFIGURATION OF AN ASSEMBLY WITH FILLER WIRE LOOPS

Figure 6

3. ASSEMBLY WHEN THE WIRE INSULATION IS SMALLER THAN THE INSULATION GRIP

A. Applicable Conditions

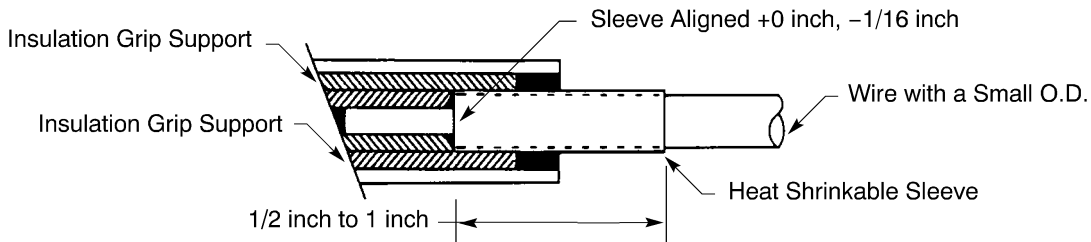
When the insulation grip cannot sufficiently hold the wire insulation because of the crimp tool adjustment and the wire size, the O.D. of the wire must be increased.

Refer to Paragraph 3.A.

B. Installation of a Heat Shrinkable Sleeve

- (1) Install a 1/2 inch to 1 inch length of heat shrinkable sleeve with the smallest possible diameter on the wire so that the end of the sleeve is aligned with the end of the insulation.

Refer to Figure 7 and Subject 20-10-14.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE WIRE

Figure 7

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

4. ASSEMBLY WITH MORE THAN ONE WIRE

A. General Conditions for Wire Insulation

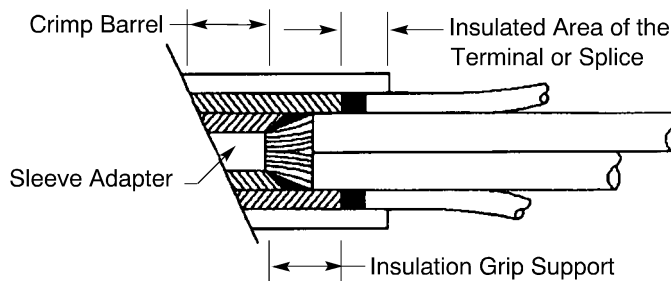
These conditions are applicable:

- If it is possible, the end of the insulation of all the wires must be held in the area of insulation grip that makes an overlap with the insulated area of the terminal or splice; refer to Figure 8
- When the dimensions of the crimp tool adjustment and the termination insulation grip support area permits, the necessary length of heat shrinkable sleeve must be installed on the wires; refer to Figure 9 and Figure 10.

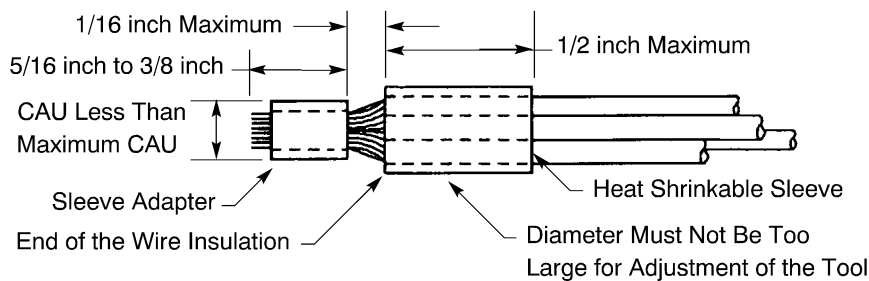
As an alternative when the applicable conditions are not possible, the end of the insulation of the wires can be outside the insulation grip of the terminal or splice, but the wires must be supported and insulated with:

- The applicable Grade and Class of heat shrinkable sleeve; refer to Subject 20-00-11 and Subject 20-10-14
- A sleeve that has a loose fit over the wires and terminal or splice, but stays tight after heat is applied
- A sleeve that has a loose fit over the wires and terminal or splice, but is held in position with ties if it is not possible to apply heat.

CAUTION: HEAT MUST NOT BE APPLIED TO A HEAT SHRINKABLE SLEEVES THAT IS INSTALLED OVER A SOLDER JOINT.



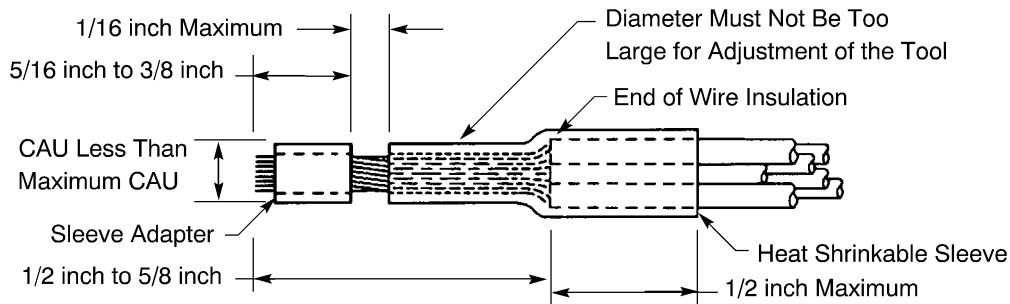
INSULATION OF THE WIRES IN THE INSULATION GRIP
Figure 8



CONFIGURATION OF THE INSULATION OF THE WIRES
Figure 9

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS



ALTERNATIVE CONFIGURATION OF THE INSULATION OF THE WIRES
Figure 10

B. Installation of a Sleeve Adapter

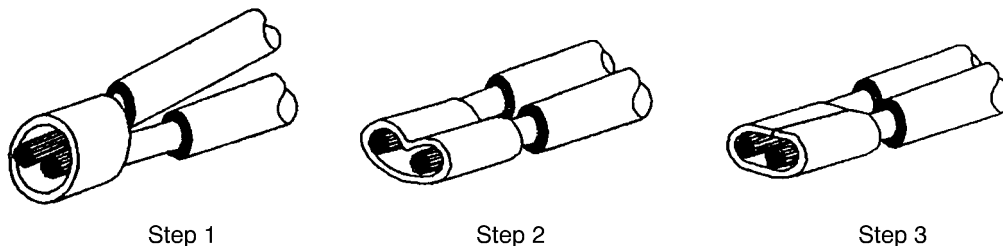
A BACS13S() sleeve adapter can be installed on two or more conductors to increase the CAU that is necessary for the crimp barrel.

- (1) Find the CAU of the conductors. Refer to Table 1.
- (2) Find the CAU of the crimp barrel.

Refer to:

- Table 2 for the CAU of a terminal
- Table 3 for the CAU of a butt splice
- Table 4 for the CAU of a parallel splice.

- (3) If the total CAU of the conductors is not within the minimum and maximum CAU of the crimp barrel, increase the total CAU:
 - (a) Make a selection of the applicable sleeve adapter from Table 6.
 - (b) Remove the color code dye from all of the surfaces of the sleeve.
 - (c) Remove the necessary length of insulation from the end of each wire.
 - (d) Install the sleeve adapter on the wires. Refer to Figure 11.
- (4) Assemble the terminal or splice. Refer to the applicable Subject for the assembly.



BACS13S() SLEEVE ADAPTER INSTALLED ON TWO CONDUCTORS
Figure 11

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

C. Assembly with More Than One Conductor

When more than one conductor is necessary in a terminal or splice, the CAU of the conductors can be increased and the terminal or splice can be assembled with any of these procedures:

- Paragraph 2.B. for the assembly with the conductor folded back
- Paragraph 2.C. for the assembly with a splice adapter
- Paragraph 2.D. for the assembly with a filler wire stub
- Paragraph 2.E. for the assembly with a filler wire loop
- Paragraph 4.B. for the assembly with a sleeve adapter.

CAUTION: THESE CONDITIONS MUST BE OBEYED:

- THE CONDITIONS FOR THE END OF THE INSULATION OF THE WIRES; REFER TO PARAGRAPH Paragraph 4.A.
- ONLY ONE CONDUCTOR THAT HAS BEEN FOLDED BACK ON ITSELF IS PERMITTED IN AN END OF A TERMINAL OR SPLICE
- ONLY ONE WIRE STUB IS PERMITTED IN AN END OF A TERMINAL OR SPLICE.

NOTE: As an alternative to a specified size of terminal or splice, a selection of a terminal or splice can be made in relation to the number and size of wires. Refer to Paragraph 4.D.

D. Selection of a Terminal or a Splice

- (1) Count the number of wires.
- (2) Find the size of each wire.
- (3) Find the crimp barrel size that agrees with the number of wires and the size of each wire in Table 8.
- (4) Make a selection of the terminal or splice.

Refer to:

- Table 2 for the terminals
- Table 3 for the butt splices
- Table 4 for the parallel splices.

Table 8

WIRE COUNT AND WIRE SIZE FOR ONE CRIMP BARREL OF A TERMINAL OR A SPLICE

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
7	3	6	Uninsulated	1/0
	4	14		
6	3	8	Uninsulated	2
	3	12		
5	3	6	Insulated	1/0
	2	10		
5	3	8	Insulated	2
	2	16		

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
5	2	12	Insulated	6
	2	14		
	1	16		
5	2	20	Insulated	16-14
	3	22		
5	1	20	Insulated	16-14
	4	22		
5	5	22	Insulated	16-14
5	1	6	Uninsulated	2
	1	8		
	3	12		
4	1	2	Insulated	2/0
	1	4		
	2	10		
4	1	2	Insulated	1/0
	2	8		
	1	16		
4	1	2	Insulated	1/0
	1	8		
	2	16		
4	2	4	Insulated	1/0
	2	10		
4	2	6	Insulated	2
	2	12		
4	2	6	Insulated	2
	2	16		
4	4	10	Insulated	4
4	2	12	Insulated	8
	1	14		
	1	16		

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
4	1	12	Insulated	8
	1	14		
	2	16		
4	4	14	Insulated	8
4	3	14	Insulated	8
	1	18		
4	3	16	Insulated	10-12
	1	20		
4	4	20	Insulated	16-14
4	3	20	Insulated	16-14
	1	22		
4	2	20	Insulated	16-14
	2	22		
4	1	20	Insulated	16-14
	3	22		
4	4	22	Insulated	16-14
4	2	2	Uninsulated	2/0
	2	12		
4	2	2	Uninsulated	3/0
	2	14		
4	1	2	Uninsulated	2/0
	1	4		
	2	12		
4	2	4	Uninsulated	1/0
	2	10		
4	2	4	Uninsulated	1/0
	2	12		
4	1	4	Uninsulated	2
	3	12		
4	2	6	Uninsulated	2
	2	12		

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
4	4	8	Uninsulated	2
3	1	1/0	Insulated	2/0
	2	10		
3	3	2	Insulated	4/0
3	1	2	Insulated	2/0
	2	6		
3	3	4	Insulated	2/0
3	1	4	Insulated	1/0
	2	6		
3	2	6	Insulated	2
	1	16		
3	1	6	Insulated	2
	2	8		
3	1	8	Insulated	6
	2	12		
3	1	8	Insulated	6
	1	12		
	1	18		
3	1	8	Insulated	6
	1	14		
	1	20		
3	1	8	Insulated	6
	2	16		
3	1	8	Insulated	8
	2	20		
3	3	10	Insulated	6
3	2	10	Insulated	6
	1	14		
3	1	10	Insulated	6
	2	12		

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
3	1	10	Insulated	8
	1	12		
	1	14		
3	1	10	Insulated	8
	1	14		
	1	20		
3	1	10	Insulated	8
	2	16		
3	3	12	Insulated	8
3	2	12	Insulated	8
	1	14		
3	2	12	Insulated	8
	1	16		
3	1	12	Insulated	10-12
	2	18		
3	2	14	Insulated	10-12
	1	18		
3	2	14	Insulated	10-12
	1	20		
3	2	14	Insulated	10-12
	1	22		
3	1	14	Insulated	10-12
	2	18		
3	3	16	Insulated	10-12
3	2	16	Insulated	10-12
	1	18		
3	2	16	Insulated	10-12
	1	20		
3	2	16	Insulated	10-12
	1	22		

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
3	1	16	Insulated	10-12
	2	18		
3	3	18	Insulated	10-12
3	2	18	Insulated	16-14
	1	20		
3	2	18	Insulated	16-14
	1	22		
3	1	18	Insulated	16-14
	2	20		
3	1	18	Insulated	16-14
	2	22		
3	3	20	Insulated	16-14
3	2	20	Insulated	16-14
	1	22		
3	1	20	Insulated	16-14
	2	22		
3	3	22	Insulated	16-14
3	3	22	Insulated	22-18
3	2	6	Uninsulated	2
	1	10		
3	1	6	Uninsulated	2
	2	8		
3	2	8	Uninsulated	4
	1	12		
3	2	10	Uninsulated	6
	1	20		
3	1	10	Uninsulated	6
	2	12		
3	1	10	Uninsulated	8
	2	16		

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
3	2	12	Uninsulated	8
	1	16		
3	2	12	Uninsulated	8
	1	16		
2	1	2/0	Insulated	4/0
	1	2		
2	2	1/0	Insulated	4/0
2	2	2	Insulated	2/0
2	1	2	Insulated	1/0
	1	6		
2	1	2	Insulated	2
	1	16		
2	1	4	Insulated	2
	1	6		
2	1	4	Insulated	2
	1	8		
2	2	6	Insulated	2
2	1	6	Insulated	4
	1	10		
2	2	8	Insulated	4
2	1	8	Insulated	6
	1	10		
2	1	8	Insulated	6
	1	12		
2	1	8	Insulated	8
	1	14		
2	1	8	Insulated	8
	1	16		
2	2	10	Insulated	8
2	1	10	Insulated	8
	1	12		

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
2	1	10	Insulated	8
	1	14		
2	2	12	Insulated	10-12
2	1	12	Insulated	10-12
	1	14		
2	1	12	Insulated	10-12
	1	16		
2	1	12	Insulated	10-12
	1	18		
2	1	12	Insulated	10-12
	1	20		
2	1	12	Insulated	10-12
	1	22		
2	2	14	Insulated	10-12
2	1	14	Insulated	10-12
	1	16		
2	1	14	Insulated	10-12
	1	18		
2	1	14	Insulated	10-12
	1	20		
2	1	14	Insulated	10-12
	1	22		
2	2	16	Insulated	16-14
2	1	16	Insulated	16-14
	1	18		
2	1	16	Insulated	16-14
	1	20		
2	1	16	Insulated	16-14
	1	22		
2	2	18	Insulated	16-14

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
2	1	18	Insulated	16-14
	1	20		
2	1	18	Insulated	16-14
	1	22		
2	2	20	Insulated	16-14
2	2	20	Insulated	22-18
2	1	20	Insulated	22-18
	1	22		
2	2	22	Insulated	22-18
2	1	2	Uninsulated	1/0
	1	6		
2	1	4	Uninsulated	2
	1	8		
2	2	8	Uninsulated	4
2	1	8	Uninsulated	6
	1	10		
2	1	10	Uninsulated	8
	1	12		
2	1	10	Uninsulated	8
	1	14		
2	1	12	Uninsulated	12-10
	1	14		
2	1	12	Uninsulated	12-10
	1	16		
2	1	12	Uninsulated	12-10
	1	18		
2	1	12	Uninsulated	12-10
	1	20		
2	1	14	Uninsulated	12-10
	1	16		

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ASSEMBLY OF TERMINALS AND SPLICES UNDER SPECIAL CONDITIONS

Table 8 (continued)

Total Number of Wires	Wire		Terminal or Splice	
	Count	Size (AWG)	Type	Crimp Barrel Size
2	1	14	Uninsulated	12-10
	1	18		
2	1	14	Uninsulated	12-10
	1	20		
2	1	14	Uninsulated	12-10
	1	22		
2	2	16	Uninsulated	12-10
2	1	16	Uninsulated	12-10
	1	18		
2	1	16	Uninsulated	16-14
	1	20		
2	1	16	Uninsulated	16-14
	1	22		
2	2	18	Uninsulated	16-14
2	1	18	Uninsulated	16-14
	1	20		
2	1	18	Uninsulated	16-14
	1	22		
2	2	20	Uninsulated	16-14
2	1	20	Uninsulated	22-18
	1	22		
2	2	22	Uninsulated	22-18

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CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

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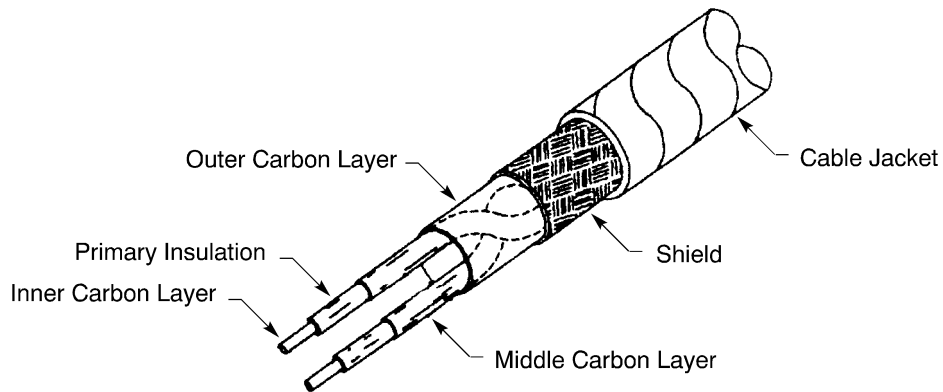
CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

1. PART NUMBERS AND DESCRIPTION

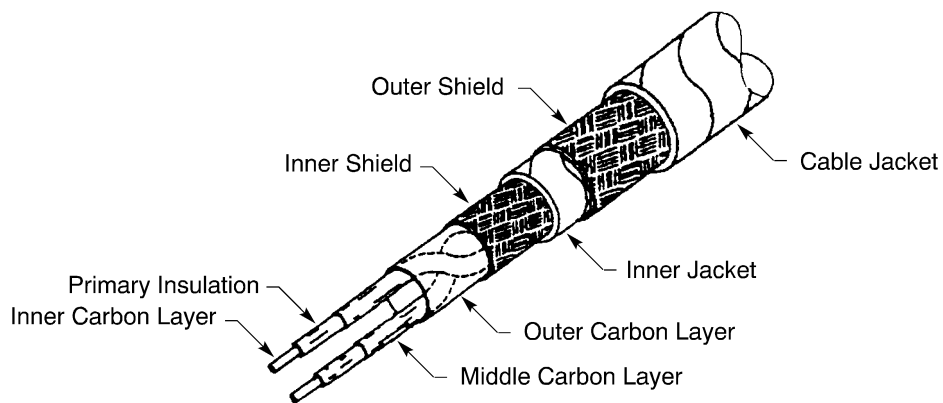
A. Cable Part Numbers

**Table 1
CABLE PART NUMBERS**

Boeing Specification	Wire Size (AWG)	Number of Conductors	Number of Shields
65B47866-1	18	2	1
65B47866-2	20	2	1
65B47866-3	18	2	1
65B47866-4	20	2	1
65B47866-5	20	2	2



**65B47866-1 AND 65B47866-2 CABLE CONFIGURATION
Figure 1**



**65B47866-5 CABLE CONFIGURATION
Figure 2**

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STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

2. CABLE PREPARATION

A. Applicable Connectors

**Table 2
APPLICABLE CONNECTORS**

Connector		Connector Assembly Reference
Part Number	Supplier	
10-244()	Bendix	Subject 20-61-18
9816KS()	Matrix	Subject 20-63-14
BACC45F()	Boeing	Subject 20-61-11
BACC63BN()	Boeing	Subject 20-61-11
BACC63BP()	Boeing	Subject 20-61-11
BACC63BR()	Boeing	Subject 20-63-13
BACC63BT()	Boeing	Subject 20-63-13
BACC63BV()	Boeing	Subject 20-61-11
BACC63CB()	Boeing	Subject 20-61-11
BACC63CC()	Boeing	Subject 20-61-11
BACC63CM()	Boeing	Subject 20-63-13
BACC63CN()	Boeing	Subject 20-63-13
CN0986-()	Cinch	Subject 20-61-11
FRF()	ITT Cannon	Subject 20-61-19
MT30K-()	Matrix	Subject 20-63-13
MT37K-()	Matrix	Subject 20-63-13

B. Cable Preparation for the Assembly of BACC45F(), BACC63(), CN0986-(), 9816KS(), and FRF() Connectors

**Table 3
SHIELD GROUND WIRES**

Area Of The Airplane	Temperature Grade	Boeing Specification	Wire Size (AWG)	
Not Pressurized	A	BMS 13-16 Type 1 Black	18	
	B	BMS 13-16 Type 1 Black	18	
	C	BMS 13-16 Type 1 Black	18	
	D		BMS 13-31 Type 1	18
			BMS 13-58 Type 1	18
			BMS 13-60 Type 7	18

20-35-11

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

Table 3 (continued)

Area Of The Airplane	Temperature Grade	Boeing Specification	Wire Size (AWG)	
Pressurized	A	BMS 13-16 Type 1 Black	20	
	B	BMS 13-16 Type 1 Black	20	
	C	BMS 13-16 Type 1 Black	20	
	D		BMS 13-31 Type 1	20
			BMS 13-58 Type 1	20
			BMS 13-60 Type 7	20

Table 4

MECHANICAL FERRULE PART NUMBERS

Cable		Ferrule				Wire Harness Temperature Grade
Part Number	Shield	Plating	Type	Part Number	Color	
65B47866-1	-	Nickel	Inner	BACS13S187BNP	-	A
						B
						C
						D
		Outer	BACS13S281CNP	-	A	
					B	
					C	
					D	
65B47866-1	-	Tin	Inner	BACS13S187B	Yellow	A
			B			
		Outer	BACS13S281C	Purple	A	
					B	
65B47866-2	-	Nickel	Inner	BACS13S175BNP	-	A
						B
						C
						D
		Outer	BACS13S261CNP	-	A	
					B	
					C	
					D	

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

Table 4 (continued)

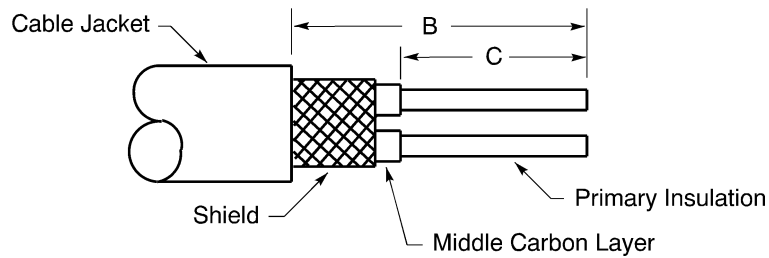
Cable		Ferrule				Wire Harness Temperature Grade
Part Number	Shield	Plating	Type	Part Number	Color	
65B47866-2	-	Tin	Inner	BACS13S175B	Green	A
			Outer	BACS13S261C	Yellow	B
65B47866-5	Inner	Nickel	Inner	BACS13S156BNP	-	A
						B
			Outer	BACS13S232CNP	-	C
						D
	Outer	Nickel	Inner	BACS13S205BNP	-	A
						B
			Outer	BACS13S281CNP	-	C
						D
65B47866-5	Inner	Tin	Inner	BACS13S156B	Red	A
			Outer	BACS13S232C	Orange	B
	Outer	Tin	Inner	BACS13S205B	Orange	A
			Outer	BACS13S281C	Purple	B
						A
						B

STANDARD WIRING PRACTICES MANUAL

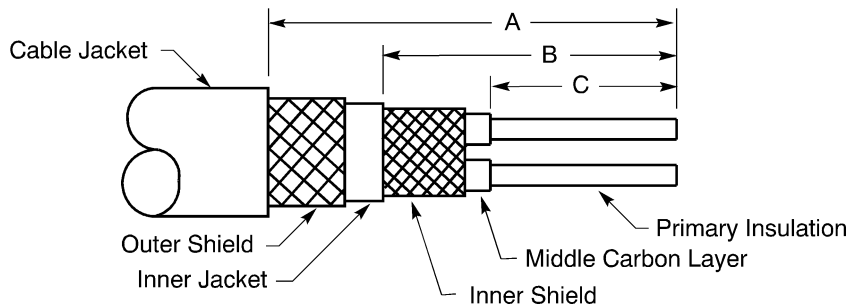
CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

**Table 5
CABLE TRIM DIMENSIONS**

Cable	Trim Dimension		
	Dimension	Target (inch)	Tolerance (inch)
65B47866-1	A	-	±0.06
	B	3.00	±0.06
	C	2.00	±0.06
65B47866-2	A	-	±0.06
	B	3.00	±0.06
	C	2.00	±0.06
65B47866-5	A	3.75	±0.06
	B	3.00	±0.06
	C	2.00	±0.06



**65B47866-1 AND 65B47866-2 CABLE TRIM DIMENSIONS
Figure 3**



**65B47866-5 CABLE TRIM DIMENSIONS
Figure 4**

STANDARD WIRING PRACTICES MANUAL**CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE**

Refer to:

- Figure 1 and Figure 3 for the cable with one shield
- Figure 2 and Figure 4 for the cable with two shields
- Table 5 for the cable trim dimension values
- Table 2 for the location of the assembly procedures of the applicable connector.

- (1) Remove the necessary length of the cable jacket.

Make sure that the distance from the end of the jacket to the end of the cable is:

- Dimension B for a cable that has one shield
- Dimension A for a cable that has two shields

- (2) If the cable has two shields, remove the necessary length of the inner jacket.

Make sure that the distance from the end of the jacket to the end of the cable is dimension B.

- (3) Remove the necessary length of the middle carbon layer.

Make sure that the distance from the end of the layer to the end of the wires is dimension C.

NOTE: Damage of the primary insulation is permitted if the strands of the conductor cannot be seen.

- (4) Remove all of the unwanted carbon from the primary insulation with a fiberglass eraser or an abrasive pad.

- (5) Clean the insulation with acetone or an equivalent solvent.

- (6) Assemble a shield ground wire with mechanical ferrules for each shield. Refer to Subject 20-10-15.

These conditions are applicable:

- The selection of the ferrules is from Table 4
- The selection of the shield ground wire is from Table 3
- The length of the shield ground wire is 3.0 inches maximum
- The heat shrinkable sleeve is a 1.0 inch length of 3/8 inch diameter CRN or TFE 2X sleeve
- The CRN sleeve has temperature grade A or B
- The TFE 2X sleeve has a temperature grade C or D.

- (7) Remove the necessary length of the primary insulation from the end of each component wire.

Refer to the applicable Subject for the assembly of the connector.

- (8) Put the necessary length of a 1/8 inch diameter TFE 2X heat shrinkable sleeve on each component wire.

Make sure that:

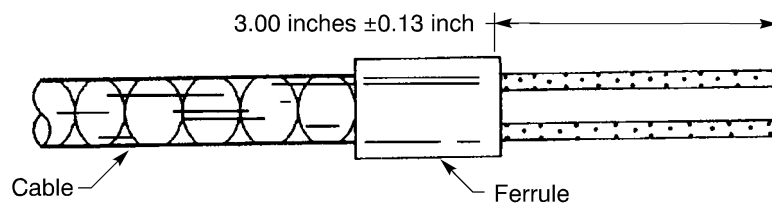
- The rearward end of each sleeve is against the ferrule
- The forward end of each sleeve is aligned with the end of the primary insulation of the component wire.

- (9) Shrink each sleeve into its position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

C. 65B47866-1 and -2 Cable Preparation for the Assembly of Bendix 10-244() Connectors



CABLE PREPARATION
Figure 5

Refer to Figure 5.

- (1) Remove 3.00 inches ±0.13 inch of the cable jacket and the shield.
- (2) Cut the outer carbon layer along the longitudinal axis of the cable between the two component wires.
- (3) Remove the necessary length of the outer carbon layer.

Make sure that the end of the carbon layer is aligned with the end of the cable jacket.

- (4) Move the two component wires apart from the end of the cable to the end of the jacket.
- (5) Remove the necessary length of the middle carbon layer on each component wire.

Make sure that the distance from the end of the carbon layer to the end of the primary insulation is 0.50 inch ±0.06 inch.

Refer to Subject 20-61-18.

CAUTION: MAKE SURE THAT DAMAGE TO THE PRIMARY INSULATION DOES NOT OCCUR.

- (6) Remove all of the unwanted carbon from the primary insulation with a fiberglass eraser or an abrasive pad.
- (7) Clean the insulation with acetone or an equivalent solvent.
- (8) Assemble a shield ground wire with mechanical ferrules. Refer to Subject 20-10-15.

These conditions are applicable:

- The selection of the ferrules is from Table 4
- The selection of the shield ground wire is from Table 3
- The length of the shield ground wire is 3.00 inches ±0.13 inch maximum.

D. 65B47866-1 and -2 Cable Preparation for the Assembly of Matrix MT30K(-) and MT37K(-) Connectors

Table 6
CONNECTOR PART NUMBERS

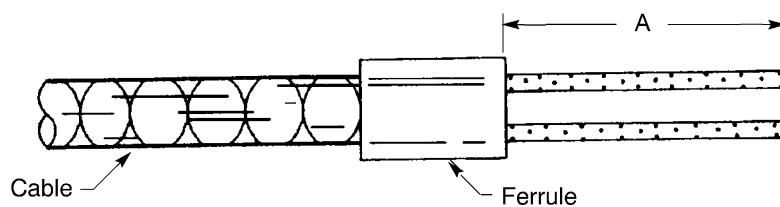
Part Number	Supplier
MT30K-2219-299	Matrix
MT37K-1203-191	Matrix
MT37K-1203-299	Matrix

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

**Table 7
CABLE TRIM DIMENSIONS**

Connector	Trim Dimension		
	Dimension	Target (inch)	Tolerance (inch)
MT37K-1203-191	A	1-1/2	± 1/8
MT37K-1203-299	A	1	± 1/8
MT30K-2219-299	A	1-1/4	± 1/8



**CABLE PREPARATION
Figure 6**

- (1) Remove the necessary length of the cable jacket and the shield. Refer to Figure 6 and Table 7.
- (2) Cut the outer carbon layer along the longitudinal axis of the cable between the two component wires.
- (3) Remove the necessary length of the outer carbon layer.
Make sure that the end of the carbon layer is aligned with the end of the cable jacket.
- (4) Move the two component wires apart from the end of the cable to the end of the jacket.
- (5) Remove the necessary length of the middle carbon layer on each component wire.
Make sure that the distance from the end of the carbon layer to the end of the primary insulation is is 0.50 inch ±0.06 inch.
Refer to Subject 20-63-13.

CAUTION: MAKE SURE THAT DAMAGE TO THE PRIMARY INSULATION DOES NOT OCCUR.

- (6) Remove all of the unwanted carbon from the primary insulation with a fiberglass eraser or an abrasive pad.
- (7) Clean the insulation with acetone or an equivalent solvent.
- (8) Assemble a shield ground wire with mechanical ferrules. Refer to Subject 20-10-15.

These conditions are applicable:

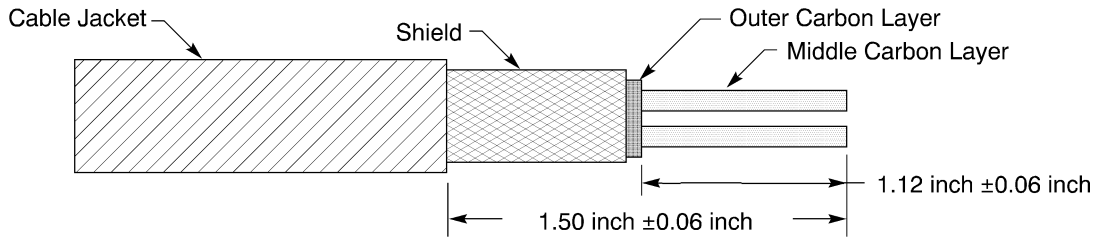
- The selection of the ferrules is from Table 4
- The selection of the shield ground wire is from Table 3
- The length of the shield ground wire is 3.00 inches ±0.13 inch maximum.

E. 65B47866-1 and -2 Cable Preparation for the Assembly of Connectors with Glenair 387()020 and Boeing S280W603 Backshells

This paragraph gives the procedure to prepare the 65B47866-2 cable.

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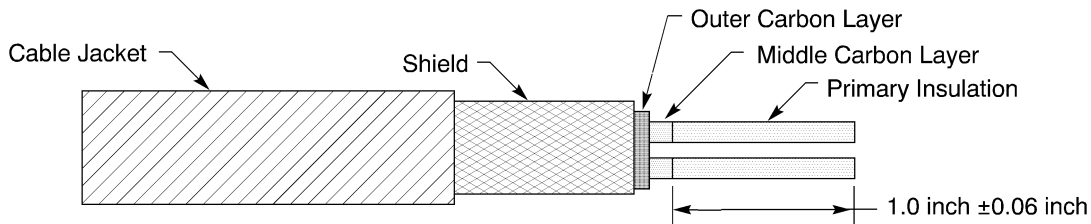
CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE



CABLE TRIM DIMENSIONS
Figure 7

Refer to Figure 7.

- (1) Put the backshell on the cable so that it is away from the end of the cable.
- (2) Remove 1.50 inches ± 0.06 inch of the jacket from the end of the cable.
- (3) Remove 1.12 inches ± 0.06 inch of the shield from the end of the cable.
- (4) Move the two wires apart from the end of the cable to the end of the jacket.
- (5) Cut the outer carbon layer along the longitudinal axis of the cable between the two component wires.
- (6) Remove 1.12 inches ± 0.06 inch of the outer carbon layer.
- (7) Remove 1.00 inch ± 0.06 inch of the middle carbon layer from the end of each component wire. Refer to Figure 8.



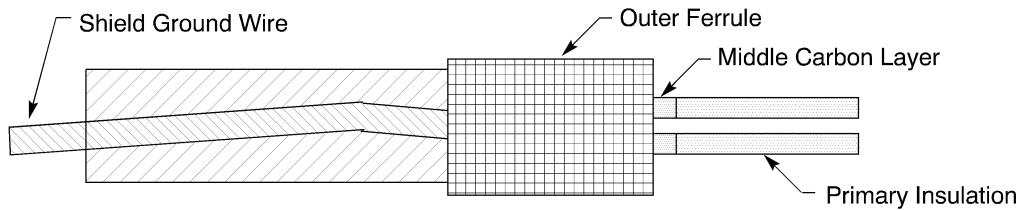
REMOVAL LENGTH OF THE MIDDLE CARBON LAYER
Figure 8

- (8) Remove all of the unwanted carbon from the primary insulation with a fiberglass eraser or an abrasive pad.
- (9) Clean the insulation with acetone or an equivalent solvent.
- (10) Assemble the shield ground wire with mechanical ferrules and a 6.0 inch length of the shield from a BMS 13-58 Type 7 Class 1 AWG 20 wire. Refer to Subject 20-10-15.

Make sure that the shield ground wire makes an exit from the cable at the rear end of the ferrule. Refer to Figure 9.

STANDARD WIRING PRACTICES MANUAL

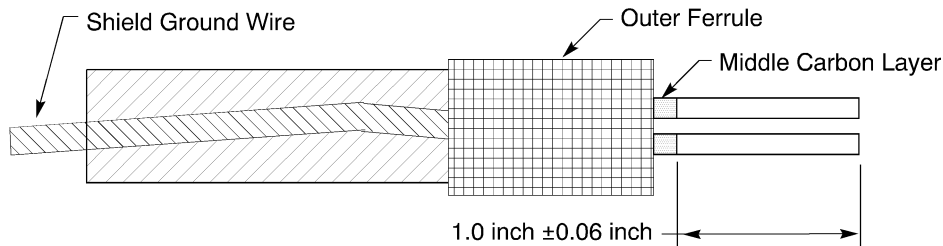
CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE



POSITION OF THE SHIELD GROUND WIRE

Figure 9

- (11) Remove 1.00 inch \pm 0.06 inch of insulation from the end of each wire. Refer to Figure 10.



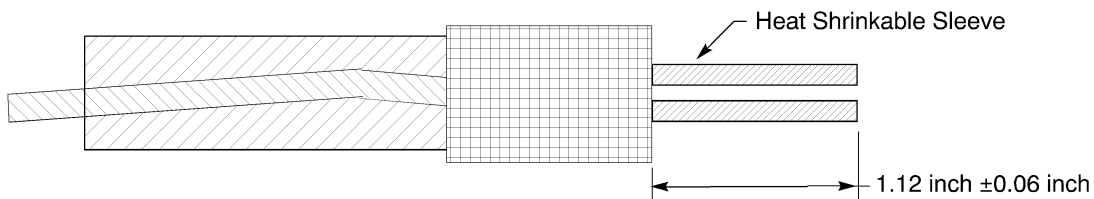
INSULATION REMOVAL

Figure 10

- (12) Put a 1.12 inch \pm 0.06 inch length of 1/8 inch diameter of TFE 4X heat shrinkable sleeve on each conductor.

Make sure that the sleeve makes an overlap with the middle carbon layer of the conductor.

Refer to Figure 11.



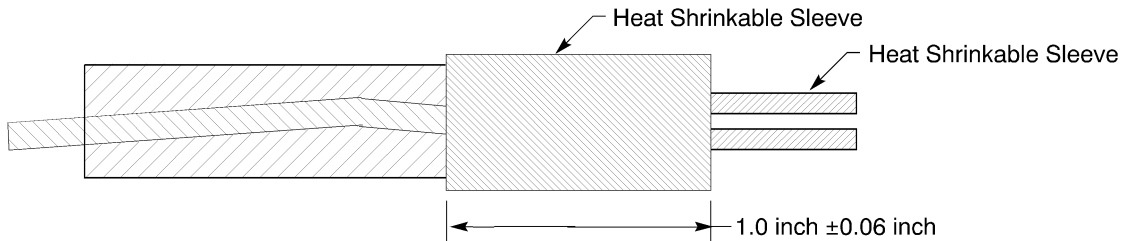
POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONDUCTORS

Figure 11

- (13) Shrink each sleeve into its position. Refer to Subject 20-10-14.
- (14) Put a 1.00 inch \pm 0.06 inch length of 3/8 inch diameter TFE 4X heat shrinkable sleeve on the cable. Make sure that the center of the sleeve is aligned with the center of the ferrule. Refer to Figure 12.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CABLE
Figure 12

(15) Shrink the sleeve into its position. Refer to Subject 20-10-14.

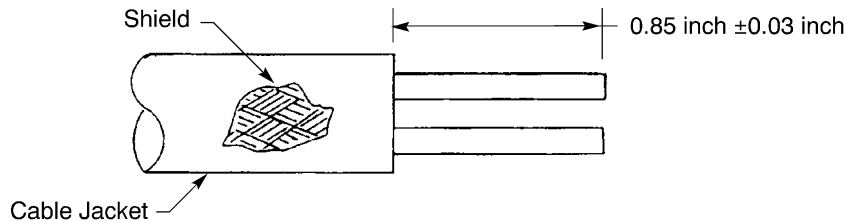
3. TERMINAL ASSEMBLY

A. Cable Preparation

Table 8
APPLICABLE TERMINALS

Part Number	Supplier
321893	AMP

- (1) Remove 1.0 inch \pm 0.1 inch of the cable jacket and the shield from the end of the cable.
 Make sure that the end of the jacket and the shield are perpendicular to the longitudinal axis of the cable.
- (2) Move the two component wires in the outer carbon layer apart.
 Make sure that the wires are parallel.
- (3) Cut the outer carbon layer along the longitudinal axis of the cable between the two wires.
- (4) Remove the necessary length of the outer carbon layer.
 Make sure that the end of the carbon layer is aligned with the end of the cable jacket.
- (5) Remove all of the unwanted carbon from the primary insulation with a fiberglass eraser or an abrasive pad.
- (6) Clean the insulation with acetone or an equivalent solvent.
- (7) Cut each wire so that the distance from the end of the cable jacket to the end of the wire is 0.85 inch \pm 0.03 inch. Refer to Figure 13.

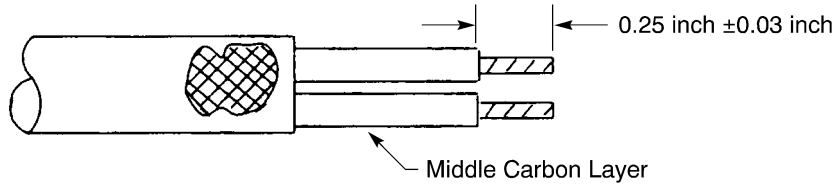


NECESSARY LENGTH OF THE WIRES
Figure 13

STANDARD WIRING PRACTICES MANUAL

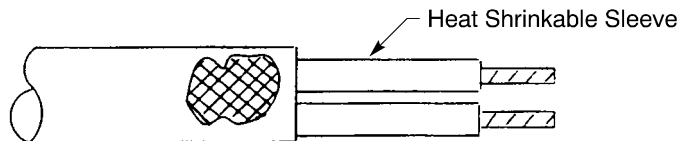
CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

- (8) Remove 0.25 inch \pm 0.03 inch of the primary insulation from each component wire. Refer to Figure 14.



INSULATION REMOVAL
Figure 14

- (9) Remove the necessary length of the middle carbon layer.
Make sure that the distance from the end of the layer to the end of the primary insulation is 0.50 inch \pm 0.03 inch.
- (10) Remove all of the unwanted carbon from the primary insulation with a fiberglass eraser or an abrasive pad.
- (11) Clean the insulation with acetone or an equivalent solvent.
- (12) Measure the insulation resistance at 500V DC between:
- The conductors
 - The shield and each conductor.
- Make sure that there are no carbon tracks.
- (13) Put a 0.60 inch \pm 0.06 inch length of 1/8 inch diameter TFE 4X heat shrinkable sleeve on each component wire.
Make sure that the forward end of the sleeve is aligned with the end of the primary insulation of the component wire. Refer to Figure 15.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE WIRES
Figure 15

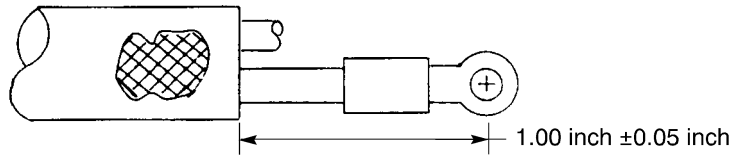
- (14) Shrink the sleeve into its position. Refer to Subject 20-10-14.

B. Terminal Assembly

- (1) Make a selection of a terminal from Table 8.
- (2) Make a selection of a crimp tool. Refer to Subject 20-30-11.
- (3) Attach a terminal to each wire:
- (a) Put the terminal on the wire. Refer to Figure 16.

STANDARD WIRING PRACTICES MANUAL

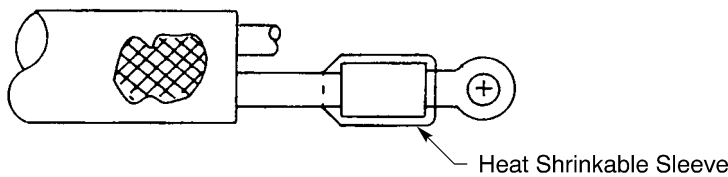
CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE



POSITION OF THE TERMINAL ON THE WIRE

Figure 16

- (b) Crimp the terminal.
- (c) Put a 0.60 inch \pm 0.06 inch length of 1/4 inch diameter TFE 4X heat shrinkable sleeve on the terminal. Refer to Figure 17.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE TERMINAL

Figure 17

- (d) Shrink the sleeve into its position. Refer to Subject 20-10-14.

4. ASSEMBLY OF THE VIBRO-METER CG505M1-03 CONNECTOR WITH 65B47866-1 AND -2 CABLE

A. Part Numbers and Description

**Table 9
CONNECTOR PART NUMBERS**

Part Number	Supplier
CG505M1-03	Vibro-Meter

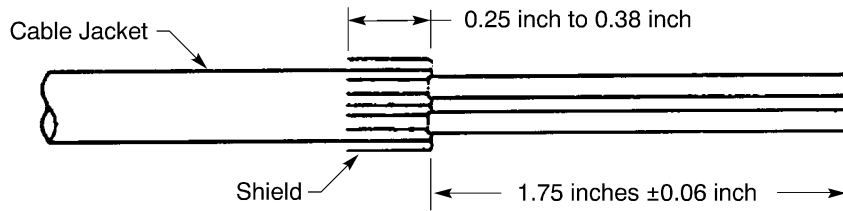
**Table 10
CONNECTOR ASSEMBLY KIT COMPONENTS**

Component	Part Number	Supplier
Socket Contacts	-	-
Teflon Heat Shrinkable Sleeve	-	-
Insertion and Removal Tool	M15570-20	Deutsch

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

B. Cable Preparation



CABLE PREPARATION
Figure 18

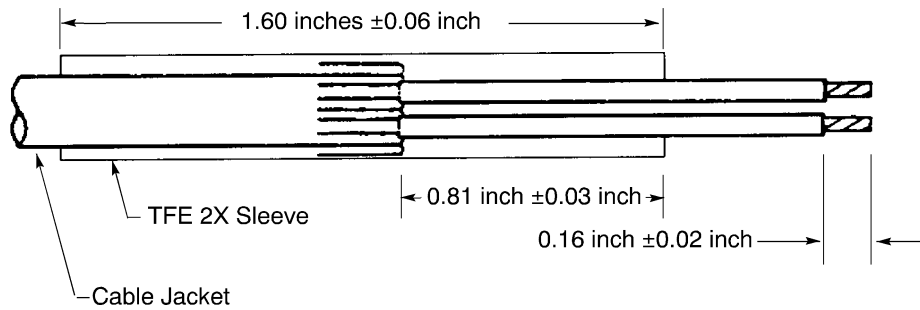
- (1) Remove 1.75 inches ±0.06 inch of the cable jacket from the end of the cable.
- (2) Move the strands of the shield apart.
- (3) Fold the strands back over the end of the cable jacket.
- (4) Remove the necessary length of the ends of the strands.
Make sure that the distance from the strand ends to the end of the jacket is 0.25 inch to 0.38 inch. Refer to Figure 18.
- (5) Put a 1.63 inch ±0.06 inch length of TFE 2X heat shrinkable sleeve on the cable.
- (6) Move the two wires apart from the end of the cable to the end of the jacket.
- (7) Cut the outer carbon layer along the longitudinal axis of the cable between the two component wires.
- (8) Remove the necessary length of the outer carbon layer.
Make sure that the end of the carbon layer is aligned with the end of the cable jacket.
- (9) Remove the necessary length of the middle carbon layer on each component wire.
Make sure that the end of the layer is aligned with the end of the jacket.

CAUTION: MAKE SURE THAT DAMAGE TO THE PRIMARY INSULATION DOES NOT OCCUR.

- (10) Remove all of the unwanted carbon from the primary insulation with a fiberglass eraser or an abrasive pad.
- (11) Clean the insulation with acetone or an equivalent solvent.
- (12) Remove 0.16 inch ±0.02 inch of the primary insulation from the end of each component wire.
- (13) Put the necessary length of a 1/8 inch diameter TFE 2X heat shrinkable sleeve on each component wire.
Make sure that:
 - The rearward end of each sleeve is against the shield
 - The forward end of each sleeve is aligned with the end of the primary insulation of the component wire.
- (14) Push the TFE 2X heat shrinkable sleeve toward the end of the cable until the forward end of the sleeve is beyond the end of the cable jacket or inner jacket.
Make sure that the distance from the forward end of the sleeve to the end of the cable jacket or inner jacket is 0.81 inch ±0.03 inch. Refer to Figure 19.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CABLE

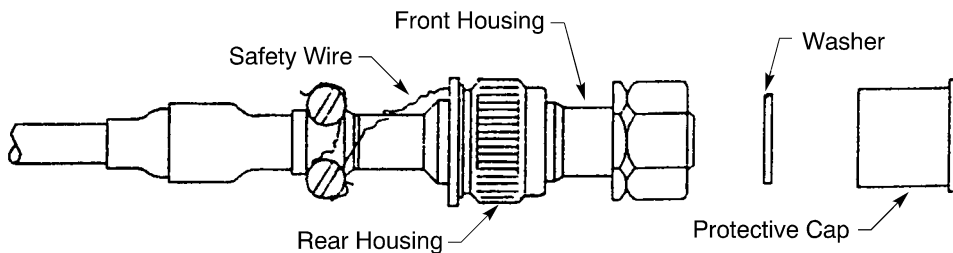
Figure 19

(15) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Connector Assembly

**Table 11
CONTACT CRIMP TOOLS**

Basic Unit	Locator
M22520/2-01	M22520/2-02



CONNECTOR ASSEMBLY

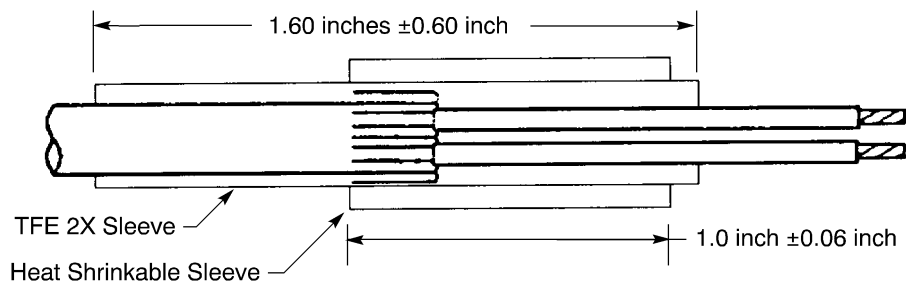
Figure 20

- (1) Make a selection of a crimp tool from Table 11.
- (2) Assemble a contact, from the connector kit, on the end of both wires.
- (3) Put the 1.00 inch \pm 0.06 inch Teflon heat shrinkable sleeve, from the connector kit, on the cable.
- (4) Push the rear housing of the connector, without the saddle clamp and the screws, rearward as far as possible on the wires and the TFE 2X heat shrinkable sleeve.
- (5) Make a selection of an insertion tool from Table 10.
- (6) With the red end of the tool, push each socket contact through the grommet of the connector front housing into the contact cavity until the contact is locked in position.
- (7) Lightly pull on the wire to make sure that the contact is locked in position.
- (8) If the contact is not locked in position:
 - (a) Push the white end of the tool forward on the wire into the contact cavity until it stops.
 - (b) At the same time, hold the wire against the tool and remove the wired contact and the tool.

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CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

- (c) Turn the insertion tool 90 degrees on its longitudinal axis.
- (d) Do Step (6) and Step (7) again.
- (9) Engage the threads of the rear housing and the front housing.
- (10) Tighten the rear housing.
 - Make sure that the clamp bar support at the rear of the connector housing is:
 - Parallel to the two socket contacts on the front of the connector
 - On the opposite side of the connector keyway.
- (11) Put the 1.0 inch \pm 0.06 inch length of heat shrinkable sleeve on the TFE 2X sleeve. Refer to Figure 21.
 - Make sure that the rear end of the sleeve is aligned with the end of the strands of the shield.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CABLE
Figure 21

- (12) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (13) Install the cable clamp on the connector.
- (14) Tighten the two saddle clamp screws.
- (15) Torque each screw 8.0 in-lbs \pm 0.5 in-lbs.
- (16) Install the safety wire on the screw heads. Refer to Figure 20.
- (17) Put the nickel washer on connector interface.
- (18) Put the protective cap on the engaging end of the connector. Refer to Figure 20.

D. Connector Installation

- (1) Remove the protective cap.
- (2) Engage the threads of the plug and the receptacle.
- (3) Tighten the coupling nut 80 inch-pounds to 110 inch-pounds.

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CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

5. ASSEMBLY OF THE VIBRO-METER VMCG505M3-01, VIBRO-METER 812-505-000-301, ENDEVCO 26574, AND GLENAIR GC501 CONNECTORS WITH 65B47866-1, -2, AND -5 CABLE

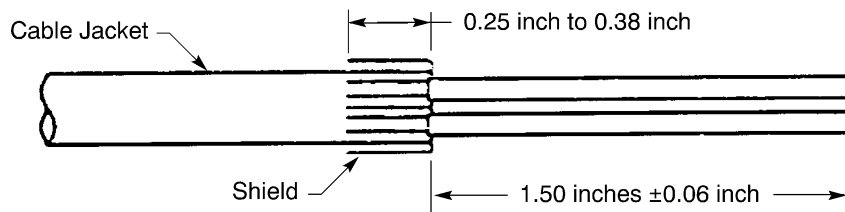
A. Part Numbers and Description

**Table 12
CONNECTOR PART NUMBERS**

Part Number	Supplier
CG505M3-01	Vibro-Meter
VMCG505M3-01	Vibro-Meter
26574	ENDEVCO
GC501	Glenair

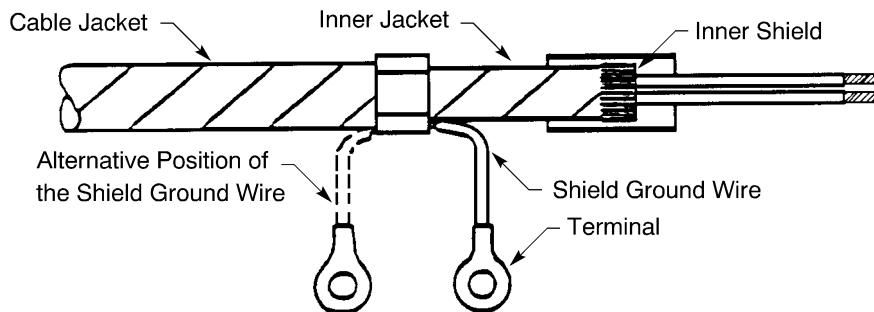
B. Cable Preparation

- (1) Remove the necessary length of the cable jacket from the end of the cable:
 - 1.50 inches \pm 0.06 inch for the 65B47866-1 and 65B47866-2 cables; refer to Figure 22
 - 2.75 inches \pm 0.06 inch for the 65B47866-5 cable.



**65B47866-1 AND 65B47866-2 CABLE PREPARATION
Figure 22**

- (2) For the 65B47866-5 cable, assemble a shield ground wire for the outer shield. Refer to Figure 23.



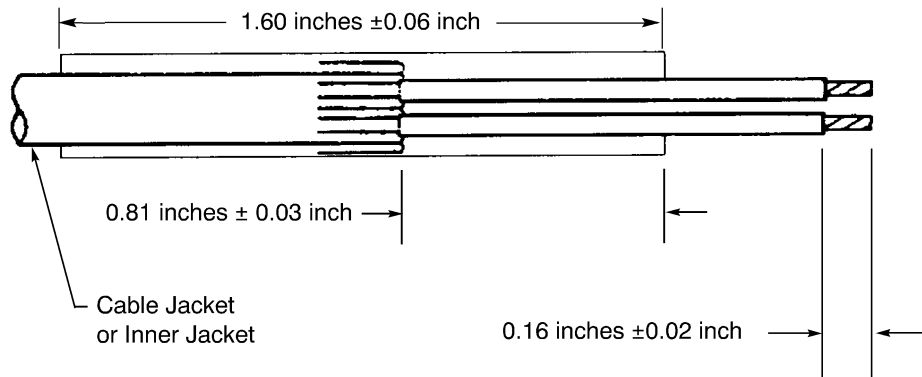
**CONFIGURATION OF THE SHIELD GROUND WIRE OF THE OUTER SHIELD OF THE 54B47866-5
CABLE
Figure 23**

STANDARD WIRING PRACTICES MANUAL**CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE**

- (a) Assemble a shield ground wire with mechanical ferrules. Refer to Subject 20-10-15.
These conditions are applicable:
- The selection of the ferrules is from Table 4
 - The selection of the shield ground wire is from Table 3
 - The length of the shield ground wire is 2.0 inches maximum.
 - The heat shrinkable sleeve is a 1.0 inch ± 0.06 inch length of TFE 2X sleeve.
- (b) Assemble a BACT12M terminal on the end of the shield ground wire. Refer to Subject 20-30-11.
Make sure that a 1.0 inch ± 0.06 inch length of heat shrinkable sleeve is installed on the terminal.
- (c) Remove 1.50 inches ± 0.06 inch of the inner jacket from the cable.
- (3) Move the strands of the shield or the inner shield apart.
- (4) Fold the strands back over the end of the cable jacket or the inner jacket.
- (5) Remove the necessary length of the shield strands.
Make sure that the distance from the strand ends to the end of the jacket is 0.25 inch to 0.38 inch. Refer to Figure 22.
- (6) Put a 1.63 inch ± 0.06 inch length of TFE 2X heat shrinkable sleeve on the cable.
- (7) Move the two wires apart from the end of the cable to the end of the jacket.
- (8) Cut the outer carbon layer along the longitudinal axis of the cable between the two component wires.
- (9) Remove the necessary length of the outer carbon layer.
Make sure that the end of the carbon layer is aligned with:
- The end of the cable jacket for the cable with one shield
 - The end of the inner jacket for the cable with two shields.
- (10) Remove the necessary length of the middle carbon layer on each component wire.
Make sure that the end of the layer is aligned with the end of the jacket.
- CAUTION:** MAKE SURE THAT DAMAGE TO THE PRIMARY INSULATION DOES NOT OCCUR.
- (11) Remove all of the unwanted carbon from the primary insulation with a fiberglass eraser or an abrasive pad.
- (12) Clean the insulation with acetone or an equivalent solvent.
- (13) Remove 0.16 inch ± 0.02 inch of the primary insulation from the end of each component wire.
- (14) Put the necessary length of a 1/8 inch diameter TFE 2X heat shrinkable sleeve on each component wire.
Make sure that:
- The rearward end of each sleeve is against the shield
 - The forward end of each sleeve is aligned with the end of the primary insulation of the component wire.
- (15) Push the TFE 2X heat shrinkable sleeve forward, toward the end of the cable, until the forward end of the sleeve is beyond the end of the cable jacket or inner jacket.
Make sure the distance from the forward end of the sleeve to the end of the cable jacket or inner jacket is 0.81 inch ± 0.03 inch. Refer to Figure 24.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE



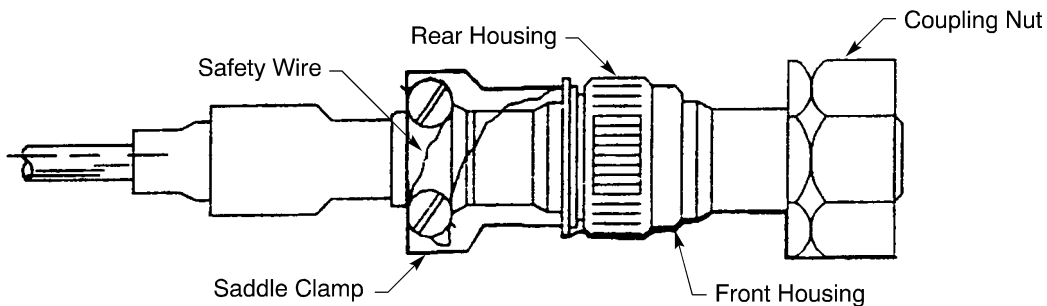
POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CABLE
Figure 24

- (16) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (17) Remove 0.16 inch ±0.02 inch of the primary insulation from the end of each component wire.

C. Connector Assembly

Table 13
CONTACT CRIMP TOOLS

Basic Unit	Locator
ST2220-1-Y	ST2220-1-1



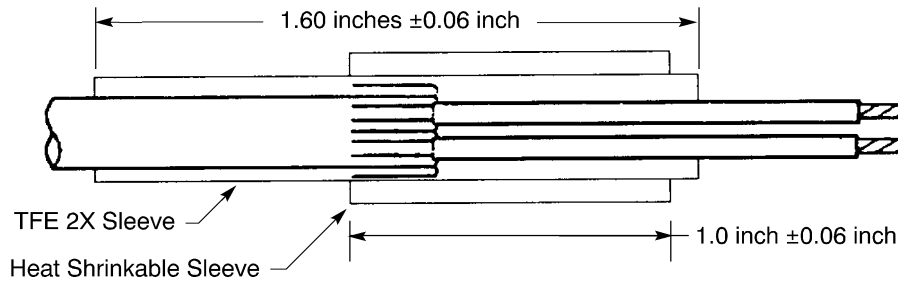
CONNECTOR ASSEMBLY
Figure 25

- (1) Make a selection of a crimp tool from Table 13.
- (2) Assemble a contact, from the connector kit, on the end of both wires.
- (3) Put the 1.0 inch ±0.06 inch Teflon heat shrinkable sleeve, from the connector kit, on the cable.
- (4) Push the rear housing of the connector, without the saddle clamp and the screws, rearward as far as possible on the wires and the TFE 2X heat shrinkable sleeve.
- (5) Make a selection of a contact insertion tool from Table 10.
- (6) With the red end of the tool, push each socket contact through the grommet of the connector front housing into the contact cavity until the contact is locked in position.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

- (7) Lightly pull on the wire to make sure that the contact is locked in position.
- (8) If the contact is not locked in position:
 - (a) Push the white end of the tool forward on the wire into the contact cavity until it stops.
 - (b) At the same time, hold the wire against the tool and remove the wired contact and the tool.
 - (c) Turn the insertion tool 90 degrees on its longitudinal axis.
 - (d) Do Step (6) and Step (7) again.
- (9) Put the 1.0 inch \pm 0.06 inch length of heat shrinkable sleeve on the TFE 2X sleeve. Refer to Figure 26. Make sure that the rear end of the sleeve is aligned with the end of the strands of the shield.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CABLE

Figure 26

- (10) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (11) Install the cable clamp on the connector.
- (12) For the 65B47866-5 cable, attach the terminal of the shield ground wire on one of the saddle clamp screws.
- (13) Tighten the two screws.
- (14) Torque each screw 8.0 in-lbs \pm 0.5 in-lbs.
- (15) Install the safety wire on the screw heads. Refer to Figure 25.

6. APPROVED TOOL SUPPLIERS

A. Crimp Tool Suppliers

**Table 14
CRIMP TOOL SUPPLIERS**

Tool	Supplier
M22520/2-01	QPL
M22520/2-02	QPL
ST2220-1-1	Boeing
ST2220-1-Y	Boeing



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STANDARD WIRING PRACTICES MANUAL

CONNECTOR AND TERMINAL ASSEMBLY WITH 65B47866() SHIELDED CABLE

B. Contact Insertion and Removal Tools

Table 15
INSERTION AND REMOVAL TOOL SUPPLIERS

Tool	Supplier
M15570-20	Deutsch

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STANDARD WIRING PRACTICES MANUAL

PREPARATION OF THE S280T004-1 AUDIO CABLE

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1. S280T004-1 AUDIO CABLE	1
A. Part Numbers and Description	1
B. Cable Preparation	1

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STANDARD WIRING PRACTICES MANUAL

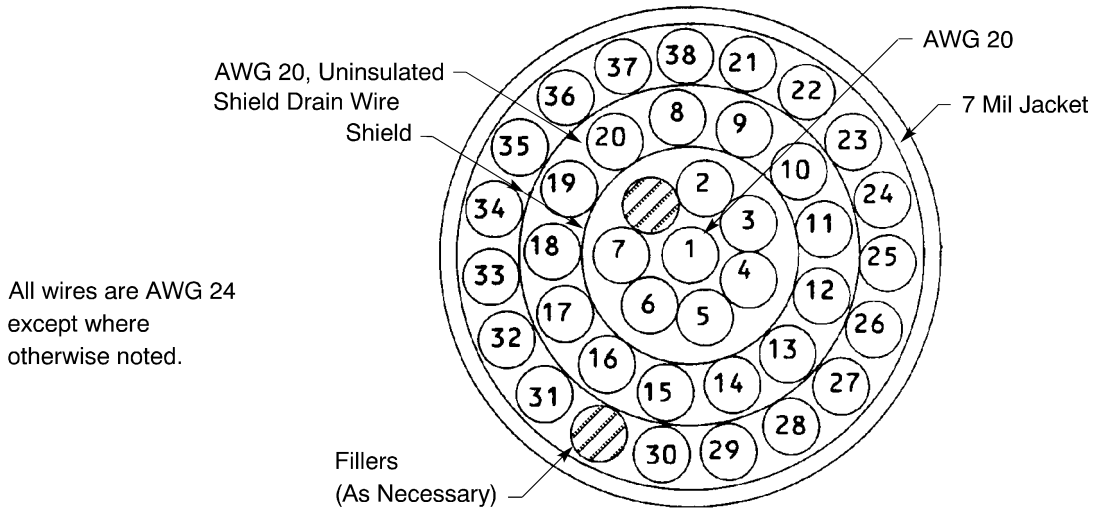
PREPARATION OF THE S280T004-1 AUDIO CABLE

1. S280T004-1 AUDIO CABLE

A. Part Numbers and Description

**Table 1
CABLE PART NUMBERS**

Boeing Specification	Description
S280T004-1	Audio Cable



**CONFIGURATION OF THE S280T004-1 CABLE
Figure 1**

B. Cable Preparation

- (1) Put a 2 inch \pm 1/2 inch length of 3/8 inch diameter heat shrinkable sleeve over the cable.
- (2) Remove 2 inches \pm 1/8 inch of the cable jacket.

CAUTION: DO NOT CAUSE ANY DAMAGE TO ANY OF THE WIRES.

- (3) Cut the shield and the fillers so that the ends are within 1/8 inch of the jacket.

CAUTION: DO NOT CUT THE BLACK INSULATED WIRE WITH THE FILLERS.

- (4) Remove the wire insulation. Refer to Subject 20-61-11.
- (5) Put a Thermofit heat shrinkable sleeve on the uninsulated ground wire so that the sleeve:
 - Is within 1/8 inch of the insulation barrel of the contact
 - Is over the cable jacket
 - Extends 1/2 inch \pm 1/8 inch beyond the saddle bar.
- (6) Shrink the sleeve in position.



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STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

<u>Paragraph</u>		<u>Page</u>
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	B. Connector Part Numbers	1
	C. Contact Part Numbers	1
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	A. Connector Assembly	2
3.	<u>ASSEMBLY OF THE BACC45FM16-10S, BACC63BV16-10S, AND 48-00R16-10S RECEPTACLES WITH S280T006-2 CABLE</u>	2
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STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

1. PART NUMBERS AND DESCRIPTION

A. Spoiler Cable Part Numbers

**Table 1
CABLE PART NUMBERS**

Boeing Specification	Supplier
S280T006-1	Boeing
S280T006-2	Boeing

B. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
48-00R16-10S	Receptacle	Amphenol
BACC45FM14-7P	Receptacle	Boeing
BACC45FM16-10S	Receptacle	Boeing
BACC63BV14-7P	Receptacle	Boeing
BACC63BV16-10S	Receptacle	Boeing

C. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

Boeing Standard	Contact Size		Contact Type	Supplier
	Engaging End	Crimp Barrel		
BACC47CP2T	16	16	Socket	Boeing

D. Necessary Assembly Components

**Table 4
NECESSARY ASSEMBLY COMPONENTS**

Component	Part Number	Supplier
Ferrule, Inner	BACS13S219B	Boeing
Ferrule, Outer	BACS13S297C	Boeing
Splice, Moisture Proof	D436-59	Raychem
Splice, Parallel	34137	AMP
Terminal Lug	BACT12M	Boeing

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STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

2. CONNECTOR ASSEMBLY WITH THE S280T006-1 SPOILER CABLE

A. Connector Assembly

Refer to Subject 20-61-11.

3. ASSEMBLY OF THE BACC45FM16-10S, BACC63BV16-10S, AND 48-00R16-10S RECEPTACLES WITH S280T006-2 CABLE

A. Shield Ground Wire Preparation

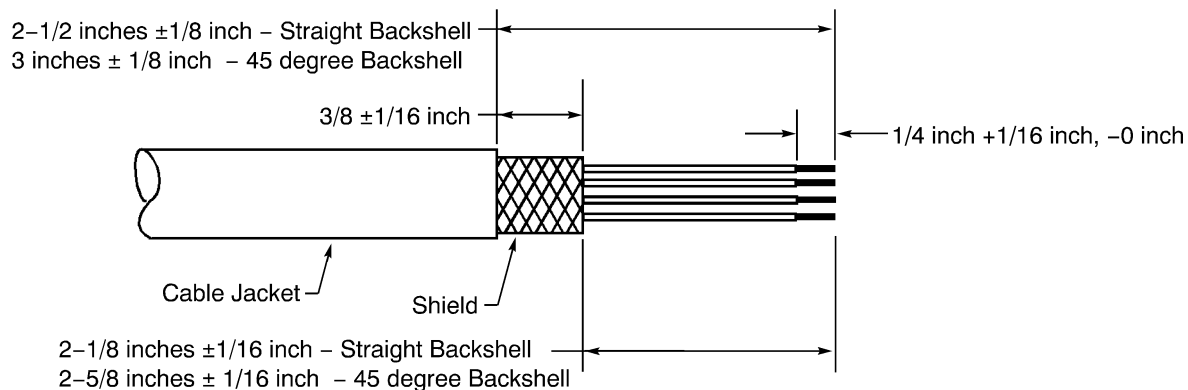
- (1) For a shield ground wire that must be attached to a ground stud, cut a 12.00 inch ± 0.25 inch length of BMS 13-48 Type 8 AWG 18 wire.
- (2) For a shield ground wire that must be attached to a backshell, cut a 2.00 inch ± 0.25 inch length of BMS 13-48 Type 8 AWG 18 wire.
- (3) Remove 0.25 inch ± 0.06 inch of insulation from one end of the wire.
- (4) Make a selection of a terminal lug from Table 4.
- (5) Assemble the terminal lug on the wire. Refer to Subject 20-30-11.

B. Case Ground Wire Preparation

- (1) Cut a 12.00 inch ± 0.25 inch length of BMS 13-48 Type 8 AWG 18 wire.
- (2) Put the wire number code on the wire. Refer to Subject 20-10-11.
- (3) Remove 0.25 inch ± 0.06 inch of insulation from one end of the wire.
- (4) Make a selection of a terminal lug from Table 4.
- (5) Assemble the terminal lug on the wire. Refer to Subject 20-30-11.

C. Cable Preparation

- (1) Put the connector backshell on the cable approximately 6 inches from the end.
- (2) Make a selection of a 0.5 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (3) Put a 2.50 inch ± 0.50 inch length of the heat shrinkable sleeve on the cable.
- (4) Put a 1.50 inch ± 0.13 inch length the heat shrinkable sleeve on the cable.
- (5) Prepare the cable. Refer to Figure 1.



CABLE PREPARATION
Figure 1

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

- (a) If it is necessary, cut the end of the cable to make the end perpendicular to its longitudinal axis.
- (b) Remove the necessary length of cable jacket from the end of the cable:
 - 2.50 inches \pm 0.13 inch for a straight backshell
 - 3.00 inches \pm 0.13 inch for a 45 degree backshell
- (c) Remove the necessary length of the shield from the end of the cable:
 - 2.13 inches \pm 0.06 inch for a straight backshell
 - 2.63 inches \pm 0.06 inch for a 45 degree backshell
- (d) Remove 0.25 inch \pm 0.06 inch, -0 inch of insulation from the end of each wire of the cable.

D. Shield Ground Wire Assembly with Mechanical Ferrules

A satisfactory alternative to the assembly of a shield ground wire with mechanical ferrules is the assembly with:

- A Shield-Kon; refer to Paragraph 3.E.
- A solder sleeve; refer to Paragraph 3.F.

**Table 5
FERRULE CRIMP TOOLS**

Outer Ferrule	Crimp Tool			
	Basic Unit	Die		
		Part Number	Cavity	Dimension (inch)
BACS13S297C	44-000	44-140	A	0.290
	612648	612893	-	
	613214	613011	-	
	620175	620308	A	
	HX-4	Y140	A	
	M22520/5-01	M22520/5-41	A	
	ST2966M	-	10	
	ST965-2	-	L	
	ST965A-14	-	-	
	ST965B	ST965B-14	-	
	WT211-14	-	L	
	WT214	-	-	
	WT414	-	-	
	WT440	4414	-	

- (1) Make a selection of an inner ferrule and outer ferrule from Table 4.
- (2) Make a selection of a ferrule crimp tool from Table 5.

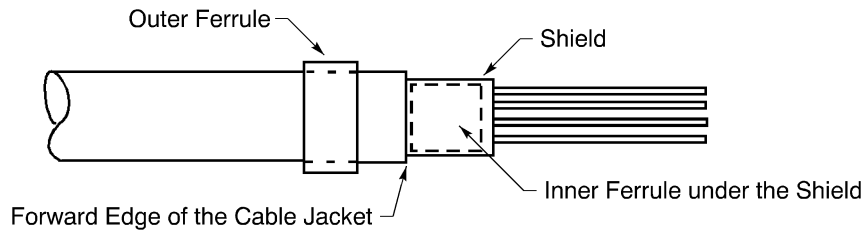
STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

- (3) Make a selection of a 3/8 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (4) Put a 1.0 inch ± 0.13 inch length of the heat shrinkable sleeve on the cable.
- (5) Put the outer ferrule on the cable.
- (6) Put the inner ferrule on the cable. Refer to Figure 2.

Make sure that the ferrule is:

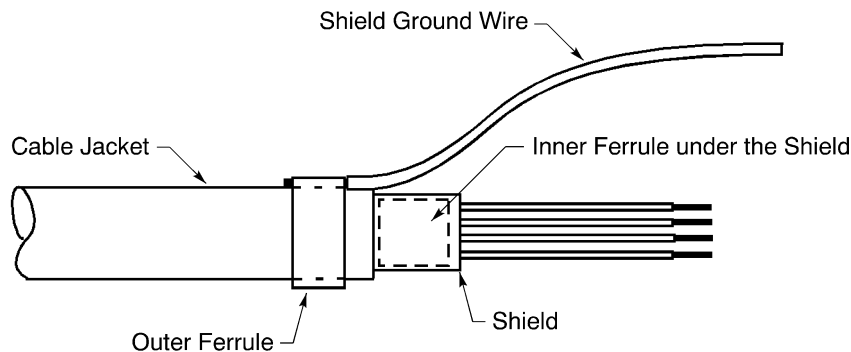
- Between the shield and the wires of the cable
- Tight against the end of the cable jacket.



POSITION OF THE INNER FERRULE

Figure 2

- (7) From the forward end of the cable, put the end of the shield ground wire without insulation between the cable jacket and the outer ferrule. Refer to Figure 3.



INITIAL POSITION OF THE OUTER FERRULE AND THE SHIELD GROUND WIRE

Figure 3

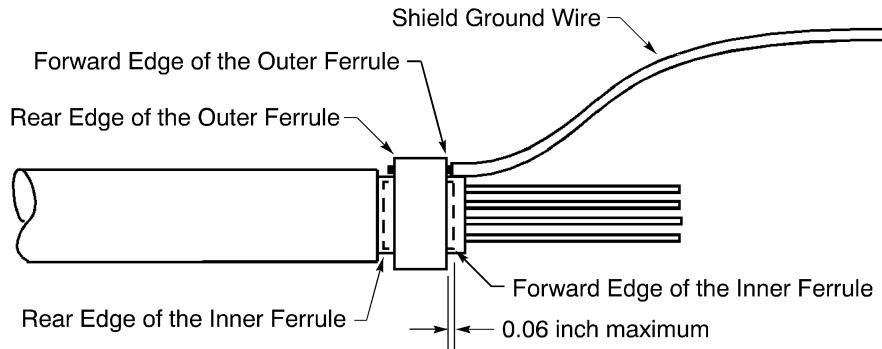
- (8) Push the outer ferrule and the shield ground wire forward at the same time until the center of the outer ferrule is aligned with the center of the inner ferrule. Refer to Figure 4.

Make sure that:

- The distance from the forward edge of the inner ferrule to the forward edge of the outer ferrule is not more than 0.06 inch
- The end of the shield ground wire is between the rear edge of the outer ferrule and the rear edge of the inner ferrule.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES



POSITION OF THE OUTER FERRULE AND THE SHIELD GROUND WIRE
Figure 4

- (9) Crimp the outer ferrule.
- (10) Remove the length of the shield that extends forward farther than the forward edge of the outer ferrule.

NOTE: The surface of the inner ferrule can be used to cut against.

- (11) Align the center of the 1 inch sleeve with the center of the outer ferrule.
- (12) Shrink the sleeve into position. Refer to Subject 20-10-14.

E. Shield Ground Wire Assembly with a Shield-Kon

Refer to Subject 20-10-15.

Make sure that the shield ground wire is extended forward from the forward end of the Shield-Kon. Refer to Figure 4.

F. Shield Ground Wire Assembly with a Solder Sleeve

Refer to Subject 20-10-15.

Make sure that the shield ground wire is extended forward from the forward end of the solder sleeve. Refer to Figure 4.

G. Splice Assembly

Table 6
SPLICE CRIMP TOOLS

Splice	Crimp Tool Basic Unit
34137	49900
	49935
	WT130
	WT1300
D-436-59	AD-1377

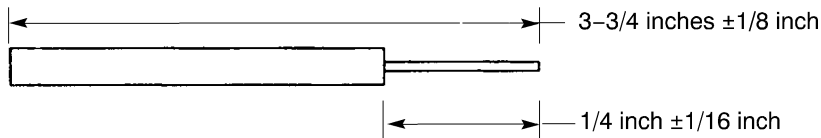
STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

NOTE: The applicable shield termination mechanism can be:

- A mechanical ferrule
- A Shield-Kon
- A solder sleeve.

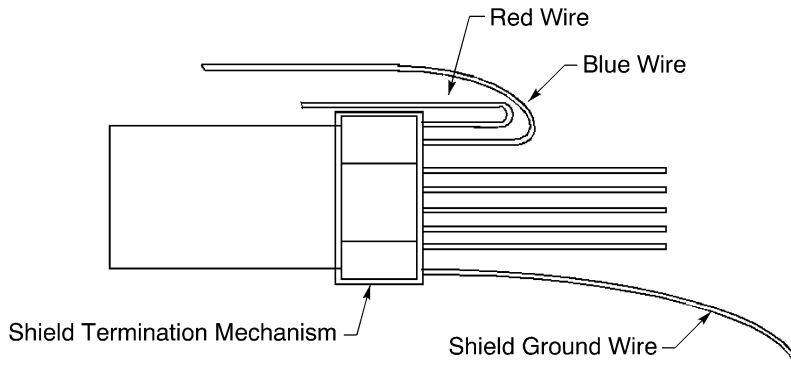
- (1) Make a selection of a splice from Table 4.
Two splices are necessary.
- (2) Make a selection of a crimp tool from Table 6.
- (3) Prepare four BMS 13-48 Type 8 AWG 20 splice wires. Refer to Figure 5.



INSULATION REMOVAL LENGTH

Figure 5

- (a) Cut each wire 3.75 inches \pm 0.13 inch.
- (b) Remove 0.25 inch \pm 0.06 inch of insulation from the end of each wire.
- (4) Bend the red and the blue wires back across the applicable shield termination mechanism. Refer to Figure 6.



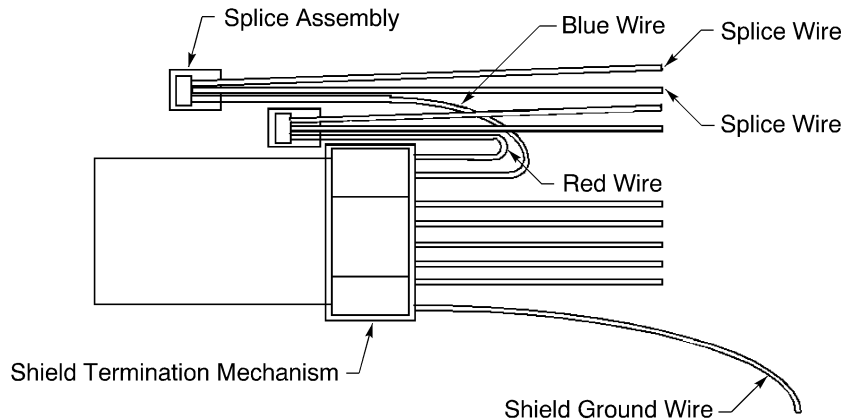
PREPARATION FOR THE ASSEMBLY OF SPLICES

Figure 6

- (5) If the splice is a moisture proof splice:
 - (a) Put the end of the red wire and the ends of the two splice wires in the same end of the splice. Refer to Figure 7.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES



CONFIGURATION OF THE SPLICES

Figure 7

- (b) Crimp the splice.
- (c) Put the moisture proof sleeve on the splice.
Make sure that the center of the sleeve is aligned with the center of the splice.
- (d) Shrink the sleeve. Refer to Subject 20-10-14.
Make sure that the lining of the sleeve is fully melted.
- (e) Do Step (a) through Step (d) again with the blue wire.
- (6) If the splice is a parallel splice:
 - (a) Put the end of the red wire and the ends of the two splice wires in the same end of the splice. Refer to Figure 7.
 - (b) Crimp the splice.
 - (c) Put a 0.75 inch length of Thermofit PD heat shrinkable sleeve on the splice assembly.
Make sure that:
 - The sleeve has the smallest possible diameter that can move easily on the splice assembly
 - The center of the sleeve is aligned with the center of the splice.
 - (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (e) Do Step (a) through Step (d) again with the blue wire.
- (7) Cut the ends of the four splice wires to align them with the ends of the remaining wires of the cable. Refer to Figure 7.

H. Contact Assembly

- (1) Make a selection of a contact from Table 3.
10 contacts are necessary.
- (2) Remove 0.25 inch \pm 0.06 inch of insulation from the end of each splice wire. Refer to Figure 5.
- (3) Remove 0.25 inch \pm 0.06 inch of insulation from one end of the case ground wire.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

- (4) Assemble a contact on the end of:
- Each of the five remaining AWG 20 wires of the cable
 - Each of the four AWG 18 splice wires
 - The AWG 18 case ground wire.

Refer to Subject 20-61-11.

I. Connector Assembly

NOTE: The applicable shield termination mechanism can be:

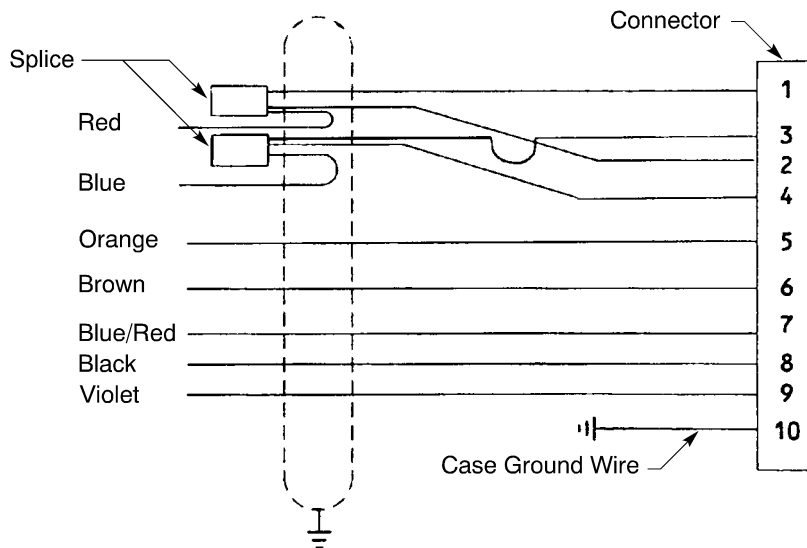
- A mechanical ferrule
- A Shield-Kon
- A solder sleeve.

- (1) Install each assembled contact in the connector.

Refer to:

- Figure 8
- Subject 20-61-11 for the contact insertion procedure.

Make sure to install the contact of the case ground wire in pin 10 of the connector.



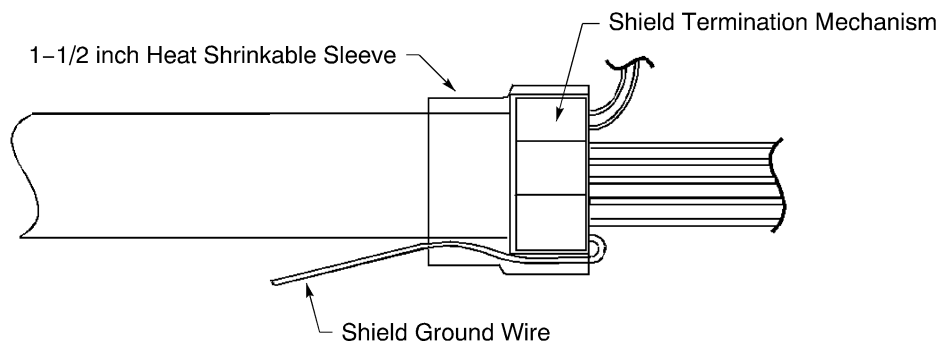
CONTACT INSERTION
Figure 8

- (2) If the shield ground wire must be attached to a ground stud:
- (a) Bend the wire back across the applicable shield termination mechanism.
 - (b) Align the forward edge of the 1.5 inch sleeve with the forward edge of the shield termination mechanism. Refer to Figure 9.

Make sure that the shield ground wire is between the sleeve and the cable.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

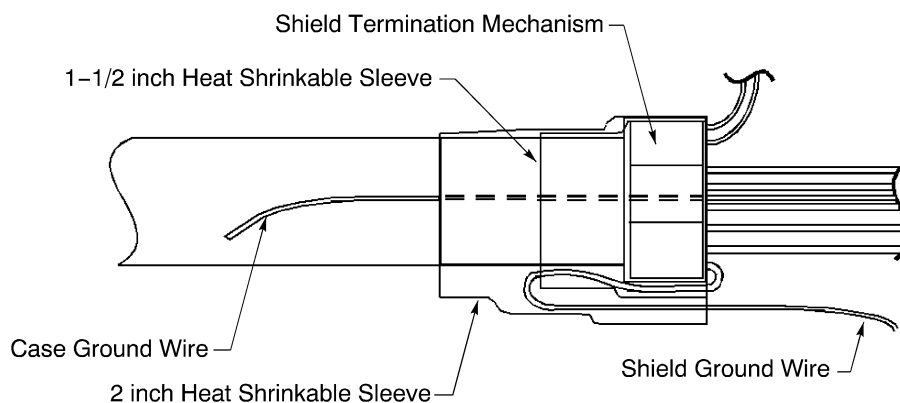


CONFIGURATION OF THE SHIELD GROUND WIRE FOR INSTALLATION ON A GROUND STUD
Figure 9

- (c) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (d) Fold the wire forward across the 1.5 inch sleeve.
- (e) Align the forward edge of the 2.5 inch sleeve with the forward edge of the shield termination mechanism. Refer to Figure 10.

Make sure that:

- The shield ground wire is between the sleeves
- The case ground wire is between the sleeves.



CONFIGURATION OF THE SHIELD GROUND WIRE FOR INSTALLATION ON A GROUND STUD
Figure 10

- (f) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (g) Install the backshell.
- (h) To make a tight fit under the saddle clamp, put the necessary layers of Permacel P-440 tape on the cable.

Make sure that:

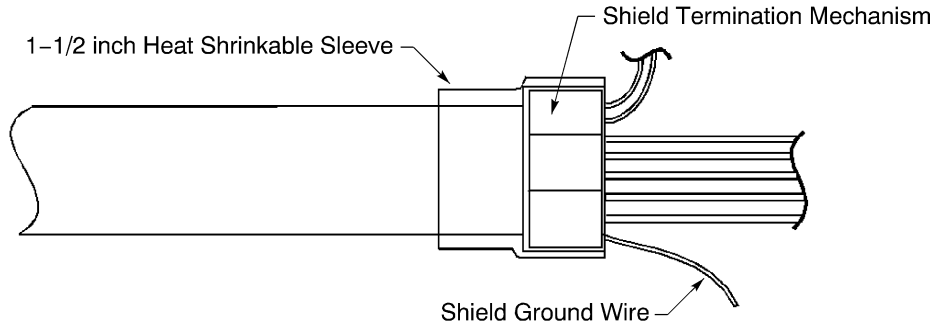
- The center each layer of tape is aligned with the center of the saddle clamp
- Each layer of tape makes 100 percent overlap.

- (3) If the shield ground wire must be attached to a backshell:

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

- (a) Align the forward edge of the 1.5 inch sleeve with the forward edge of the shield termination mechanism. Refer to Figure 11.

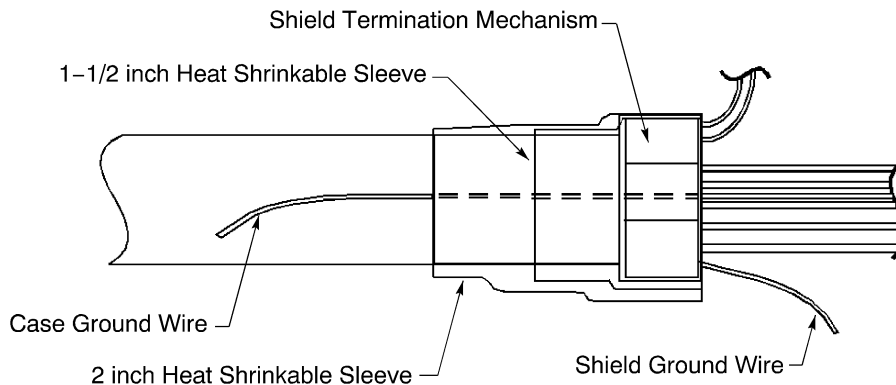


CONFIGURATION OF THE SHIELD GROUND WIRE FOR INSTALLATION ON A BACKSHELL

Figure 11

- (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
 (c) Align the forward edge of the 2.5 inch sleeve with the forward edge of the shield termination mechanism. Refer to Figure 12.

Make sure that the case ground wire is between the sleeves.



CONFIGURATION OF THE SHIELD GROUND WIRE FOR INSTALLATION ON A BACKSHELL

Figure 12

- (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
 (e) Install the backshell.
 (f) To make a tight fit under the saddle clamp, put the necessary layers of Permacel P-440 tape on the cable.
 Make sure that:
- The center each layer of tape is aligned with the center of the saddle clamp
 - Each layer of tape makes 100 percent overlap.
- (g) Put the terminal lug of the shield ground wire on a saddle clamp screw.
 (4) Install the saddle clamp.

STANDARD WIRING PRACTICES MANUAL**CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES****4. ASSEMBLY OF THE BACC45FM14-7P AND BACC63BV14-7P RECEPTACLES WITH S280T006-2 CABLE****A. Shield Ground Wire Preparation**

- (1) For a shield ground wire that must be attached to a ground stud, cut an 8.00 inch ± 0.25 inch length of BMS 13-48 Type 8 AWG 18 wire.
- (2) For a shield ground wire that must be attached to a backshell, cut a 2.00 inch $\pm .025$ inch length of BMS 13-48 Type 8 AWG 18 wire.
- (3) Remove 0.25 inch ± 0.06 inch of insulation from one end of the wire.
- (4) Make a selection of a terminal lug from Table 4.
- (5) Assemble the terminal lug on the wire. Refer to Subject 20-30-11.

B. Cable Preparation

- (1) Put the connector backshell on the cable approximately 6 inches from the end.
- (2) Make a selection of a 0.5 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (3) Put a 2.50 inch ± 0.50 inch length of the heat shrinkable sleeve on the cable.
- (4) Put a 1.50 inch ± 0.13 inch length of the heat shrinkable sleeve on the cable.
- (5) Prepare the cable. Refer to Figure 1.
 - (a) If it is necessary, cut the end of the cable to make the end perpendicular to its longitudinal axis.
 - (b) Remove 2.50 inches ± 0.13 inch of the outer jacket from the end of the cable.
 - (c) Remove 2.13 inches ± 0.06 inch of the shield from the end of the cable.
 - (d) Remove 0.25 inch $+0.06$ inch, -0 inch of insulation from the end of each wire of the cable.

C. Shield Ground Wire Assembly with Mechanical Ferrules

A satisfactory alternative to the assembly of a shield ground wire with mechanical ferrules is the assembly with:

- A Shield-Kon; refer to Paragraph 4.D.
 - A solder sleeve; refer to Paragraph 4.E.
- (1) Make a selection of an inner ferrule and outer ferrule from Table 4.
 - (2) Make a selection of a ferrule crimp tool from Table 5.
 - (3) Make a selection of a 3/8 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
 - (4) Put a 1.0 inch ± 0.13 inch length of the heat shrinkable sleeve on the cable.
 - (5) Put the outer ferrule on the cable.
 - (6) Put the inner ferrule on the cable. Refer to Figure 2.

Make sure that the ferrule is:

 - Between the shield and the wires of the cable
 - Tight against the end of the cable jacket.
 - (7) From the forward end of the cable, put the end of the shield ground wire without insulation between the cable jacket and the outer ferrule. Refer to Figure 3.
 - (8) Push the outer ferrule and the shield ground wire forward at the same time until the center of the outer ferrule is aligned with the center of the inner ferrule. Refer to Figure 4.

STANDARD WIRING PRACTICES MANUAL**CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES**

Make sure that:

- The distance from the forward edge of the inner ferrule to the forward edge of the outer ferrule is not more than 0.06 inch
 - The end of the shield ground wire is between the rear edge of the outer ferrule and the rear edge of the inner ferrule.
- (9) Crimp the outer ferrule.
- (10) Remove the unwanted length of the shield that extends forward farther than the forward edge of the outer ferrule.

NOTE: The surface of the inner ferrule can be used to cut against.

- (11) Align the center of the 1 inch sleeve with the center of the outer ferrule.
- (12) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Shield Ground Wire Assembly with a Shield-Kon

Refer to Subject 20-10-15.

Make sure that the shield ground wire is extended forward from the forward end of the Shield-Kon. Refer to Figure 4.

E. Shield Ground Wire Assembly with a Solder Sleeve

Refer to Subject 20-10-15.

Make sure that the shield ground wire is extended forward from the forward end of the solder sleeve. Refer to Figure 4.

F. Contact Assembly

- (1) Make a selection of the contacts from Table 3.
- (2) Assemble a contact on the end of each of the seven AWG 20 wires of the cable. Refer to Subject 20-61-11.

G. Connector Assembly

NOTE: The applicable shield termination mechanism can be:

- A mechanical ferrule
 - A Shield-Kon
 - A solder sleeve.
- (1) Install each assembled contact in the connector.
- Refer to:
- Figure 8
 - Subject 20-61-11 for the contact insertion procedure.
- (2) If the shield ground wire must be attached to a ground stud:
- (a) Bend the wire back across the applicable shield termination mechanism.
- (b) Align the forward edge of the 1.5 inch sleeve with the forward edge of the shield termination mechanism. Refer to Figure 9.
- Make sure that the shield ground wire is between the sleeve and the cable.
- (c) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (d) Fold the wire forward across the 1.5 inch sleeve.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

- (e) Align the forward edge of the 2.5 inch sleeve with the forward edge of the shield termination mechanism. Refer to Figure 10.
 Make sure that the shield ground wire is between the sleeves.
 - (f) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (g) Install the backshell.
 - (h) To make a tight fit under the saddle clamp, put the necessary layers of Permacel P-440 tape on the cable.
 Make sure that:
 - The center each layer of tape is aligned with the center of the saddle clamp
 - Each layer of tape makes 100 percent overlap.
- (3) If the shield ground wire must be attached to a backshell:
- (a) Align the forward edge of the 1.5 inch sleeve with the forward edge of the shield termination mechanism. Refer to Figure 11.
 - (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (c) Align the forward edge of the 2.5 inch sleeve with the forward edge of the shield termination mechanism. Refer to Figure 12.
 - (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (e) Install the backshell.
 - (f) To make a tight fit under the saddle clamp, put the necessary layers of Permacel P-440 tape on the cable.
 Make sure that:
 - The center each layer of tape is aligned with the center of the saddle clamp
 - Each layer of tape makes 100 percent overlap.
 - (g) Put the terminal lug of the shield ground wire on a saddle clamp screw.
- (4) Install the saddle clamp.

5. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 7
CRIMP TOOL SUPPLIERS**

Tool	Supplier
44-000	Balmar
44-140	Balmar
4414	Thomas & Betts
49900	AMP
49935	AMP
612648	Buchanan
612893	Buchanan
613214	Buchanan



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STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH S280T006-1 AND S280T006-2 SPOILER CABLES

Table 7 (continued)

Tool	Supplier
613011	Buchanan
620175	Buchanan
620308	Buchanan
AD-1377	Raychem
HX-4	Daniels
M22520/5-01	QPL
M22520/5-41	QPL
ST2966M	Boeing
ST965-2	Boeing
ST965A-14	Boeing
ST965B	Boeing
ST965B-14	Boeing
WT130	Thomas & Betts
WT1300	Thomas & Betts
WT211-14	Thomas & Betts
WT214	Thomas & Betts
WT414	Thomas & Betts
WT440	Thomas & Betts
Y140	Daniels

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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE RAYCHEM 0024A0014 BALANCED LINE CABLE

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STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF THE RAYCHEM 0024A0014 BALANCED LINE CABLE****1. PART NUMBERS AND DESCRIPTION****A. Cable Part Numbers**

Table 1
CABLE PART NUMBERS

Part Number	Supplier
0024A0014	Raychem

2. SHIELD TERMINATION**A. Cable Preparation**

- (1) Remove 2 inches of the jacket from the end of the cable.
- (2) Remove the length of the shield so that the end of the shield is 1/4 inch from the end of the jacket.
- (3) For contact assembly with size 22 contacts:
 - (a) Remove 1-1/4 inches of insulation from the end of the wire.
 - (b) Put a 2 inch length of 1/16 inch diameter Kynar heat shrinkable sleeve on the wire and under the shield so that:
 - The end of the sleeve is against the end of the jacket
 - The other end of the sleeve extends a minimum of 5/8 inch beyond the end of the wire insulation.
 - (c) Shrink the sleeve in position. Refer to Subject 20-10-14.

B. Shield Ground Wire Assembly

- (1) Assemble a shield ground wire with a solder sleeve. Refer to Subject 20-10-15.



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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF RAYCHEM 55A6087 CABLES

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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF RAYCHEM 55A6087 CABLES

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
BACC63BP	Plug	Boeing

B. Shield Termination Components

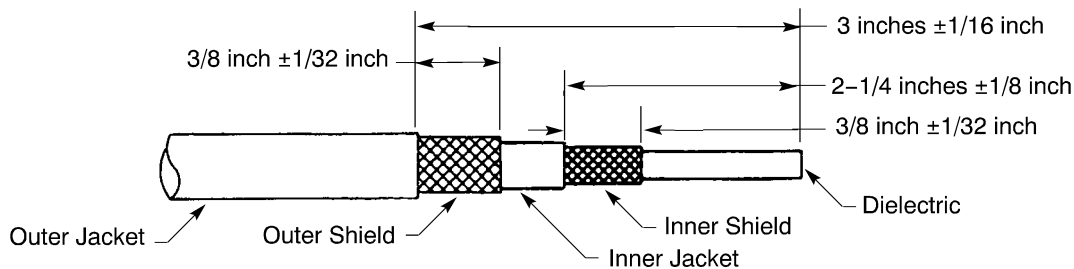
**Table 2
SHIELD TERMINATION COMPONENTS**

Component	Part Number	Supplier
Heat Shrinkable Solder Sleeve	BACS13BH2	Boeing
Terminal	BACT12AC3	Boeing

2. SHIELD TERMINATION

A. Cable Preparation

(1) Prepare the cable. Refer to Figure 1.



CABLE TRIM DIMENSIONS

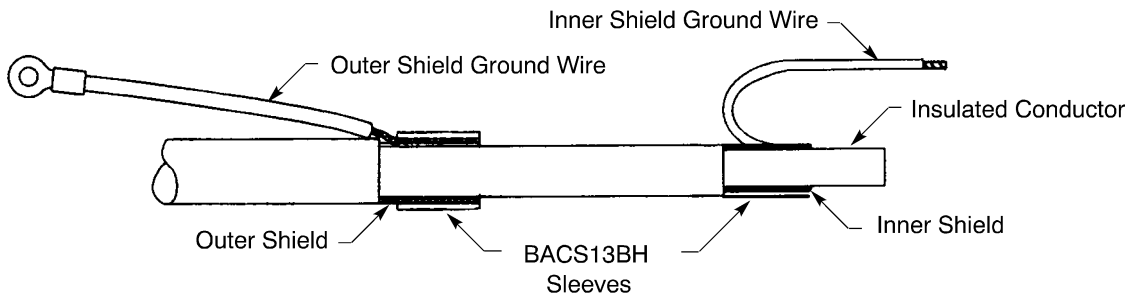
Figure 1

- (a) Remove 3 inches \pm 1/16 inch of the outer jacket from the end of the cable.
- (b) Remove the length of the outer shield so that the end of the shield is 3/8 inch \pm 1/32 inch from the end of the outer jacket.
- (c) Remove 2-1/4 inches \pm 1/8 inch of the inner jacket from the end of the cable.
- (d) Remove the length of the inner shield so that the end of the shield is 3/8 inch \pm 1/32 inch from the end of the inner jacket.

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SHIELD TERMINATION OF RAYCHEM 55A6087 CABLES

B. Inner and Outer Shield Ground Wire Assembly



INNER SHIELD AND OUTER SHIELD GROUND WIRES

Figure 2

- (1) Cut a 6 inch \pm 1/16 inch length of BMS 13-16 Type I Class 1 AWG 18 wire for the shield ground wire.
- (2) Remove the insulation from both ends of the wire. Refer to Subject 20-30-11.
- (3) Make a selection of a heat shrinkable solder sleeve from Table 2.
- (4) To terminate an inner shield with a shielded contact:
 - (a) Hold the shield ground wire on the inner shield.
 - (b) Put the sleeve on the cable and the end of the ground wire. Refer to Figure 2.
 - (c) Assemble the contact. Refer to Subject 20-61-11.
- (5) To terminate either an inner shield without a shielded contact or an outer shield:
 - (a) Make a selection of a terminal lug from Table 2.
 - (b) Crimp the terminal lug on one end of one ground wire. Refer to Subject 20-30-11.
 - (c) Hold the shield ground wire on the cable.
 - (d) Put the sleeve on the cable and the end of the ground wire. Refer to Figure 2.
 - (e) Shrink the sleeve in position.

Make sure that the shield ground wire points away from the end of the cable.



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SHIELD TERMINATION OF THE RAYCHEM 55A6090 CABLE

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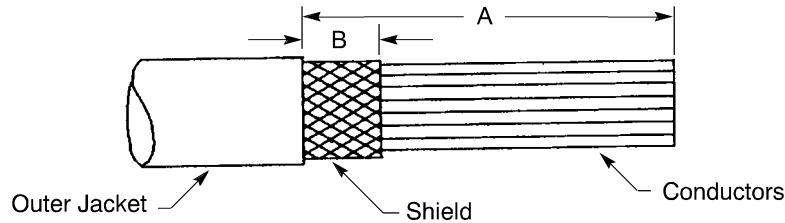
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SHIELD TERMINATION OF THE RAYCHEM 55A6090 CABLE

This Subject gives the procedures to terminate the outer shield of the Raychem 55A6090 cable.

1. CABLE SHIELD TERMINATION

A. Cable Preparation

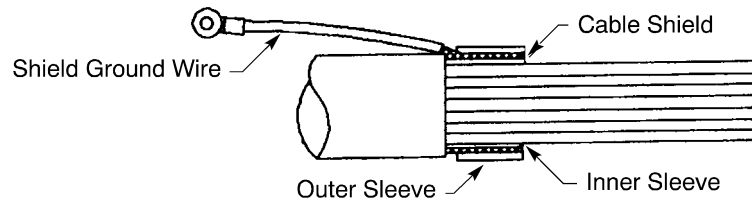


**CABLE TRIM DIMENSIONS
Figure 1**

**Table 1
CABLE TRIM DIMENSIONS**

Connector	Cable Trim		
	Dimension	Minimum (inch)	Maximum (inch)
BACC45FS20C	A	2-7/8	3-1/8
	B	11/32	13/32
BACC63BP18R	A	2-3/4	3
	B	11/32	13/32
BACC63BP22R	A	3	3-1/4
	B	11/32	13/32
BACC63BV18R	A	2-3/4	3
	B	11/32	13/32
BACC63BV22R	A	3	3-1/4
	B	11/32	13/32

- (1) Prepare the cable.
Refer to Figure 1 and Table 1.
 - (a) Remove the necessary length of the outer jacket so that the distance from the end of the jacket to the end of the cable is Dimension A.
 - (b) Remove the necessary length of the shield so that the distance from the end of the shield to the end of the outer jacket is Dimension B.

STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF THE RAYCHEM 55A6090 CABLE****B. Shield Ground Wire Assembly****SHIELD GROUND WIRE ASSEMBLY****Figure 2**

- (1) Prepare the shield ground wire. Refer to Subject 20-10-15.
 - (a) Make a selection of the shield ground wire.
 - (b) Cut a 6.0 inch ± 0.1 inch length of the wire.
 - (c) Remove the necessary insulation from both ends of the wire.
- (2) Assemble the BACT12AC3 general purpose terminal on the end of the ground wire. Refer to Subject 20-30-11.
- (3) Attach the shield ground wire to the shield with mechanical ferrules. Refer to Subject 20-10-15.
- (4) Make a selection of a 3/8 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (5) Put a 1.06 inch ± 0.06 inch length of the sleeve on the cable.

Make sure that the center of the sleeve is aligned with the center of the outer ferrule.
- (6) Shrink the sleeve into its position. Refer to Subject 20-10-14.

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SHIELD TERMINATION OF THE RAYCHEM 55A6088 CABLE

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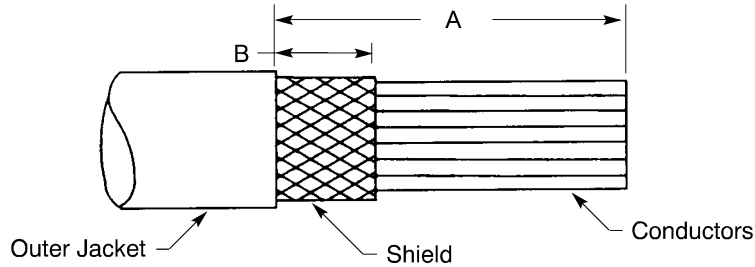
STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE RAYCHEM 55A6088 CABLE

This Subject gives the procedures to terminate the outer shield of the Raychem 55A6088 cable.

1. CABLE SHIELD TERMINATION

A. Cable Preparation



CABLE TRIM DIMENSIONS
Figure 1

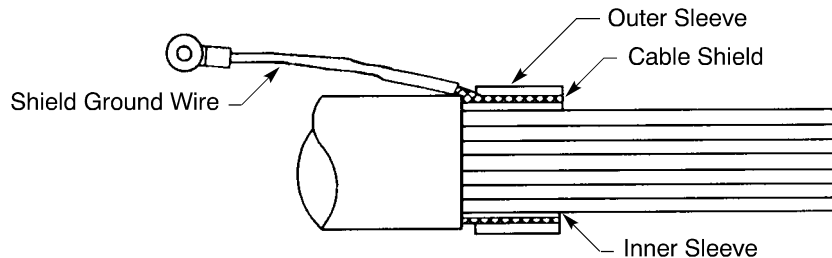
Table 1
CABLE TRIM DIMENSIONS

Connector	Cable Trim		
	Dimension	Minimum (inch)	Maximum (inch)
BACC45FS20	A	2-7/8	3-1/8
	B	11/32	13/32
BACC63BP14	A	2-3/8	2-5/8
	B	11/32	13/32
BACC63BP18	A	2-3/4	3
	B	11/32	13/32
BACC63BP20	A	2-7/8	3-1/8
	B	11/32	13/32
BACC63BP22	A	3	3-1/4
	B	11/32	13/32
BACC63BV18	A	2-3/4	3
	B	11/32	13/32
BACC63BV22	A	3	3-1/4
	B	11/32	13/32

- (1) Prepare the cable.
Refer to Figure 1 and Table 1.
- (2) Remove the necessary length of the outer jacket so that the distance from the end of the jacket to the end of the cable is Dimension A.

STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF THE RAYCHEM 55A6088 CABLE**

- (3) Remove the necessary length of the shield so that the distance from the end of the shield to the end of the jacket is Dimension B.

B. Shield Ground Wire Assembly**SHIELD GROUND WIRE ASSEMBLY****Figure 2**

- (1) Prepare the shield ground wire. Refer to Subject 20-10-15.
 - (a) Make a selection of the shield ground wire.
 - (b) Cut a 6.0 inch ± 0.1 inch length of the wire.
 - (c) Remove the necessary length of insulation from both ends of the wire.
- (2) If a terminal is specified:
 - (a) Assemble the BACT12AC3 general purpose terminal on the end of the ground wire. Refer to Subject 20-30-11.
 - (b) Attach the shield ground wire to the shield with mechanical ferrules. Refer to Subject 20-10-15.
- (3) If a contact is specified, install a contact on the shield ground wire. Refer to Subject 20-61-11.
- (4) Make a selection of a 5/8 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (5) Put a 1.06 inch ± 0.06 inch length of the sleeve on the cable.
Make sure that the center of the sleeve is aligned with the center of the outer ferrule.
- (6) Shrink the sleeve into its position. Refer to Subject 20-10-14.



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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF RAYCHEM 55A6160 AND 55A6160-20 CABLES, AND CHAMPLAIN 61-02651 AND 61-02783 CABLES

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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF RAYCHEM 55A6160 AND 55A6160-20 CABLES, AND CHAMPLAIN 61-02651 AND 61-02783 CABLES

1. CABLE PREPARATION

A. Cable Part Numbers

Table 1
CABLE PART NUMBERS

Part Number	Supplier
55A6160	Raychem
55A6160-20	Raychem
61-02651	Champlain
61-02783	Champlain

B. Cable Preparation

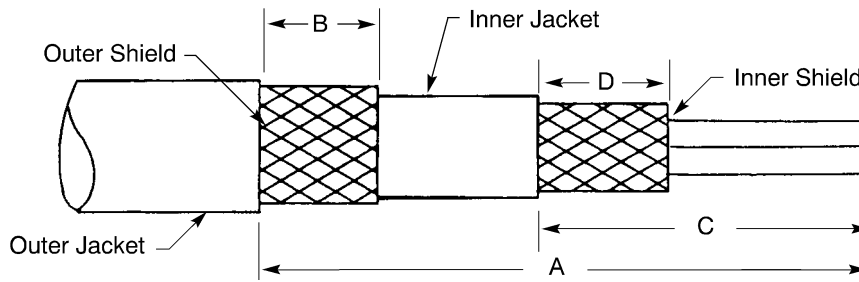
Table 2
CABLE TRIM DIMENSIONS

Cable	Cable Trim		
	Dimension	Target (inch)	Tolerance (inch)
55A6160	A	3-1/2	± 1/8
	B	3/8	± 1/32
	C	2-1/4	± 1/8
	D	3/8	± 1/32
55A6160-20	A	3-1/2	± 1/8
	B	3/8	± 1/32
	C	2-1/2	± 1/8
	D	3/8	± 1/32
61-02651	A	3-1/2	± 1/8
	B	3/8	± 1/32
	C	2-1/2	± 1/8
	D	3/8	± 1/32
61-02783	A	3-1/2	± 1/8
	B	3/8	± 1/32
	C	2-1/2	± 1/8
	D	3/8	± 1/32

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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF RAYCHEM 55A6160 AND 55A6160-20 CABLES, AND CHAMPLAIN 61-02651 AND 61-02783 CABLES



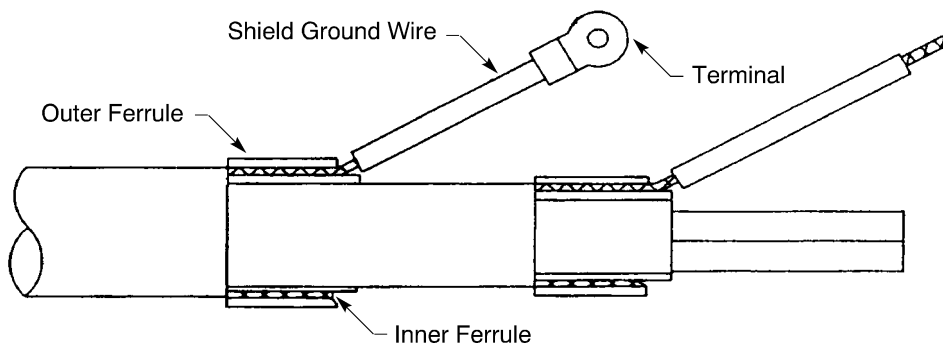
CABLE PREPARATION
Figure 1

Refer to Table 2 and Figure 1.

- (1) Remove the necessary length of the outer jacket so that the distance from the end of the jacket to the end of the cable is dimension A.
- (2) Remove the necessary length of the outer shield so that the distance from the end of the outer shield to the end of the outer jacket is dimension B.
- (3) Remove the necessary length of the inner jacket so that the distance from the end of the inner jacket to the end of the cable is dimension C.
- (4) Remove the necessary length of the inner shield so that the distance from the end of the inner shield to the end of the inner jacket is dimension D.

2. TERMINATION OF THE OUTER SHIELD

A. Shield Ground Wire Assembly



SHIELD GROUND WIRE ON THE OUTER SHIELD
Figure 2

- (1) Assemble a shield ground wire with mechanical ferrules on the outer shield. Refer to Figure 2 and Subject 20-10-15.

NOTE: A satisfactory alternative for the Raychem 55A6160 cable is the assembly of the shield ground wire with a BACS13BH2 solder sleeve. Refer to Subject 20-10-15.

STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF RAYCHEM 55A6160 AND 55A6160-20 CABLES, AND CHAMPLAIN 61-02651 AND 61-02783 CABLES**

Make sure that:

- The shield ground wire is a 6 inch $\pm 1/16$ inch length of AWG 20 wire
- The length of the heat shrinkable sleeve is 1-1/8 inches $\pm 1/16$ inch.

NOTE: If the shield ground wire is assembled with a solder sleeve, the heat shrinkable sleeve is not used.

(2) Assemble a BACT12M terminal on the ground wire. Refer to Subject 20-30-11.

3. TERMINATION OF THE INNER SHIELD**A. Shield Ground Wire Assembly**

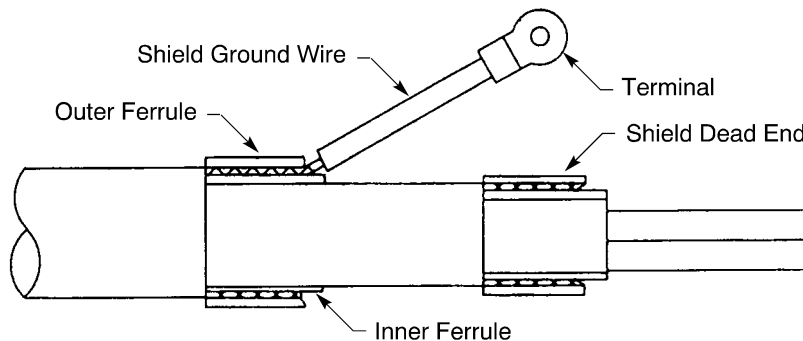
(1) Assemble a shield ground wire with mechanical ferrules on the inner shield. Refer to Figure 2 and Subject 20-10-15.

NOTE: A satisfactory alternative for the Raychem 55A6160 cable is the assembly of the shield ground wire with a BACS13BH2 solder sleeve. Refer to Subject 20-10-15.

Make sure that:

- The shield ground wire is a 6 inch $\pm 1/16$ inch length of AWG 20 wire
- The length of the heat shrinkable sleeve is 1-1/8 inches $\pm 1/16$ inch.

NOTE: If the shield ground wire is assembled with a solder sleeve, the heat shrinkable sleeve is not used.

B. Assembly of a Shield Dead End

SHIELD DEAD END ON THE INNER SHIELD
Figure 3

(1) Assemble a shield dead end on the inner shield. Refer to Figure 3 and Subject 20-10-15.

Make sure that the length of the heat shrinkable sleeve is 1-1/8 inches $\pm 1/16$ inch.

C. Assembly of a Shield Ground Wire That Is Attached to a Cable Conductor

(1) Assemble a shield ground wire with mechanical ferrules on the inner shield. Refer to Subject 20-10-15.

STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF RAYCHEM 55A6160 AND 55A6160-20 CABLES, AND CHAMPLAIN 61-02651 AND 61-02783 CABLES**

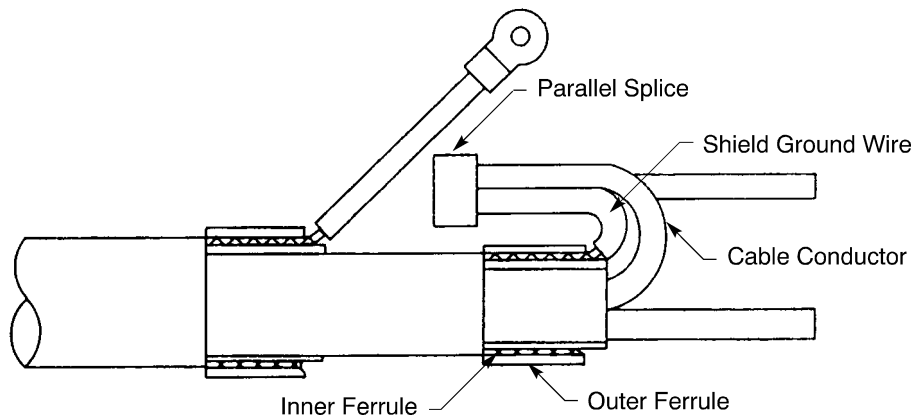
Make sure that:

- The shield ground wire is a 4.5 inch ± 0.06 inch length of AWG 20 wire
- The length of the heat shrinkable sleeve is 1.06 inches ± 0.06 inch.

(2) Attach these wires with a parallel splice:

- The end of the shield ground wire
- One end of a 4.5 inch ± 0.06 inch length of the same type of wire as the shield ground wire
- The specified conductor of the cable.

Refer to Figure 4 and Subject 20-30-12.



CONFIGURATION OF THE SHIELD GROUND WIRE
Figure 4

- (3) Put one layer of the TFE Stage B tape on the splice.
- (4) For the Raychem 55A6160-20 cable, put the sufficient length of PD or an equivalent heat shrinkable sleeve on the splice so that both ends of the sleeve extend beyond the ends of the splice.
- (5) For the Raychem 61-02651 and the 61-02783 cables, put one layer of PTFE tape on the splice so that both ends of the layer of tape extend beyond the ends of the splice.
- (6) Fold the shield ground wire and the cable conductor back over the ferrule so that free end of the wire opposite the splice is aligned with the end of the remaining conductor of the cable.

Refer to Figure 4.

- (7) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (8) Put a 1.5 inch ± 0.06 inch length of the sleeve on the wires with the splice and the cable.
- (9) Shrink the sleeve into position. Refer to Subject 20-10-14.



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STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH MICRODOT 202-3836-0000 AVM CABLE

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STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH MICRODOT 202-3836-0000 AVM CABLE

1. PART NUMBERS AND DESCRIPTION

A. Cable Part Numbers

**Table 1
CABLE PART NUMBERS**

Part Number	Supplier
202-3836-000	Microdot

B. Connector Part Numbers

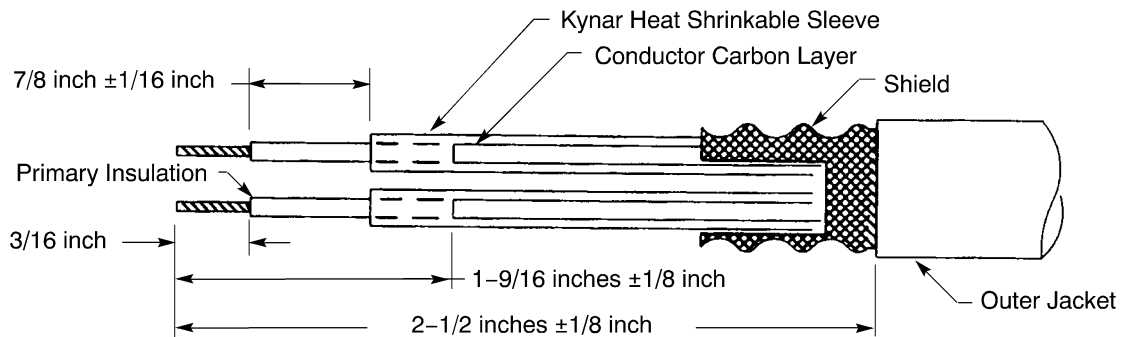
**Table 2
CONNECTOR PART NUMBERS**

Boeing Standard	Type
BACC66()	Plug
	Receptacle
BACC45F()	Plug
	Receptacle
BACC63BP()	Plug
BACC63BV()	Receptacle

2. ASSEMBLY OF BACC66() CONNECTORS

A. Cable Preparation

Refer to Figure 1.



**CABLE TRIM DIMENSIONS
Figure 1**

- (1) Remove 2-1/2 inches ± 1/8 inch of the outer jacket from the end of the cable.
- (2) Push the shield back.
- (3) Remove 1-9/16 inches ± 1/8 inch of the carbon layer from the end of each conductor.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH MICRODOT 202-3836-0000 AVM CABLE

CAUTION: MAKE SURE THAT DAMAGE TO THE PRIMARY INSULATION DOES NOT OCCUR.

- (4) Remove the remaining carbon from the primary insulation with acetone or an equivalent solvent.
- (5) Remove 3/16 inch of the primary insulation from the end of each conductor.

B. Connector Assembly

- (1) Assemble the contacts. Refer to Subject 20-71-14.
- (2) Put a 1-3/8 inch \pm 1/8 inch length of 1/16 inch diameter of Kynar heat shrinkable sleeve on each conductor.
Make sure that the distance from the end of the sleeve to the end of the primary insulation is 7/8 inch \pm 1/16 inch.
- (3) Shrink the sleeves in position. Refer to Subject 20-10-14.
- (4) Install the contacts in the connector. Refer to Subject 20-71-14.
- (5) Assemble a shield dead end on the free end of the shield. Refer to Subject 20-10-15.
- (6) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (7) Put a 1.00 inch \pm 0.25 inch length of the sleeve on the end of the cable.
Make sure that the end of the sleeve is 0.25 inch from the connector grommet.
- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.

3. ASSEMBLY OF BACC45F(), BACC63BP(), AND BACC63BV() CONNECTORS

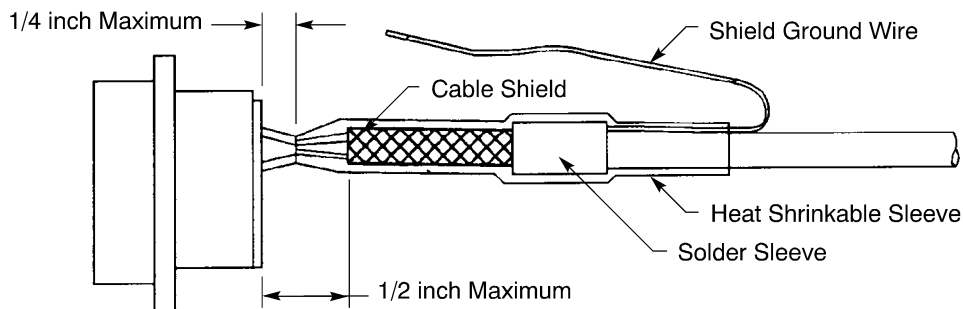
A. Cable Preparation

- (1) Remove 2 inches \pm 1/8 inches of the outer jacket from the end of the cable.
- (2) Remove 2 inches \pm 1/8 inches of the shield from the end of the cable.
- (3) Remove 1 inch \pm 1/16 inch of the carbon layer from the end of each conductor.

CAUTION: MAKE SURE THAT DAMAGE TO THE PRIMARY INSULATION DOES NOT OCCUR.

- (4) Remove the remaining carbon from the primary insulation with acetone or an equivalent solvent.

B. Connector Assembly



CONNECTOR ASSEMBLY WITH A MICRODOT 202-3836-0000 CABLE

Figure 2

- (1) Assemble the contacts. Refer to Subject 20-61-11.
- (2) Put a 3/4 inch \pm 1/16 inch length of 1/16 inch diameter of Kynar heat shrinkable sleeve on each conductor.

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CONNECTOR ASSEMBLY WITH MICRODOT 202-3836-0000 AVM CABLE

- (3) Shrink the sleeves in position. Refer to Subject 20-10-14.
- (4) Assemble the shield ground wire.
Refer to Figure 2 and Subject 20-10-15.
- (5) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (6) Put a 2.00 inch \pm 0.13 inch length of the sleeve on the cable.
- (7) Install the contacts in the connector. Refer to Subject 20-61-11.
- (8) Push the sleeve over the shield and the conductors until the end of the sleeve is 1/4 inch or less from the connector grommet.
- (9) Shrink the sleeve in position. Refer to Subject 20-10-14.

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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE CHAMPLAIN 30-04749 ADF CABLE

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	A. Cable Part Numbers	1
2.	<u>SHIELD TERMINATION</u>	1
	A. Cable Preparation	1
	B. Shield Ground Wire Assembly	3

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STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF THE CHAMPLAIN 30-04749 ADF CABLE****1. PART NUMBERS AND DESCRIPTION****A. Cable Part Numbers**

Table 1
CABLE PART NUMBERS

Part Number	Supplier
30-40749	Champlain

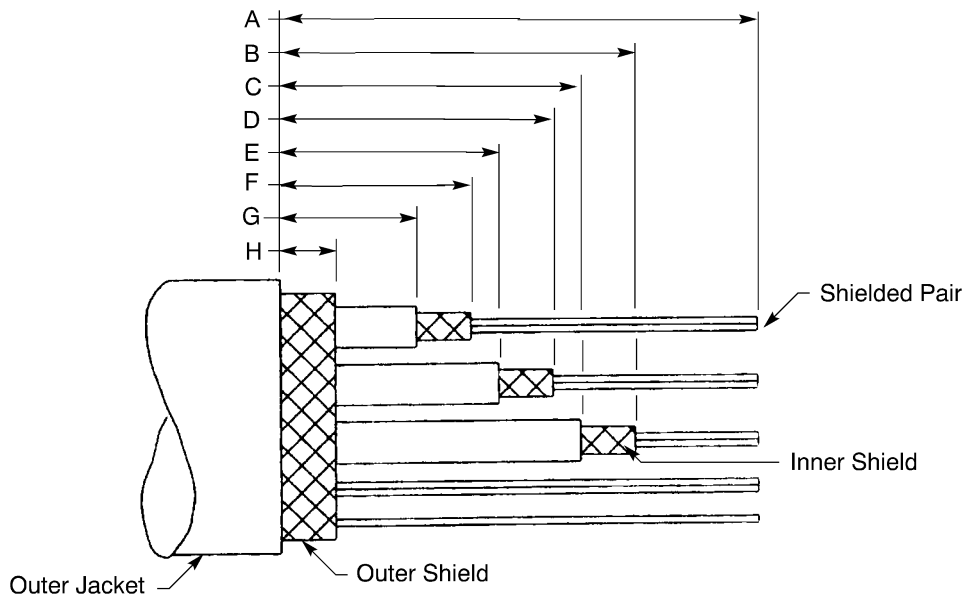
2. SHIELD TERMINATION**A. Cable Preparation**

Table 2
CABLE TRIM DIMENSIONS

Dimension	Removal Length (inch)	
	Target	Tolerance
A	4-1/2	1/8
B	2-1/4	1/32
C	2	1/8
D	1-3/4	1/32
E	1-1/2	1/8
F	1-1/4	1/32
G	1	1/8
H	1/4	1/32

STANDARD WIRING PRACTICES MANUAL

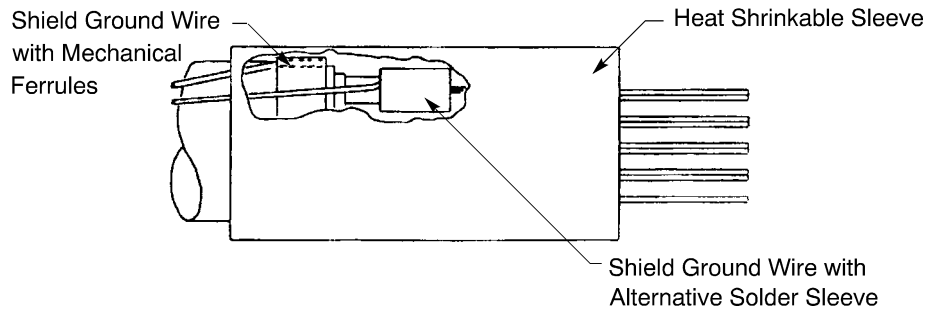
SHIELD TERMINATION OF THE CHAMPLAIN 30-04749 ADF CABLE



CABLE TRIM DIMENSIONS

Figure 1

- (1) If a connector clamp is specified, put the clamp on the cable.
- (2) Prepare the cable.
 - Refer to Table 2 and Figure 1.
 - (a) Remove the necessary length of the outer jacket so that the distance from the end of the jacket to the end of the cable is Dimension A.
 - (b) Remove the necessary length of the outer shield so that the distance from the end of the outer jacket to the end of the shield is Dimension H.
 - (c) Remove the necessary lengths of the outer jackets from each shielded pair.
 - (d) Remove the necessary lengths of the shields from each shielded pair.
- (3) Put a 4-1/2 inch \pm 1/8 inch length of heat shrinkable sleeve on the cable.
- (4) Put a 1/2 inch \pm 1/16 inch length of heat shrinkable sleeve on each shielded pair so that the end of each sleeve extends 1/8 inch under the shield.
- (5) Shrink the 1/2 inch sleeves in position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF THE CHAMPLAIN 30-04749 ADF CABLE****B. Shield Ground Wire Assembly****SHIELD GROUND WIRE ASSEMBLY AND INSULATION****Figure 2**

- (1) Assemble a shield ground wire on each shield of the 3 shielded pairs. Refer to Subject 20-10-15 and Figure 2.

These conditions are applicable:

- The shield ground wires are 6 inches \pm 1/16 inch in length
- The shield ground wires are assembled with a BACS13S109B inner ferrule and a BACS13S175C outer ferrule.

NOTE: The assembly of a shield ground wire with a solder sleeve is a satisfactory alternative.

- (2) Assemble a shield ground wire on the outer shield of the cable. Refer to Subject 20-10-15 and Figure 2.

These conditions are applicable:

- The shield ground wire is 6 inches \pm 1/16 inch in length
- The shield ground wire is assembled with a BACS13S297B inner ferrule and a BACS13S375C outer ferrule.
- The heat shrinkable sleeve is 4-1/2 inches \pm 1/8 in length.

- (3) Push the heat shrinkable sleeve over the shield ground wires and the shielded pairs.
- (4) Shrink the sleeve in position. Refer to Subject 20-10-14.



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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE CHAMPLAIN 30-04680 ADF CABLE

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STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF THE CHAMPLAIN 30-04680 ADF CABLE****1. PART NUMBERS AND DESCRIPTION****A. Cable Part Numbers**

Table 1
CABLE PART NUMBERS

Part Number	Supplier
30-04680	Champlain

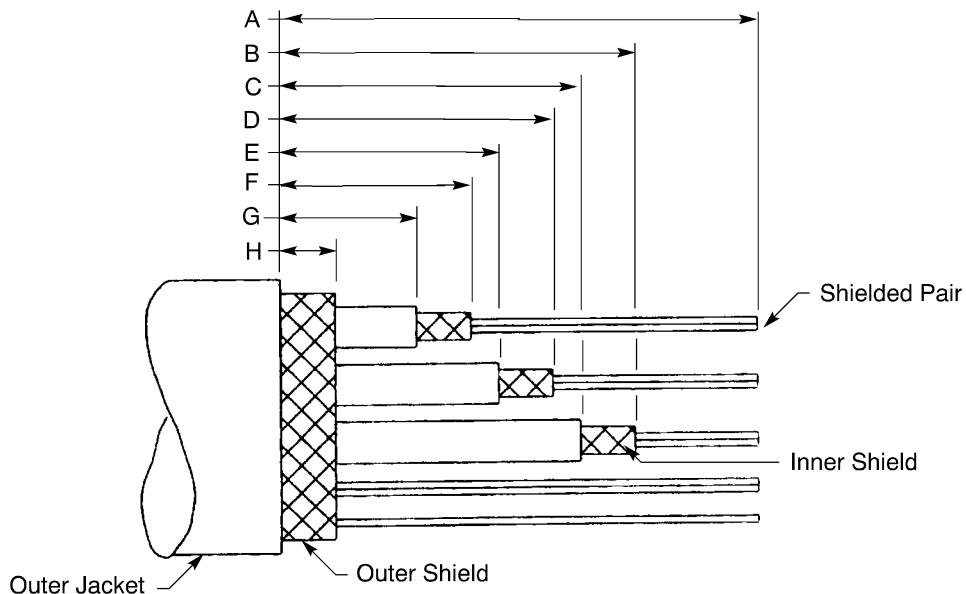
2. SHIELD TERMINATION**A. Cable Preparation**

Table 2
CABLE TRIM DIMENSIONS

Dimension	Removal Length (inch)	
	Target	Tolerance
A	4-1/2	1/8
B	2-1/4	1/32
C	2	1/8
D	1-3/4	1/32
E	1-1/2	1/8
F	1-1/4	1/32
G	1	1/8
H	1/4	1/32

STANDARD WIRING PRACTICES MANUAL

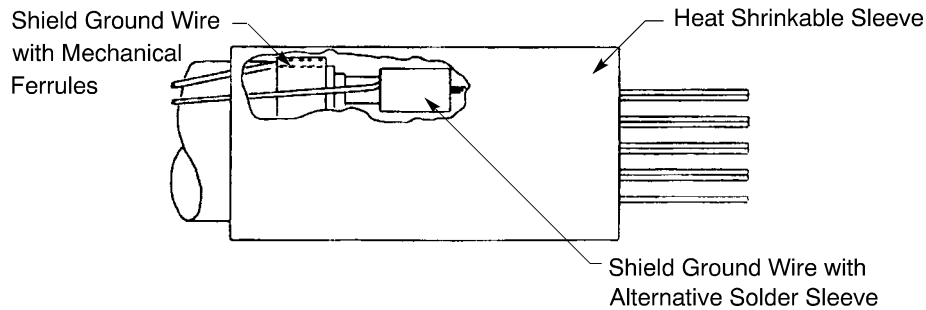
SHIELD TERMINATION OF THE CHAMPLAIN 30-04680 ADF CABLE



CABLE TRIM DIMENSIONS

Figure 1

- (1) If a connector clamp is specified, put the clamp on the cable.
- (2) Prepare the cable.
 - Refer to Table 2 and Figure 1.
 - (a) Remove the necessary length of the outer jacket so that the distance from the end of the jacket to the end of the cable is Dimension A.
 - (b) Remove the necessary length of the outer shield so that the distance from the end of the outer jacket to the end of the shield is Dimension H.
 - (c) Remove the necessary lengths of the outer jackets from each shielded pair.
 - (d) Remove the necessary lengths of the shields from each shielded pair.
- (3) Put a 4-1/2 inch \pm 1/8 inch length of heat shrinkable sleeve on the cable.
- (4) Put a 1/2 inch \pm 1/16 inch length of heat shrinkable sleeve on each shielded pair so that the end of each sleeve extends 1/8 inch under the shield.
- (5) Shrink the 1/2 inch sleeves in position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL**SHIELD TERMINATION OF THE CHAMPLAIN 30-04680 ADF CABLE****B. Shield Ground Wire Assembly****SHIELD GROUND WIRE ASSEMBLY AND INSULATION****Figure 2**

- (1) Assemble a shield ground wire on each shield of the 3 shielded pairs. Refer to Subject 20-10-15 and Figure 2.

These conditions are applicable:

- The shield ground wires are 6 inches \pm 1/16 inch in length
- The shield ground wires are assembled with a BACS13S109B inner ferrule and a BACS13S175C outer ferrule.

NOTE: The assembly of a shield ground wire with a solder sleeve is a satisfactory alternative.

- (2) Assemble a shield ground wire on the outer shield of the cable. Refer to Subject 20-10-15 and Figure 2.

These conditions are applicable:

- The shield ground wire is 6 inches \pm 1/16 inch in length
- The shield ground wire is assembled with a BACS13S297B inner ferrule and a BACS13S375C outer ferrule.
- The heat shrinkable sleeve is 4-1/2 inches \pm 1/8 in length; refer to Paragraph P2.A., Step (3).

- (3) Push the heat shrinkable sleeve over the shield ground wires and the shielded pairs.
- (4) Shrink the sleeve in position. Refer to Subject 20-10-14.



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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE RAYCHEM CTC-0039-()-9/5-9 THERMOCOUPLE CABLE

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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE RAYCHEM CTC-0039-()-9/5-9 THERMOCOUPLE CABLE

1. PART NUMBERS AND DESCRIPTION

A. Cable Part Numbers

**Table 1
THERMOCOUPLE CABLE PART NUMBERS**

Part Number	Supplier
CTC-0039-()-9/5-9	Raychem

2. SHIELD TERMINATION

A. Cable Preparation

Refer to Subject 20-00-15 and Figure 1.

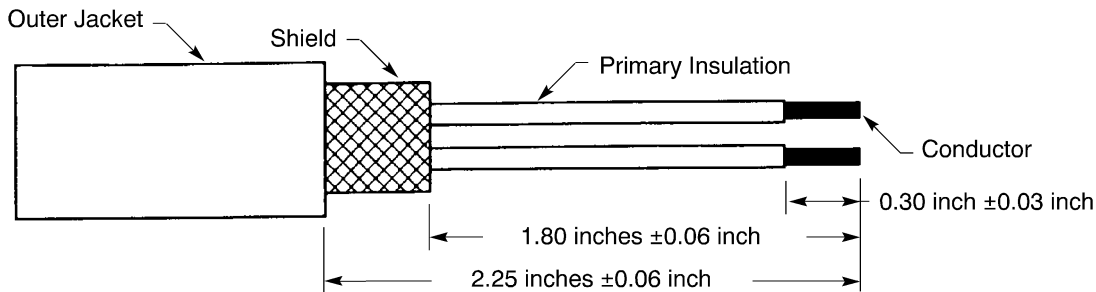
- (1) Remove 2.25 inches ± 0.06 inch of the outer jacket from the end of the cable.

Either of these tools can be used:

- A pair of Meisei 4C tweezers with a Meisei M-10 power supply
- An X-ACTO knife.

- (2) Remove 1.80 inches ± 0.06 inch of the shield from the end of the cable.

- (3) Remove 0.30 inch ± 0.03 inch of the insulation from the end of each wire.



**CABLE TRIM DIMENSIONS
Figure 1**

B. Shield Ground Wire Assembly

- (1) Assemble a shield ground wire with either of these:

- A mechanical ferrule
- A solder sleeve.

Refer to Subject 20-10-15.



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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE ENDEVCO 16833 AVM CABLE

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3. <u>SHIELD TERMINATION FOR THE ASSEMBLY OF BACC63AE, BACC63AF, BACC63X AND BACC63Y CONNECTORS</u>	1
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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE ENDEVCO 16833 AVM CABLE

1. PART NUMBERS AND DESCRIPTION

A. Cable Part Numbers

Table 1
CABLE PART NUMBERS

Part Number	Supplier
16833	Endevco

B. Connector Part Numbers

Table 2
CONNECTOR PART NUMBERS

Part Number	Configuration	Supplier
115-5066	Plug	Amphenol
115-5074	Plug	Amphenol
BACC63AE	Plug	Boeing
BACC63AF	Receptacle	Boeing
BACC63X	Plug	Boeing
BACC63Y	Receptacle	Boeing

2. SHIELD TERMINATION FOR THE ASSEMBLY OF AMPHENOL 115-5066 AND 115-5074 CONNECTORS

A. Shield Termination

Refer to Subject 20-62-12.

3. SHIELD TERMINATION FOR THE ASSEMBLY OF BACC63AE, BACC63AF, BACC63X AND BACC63Y CONNECTORS

A. Cable Preparation

- (1) Remove 1-3/4 inches \pm 1/8 inch of the outer jacket from the end of the cable.
- (2) Remove 1-3/4 inches \pm 1/8 inch of the shield from the end of the cable.
- (3) Carefully cut the outer carbon layer along the groove between the two conductors.
- (4) Pull the conductors apart back to the end of the outer jacket.
- (5) Remove the unwanted outer carbon layer.
- (6) Remove the inner carbon layer so that the end of the layer is 1/2 inch \pm 1/16 inch beyond the location on the wire that is specified for the assembly of the contact.

Refer to Subject 20-61-11.

CAUTION: MAKE SURE THAT DAMAGE DOES NOT OCCUR TO THE PRIMARY INSULATION.

- (7) Remove the remaining carbon from primary insulation with acetone or an equivalent solvent.

B. Shield Ground Wire Assembly

- (1) Assemble a shield ground wire with a mechanical ferrule.

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STANDARD WIRING PRACTICES MANUAL

SHIELD TERMINATION OF THE ENDEVCO 16833 AVM CABLE

Refer to Subject 20-10-15.

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STANDARD WIRING PRACTICES MANUAL

TERMINAL ASSEMBLY WITH ALUMEL-CHROMEL THERMOCOUPLE WIRE

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STANDARD WIRING PRACTICES MANUAL

TERMINAL ASSEMBLY WITH ALUMEL-CHROMEL THERMOCOUPLE WIRE

This Subject gives the procedure to assemble AMP and Thermo-Electric terminals with Alumel-Chromel (Al-Ch) thermocouple wire.

1. PART NUMBERS AND DESCRIPTION

A. Thermocouple Terminal Part Numbers

**Table 1
ALUMEL AND CHROMEL THERMOCOUPLE TERMINAL PART NUMBERS**

Material	Terminal	
	Part Number	Supplier
Alumel	1387-4	Thermo-Electric
	1-321898-0	AMP
Chromel	1387-3	Thermo-Electric
	1-321897-0	AMP

B. Alumel-Chromel Thermocouple Cable Part Numbers

**Table 2
ALUMEL AND CHROMEL THERMOCOUPLE WIRE PART NUMBERS**

Part Number	Supplier
WC-94102	Revere
252-94102	Galite
852-4000311	Pirelli
852-4985321	Pirelli

2. TERMINAL ASSEMBLY

A. Wire Preparation

**Table 3
INSULATION REMOVAL LENGTH**

Terminal	Wire Insulation		
	Color	Removal Length (inch)	
		Target	Tolerance
1387-3	White	5/16	± 1/16
1387-4	Green	5/16	± 1/16
1-321897-0	White	1/4	± 1/16
1-321898-0	Green	1/4	± 1/16

(1) Remove the necessary length of insulation from the end of each wire. Refer to Table 3.

STANDARD WIRING PRACTICES MANUAL**TERMINAL ASSEMBLY WITH ALUMEL-CHROMEL THERMOCOUPLE WIRE****B. Terminal Assembly**

Table 4
TERMINAL CRIMP TOOLS

Terminal	Crimp Tool		
	Basic Unit	Setting	Supplier
1387-3	Y14MV	-	Burndy
1387-4	Y14MV	-	Burndy
1-321897-0	46673	3	AMP
1-321898-0	46673	3	AMP

- (1) Make a selection of a crimp tool from Table 4.
- (2) Put the end of the white wire into the crimp barrel of the chromel terminal.
NOTE: The Thermo-Electric 1387-3 terminals are identified on the under side with a CR mark.
- (3) Crimp the terminal.
- (4) Put the end of the green wire into the crimp barrel of the alumel terminal.
NOTE: The Thermo-Electric 1387-4 terminals are identified on the under side with a AL mark.
- (5) Crimp the terminal.
- (6) For the Thermo-Electric terminals, lightly solder the terminal to the wire with AG5.5 silver solder.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CONNECTORS WITH SOLDER TYPE CONTACTS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CONNECTORS WITH SOLDER TYPE CONTACTS

1. GENERAL DATA

A. Applicable Conditions

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT. DAMAGE TO THE CONNECTOR OR THE WIRE CAN OCCUR

CAUTION: DO NOT LET THE STRANDS OF THE CONDUCTOR THAT ARE IN THE INSULATION OF THE WIRE ABSORB THE SOLDER. THE WIRE:

- CANNOT BEND AT THE NECESSARY LOCATION
- CAN BREAK AT THE END OF THE SOLDER.

B. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
PT06E()	MIL-C-26482 series I type; front release, rear removal solder contacts	20	0.060
		16	0.066
		12	0.097
SM3106()	MIL-C-5015 type, front release, rear removal solder contacts	16	0.064
		12	0.114
		8	0.164
		4	0.272
		0	0.415

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

Part Number	Description	Supplier
CE9307-()	Rack and Panel Plug Connector	ITT Cannon
DPDN10-33S1B	Rack and Panel Plug Connector	ITT Cannon
DPDB18-33S1B	Rack and Panel Plug Connector	ITT Cannon
DPE60-33S	Plug Connector	ITT Cannon
DPXF40C1S	Rack and Panel Plug Connector	ITT Cannon

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CONNECTORS WITH SOLDER TYPE CONTACTS

Table 2 (continued)

Part Number	Description	Supplier
KO()	High Density Circular Plug Connector	ITT Cannon
PT06E()	Circular Plug Connector	Amphenol
SM3106()	Circular Plug Connector	Bendix
SRPA1N8AS1	Sliding Rack Plug Connector	Bendix
VB10-1PWC11-76	Relay Socket	Viking

B. Solder Adapter Part Numbers

**Table 3
SOLDER ADAPTER PART NUMBERS**

Boeing Standard	Part Number	Supplier
BACA14AB164	460-3094-01-01-00	Cambion

3. CONTACT ASSEMBLY

A. Installation of One Wire in a Contact Solder Cup

- (1) If a solder adapter is specified, make a selection of a solder adapter from Table 3.
- (2) If the connector does not have a grommet, put a 0.75 inch \pm 0.13 inch length of MIL-DTL-23053/5 Class 1 heat shrinkable sleeve on the wire.

Make sure that the sleeve has the smallest possible diameter that can be put on the wire.

NOTE: For alternative equivalent heat shrinkable sleeves, refer to Subject 20-00-11.

- (3) Remove the necessary length of insulation from the end of the wire.

NOTE: When the wire is fully installed in the contact, the end of the insulation must not be more than 0.06 inch from the rear end of the solder cup.

- (4) If a solder adapter is specified:
 - (a) Tin these components of the contact assembly:
 - The wire
 - The solder adapter
 - The contact solder cup.

(b) Solder the end of the wire in the adapter.

(c) Solder the adapter in the solder cup.

- (5) If a solder adapter is not specified:
 - (a) Tin these components of the contact assembly:
 - The wire
 - The contact solder cup.

(b) Solder the end of the wire in the solder cup.

- (6) If the connector has a grommet and the contacts can be removed:

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF CONNECTORS WITH SOLDER TYPE CONTACTS**

- (a) Measure the O.D. of the wire.
- (b) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.B.
- (7) If the connector does not have a grommet:
 - (a) Push the heat shrinkable sleeve forward until the forward end of the sleeve is between 0 inch and 0.06 inch from the rear face of the connector.
 - (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.

B. Installation of More Than One Wire in a Contact Solder Cup

This paragraph gives the procedure to solder two or three AWG 22 wires in an size 20 contact with a solder cup.

- (1) Make a selection of a solder adapter from Table 3.
- (2) If the connector does not have a grommet, put a 0.75 inch \pm 0.13 inch length of MIL-DTL-23053/5 Class 1 heat shrinkable sleeve on the wire.

Make sure that the sleeve has the smallest possible diameter that can be put on the wire.

NOTE: For alternative equivalent heat shrinkable sleeves, refer to Subject 20-00-11.

- (3) Remove the necessary length of insulation from the end of the wire.

NOTE: When the wire is fully installed in the contact, the end of the insulation must not be more than 0.06 inch from the rear end of the solder cup.

- (4) Tin these components of the contact cavity:
 - The wire
 - The solder adapter
 - The contact solder cup.
- (5) Solder the end of the wire in the adapter.
- (6) Solder the adapter in the solder cup.
- (7) If the connector does not have a grommet:
 - (a) Push the heat shrinkable sleeve forward until the forward end of the sleeve is between 0 inch and 0.06 inch from the rear face of the connector.
 - (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT

1. PART NUMBERS AND DESCRIPTION

NOTE: Refer to Subject 20-84-10 for the procedures to assemble other Grimes-Honeywell lights.

A. Map Light Part Numbers

Table 1
A-4135 MAP LIGHT PART NUMBERS

Map Light Part Number	Supplier
A-4135()-13()	Grimes-Honeywell
A-4135()-1810()	Grimes-Honeywell
A-4135()-1820()	Grimes-Honeywell
A-4135()-1864()	Grimes-Honeywell
A-4135()-24()	Grimes-Honeywell
A-4135()-6()	Grimes-Honeywell

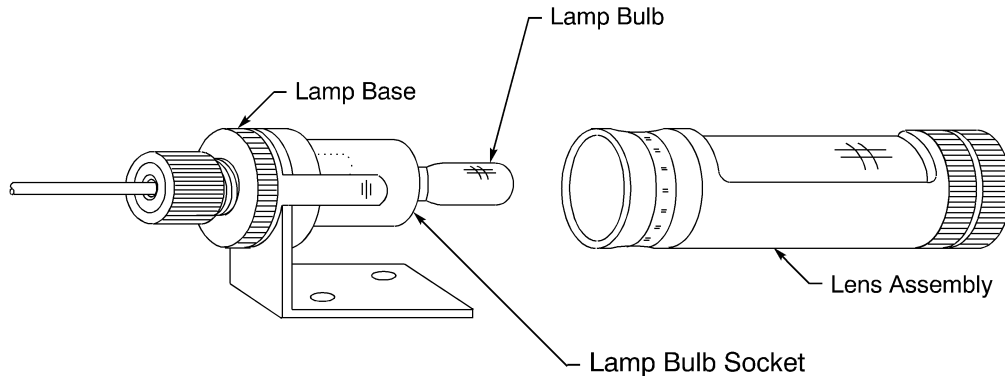
Table 2
LAMP BULBS FOR THE A-4135 MAP LIGHT

Map Light Part Number	Lamp Bulb		
	Part Number	Voltage	Supplier
A-4135()-13()	1816	13V	GE
A-4135()-1810()	MS15571-9	6.3V	QPL
A-4135()-1820()	1820	28V	GE
A-4135()-1864()	1864	28V	GE
A-4135()-24()	MS25231-313	28V	QPL
A-4135()-6()	MS25231-316	6V	QPL

Table 3
CENTER CONTACT FOR THE A-4135 MAP LIGHT

Part Number	Supplier
A-2351-1	Grimes-Honeywell

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT****2. LAMP BULB REPLACEMENT****A. Lamp Bulb Replacement**

GRIMES-HONEYWELL A-4135 MAP LIGHT - LAMP BASE AND LENS ASSEMBLY
Figure 1

Refer to Figure 1.

- (1) Pull the lens assembly away from the lamp base.
Make sure to keep the lens assembly aligned with the lamp base.
- (2) Remove the lamp bulb:
 - (a) Push the old lamp bulb into the lamp bulb socket until it stops.
 - (b) While you hold the lamp bulb in, turn it counterclockwise until it stops.
 - (c) Remove the old lamp bulb from the lamp bulb socket.
- (3) Make a selection of a lamp bulb from Table 2.
- (4) Install the lamp bulb:
 - (a) Push the new lamp bulb into the lamp bulb socket until it stops.
 - (b) While you hold the lamp bulb in, turn it clockwise until it stops.
Make sure that the new lamp bulb is locked in its position.
- (5) Align the lens assembly and the lamp base.
- (6) Push the lens assembly on the lamp base until it stops.

STANDARD WIRING PRACTICES MANUAL

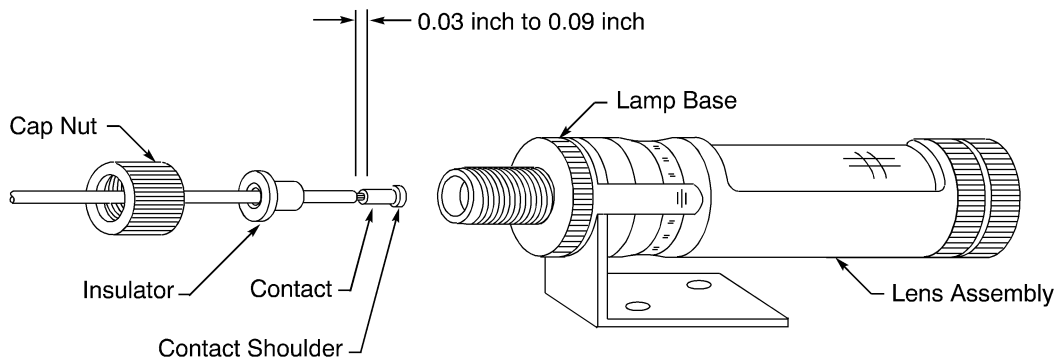
ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT

3. MAP LIGHT ASSEMBLY

A. Wire Preparation

**Table 4
INSULATION REMOVAL LENGTH FOR THE A-4135 MAP LIGHT**

Contact Assembly Procedure	Wire Size	Insulation Removal Length		Special Instructions
		Target (inch)	Tolerance (inch)	
Crimp Paragraph 3.B..	22	0.69	± 0.03	Fold back the conductor
	20	0.69	± 0.03	Fold back the conductor
	16	0.34	± 0.03	-
Solder Paragraph 3.C..	22	0.47	± 0.03	-
	16			-
	12			-



**GRIMES-HONEYWELL A-4135 MAP LIGHT
Figure 2**

Refer to Figure 2.

- (1) Put the cap nut on the wire.
Make sure that the threads of the cap nut point forward to the end of the wire.
- (2) Put the insulator on the wire.
Make sure that the smaller diameter end of the insulator points forward to the end of the wire.
- (3) Remove the correct length of insulation from the end of the wire. Refer to Table 4.

B. Contact Assembly - Crimp Procedure

NOTE: The contact can be assembled by this crimp procedure, or by the solder procedure in Paragraph 3.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT

**Table 5
CRIMP TOOLS FOR THE A-4135 MAP LIGHT**

Basic Unit	Die	Position	Supplier
WT-400	-	-	Thomas and Betts
WT-400	WT-4400	-	Thomas and Betts
M22520/5-01	M22520/5-35	B	QPL

Refer to Figure 2.

- (1) Make a selection of a crimp tool from Table 5.
- (2) Put the end of the wire into the contact.

Make sure that:

- The cap nut and the insulator are on the wire.
- The larger diameter end of the contact points forward to the end of the wire.
- The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

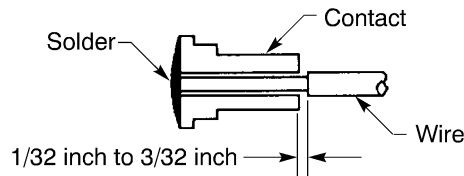
- (3) Crimp the contact.

Make sure that:

- The flash on the contact crimp barrel does not touch the side of the insulator when the contact is installed in the insulator.

C. Contact Assembly - Solder Procedure

NOTE: The contact can be assembled by this solder procedure, or by the crimp procedure in Paragraph 3.B.



**POSITION OF THE WIRE IN THE CONTACT
Figure 3**

Refer to Figure 3.

- (1) Put the end of the wire into the contact.

Make sure that:

- The cap nut and the insulator are on the wire. Refer to Figure 2.
- The larger diameter end of the contact points forward to the end of the wire.
- The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

- (2) Put the ends of the conductor strands evenly around the large end of the contact.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT**

- (3) Make a selection of one of these. Refer to Subject 20-00-11.
 - A solder and a flux
 - A flux cored solder.
- (4) Solder the conductor strands to the front surface of the large end of the contact.
Make sure that:
 - A sufficient amount of solder is applied for a satisfactory lamp contact surface.
 - Solder is not on the side of the contact
 - The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

D. Map Light Assembly

Refer to Figure 2.

- (1) Put the insulator against the shoulder of the assembled contact.
- (2) Push the insulator and the contact into the rear of the lamp base.
- (3) Engage the threads of the cap nut and the threads on the rear of the lamp base.
- (4) Tighten the cap nut.



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STANDARD WIRING PRACTICES MANUAL

TERMINATION OF WIRE IN MS25257 TYPE INDICATOR LIGHTS

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	A. Terminal Preparation	1
	B. Installation of the Wire	1

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STANDARD WIRING PRACTICES MANUAL**TERMINATION OF WIRE IN MS25257 TYPE INDICATOR LIGHTS**

This Subject gives the procedure to attach AWG 20 and larger wire to the terminals of MS25257 type indicator lights.

1. WIRE TERMINATION**A. Terminal Preparation**

- (1) Apply the sufficient amount of Kester 1544 flux to both sides of each terminal on the indicator light.
- (2) Put a heat sink on each terminal so that each heat sink is adjacent to the light base.
- (3) Lightly tin each terminal.
Make sure that the hole in each terminal is open.
- (4) Remove the heat sinks.

B. Installation of the Wire

- (1) Put the conductor strands of each wire into 2 groups.
- (2) For each terminal:
 - (a) Put one group of strands through the hole of the terminal.
 - (b) Put the other group of strands over the terminal near the hole.
- (3) Apply the sufficient amount of Kester 1544 flux to the strands that are against the terminal.
- (4) Put a heat sink on each terminal so that each heat sink is adjacent to the light base.
- (5) Solder each wire to the terminals.

CAUTION: DO NOT APPLY MORE HEAT THAN IS NECESSARY FOR THE SOLDER TO FLOW.
DAMAGE CAN OCCUR TO THE WIRE OR THE INDICATOR LIGHT OR BOTH.

- (6) Remove the heat sinks.



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STANDARD WIRING PRACTICES MANUAL

TERMINATION OF WIRE IN THE JOHNSON 105-0303-001 TIP PLUG CONNECTOR

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STANDARD WIRING PRACTICES MANUAL

TERMINATION OF WIRE IN THE JOHNSON 105-0303-001 TIP PLUG CONNECTOR

This Subject gives the procedure to attach BMS 13-48 AWG 22 wire to the tip plug connector.

1. WIRE TERMINATION

A. Wire Preparation

- (1) Remove 1/4 inch \pm 1/16 inch of insulation from the end of the wire.
- (2) Tin the bare conductor strands.
- (3) Put the insulated handle on the wire.
- (4) Make a selection of these Grade B, Class 1 heat shrinkable sleeves from Subject 20-00-11:
 - 1/16 inch diameter sleeve
 - 3/16 inch diameter sleeve.
- (5) Put the heat shrinkable sleeves on the wire:
 - Two 1 inch lengths of 1/16 inch diameter sleeve
 - One 1 inch length of 3/16 inch diameter sleeve.

B. Installation of the Wire

- (1) Tin the area around the wire exit hole on the side of the pin body.
- (2) Put the sufficient amount of Kester 197 flux or an equivalent flux on the tinned area.
- (3) Put the end of the wire into the wire entry hole so that 1/8 inch to 3/16 inch of the wire is on the other side of the hole.
- (4) Solder the wire in the tip plug.
- (5) Install each heat shrinkable sleeve:
 - (a) Push the sleeve until the end of the sleeve is against the rear of the plug.
 - (b) Shrink the sleeve in position. Refer to Subject 20-10-14.
- (6) Engage the threads of the insulated handle and the body of the tip plug.
- (7) Tighten the handle.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE ITT GREMAR 150900-() TWINAXPLUG CONNECTOR

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE ITT GREMAR 150900-() TWINAXPLUG CONNECTOR

This Subject gives these procedures for the twinax plug connectors:

- Separation
- Disassembly
- Assembly
- Installation.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
TWINAX PLUG CONNECTOR PART NUMBERS**

Part Number	Contact Type	Clamp Configuration	Supplier
150900-0302	Socket	Shield clamp only	ITT Gremar
150900-0303	Pin	Shield clamp only	ITT Gremar
150900-2341	Socket	Shield clamp and jacket clamp	ITT Gremar
150900-2342	Pin	No clamps; does not accept a shield	ITT Gremar
150900-2343	Socket	No clamps; does not accept a shield	ITT Gremar
204-18291-2	Pin	Shield clamp only	Boeing

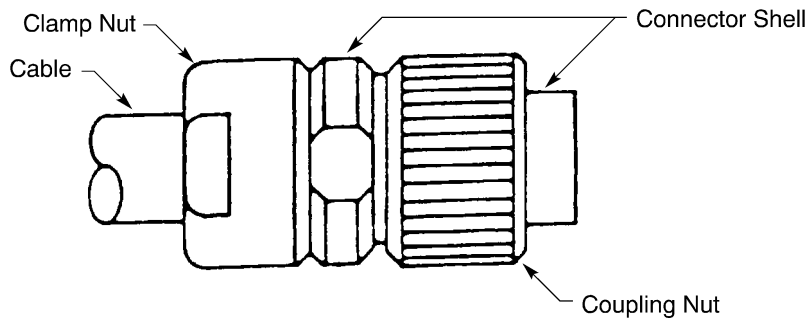
NOTE: Some Wiring Diagrams show the Boeing 204-18291-2 plug as an alternative to the 150900-0303 twinax plug.

B. Connector Description

The twinax plug connector has these technical features:

- Solder cup contacts
- Integral shield to connector shell electrical bond.

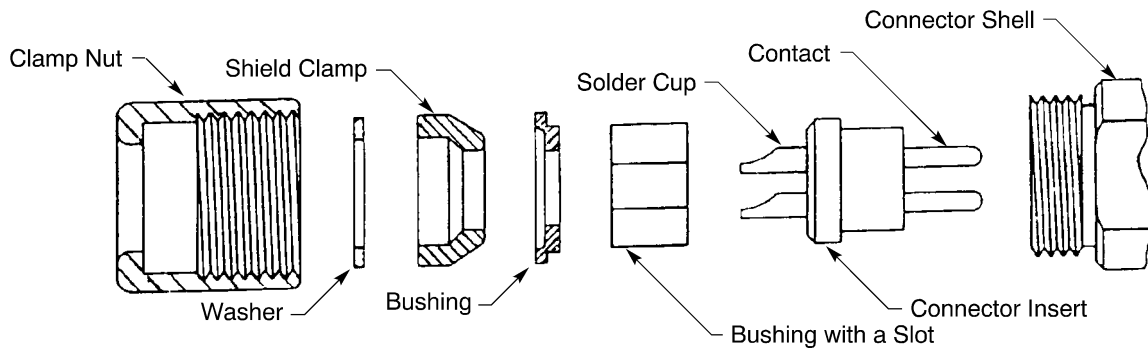
Refer to Figure 1 and Figure 2.



**THE ITT GREMAR 150900-() TWINAX PLUG CONNECTOR ASSEMBLY
Figure 1**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE ITT GREMAR 150900-() TWINAXPLUG CONNECTOR



COMPONENTS OF THE ITT GREMAR 150900-() TWINAX PLUG
Figure 2

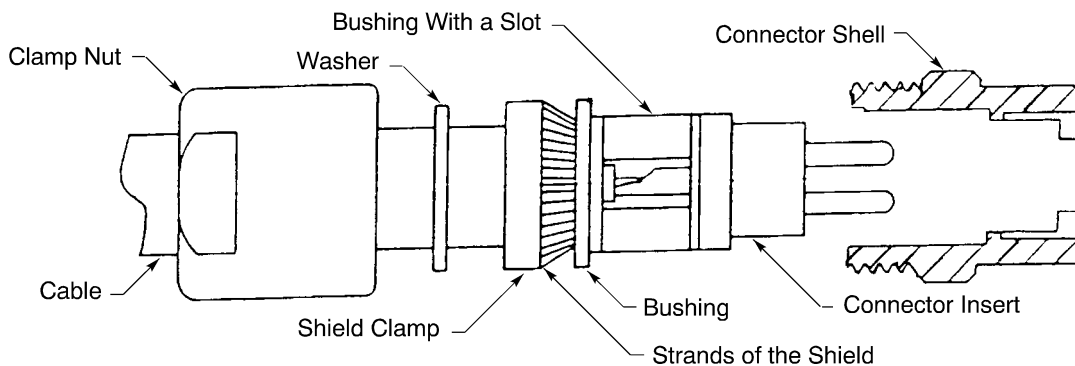
2. CONNECTOR DISASSEMBLY

A. Separation of the Plug from the Receptacle

- (1) Turn the coupling nut until the threads are disengaged from the threads on the receptacle. Refer to Figure 1.
- (2) Pull the shell of the plug away from the receptacle.
 Make sure that the shell stays perpendicular to the receptacle.

CAUTION: DO NOT PULL THE CABLE TO DISCONNECT THE PLUG FROM THE RECEPTACLE. IT CAN CAUSE DAMAGE TO THE CABLE.

B. Contact Disassembly



CONTACT DISASSEMBLY
Figure 3

Refer to Figure 3.

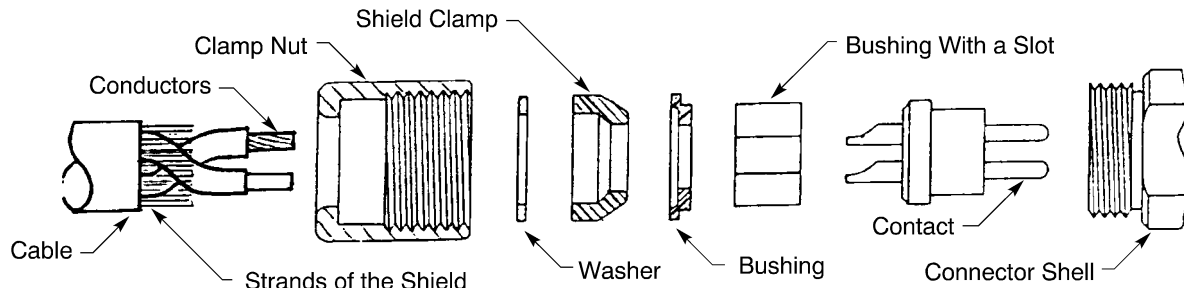
- (1) Disengage the threads of the clamp nut from the threads of the connector shell.
- (2) Move the nut and the washer away from the connector.
- (3) From the forward end of the connector, carefully push the connector insert out of the connector shell.
- (4) Remove the bushing with a slot.
- (5) For each contact:

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE ITT GREMAR 150900-() TWINAXPLUG CONNECTOR

- (a) Apply heat to the solder cup of the contact with a soldering iron.
- (b) Remove the conductor from the contact.

C. Connector Disassembly



**CONNECTOR DISASSEMBLY
Figure 4**

Refer to Figure 4.

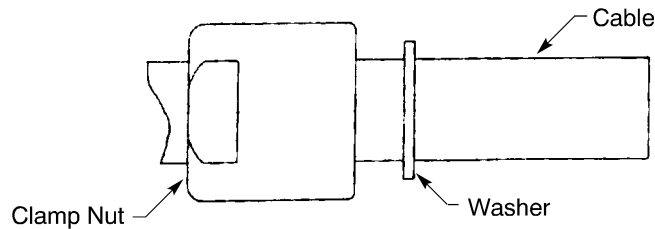
- (1) Remove the bushing from the cable.
- (2) Push the strands of the shield against the conductors.
Make sure that the strands are flat against the outer jacket of the cable.
- (3) In this order, carefully remove these components from the cable:
 - The shield clamp
 - The washer
 - The clamp nut.

3. CONNECTOR ASSEMBLY WITH RG108/U OR RAYCHEM 10599 TWINAX CABLE

A. Cable Preparation

- (1) In order, put these components on the end of the cable:
 - The clamp nut
 - The washer.

Refer to Figure 5.



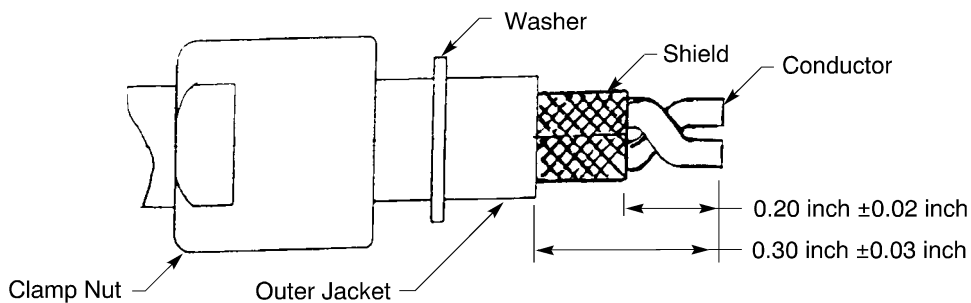
**POSITION OF THE CLAMP NUT AND THE WASHER ON THE CABLE
Figure 5**

- (2) Remove 0.30 inch \pm 0.03 inch of the outer jacket from the end of the cable. Refer to Subject 20-00-15 and Figure 6.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE ITT GREMAR 150900-() TWINAXPLUG CONNECTOR

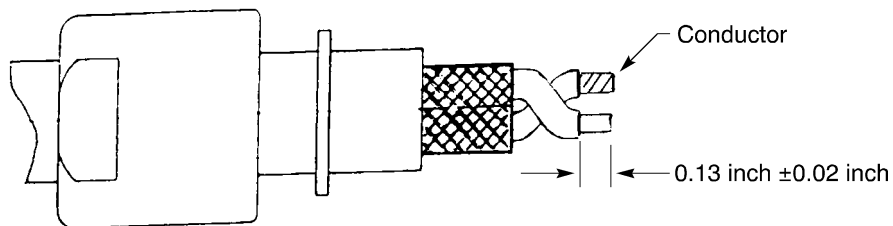
- (3) Remove 0.20 inch \pm 0.02 inch of the shield from the end of the cable. Refer to Figure 6.



OUTER JACKET AND SHIELD REMOVAL

Figure 6

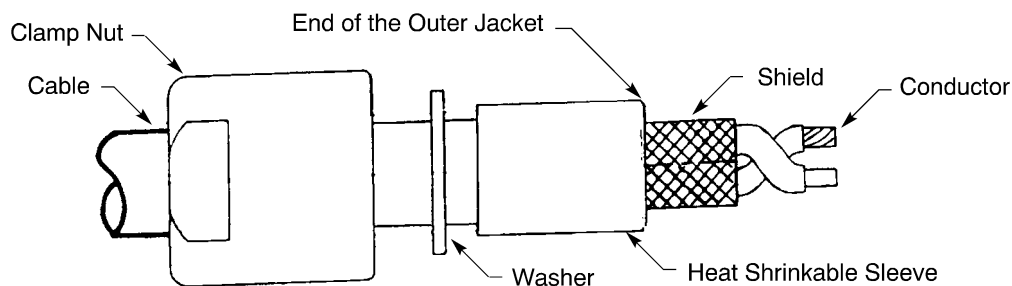
- (4) Remove 0.13 inch \pm 0.02 inch of the insulation from each conductor. Refer to Figure 7.



INSULATION REMOVAL

Figure 7

- (5) For the Raychem 10599 cable, the outer diameter of the cable must be increased so that the clamp nut has the correct fit. Refer to Figure 8.

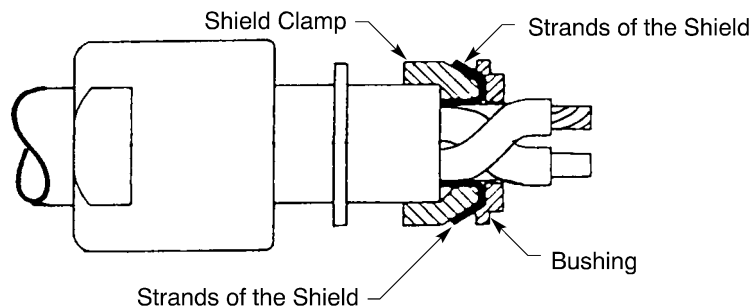


POSITION OF THE HEAT SHRINKABLE SLEEVES

Figure 8

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF THE ITT GREMAR 150900-() TWINAXPLUG CONNECTOR**

- (a) Make a selection of these Grade B, Class 1 heat shrinkable sleeves from Subject 20-00-11:
 - 0.19 inch diameter sleeve
 - 0.25 inch diameter sleeve.
- (b) Cut these lengths of the heat shrinkable sleeve:
 - Two 1.0 inch \pm 0.1 inch lengths of the 0.19 inch diameter sleeve
 - Two 1.0 inch \pm 0.1 inch lengths of the 0.25 inch diameter sleeve.
- (c) Put one of the sleeves that has the smaller diameter on the cable.
Make sure that the end of the sleeve is aligned with the end of the outer jacket.
- (d) Shrink the sleeve into its position. Refer to Subject 20-10-15.
- (e) Put the other sleeve that has the smaller diameter on the cable.
Make sure that the end of the sleeve is aligned with the end of the outer jacket.
- (f) Shrink the sleeve into its position. Refer to Subject 20-10-15.
- (g) Do Step (c) through Step (f) again for the sleeves that have the larger diameter.
- (6) Move the strands of the shield apart with a plastic awl or an equivalent tool.
- (7) Push the shield against the conductors.
Make sure that the strands are flat against the cable jacket.
- (8) Put the shield clamp on the cable.
Make sure that the clamp is:
 - On the strands of the shield
 - Against the end of the outer jacket of the cable.
- (9) Fold the strands of the shield on the front end of the clamp.
Make sure that the strands are:
 - Even and symmetrical around the clamp
 - Flat against the clamp
 - The strands of the shield go on the edge of the clamp.
- (10) Put the bushing on cable.
Make sure that the bushing holds the strands of the shield against the shield clamp. Refer to Figure 9.

**POSITION OF THE BUSHING, THE STRANDS OF THE SHIELD, AND THE SHIELD CLAMP****Figure 9**

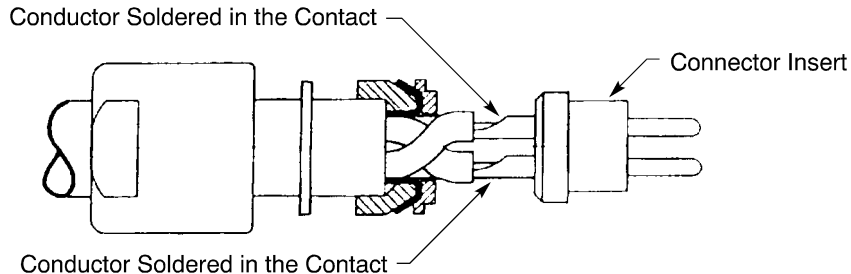
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE ITT GREMAR 150900-() TWINAXPLUG CONNECTOR

B. Contact Assembly

NOTE: The conductor that:

- Has tin coated strands is identified as White by the Wiring Diagram
- Is solid copper is identified as Blue by the Wiring Diagram.



CONDUCTORS SOLDERED IN THE CONTACTS
Figure 10

- (1) Examine the rear end of the connector insert.

Make sure that there is not any of these types of damage:

- Gouges or cracks between two contact cavities
- Gouges or cracks from a contact cavity to the edge of the connector insert.

- (2) Solder each conductor in the solder cup of the applicable contact. Refer to Subject 20-40-00 and Figure 10.

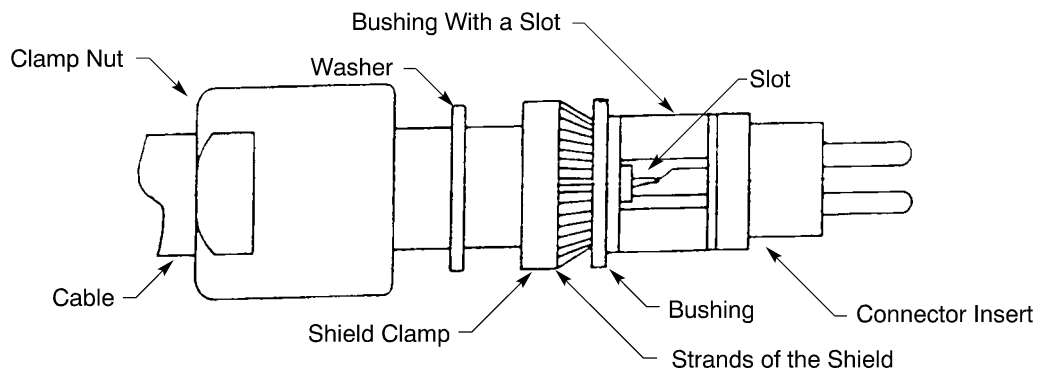
Make sure that:

- There are no bad solder joints
- There are no broken strands of the conductor at the solder joint
- There is no damage to the strands of the conductor that shows the base metal.

C. Connector Assembly

- (1) Put the bushing that has the slot on the connector insert.

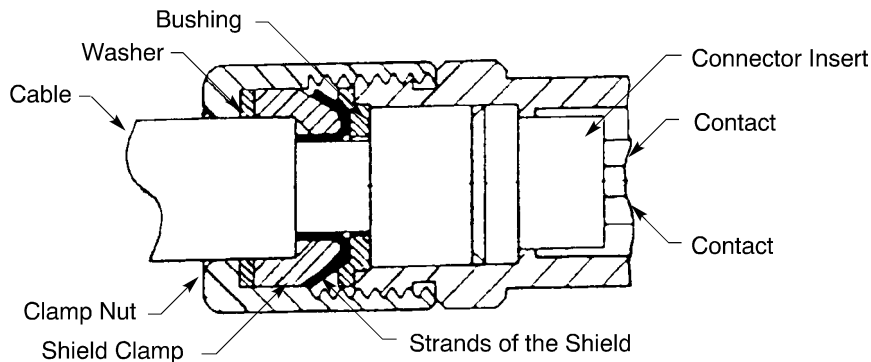
Make sure that the bushing is on the solder cups of the contacts and the conductors. Refer to Figure 11.



POSITION OF THE BUSHING WITH A SLOT
Figure 11

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF THE ITT GREMAR 150900-() TWINAXPLUG CONNECTOR**

- (2) Push the connector insert into the connector shell until it stops.
- (3) Engage the threads of the clamp nut and the connector shell.
Make sure that there is no damage to the threads of the nut or the shell.
- (4) Tighten the nut until it stops. Refer to Figure 12.

**ASSEMBLED PLUG CONNECTOR****Figure 12****4. CONNECTOR INSTALLATION****A. Installation of a Plug into a Receptacle**

- (1) Examine the front face.
Make sure that there is not an of these types of damage:
 - A bent contact pin
 - A crack or a chip from one contact cavity to another contact cavity
 - A crack or a chip from a contact cavity to the edge of the connector insert.
- (2) Align the plug with the receptacle.
Make sure that:
 - The contacts in the plug are aligned with the contacts in the receptacle
 - The longitudinal axis of the plug is parallel to the longitudinal axis of the receptacle.
- (3) Push the plug into the receptacle.
Make sure that the contacts are fully engaged.
- (4) Engage the threads of the coupling nut and the threads of the receptacle shell.
- (5) Tighten the nut until it stops.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE W. W. FISHER D105A067-60 CONNECTOR

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE W. W. FISHER D105A067-60 CONNECTOR

1. PART NUMBERS AND DESCRIPTION

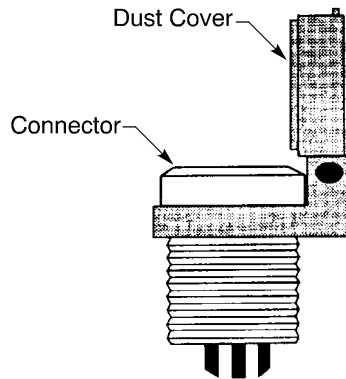
A. Necessary Parts for Assembly

**Table 1
ASSEMBLY PART NUMBERS**

Part Number	Description	Supplier
437-027	Backshell	Glenair
667-047	Dust Cover	Glenair
D105A067-60	Connector	W. W. Fisher

2. CONNECTOR ASSEMBLY

A. Dust Cover Installation

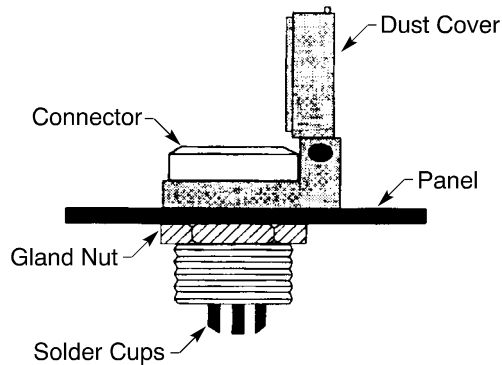


POSITION OF THE DUST COVER ON THE CONNECTOR

Figure 1

Refer to Figure 1.

- (1) Install the dust cover over the rear of the connector.
- (2) Open the dust cover so that it is against the front end of the connector.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF THE W. W. FISHER D105A067-60 CONNECTOR****B. Connector Assembly**

POSITION OF THE CONNECTOR ON THE PANEL
Figure 2

Refer to Figure 2.

- (1) Put the connector into the correct panel cutout.
- (2) Engage the threads of the gland nut the rear of the connector body.
- (3) Torque the gland nut 50 inch-pounds \pm 5 inch-pounds.
- (4) Close the dust cover.

C. Wire Installation

- (1) Remove a 0.25 inch \pm 0.1 inch length of insulation from the end of each wire. Refer to Subject 20-00-15.
- (2) Find the correct solder cup for each wire. Refer to the Wiring Diagram Manual.
- (3) Put each wire through the applicable hole in the insulator of the backshell.
- (4) Push each wire into the correct solder cup.

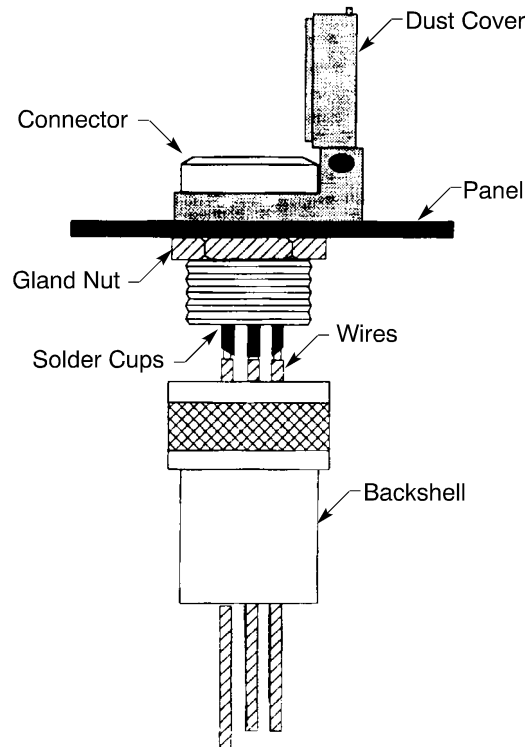
Make sure the distance from the end of the wire insulation to the end of the solder cup is less than 0.03 inch.

- (5) Solder each wire in the applicable solder cup.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE W. W. FISHER D105A067-60 CONNECTOR

D. Backshell Installation



INSTALLATION OF THE BACKSHELL

Figure 3

- (1) Align the holes in the insulator with the solder cups.
Refer to Figure 3.
- (2) Push the backshell until it is against the body of the connector.
- (3) Engage the threads of the coupling ring and the body of the connector.
- (4) Torque the backshell 50 inch-pounds \pm 5 inch-pounds.



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STANDARD WIRING PRACTICES MANUAL

ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION

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STANDARD WIRING PRACTICES MANUAL**ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION****1. GENERAL DATA****A. Electrostatic Discharge (ESD)**

Electrostatic charges:

- Are generated when surfaces of different materials come into contact
- Are stored on the surfaces of physical objects; the human body is included.

ESD from nylon or human hair onto polyethylene or steel can cause these types of damage to unprotected electrostatic discharge sensitive devices:

- Changes in basic characteristics
- Degradation of performance
- Catastrophic failures.

B. Electrostatic Discharge Sensitive (ESDS) Devices

Any equipment that can have damage from ESD is an ESDS device.

An LRU is a line replaceable unit that can be:

- An assembly or part that is not ESDS
- A metal encased assembly or box that contains ESDS parts and may or may not be ESDS
- A nonmetal encased assembly or box that contains ESDS part and may or may not be ESDS
- An ESDS printed wiring board assembly (PWA) or card.

ESDS LRUs:

- Have ESDS labels for identification
- Have more necessary precautions than equipment that is not ESDS.

C. General Conditions for Work with ESDS Devices

All persons who remove, install, or move ESDS devices should have knowledge of:

- How static electricity is generated
- How ESDS equipment is protected from static electricity.

D. Identification of ESDS Line Replaceable Units (LRUs)

Three types of labels are used to identify:

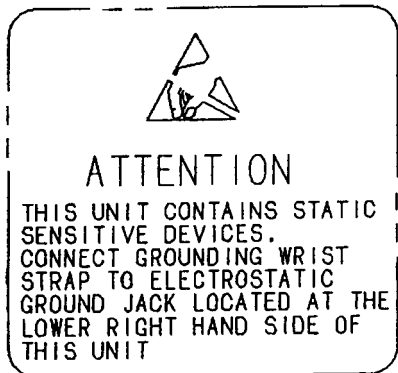
- Which LRUs are ESDS
- What precautions are necessary to install and remove the LRUs.

Refer to:

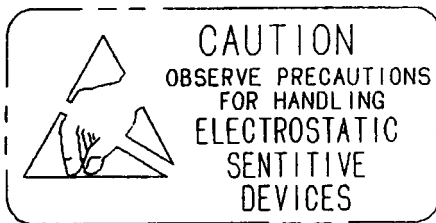
- Figure 1 for the three types of labels
- Figure 2 for the usual locations of the labels in the E/E bay
- Figure 3 for the usual locations of the labels in the card file.

STANDARD WIRING PRACTICES MANUAL

ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION



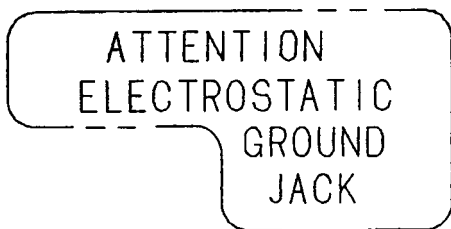
Label Type 1



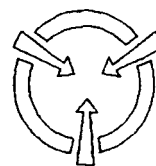
Label Type 2



Label Type 3

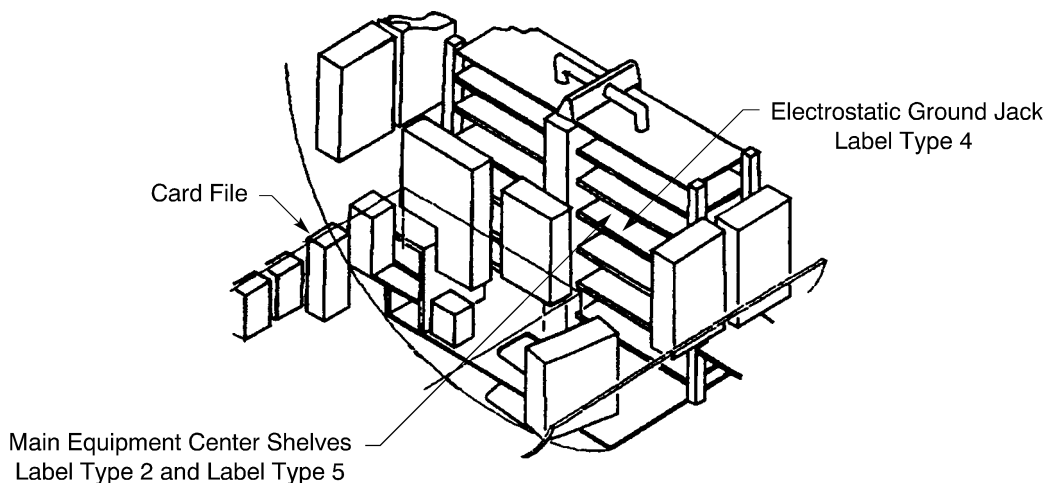


Label Type 4



Label Type 5

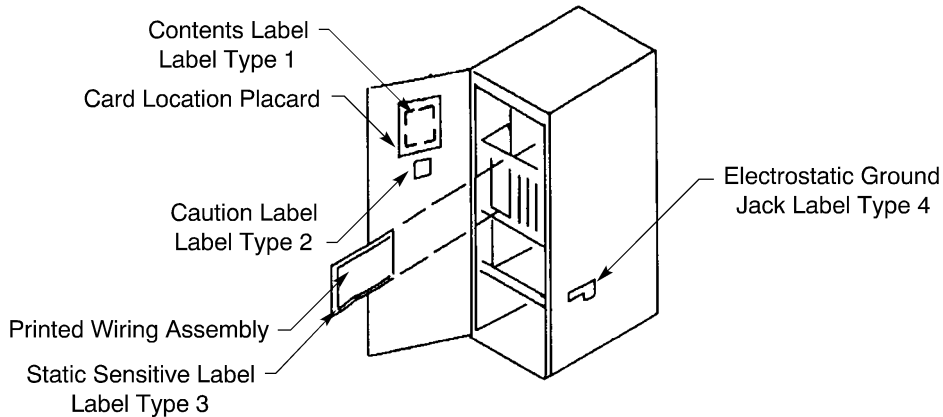
TYPES OF ESDS LABELS
Figure 1



USUAL LOCATIONS OF ESDS LABELS IN THE E/E BAY
Figure 2

STANDARD WIRING PRACTICES MANUAL

ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION



USUAL LOCATIONS OF ESDS LABELS IN THE CARD FILE
Figure 3

2. PART NUMBERS AND DESCRIPTIONS

A. Conductive Bags

Table 1
CONDUCTIVE BAGS

Grade	Class	Part Number	Supplier	Description
-	-	Type 2100	3M	-
-	-	Type 2110	3M	-

B. Wrist Straps

Table 2
WRIST STRAPS

Part Number	Description	Supplier
2201	Wrist Band only, Gray, Small	3M
2204	Adjustable Wrist Strap	3M
2205	Fixed Metal Wrist Strap, Expandable, Small	3M
2206	Fixed Metal Wrist Strap, Expandable, Medium	3M
2207	Fixed Metal Wrist Strap, Expandable, Large	3M
2211	5 feet Coiled Cord, Gray, Small	3M
2212	5 feet Cord, Burgundy, Medium	3M
2213	5 feet Cord, Blue, Large	3M
2214	Adjustable Wrist Strap, 5 feet Coiled Cord	3M
2221	10 feet Coiled Cord, Gray, Small	3M

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STANDARD WIRING PRACTICES MANUAL

ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION

Table 2 (continued)

Part Number	Description	Supplier
2224	Adjustable Wrist Strap, 10 feet Coiled Cord	3M
2244	Adjustable Wrist Strap, 5 feet Coiled Cord	3M
4001317	6 feet Coiled Cord, Large	Simco
4001374	10 feet Coiled Cord, Large	Simco
401	Wrist Strap	Charleswater Desco
407	Wrist Strap	Charleswater Desco

NOTE: Any wrist strap that has a ground lead resistance of 250,000 ohms minimum to 1.5 megohms maximum is satisfactory.

C. Conductive Dust Caps

**Table 3
CONDUCTIVE DUST CAPS**

Grade	Class	Part Number	Supplier	Description
-	-	025-1155-001	ITT Cannon	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Signal, Size 1
-	-	025-1156-001	ITT Cannon	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Power, Size 1
-	-	025-1157-001	ITT Cannon	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Signal, Size 2 and Size 3
-	-	025-1158-001	ITT Cannon	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Power, Size 2 and Size 3
-	-	8660-1404	Souriau	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Power, Size 1
-	-	8660-1405	Souriau	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Signal, Size 1
-	-	8660-1406	Souriau	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Power, Size 2 and Size 3
-	-	8660-1407	Souriau	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Signal, Size 2 and Size 3
-	-	211600-1	AMP	BACC66E, BACC66G, and BACC66J Receptacles and Plugs (ARINC 600), Size 1
-	-	211600-2	AMP	BACC66E, BACC66G, and BACC66J Receptacles and Plugs (ARINC 600), Size 2 Size and 3 (Size 3 Needs Two)

STANDARD WIRING PRACTICES MANUAL

ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION

Table 3 (continued)

Grade	Class	Part Number	Supplier	Description
-	-	NEC-()	Nicor, Inc.	Circular Connector Cap, Black, Material 75; Specify Shell Size
-	-	NEP-()	Nicor, Inc.	Circular Connector Plug, Black, Material 75; Specify Shell Size

D. Tie Material

**Table 4
TIE MATERIAL**

Grade	Class	Part Number	Supplier	Description
-	-	-	-	Twine, 100 Percent Cotton

E. Wrist Strap Testers

**Table 5
WRIST STRAP TESTERS**

Grade	Class	Part Number	Supplier	Description
-	-	EN425-AC	Semtronics	-
-	-	716	3M	-
-	-	Ask 1784 Model 9810	Desco	-

3. NECESSARY TESTS

A. Wrist Strap Continuity Test

This paragraph gives the procedures to test the continuity of a ESDS protective wrist strap with either of these:

- A wrist strap tester
- An ohmmeter.

NOTE: The continuity test with a wrist strap tester is the recommended procedure.

- (1) To do the test with a wrist strap tester:
 - (a) Make a selection of a wrist strap tester from Table 5.
 - (b) Put the wrist strap on.
 - (c) Plug the jack end of the wrist strap into the tester.
 - (d) Do the touch test.
- (2) To do the test with an ohmmeter:
 - (a) Plug the jack end of the wrist strap into the ground or common receptacle of the meter.
 - (b) Adjust the meter to the applicable resistance to range.
 - (c) Touch the red lead of the meter to the resistor portion of the wrist strap.

STANDARD WIRING PRACTICES MANUAL**ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION**

The acceptable range is from 250,000 ohms to 1,500,000 ohms.

- (d) Put the wrist strap on.
- (e) Hold the red lead of the meter between the forefinger and the thumb.

The acceptable range is less than 10,000,000 ohms.

- (3) Discard any wrist strap that does not operate in the acceptable range.

4. REMOVAL OF ESDS LRUS**A. Printed Wiring Board Removal**

- (1) Make a selection of a wrist strap from Table 2.

WARNING: USE ONLY WRIST STRAPS THAT HAVE A GROUND LEAD RESISTANCE OF 250,000 OHMS MINIMUM TO 1.5 MEGOHMS MAXIMUM. CONTACT BETWEEN A LOW RESISTANCE WRIST STRAP AND A HIGH VOLTAGE IS A SHOCK HAZARD AND WILL CAUSE INJURY TO THE PERSON.

- (2) Do the wrist strap test. Refer to Paragraph 3.
- (3) Disconnect the system electrical power to the LRU.
- (4) Make a selection of a conductive bag from Table 1.
- (5) Plug the jack end of the wrist strap to the electrostatic ground jack of the card file.
- (6) Put the wrist strap on.
- (7) Open the access door on the card file.
- (8) Find the location of the printed circuit board.

NOTE: The label on the card file door identifies the location of each LRU.

- (9) Hold the printed wiring board with either pair of these extractors:
 - The top and the bottom
 - The left and the right.
- (10) Pull the printed wiring board from the card file.
- (11) Put the printed wiring board in the conductive bag.
- (12) Close the bag with any of these:
 - A fold lock
 - A zip lock
 - An ESDS label
 - A tie material from Table 4.

CAUTION: DO NOT USE STAPLES TO CLOSE CONDUCTIVE BAGS. DAMAGE TO THE BAG WILL EXPOSE THE CONTENTS TO ESD.

- (13) Close the card file access door.
- (14) Disconnect the wrist strap from the electrostatic ground jack.
- (15) If it is necessary to move the LRU, put it into a protective container so that no damage occurs to either the conductive bag or the LRU.

B. Metal Encased Assembly Removal

- (1) Make a selection of a wrist strap from Table 2.

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STANDARD WIRING PRACTICES MANUAL**ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION**

WARNING: USE ONLY WRIST STRAPS THAT HAVE A GROUND LEAD RESISTANCE OF 250,000 OHMS MINIMUM TO 1.5 MEGOHMS MAXIMUM. CONTACT BETWEEN A LOW RESISTANCE WRIST STRAP AND A HIGH VOLTAGE IS A SHOCK HAZARD AND WILL CAUSE INJURY TO THE PERSON.

- (2) Do the wrist strap test. Refer to Paragraph 3.
- (3) Disconnect the system electrical power to the LRU.
- (4) Make a selection of either of these:
 - A conductive bag from Table 1
 - A conductive dust cap from Table '3.

NOTE: The conductive dust cap from the new LRU can be used.

- (5) Connect the jack end of the wrist strap to an electrostatic ground jack on the E/E rack or to an unpainted surface of the primary structure.
- (6) Put the wrist strap on.
- (7) Remove the LRU from the rack.
- (8) Put the dust cap on the connector of the LRU.

NOTE: A satisfactory alternative is to put the LRU into a conductive bag.

CAUTION: DO NOT TO TOUCH THE ELECTRICAL PINS. DAMAGE CAN OCCUR TO THE INTERNAL ESDS COMPONENTS.

5. INSTALLATION OF ESDS LRUS**A. Printed Wiring Board Installation**

- (1) Make a selection of a wrist strap from Table 2.

WARNING: USE ONLY WRIST STRAPS THAT HAVE A GROUND LEAD RESISTANCE OF 250,000 OHMS MINIMUM TO 1.5 MEGOHMS MAXIMUM. CONTACT BETWEEN A LOW RESISTANCE WRIST STRAP AND A HIGH VOLTAGE IS A SHOCK HAZARD AND WILL CAUSE INJURY TO THE PERSON.

- (2) Do the wrist strap test. Refer to Paragraph 3.
- (3) Disconnect the system electrical power.
- (4) Open the access door on the card file.
- (5) Find the location for the printed circuit board.

NOTE: The label on the card file door identifies the location of each LRU.

- (6) Remove the printed wiring board from the conductive bag.
- (7) Hold the printed wiring board with either pair of these extractors:
 - The top and the bottom
 - The left and the right.
- (8) Push the LRU into the card file.
- (9) Lock the extractors.
- (10) Close and the card file access door.
Make sure that the access door is in position.
- (11) Disconnect the wrist strap from the electrostatic ground jack.

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ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION

B. Metal Encased Assembly Installation

- (1) Make a selection of a wrist strap from Table 2.

WARNING: USE ONLY WRIST STRAPS THAT HAVE A GROUND LEAD RESISTANCE OF 250,000 OHMS MINIMUM TO 1.5 MEGOHMS MAXIMUM. CONTACT BETWEEN A LOW RESISTANCE WRIST STRAP AND A HIGH VOLTAGE IS A SHOCK HAZARD AND WILL CAUSE INJURY TO THE PERSON.

- (2) Do the wrist strap test. Refer to Paragraph 3.
- (3) Disconnect the system electrical power.
- (4) Connect the jack end of the wrist strap to an electrostatic ground jack on the E/E rack or to an unpainted surface of the primary structure.
- (5) Put the wrist strap on.
- (6) Remove the conductive dust caps from the connectors of the LRU.
- (7) Push the LRU into the rack.
- (8) Disconnect the jack end of the wrist strap from ground.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP MATE-N-LOK CONNECTORS

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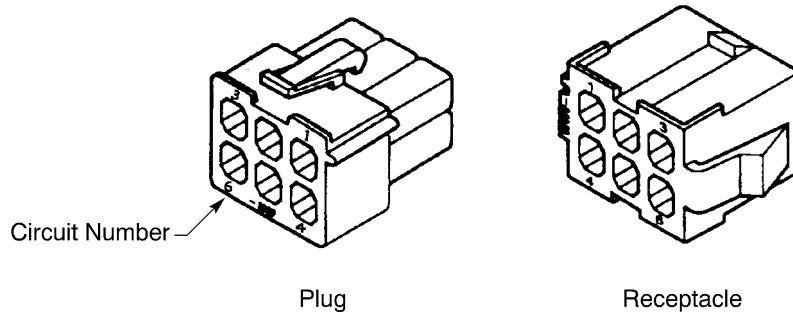
ASSEMBLY OF AMP MATE-N-LOK CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
172160-1	Receptacle	AMP
172168-1	Plug	AMP



**AMP MATE-N-LOK CONNECTORS
Figure 1**

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Wire Size (AWG)	Contact		
	Type	Part Number	Supplier
22	Pin	170364-3	AMP
	Socket	170366-3	AMP
20	Pin	170364-3	AMP
	Socket	170366-3	AMP
18	Pin	170364-3	AMP
	Socket	170366-3	AMP

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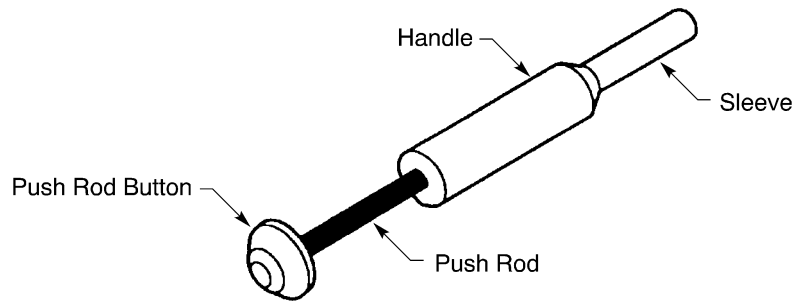
ASSEMBLY OF AMP MATE-N-LOK CONNECTORS

2. CONNECTOR DISASSEMBLY

A. Contact Removal

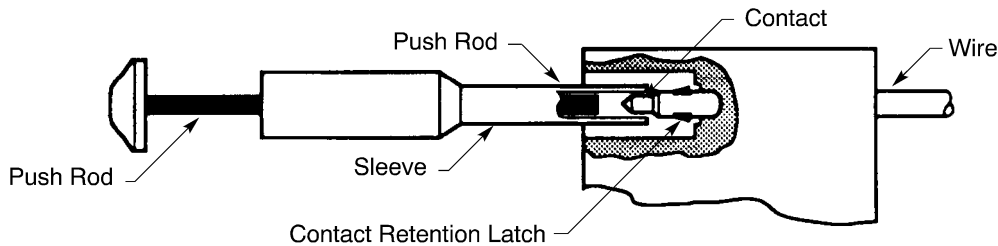
**Table 3
CONTACT REMOVAL TOOLS**

Removal Tool	Supplier
724668-1	AMP



**CONTACT REMOVAL TOOL
Figure 2**

- (1) Make a selection of a contact removal tool from Table 3. Refer to Figure 2.
- (2) Hold the wire of the contact.
- (3) Put the tool into the contact cavity on the side that is opposite the wire.
- (4) Push the tool into the contact cavity until the contact retention latches are opened. Refer to Figure 3.



**CONTACT REMOVAL
Figure 3**

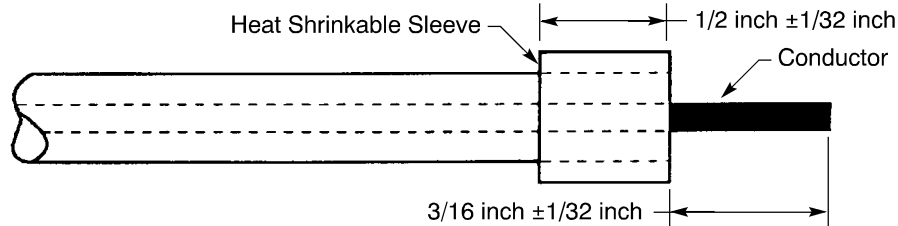
- (5) Turn the handle of the tool until the contact retention latches are released. Make sure that the tool stays fully inserted in the contact cavity.
- (6) Push the rod button on the tool to eject the contact.
- (7) Pull the contact from the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP MATE-N-LOK CONNECTORS

3. CONNECTOR ASSEMBLY

A. Wire Preparation



**WIRE PREPARATION
Figure 4**

- (1) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (2) Put a 1/2 inch ± 1/32 inch length of the heat shrinkable sleeve on the wire.
- (3) Remove 3/16 inch ± 1/32 inch of insulation from the end of the wire. Refer to Figure 4.
- (4) Move the heat shrinkable sleeve so that the end of the sleeve is aligned with the end of the wire insulation. Refer to Figure 4.

Make sure that:

- The end of the sleeve is within 1/32 inch of the end of the insulation
- The sleeve does not make an overlap with the conductor.

- (5) Shrink the sleeve into position. Refer to Subject 20-10-14.

B. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Tool		
	Basic Unit	Die	Supplier
22	724651-1	A	AMP
	755331-1		
20	724651-1	A	AMP
	755331-1		
18	724651-1	B	AMP
	755331-1		

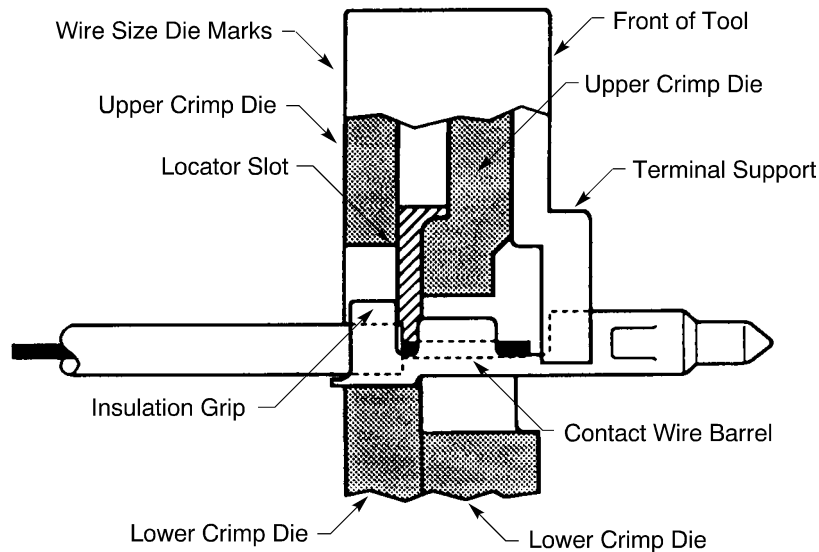
- (1) Make a selection of a contact crimp tool from Table 4.
- (2) Put the contact in the crimp tool so that:
 - The insulation grip of the contact is against the locator
 - The end of the contact is in the locator slot of the tool.

Make sure the contact is in the correct tool die.

Refer to Figure 5.

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ASSEMBLY OF AMP MATE-N-LOK CONNECTORS



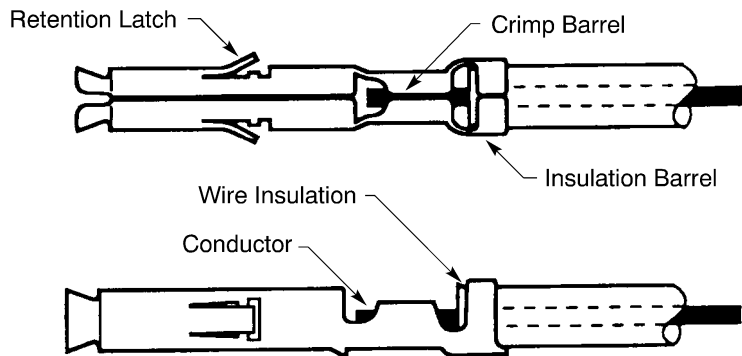
POSITION OF THE CONTACT IN THE CRIMP TOOL

Figure 5

- (3) Lightly close the handles of the tool so that the contact stays in the die.
- (4) Push the wire into the crimp barrel of the contact until the wire insulation is against the contact insulation stop. Refer to Figure 6.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The end of the conductor can be seen in the contact inspection hole.



POSITION OF THE CONTACT ON THE WIRE

Figure 6

- (5) Close the handles of the tool until the ratchet is released.

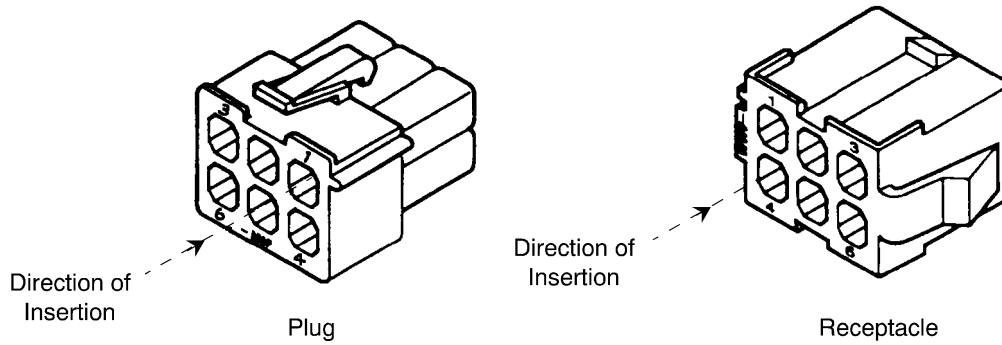
C. Contact Insertion

NOTE: It is not necessary to use a contact insertion tool.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP MATE-N-LOK CONNECTORS

- (1) Put the contact into the contact cavity from the wire side of the connector. Refer to Figure 7.



CONTACT INSERTION
Figure 7

- (2) To make sure that the contact is fully inserted, lightly pull on the wire.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

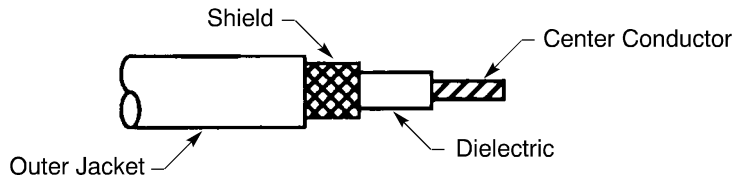
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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF COAX CONNECTORS**

This Subject gives:

- The general conditions for the preparation and assembly of connectors and contacts with coax cable
- The coax jack and plug connectors for the splice of coax cable.

1. GENERAL CONDITIONS FOR THE ASSEMBLY OF COAX CONNECTORS**A. Applicable Conditions for the Preparation of Coax Cable****USUAL CONFIGURATION OF A COAX CABLE****Figure 1**

NOTE: Cable preparation dimensions are very important and the specified tolerances must be obeyed.

These conditions are applicable:

- The ends of the outer jacket and the dielectric must be perpendicular to the longitudinal axis of the cable
- The ends of the outer jacket and the dielectric must be smooth and symmetrical to have the correct fit in the contact or the connector
- The outer jacket and the dielectric must not have damage after the specified length of the outer jacket is removed
- The shield must not have damage after the specified length of the outer jacket is removed
- The conductor must not have damage after the specified length of the dielectric is removed.

In order to prepare a cable that agrees with the applicable conditions, it is necessary to use the correct tools that do not cause deformation of the cable.

B. Applicable Conditions for the Assembly of Coax Contacts

These conditions are applicable for the assembly of all coax contacts:

- The end of the contact must be against the end of dielectric of the cable
- Before the contact is soldered or crimped, the conductor must be in the correct position in the crimp barrel or the solder barrel of the contact
- The conductor is in the correct position in the crimp barrel or the solder barrel of the contact when the conductor can be seen in the inspection hole of the contact.

These conditions are applicable for the assembly of solder type coax contacts:

- Solder must be applied with only the necessary amount of heat for the solder to flow
- Flux and unwanted solder must be removed from the outer surface of the contact.

CAUTION: MORE THAN THE NECESSARY AMOUNT OF HEAT CAN CAUSE DAMAGE TO THE DIELECTRIC OF THE CABLE OR THE COAX CONTACT.

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF COAX CONNECTORS****C. Applicable Conditions for the Assembly of Coax Connectors**

These general conditions are applicable:

- The different components of the connector must be correctly aligned and in the correct position
- If a connector that has a vee gasket is disassembled, a new vee gasket must be installed when the connector is assembled again.

Connector assemblies must be tested for:

- Continuity
- Short circuits
- Unwanted grounds
- Insulation resistance.

NOTE: The minimum, acceptable insulation resistance is 100 megohms.

A connector that is not connected must have one of these seals for protection:

- A metallic cap that engages the connector coupling mechanism
- A plastic cap that has a tight fit
- A polyethylene bag that is held in position with a wire harness tie.

2. COAX CABLE REPAIR

For the applicable damage conditions and repair conditions of coax cables, refer to Subject 20-10-13.

A. Coax Connectors for a Coax Cable Splice

Table 1

APPLICABLE COAX JACK AND PLUG CONNECTORS FOR SPECIFIED COAX CABLES

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
09-026	BNC	In-Line Jack	KC-39-31	Subject 20-51-11
		Straight Plug	KC-59-96	Subject 20-51-11

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
09-058	BNC	In-Line Jack	KC-39-108	Subject 20-51-15
			KC-39-20	Subject 20-51-11
		Straight Plug	KC-59-411	Subject 20-51-15
			KC-59-61	Subject 20-51-11
	C	In-Line Jack	KD-19-45	Subject 20-51-11
			KD-59-130	Subject 20-51-16
		Straight Plug	KD-59-161	Subject 20-51-15
			KD-59-44	Subject 20-51-11
			KD-59-55	Subject 20-51-11
	N	In-Line Jack	KN-39-21	Subject 20-51-11
		Straight Plug	KN-59-247	Subject 20-51-15
	TNC	In-Line Jack	KA-39-12	Subject 20-51-11
			KA-39-82	Subject 20-51-15
		Straight Plug	KA-59-277	Subject 20-51-15
			KA-59-29	Subject 20-51-11
10-008	C	In-Line Jack	KD-39-08	Subject 20-51-11
			KD-39-42	Subject 20-51-15
		Straight Plug	KD-59-163	Subject 20-51-15
			KD-59-33	Subject 20-51-11
			KD-59-38	Subject 20-51-11
	HN	In-Line Jack	KH-39-11	Subject 20-51-11
			KH-39-21	Subject 20-51-15
		Straight Plug	KH-59-19	Subject 20-51-11
			KH-59-63	Subject 20-51-15
	N	In-Line Jack	KN-39-19	Subject 20-51-11
			KN-59-18	Subject 20-51-11
		Straight Plug	KN-59-261	Subject 20-51-15
			KN-59-46	Subject 20-51-11
5012H3012	N	In-Line Jack	KN-39-114-M06	Subject 20-51-15
		Straight Plug	KN-59-330-M06	Subject 20-51-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
5026A1018	KM	In-Line Jack	KM-19-08	Subject 20-51-15
		Straight Plug	KM-59-18	Subject 20-51-15
			KM-59-31	Subject 20-51-15
			KM-59-41	Subject 20-51-15
5026A1314	KM	In-Line Jack	KM-19-08	Subject 20-51-15
		Straight Plug	KM-59-18	Subject 20-51-15
			KM-59-31	Subject 20-51-15
			KM-59-41	Subject 20-51-15
5026A1318	KM	In-Line Jack	KM-19-08	Subject 20-51-15
		Straight Plug	KM-59-18	Subject 20-51-15
			KM-59-31	Subject 20-51-15
			KM-59-41	Subject 20-51-15
AA-1500	BNC	In-Line Jack	KC-39-110	Subject 20-51-15
			KC-39-48	Subject 20-51-11
		Straight Plug	KC-59-177	Subject 20-51-11
			KC-59-267	Subject 20-51-15
	C	In-Line Jack	KD-39-21	Subject 20-51-11
			KD-39-28	Subject 20-51-15
		Straight Plug	KD-59-125	Subject 20-51-15
			KD-59-94	Subject 20-51-11
	N	In-Line Jack	KN-39-48	Subject 20-51-11
			KN-39-72	Subject 20-51-15
		Straight Plug	KN-59-128	Subject 20-51-11
			KN-59-185	Subject 20-51-15
	TNC	In-Line Jack	KA-39-32	Subject 20-51-11
			KA-39-83	Subject 20-51-15
		Straight Plug	KA-59-188	Subject 20-51-15
			KA-59-98	Subject 20-51-11
AA-2831	N	In-Line Jack	1203-13-9	Subject 20-51-15
		Straight Plug	1205-31-9	Subject 20-51-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
BA13077A	BNC	In-Line Jack	KC-39-110	Subject 20-51-15
			KC-39-48	Subject 20-51-11
		Straight Plug	KC-59-177	Subject 20-51-11
			KC-59-267	Subject 20-51-15
	C	In-Line Jack	KD-39-21	Subject 20-51-11
			KD-39-28	Subject 20-51-15
		Straight Plug	KD-59-125	Subject 20-51-15
			KD-59-94	Subject 20-51-11
	N	In-Line Jack	KN-39-48	Subject 20-51-11
			KN-39-72	Subject 20-51-15
		Straight Plug	KN-59-128	Subject 20-51-11
			KN-59-185	Subject 20-51-15
	TNC	In-Line Jack	KA-39-32	Subject 20-51-11
			KA-39-83	Subject 20-51-15
		Straight Plug	KA-59-188	Subject 20-51-15
			KA-59-98	Subject 20-51-11
BA14349	BNC	In-Line Jack	KC-39-110	Subject 20-51-15
			KC-39-48	Subject 20-51-11
		Straight Plug	KC-59-177	Subject 20-51-11
			KC-59-267	Subject 20-51-15
	C	In-Line Jack	KD-39-21	Subject 20-51-11
			KD-39-28	Subject 20-51-15
		Straight Plug	KD-59-125	Subject 20-51-15
			KD-59-94	Subject 20-51-11
	N	In-Line Jack	KN-39-48	Subject 20-51-11
			KN-39-72	Subject 20-51-15
		Straight Plug	KN-59-128	Subject 20-51-11
			KN-59-185	Subject 20-51-15
	TNC	In-Line Jack	KA-39-32	Subject 20-51-11
			KA-39-83	Subject 20-51-15
		Straight Plug	KA-59-188	Subject 20-51-15
			KA-59-98	Subject 20-51-11

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
BA5903	BNC	In-Line Jack	KC-39-108	Subject 20-51-15
			KC-39-20	Subject 20-51-11
		Straight Plug	KC-59-383	Subject 20-51-15
			KC-59-411	Subject 20-51-15
			KC-59-61	Subject 20-51-11
	C	In-Line Jack	KD-19-45	Subject 20-51-11
		Straight Plug	KD-59-130	Subject 20-51-16
			KD-59-161	Subject 20-51-15
			KD-59-44	Subject 20-51-11
	N	In-Line Jack	KN-39-21	Subject 20-51-11
			KN-59-247	Subject 20-51-15
		Straight Plug	KN-59-369-M06	Subject 20-51-15
			KN-59-49	Subject 20-51-11
	TNC	In-Line Jack	KA-39-12	Subject 20-51-11
KA-39-15			Subject 20-51-11	
KA-39-82			Subject 20-51-15	
Straight Plug		KA-59-128	Subject 20-51-11	
		KA-59-277	Subject 20-51-15	
		KA-59-29	Subject 20-51-11	
		KA-59-438-M06	Subject 20-51-15	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
BA6903	C	In-Line Jack	KD-39-09	Subject 20-51-11
			KD-39-37	Subject 20-51-15
		Straight Plug	KD-59-164	Subject 20-51-15
			KD-59-165	Subject 20-51-15
			KD-59-201	Subject 20-51-15
			KD-59-201-M06	Subject 20-51-15
			KD-59-41	Subject 20-51-11
			KD-59-42	Subject 20-51-11
			KD-59-64	Subject 20-51-15
			HN	In-Line Jack
	KH-39-12	Subject 20-51-11		
	KH-39-22	Subject 20-51-15		
	Straight Plug	KH-59-21		Subject 20-51-11
		KH-59-65		Subject 20-51-15
		N		In-Line Jack
	KN-39-93		Subject 20-51-15	
	Straight Plug		KN-59-220	Subject 20-51-15
			KN-59-220-M07	Subject 20-51-15
			KN-59-48	Subject 20-51-11
			KN-59-49	Subject 20-51-11
	TNC	In-Line Jack	KA-39-15	Subject 20-51-11
		Straight Plug	KA-59-185	Subject 20-51-15
			KA-59-185-MC7	Subject 20-51-15
			KA-59-31	Subject 20-51-11
KA-59-316			Subject 20-51-15	
KA-59-438-M06			Subject 20-51-15	



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ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
BMS13-65 Type 0F	N	In-Line Jack	1203-14-9	Subject 20-51-15
			KN-39-71	Subject 20-51-15
		Straight Plug	1205-47-9	Subject 20-51-15
			KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15
			KN-59-369-M06	Subject 20-51-15
	TNC	In-Line Jack	123-22-5	Subject 20-51-15
			125-94-9	Subject 20-51-15
		Straight Plug	125-88-9	Subject 20-51-15
			KA-59-128	Subject 20-51-11
			KA-59-251	Subject 20-51-15
			KA-59-438-M06	Subject 20-51-15
BMS13-65 Type 0G	N	In-Line Jack	1203-19-9	Subject 20-51-15
			1205-62-9	Subject 20-51-15
		Straight Plug	KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15
BMS13-65 Type 0H	N	In-Line Jack	1203-20-9	Subject 20-51-15
			1205-48-9	Subject 20-51-15
		Straight Plug	KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15
			KN-59-49	Subject 20-51-11
	TNC	In-Line Jack	123-23-9	Subject 20-51-15
			125-101-9	Subject 20-51-15
		Straight Plug	125-91-9	Subject 20-51-15
BMS13-65 Type 0J	N	In-Line Jack	1203-16-9	Subject 20-51-15
			1205-49-9	Subject 20-51-15
		Straight Plug	KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15
	SC	In-Line Jack	823-2-9	Subject 20-51-15
			Straight Plug	825-12-9

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
BMS13-65 Type 0K	N	In-Line Jack	1203-21-9	Subject 20-51-15
		Straight Plug	1205-61-9	Subject 20-51-15
FEP226	N	In-Line Jack	1203-13-9	Subject 20-51-15
		Straight Plug	1205-31-9	Subject 20-51-15
MC5400	BNC	In-Line Jack	KC-39-48	Subject 20-51-11
		Straight Plug	KC-59-177	Subject 20-51-11
	C	In-Line Jack	KD-39-21	Subject 20-51-11
		Straight Plug	KD-59-94	Subject 20-51-11
	N	In-Line Jack	KN-39-48	Subject 20-51-11
		Straight Plug	KN-59-128	Subject 20-51-11
	TNC	In-Line Jack	KA-39-32	Subject 20-51-11
		Straight Plug	KA-59-98	Subject 20-51-11
MI-5224	HN	In-Line Jack	KH-39-11	Subject 20-51-11
		Straight Plug	KH-59-47	Subject 20-51-11
MI-5406	BNC	In-Line Jack	KC-39-110	Subject 20-51-15
			KC-39-48	Subject 20-51-11
		Straight Plug	KC-59-177	Subject 20-51-11
			KC-59-267	Subject 20-51-15
	C	In-Line Jack	KD-39-21	Subject 20-51-11
			KD-39-28	Subject 20-51-15
		Straight Plug	KD-59-125	Subject 20-51-15
			KD-59-94	Subject 20-51-11
	N	In-Line Jack	KN-39-48	Subject 20-51-11
			KN-39-72	Subject 20-51-15
		Straight Plug	KN-59-128	Subject 20-51-11
			KN-59-185	Subject 20-51-15
	TNC	In-Line Jack	KA-39-32	Subject 20-51-11
			KA-39-83	Subject 20-51-15
Straight Plug		KA-59-188	Subject 20-51-15	
		KA-59-98	Subject 20-51-11	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
RG-11	C	In-Line Jack	KD-39-08	Subject 20-51-11
			KD-39-42	Subject 20-51-15
		Straight Plug	KD-59-163	Subject 20-51-15
			KD-59-33	Subject 20-51-11
			KD-59-38	Subject 20-51-11
	HN	In-Line Jack	KH-39-11	Subject 20-51-11
			KH-39-21	Subject 20-51-15
		Straight Plug	KH-59-19	Subject 20-51-11
			KH-59-63	Subject 20-51-15
	N	In-Line Jack	KN-39-19	Subject 20-51-11
Straight Plug		KN-59-18	Subject 20-51-11	
		KN-59-261	Subject 20-51-15	
		KN-59-46	Subject 20-51-11	
RG-115	N	In-Line Jack	KN-39-23	Subject 20-51-11
			KN-39-55	Subject 20-51-11
		Straight Plug	KN-59-135	Subject 20-51-11
			KN-59-28	Subject 20-51-11
			KN-59-57	Subject 20-51-11
RG-122	BNC	In-Line Jack	KC-39-142-M06	Subject 20-51-15
			KC-39-36	Subject 20-51-15
			KC-39-44	Subject 20-51-11
		Straight Plug	KC-59-111	Subject 20-51-11
			KC-59-446	Subject 20-51-15
	TNC	In-Line Jack	KA-39-31	Subject 20-51-11
		Straight Plug	125-69-9	Subject 20-51-15
RG-142	TNC	In-Line Jack	KA-39-15	Subject 20-51-11
			KA-39-85	Subject 20-51-15
		Straight Plug	KA-59-128	Subject 20-51-11
			KA-59-230	Subject 20-51-15
			KA-59-251	Subject 20-51-15
			KA-59-438-M06	Subject 20-51-15
			KA-59-57	Subject 20-51-11

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ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
RG-180	BNC	In-Line Jack	KC-39-142-M06	Subject 20-51-15
			KC-39-36	Subject 20-51-15
			KC-39-44	Subject 20-51-11
	BNC	Straight Plug	KC-59-111	Subject 20-51-11
			KC-59-446	Subject 20-51-15
			TNC	In-Line Jack
TNC	Straight Plug	125-69-9	Subject 20-51-15	
RG-195	BNC	In-Line Jack	KC-39-142-M06	Subject 20-51-15
			KC-39-36	Subject 20-51-15
			KC-39-44	Subject 20-51-11
	BNC	Straight Plug	KC-59-111	Subject 20-51-11
			KC-59-446	Subject 20-51-15
			TNC	In-Line Jack
TNC	Straight Plug	125-69-9	Subject 20-51-15	
RG-210	BNC	In-Line Jack	KC-39-109	Subject 20-51-15
			KC-39-22	Subject 20-51-11
			KC-39-45	Subject 20-51-11
	BNC	Straight Plug	KC-59-263	Subject 20-51-15
			KC-59-64	Subject 20-51-11
			N	In-Line Jack
N	Straight Plug	KN-59-133	Subject 20-51-11	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
RG-213	C	In-Line Jack	KD-39-08	Subject 20-51-11
			KD-39-42	Subject 20-51-15
		Straight Plug	KD-59-163	Subject 20-51-15
			KD-59-33	Subject 20-51-11
			KD-59-38	Subject 20-51-11
	HN	In-Line Jack	KH-39-11	Subject 20-51-11
			KH-39-21	Subject 20-51-15
		Straight Plug	KH-59-19	Subject 20-51-11
			KH-59-63	Subject 20-51-15
	N	In-Line Jack	KN-39-19	Subject 20-51-11
		Straight Plug	KN-59-18	Subject 20-51-11
			KN-59-201	Subject 20-51-15
			KN-59-261	Subject 20-51-15
KN-59-369-M06			Subject 20-51-15	
KN-59-46	Subject 20-51-11			
KN-59-67	Subject 20-51-15			

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
RG-214	C	In-Line Jack	KD-39-09	Subject 20-51-11
			KD-39-37	Subject 20-51-15
		Straight Plug	KD-59-164	Subject 20-51-15
			KD-59-165	Subject 20-51-15
			KD-59-41	Subject 20-51-11
			KD-59-42	Subject 20-51-11
	HN	In-Line Jack	KD-59-52	Subject 20-51-15
			KH-19-12	Subject 20-51-11
			KH-39-12	Subject 20-51-11
		Straight Plug	KH-39-22	Subject 20-51-15
	KH-59-21		Subject 20-51-11	
	N	In-Line Jack	KH-59-65	Subject 20-51-15
			KN-39-20	Subject 20-51-11
			KN-39-93	Subject 20-51-15
		Straight Plug	KN-59-34	Subject 20-51-11
			KN-59-220	Subject 20-51-15
			KN-59-220-M07	Subject 20-51-15
	RG-223	BNC	In-Line Jack	KN-59-48
KC-39-25				Subject 20-51-11
Straight Plug			KC-39-75	Subject 20-51-16
			KC-59-218	Subject 20-51-15
N		In-Line Jack	KC-59-259	Subject 20-51-15
			KC-59-33	Subject 20-51-11
		Straight Plug	KN-39-42	Subject 20-51-11
			KN-39-71	Subject 20-51-15
			KN-59-113	Subject 20-51-11
			KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15
			KN-59-242-M06	Subject 20-51-15
KN-59-369-M06	Subject 20-51-15			
KN-59-49	Subject 20-51-11			

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
RG-225	HN	In-Line Jack	KH-39-11	Subject 20-51-11
		Straight Plug	KH-59-50	Subject 20-51-11
			KH-59-60	Subject 20-51-11
	N	In-Line Jack	KN-39-93	Subject 20-51-15
		Straight Plug	KN-59-131	Subject 20-51-11
			KN-59-220	Subject 20-51-15
			KN-59-220-M07	Subject 20-51-15
RG-303	TNC	In-Line Jack	KA-39-85	Subject 20-51-15
		Straight Plug	KA-59-251	Subject 20-51-15
RG-393	N	In-Line Jack	1203-4-9	Subject 20-51-15
		Straight Plug	KN-59-237	Subject 20-51-11
			KN-59-239	Subject 20-51-15
			KN-59-329-M06	Subject 20-51-15
			KN-59-49	Subject 20-51-11
	TNC	In-Line Jack	KA-39-100-M06	Subject 20-51-15
			KA-39-85	Subject 20-51-15
		Straight Plug	KA-59-251	Subject 20-51-15
			KA-59-267	Subject 20-51-11
			KA-59-319	Subject 20-51-11
			KA-59-353-M06	Subject 20-51-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
RG-58	BNC	In-Line Jack	KC-39-108	Subject 20-51-15
			KC-39-20	Subject 20-51-11
			KC-39-75	Subject 20-51-16
		Straight Plug	KC-59-411	Subject 20-51-15
			KC-59-61	Subject 20-51-11
			C	In-Line Jack
	Straight Plug	KD-59-130		Subject 20-51-16
		KD-59-161		Subject 20-51-15
		KD-59-44		Subject 20-51-11
		KD-59-55	Subject 20-51-11	
	N	In-Line Jack	KN-39-21	Subject 20-51-11
		Straight Plug	KN-59-247	Subject 20-51-15
	TNC	In-Line Jack	KA-39-12	Subject 20-51-11
			KA-39-82	Subject 20-51-15
		Straight Plug	KA-59-277	Subject 20-51-15
			KA-59-29	Subject 20-51-11
RG-59	BNC	In-Line Jack	KC-39-109	Subject 20-51-15
			KC-39-22	Subject 20-51-11
			KC-39-45	Subject 20-51-11
			KC-39-75	Subject 20-51-16
		Straight Plug	KC-59-128	Subject 20-51-15
			KC-59-263	Subject 20-51-15
	KC-59-64		Subject 20-51-11	
	N	In-Line Jack	KN-39-51	Subject 20-51-11
		Straight Plug	KN-59-133	Subject 20-51-11
	RG-62	BNC	In-Line Jack	KC-39-109
KC-39-22				Subject 20-51-11
Straight Plug			KC-59-263	Subject 20-51-15
			KC-59-64	Subject 20-51-11
N		In-Line Jack	KN-39-51	Subject 20-51-11
		Straight Plug	KN-59-133	Subject 20-51-11

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
RG-71	BNC	In-Line Jack	KC-39-21	Subject 20-51-11
		Straight Plug	KC-59-262	Subject 20-51-15
			KC-59-41	Subject 20-51-11
			KC-59-425-M06	Subject 20-51-15
			KC-59-51	Subject 20-51-15
			KC-59-63	Subject 20-51-11
	N	In-Line Jack	KN-39-19	Subject 20-51-11
	TNC	Straight Plug	KA-59-313	Subject 20-51-15
			KA-59-39	Subject 20-51-11
	S280W503-2	N	In-Line Jack	1203-14-9
KN-39-71				Subject 20-51-15
Straight Plug			1205-47-9	Subject 20-51-15
			KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15
			KN-59-369-M06	Subject 20-51-15
			KN-59-49	Subject 20-51-11
TNC		In-Line Jack	123-22-5	Subject 20-51-15
		Straight Hex Plug	125-94-9	Subject 20-51-15
			125-88-9	Subject 20-51-15
		Straight Plug	KA-59-128	Subject 20-51-11
			KA-59-251	Subject 20-51-15
			KA-59-438-M06	Subject 20-51-15
S280W503-3	N	In-Line Jack	1203-19-9	Subject 20-51-15
		Straight Plug	1205-62-9	Subject 20-51-15
			KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF COAX CONNECTORS

Table 1 (continued)

Coax Cable	Connector			
	Series	Type	Part Number	Assembly Procedure
S280W503-4	N	In-Line Jack	1203-20-9	Subject 20-51-15
		Straight Plug	1205-48-9	Subject 20-51-15
			KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15
			KN-59-49	Subject 20-51-11
	TNC	In-Line Jack	123-23-9	Subject 20-51-15
		Straight Hex Plug	125-101-9	Subject 20-51-15
Straight Plug		125-91-9	Subject 20-51-15	
S280W503-5	N	In-Line Jack	1203-16-9	Subject 20-51-15
		Straight Plug	1205-49-9	Subject 20-51-15
			KN-59-183	Subject 20-51-15
			KN-59-183-M06	Subject 20-51-15
	SC	In-Line Jack	823-2-9	Subject 20-51-15
		Straight Plug	825-12-9	Subject 20-51-15
S280W503-6	N	In-Line Jack	1203-21-9	Subject 20-51-15
		Straight Plug	1205-61-9	Subject 20-51-15



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ASSEMBLY OF STANDARD CONNECTORS WITH COAX CABLE

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF STANDARD CONNECTORS WITH COAX CABLE**

This Subject gives the procedure to prepare a coax cable for the assembly of a connector that is not a coax connector.

1. PART NUMBERS AND DESCRIPTION**A. Coax Cable Part Numbers**

Table 1
COAX CABLE PART NUMBERS

Coax Cable	Supplier
BA14349	ITT Surprenant
5020G3442	Raychem

2. CONNECTOR ASSEMBLY WITH ITT SURPRENANT BA14349 AND RAYCHEM 5020G3442 COAX CABLE**A. Necessary Parts and Materials**

Table 2
FERRULE PART NUMBERS

Part	Boeing Standard
Ferrule, Inner	BACS13S124B
Ferrule, Outer	BACS13S199C

B. Cable Preparation

Refer to Subject 20-51-00 for the general conditions that are applicable for the preparation of coax cable.

- (1) Remove 2.5 inches ± 0.06 inch of the outer jacket from the end of the cable.
- (2) Remove 2.5 inches ± 0.06 inch of the outer shield from the end of the cable.
- (3) Make a selection of an outer ferrule from Table 2.
- (4) Put the outer ferrule on the cable.
- (5) Put a 2 inch length of 1/4 inch diameter heat shrinkable sleeve on the cable.
- (6) Remove 1.13 inches ± 0.03 inch of the inner shield from the end of the cable.
- (7) Remove 1.13 inches ± 0.03 inch of the dielectric from the end of the cable.

CAUTION: DO NOT CUT OR CAUSE ANY DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (8) Put a 1.06 inch $+0$ inch, -0.03 inch length of 1/16 inch diameter heat shrinkable sleeve on the conductor.

Make sure that the forward end of the sleeve is aligned with the end of the dielectric.

- (9) Shrink the sleeve in position. Refer to Subject 20-10-14.

C. Shield Termination

- (1) Make a selection of the inner ferrule from Table 2.
- (2) Put the inner ferrule on the cable.

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF STANDARD CONNECTORS WITH COAX CABLE**

- (3) Assemble a shield ground wire with the mechanical ferrules.

Make sure that:

- The shield ground wire is 4 inches in length
- The heat shrinkable sleeve is 1/2 inch in length and has a 1/8 inch diameter
- The end of the sleeve is aligned with the end of the outer jacket.

Refer to Subject 20-10-15 for:

- The selection of the wire
- The crimp tools for the specified ferrules.

- (4) Put the strands of the shield:

- Against the dielectric
- Symmetrically around the circumference of the dielectric.

- (5) Assemble a shield dead end. Refer to Subject 20-10-15.

- (6) Push the 2 inch length of 1/4 inch diameter heat shrinkable sleeve forward until the forward end of the sleeve makes an overlap with the rear end of the shield ground wire.

- (7) Shrink the sleeve in position. Refer to Subject 20-10-14.

D. Connector Assembly

- (1) Assemble the connector.

Refer to the applicable Subject for the connector.



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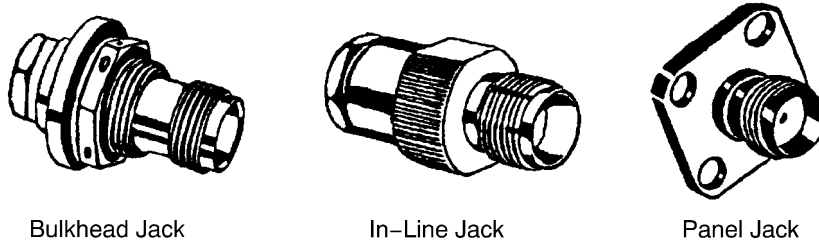
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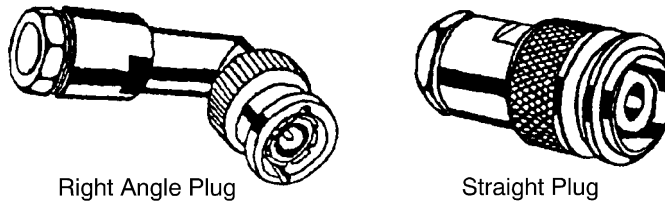
ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers and Description



K-GRIP WEATHERPROOF COAX JACK CONNECTORS
Figure 1



K-GRIP WEATHERPROOF COAX PLUG CONNECTORS
Figure 2

Table 1
COAX CONNECTOR PART NUMBERS

Part Number	Series	Configuration	Contact Type	Supplier
KA-19-21	TNC	Panel Jack	Solder	Kings Electronics
KA-19-23	TNC	Panel Jack	Solder	Kings Electronics
KA-19-24	TNC	Panel Jack	Solder	Kings Electronics
KA-19-25	TNC	Panel Jack	Solder	Kings Electronics
KA-19-48	TNC	Bulkhead Jack	Solder	Kings Electronics
KA-19-50	TNC	Panel Jack	Solder	Kings Electronics
KA-19-51	TNC	Panel Jack	Solder	Kings Electronics
KA-19-63	TNC	Panel Jack	Solder	Kings Electronics
KA-39-12	TNC	In-Line Jack	Solder	Kings Electronics
KA-39-15	TNC	In-Line Jack	Solder	Kings Electronics
KA-39-31	TNC	In-Line Jack	Solder	Kings Electronics
KA-39-32	TNC	In-Line Jack	Solder	Kings Electronics
KA-59-128	TNC	Straight Plug	Solder	Kings Electronics
KA-59-134	TNC	Straight Plug	Solder	Kings Electronics

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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KA-59-138	TNC	Right Angle Plug	Solder	Kings Electronics
KA-59-166	TNC	Right Angle Plug	Solder	Kings Electronics
KA-59-267	TNC	Straight Plug	Solder	Kings Electronics
KA-59-29	TNC	Straight Plug	Solder	Kings Electronics
KA-59-31	TNC	Straight Plug	Solder	Kings Electronics
KA-59-318	TNC	Right Angle Plug	Solder	Kings Electronics
KA-59-319	TNC	Straight Plug	Solder	Kings Electronics
KA-59-32	TNC	Right Angle Plug	Solder	Kings Electronics
KA-59-36	TNC	Straight Plug	Solder	Kings Electronics
KA-59-39	TNC	Straight Plug	Solder	Kings Electronics
KA-59-40	TNC	Straight Plug	Solder	Kings Electronics
KA-59-41	TNC	Right Angle Plug	Solder	Kings Electronics
KA-59-59	TNC	Right Angle Plug	Solder	Kings Electronics
KA-59-98	TNC	Straight Plug	Solder	Kings Electronics
KA-59-99	TNC	Right Angle Plug	Solder	Kings Electronics
KC-19-100	BNC	Panel Jack	Solder	Kings Electronics
KC-19-101	BNC	Panel Jack	Solder	Kings Electronics
KC-19-113	BNC	Panel Jack	Solder	Kings Electronics
KC-19-116	BNC	Panel Jack	Solder	Kings Electronics
KC-19-121	BNC	Right Angle Bulkhead Jack	Crimp	Kings Electronics
KC-19-125	BNC	Panel Jack	Solder	Kings Electronics
KC-19-136	BNC	Panel Jack	Solder	Kings Electronics
KC-19-21	BNC	Panel Jack	Solder	Kings Electronics
KC-19-31	BNC	Panel Jack	Solder	Kings Electronics
KC-19-32	BNC	Panel Jack	Solder	Kings Electronics
KC-19-33	BNC	Bulkhead Jack	Solder	Kings Electronics
KC-19-34	BNC	Panel Jack	Solder	Kings Electronics
KC-19-57	BNC	Bulkhead Jack	Solder	Kings Electronics
KC-19-69	BNC	Panel Jack	Solder	Kings Electronics
KC-39-102	BNC	Right Angle Jack	Solder	Kings Electronics
KC-39-14	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-20	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-21	BNC	In-Line Jack	Solder	Kings Electronics

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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KC-39-22	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-25	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-31	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-44	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-48	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-56	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-57	BNC	Right Angle Jack	Solder	Kings Electronics
KC-59-111	BNC	Straight Plug	Solder	Kings Electronics
KC-59-136	BNC	Straight Plug	Solder	Kings Electronics
KC-59-172	BNC	Right Angle Plug	Solder	Kings Electronics
KC-59-177	BNC	Straight Plug	Solder	Kings Electronics
KC-59-178	BNC	Right Angle Plug	Solder	Kings Electronics
KC-59-188	BNC	Straight Plug	Solder	Kings Electronics
KC-59-191	BNC	Right Angle Plug	Solder	Kings Electronics
KC-59-194	BNC	Right Angle Plug	Solder	Kings Electronics
KC-59-33	BNC	Straight Plug	Solder	Kings Electronics
KC-59-38	BNC	Straight Plug	Solder	Kings Electronics
KC-59-41	BNC	Straight Plug	Solder	Kings Electronics
KC-59-42	BNC	Right Angle Plug	Solder	Kings Electronics
KC-59-61	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-62	BNC	Right Angle Plug	Solder	Kings Electronics
KC-59-63	BNC	Straight Plug	Solder	Kings Electronics
KC-59-64	BNC	Straight Plug	Solder	Kings Electronics
KC-59-85	BNC	Straight Plug	Solder	Kings Electronics
KC-59-96	BNC	Straight Plug	Solder	Kings Electronics
KD-19-26	C	Panel Jack	Solder	Kings Electronics
KD-19-28	C	Panel Jack	Solder	Kings Electronics
KD-19-29	C	Bulkhead Jack	Solder	Kings Electronics
KD-19-33	C	Panel Jack	Solder	Kings Electronics
KD-19-44	C	Bulkhead Jack	Solder	Kings Electronics
KD-19-45	C	In-Line Jack	Solder	Kings Electronics
KD-19-49	C	Panel Jack	Solder	Kings Electronics
KD-19-52	C	Panel Jack	Solder	Kings Electronics

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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KD-19-56	C	Panel Jack	Solder	Kings Electronics
KD-39-08	C	In-Line Jack	Solder	Kings Electronics
KD-39-09	C	In-Line Jack	Solder	Kings Electronics
KD-39-10	C	Tee Jack	Solder	Kings Electronics
KD-39-21	C	In-Line Jack	Solder	Kings Electronics
KD-59-100	C	Right Angle Plug	Solder	Kings Electronics
KD-59-101	C	Right Angle Plug	Solder	Kings Electronics
KD-59-155	C	Right Angle Plug	Solder	Kings Electronics
KD-59-156	C	Straight Plug	Solder	Kings Electronics
KD-59-33	C	Straight Plug	Solder	Kings Electronics
KD-59-35	C	Straight Plug	Solder	Kings Electronics
KD-59-38	C	Straight Plug	Solder	Kings Electronics
KD-59-40	C	Right Angle Plug	Solder	Kings Electronics
KD-59-41	C	Straight Plug	Solder	Kings Electronics
KD-59-42	C	Straight Plug	Solder	Kings Electronics
KD-59-43	C	Right Angle Plug	Solder	Kings Electronics
KD-59-44	C	Straight Plug	Solder	Kings Electronics
KD-59-50	C	Straight Plug	Solder	Kings Electronics
KD-59-55	C	Straight Plug	Solder	Kings Electronics
KD-59-57	C	Right Angle Plug	Solder	Kings Electronics
KD-59-90	C	Straight Plug	Solder	Kings Electronics
KD-59-94	C	Straight Plug	Solder	Kings Electronics
KD-59-95	C	Right Angle Plug	Solder	Kings Electronics
KG-59-16	SC	Right Angle Plug	Solder	Kings Electronics
KG-59-22	SC	Right Angle Plug	Solder	Kings Electronics
KG-59-23	SC	Straight Plug	Solder	Kings Electronics
KG-59-25	SC	Straight Plug	Crimp	Kings Electronics
KG-59-26	SC	Right Angle Plug	Solder	Kings Electronics
KH-19-12	HN	In-Line Jack	Solder	Kings Electronics
KH-19-13	HN	Panel Jack	Solder	Kings Electronics
KH-19-14	HN	Panel Jack	Solder	Kings Electronics
KH-19-22	HN	Panel Jack	Solder	Kings Electronics
KH-39-11	HN	In-Line Jack	Solder	Kings Electronics

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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KH-39-12	HN	In-Line Jack	Solder	Kings Electronics
KH-59-19	HN	Straight Plug	Solder	Kings Electronics
KH-59-20	HN	Right Angle Plug	Solder	Kings Electronics
KH-59-21	HN	Straight Plug	Solder	Kings Electronics
KH-59-24	HN	Right Angle Plug	Solder	Kings Electronics
KH-59-28	HN	Straight Plug	Solder	Kings Electronics
KH-59-31	HN	Right Angle Plug	Solder	Kings Electronics
KH-59-47	HN	Straight Plug	Solder	Kings Electronics
KH-59-50	HN	Straight Plug	Solder	Kings Electronics
KH-59-53	HN	Straight Plug	Solder	Kings Electronics
KH-59-54	HN	Right Angle Plug	Solder	Kings Electronics
KH-59-56	HN	Right Angle Plug	Solder	Kings Electronics
KH-59-60	HN	Straight Plug	Solder	Kings Electronics
KH-59-78	HN	Straight Plug	Solder	Kings Electronics
KN-19-30	N	Panel Jack	Solder	Kings Electronics
KN-19-31	N	Panel Jack	Solder	Kings Electronics
KN-19-37	N	Bulkhead Jack	Solder	Kings Electronics
KN-19-44	N	Bulkhead Jack	Solder	Kings Electronics
KN-19-48	N	Panel Jack	Solder	Kings Electronics
KN-19-68	N	Panel Jack	Solder	Kings Electronics
KN-19-73	N	Panel Jack	Solder	Kings Electronics
KN-19-78	N	Panel Jack	Solder	Kings Electronics
KN-19-79	N	Panel Jack	Solder	Kings Electronics
KN-39-19	N	In-Line Jack	Solder	Kings Electronics
KN-39-20	N	In-Line Jack	Solder	Kings Electronics
KN-39-21	N	In-Line Jack	Solder	Kings Electronics
KN-39-23	N	In-Line Jack	Solder	Kings Electronics
KN-39-42	N	In-Line Jack	Solder	Kings Electronics
KN-39-48	N	In-Line Jack	Solder	Kings Electronics
KN-39-51	N	In-Line Jack	Solder	Kings Electronics
KN-39-55	N	In-Line Jack	Solder	Kings Electronics
KN-59-107	N	Right Angle Plug	Solder	Kings Electronics
KN-59-110	N	Right Angle Plug	Solder	Kings Electronics

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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KN-59-113	N	Straight Plug	Solder	Kings Electronics
KN-59-128	N	Straight Plug	Solder	Kings Electronics
KN-59-129	N	Right Angle Plug	Solder	Kings Electronics
KN-59-131	N	Straight Plug	Solder	Kings Electronics
KN-59-133	N	Straight Plug	Solder	Kings Electronics
KN-59-135	N	Straight Plug	Solder	Kings Electronics
KN-59-136	N	Right Angle Plug	Solder	Kings Electronics
KN-59-138	N	Right Angle Plug	Solder	Kings Electronics
KN-59-18	N	Straight Plug	Solder	Kings Electronics
KN-59-237	N	Straight Plug	Solder	Kings Electronics
KN-59-238	N	Right Angle Plug	Solder	Kings Electronics
KN-59-28	N	Straight Plug	Solder	Kings Electronics
KN-59-29	N	Right Angle Plug	Solder	Kings Electronics
KN-59-31	N	Right Angle Plug	Solder	Kings Electronics
KN-59-34	N	Straight Plug	Solder	Kings Electronics
KN-59-46	N	Straight Plug	Solder	Kings Electronics
KN-59-47	N	Right Angle Plug	Solder	Kings Electronics
KN-59-48	N	Straight Plug	Solder	Kings Electronics
KN-59-49	N	Straight Plug	Solder	Kings Electronics
KN-59-50	N	Right Angle Plug	Solder	Kings Electronics
KN-59-53	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-56	N	Right Angle Plug	Solder	Kings Electronics
KN-59-57	N	Straight Plug	Solder	Kings Electronics
KN-59-69	N	Straight Plug	Solder	Kings Electronics
KS-89-31	-	End Seal	-	Kings Electronics
KS-89-35	-	End Seal	-	Kings Electronics
KS-89-42	-	End Seal	-	Kings Electronics
KU-59-19	UHF	Right Angle Plug	Solder	Kings Electronics
KU-59-21	UHF	Right Angle Plug	Solder	Kings Electronics
KU-59-25	UHF	Right Angle Plug	Solder	Kings Electronics
KU-59-32	UHF	Right Angle Plug	Solder	Kings Electronics
KU-59-67	UHF	Right Angle Plug	Solder	Kings Electronics



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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 2
ALTERNATIVE COAX CONNECTORS

Specified Connector	Alternative Connector		Special Instructions
	Part Number	Assembly Procedure	
KA-19-25	KA-19-162	Subject 20-51-15	-
KA-19-50	KA-19-83	Subject 20-51-15	-
KA-19-51	KA-19-193	Subject 20-51-15	-
KA-19-63	KA-19-163	Subject 20-51-15	-
KA-39-12	KA-39-82	Subject 20-51-15	-
KA-39-15	KA-39-85	Subject 20-51-15	-
KA-39-31	KA-39-44	Subject 20-51-15	-
KA-39-32	KA-39-83	Subject 20-51-15	-
KA-59-128	KA-59-438-M06	Subject 20-51-15	-
KA-59-134	KA-59-438-M06	Subject 20-51-15	-
KA-59-166	KA-59-439-M06	Subject 20-51-15	-
KA-59-251	KA-59-438-M06	Subject 20-51-15	-
KA-59-267	KA-59-353-M06	Subject 20-51-15	-
KA-59-29	KA-59-277	Subject 20-51-15	-
KA-59-31	KA-59-185	Subject 20-51-15	-
KA-59-32	KA-59-186	Subject 20-51-15	-
KA-59-39	KA-59-313	Subject 20-51-15	-
KA-59-40	KA-59-437-M06	Subject 20-51-15	-
KA-59-41	KA-59-304	Subject 20-51-15	-
KA-59-59	KA-59-187	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KA-59-98	KA-59-188	Subject 20-51-15	-
KA-59-99	KA-59-189	Subject 20-51-15	-
KC-19-100	KC-19-170	Subject 20-51-15	-
KC-19-101	KC-19-256	Subject 20-51-15	-
KC-19-113	KC-19-169	Subject 20-51-15	-
KC-19-116	KC-19-129-M06	Subject 20-51-15	-
KC-19-125	KC-19-262	Subject 20-51-15	-
KC-19-136	KC-19-329-M06	Subject 20-51-15	-
KC-19-21	KC-19-129-M06	Subject 20-51-15	-
KC-19-31	KC-19-254	Subject 20-51-15	-

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Table 2 (continued)

Specified Connector	Alternative Connector		Special Instructions
	Part Number	Assembly Procedure	
KC-19-32	KC-19-327-M06	Subject 20-51-15	-
KC-19-34	KC-19-327-M06	Subject 20-51-15	-
KC-19-57	KC-19-261	Subject 20-51-15	-
KC-39-102	KC-39-111	Subject 20-51-15	-
KC-39-14	KC-39-140-M06	Subject 20-51-15	-
KC-39-20	KC-39-108	Subject 20-51-15	-
KC-39-21	KC-39-29	Subject 20-51-15	-
KC-39-22	KC-39-109	Subject 20-51-15	-
KC-39-25	KC-39-56	Subject 20-51-15	-
KC-39-31	KC-39-81	Subject 20-51-15	-
KC-39-44	KC-39-142-M06	Subject 20-51-15	-
KC-39-48	KC-39-110	Subject 20-51-15	-
KC-39-56	KC-39-140-M06	Subject 20-51-15	-
KC-59-111	KC-59-446	Subject 20-51-15	-
KC-59-177	KC-59-267	Subject 20-51-15	-
KC-59-178	KC-59-447	Subject 20-51-15	-
KC-59-188	KC-59-383	Subject 20-51-15	-
KC-59-191	KC-59-669-M06	Subject 20-51-15	-
KC-59-194	KC-59-448	Subject 20-51-15	-
KC-59-33	KC-59-383	Subject 20-51-15	-
KC-59-38	KC-59-383	Subject 20-51-15	-
KC-59-42	KC-59-444	Subject 20-51-15	-
KC-59-61	KC-59-411	Subject 20-51-15	-
KC-59-62	KC-59-261	Subject 20-51-15	-
KC-59-63	KC-59-262	Subject 20-51-15	-
KC-59-64	KC-59-263	Subject 20-51-15	-
KC-59-85	KC-59-445	Subject 20-51-15	-
KC-59-96	KC-59-265	Subject 20-51-15	-
KD-19-28	KD-19-66	Subject 20-51-15	-
KD-19-29	KD-19-90	Subject 20-51-15	-
KD-19-33	KD-19-67	Subject 20-51-15	-
KD-19-45	KD-19-55	Subject 20-51-15	-

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Table 2 (continued)

Specified Connector	Alternative Connector		Special Instructions
	Part Number	Assembly Procedure	
KD-19-49	KD-19-68	Subject 20-51-15	-
KD-19-52	KD-19-69	Subject 20-51-15	-
KD-19-56	KD-19-95	Subject 20-51-15	-
KD-39-08	KD-39-42	Subject 20-51-15	-
KD-39-09	KD-39-37	Subject 20-51-15	-
KD-39-10	KD-39-27	Subject 20-51-15	-
KD-39-21	KD-39-28	Subject 20-51-15	-
KD-59-100	KD-59-202-M06	Subject 20-51-15	-
KD-59-101	KD-59-202-M06	Subject 20-51-15	-
KD-59-155	KD-59-193-M06	Subject 20-51-15	-
KD-59-33	KD-59-163	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KD-59-35	KD-59-58	Subject 20-51-15	-
KD-59-38	KD-59-163	Subject 20-51-15	-
KD-59-40	KD-59-120	Subject 20-51-15	-
KD-59-41	KD-59-164	Subject 20-51-15	-
KD-59-42	KD-59-165	Subject 20-51-15	-
KD-59-43	KD-59-165	Subject 20-51-15	-
KD-59-44	KD-59-161	Subject 20-51-15	-
KD-59-50	KD-59-201-M06	Subject 20-51-15	-
KD-59-55	KD-59-166	Subject 20-51-15	-
KD-59-57	KD-59-129	Subject 20-51-15	-
KD-59-90	KD-59-201-M06	Subject 20-51-15	-
KD-59-94	KD-59-125	Subject 20-51-15	-
KD-59-95	KD-59-126	Subject 20-51-15	-
KG-59-16	KG-59-28	Subject 20-51-15	-
KG-59-22	KG-59-33-M06	Subject 20-51-15	-
KG-59-23	KG-59-32-M06	Subject 20-51-15	-
KG-59-26	KG-59-31-M06	Subject 20-51-15	-
KH-19-13	KH-19-18	Subject 20-51-15	-
KH-39-11	KH-39-21	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 2 (continued)

Specified Connector	Alternative Connector		Special Instructions
	Part Number	Assembly Procedure	
KH-59-19	KH-59-63	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KH-59-21	KH-59-65	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KH-59-24	KH-59-66	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KH-59-28	KH-59-102-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KH-59-31	KH-59-103-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KH-59-50	KH-59-65	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KH-59-56	KH-59-69	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KH-59-78	KH-59-104-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KA-39-44	KA-39-102-M06	Subject 20-51-15	-
KN-19-30	KN-19-208-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-19-31	KN-19-162	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-19-44	KN-19-145	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-19-48	KN-19-205-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-19-68	KN-19-115	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-19-73	KN-19-206-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-19-78	KN-19-117	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-19-79	KN-19-118	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-39-19	KN-39-122-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-39-20	KN-39-93	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-39-21	KN-39-87	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only

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Table 2 (continued)

Specified Connector	Alternative Connector		Special Instructions
	Part Number	Assembly Procedure	
KN-39-23	KN-39-121-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-39-42	KN-39-71	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-39-51	KN-39-73	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-39-55	KN-39-121-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-59-107	KN-59-313-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-59-110	KN-59-313-M06	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-59-113	KN-59-183	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-59-128	KN-59-185	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-59-129	KN-59-186	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only
KN-59-131	KN-59-220	Subject 20-51-15	-
KN-59-135	KN-59-367-M06	Subject 20-51-15	-
KN-59-136	KN-59-368-M06	Subject 20-51-15	-
KN-59-138	KN-59-313-M06	Subject 20-51-15	-
KN-59-18	KN-59-261	Subject 20-51-15	-
KN-59-237	KN-59-329-M06	Subject 20-51-15	-
KN-59-238	KN-59-264	Subject 20-51-15	Applicable for the RG-393 cable only
KN-59-31	KN-59-368-M06	Subject 20-51-15	-
KN-59-46	KN-59-261	Subject 20-51-15	-
KN-59-47	KN-59-262	Subject 20-51-15	-
KN-59-48	KN-59-220	Subject 20-51-15	-
KN-59-49	KN-59-247	Subject 20-51-15	-
KN-59-50	KN-59-263	Subject 20-51-15	-
KN-59-53	KN-59-263	Subject 20-51-15	-
KN-59-56	KN-59-368-M06	Subject 20-51-15	-
KN-59-57	KN-59-367-M06	Subject 20-51-15	-
KN-59-69	KN-59-183	Subject 20-51-15	-

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B. Necessary Materials

**Table 3
NECESSARY MATERIALS**

Material	Part Number or Specification	Supplier
Primer	Product 7471, Primer T	Loctite
Sleeve, Heat Shrinkable	DWP-125	Raychem
Solvent	Isopropyl Alcohol	Any Source
Thread Lock Compound	222	Loctite
	Product 081 Grade D	Loctite

2. COAX CONNECTOR ASSEMBLY TOOLS

A. Coax Cable Trim Jigs

**Table 4
COAX CABLE TRIM JIGS**

Connector	Trim Jig	
	Cable Jacket	Dielectric
KA-19-21	KTJ-24	KTD-81
KA-19-23	KTJ-17	KTD-78
KA-19-24	KTJ-17	KTD-78
KA-19-25	KTJ-17	KTD-77
KA-19-48	-	KTD-6
KA-19-50	KTJ-17	KTD-77
KA-19-51	KTJ-17	KTD-77
KA-19-63	KTJ-17	KTD-77
KA-39-12	KTJ-17	KTD-77
KA-39-15	KTJ-17	KTD-77
KA-39-31	KTJ-19	KTD-89
KA-39-32	KTJ-17	KTD-77
KA-59-128	KTJ-17	KTD-77
KA-59-134	KTJ-17	KTD-77
KA-59-138	KTJ-24	KTD-81
KA-59-166	KTJ-17	KTD-77
KA-59-267	KTJ-24	KTD-81
KA-59-29	KTJ-17	KTD-77
KA-59-31	KTJ-25	KTD-82



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Table 4 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KA-59-318	KTJ-24	KTD-81
KA-59-319	KTJ-24	KTD-81
KA-59-32	KTJ-24	KTD-81
KA-59-36	KTJ-22	KTD-81
KA-59-39	KTJ-17	KTD-78
KA-59-40	KTJ-17	KTD-78
KA-59-41	KTJ-17	KTD-77
KA-59-59	KTJ-24	KTD-81
KA-59-98	KTJ-17	KTD-77
KA-59-99	KTJ-17	KTD-77
KC-19-100	KTJ-17	KTD-77
KC-19-101	KTJ-17	KTD-77
KC-19-113	KTJ-17	KTD-78
KC-19-116	KTJ-17	KTD-77
KC-19-121	KTJ-57	KTD-25
KC-19-125	KTJ-17	KTD-78
KC-19-136	KTJ-19	KTD-89
KC-19-21	KTJ-17	KTD-77
KC-19-31	KTJ-17	KTD-77
KC-19-32	KTJ-17	KTD-78
KC-19-33	KTJ-17	KTD-78
KC-19-34	KTJ-17	KTD-78
KC-19-57	KTJ-17	KTD-78
KC-19-69	KTJ-19	KTD-89
KC-39-102	KTJ-17	KTD-77
KC-39-14	KTJ-17	KTD-77
KC-39-20	KTJ-17	KTD-77
KC-39-21	KTJ-17	KTD-78
KC-39-22	KTJ-17	KTD-78
KC-39-25	KTJ-17	KTD-77
KC-39-31	KTJ-19	KTD-89
KC-39-44	KTJ-19	KTD-89

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Table 4 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KC-39-48	KTJ-17	KTD-77
KC-39-56	KTJ-17	KTD-77
KC-39-57	KTJ-17	KTD-77
KC-59-111	KTJ-19	KTD-89
KC-59-136	KTJ-39	KTD-6
KC-59-172	KTJ-22	KTD-81
KC-59-177	KTJ-17	KTD-77
KC-59-178	KTJ-17	KTD-77
KC-59-188	KTJ-17	KTD-77
KC-59-191	KTJ-17	KTD-77
KC-59-194	KTJ-19	KTD-89
KC-59-33	KTJ-17	KTD-77
KC-59-38	KTJ-17	KTD-77
KC-59-41	KTJ-17	KTD-78
KC-59-42	KTJ-17	KTD-80
KC-59-61	KTJ-17	KTD-77
KC-59-62	KTJ-17	KTD-77
KC-59-63	KTJ-17	KTD-78
KC-59-64	KTJ-17	KTD-78
KC-59-85	KTJ-24	KTD-81
KC-59-96	KTJ-19	KTD-89
KD-19-26	KTJ-24	KTD-81
KD-19-28	KTJ-22	KTD-81
KD-19-29	KTJ-23	KTD-84
KD-19-33	KTJ-18	KTD-88
KD-19-44	KTJ-18	KTD-88
KD-19-45	KTJ-18	KTD-88
KD-19-49	KTJ-18	KTD-88
KD-19-52	KTJ-18	KTD-88
KD-19-56	KTJ-18	KTD-88
KD-39-08	KTJ-24	KTD-81
KD-39-09	KTJ-24	KTD-81

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 4 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KD-39-10	KTJ-23	KTD-214
KD-39-21	KTJ-18	KTD-88
KD-59-100	KTJ-17	KTD-77
KD-59-101	KTJ-17	KTD-77
KD-59-155	KTJ-24	KTD-81
KD-59-156	KTJ-24	KTD-81
KD-59-33	KTJ-22	KTD-81
KD-59-35	KTJ-22	KTD-81
KD-59-38	KTJ-24	KTD-81
KD-59-40	KTJ-24	KTD-81
KD-59-41	KTJ-24	KTD-81
KD-59-42	KTJ-23	KTD-84
KD-59-43	KTJ-24	KTD-81
KD-59-44	KTJ-18	KTD-88
KD-59-50	KTJ-18	KTD-88
KD-59-55	KTJ-88	KTD-90
KD-59-57	KTJ-17	KTD-79
KD-59-90	KTJ-18	KTD-88
KD-59-94	KTJ-18	KTD-88
KD-59-95	KTJ-17	KTD-88
KG-59-16	KTJ-24	KTD-81
KG-59-22	KTJ-17	KTD-79
KG-59-23	KTJ-62	KTD-117
KG-59-25	KTJ-24	KTD-81
KG-59-26	KTJ-17	KTD-79
KH-19-12	KTJ-23	KTD-82
KH-19-13	KTJ-23	KTD-82
KH-19-14	KTJ-23	KTD-82
KH-19-22	KTJ-23	KTD-82
KH-39-11	KTJ-23	KTD-82
KH-39-12	KTJ-23	KTD-82
KH-59-19	KTJ-23	KTD-82

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Table 4 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KH-59-20	KTJ-23	KTD-82
KH-59-21	KTJ-23	KTD-82
KH-59-24	KTJ-23	KTD-82
KH-59-28	KTJ-49	KTD-105
KH-59-31	KTJ-25	KTD-82
KH-59-47	-	-
KH-59-50	KTJ-23	KTD-82
KH-59-53	KTJ-11	KTD-82
KH-59-54	KTJ-11	KTD-82
KH-59-56	KTJ-17	KTD-77
KH-59-60	KTJ-23	KTD-82
KH-59-78	KTJ-23	KTD-82
KN-19-30	KTJ-24	KTD-81
KN-19-31	KTJ-24	KTD-81
KN-19-37	KTJ-20	KTD-85
KN-19-44	KTJ-24	KTD-81
KN-19-48	KTJ-18	KTD-117
KN-19-68	KTJ-18	KTD-117
KN-19-73	KTJ-24	KTD-81
KN-19-78	KTJ-18	KTD-117
KN-19-79	KTJ-18	KTD-103
KN-39-19	KTJ-22	KTD-81
KN-39-20	KTJ-22	KTD-81
KN-39-21	KTJ-18	KTD-117
KN-39-23	KTJ-22	KTD-81
KN-39-42	KTJ-18	KTD-117
KN-39-48	KTJ-18	KTD-117
KN-39-51	KTJ-18	KTD-103
KN-39-55	KTJ-22	KTD-81
KN-59-107	KTJ-6	KTD-79
KN-59-110	KTJ-73	KTD-79
KN-59-113	KTJ-18	KTD-117

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Table 4 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KN-59-128	KTJ-18	KTD-117
KN-59-129	KTJ-63	KTD-79
KN-59-131	KTJ-211	KTD-81
KN-59-133	KTJ-17	KTD-94
KN-59-135	KTJ-22	KTD-81
KN-59-136	KTJ-27	KTD-81
KN-59-138	KTJ-17	KTD-77
KN-59-18	KTJ-22	KTD-31
KN-59-237	KTJ-24	KTD-81
KN-59-238	KTJ-33	KTD-81
KN-59-28	-	-
KN-59-29	KTJ-63	KTD-79
KN-59-31	KTJ-45	KTD-104
KN-59-34	KTJ-22	KTD-81
KN-59-46	KTJ-22	KTD-81
KN-59-47	KTJ-23	KTD-81
KN-59-48	KTJ-24	KTD-81
KN-59-49	KTJ-18	KTD-117
KN-59-50	KTJ-24	KTD-81
KN-59-53	KTJ-33	KTD-81
KN-59-56	KTJ-27	KTD-81
KN-59-57	KTJ-22	KTD-81
KN-59-69	KTJ-18	KTD-117
KS-89-31	-	-
KS-89-35	-	-
KS-89-42	-	-
KU-59-19	KTJ-141	KTD-91
KU-59-21	KTJ-44	KTD-86
KU-59-25	KTJ-16	KTD-106
KU-59-32	KTJ-44	KTD-86
KU-59-67	KTJ-16	KTD-106

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B. Coax Connector Crimp Tools

**Table 5
COAX CRIMP TOOL TYPES**

Crimp Tool Basic Unit	Type
CT-32	Pneumatic
HX23	Pneumatic
HX4	Hand
KTH-1000	Hand
KTM-1000	Electric
KTM-3000	Pneumatic
KTM-4000	Pneumatic
M22520/5-01	Hand

**Table 6
COAX CONNECTOR TOOL CODES**

Connector	Tool Code	
	K-Grip Sleeve	Center Contact
KA-19-21	429H	-
KA-19-23	255H	-
KA-19-24	255H	-
KA-19-25	213H	-
KA-19-48	105H	-
KA-19-50	213H	-
KA-19-51	213H	-
KA-19-63	255H	-
KA-39-12	213H	-
KA-39-15	213H	-
KA-39-31	178H	-
KA-39-32	213H	-
KA-59-128	213H	-
KA-59-134	213H	-
KA-59-138	429H	-
KA-59-166	213H	-
KA-59-267	429H	-
KA-59-29	213H	-

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Table 6 (continued)

Connector	Tool Code	
	K-Grip Sleeve	Center Contact
KA-59-31	429H	-
KA-59-318	429H	-
KA-59-319	429H	-
KA-59-32	429H	-
KA-59-36	429H	-
KA-59-39	255H	-
KA-59-40	255H	-
KA-59-41	213H	-
KA-59-59	384H	-
KA-59-98	213H	-
KA-59-99	213H	-
KC-19-100	213H	-
KC-19-101	213H	-
KC-19-113	255H	-
KC-19-116	213H	-
KC-19-121	213H	069H
KC-19-125	255H	-
KC-19-136	178H	-
KC-19-21	213H	-
KC-19-31	213H	-
KC-19-32	255H	-
KC-19-33	255H	-
KC-19-34	255H	-
KC-19-57	255H	-
KC-19-69	178H	-
KC-39-102	213H	-
KC-39-14	213H	-
KC-39-20	213H	-
KC-39-21	255H	-
KC-39-22	255H	-
KC-39-25	213H	-
KC-39-31	178H	-

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Table 6 (continued)

Connector	Tool Code	
	K-Grip Sleeve	Center Contact
KC-39-44	178H	-
KC-39-48	213H	-
KC-39-56	213H	-
KC-39-57	213H	-
KC-59-111	178H	-
KC-59-136	105H	-
KC-59-172	429H	-
KC-59-177	213H	-
KC-59-178	213H	-
KC-59-188	213H	-
KC-59-191	213H	-
KC-59-194	178H	-
KC-59-33	213H	-
KC-59-38	213H	-
KC-59-41	255H	-
KC-59-42	255H	-
KC-59-61	213H	069H
KC-59-62	213H	-
KC-59-63	255H	-
KC-59-64	255H	-
KC-59-85	429H	-
KC-59-96	178H	-
KD-19-26	384H	-
KD-19-28	429H	-
KD-19-29	429H	-
KD-19-33	213H	-
KD-19-44	213H	-
KD-19-45	213H	-
KD-19-49	213H	-
KD-19-52	213H	-
KD-19-56	213H	-
KD-39-08	384H	-

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Table 6 (continued)

Connector	Tool Code	
	K-Grip Sleeve	Center Contact
KD-39-09	429H	-
KD-39-10	384H	-
KD-39-21	213H	-
KD-59-100	213H	-
KD-59-101	213H	-
KD-59-155	429H	-
KD-59-156	429H	-
KD-59-33	384H	-
KD-59-35	384H	-
KD-59-38	384H	-
KD-59-40	384H	-
KD-59-41	429H	-
KD-59-42	429H	-
KD-59-43	429H	-
KD-59-44	213H	-
KD-59-50	213H	-
KD-59-55	178H	-
KD-59-57	213H	-
KD-59-90	213H	-
KD-59-94	213H	-
KD-59-95	213H	-
KG-59-16	429H	-
KG-59-22	213H	-
KG-59-23	213H	-
KG-59-25	429H	100H
KG-59-26	213H	-
KH-19-12	429H	-
KH-19-13	384H	-
KH-19-14	429H	-
KH-19-22	429H	-
KH-39-11	384H	-
KH-39-12	429H	-

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Table 6 (continued)

Connector	Tool Code	
	K-Grip Sleeve	Center Contact
KH-59-19	384H	-
KH-59-20	384H	-
KH-59-21	429H	-
KH-59-24	429H	-
KH-59-28	429H	-
KH-59-31	429H	-
KH-59-47	384H	-
KH-59-50	429H	-
KH-59-53	429H	-
KH-59-54	213H	-
KH-59-56	213H	-
KH-59-60	429H	-
KH-59-78	429H	-
KN-19-30	384H	-
KN-19-31	429H	-
KN-19-37	213H	-
KN-19-44	429H	-
KN-19-48	213H	-
KN-19-68	213H	-
KN-19-73	429H	-
KN-19-78	213H	-
KN-19-79	255H	-
KN-39-19	384H	-
KN-39-20	429H	-
KN-39-21	213H	-
KN-39-23	429H	-
KN-39-42	213H	-
KN-39-48	213H	-
KN-39-51	255H	-
KN-39-55	429H	-
KN-59-107	213H	-
KN-59-110	213H	-

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Table 6 (continued)

Connector	Tool Code	
	K-Grip Sleeve	Center Contact
KN-59-113	213H	-
KN-59-128	213H	-
KN-59-129	213H	-
KN-59-131	429H	-
KN-59-133	255H	-
KN-59-135	429H	-
KN-59-136	429H	-
KN-59-138	213H	-
KN-59-18	384H	-
KN-59-237	429H	-
KN-59-238	429H	-
KN-59-28	429H	-
KN-59-29	213H	-
KN-59-31	384H	-
KN-59-34	429H	-
KN-59-46	384H	-
KN-59-47	384H	-
KN-59-48	429H	-
KN-59-49	213H	-
KN-59-50	429H	-
KN-59-53	429H	100H
KN-59-56	429H	-
KN-59-57	429H	-
KN-59-69	213H	-
KS-89-31	213H	-
KS-89-35	429H	-
KS-89-42	255H	-
KU-59-19	178H	-
KU-59-21	384H	-
KU-59-25	213H	-
KU-59-32	429H	-
KU-59-67	213H	-

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**Table 7
COAX CONNECTOR CENTER CONTACT CRIMP TOOLS**

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
069H	CT-32	-	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069
069H	KTH-1000	-	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069
069H	KTM-1000	KTM-1099	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069
069H	KTM-3000	-	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069

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Table 7 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
069H	KTM-4000	-	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069
100H	227-944	-	227-1221-25	0.100
			227-1221-57	0.100
			227-1351-3	0.100
			227-956-4	0.100
			M22520/5-57	0.100
100H	227-956-4	-	-	0.100
100H	CT-32	-	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100
100H	HX23	-	227-1221-25	0.100
			227-1221-57	0.100
			227-1351-3	0.100
			227-1351-4	0.100
			227-956-4	0.100
			M22520/5-57	0.100

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Table 7 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
100H	HX4	-	227-1221-25	0.100
			227-1221-57	0.100
			227-1351-3	0.100
			227-1351-4	0.100
			227-956-4	0.100
			M22520/5-57	0.100
100H	KTH-1000	-	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100
100H	KTM-1000	KTM-1099	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100

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Table 7 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
100H	KTM-3000	-	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100
100H	KTM-4000	-	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100
100H	M22520/5-01	-	227-1221-25	0.100
			227-1221-57	0.100
			227-1351-3	0.100
			227-1351-4	0.100
			227-956-4	0.100
			M22520/5-57	0.100

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**Table 8
COAX CONNECTOR K-GRIP SLEEVE CRIMP TOOLS**

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
105H	612648	-	612734	0.105
	CT-32	-	KTH-2008	0.105
			KTH-2230	0.105
	HX23	-	M22520/5-03	0.105
	HX4	-	M22520/5-03	0.105
	KTH-1000	-	KTH-2008	0.105
			KTH-2230	0.105
	KTM-1000	KTM-1099	KTH-2008	0.105
			KTH-2230	0.105
	KTM-3000	-	KTH-2008	0.105
			KTH-2230	0.105
KTM-4000	-	KTH-2008	0.105	
		KTH-2230	0.105	
M22520/5-01	-	M22520/5-03	0.105	
178H	612648	-	612642	0.178
	CT-32	-	KTH-2007	0.178
	HX23	-	M22520/5-05	0.178
			M22520/5-41	0.178
			Y197	0.178
	HX4	-	M22520/5-05	0.178
			M22520/5-41	0.178
			Y197	0.178
	KTH-1000	-	KTH-2007	0.178
	KTM-1000	KTM-1099	KTH-2007	0.178
	KTM-3000	-	KTH-2007	0.178
	KTM-4000	-	KTH-2007	0.178
	M22520/5-01	-	M22520/5-05	0.178
M22520/5-41			0.178	
Y197			0.178	

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
213H	227-944	-	M22520/5-19	0.213
	612648	-	612673	0.213
	CT-32	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	HX23	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
	HX4	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
	KTH-1000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
213H	KTM-1000	KTM-1099	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	KTM-3000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	KTM-4000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	M22520/5-01	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
	ST2966M	-	ST2966M-6	0.213
255H	612648	-	612675	0.255
	HX23	-	M22520/5-19	0.255
			Y142	0.255
	HX4	-	M22520/5-19	0.255
			Y142	0.255
	KTH-1000	-	KTH-2002	0.255
	KTM-1000	KTM-1099	KTH-2002	0.255
	KTM-3000	-	KTH-2002	0.255
	KTM-4000	-	KTH-2002	0.255
	M22520/5-01	-	M22520/5-19	0.255
Y142			0.255	
ST2966M	-	ST2966M-8	0.255	

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
384H	612648	-	612739	0.384
	CT-32	-	KTH-2003	0.384
	HX23	-	M22520/5-23	0.384
	HX4	-	M22520/5-23	0.384
	KTH-1000	-	KTH-2003	0.384
	KTM-1000	KTM-1099	KTH-2003	0.384
	KTM-3000	-	KTH-2003	0.384
	KTM-4000	-	KTH-2003	0.384
	M22520/5-01	-	M22520/5-23	0.384
	ST2352-5-Y	-	ST2352-5-1	0.384
	ST2966M	-	ST2966M-13	0.384
429H	612648	-	612807	0.429
	CT-32	-	KTH-2004	0.429
			KTH-2235	0.429
	HX23	-	M22520/5-25	0.429
	HX4	-	M22520/5-25	0.429
	KTH-1000	-	KTH-2004	0.429
			KTH-2235	0.429
	KTM-1000	KTM-1099	KTH-2004	0.429
			KTH-2235	0.429
	KTM-3000	-	KTH-2004	0.429
			KTH-2235	0.429
	KTM-4000	-	KTH-2004	0.429
			KTH-2235	0.429
	M22520/5-01	-	M22520/5-25	0.429
ST2352-5-Y	-	ST2352-5-2	0.429	
ST2966M	-	ST2966M-16	0.429	

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

3. CONNECTOR ASSEMBLY

A. Cable Preparation Dimensions

**Table 9
CABLE PREPARATION DIMENSIONS**

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-19-21	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KA-19-23	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.08	± 0.02
KA-19-24	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-19-25	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-19-48	A	0.77	± 0.02
	B	0.58	± 0.02
	C	0.11	± 0.02
	D	0.24	± 0.02
KA-19-50	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-19-51	A	0.72	± 0.02
	B	0.22	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02

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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-19-63	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-39-12	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-39-15	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-39-31	A	0.75	± 0.02
	B	0.56	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-39-32	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-59-128	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-59-134	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-59-138	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KA-59-166	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-59-267	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KA-59-29	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-59-31	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KA-59-318	A	0.82	± 0.02
	B	0.60	± 0.02
	C	0.16	± 0.02
	D	0.40	± 0.02
KA-59-319	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02



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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-59-32	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KA-59-36	A	0.86	± 0.02
	B	0.64	± 0.02
	C	0.20	± 0.02
	D	0.04	± 0.02
KA-59-39	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.08	± 0.02
KA-59-40	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-59-41	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KA-59-59	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KA-59-98	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02

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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-59-99	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-100	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-101	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-113	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-116	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-121	A	0.58	± 0.02
	B	0.22	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02
KC-19-125	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.08	± 0.02

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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-19-136	A	0.75	± 0.02
	B	0.56	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-21	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-31	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-32	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.08	± 0.02
KC-19-33	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.08	± 0.02
KC-19-34	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-19-57	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02

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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-19-69	A	0.75	± 0.02
	B	0.56	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-102	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-14	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-20	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-21	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.08	± 0.02
KC-39-22	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-25	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02

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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-39-31	A	0.75	± 0.02
	B	0.56	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-44	A	0.75	± 0.02
	B	0.56	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-48	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-56	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-39-57	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-111	A	0.75	± 0.02
	B	0.56	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-136	A	0.77	± 0.02
	B	0.58	± 0.02
	C	0.11	± 0.02
	D	0.24	± 0.02



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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-59-172	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KC-59-177	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-178	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-188	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-191	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-194	A	0.75	± 0.02
	B	0.56	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-33	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02

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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-59-38	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-41	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-42	A	0.77	± 0.02
	B	0.55	± 0.02
	C	0.09	± 0.02
	D	0.17	± 0.02
KC-59-61	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-62	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KC-59-63	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.08	± 0.02
KC-59-64	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02

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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-59-85	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KC-59-96	A	0.75	± 0.02
	B	0.56	± 0.02
	C	0.19	± 0.02
	D	0.11	± 0.02
KD-19-26	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KD-19-28	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KD-19-29	A	1.11	± 0.02
	B	0.89	± 0.02
	C	0.16	± 0.02
	D	0.34	± 0.02
KD-19-33	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-19-44	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-19-45	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-19-49	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-19-52	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-19-56	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-39-08	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KD-39-09	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KD-39-10	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.14	± 0.02
	D	0.47	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-39-21	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-59-100	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KD-59-101	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KD-59-155	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KD-59-156	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KD-59-33	A	0.88	± 0.02
	B	0.66	± 0.02
	C	0.22	± 0.02
	D	0.04	± 0.02
KD-59-35	A	0.88	± 0.02
	B	0.66	± 0.02
	C	0.22	± 0.02
	D	0.04	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-59-38	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KD-59-40	A	0.77	± 0.02
	B	0.55	± 0.02
	C	0.11	± 0.02
	D	0.05	± 0.02
KD-59-41	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KD-59-42	A	1.11	± 0.02
	B	0.89	± 0.02
	C	0.16	± 0.02
	D	0.34	± 0.02
KD-59-43	A	0.77	± 0.02
	B	0.55	± 0.02
	C	0.11	± 0.02
	D	0.05	± 0.02
KD-59-44	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-59-50	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-59-55	A	0.81	± 0.02
	B	0.63	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-59-57	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.11	± 0.02
	D	0.21	± 0.02
KD-59-90	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-59-94	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KD-59-95	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.11	± 0.02
	D	0.21	± 0.02
KG-59-16	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.17	± 0.02
	D	0.04	± 0.02
KG-59-22	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.11	± 0.02
	D	0.21	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KG-59-23	A	1.06	± 0.02
	B	0.84	± 0.02
	C	0.22	± 0.02
	D	0.12	± 0.02
KG-59-25	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KG-59-26	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.11	± 0.02
	D	0.21	± 0.02
KH-19-12	A	1.16	± 0.02
	B	0.25	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-19-13	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-19-14	A	1.16	± 0.02
	B	0.25	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-19-22	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.28	± 0.02
	D	0.29	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KH-39-11	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-39-12	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-59-19	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-59-20	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-59-21	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-59-24	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02
KH-59-28	A	2.06	± 0.02
	B	1.84	± 0.02
	C	0.70	± 0.02
	D	0.74	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KH-59-31	A	1.30	± 0.02
	B	1.08	± 0.02
	C	0.39	± 0.02
	D	0.29	± 0.02
KH-59-47	A	0.77	± 0.02
	B	0.22	± 0.02
	C	0.11	± 0.02
	D	0.04	± 0.02
KH-59-50	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.16	± 0.02
	D	0.04	± 0.02
KH-59-53	A	0.89	± 0.02
	B	0.67	± 0.02
	C	0.13	± 0.02
	D	0.34	± 0.02
KH-59-54	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KH-59-56	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02
KH-59-60	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.22	± 0.02
	D	0.30	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KH-59-78	A	1.13	± 0.02
	B	0.91	± 0.02
	C	0.28	± 0.02
	D	0.29	± 0.02
KN-19-30	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-19-31	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-19-37	A	1.03	± 0.02
	B	0.81	± 0.02
	C	0.16	± 0.02
	D	0.37	± 0.02
KN-19-44	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-19-48	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02
KN-19-68	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02



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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-19-73	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-19-78	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02
KN-19-79	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KN-39-19	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-39-20	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-39-21	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02
KN-39-23	A	0.88	± 0.02
	B	0.66	± 0.02
	C	0.22	± 0.02
	D	0.04	± 0.02

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-39-42	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.19	± 0.02
KN-39-48	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02
KN-39-51	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KN-39-55	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-59-107	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.11	± 0.02
	D	0.21	± 0.02
KN-59-110	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.11	± 0.02
	D	0.21	± 0.02
KN-59-113	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-59-128	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02
KN-59-129	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.11	± 0.02
	D	0.21	± 0.02
KN-59-131	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-59-133	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.19	± 0.02
KN-59-135	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-59-136	A	0.77	± 0.02
	B	0.54	± 0.02
	C	0.11	± 0.02
	D	0.05	± 0.02
KN-59-138	A	0.72	± 0.02
	B	0.55	± 0.02
	C	0.11	± 0.02
	D	0.11	± 0.02



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Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-59-18	A	0.88	± 0.02
	B	0.66	± 0.02
	C	0.22	± 0.02
	D	0.04	± 0.02
KN-59-237	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-59-238	A	0.77	± 0.02
	B	0.55	± 0.02
	C	0.11	± 0.02
	D	0.05	± 0.02
KN-59-28	A	2.09	± 0.02
	B	0.38	± 0.02
	C	0.72	± 0.02
	D	0.74	± 0.02
KN-59-29	A	0.83	± 0.02
	B	0.61	± 0.02
	C	0.11	± 0.02
	D	0.21	± 0.02
KN-59-31	A	1.20	± 0.02
	B	0.98	± 0.02
	C	0.13	± 0.02
	D	0.47	± 0.02
KN-59-34	A	0.88	± 0.02
	B	0.66	± 0.02
	C	0.22	± 0.02
	D	0.04	± 0.02

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-59-46	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-59-47	A	0.77	± 0.02
	B	0.55	± 0.02
	C	0.11	± 0.02
	D	0.05	± 0.02
KN-59-48	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-59-49	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02
KN-59-50	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.19	± 0.02
	D	0.04	± 0.02
KN-59-53	A	0.77	± 0.02
	B	0.55	± 0.02
	C	0.11	± 0.02
	D	0.05	± 0.02
KN-59-56	A	0.77	± 0.02
	B	0.55	± 0.02
	C	0.11	± 0.02
	D	0.05	± 0.02



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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-59-57	A	0.88	± 0.02
	B	0.66	± 0.02
	C	0.22	± 0.02
	D	0.04	± 0.02
KN-59-69	A	0.78	± 0.02
	B	0.56	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02
KS-89-31	A	-	± 0.02
	B	-	± 0.02
	C	-	± 0.02
	D	-	± 0.02
KS-89-35	A	-	± 0.02
	B	-	± 0.02
	C	-	± 0.02
	D	-	± 0.02
KS-89-42	A	-	± 0.02
	B	-	± 0.02
	C	-	± 0.02
	D	-	± 0.02
KU-59-19	A	1.00	± 0.02
	B	0.81	± 0.02
	C	0.13	± 0.02
	D	0.34	± 0.02
KU-59-21	A	1.24	± 0.02
	B	1.02	± 0.02
	C	0.13	± 0.02
	D	0.50	± 0.02

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 9 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KU-59-25	A	0.89	± 0.02
	B	0.67	± 0.02
	C	0.13	± 0.02
	D	0.34	± 0.02
KU-59-32	A	1.24	± 0.02
	B	1.02	± 0.02
	C	0.13	± 0.02
	D	0.50	± 0.02
KU-59-67	A	0.89	± 0.02
	B	0.67	± 0.02
	C	0.13	± 0.02
	D	0.34	± 0.02

B. Cable Preparation

For the general conditions that are applicable for the preparation of coax connectors, refer to Subject 20-51-00.

- (1) Make a selection of a heat shrinkable sleeve from Table 3.

NOTE: An equivalent sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

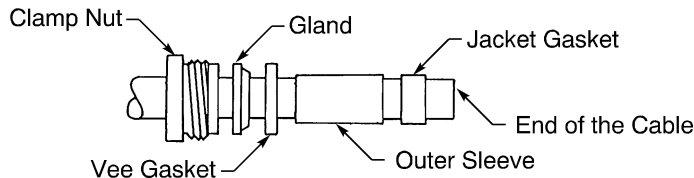
- (2) Put a 1.5 inch length of heat shrinkable sleeve on the cable.
- (3) Examine the threads on the rear of the connector shell for contamination or thread lock compound.
- (4) If the threads have material on them, clean the threads:
 - (a) Fully engage the threads the clamp nut and the threads of the connector shell.
 - (b) Remove the clamp nut from the connector shell.
- (5) Put these components on the cable in this sequence:
 - The clamp nut
 - The gland
 - The vee gasket
 - The K-Grip sleeve
 - The jacket gasket.

Refer to Figure 3.

NOTE: The jacket gasket is not supplied with all connectors.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS



POSITION OF THE COMPONENTS ON THE CABLE
Figure 3

(6) Cut the end of the cable to make it perpendicular to the longitudinal axis of the cable.

(7) Make a selection of a cable jacket trim jig from Table 4.

NOTE: Cable preparation without a trim jig is a satisfactory alternative. Refer to Paragraph 4.A.

NOTE: If a trim jig is not specified for the connector, the cable must be prepared without a trim jig. Refer to Paragraph 4.A.

(8) Prepare the cable with the trim jig. Refer to Paragraph 4.B.

C. K-Grip Assembly

For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.

(1) Find the K-Grip sleeve crimp tool code. Refer to Table 6.

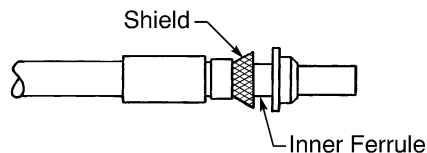
(2) Make a selection of the K-Grip sleeve crimp tool from Table 8.

Make sure that the tool is applicable for the tool code.

(3) Move the strands of the shield apart.

(4) Put the K-Grip on the end of the cable. Refer to Figure 4.

Make sure that the inner ferrule is between the shield and the dielectric.



POSITION OF THE K-GRIP ON THE CABLE
Figure 4

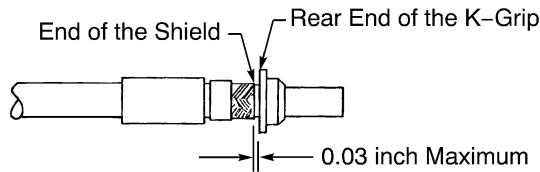
(5) Push the K-Grip rearward on the cable. Refer to Figure 5.

Make sure that:

- The rear end of the inner ferrule is against the end of the jacket
- The end of the shield is not more than 0.03 inch from the rear end of the K-Grip.

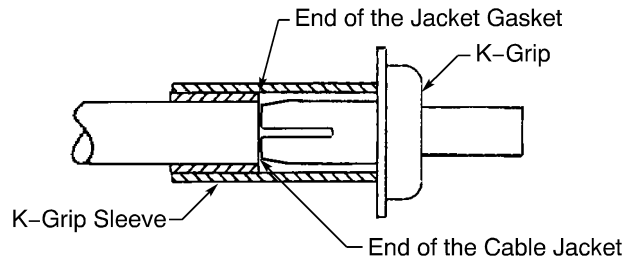
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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS



POSITION OF THE K-GRIP
Figure 5

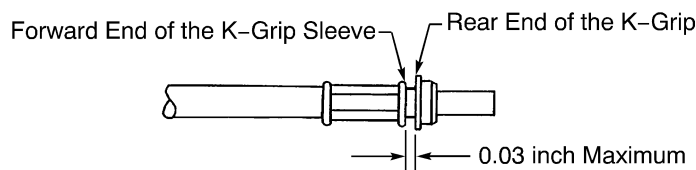
- (6) If a jacket gasket is on the cable, push the jacket gasket forward until the forward end of the gasket is aligned with the end of the cable jacket. Refer to Figure 6.



POSITION OF THE K-GRIP, THE JACKET GASKET, AND THE K-GRIP SLEEVE
Figure 6

- (7) Push the K-Grip sleeve forward until the forward end of the sleeve is against the rear end of the K-Grip. Refer to Figure 6.
- (8) Hold the K-Grip, the K-Grip sleeve, and the cable in their positions.
- (9) Put the assembly in the crimp tool.
- (10) Align the rear end of the K-Grip sleeve with the nearest edge of the tool die.
- (11) Crimp the K-Grip sleeve. Refer to Figure 7.

Make sure the forward end of the K-Grip sleeve is not more than 0.03 inch from the rear end of the K-Grip.

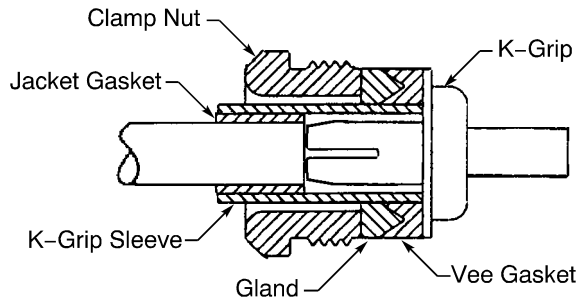


POSITION OF THE K-GRIP SLEEVE
Figure 7

- (12) Push the vee gasket forward until it is against the rear end of the K-Grip. Refer to Figure 8.

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POSITION OF THE VEE GASKET, THE GLAND, AND THE CLAMP NUT

Figure 8

(13) Push the gland forward until it is against the vee gasket. Refer to Figure 8.

(14) Push the clamp nut forward until it is against the gland. Refer to Figure 8.

D. Center Contact Assembly - Crimp Type Contacts

For the general conditions that are applicable for the assembly of coax contacts, refer to Subject 20-51-00.

(1) Find the center contact tool code. Refer to Table 6.

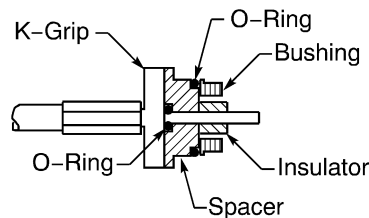
(2) Make a selection of a contact crimp tool from Table 7.

Make sure that the tool is applicable for the tool code.

(3) If the connector is supplied with these components, put them on the end of the cable in this sequence:

- A smaller O-Ring
- A spacer
- A larger O-Ring
- A bushing
- An insulator.

Refer to Figure 9.



POSITION OF THE COMPONENTS ON THE END OF THE CABLE

Figure 9

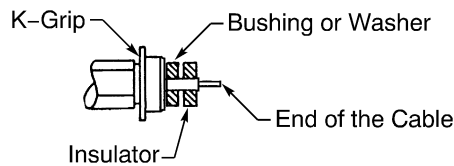
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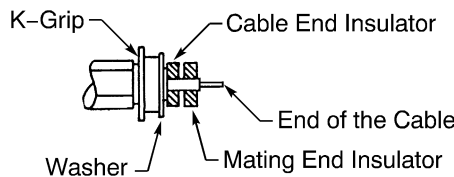
- (4) If the connector is supplied with these components, put them on the end of the cable in this sequence:
- A bushing or a washer
 - A cable end insulator
 - A mating end insulator.

Refer to:

- Figure 10 for the installation of the insulator and the bushing or the washer
- Figure 11 for the installation of the washer, the cable end insulator, and the mating end insulator.



POSITION OF THE INSULATOR AND THE BUSHING OR THE WASHER
Figure 10



POSITION OF THE WASHER, THE CABLE END INSULATOR, AND THE MATING END INSULATOR
Figure 11

- (5) If an insulator is installed, or the dielectric is a metal, semi-rigid material, remove the necessary length of dielectric without a trim jig.

Refer to Paragraph 4.C.

- (6) If an insulator is not installed and the dielectric is not a metal, semi-rigid material:

- (a) Make a selection of a dielectric trim jig from Table 4.

NOTE: Removal of the dielectric without a trim jig is a satisfactory alternative. Refer to Paragraph 4.C.

NOTE: If a trim jig is not specified for the connector, the dielectric must be removed without a trim jig. Refer to Paragraph 4.C.

- (b) Remove the dielectric with the trim jig. Refer to Paragraph 4.D.

- (7) If the dielectric is a metal, semi-rigid material and a spacer is supplied with the connector, put the spacer on the end of the dielectric.

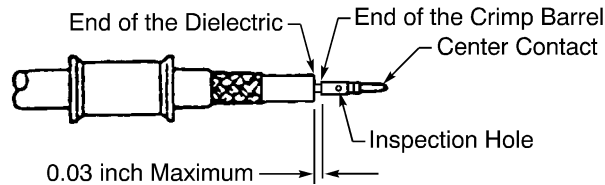
- (8) Put the conductor in the crimp barrel of the center contact. Refer to Figure 12.

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Make sure that:

- All of the strands of the conductor are in the crimp barrel of the contact
- The conductor can be seen in the inspection hole of the contact
- The distance from the end of the dielectric to the rear end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE CENTER CONTACT ON THE CONDUCTOR
Figure 12

- (9) Crimp the contact.

Make sure that the crimp is between the inspection hole and the rear end of the crimp barrel.

- (10) Examine the contact assembly for these types of damage:

- The finish has damage
- The crimp barrel of the contact has a crack.

NOTE: If the contact has damage, it must be replaced.

E. Center Contact Assembly - Solder Type Contacts

For the general conditions that are applicable for the assembly of coax contacts, refer to Subject 20-51-00.

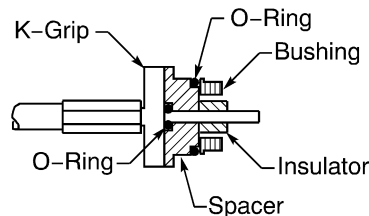
- (1) Make a selection of a Temperature Grade C solder. Refer to Subject 20-00-11.

CAUTION: DO NOT USE A TEMPERATURE GRADE D SOLDER. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CABLE CAN OCCUR.

- (2) If the connector is supplied with these components, put them on the end of the cable in this sequence:

- A smaller O-Ring
- A spacer
- A larger O-Ring
- A bushing
- An insulator.

Refer to Figure 13.



POSITION OF THE COMPONENTS ON THE END OF THE CABLE
Figure 13

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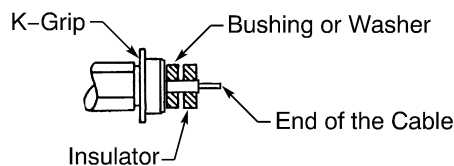
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(3) If the connector is supplied with these components, put them on the end of the cable in this sequence:

- A bushing or the washer
- A cable end insulator
- A mating end insulator.

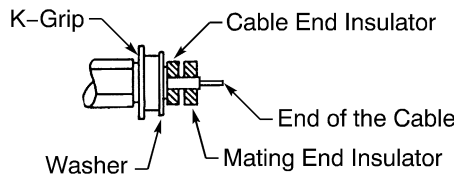
Refer to:

- Figure 14 for the installation of the insulator and the bushing or the washer
- Figure 15 for the installation of the washer, the cable end insulator, and the mating end insulator.



POSITION OF THE INSULATOR AND THE BUSHING OR THE WASHER

Figure 14



POSITION OF THE WASHER, THE CABLE END INSULATOR, AND THE MATING END INSULATOR

Figure 15

(4) If an insulator is installed, or the dielectric is a metal, semi-rigid material, remove the necessary length of dielectric without a trim jig.

Refer to Paragraph 4.C.

(5) If an insulator is not installed and the dielectric is not a metal, semi-rigid material:

(a) Make a selection of a dielectric trim jig from Table 4.

NOTE: Removal of the dielectric without a trim jig is a satisfactory alternative. Refer to Paragraph 4.C.

NOTE: If a trim jig is not specified for the connector, the dielectric must be removed without a trim jig. Refer to Paragraph 4.C.

(b) Remove the dielectric with the trim jig. Refer to Paragraph 4.D.

(6) Tin the center conductor.

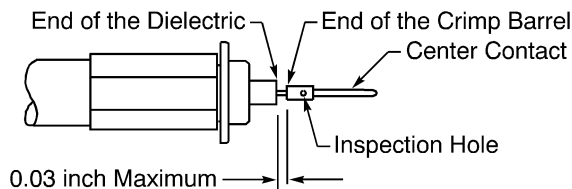
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CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN OCCUR.

- (7) If the dielectric is a metal, semi-rigid material and a spacer is supplied with the connector, put the spacer on the end of the dielectric.
- (8) Put the center conductor in the solder barrel of the center contact. Refer to Figure 16.

Make sure that:

- All of the strands of the conductor are in the solder barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the dielectric to the rear end of the solder barrel is not more than 0.03 inch.



POSITION OF THE CENTER CONTACT ON THE CONDUCTOR

Figure 16

- (9) Apply a small quantity of solder in the inspection hole of the contact.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN OCCUR.

- (10) Remove all of the solder and the flux from the outer surface of the contact.
- (11) Examine the contact for damage to the finish.

NOTE: If the contact has damage, it must be replaced.

- (12) If a solder access cover is supplied with the contact, install the cover.

F. Center Contact Assembly - Solder Type Contacts of Right Angle Plug Connectors

For the general conditions that are applicable for the assembly of coax contacts, refer to Subject 20-51-00.

- (1) Make a selection of a Temperature Grade C solder. Refer to Subject 20-00-11.

CAUTION: DO NOT USE A TEMPERATURE GRADE D SOLDER. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CABLE CAN OCCUR.

- (2) Make a selection of a solvent from Table 3.
- (3) Make a selection of a primer from Table 3.
- (4) Make a selection of a thread lock compound from Table 3.
- (5) If an insulator is installed, or the dielectric is a metal, semi-rigid material, remove the necessary length of dielectric without a trim jig.

Refer to Paragraph 4.C.

- (6) If an insulator is not installed and the dielectric is not a metal, semi-rigid material:

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- (a) Make a selection of a dielectric trim jig from Table 4.
- NOTE:** Removal of the dielectric without a trim jig is a satisfactory alternative. Refer to Paragraph 4.C.
- NOTE:** If a trim jig is not specified for the connector, the dielectric must be removed without a trim jig. Refer to Paragraph 4.C.
- (b) Remove the dielectric with the trim jig. Refer to Paragraph 4.D.
- (7) Tin the center conductor.
- CAUTION:** DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN OCCUR.
- (8) If the dielectric is a metal, semi-rigid material and a spacer is supplied with the connector, put the spacer on the end of the dielectric.
- (9) Install the connector shell. Refer to Paragraph 3.G.
- (10) Apply a small quantity of solder to the end of the conductor and the contact.
- CAUTION:** DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN OCCUR.
- (11) Hold the connector shell and lightly pull the cable to make sure that the solder joint is satisfactory.
- (12) If the access cap has threads:
- (a) Clean the cap with solvent and a clean wiper.
- (b) Dry the cap with a clean wiper.
- (c) Apply the primer to the threads of the cap.
- (d) Let the primer dry for 10 minutes minimum at room temperature.
- (e) Apply a thin smooth layer of the compound to one or two full threads of the cap.
- CAUTION:** THE THREAD LOCK COMPOUND DOES NOT MAKE A BOND IF THE COMPONENTS ARE ASSEMBLED MORE THAN 30 MINUTES AFTER THE COMPOUND IS APPLIED.
- (f) Remove the unwanted compound from the cap.
- (g) Fully engage the threads of the cap and the threads of the connector shell.
- (h) Tighten the cap.
- (13) If the access cap does not have threads:
- (a) Put the cap on the connector shell.
- (b) Apply a small amount of solder around the edge of the cap.

G. Connector Shell Installation

For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.



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Table 10
CLAMP NUT TORQUE VALUES

Connector	Torque Value (inch-pound)	
	Minimum	Maximum
KA-19-21	90	100
KA-19-23	40	50
KA-19-24	40	50
KA-19-25	40	50
KA-19-48	40	50
KA-19-50	40	50
KA-19-51	40	50
KA-19-63	40	50
KA-39-12	40	50
KA-39-15	40	50
KA-39-31	40	50
KA-39-32	40	50
KA-59-128	40	50
KA-59-134	40	50
KA-59-138	90	100
KA-59-166	40	50
KA-59-267	90	100
KA-59-29	40	50
KA-59-31	65	75
KA-59-318	90	100
KA-59-319	90	100
KA-59-32	65	75
KA-59-36	90	100
KA-59-39	40	50
KA-59-40	40	50
KA-59-41	40	50
KA-59-59	90	100
KA-59-98	40	50
KA-59-99	40	50
KC-19-100	40	50

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Table 10 (continued)

Connector	Torque Value (inch-pound)	
	Minimum	Maximum
KC-19-101	40	50
KC-19-113	40	50
KC-19-116	40	50
KC-19-121	40	50
KC-19-125	40	50
KC-19-136	40	50
KC-19-21	40	50
KC-19-31	40	50
KC-19-32	40	50
KC-19-33	40	50
KC-19-34	40	50
KC-19-57	40	50
KC-19-69	40	50
KC-39-102	40	50
KC-39-14	40	50
KC-39-20	40	50
KC-39-21	40	50
KC-39-22	40	50
KC-39-25	40	50
KC-39-31	40	50
KC-39-44	40	50
KC-39-48	40	50
KC-39-56	40	50
KC-39-57	40	50
KC-59-111	40	50
KC-59-136	40	50
KC-59-172	40	50
KC-59-177	40	50
KC-59-178	40	50
KC-59-188	40	50
KC-59-191	40	50

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Table 10 (continued)

Connector	Torque Value (inch-pound)	
	Minimum	Maximum
KC-59-194	40	50
KC-59-33	40	50
KC-59-38	40	50
KC-59-41	40	50
KC-59-42	40	50
KC-59-61	40	50
KC-59-62	40	50
KC-59-63	40	50
KC-59-64	40	50
KC-59-85	65	75
KC-59-96	40	50
KD-19-26	90	100
KD-19-28	65	75
KD-19-29	65	75
KD-19-33	40	50
KD-19-44	40	50
KD-19-45	40	50
KD-19-49	40	50
KD-19-52	40	50
KD-19-56	40	50
KD-39-08	65	75
KD-39-09	65	75
KD-39-10	65	75
KD-39-21	40	50
KD-59-100	40	50
KD-59-101	40	50
KD-59-155	90	100
KD-59-156	90	100
KD-59-33	65	75
KD-59-35	65	75
KD-59-38	90	100

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Table 10 (continued)

Connector	Torque Value (inch-pound)	
	Minimum	Maximum
KD-59-40	90	100
KD-59-41	65	75
KD-59-42	65	75
KD-59-43	65	75
KD-59-44	40	50
KD-59-50	40	50
KD-59-55	40	50
KD-59-57	40	50
KD-59-90	40	50
KD-59-94	40	50
KD-59-95	40	50
KG-59-16	65	75
KG-59-22	40	50
KG-59-23	40	50
KG-59-25	65	75
KG-59-26	40	50
KH-19-12	90	100
KH-19-13	65	75
KH-19-14	90	100
KH-19-22	65	75
KH-39-11	65	75
KH-39-12	90	100
KH-59-19	65	75
KH-59-20	65	75
KH-59-21	90	100
KH-59-24	90	100
KH-59-28	90	100
KH-59-31	90	100
KH-59-47	65	75
KH-59-50	90	100
KH-59-53	90	100

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Table 10 (continued)

Connector	Torque Value (inch-pound)	
	Minimum	Maximum
KH-59-54	90	100
KH-59-56	40	50
KH-59-60	90	100
KH-59-78	90	100
KN-19-30	90	100
KN-19-31	65	75
KN-19-37	40	50
KN-19-44	90	100
KN-19-48	40	50
KN-19-68	40	50
KN-19-73	90	100
KN-19-78	40	50
KN-19-79	40	50
KN-39-19	90	100
KN-39-20	65	75
KN-39-21	40	50
KN-39-23	90	100
KN-39-42	40	50
KN-39-48	40	50
KN-39-51	40	50
KN-39-55	90	100
KN-59-107	40	50
KN-59-110	40	50
KN-59-113	40	50
KN-59-128	40	50
KN-59-129	40	50
KN-59-131	65	75
KN-59-133	40	50
KN-59-135	90	100
KN-59-136	90	100
KN-59-138	40	50

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Table 10 (continued)

Connector	Torque Value (inch-pound)	
	Minimum	Maximum
KN-59-18	90	100
KN-59-237	90	100
KN-59-238	90	100
KN-59-28	90	100
KN-59-29	40	50
KN-59-31	90	100
KN-59-34	40	50
KN-59-46	90	100
KN-59-47	90	100
KN-59-48	90	100
KN-59-49	40	50
KN-59-50	65	75
KN-59-53	65	75
KN-59-56	90	100
KN-59-57	90	100
KN-59-69	40	50
KS-89-31	40	50
KS-89-35	40	50
KS-89-42	40	50
KU-59-19	40	50
KU-59-21	65	75
KU-59-25	40	50
KU-59-32	65	75
KU-59-67	40	50

- (1) Make a selection of a solvent from Table 3.
- (2) Make a selection of a primer from Table 3.
- (3) Make a selection of a thread lock compound from Table 3.
- (4) If the connector is a right angle connector with an access cap, remove the cap.
- (5) Clean the clamp nut with solvent and a clean wiper.
- (6) Dry the nut with a clean wiper.
- (7) Apply the primer with a spray to the threads of the nut

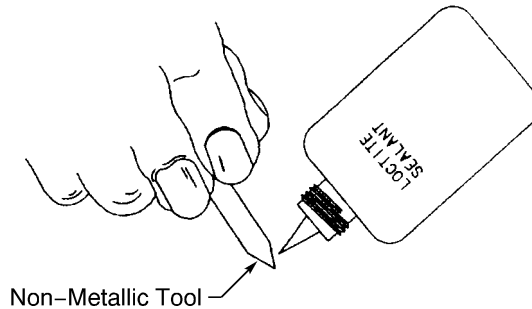
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- (8) Let the primer to dry for 10 minutes minimum at room temperature.
- (9) Apply a layer of thread lock compound on the threads of the clamp nut.

CAUTION: THE THREAD LOCK COMPOUND DOES NOT MAKE A BOND IF THE COMPONENTS ARE ASSEMBLED MORE THAN 30 MINUTES AFTER THE COMPOUND IS APPLIED.

- (a) Put a small quantity of the compound on the tip of a non-metallic, pointed tool. Refer to Figure 17.

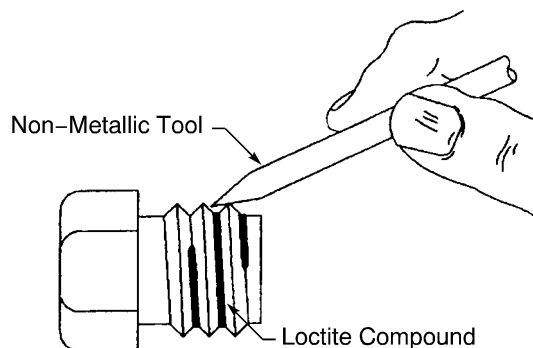


LOCATION OF THE THREAD LOCK COMPOUND ON THE TOOL

Figure 17

- (b) Apply a thin smooth layer of the compound to one or two full threads of the nut. Refer to Figure 18.

CAUTION: THREAD LOCK COMPOUND IS AN INSULATOR. TOO MUCH THREAD LOCK COMPOUND CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.



LOCATION OF THE LOCTITE COMPOUND ON THE THREADS OF THE CLAMP NUT

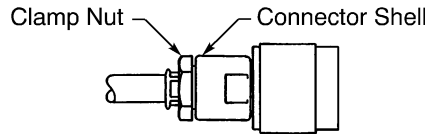
Figure 18

- (c) If too much thread lock compound is applied, remove the unwanted compound from the nut.
- (10) Push the components rearward until they are against the K-Grip.
- (11) Fully engage the threads of the clamp nut and the threads of the connector shell. Refer to Figure 19. If the connector is a right angle connector with a solder type contact, make sure the end of the center conductor goes in the slot on the end of the center contact. Refer to Figure 20.

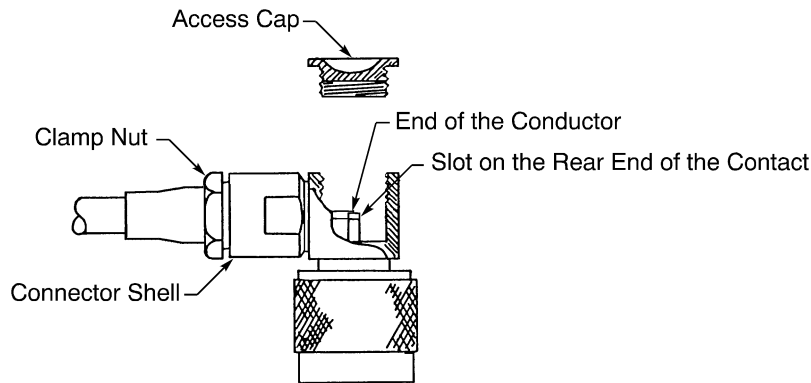
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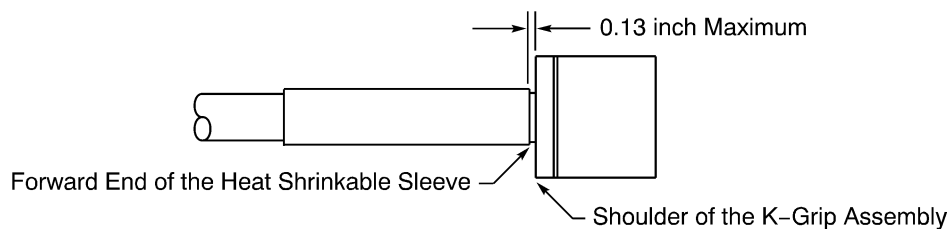
POSITION OF THE CONNECTOR SHELL AND THE CLAMP NUT
Figure 19



INSTALLATION OF A RIGHT ANGLE CONNECTOR SHELL WITH A SOLDER TYPE CONTACT
Figure 20

- (12) Tighten the clamp nut to the specified torque value. Refer to Table 10.
- (13) Push the heat shrinkable sleeve forward on the cable until the forward end of the sleeve is against the shoulder of the K-Grip assembly. Refer to Figure 21.

Make sure that the forward end of the heat shrinkable sleeve is not more than 0.13 inch from the rear end of the clamp nut.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 21

- (14) Shrink the sleeve into its position. Refer to Subject 20-10-14.

4. COAX CABLE PREPARATION PROCEDURES

A. Cable Preparation - No Trim Jig

NOTE: If the cable has two shields, the shields are prepared as one shield.

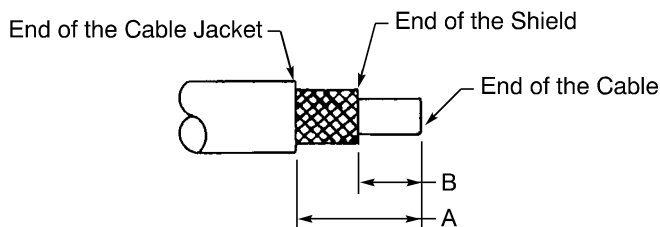
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- (1) Remove the necessary length of jacket to make the distance from the end of the jacket to the end of the cable equal to dimension A.

Refer to Figure 22 and Table 9.

CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



REMOVAL OF THE CABLE JACKET AND THE SHIELD
Figure 22

- (2) Remove the necessary length of shield to make the distance from the end of the cable jacket to the end of the shield equal to dimension B.

Refer to Figure 22 and Table 9.

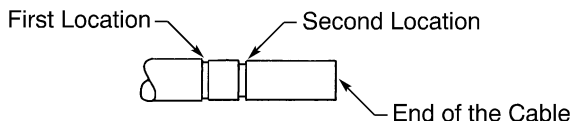
CAUTION: DO NOT CAUSE DAMAGE TO THE DIELECTRIC. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

B. Cable Preparation - Cable Jacket Trim Jig

NOTE: If the cable has two shields, the shields are prepared as one shield.

- (1) Put the trim jig on the end of the cable.
 Make sure that the end of the trim jig is against the end of the cable.
- (2) Turn the cable in the jig, and at the same time, apply light pressure to the cable at the location of the blades. Refer to Figure 23.

CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD OR THE DIELECTRIC. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

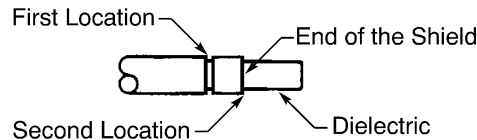


LOCATIONS TO CUT THE CABLE JACKET
Figure 23

- (3) Remove the trim jig from the end of the cable.
- (4) Remove the length of the cable jacket and the shield from the second location to the end of the cable. Refer to Figure 24.

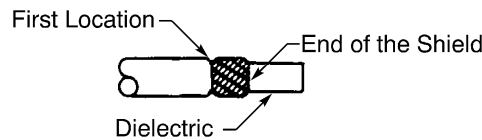
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS



SHIELD REMOVAL
Figure 24

- (5) Remove the length of the cable jacket from the first location to the end of the shield. Refer to Figure 25.

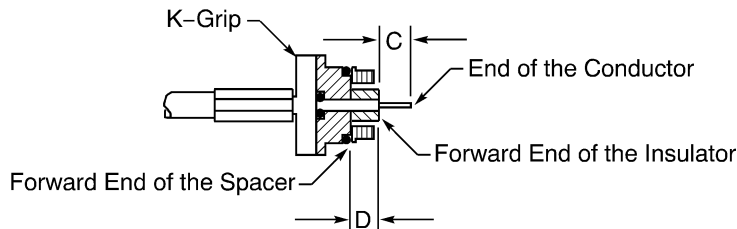


CABLE JACKET REMOVAL
Figure 25

C. Dielectric Removal - No Trim Jig

- (1) For a cable with a spacer and an insulator installed:
 - (a) Remove the length of the dielectric from the forward end of the insulator to the end of the cable. Refer to Figure 26 and Table 9.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



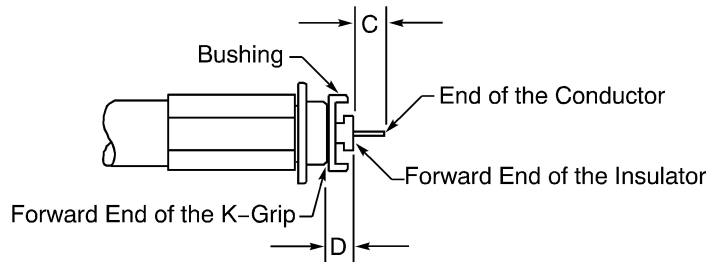
DIELECTRIC REMOVAL WITH A SPACER AND AN INSULATOR INSTALLED
Figure 26

- (b) Remove the necessary length of the conductor to make the distance from the forward end of the insulator to the end of the conductor equal to dimension C. Refer to Figure 26 and Table 9.
- (2) For a cable with a bushing and an insulator installed:
 - (a) Remove the length of dielectric from the forward end of the insulator to the end of the cable. Refer to Figure 27 and Table 9.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

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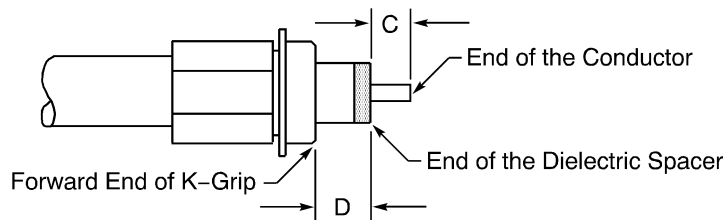
ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS



DIELECTRIC REMOVAL WITH A BUSHING AND AN INSULATOR INSTALLED
Figure 27

- (b) Remove the necessary length of the conductor to make the distance from the end of the insulator to the end of the conductor equal to dimension C. Refer to Figure 27 and Table 9.
- (3) For a cable with a semi-rigid dielectric:
 - (a) Remove the necessary length of dielectric to make the distance from the end of the K-Grip to the end of the dielectric equal to dimension D minus the width of the spacer. Refer to Figure 28 and Table 9.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



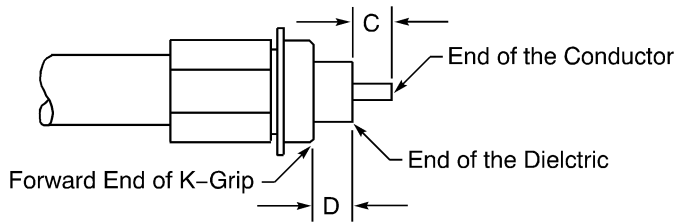
DIELECTRIC REMOVAL WITH A DIELECTRIC SPACER INSTALLED
Figure 28

- (b) Install the dielectric spacer.
- (c) Remove the necessary length of the conductor to make the distance from the end of the spacer to the end of the conductor equal to dimension C. Refer to Figure 28 and Table 9.
- (4) For a cable without spacers, insulators, or bushings installed:
 - (a) Remove the necessary length of dielectric to make the distance from the end of the K-Grip to the end of the dielectric equal to dimension D. Refer to Figure 29 and Table 9.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

STANDARD WIRING PRACTICES MANUAL

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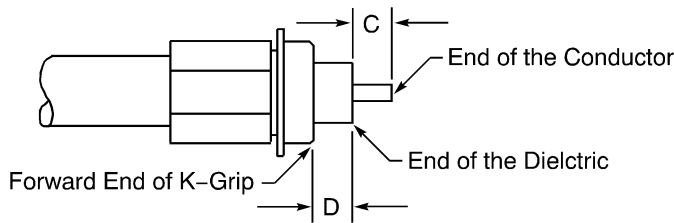
DIELECTRIC REMOVAL
Figure 29

- (b) Remove the necessary length of the conductor to make the distance from the end of the dielectric to the end of the conductor equal to dimension C. Refer to Figure 29 and Table 9.

D. Dielectric Removal - Dielectric Trim Jig

- (1) Put the dielectric trim jig on the end of the cable.
- (2) Remove the necessary length of dielectric that extends farther than the end of the trim jig. Refer to Figure 30 and Table 9.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



DIELECTRIC REMOVAL
Figure 30

- (3) Remove the necessary length of the conductor to make the distance from the end of the dielectric to the end of the conductor equal to dimension C. Refer to Figure 30 and Table 9.

5. APPROVED TOOL SUPPLIERS

A. Coax Cable Trim Jigs

Table 11
TRIM JIG TOOL SUPPLIERS

Trim Jig	Supplier
KTD-103	Kings Electronics
KTD-104	Kings Electronics
KTD-105	Kings Electronics
KTD-106	Kings Electronics
KTD-117	Kings Electronics

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Table 11 (continued)

Trim Jig	Supplier
KTD-214	Kings Electronics
KTD-25	Kings Electronics
KTD-31	Kings Electronics
KTD-6	Kings Electronics
KTD-77	Kings Electronics
KTD-78	Kings Electronics
KTD-79	Kings Electronics
KTD-80	Kings Electronics
KTD-81	Kings Electronics
KTD-82	Kings Electronics
KTD-84	Kings Electronics
KTD-85	Kings Electronics
KTD-86	Kings Electronics
KTD-88	Kings Electronics
KTD-89	Kings Electronics
KTD-90	Kings Electronics
KTD-91	Kings Electronics
KTD-94	Kings Electronics
KTJ-11	Kings Electronics
KTJ-141	Kings Electronics
KTJ-16	Kings Electronics
KTJ-17	Kings Electronics
KTJ-18	Kings Electronics
KTJ-19	Kings Electronics
KTJ-20	Kings Electronics
KTJ-211	Kings Electronics
KTJ-22	Kings Electronics
KTJ-23	Kings Electronics
KTJ-24	Kings Electronics
KTJ-25	Kings Electronics
KTJ-27	Kings Electronics
KTJ-33	Kings Electronics
KTJ-39	Kings Electronics

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 11 (continued)

Trim Jig	Supplier
KTJ-44	Kings Electronics
KTJ-45	Kings Electronics
KTJ-49	Kings Electronics
KTJ-57	Kings Electronics
KTJ-6	Kings Electronics
KTJ-62	Kings Electronics
KTJ-63	Kings Electronics
KTJ-73	Kings Electronics
KTJ-88	Kings Electronics

B. Coax Connector Crimp Tools

**Table 12
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
227-1221-25	Amphenol
227-1221-57	Amphenol
227-1351-3	Amphenol
227-1351-4	Amphenol
227-944	Amphenol
227-956-4	Amphenol
612642	Buchanan
612648	Buchanan
612673	Buchanan
612675	Buchanan
612734	Buchanan
612739	Buchanan
612807	Buchanan
683-51470-1	Kings Electronics
CT-32	Schleuniger
HX23	Daniels
HX4	Daniels
KTH-1000	Kings Electronics



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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 12 (continued)

Crimp Tool	Supplier
KTH-1078	Kings Electronics
KTH-1079	Kings Electronics
KTH-2001	Kings Electronics
KTH-2002	Kings Electronics
KTH-2003	Kings Electronics
KTH-2004	Kings Electronics
KTH-2007	Kings Electronics
KTH-2008	Kings Electronics
KTH-2042	Kings Electronics
KTH-2061	Kings Electronics
KTH-2105	Kings Electronics
KTH-2106	Kings Electronics
KTH-2111	Kings Electronics
KTH-2127	Kings Electronics
KTH-2128	Kings Electronics
KTH-2161	Kings Electronics
KTH-2211	Kings Electronics
KTH-2212	Kings Electronics
KTH-2213	Kings Electronics
KTH-2216	Kings Electronics
KTH-2220	Kings Electronics
KTH-2230	Kings Electronics
KTH-2231	Kings Electronics
KTH-2235	Kings Electronics
KTM-1000	Kings Electronics
KTM-1099	Kings Electronics
KTM-3000	Kings Electronics
KTM-4000	Kings Electronics
M22520/5-01	QPL
M22520/5-03	QPL
M22520/5-05	QPL
M22520/5-19	QPL
M22520/5-23	QPL

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ASSEMBLY OF KINGS K-GRIP WEATHERPROOF COAX CONNECTORS

Table 12 (continued)

Crimp Tool	Supplier
M22520/5-25	QPL
M22520/5-41	QPL
M22520/5-57	QPL
ST2352-5-1	Boeing
ST2352-5-2	Boeing
ST2352-5-Y	Boeing
ST2966M	Boeing
ST2966M-13	Boeing
ST2966M-16	Boeing
ST2966M-6	Boeing
ST2966M-8	Boeing
Y142	Daniels
Y197	Daniels
Y322	Daniels



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ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

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ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Series	Configuration	Supplier
KD-19-08	C	Bulkhead Jack	Kings Electronics
KM-59-05	KM	Straight Plug	Kings Electronics
KY-59-02	-	Straight Plug	Kings Electronics

**Table 2
ALTERNATIVE COAX CONNECTORS**

Specified Connector	Alternative Connector		Special Instructions
	Part Number	Assembly Procedure	
KM-59-05	KM-59-36	Subject 20-51-15	Applicable for the 10-008, 10-008R, RG-11A, RG-213 cables only

B. Necessary Materials

**Table 3
NECESSARY MATERIALS**

Material	Part Number or Specification	Supplier
Primer	Product 7471, Primer T	Loctite
Sleeve, Heat Shrinkable	DWP-125	Raychem
Solvent	Isopropyl Alcohol	Any Source
Thread Lock Compound	222	Loctite
	Product 081 Grade D	Loctite

2. COAX CONNECTOR ASSEMBLY TOOLS

A. Coax Cable Trim Jigs

**Table 4
COAX CABLE TRIM JIGS**

Connector	Trim Jig	
	Cable Jacket	Dielectric
KD-19-08	KTB-4	-
KM-59-05	KTB-4	KTD-1
KY-59-02	KTB-5	KTD-76



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B. Coax Connector Crimp Tools

Table 5
COAX CRIMP TOOL TYPES

Crimp Tool Basic Unit	Type
CT-32	Pneumatic
HX23	Pneumatic
HX4	Hand
KTH-1000	Hand
KTM-1000	Electric
KTM-3000	Pneumatic
KTM-4000	Pneumatic
M22520/5-01	Hand

Table 6
COAX CONNECTOR K-GRIP SLEEVE TOOL CODES

Connector	Tool Code
KD-19-08	213H
KM-59-05	213H
KY-59-02	255H

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**Table 7
COAX CONNECTOR K-GRIP SLEEVE CRIMP TOOLS**

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
213H	227-944	-	M22520/5-19	0.213
	612648	-	612673	0.213
	CT-32	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	HX23	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
	HX4	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
	KTH-1000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213

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ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

Table 7 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
213H	KTM-1000	KTM-1099	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	KTM-3000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	KTM-4000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	M22520/5-01	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
ST2966M	-	ST2966M-6	0.213	
255H	612648	-	612675	0.255
	CT-32	-	KTH-2002	0.255
	HX23	-	M22520/5-19	0.255
			Y142	0.255
	HX4	-	M22520/5-19	0.255
			Y142	0.255
	KTH-1000	-	KTH-2002	0.255
	KTM-1000	KTM-1099		0.255
	KTM-3000	-		0.255
	KTM-4000	-		0.255
	M22520/5-01	-	M22520/5-19	0.255
Y142			0.255	
ST2966M	-	ST2966M-8	0.255	

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ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

3. CONNECTOR ASSEMBLY

A. Cable Preparation Dimensions

**Table 8
CABLE PREPARATION DIMENSIONS**

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-19-08	A	1.28	± 0.02
	B	0.97	± 0.02
	C	0.16	± 0.02
	D	0.13	± 0.02
KM-59-05	A	0.88	± 0.02
	B	0.56	± 0.02
	C	0.08	± 0.02
	D	0.05	± 0.02
KY-59-02	A	0.88	± 0.02
	B	0.56	± 0.02
	C	0.08	± 0.02
	D	0.05	± 0.02

B. Cable Preparation

For the general conditions that are applicable for the preparation of coax cable, refer to Subject 20-51-00.

- (1) Make a selection of a heat shrinkable sleeve from Table 3.

Make sure that the sleeve has the smallest diameter that can be moved easily on the K-Grip sleeve.

- (2) Put a 1.5 inch length of heat shrinkable sleeve on the cable.
- (3) Cut the end of the cable to make it perpendicular to the longitudinal axis of the cable.
- (4) Put the K-Grip sleeve on the cable.
- (5) Prepare the cable with a trim jig.

NOTE: Preparation of the cable without a trim jig is a satisfactory alternative. Refer to Paragraph 4.A.

- (a) Make a selection of a cable jacket trim jig from Table 4.
- (b) Prepare the cable with the trim jig. Refer to Paragraph 4.B.

C. K-Grip Assembly

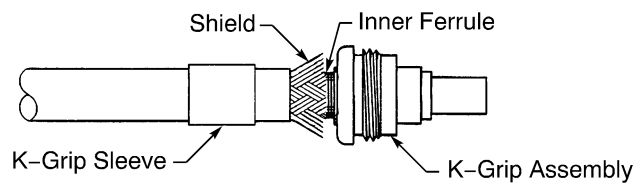
For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.

- (1) Find the K-Grip sleeve crimp tool code. Refer to Table 6.

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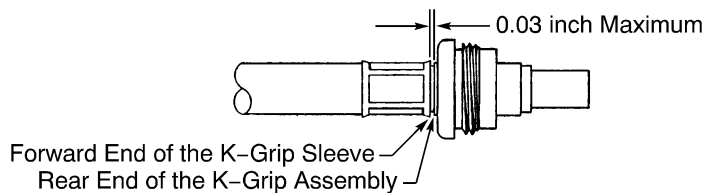
ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

- (2) Make a selection of the K-Grip sleeve crimp tool from Table 7.
Make sure that the tool is applicable for the tool code.
- (3) Examine the threads on the rear of the connector shell for contamination or thread lock compound.
- (4) If the threads have material on them, clean the threads:
 - (a) Fully engage the threads the clamp nut and the threads of the connector shell.
 - (b) Remove the clamp nut from the connector shell.
- (5) Move the strands of the shield apart.
- (6) Put the K-Grip assembly on the end of the cable. Refer to Figure 1.
Make sure that the inner ferrule is between the shield and the dielectric.



POSITION OF THE K-GRIP ASSEMBLY ON THE CABLE
Figure 1

- (7) Push the K-Grip assembly rearward.
Make sure that:
 - The rear end of the inner ferrule is against the end of the jacket
 - The end of the shield is not more than 0.03 inch from the rear end of the K-Grip assembly.
- (8) Push the K-Grip sleeve forward until the forward end of the sleeve is against the rear end of the K-Grip assembly.
- (9) Put the assembly in the crimp tool.
Make sure that the K-Grip assembly, the sleeve, and the cable stay in their position.
- (10) Align the rear end of the sleeve with the nearest edge of the tool die.
- (11) Crimp the sleeve. Refer to Figure 2.
Make sure the forward end of the sleeve is not more than 0.03 inch from the rear end of the K-Grip assembly.



POSITION OF THE K-GRIP SLEEVE
Figure 2

D. Center Contact Assembly

For the general conditions that are applicable for the assembly of coax contacts, refer to Subject 20-51-00.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

- (1) Make a selection of a Temperature Grade C solder. Refer to Subject 20-00-11.

CAUTION: DO NOT USE A TEMPERATURE GRADE D SOLDER. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CABLE CAN OCCUR.

- (2) Remove the necessary length of dielectric with a trim jig.

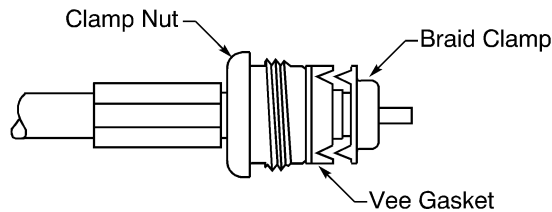
NOTE: Removal of the dielectric without a trim jig is a satisfactory alternative. Refer to Paragraph 4.C.

- (a) Make a selection of a dielectric trim jig from Table 4.

NOTE: If a trim jig is not specified for the connector, the dielectric must be removed without a trim jig. Refer to Paragraph 4.C.

- (b) Remove the dielectric with the trim jig. Refer to Paragraph 4.D.

- (3) If the connector is supplied with a vee gasket and a braid clamp, put gasket and the clamp on the end of the cable. Refer to Figure 3.



POSITION OF THE VEE GASKET AND THE BRAID CLAMP ON THE END OF THE CABLE

Figure 3

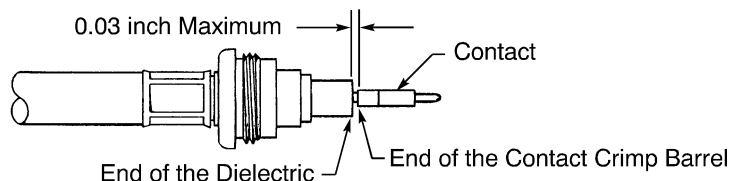
- (4) Tin the center conductor.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN OCCUR.

- (5) Put the center conductor in the solder barrel of the center contact. Refer to Figure 4.

Make sure that:

- All of the strands of the conductor are in the solder barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the dielectric to the rear end of the solder barrel is not more than 0.03 inch.



POSITION OF THE CENTER CONTACT ON THE CONDUCTOR

Figure 4

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ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

- (6) Apply a small quantity of solder in the inspection hole of the contact.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN OCCUR.

- (7) Remove all of the solder and the flux from the outer surface of the contact.
- (8) Examine the contact for damage to the finish.

NOTE: If the contact has damage, it must be replaced.

- (9) If a solder access cover is supplied with the contact, install the cover.

E. Connector Shell Installation

For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.

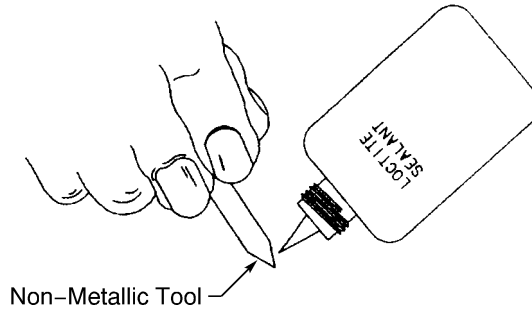
**Table 9
CLAMP NUT TORQUE VALUES**

Connector	Torque Value (inch-pound)	
	Minimum	Maximum
KD-19-08	40	50
KM-59-05	40	50
KY-59-02	40	50

- (1) Make a selection of a solvent from Table 3.
- (2) Make a selection of a primer from Table 3.
- (3) Make a selection of a thread lock compound from Table 3.
- (4) Clean the clamp nut with a wiper and solvent.
- (5) Dry the nut with a clean wiper.
- (6) Apply the primer with a spray on the threads of the nut.
- (7) Let the primer to dry for 10 minutes minimum at room temperature.
- (8) Apply a layer of thread lock compound on the threads of the clamp nut.

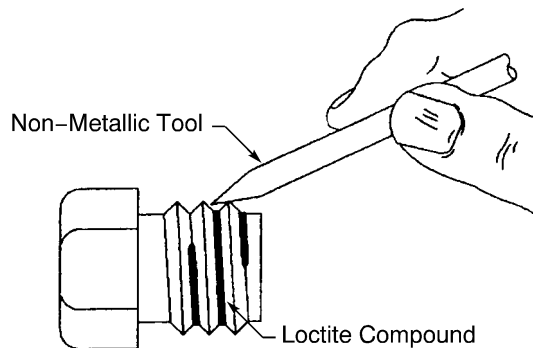
CAUTION: THE THREAD LOCK COMPOUND DOES NOT MAKE A BOND IF THE COMPONENTS ARE ASSEMBLED MORE THAN 30 MINUTES AFTER THE COMPOUND IS APPLIED.

- (a) Put a small quantity of the compound on the tip of a non-metallic, pointed tool. Refer to Figure 5.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS****LOCATION OF THE THREAD LOCK COMPOUND ON THE TOOL****Figure 5**

- (b) Apply a thin smooth layer of the compound on one or two full threads of the nut. Refer to Figure 6.

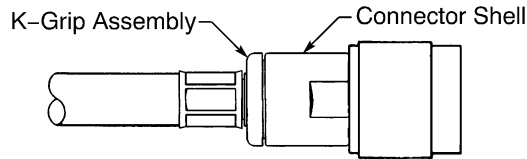
CAUTION: THREAD LOCK COMPOUND IS AN INSULATOR. TOO MUCH THREAD LOCK COMPOUND CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**LOCATION OF THE THREAD LOCK COMPOUND ON THE THREADS OF THE CLAMP NUT****Figure 6**

- (c) If too much thread lock compound is applied, remove the unwanted compound from the nut.
- (9) If a vee gasket is on the cable, push it rearward until it is against the K-Grip assembly.
- (10) If a braid clamp is on the cable, push it rearward until it is against the vee gasket.
- (11) Put the K-Grip assembly in the rear end of the connector shell.
- (12) Fully engage the threads of the connector shell and the threads of the clamp nut on the K-Grip assembly. Refer to Figure 7.

STANDARD WIRING PRACTICES MANUAL

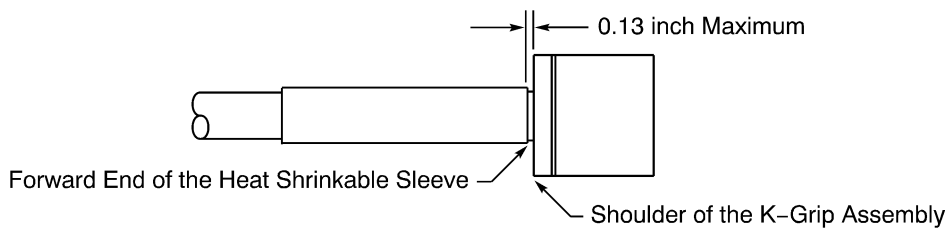
ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS



POSITION OF THE CONNECTOR SHELL ON THE K-GRIP ASSEMBLY
Figure 7

- (13) Tighten the clamp nut to the specified torque value. Refer to Table 9.
- (14) Push the heat shrinkable sleeve forward on the cable until the forward end of the sleeve is against the shoulder of the K-Grip assembly. Refer to Figure 8.

Make sure that the forward end of the sleeve is not more than 0.13 inch from the shoulder of the K-Grip assembly.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 8

- (15) Shrink the sleeve into its position. Refer to Subject 20-10-14.

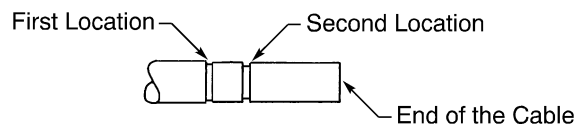
4. COAX CABLE PREPARATION

A. Cable Preparation - No Trim Jig

NOTE: If the cable has two shields, the shields are prepared as one shield.

- (1) Put the trim jig on the end of the cable.
 Make sure that the end of the cable is against the end of the trim jig.
- (2) Turn the cable in the jig, and at the same time, apply light pressure on the cable at the location that is opposite the blades. Refer to Figure 9.

CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD OR THE DIELECTRIC. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



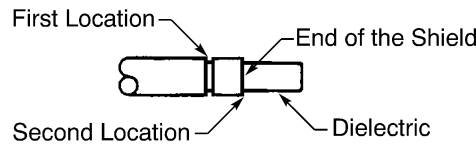
LOCATIONS TO CUT THE CABLE JACKET
Figure 9

- (3) Remove the trim jig from the end of the cable.

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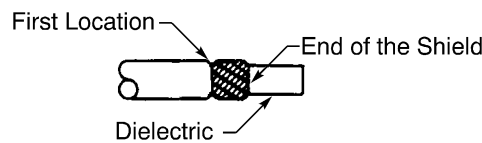
ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

- (4) Remove the lengths of the cable jacket and the shield from the second location to the end of the cable. Refer to Figure 10.



SHIELD REMOVAL
Figure 10

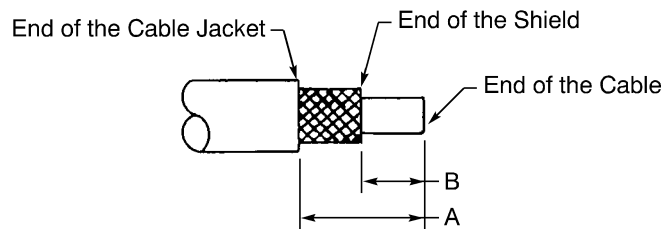
- (5) Remove the length of cable jacket from the first location to the end of the shield. Refer to Figure 11.



CABLE JACKET REMOVAL
Figure 11

B. Cable Preparation - Cable Jacket Trim Jig

NOTE: If the cable has two shields, the shields are prepared as one shield.



CABLE PREPARATION
Figure 12

- (1) Remove the necessary length of jacket to make the distance from the end of the jacket to the end of the cable equal to dimension A.

Refer to Figure 12 and Table 8.

CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

- (2) Remove the necessary length of shield to make the distance from the end of the shield to the end of the cable equal to dimension B.

Refer to Figure 12 and Table 8.

CAUTION: DO NOT CAUSE DAMAGE TO THE DIELECTRIC. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

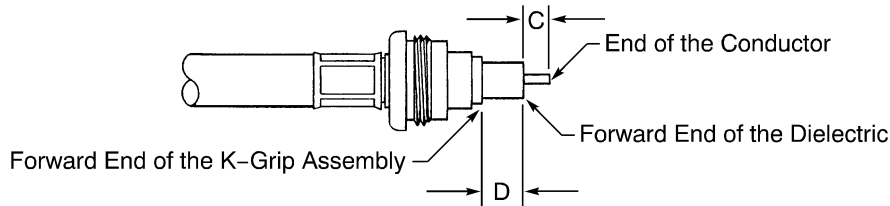
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ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

C. Dielectric Removal - No Trim Jig

- (1) Remove the necessary length of the dielectric to make the distance from the forward end of the K-Grip assembly to the end of the dielectric equal to dimension D.

Refer to Figure 13 and Table 8.



DIELECTRIC REMOVAL

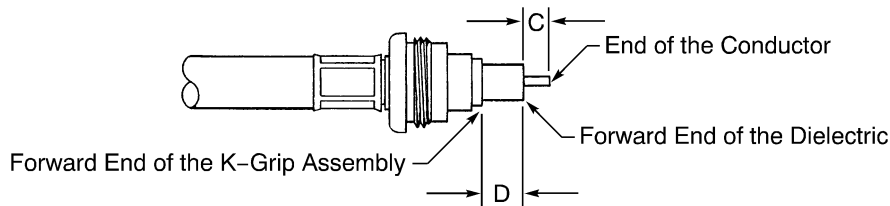
Figure 13

- (2) Remove the necessary length of conductor to make the distance from the end of the dielectric to the end of the conductor equal to dimension C. Refer to Figure 13 and Table 8.

D. Dielectric Removal - Dielectric Trim Jig

- (1) Put the trim jig on the end of the cable.
- (2) Remove the dielectric that extends farther than the end of the trim jig. Refer to Figure 14 and Table 8.

Make sure that the distance from the forward end of the K-Grip assembly to the end of the dielectric is equal to dimension D.



DIELECTRIC REMOVAL

Figure 14

- (3) Remove the necessary length of conductor to make the distance from the end of the dielectric to the end of the conductor equal to dimension C. Refer to Figure 14 and Table 8.

5. APPROVED TOOL SUPPLIERS

A. Coax Cable Trim Jig Tools

**Table 10
TRIM JIG TOOL SUPPLIERS**

Trim Jig	Supplier
KTB-4	Kings Electronics
KTB-5	Kings Electronics
KTD-1	Kings Electronics



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ASSEMBLY OF KINGS STANDARD K-GRIP COAX CONNECTORS

Table 10 (continued)

Trim Jig	Supplier
KTD-76	Kings Electronics

B. Coax Connector K-Grip Sleeve Crimp Tools

Table 11
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
227-944	Amphenol
612648	Buchanan
612673	Buchanan
612675	Buchanan
CT-32	Schleuniger
HX23	Daniels
HX4	Daniels
KTH-1000	Kings Electronics
KTH-2001	Kings Electronics
KTH-2002	Kings Electronics
KTH-2042	Kings Electronics
KTH-2220	Kings Electronics
KTM-1000	Kings Electronics
KTM-1099	Kings Electronics
KTM-3000	Kings Electronics
KTM-4000	Kings Electronics
M22520/5-01	QPL
M22520/5-05	QPL
M22520/5-19	QPL
ST2966M	Boeing
ST2966M-6	Boeing
ST2966M-8	Boeing
Y142	Daniels
Y197	Daniels
Y322	Daniels

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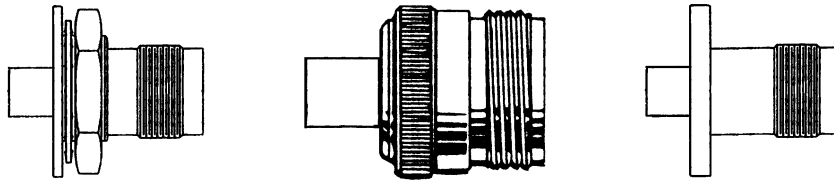
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1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers and Description

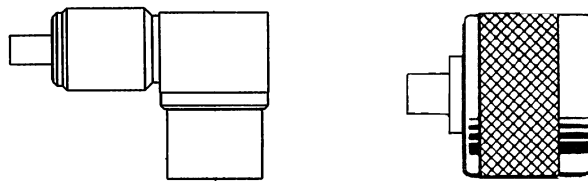


Bulkhead Jack

In-Line Jack

Panel Jack

WEATHERPROOF K-GRIP JUNIOR COAX JACK CONNECTORS
Figure 1



Right Angle Plug

Straight Plug

WEATHERPROOF K-GRIP JUNIOR COAX PLUG CONNECTORS
Figure 2

Table 1
COAX CONNECTOR PART NUMBERS

Part Number	Series	Configuration	Contact Type	Supplier
1201-11-9	N	Panel Jack	Crimp	Kings Electronics
1201-12-9	N	Panel Jack	Crimp	Kings Electronics
1201-13-9	N	Panel Jack	Crimp	Kings Electronics
1201-14-9	N	Panel Jack	Crimp	Kings Electronics
1201-20-9	N	Panel Jack	Crimp	Kings Electronics
1201-21-9	N	Panel Jack	Crimp	Kings Electronics
1201-22-9	N	Panel Jack	Crimp	Kings Electronics
1201-23-9	N	Panel Jack	Crimp	Kings Electronics
1201-24-9	N	Panel Jack	Crimp	Kings Electronics
1201-25-9	N	Panel Jack	Crimp	Kings Electronics
1201-6-9	N	Panel Jack	Crimp	Kings Electronics
1202-20-9	N	Bulkhead Jack	Crimp	Kings Electronics
1202-23-9	N	Bulkhead Jack	Crimp	Kings Electronics

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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
1202-26-9	N	Bulkhead Jack	Crimp	Kings Electronics
1203-13-9	N	In-Line Jack	Crimp	Kings Electronics
1203-14-9	N	In-Line Jack	Crimp	Kings Electronics
1203-15-9	N	Right Angle Jack	Crimp	Kings Electronics
1203-16-9	N	In-Line Jack	Crimp	Kings Electronics
1203-19-9	N	In-Line Jack	Crimp	Kings Electronics
1203-20-9	N	In-Line Jack	Crimp	Kings Electronics
1203-21-9	N	In-Line Jack	Crimp	Kings Electronics
1203-4-9	N	In-Line Jack	Crimp	Kings Electronics
1205-20-9	N	Straight Plug	Crimp	Kings Electronics
1205-31-9	N	Straight Plug	Crimp	Kings Electronics
1205-47-9	N	Straight Plug	Crimp	Kings Electronics
1205-48-9	N	Straight Plug	Crimp	Kings Electronics
1205-49-9	N	Straight Plug	Crimp	Kings Electronics
1205-61-9	N	Straight Plug	Crimp	Kings Electronics
1205-62-9	N	Straight Plug	Crimp	Kings Electronics
1206-11-9	N	Right Angle Plug	Crimp	Kings Electronics
1206-21-9	N	Right Angle Plug	Crimp	Kings Electronics
1206-22-9	N	Right Angle Plug	Crimp	Kings Electronics
1206-26-9	N	Right Angle Plug	Crimp	Kings Electronics
1206-29-9	N	Right Angle Plug	Crimp	Kings Electronics
1206-30-9	N	Right Angle Plug	Crimp	Kings Electronics
121-11-9	TNC	Panel Jack	Solder	Kings Electronics
121-24-9	TNC	Panel Jack	Crimp	Kings Electronics
121-35-9	TNC	Panel Jack	Crimp	Kings Electronics
121-36-9	TNC	Panel Jack	Crimp	Kings Electronics
121-37-9	TNC	Panel Jack	Crimp	Kings Electronics
121-38-9	TNC	Panel Jack	Crimp	Kings Electronics
121-39-9	TNC	Panel Jack	Crimp	Kings Electronics
121-40-9	TNC	Panel Jack, Isolated Ground	Crimp	Kings Electronics
121-44-9	TNC	Panel Jack	Crimp	Kings Electronics
121-45-9	TNC	Panel Jack	Crimp	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
121-46-9	TNC	Panel Jack	Crimp	Kings Electronics
121-52-9	TNC	Panel Jack, Isolated Ground	Crimp	Kings Electronics
122-37-9	TNC	Bulkhead Jack	Crimp	Kings Electronics
123-22-5	TNC	In-Line Jack	Crimp	Kings Electronics
123-23-9	TNC	In-Line Jack	Crimp	Kings Electronics
123-24-9	TNC	Right Angle Jack	Crimp	Kings Electronics
123-26-9	TNC	Right Angle Jack	Crimp	Kings Electronics
125-101-9	TNC	Straight Hex Plug	Crimp	Kings Electronics
125-105-9	TNC	Straight Plug	Crimp	Kings Electronics
125-60-9	TNC	Straight Plug	Crimp	Kings Electronics
125-61-9	TNC	Straight Plug	Crimp	Kings Electronics
125-69-9	TNC	Straight Plug	Crimp	Kings Electronics
125-88-9	TNC	Straight Plug	Crimp	Kings Electronics
125-89-9	TNC	Straight Plug	Crimp	Kings Electronics
125-91-9	TNC	Straight Plug	Crimp	Kings Electronics
125-92-9	TNC	Straight Plug	Crimp	Kings Electronics
125-94-9	TNC	Straight Hex Plug	Crimp	Kings Electronics
125-95-9	TNC	Straight Hex Plug	Crimp	Kings Electronics
125-96-9	TNC	Straight Hex Plug	Crimp	Kings Electronics
126-14-5	TNC	Right Angle Plug	Crimp	Kings Electronics
126-50-9	TNC	Right Angle Plug	Crimp	Kings Electronics
126-58-9	TNC	Right Angle Plug	Crimp	Kings Electronics
126-59-9	TNC	Right Angle Plug	Crimp	Kings Electronics
126-64-9	TNC	Long Right Angle Plug	Crimp	Kings Electronics
126-67-9	TNC	Right Angle Plug	Crimp	Kings Electronics
126-70-9	TNC	Long Right Angle Plug	Crimp	Kings Electronics
126-71-9	TNC	Right Angle Plug	Crimp	Kings Electronics
126-73-9	TNC	Right Angle Plug	Crimp	Kings Electronics
126-74-9	TNC	Right Angle Plug	Crimp	Kings Electronics
126-78-1	TNC	Right Angle Plug	Crimp	Kings Electronics
126-78-6	TNC	Right Angle Plug	Crimp	Kings Electronics
1525-4-9	TPS	Straight Plug	Crimp	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
2430-1-()	TNC	Keyed Right Angle Panel Jack	Crimp	Kings Electronics
2430-2-()	TNC	Keyed Right Angle Panel Jack	Crimp	Kings Electronics
2431-74-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-76-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-80-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-81-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-82-()	TNC	Keyed Panel Jack, Isolated Ground	Crimp	Kings Electronics
2431-83-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-84-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-85-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-87-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-88-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2431-89-()	TNC	Keyed Panel Jack	Crimp	Kings Electronics
2435-74-()	TNC	Keyed Straight Plug	Crimp	Kings Electronics
2435-77-()	TNC	Keyed Straight Plug	Crimp	Kings Electronics
2435-81-()	TNC	Keyed Straight Plug	Crimp	Kings Electronics
2435-82-()	TNC	Keyed Straight Plug	Crimp	Kings Electronics
2435-83-()	TNC	Keyed Straight Plug	Crimp	Kings Electronics
2435-84-()	TNC	Keyed Straight Plug	Crimp	Kings Electronics
2435-87-()	TNC	Keyed Straight Plug	Crimp	Kings Electronics
2436-81-()	TNC	Keyed Right Angle Plug	Crimp	Kings Electronics
2436-83-()	TNC	Keyed Right Angle Plug	Crimp	Kings Electronics
2436-85-()	TNC	Keyed Right Angle Plug	Crimp	Kings Electronics
2971-2-()	N	Keyed Panel Jack	Crimp	Kings Electronics
2971-3-()	N	Keyed Panel Jack	Crimp	Kings Electronics
2971-4-()	N	Keyed Panel Jack	Crimp	Kings Electronics
2971-5-()	N	Keyed Panel Jack	Crimp	Kings Electronics
2971-6-()	N	Keyed Panel Jack	Crimp	Kings Electronics
2971-7-()	N	Keyed Panel Jack	Crimp	Kings Electronics
2971-8-()	N	Keyed Panel Jack	Crimp	Kings Electronics
2975-2-()	N	Keyed Straight Plug	Crimp	Kings Electronics
2975-4-()	N	Keyed Straight Plug	Crimp	Kings Electronics



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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
2975-5-()	N	Keyed Straight Plug	Crimp	Kings Electronics
2975-6-()	N	Keyed Straight Plug	Crimp	Kings Electronics
2976-1-()	N	Keyed Right Angle Plug	Crimp	Kings Electronics
2976-3-()	N	Keyed Right Angle Plug	Crimp	Kings Electronics
2981-1-()	SC	Keyed Panel Jack	Crimp	Kings Electronics
2981-3-()	SC	Keyed Panel Jack	Crimp	Kings Electronics
2981-4-()	SC	Keyed Panel Jack	Crimp	Kings Electronics
2981-5-()	SC	Keyed Panel Jack	Crimp	Kings Electronics
2981-6-()	SC	Keyed Panel Jack	Crimp	Kings Electronics
2981-7-()	SC	Keyed Panel Jack	Crimp	Kings Electronics
2981-8-()	SC	Keyed Panel Jack	Crimp	Kings Electronics
2985-2-()	SC	Keyed Straight Plug	Crimp	Kings Electronics
2985-3-()	SC	Keyed Straight Plug	Crimp	Kings Electronics
2985-4-()	SC	Keyed Straight Plug	Crimp	Kings Electronics
2986-1-()	SC	Keyed Right Angle Plug	Crimp	Kings Electronics
2986-3-()	SC	Keyed Right Angle Plug	Crimp	Kings Electronics
751-10-9	BNC	Panel Jack	Crimp	Kings Electronics
751-11-9	BNC	Panel Jack	Crimp	Kings Electronics
751-2-9	BNC	Panel Jack	Crimp	Kings Electronics
751-20-9	BNC	Panel Jack	Crimp	Kings Electronics
751-22-9	BNC	Panel Jack	Crimp	Kings Electronics
751-3-9	BNC	Panel Jack	Crimp	Kings Electronics
751-4-9	BNC	Panel Jack	Crimp	Kings Electronics
752-43-9	BNC	Splitter Tee Bulkhead Jack	Crimp	Kings Electronics
755-78-9	BNC	Straight Plug	Crimp	Kings Electronics
755-79-9	BNC	Straight Plug	Crimp	Kings Electronics
755-93-9	BNC	Straight Plug	Crimp	Kings Electronics
755-129-9	BNC	Straight Plug	Crimp	Kings Electronics
756-10-9	BNC	Right Angle Plug	Crimp	Kings Electronics
756-16-9	BNC	Right Angle Plug	Crimp	Kings Electronics
756-4-9	BNC	Right Angle Plug	Crimp	Kings Electronics
791-10-9	BNC	Panel Jack	Crimp	Kings Electronics

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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
791-11-9	BNC	Panel Jack	Crimp	Kings Electronics
791-5-9	BNC	Panel Jack	Crimp	Kings Electronics
791-6-9	BNC	Panel Jack	Crimp	Kings Electronics
791-7-9	BNC	Panel Jack	Crimp	Kings Electronics
791-8-9	BNC	Panel Jack	Crimp	Kings Electronics
791-9-9	BNC	Panel Jack	Crimp	Kings Electronics
795-15-9	C	Straight Plug	Crimp	Kings Electronics
795-16-9	C	Straight Plug	Crimp	Kings Electronics
795-20-9	C	Straight Plug	Crimp	Kings Electronics
795-21-9	C	Straight Plug	Crimp	Kings Electronics
795-23-9	C	Straight Plug	Crimp	Kings Electronics
795-29-9	C	Straight Plug	Crimp	Kings Electronics
795-30-9	C	Straight Plug	Crimp	Kings Electronics
796-15-9	C	Right Angle Plug	Crimp	Kings Electronics
796-17-9	C	Right Angle Plug	Crimp	Kings Electronics
796-18-9	C	Right Angle Plug	Crimp	Kings Electronics
796-19-9	C	Right Angle Plug	Crimp	Kings Electronics
796-4-9	C	Right Angle Plug	Crimp	Kings Electronics
821-2-9	SC	Panel Jack	Crimp	Kings Electronics
821-3-9	SC	Panel Jack	Crimp	Kings Electronics
821-4-9	SC	Panel Jack	Crimp	Kings Electronics
821-5-9	SC	Panel Jack	Crimp	Kings Electronics
821-6-9	SC	Panel Jack	Crimp	Kings Electronics
821-7-9	SC	Panel Jack	Crimp	Kings Electronics
821-9-9	SC	Panel Jack	Crimp	Kings Electronics
823-1-9	SC	In-Line Jack	Crimp	Kings Electronics
823-2-9	SC	In-Line Jack	Crimp	Kings Electronics
825-10-9	SC	Straight Plug	Crimp	Kings Electronics
825-11-9	SC	Straight Plug	Crimp	Kings Electronics
825-12-9	SC	Straight Plug	Crimp	Kings Electronics
825-14-9	SC	Straight Plug	Crimp	Kings Electronics
825-7-9	SC	Straight Plug	Crimp	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
826-10-9	SC	Right Angle Plug	Crimp	Kings Electronics
826-8-9	SC	Right Angle Plug	Crimp	Kings Electronics
826-9-9	SC	Right Angle Plug	Crimp	Kings Electronics
841-1-9	SMA	Panel Jack	Crimp	Kings Electronics
843-2-9	HN	In-Line Jack	Crimp	Kings Electronics
845-3-9	SMA	Straight Plug	Crimp	Kings Electronics
846-5-9	SMA	Right Angle Plug	Crimp	Kings Electronics
871-59-3	SMA	Panel Jack	Crimp	Kings Electronics
875-100-3	SMA	Straight Plug	Crimp	Kings Electronics
875-105-3	SMA	Straight Plug	Crimp	Kings Electronics
875-91-3	SMA	Straight Plug	Crimp	Kings Electronics
875-92-3	SMA	Straight Plug	Crimp	Kings Electronics
876-64-3	SMA	Right Angle Plug	Crimp	Kings Electronics
892-2-9	KM	Bulkhead Jack	Crimp	Kings Electronics
892-3-9	KM	Bulkhead Jack	Crimp	Kings Electronics
895-3-9	KM	Straight Plug	Crimp	Kings Electronics
895-6-9	KM	Straight Plug	Crimp	Kings Electronics
896-4-9	KM	Right Angle Plug	Crimp	Kings Electronics
KA-19-102	TNC	Bulkhead Jack	Crimp	Kings Electronics
KA-19-143	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-143-M06	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-162	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-163	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-193	TNC	Bulkhead Jack	Crimp	Kings Electronics
KA-19-195-M06	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-198-M06	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-213	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-213-M06	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-216	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-216-M06	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-68	TNC	Panel Jack	Crimp	Kings Electronics
KA-19-83	TNC	Panel Jack	Crimp	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KA-39-100-M06	TNC	In-Line Jack	Crimp	Kings Electronics
KA-39-102-M06	TNC	In-Line Jack	Crimp	Kings Electronics
KA-39-44	TNC	Straight Jack	Solder	Kings Electronics
KA-39-82	TNC	In-Line Jack	Crimp	Kings Electronics
KA-39-83	TNC	In-Line Jack	Crimp	Kings Electronics
KA-39-85	TNC	In-Line Jack	Crimp	Kings Electronics
KA-39-94-M06	TNC	Right Angle Jack	Crimp	Kings Electronics
KA-59-185	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-185-MC7	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-186	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-187	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-188	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-189	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-230	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-236	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-251	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-260	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-277	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-292	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-304	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-313	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-316	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-317	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-324	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-353-M06	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-391-M06	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-392-M06	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-393-M06	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-437-M06	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-438-M06	TNC	Straight Plug	Crimp	Kings Electronics
KA-59-439-M06	TNC	Right Angle Plug	Crimp	Kings Electronics
KA-59-57	TNC	Straight Plug	Crimp	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KA-59-73	TNC	Right Angle Plug	Solder	Kings Electronics
KC-19-121	BNC	Right Angle Bulkhead Jack	Crimp	Kings Electronics
KC-19-122	BNC	Tee Jack	Crimp	Kings Electronics
KC-19-129	BNC	Panel Jack	Solder	Kings Electronics
KC-19-129-M06	BNC	Panel Jack	Solder	Kings Electronics
KC-19-161	BNC	Bulkhead Jack	Crimp	Kings Electronics
KC-19-169	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-170	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-177	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-177-M06	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-226	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-254	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-255	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-256	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-261	BNC	Bulkhead Jack	Crimp	Kings Electronics
KC-19-262	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-307-M06	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-308-M06	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-327-M06	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-328-M06	BNC	Panel Jack	Crimp	Kings Electronics
KC-19-329-M06	BNC	Panel Jack	Crimp	Kings Electronics
KC-39-108	BNC	In-Line Jack	Crimp	Kings Electronics
KC-39-109	BNC	In-Line Jack	Crimp	Kings Electronics
KC-39-110	BNC	In-Line Jack	Crimp	Kings Electronics
KC-39-111	BNC	Right Angle Jack	Crimp	Kings Electronics
KC-39-140-M06	BNC	In-Line Jack	Crimp	Kings Electronics
KC-39-142-M06	BNC	In-Line Jack	Crimp	Kings Electronics
KC-39-29	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-36	BNC	In-Line Jack	Solder	Kings Electronics
KC-39-45	BNC	Straight Plug	Crimp	Kings Electronics
KC-39-81	BNC	In-Line Jack	Crimp	Kings Electronics
KC-59-104	BNC	Straight Plug	Crimp	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KC-59-128	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-152	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-218	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-222	BNC	Right Angle Plug	Solder	Kings Electronics
KC-59-259	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-261	BNC	Right Angle Plug	Crimp	Kings Electronics
KC-59-262	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-263	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-265	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-267	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-281	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-287	BNC	Right Angle Plug	Crimp	Kings Electronics
KC-59-291	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-383	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-411	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-425-M06	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-444	BNC	Right Angle Plug	Crimp	Kings Electronics
KC-59-445	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-446	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-447	BNC	Right Angle Plug	Crimp	Kings Electronics
KC-59-448	BNC	Right Angle Plug	Crimp	Kings Electronics
KC-59-557-M06	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-585-M06	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-604-M06	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-605-M06	BNC	Right Angle Plug	Crimp	Kings Electronics
KC-59-609	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-609-M06	BNC	Straight Plug	Crimp	Kings Electronics
KC-59-660-M06	BNC	Right Angle Plug	Crimp	Kings Electronics
KC-59-669-M06	BNC	Right Angle Plug	Crimp	Kings Electronics
KD-19-104	C	Panel Jack	Crimp	Kings Electronics
KD-19-104-M06	C	Panel Jack	Crimp	Kings Electronics
KD-19-105-M06	C	Panel Jack	Crimp	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KD-19-107-M06	C	Bulkhead Jack	Crimp	Kings Electronics
KD-19-55	C	Bulkhead Jack	Crimp	Kings Electronics
KD-19-66	C	Panel Jack	Crimp	Kings Electronics
KD-19-67	C	Panel Jack	Crimp	Kings Electronics
KD-19-68	C	Panel Jack	Crimp	Kings Electronics
KD-19-69	C	Panel Jack	Crimp	Kings Electronics
KD-19-90	C	In-Line Jack	Crimp	Kings Electronics
KD-19-94	C	Panel Jack	Crimp	Kings Electronics
KD-19-95	C	Panel Jack	Crimp	Kings Electronics
KD-39-27	C	Tee Jack	Crimp	Kings Electronics
KD-39-28	C	In-Line Jack	Crimp	Kings Electronics
KD-39-37	C	In-Line Jack	Crimp	Kings Electronics
KD-39-42	C	In-Line Jack	Crimp	Kings Electronics
KD-59-110	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-120	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-125	C	Straight Plug	Crimp	Kings Electronics
KD-59-126	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-128	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-129	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-161	C	Straight Plug	Crimp	Kings Electronics
KD-59-163	C	Straight Plug	Crimp	Kings Electronics
KD-59-164	C	Straight Plug	Crimp	Kings Electronics
KD-59-165	C	Straight Plug	Crimp	Kings Electronics
KD-59-166	C	Straight Plug	Crimp	Kings Electronics
KD-59-180-M06	C	Straight Plug	Crimp	Kings Electronics
KD-59-184-M06	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-185	C	Straight Plug	Crimp	Kings Electronics
KD-59-185-M06	C	Straight Plug	Crimp	Kings Electronics
KD-59-186	C	Straight Plug	Crimp	Kings Electronics
KD-59-186-M06	C	Straight Plug	Crimp	Kings Electronics
KD-59-187-M06	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-193-M06	C	Right Angle Plug	Crimp	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KD-59-199-M06	C	Straight Plug	Crimp	Kings Electronics
KD-59-201	C	Straight Plug	Crimp	Kings Electronics
KD-59-201-M06	C	Straight Plug	Crimp	Kings Electronics
KD-59-202	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-202-M06	C	Right Angle Plug	Crimp	Kings Electronics
KD-59-52	C	Straight Plug	Crimp	Kings Electronics
KD-59-58	C	Straight Plug	Crimp	Kings Electronics
KD-59-63	C	Straight Plug	Solder	Kings Electronics
KD-59-64	C	Straight Plug	Solder	Kings Electronics
KG-19-15-M06	SC	Panel Jack	Crimp	Kings Electronics
KG-59-28	SC	Right Angle Plug	Crimp	Kings Electronics
KG-59-31-M06	SC	Right Angle Plug	Crimp	Kings Electronics
KG-59-32-M06	SC	Straight Plug	Crimp	Kings Electronics
KG-59-33-M06	SC	Right Angle Plug	Crimp	Kings Electronics
KG-59-34-M06	SC	Straight Plug	Crimp	Kings Electronics
KH-19-18	HN	Panel Jack	Crimp	Kings Electronics
KH-39-21	HN	In-Line Jack	Crimp	Kings Electronics
KH-39-22	HN	In-Line Jack	Crimp	Kings Electronics
KH-39-25-M06	HN	In-Line Jack	Crimp	Kings Electronics
KH-59-102-M06	HN	Straight Plug	Crimp	Kings Electronics
KH-59-103-M06	HN	Right Angle Plug	Crimp	Kings Electronics
KH-59-104-M06	HN	Straight Plug	Crimp	Kings Electronics
KH-59-63	HN	Straight Plug	Crimp	Kings Electronics
KH-59-64	HN	Right Angle Plug	Crimp	Kings Electronics
KH-59-65	HN	Straight Plug	Crimp	Kings Electronics
KH-59-66	HN	Right Angle Plug	Crimp	Kings Electronics
KH-59-69	HN	Right Angle Plug	Crimp	Kings Electronics
KH-59-99-M06	HN	Right Angle Plug	Crimp	Kings Electronics
KM-19-08	KM	In-Line Jack	Solder	Kings Electronics
KM-39-07	KM	Tee Jack	Solder	Kings Electronics
KM-59-18	KM	Straight Plug	Solder	Kings Electronics
KM-59-20	KM	Right Angle Plug	Solder	Kings Electronics

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KM-59-31	KM	Straight Plug	Solder	Kings Electronics
KM-59-36	KM	Straight Plug	Crimp	Kings Electronics
KM-59-41	KM	Straight Plug	Crimp	Kings Electronics
KN-19-115	N	Panel Jack	Crimp	Kings Electronics
KN-19-117	N	Panel Jack	Crimp	Kings Electronics
KN-19-118	N	Panel Jack	Crimp	Kings Electronics
KN-19-125	N	Bulkhead Jack	Crimp	Kings Electronics
KN-19-145	N	Bulkhead Jack	Crimp	Kings Electronics
KN-19-149	N	Bulkhead Jack	Crimp	Kings Electronics
KN-19-151	N	Bulkhead Jack	Crimp	Kings Electronics
KN-19-162	N	Panel Jack	Crimp	Kings Electronics
KN-19-195-M06	N	Panel Jack	Crimp	Kings Electronics
KN-19-196-M06	N	Bulkhead Jack	Crimp	Kings Electronics
KN-19-198-M06	N	Panel Jack	Crimp	Kings Electronics
KN-19-199-M06	N	Panel Jack	Crimp	Kings Electronics
KN-19-205-M06	N	Panel Jack	Crimp	Kings Electronics
KN-19-206-M06	N	Panel Jack	Crimp	Kings Electronics
KN-19-207-M06	N	Panel Jack	Crimp	Kings Electronics
KN-19-208-M06	N	Panel Jack	Crimp	Kings Electronics
KN-19-209-M06	N	Panel Jack	Crimp	Kings Electronics
KN-39-114-M06	N	In-Line Jack	Crimp	Kings Electronics
KN-39-121-M06	N	In-Line Jack	Crimp	Kings Electronics
KN-39-122-M06	N	In-Line Jack	Crimp	Kings Electronics
KN-39-71	N	In-Line Jack	Crimp	Kings Electronics
KN-39-72	N	Straight Plug	Crimp	Kings Electronics
KN-39-73	N	In-Line Jack	Crimp	Kings Electronics
KN-39-87	N	In-Line Jack	Crimp	Kings Electronics
KN-39-93	N	In-Line Jack	Crimp	Kings Electronics
KN-59-120	N	Straight Plug	Solder	Kings Electronics
KN-59-159	N	Straight Plug	Crimp	Kings Electronics
KN-59-183	N	Straight Plug	Crimp	Kings Electronics
KN-59-183-M06	N	Straight Plug	Crimp	Kings Electronics

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Table 1 (continued)

Part Number	Series	Configuration	Contact Type	Supplier
KN-59-185	N	Straight Plug	Crimp	Kings Electronics
KN-59-186	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-190	N	Straight Plug	Crimp	Kings Electronics
KN-59-201-M06	N	Straight Plug	Crimp	Kings Electronics
KN-59-220	N	Straight Plug	Crimp	Kings Electronics
KN-59-220-M07	N	Straight Plug	Crimp	Kings Electronics
KN-59-239	N	Straight Plug	Crimp	Kings Electronics
KN-59-242-M06	N	Straight Plug	Crimp	Kings Electronics
KN-59-247	N	Straight Plug	Crimp	Kings Electronics
KN-59-261	N	Straight Plug	Crimp	Kings Electronics
KN-59-262	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-263	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-264	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-264-M06	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-313-M06	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-329-M06	N	Straight Plug	Crimp	Kings Electronics
KN-59-330-M06	N	Straight Plug	Crimp	Kings Electronics
KN-59-331-M06	N	Straight Plug	Crimp	Kings Electronics
KN-59-332-M06	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-361-M06	N	Straight Plug	Crimp	Kings Electronics
KN-59-367-M06	N	Straight Plug	Crimp	Kings Electronics
KN-59-368-M06	N	Right Angle Plug	Crimp	Kings Electronics
KN-59-369-M06	N	Straight Plug	Crimp	Kings Electronics
KS-89-108	-	End Seal, Panel	-	Kings Electronics
KS-89-164	-	End Seal, Bulkhead	-	Kings Electronics
KS-89-55	-	End Seal, Panel	-	Kings Electronics
KU-59-03	UHF	Straight Plug	Solder	Kings Electronics



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Table 2
KEY ANGLES OF KEYED CONNECTORS

Connector Part Number	Key Angle (Degrees)
()-()-1	42
()-()-2	54
()-()-3	66
()-()-4	78
()-()-5	90
()-()-6	102
()-()-7	114
()-()-8	127
()-()-9	138
()-()-10	150
()-()-11	162
()-()-12	174
()-()-13	186
()-()-14	198
()-()-15	210
()-()-16	222
()-()-17	234
()-()-18	246
()-()-19	258
()-()-20	270
()-()-21	282
()-()-22	294
()-()-23	306
()-()-24	318

Table 3
ALTERNATIVE COAX CONNECTORS

Specified Connector	Alternative Connector Part Number	Special Instructions
1206-11-9	1206-30-9	-
126-64-9	126-70-9	-
751-3-9	KC-19-129-M06	-

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Table 3 (continued)

Specified Connector	Alternative Connector Part Number	Special Instructions
795-23-9	795-29-9	-
795-30-9	KD-59-180-M06	-
KA-19-143	KA-19-143-M06	-
KA-19-213	KA-19-213-M06	-
KA-19-216	KA-19-216-M06	-
KA-39-44	KA-39-102-M06	-
KA-59-251	KA-59-438-M06	-
KA-59-392-M06	125-94-9	-
KC-19-129	KC-19-129-M06	-
KC-19-226	KC-19-177	-
KC-19-261	KC-19-261	-
KC-19-307-M06	751-22-9	-
KC-39-45	KC-39-109	-
KC-59-152	755-129-9	-
KC-59-259	KC-59-383	-
KC-59-281	KC-59-557-M06	-
KC-59-557-M06	KC-59-281	-
KC-59-585-M06	755-79-9	-
KC-59-609	KC-59-609-M06	-
KD-59-120	KD-59-163	-
KD-59-128	KD-59-126	-
KD-59-164	KD-59-165	-
KD-59-180-M06	795-30-9	-
KD-59-185-M06	795-15-9	-
KD-59-193-M06	796-19-9	-
KD-59-199-M06	KD-59-201-M06	-
KG-19-15-M06	821-5-9	-
KM-59-18	KM-59-41	Applicable for the 10-008, 10-008R, RG-11A, and RG-213 cables only
KM-59-31	KM-59-41	Applicable for the 10-008, 10-008R, RG-11A, and RG-213 cables only
KN-19-115	KN-19-207-M06	Applicable for the 10-008, 10-008R, RG-11A, and RG-213 cables only

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Table 3 (continued)

Specified Connector	Alternative Connector Part Number	Special Instructions
KN-19-199-M06	1201-22-9	-
KN-19-209-M06	KN-19-195-M06	Applicable for the 10-008, 10-008R, RG-11A, and RG-213 cables only
KN-39-71	1203-14-9	Applicable for the 10-008, 10-008R, RG-11A, and RG-213 cables only
KN-59-159	KN-59-369-M06	-
KN-59-183	KN-59-183-M06	-
KN-59-183	KN-59-369-M06	-
KN-59-190	KN-59-329-M06	-
KN-59-220	KN-59-220-M07	-
KN-59-264	KN-59-264-M06	-

B. Necessary Materials

**Table 4
NECESSARY MATERIALS**

Material	Part Number or Specification	Supplier
Sleeve, Heat Shrinkable	DWP-125	Raychem
Solvent	Isopropyl Alcohol	Any Source

2. COAX CONNECTOR ASSEMBLY TOOLS

A. Coax Cable Trim Jigs

**Table 5
COAX CABLE TRIM JIGS**

Connector	Trim Jig	
	Cable Jacket	Dielectric
1201-6-9	KTJ-223	KTD-404
1203-13-9	KTJ-223	KTD-404
1203-4-9	KTJ-150	KTD-138
1205-20-9	KTJ-150	KTD-138
1205-31-9	KTJ-223	KTD-404
1206-11-9	KTJ-223	KTD-404
121-11-9	KTJ-222	KTD-159
121-24-9	KTJ-149	KTD-166



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Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
125-60-9	KTJ-149	KTD-166
125-61-9	KTJ-100	KTD-145
125-69-9	KTJ-153	KTD-161
126-14-5	KTJ-150	KTD-138
126-50-9	KTJ-153	KTD-161
126-64-9	KTJ-150	KTD-138
126-70-9	KTJ-150	KTD-138
2431-74-()	KTJ-113	KTD-166
2431-76-()	KTJ-150	KTD-138
2435-74-()	KTJ-113	KTD-166
2435-77-()	KTJ-150	KTD-138
2971-2-()	KTJ-224	KTD-268
2971-3-()	KTJ-160	KTD-208
2975-2-()	KTJ-162	KTD-208
2976-1-()	KTJ-150	KTD-138
2981-1-()	KTJ-223	KTD-404
2981-3-()	KTJ-200	KTD-208
2981-4-()	KTJ-150	KTD-138
2985-2-()	KTJ-162	KTD-208
2986-1-()	KTJ-223	KTD-404
751-2-9	KTJ-187	KTD-225
751-3-9	KTJ-149	KTD-166
751-4-9	KTJ-100	KTD-145
756-4-9	KTJ-187	KTD-225
796-19-9	KTJ-150	KTD-138
796-4-9	KTJ-138	KTD-150
821-2-9	KTJ-160	KTD-208
821-3-9	KTJ-223	KTD-404
823-1-9	KTJ-223	KTD-404
825-7-9	KTJ-223	KTD-404
841-1-9	KTJ-154	KTD-137
843-2-9	KTJ-137	KTD-154

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Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
845-3-9	KTJ-154	KTD-137
892-2-9	KTJ-154	KTD-208
895-3-9	KTJ-225	KTD-405
KA-19-102	KTJ-113	KTD-166
KA-19-143	KTJ-137	KTD-166
KA-19-143-M06	KTJ-149	KTD-166
KA-19-162	KTJ-149	KTD-166
KA-19-163	KTJ-149	KTD-184
KA-19-193	KTJ-113	KTD-184
KA-19-195-M06	KTJ-150	KTD-138
KA-19-198-M06	KTJ-153	KTD-161
KA-19-213	KTJ-150	KTD-138
KA-19-213-M06	KTJ-150	KTD-138
KA-19-216	KTJ-149	KTD-166
KA-19-216-M06	KTJ-149	KTD-166
KA-19-68	KTJ-58	KTD-43
KA-19-83	KTJ-149	KTD-166
KA-39-100-M06	KTJ-150	KTD-138
KA-39-102-M06	KTJ-153	KTD-161
KA-39-44	KTJ-41	KTD-98
KA-39-82	KTJ-149	KTD-166
KA-39-83	KTJ-149	KTD-166
KA-39-85	KTJ-149	KTD-166
KA-39-94-M06	KTJ-149	KTD-166
KA-59-185	KTJ-150	KTD-138
KA-59-185-MC7	KTJ-150	KTD-138
KA-59-186	KTJ-150	KTD-138
KA-59-187	KTJ-150	KTD-138
KA-59-188	KTJ-149	KTD-166
KA-59-189	KTJ-149	KTD-166
KA-59-230	KTJ-113	KTD-166
KA-59-251	KTJ-131	KTD-166

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Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KA-59-260	KTJ-100	KTD-145
KA-59-277	KTJ-149	KTD-166
KA-59-292	KTJ-113	KTD-166
KA-59-304	KTJ-149	KTD-166
KA-59-313	KTJ-149	KTD-184
KA-59-316	KTJ-150	KTD-138
KA-59-317	KTJ-150	KTD-138
KA-59-324	KTJ-150	KTD-133
KA-59-353-M06	KTJ-150	KTD-138
KA-59-391-M06	KTJ-187	KTD-225
KA-59-392-M06	KTJ-153	KTD-161
KA-59-393-M06	KTJ-153	KTD-161
KA-59-437-M06	KTJ-149	KTD-184
KA-59-438-M06	KTJ-113	KTD-166
KA-59-439-M06	KTJ-149	KTD-166
KA-59-57	KTJ-57	KTD-25
KA-59-73	KTJ-57	KTD-25
KC-19-121	KTJ-57	KTD-25
KC-19-122	KTJ-57	KTD-25
KC-19-129	KTJ-57	KTD-25
KC-19-129-M06	KTJ-57	KTD-25
KC-19-161	KTJ-83	KTD-122
KC-19-169	KTJ-149	KTD-184
KC-19-170	KTJ-149	KTD-166
KC-19-177	KTJ-110	KTD-159
KC-19-177-M06	KTJ-110	KTD-159
KC-19-226	KTJ-110	KTD-159
KC-19-254	KTJ-149	KTD-166
KC-19-255	KTJ-149	KTD-184
KC-19-256	KTJ-149	KTD-166
KC-19-261	KTJ-149	KTD-184
KC-19-262	KTJ-149	KTD-184

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KC-19-307-M06	KTJ-153	KTD-161
KC-19-308-M06	KTJ-153	KTD-161
KC-19-327-M06	KTJ-144	KTD-184
KC-19-328-M06	KTJ-149	KTD-166
KC-19-329-M06	KTJ-153	KTD-161
KC-39-108	KTJ-149	KTD-166
KC-39-109	KTJ-149	KTD-184
KC-39-110	KTJ-149	KTD-166
KC-39-111	KTJ-149	KTD-166
KC-39-140-M06	KTJ-149	KTD-166
KC-39-142-M06	KTJ-153	KTD-161
KC-39-29	KTJ-57	KTD-26
KC-39-36	KTJ-41	KTD-98
KC-39-45	KTJ-57	KTD-26
KC-39-81	KTJ-153	KTD-161
KC-59-104	KTJ-57	KTD-25
KC-59-128	KTJ-57	KTD-26
KC-59-152	KTJ-38	-
KC-59-218	KTJ-57	KTD-25
KC-59-222	KTJ-57	KTD-26
KC-59-259	KTJ-149	KTD-166
KC-59-261	KTJ-149	KTD-166
KC-59-262	KTJ-149	KTD-184
KC-59-263	KTJ-149	KTD-184
KC-59-265	KTJ-153	KTD-161
KC-59-267	KTJ-149	KTD-166
KC-59-281	KTJ-100	KTD-145
KC-59-287	KTJ-100	KTD-145
KC-59-291	KTJ-57	KTD-25
KC-59-383	KTJ-131	KTD-166
KC-59-411	KTJ-149	KTD-166
KC-59-425-M06	KTJ-113	KTD-184

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KC-59-444	KTJ-149	KTD-184
KC-59-445	KTJ-150	KTD-138
KC-59-446	KTJ-153	KTD-161
KC-59-447	KTJ-149	KTD-166
KC-59-448	KTJ-153	KTD-161
KC-59-557-M06	KTJ-174	KTD-218
KC-59-585-M06	KTJ-100	KTD-145
KC-59-604-M06	KTJ-153	KTD-161
KC-59-605-M06	KTJ-153	KTD-161
KC-59-609	KTJ-187	KTD-225
KC-59-609-M06	KTJ-187	KTD-255
KC-59-660-M06	KTJ-100	KTD-145
KC-59-669-M06	KTJ-149	KTD-166
KD-19-104	KTJ-60	KTD-28
KD-19-104-M06	KTJ-160	KTD-138
KD-19-105-M06	KTJ-187	KTD-225
KD-19-107-M06	KTJ-153	KTD-161
KD-19-55	KTJ-160	KTD-208
KD-19-66	KTJ-150	KTD-138
KD-19-67	KTJ-160	KTD-208
KD-19-68	KTJ-160	KTD-208
KD-19-69	KTJ-160	KTD-208
KD-19-90	KTJ-137	KTD-138
KD-19-94	KTJ-150	KTD-138
KD-19-95	KTJ-160	KTD-208
KD-39-27	KTJ-150	KTD-138
KD-39-28	KTJ-160	KTD-208
KD-39-37	KTJ-150	KTD-138
KD-39-42	KTJ-150	KTJ-138
KD-59-110	KTJ-150	KTD-138
KD-59-120	KTJ-150	KTJ-138
KD-59-125	KTJ-160	KTD-208

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KD-59-126	KTJ-160	KTD-208
KD-59-128	KTJ-65	KTD-51
KD-59-129	KTJ-160	KTD-208
KD-59-161	KTJ-160	KTD-208
KD-59-163	KTJ-150	KTJ-138
KD-59-164	KTJ-150	KTD-138
KD-59-165	KTJ-155	KTD-137
KD-59-166	KTJ-153	KTD-161
KD-59-180-M06	KTJ-150	KTD-138
KD-59-184-M06	KTJ-153	KTD-161
KD-59-185	KTJ-153	KTD-161
KD-59-185-M06	KTJ-153	KTD-161
KD-59-186	KTJ-187	KTD-225
KD-59-186-M06	KTJ-187	KTD-225
KD-59-187-M06	KTJ-187	KTD-225
KD-59-193-M06	KTJ-150	KTD-138
KD-59-199-M06	KTJ-160	KTD-208
KD-59-201	KTJ-160	KTD-208
KD-59-201-M06	KTJ-160	KTD-208
KD-59-202	KTJ-160	KTD-208
KD-59-202-M06	KTJ-160	KTD-208
KD-59-52	KTJ-79	KTD-28
KD-59-58	KTJ-79	KTD-50
KD-59-63	KTJ-67	KTD-51
KD-59-64	KTJ-67	KTD-51
KG-19-15-M06	KTJ-150	KTD-138
KG-59-28	KTJ-150	KTD-138
KG-59-31-M06	KTJ-160	KTD-208
KG-59-32-M06	KTJ-160	KTD-208
KG-59-33-M06	KTJ-160	KTD-208
KG-59-34-M06	KTJ-150	KTD-138
KH-19-18	KTJ-154	KTD-137

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Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KH-39-21	KTJ-154	KTD-137
KH-39-22	KTJ-154	KTD-137
KH-39-25-M06	KTJ-190	KTD-233
KH-59-102-M06	KTJ-154	KTD-403
KH-59-103-M06	KTJ-154	KTD-403
KH-59-104-M06	KTJ-154	KTD-437
KH-59-63	KTJ-154	KTD-137
KH-59-64	KTJ-154	KTD-137
KH-59-65	KTJ-154	KTD-137
KH-59-66	KTJ-154	KTD-137
KH-59-69	KTJ-160	KTD-208
KH-59-99-M06	KTJ-190	KTD-233
KM-19-08	KTJ-114	KTD-216
KM-59-18	KTJ-84	KTD-124
KM-59-20	KTJ-102	KTD-150
KM-59-31	KTJ-84	KTD-124
KM-59-36	KTJ-117	KTD-172
KM-59-41	KTJ-84	KTD-216
KN-19-115	KTJ-160	KTD-208
KN-19-117	KTJ-160	KTD-208
KN-19-125	KTJ-150	KTD-138
KN-19-145	KTJ-137	KTD-138
KN-19-149	KTJ-137	KTD-138
KN-19-162	KTJ-150	KTD-138
KN-19-195-M06	KTJ-150	KTD-138
KN-19-196-M06	KTJ-150	KTD-138
KN-19-198-M06	KTJ-187	KTD-225
KN-19-199-M06	KTJ-153	KTD-161
KN-19-205-M06	KTJ-160	KTD-208
KN-19-206-M06	KTJ-150	KTD-138
KN-19-207-M06	KTJ-160	KTD-208
KN-19-208-M06	KTJ-150	KTD-138

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KN-19-209-M06	KTJ-150	KTD-138
KN-39-114-M06	KTJ-187	KTD-225
KN-39-121-M06	KTJ-150	KTD-402
KN-39-122-M06	KTJ-150	KTD-138
KN-39-71	KTJ-160	KTD-208
KN-39-72	KTJ-160	KTD-208
KN-39-73	KTJ-200	KTD-123
KN-39-87	KTJ-160	KTD-208
KN-39-93	KTJ-150	KTD-138
KN-59-120	KTJ-65	KTD-38
KN-59-159	KTJ-38	KTD-108
KN-59-183	KTJ-149	KTD-166
KN-59-183-M06	KTJ-149	KTD-166
KN-59-185	KTJ-160	KTD-208
KN-59-186	KTJ-160	KTD-208
KN-59-190	KTJ-92	KTD-138
KN-59-201-M06	KTJ-137	KTD-138
KN-59-220	KTJ-150	KTD-138
KN-59-220-M07	KTJ-150	KTD-138
KN-59-239	KTJ-137	KTD-138
KN-59-242-M06	KTJ-162	KTD-208
KN-59-247	KTJ-160	KTD-208
KN-59-261	KTJ-150	KTD-138
KN-59-262	KTJ-150	KTD-138
KN-59-263	KTJ-150	KTD-138
KN-59-264	KTJ-150	KTD-138
KN-59-264-M06	KTJ-150	KTD-138
KN-59-313-M06	KTJ-149	KTD-166
KN-59-329-M06	KTJ-150	KTD-138
KN-59-330-M06	KTJ-187	KTD-225
KN-59-331-M06	KTJ-153	KTD-161
KN-59-332-M06	KTJ-187	KTD-225

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 5 (continued)

Connector	Trim Jig	
	Cable Jacket	Dielectric
KN-59-361-M06	KTJ-200	KTD-123
KN-59-367-M06	KTJ-150	KTD-402
KN-59-368-M06	KTJ-150	KTD-402
KN-59-369-M06	KTJ-160	KTD-208
KS-89-108	KTB-10	-
KS-89-164	KTB-10	-
KS-89-55	KTB-2	-
KU-59-03	KTJ-68	KTD-35

B. Coax Connector Crimp Tools

**Table 6
COAX CONNECTOR CRIMP TOOL TYPES**

Crimp Tool Basic Unit	Type
CT-32	Pneumatic
HX23	Pneumatic
HX4	Hand
KTH-1000	Hand
KTM-1000	Electric
KTM-3000	Pneumatic
KTM-4000	Pneumatic
M22520/5-01	Hand

**Table 7
COAX CONNECTOR CRIMP TOOL CODES**

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
1201-11-9	043H	178HLS
1201-12-9	100H	213HLS
1201-13-9	100H	334HLS
1201-14-9	100H	384HLS
1201-20-9	100H	255HLS
1201-21-9	144H	552HLS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
1201-22-9	100H	213HLS
1201-23-9	100H	334HLS
1201-24-9	100H	384HLS
1201-25-9	100H	255HLS
1201-6-9	132H	522H
1202-20-9	100H	334HLS
1202-23-9	144H	552HLS
1202-26-9	100H	384HLS
1203-13-9	132H	522H
1203-14-9	100H	213HLS
1203-15-9	100H	213HLS
1203-16-9	100H	384HLS
1203-19-9	100H	255HLS
1203-20-9	100H	334HLS
1203-21-9	144H	552HLS
1203-4-9	100H	429HLS
1205-20-9	100H	384HS
1205-31-9	132H	522H
1205-47-9	100H	213HLS
1205-48-9	100H	334HLS
1205-49-9	100H	384HLS
1205-61-9	144H	552HLS
1205-62-9	100H	255HLS
1206-11-9	132H	522H
1206-21-9	100H	213HLS
1206-22-9	100H	334HLS
1206-26-9	100H	384HLS
1206-29-9	100H	255HLS
1206-30-9	144H	552HLS
121-11-9	-	105H
121-24-9	069H	213HS
121-35-9	043H	178HLS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
121-36-9	069H	213HLS
121-37-9	100H	334HLS
121-38-9	100H	384HLS
121-39-9	069H	255HLS
121-40-9	069H	213HLS
121-44-9	069H	213HLS
121-45-9	100H	334HLS
121-46-9	069H	255HLS
121-52-9	043H	178HLS
122-37-9	069H	213HLS
123-22-5	069H	213HLS
123-23-9	100H	334HLS
123-24-9	069H	255HLS
123-26-9	069H	213HLS
125-101-9	100H	334HLS
125-105-9	144H	552HLS
125-60-9	069H	213HLS
125-61-9	041H	128HS
125-69-9	069H	178HS
125-88-9	069H	213HLS
125-89-9	043H	178HLS
125-91-9	100H	334HLS
125-92-9	100H	384HLS
125-94-9	069H	213HLS
125-95-9	069H	255HLS
125-96-9	069H	255HLS
126-14-5	100H	429HLS
126-50-9	069H	178HS
126-58-9	069H	213HLS
126-59-9	100H	334HLS
126-64-9	100H	429HLS
126-67-9	043H	178HLS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
126-70-9	100H	429HLS
126-71-9	069H	255HLS
126-73-9	100H	384HLS
126-74-9	144H	552HLS
126-78-1	100H	384HLS
126-78-6	100H	384HLS
1525-4-9	051H	213HLS
2430-1-()	100H	334HLS
2430-2-()	069H	255HLS
2431-74-()	069H	213HS
2431-76-()	100H	429HS
2431-80-()	069H	213HLS
2431-81-()	043H	178HLS
2431-82-()	069H	213HLS
2431-83-()	100H	334HLS
2431-84-()	069H	213HLS
2431-85-()	069H	255HLS
2431-87-()	069H	255HLS
2431-88-()	100H	334HLS
2431-89-()	100H	384HLS
2435-74-()	069H	213HLS
2435-77-()	100H	429HS
2435-81-()	069H	213HLS
2435-82-()	043H	178HLS
2435-83-()	100H	334HLS
2435-84-()	069H	255HLS
2435-87-()	100H	384HLS
2436-81-()	069H	213HLS
2436-83-()	100H	334HLS
2436-85-()	100H	384HLS
2971-2-()	100H	429HLS
2971-3-()	100H	213HS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
2971-4-()	100H	213HLS
2971-5-()	100H	384HLS
2971-6-()	100H	334HLS
2971-7-()	100H	334HLS
2971-8-()	100H	213HLS
2975-2-()	100H	213HS
2975-4-()	100H	213HLS
2975-5-()	100H	384HLS
2975-6-()	100H	334HLS
2976-1-()	100H	429HLS
2976-3-()	100H	213HLS
2981-1-()	132H	522H
2981-3-()	100H	213HS
2981-4-()	100H	429HLS
2981-5-()	100H	384HLS
2981-6-()	100H	213HLS
2981-7-()	100H	384HLS
2981-8-()	100H	213HLS
2985-2-()	100H	213HS
2985-3-()	100H	213HLS
2985-4-()	100H	384HLS
2986-1-()	132H	522H
2986-3-()	100H	384HLS
751-10-9	069H	213HLS
751-11-9	043H	178HLS
751-2-9	100H	334HLS
751-20-9	069H	255HLS
751-22-9	069H	213HLS
751-3-9	069H	213HS
751-4-9	041H	128HS
752-43-9	069H	213HLS
755-78-9	069H	213HLS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
755-79-9	043H	178HLS
755-93-9	069H	255HLS
755-129-9	042H	151H
756-10-9	043H	178HLS
756-16-9	069H	213HLS
756-4-9	100H	334HLS
791-10-9	100H	334HLS
791-11-9	144H	552HLS
791-5-9	100H	213HLS
791-6-9	100H	334HLS
791-7-9	100H	255HLS
791-8-9	100H	255HLS
791-9-9	100H	213HLS
795-15-9	100H	213HLS
795-16-9	100H	334HLS
795-20-9	144H	552HLS
795-21-9	100H	255HLS
795-23-9	100H	384HLS
795-29-9	100H	384HLS
795-30-9	100H	429HLS
796-15-9	100H	213HLS
796-17-9	100H	255HLS
796-18-9	100H	334HLS
796-19-9	100H	429HLS
796-4-9	100H	384H
821-2-9	100H	213HS
821-3-9	132H	522H
821-4-9	100H	334HLS
821-5-9	100H	384HLS
821-6-9	144H	552HLS
821-7-9	100H	213HLS
821-9-9	144H	552HLS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
823-1-9	132H	522H
823-2-9	100H	384HLS
825-10-9	100H	213HLS
825-11-9	100H	334HLS
825-12-9	100H	384HLS
825-14-9	144H	552HLS
825-7-9	132H	522H
826-10-9	100H	384HLS
826-8-9	100H	213HLS
826-9-9	100H	334HLS
841-1-9	100H	384HS
843-2-9	100H	384H
845-3-9	100H	384HS
846-5-9	100H	334HLS
871-59-3	043H	213HLS
875-100-3	051H	255HLS
875-105-3	041H	128HS
875-91-3	043H	213HLS
875-92-3	043H	178HLS
876-64-3	043H	213HLS
892-2-9	212HS	213HS
892-3-9	051H	213HLS
895-3-9	051H	212HS
895-6-9	051H	213HLS
896-4-9	051H	213HLS
KA-19-102	069H	213H
KA-19-143	069H	213HS
KA-19-143-M06	069H	213HS
KA-19-162	069H	213HS
KA-19-163	069H	213HS
KA-19-193	069H	255H
KA-19-195-M06	100H	429HS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
KA-19-198-M06	069H	178HM
KA-19-213	100H	429HLS
KA-19-213-M06	100H	429HLS
KA-19-216	069H	213HS
KA-19-216-M06	069H	213HS
KA-19-68	100H	213HS
KA-19-83	069H	213HLS
KA-39-100-M06	100H	429HLS
KA-39-102-M06	069H	178H
KA-39-44	-	178H
KA-39-82	069H	213HS
KA-39-83	069H	213HLS
KA-39-85	069H	213HS
KA-39-94-M06	069H	213HS
KA-59-185	100H	429HS
KA-59-185-MC7	100H	429HS
KA-59-186	100H	429HS
KA-59-187	100H	384HS
KA-59-188	069H	213HLS
KA-59-189	069H	213HLS
KA-59-230	069H	213H
KA-59-236	069H	213H
KA-59-251	069H	213HS
KA-59-260	041H	128HS
KA-59-277	069H	213HS
KA-59-292	069H	213H
KA-59-304	069H	213HS
KA-59-313	069H	255HS
KA-59-316	100H	429HS
KA-59-317	100H	429HS
KA-59-324	100H	429HLS
KA-59-353-M06	100H	429HLS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
KA-59-391-M06	100H	334HLS
KA-59-392-M06	069H	178HM
KA-59-393-M06	069H	178HM
KA-59-437-M06	069H	255HS
KA-59-438-M06	069H	213HS
KA-59-439-M06	069H	213HS
KA-59-57	069H	213H
KA-59-73	-	213H
KC-19-121	069H	213H
KC-19-122	069H	213H
KC-19-129	-	213HS
KC-19-129-M06	-	213HS
KC-19-161	069H	213H
KC-19-169	069H	255HS
KC-19-170	069H	213HLS
KC-19-177	041H	128HS
KC-19-177-M06	041H	128HS
KC-19-226	041H	128HS
KC-19-254	069H	213HS
KC-19-255	069H	255HS
KC-19-256	069H	213HS
KC-19-261	069H	255HS
KC-19-262	069H	255HS
KC-19-307-M06	069H	178HM
KC-19-308-M06	069H	178HM
KC-19-327-M06	069H	255HS
KC-19-328-M06	069H	213HS
KC-19-329-M06	069H	178HS
KC-39-108	069H	213HS
KC-39-109	069H	255HS
KC-39-110	069H	213HLS
KC-39-111	069H	213HS

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Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
KC-39-140-M06	069H	213HS
KC-39-142-M06	069H	178HS
KC-39-29	-	255H
KC-39-36	-	178H
KC-39-45	069H	255H
KC-39-81	069H	178H
KC-59-104	069H	213H
KC-59-128	069H	255H
KC-59-152	042H	151H
KC-59-218	069H	213HS
KC-59-222	-	255H
KC-59-259	069H	213HS
KC-59-261	069H	213HS
KC-59-262	069H	255HS
KC-59-263	069H	255HS
KC-59-265	069H	178HS
KC-59-267	069H	213HLS
KC-59-281	041H	128HS
KC-59-287	041H	128HS
KC-59-291	069H	213H
KC-59-383	069H	213HLS
KC-59-411	069H	213HS
KC-59-425-M06	069H	255H
KC-59-444	069H	255HS
KC-59-445	100H	429HS
KC-59-446	069H	178HS
KC-59-447	069H	213HLS
KC-59-448	069H	178HS
KC-59-557-M06	058S	128HLS
KC-59-585-M06	041H	128HS
KC-59-604-M06	069H	178HM
KC-59-605-M06	069H	178HM

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
KC-59-609	100H	334HLS
KC-59-609-M06	100H	334HLS
KC-59-660-M06	041H	128HS
KC-59-669-M06	069H	213HS
KD-19-104	100H	429HLS
KD-19-104-M06	100H	429HLS
KD-19-105-M06	100H	334HLS
KD-19-107-M06	069H	178HM
KD-19-55	100H	213HS
KD-19-66	100H	429HS
KD-19-67	100H	213HS
KD-19-68	100H	213HS
KD-19-69	100H	213HLS
KD-19-90	100H	429H
KD-19-94	100H	384HS
KD-19-95	100H	213HLS
KD-39-27	100H	384HS
KD-39-28	100H	213HLS
KD-39-37	100H	429HS
KD-39-42	100H	384HS
KD-59-110	100H	429HS
KD-59-120	100H	384HS
KD-59-125	100H	213HLS
KD-59-126	100H	213HLS
KD-59-128	041H	128HS
KD-59-129	100H	213HS
KD-59-161	100H	213HS
KD-59-163	100H	384HS
KD-59-164	100H	429HS
KD-59-165	100H	429HS
KD-59-166	100H	178HS
KD-59-180-M06	100H	429HLS

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Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
KD-59-184-M06	100H	178HM
KD-59-185	100H	178HM
KD-59-185-M06	100H	178HM
KD-59-186	100H	334HLS
KD-59-186-M06	100H	334HLS
KD-59-187-M06	100H	334HLS
KD-59-193-M06	100H	429HLS
KD-59-199-M06	100H	213HS
KD-59-201	100H	213HS
KD-59-201-M06	100H	213HS
KD-59-202	100H	213HS
KD-59-202-M06	100H	213HS
KD-59-52	100H	429H
KD-59-58	100H	0.324
KD-59-63	-	213H
KD-59-64	-	213H
KG-19-15-M06	100H	429HLS
KG-59-28	100H	429HS
KG-59-31-M06	100H	213HS
KG-59-32-M06	100H	213HS
KG-59-33-M06	100H	213HS
KG-59-34-M06	100H	429HLS
KH-19-18	100H	384HS
KH-39-21	100H	384HS
KH-39-22	100H	429H
KH-39-25-M06	100H	334HLS
KH-59-102-M06	100H	429H
KH-59-103-M06	100H	429H
KH-59-104-M06	100H	429HLS
KH-59-63	100H	384HS
KH-59-64	100H	384HS
KH-59-65	100H	429HS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
KH-59-66	100H	429HS
KH-59-69	100H	213H
KH-59-99-M06	069H	178HM
KM-19-08	-	128H
KM-39-07	-	128H
KM-59-18	-	128H
KM-59-20	-	128H
KM-59-31	-	128H
KM-59-36	069H	213HS
KM-59-41	051H	128H
KN-19-115	100H	213HS
KN-19-117	100H	213HLS
KN-19-118	069H	255HS
KN-19-125	100H	429HS
KN-19-145	100H	429H
KN-19-149	100H	429H
KN-19-151	100H	213H
KN-19-162	100H	429HS
KN-19-195-M06	100H	429HLS
KN-19-196-M06	100H	429HLS
KN-19-198-M06	100H	334HLS
KN-19-199-M06	069H	178HM
KN-19-205-M06	100H	213HS
KN-19-206-M06	100H	429H
KN-19-207-M06	100H	213HS
KN-19-208-M06	100H	384HS
KN-19-209-M06	100H	429HLS
KN-39-114-M06	100H	334HLS
KN-39-121-M06	100H	429H
KN-39-122-M06	100H	384HS
KN-39-71	100H	213HS
KN-39-72	100H	213HLS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
KN-39-73	100H	255HS
KN-39-87	100H	213HS
KN-39-93	100H	429HS
KN-59-120	-	213H
KN-59-159	100H	213HS
KN-59-183	069H	213HS
KN-59-183-M06	069H	213HS
KN-59-185	100H	213HLS
KN-59-186	100H	213HLS
KN-59-190	100H	429HLS
KN-59-201-M06	100H	213HS
KN-59-220	100H	429HS
KN-59-220-M07	100H	429H
KN-59-239	100H	429H
KN-59-242-M06	100H	213H
KN-59-247	100H	213HS
KN-59-261	100H	384HS
KN-59-262	100H	384HS
KN-59-263	100H	429HS
KN-59-264	100H	429HLS
KN-59-264-M06	100H	429HLS
KN-59-313-M06	069H	213HS
KN-59-329-M06	100H	429HLS
KN-59-330-M06	100H	334HLS
KN-59-331-M06	069H	178HM
KN-59-332-M06	100H	334HLS
KN-59-361-M06	100H	255HS
KN-59-367-M06	100H	429H
KN-59-368-M06	100H	429H
KN-59-369-M06	100H	213HS
KS-89-108	-	213HS
KS-89-164	-	213HLS

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 7 (continued)

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
KS-89-55	-	213H
KU-59-03	-	384H

Table 8
COAX CONNECTOR CENTER CONTACT CRIMP TOOLS

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
041H	CT-32	-	KTH-2081	0.041
	KTH-1000	-	KTH-2081	0.041
	KTM-1000	KTM-1099	KTH-2081	0.041
	KTM-3000	-	KTH-2081	0.041
	KTM-4000	-	KTH-2081	0.041
042H	CT-32	-	KTH-2021	0.042
			KTH-2032	0.042
	KTH-1000	-	KTH-2021	0.042
			KTH-2032	0.042
	KTM-1000	KTM-1099	KTH-2021	0.042
			KTH-2032	0.042
	KTM-3000	-	KTH-2021	0.042
			KTH-2032	0.042
	KTM-4000	-	KTH-2021	0.042
			KTH-2032	0.042

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 8 (continued)

Tool Code	Crimp Tool				
	Basic Unit	Master Jaws	Die		
			Part Number	Opening (inch)	
043H	CT-32	-	KTH-2207	0.043	
			KTH-2214	0.043	
	KTH-1000	-	KTH-2207	0.043	
			KTH-2214	0.043	
	KTM-1000	KTM-1099	KTH-2207	0.043	
			KTH-2214	0.043	
	KTM-3000	-	KTH-2207	0.043	
			KTH-2214	0.043	
	KTM-4000	-	KTH-2207	0.043	
			KTH-2214	0.043	
	050H	CT-32	-	KTH-2023	0.050
		KTH-1000	-	KTH-2023	0.050
KTM-1000		KTM-1099	KTH-2023	0.050	
KTM-3000		-	KTH-2023	0.050	
KTM-4000		-	KTH-2023	0.050	
051H	CT-32	-	KTH-2022	0.051	
			KTH-2087	0.051	
			KTH-2232	0.051	
			KTH-2242	0.051	
051H	KTH-1000	-	KTH-2022	0.051	
			KTH-2087	0.051	
			KTH-2232	0.051	
			KTH-2242	0.051	
051H	KTM-1000	KTM-1099	KTH-2022	0.051	
			KTH-2087	0.051	
			KTH-2232	0.051	
			KTH-2242	0.051	

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
051H	KTM-3000	-	KTH-2022	0.051
			KTH-2087	0.051
			KTH-2232	0.051
			KTH-2242	0.051
051H	KTM-4000	-	KTH-2022	0.051
			KTH-2087	0.051
			KTH-2232	0.051
			KTH-2242	0.051
058S	KTH-1000	-	KTH-2138	0.058
	KTM-1000	KTM-1099	KTH-2138	0.058
	KTM-3000	-	KTH-2138	0.058
	KTM-4000	-	KTH-2138	0.058
069H	CT-32	-	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069
069H	KTH-1000	-	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
069H	KTM-1000	KTM-1099	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069
069H	KTM-3000	-	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069
069H	KTM-4000	-	683-51470-1	0.069
			KTH-2001	0.069
			KTH-2061	0.069
			KTH-2111	0.069
			KTH-2128	0.069
			KTH-2161	0.069
			KTH-2216	0.069
100H	227-944	-	227-1221-25	0.100
			227-1221-57	0.100
			227-1351-3	0.100
			227-956-4	0.100
			M22520/5-57	0.100
	227-956-4	-	0.100	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
100H	CT-32	-	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100
100H	HX23	-	227-1221-25	0.100
			227-1221-57	0.100
			227-1351-3	0.100
			227-1351-4	0.100
			227-956-4	0.100
			M22520/5-57	0.100
100H	HX4	-	227-1221-25	0.100
			227-1221-57	0.100
			227-1351-3	0.100
			227-1351-4	0.100
			227-956-4	0.100
			M22520/5-57	0.100

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Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
100H	KTH-1000	-	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100
100H	KTM-1000	KTM-1099	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
100H	KTM-3000	-	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100
100H	KTM-4000	-	KTH-1078	0.100
			KTH-1079	0.100
			KTH-2004	0.100
			KTH-2042	0.100
			KTH-2105	0.100
			KTH-2106	0.100
			KTH-2127	0.100
			KTH-2211	0.100
			KTH-2212	0.100
			KTH-2213	0.100
			KTH-2231	0.100
100H	M22520/5-01	-	227-1221-25	0.100
			227-1221-57	0.100
			227-1351-3	0.100
			227-1351-4	0.100
			227-956-4	0.100
			M22520/5-57	0.100

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Table 8 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
132H	HX23	-	Y1731	0.132
	HX4	-	Y1731	0.132
	KTH-1000	-	KTH-2177	0.132
	KTM-1000	KTM-1099	KTH-2177	0.132
	KTM-3000	-	KTH-2177	0.132
	KTM-4000	-	KTH-2177	0.132
	M22520/5-01	-	Y1731	0.132
144H	KTH-1000	-	KTH-2229	0.132
	KTM-1000	KTM-1099	KTH-2229	0.144
	KTM-3000	-	KTH-2229	0.144
	KTM-4000	-	KTH-2229	0.144
212HS	CT-32	-	KTH-2087	0.212
	KTH-1000	-	KTH-2087	0.212
	KTM-1000	KTM-1099	KTH-2087	0.212
	KTM-3000	-	KTH-2087	0.212
	KTM-4000	-	KTH-2087	0.212

**Table 9
COAX CONNECTOR K-GRIP SLEEVE CRIMP TOOLS**

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
105H	612648	-	612734	0.105
	CT-32	-	KTH-2008	0.105
			KTH-2230	0.105
	HX23	-	M22520/5-03	0.105
	HX4	-	M22520/5-03	0.105

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Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
105H	KTH-1000	-	KTH-2008	0.105
			KTH-2230	0.105
	KTM-1000	KTM-1099	KTH-2008	0.105
			KTH-2230	0.105
	KTM-3000	-	KTH-2008	0.105
			KTH-2230	0.105
	KTM-4000	-	KTH-2008	0.105
KTH-2230			0.105	
M22520/5-01	-	M22520/5-03	0.105	
128H	227-944	-	M22520/5-08	0.128
	612648	-	612778	0.128
	CT-32	-	683-51454-3	0.128
			KTH-2011	0.128
			KTH-2021	0.128
			KTH-2022	0.128
128H	HX23	-	M22520/5-03	0.128
			M22520/5-08	0.128
			M22520/5-35	0.128
			Y119	0.128
	HX4	-	M22520/5-03	0.128
			M22520/5-08	0.128
			M22520/5-35	0.128
			Y119	0.128

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Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
128H	KTH-1000	-	683-51454-3	0.128
			KTH-2011	0.128
			KTH-2021	0.128
			KTH-2022	0.128
	KTM-1000	KTM-1099	683-51454-3	0.128
			KTH-2011	0.128
			KTH-2021	0.128
			KTH-2022	0.128
128H	KTM-3000	-	683-51454-3	0.128
			KTH-2011	0.128
			KTH-2021	0.128
			KTH-2022	0.128
	KTM-4000	-	683-51454-3	0.128
			KTH-2011	0.128
			KTH-2021	0.128
			KTH-2022	0.128
128H	M22520/5-01	-	M22520/5-03	0.128
			M22520/5-08	0.128
			M22520/5-35	0.128
			Y119	0.128
	ST2966M	-	ST2966M-1	0.128
	WT-200	-	-	0.128
128HLS	KTH-1000	-	KTH-2138	0.128
128HS	KTH-1000	-	KTH-2081	0.128

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Table 9 (continued)

Tool Code	Crimp Tool				
	Basic Unit	Master Jaws	Die		
			Part Number	Opening (inch)	
151H	CT-32	-	KTH-2023	0.151	
			KTH-2032	0.151	
	KTH-1000	-	KTH-2023	0.151	
			KTH-2032	0.151	
	KTM-1000	KTM-1099	KTH-2023	0.151	
			KTH-2032	0.151	
	KTM-3000	-	KTH-2023	0.151	
			KTH-2032	0.151	
	KTM-4000	-	KTH-2023	0.151	
			KTH-2032	0.151	
178H	612648	-	612642	0.178	
	CT-32	-	KTH-2007	0.178	
	HX23	-	M22520/5-05	0.178	
			M22520/5-41	0.178	
			Y197	0.178	
	HX4	-	M22520/5-05	0.178	
			M22520/5-41	0.178	
			Y197	0.178	
	178H	KTH-1000	-	KTH-2007	0.178
		KTM-1000	KTM-1099	KTH-2007	0.178
KTM-3000		-	KTH-2007	0.178	
KTM-4000		-	KTH-2007	0.178	
M22520/5-01		-	M22520/5-05	0.178	
			M22520/5-41	0.178	
			Y197	0.178	
178HLS		CT-32	-	KTH-2214	0.178
	KTH-1000	-	KTH-2214	0.178	
	KTM-1000	KTM-1099	KTH-2214	0.178	
	KTM-3000	-	KTH-2214	0.178	
	KTM-4000	-	KTH-2214	0.178	

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Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
178HLSM	CT-32	-	KTH-2138	0.178
	KTH-1000	-	KTH-2138	0.178
	KTM-1000	KTM-1099	KTH-2138	0.178
	KTM-3000	-	KTH-2138	0.178
	KTM-4000	-	KTH-2138	0.178
178HM	CT-32	-	KTH-2128	0.178
	KTH-1000	-	KTH-2128	0.178
	KTM-1000	KTM-1099	KTH-2128	0.178
	KTM-3000	-	KTH-2128	0.178
	KTM-4000	-	KTH-2128	0.178
178HS	CT-32	-	KTH-2067	0.178
			KTH-2102	0.178
	KTH-1000	-	KTH-2067	0.178
			KTH-2102	0.178
178HS	KTM-1000	KTM-1099	KTH-2067	0.178
			KTH-2102	0.178
	KTM-3000	-	KTH-2067	0.178
			KTH-2102	0.178
	KTM-4000	-	KTH-2067	0.178
			KTH-2102	0.178
212HS	CT-32	-	KTH-2087	0.212
	KTH-1000	-	KTH-2087	0.212
	KTM-1000	KTM-1099	KTH-2087	0.212
	KTM-3000	-	KTH-2087	0.212
	KTM-4000	-	KTH-2087	0.212
213H	227-944	-	M22520/5-19	0.213
	612648	-	612673	0.213
	CT-32	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
213H	HX23	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
213H	HX4	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
213H	KTH-1000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	KTM-1000	KTM-1099	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
213H	KTM-3000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
	KTM-4000	-	KTH-2001	0.213
			KTH-2042	0.213
			KTH-2220	0.213
213H	M22520/5-01	-	M22520/5-05	0.213
			M22520/5-19	0.213
			Y142	0.213
			Y197	0.213
			Y322	0.213
	ST2966M	-	ST2966M-6	0.213

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Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
213HLS	CT-32	-	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
213HLS	KTH-1000	-	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
213HLS	KTM-1000	KTM-1099	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
213HLS	KTM-3000	-	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
213HLS	KTM-4000	-	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
213HS	CT-32	-	KTH-1061	0.213
			KTH-2061	0.213
			KTH-2087	0.213
			KTH-2101	0.213

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
213HS	KTH-1000	-	KTH-1061	0.213
			KTH-2061	0.213
			KTH-2087	0.213
			KTH-2101	0.213
213HS	KTM-1000	KTM-1099	KTH-1061	0.213
			KTH-2061	0.213
			KTH-2087	0.213
			KTH-2101	0.213
213HS	KTM-3000	-	KTH-1061	0.213
			KTH-2061	0.213
			KTH-2087	0.213
			KTH-2101	0.213
	KTM-4000	-	KTH-1061	0.213
			KTH-2061	0.213
			KTH-2087	0.213
			KTH-2101	0.213
255H	612648	-	612675	0.255
	CT-32	-	KTH-2002	0.255
	HX23	-	M22520/5-19	0.255
			Y142	0.255
	HX4	-	M22520/5-19	0.255
			Y142	0.255
255H	KTH-1000	-	KTH-2002	0.255
	KTM-1000	KTM-1099	KTH-2002	0.255
	KTM-3000	-	KTH-2002	0.255
	KTM-4000	-	KTH-2002	0.255
	M22520/5-01	-	M22520/5-19	0.255
			Y142	0.255
	ST2966M	-	ST2966M-8	0.255

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
255HLS	CT-32	-	KTH-2216	0.255
			KTH-2231	0.255
	KTH-1000	-	KTH-2216	0.255
			KTH-2231	0.255
	KTM-1000	KTM-1099	KTH-2216	0.255
			KTH-2231	0.255
255HLS	KTM-3000	-	KTH-2216	0.255
			KTH-2231	0.255
	KTM-4000	-	KTH-2216	0.255
			KTH-2231	0.255
255HS	CT-32	-	KTH-1062	0.255
			KTH-2062	0.255
			KTH-2242	0.255
	KTH-1000	-	KTH-1062	0.255
			KTH-2062	0.255
			KTH-2242	0.255
255HS	KTM-1000	KTM-1099	KTH-1062	0.255
			KTH-2062	0.255
			KTH-2242	0.255
	KTM-3000	-	KTH-1062	0.255
			KTH-2062	0.255
			KTH-2242	0.255
	KTM-4000	-	KTH-1062	0.255
			KTH-2062	0.255
			KTH-2242	0.255

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Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
334HLS	CT-32	-	KTH-2127	0.334
			KTH-2212	0.334
	KTH-1000	-	KTH-2127	0.334
			KTH-2212	0.334
	KTM-1000	KTM-1099	KTH-2127	0.334
			KTH-2212	0.334
334HLS	KTM-3000	-	KTH-2127	0.334
			KTH-2212	0.334
	KTM-4000	-	KTH-2127	0.334
			KTH-2212	0.334
384H	612648	-	612739	0.384
	CT-32	-	KTH-2003	0.384
	HX23	-	M22520/5-23	0.384
	HX4	-	M22520/5-23	0.384
	KTH-1000	-	KTH-2003	0.384
384H	KTM-1000	KTM-1099	KTH-2003	0.384
	KTM-3000	-	KTH-2003	0.384
	KTM-4000	-	KTH-2003	0.384
	M22520/5-01	-	M22520/5-23	0.384
	ST2352-5-Y	-	ST2352-5-1	0.384
	ST2966M	-	ST2966M-13	0.384
384HLS	CT-32	-	KTH-2213	0.384
	KTH-1000	-	KTH-2213	0.384
	KTM-1000	KTM-1099	KTH-2213	0.384
	KTM-3000	-	KTH-2213	0.384
	KTM-4000	-	KTH-2213	0.384

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Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
384HS	CT-32	-	KTH-1078	0.384
	KTH-1000	-	KTH-1078	0.384
	KTM-1000	KTM-1099	KTH-1078	0.384
	KTM-3000	-	KTH-1078	0.384
	KTM-4000	-	KTH-1078	0.384
429H	612648	-	612807	0.429
	CT-32	-	KTH-2004	0.429
			KTH-2235	0.429
	HX23	-	M22520/5-25	0.429
HX4	-	M22520/5-25	0.429	
429H	KTH-1000	-	KTH-2004	0.429
			KTH-2235	0.429
	KTM-1000	KTM-1099	KTH-2004	0.429
			KTH-2235	0.429
	KTM-3000	-	KTH-2004	0.429
KTH-2235			0.429	
429H	KTM-4000	-	KTH-2004	0.429
			KTH-2235	0.429
	M22520/5-01	-	M22520/5-25	0.429
	ST2352-5-Y	-	ST2352-5-2	0.429
	ST2966M	-	ST2966M-16	0.429
429HLS	CT-32	-	KTH-2105	0.429
	KTH-1000	-	KTH-2105	0.429
	KTM-1000	KTM-1099	KTH-2105	0.429
	KTM-3000	-	KTH-2105	0.429
	KTM-4000	-	KTH-2105	0.429

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Table 9 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
429HS	CT-32	-	KTH-1079	0.429
	KTH-1000	-	KTH-1079	0.429
	KTM-1000	KTM-1099	KTH-1079	0.429
	KTM-3000	-	KTH-1079	0.429
	KTM-4000	-	KTH-1079	0.429
522H	CT-32	-	KTH-2177	0.522
	KTH-1000	-	KTH-2177	0.522
	KTM-1000	KTM-1099	KTH-2177	0.522
	KTM-3000	-	KTH-2177	0.522
	KTM-4000	-	KTH-2177	0.522
522HS	CT-32	-	KTH-2177	0.522
	KTH-1000	-	KTH-2177	0.522
	KTM-1000	KTM-1099	KTH-2177	0.522
	KTM-3000	-	KTH-2177	0.522
	KTM-4000	-	KTH-2177	0.522
552HLS	CT-32	-	KTH-2229	0.552
	KTH-1000	-	KTH-2229	0.552
	KTM-1000	KTM-1099	KTH-2229	0.552
	KTM-3000	-	KTH-2229	0.552
	KTM-4000	-	KTH-2229	0.552

3. CONNECTOR ASSEMBLY

This paragraph gives the procedures to assemble:

- A bulkhead jack
- An in-line jack
- A panel jack
- A straight plug
- A right angle plug with crimp type contacts.

For the procedures to assemble a right angle plug with solder type contacts, refer to Paragraph 4.



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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

A. Cable Preparation Dimensions

Table 10
CABLE PREPARATION DIMENSIONS

Connector	Dimension	Length (inch)	
		Target	Tolerance
1201-11-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
1201-12-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1201-13-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1201-14-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1201-20-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1201-21-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1201-22-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

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Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
1201-23-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1201-24-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1201-25-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1201-6-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1202-20-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1202-23-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1202-26-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
1203-13-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1203-14-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1203-15-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1203-16-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1203-19-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1203-20-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1203-21-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
1203-4-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1205-20-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1205-31-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1205-47-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1205-48-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1205-49-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1205-61-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02



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Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
1205-62-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1206-11-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1206-21-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1206-22-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1206-26-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1206-29-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1206-30-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
121-11-9	A	0.73	± 0.02
	B	0.51	± 0.02
	C	0.28	± 0.02
	D	0.45	± 0.02
121-24-9	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
121-35-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
121-36-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
121-37-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
121-38-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
121-39-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

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Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
121-40-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
121-44-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
121-45-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
121-46-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
121-52-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
122-37-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
123-22-5	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
123-23-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
123-24-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
123-26-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
125-101-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
125-105-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
125-60-9	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
125-61-9	A	0.59	± 0.02
	B	0.40	± 0.02
	C	0.28	± 0.02
	D	0.38	± 0.02

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
125-69-9	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
125-88-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
125-89-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
125-91-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
125-92-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
125-94-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
125-95-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
125-96-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
126-14-5	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
126-50-9	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
126-58-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
126-59-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
126-64-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
126-67-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
126-70-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
126-71-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
126-73-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
126-74-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
126-78-1	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
126-78-6	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
1525-4-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
2430-1-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2430-2-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2431-74-()	A	0.59	± 0.02
	B	0.20	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2431-76-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.31	± 0.02
	D	0.50	± 0.02
2431-80-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2431-81-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2431-82-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
2431-83-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2431-84-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2431-85-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2431-87-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2431-88-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2431-89-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2435-74-()	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
2435-77-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.31	± 0.02
	D	0.50	± 0.02
2435-81-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2435-82-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2435-83-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2435-84-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
2435-87-()	A	1.10	± 0.02
	B	0.50	± 0.02
	C	0.25	± 0.02
	D	0.85	± 0.02
2436-81-()	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
2436-83-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2436-85-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2971-2-()	A	0.71	± 0.02
	B	0.40	± 0.02
	C	0.19	± 0.02
	D	0.53	± 0.02
2971-3-()	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2971-4-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2971-5-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2971-6-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
2971-7-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2971-8-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2975-2-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2975-4-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2975-5-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2975-6-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2976-1-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
2976-3-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2981-1-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2981-3-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2981-4-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2981-5-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2981-6-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2981-7-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
2981-8-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2985-2-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2985-3-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2985-4-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2986-1-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
2986-3-()	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
751-10-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
751-11-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
751-2-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
751-20-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
751-22-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
751-3-9	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
751-4-9	A	0.59	± 0.02
	B	0.41	± 0.02
	C	0.22	± 0.02
	D	0.38	± 0.02
752-43-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
755-78-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
755-79-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
755-93-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
755-129-9	A	0.28	± 0.02
	B	0.00	± 0.02
	C	0.19	± 0.02
	D	0.09	± 0.02
756-10-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
756-16-9	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
756-4-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
791-10-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
791-11-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
791-5-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
791-6-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
791-7-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
791-8-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
791-9-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
795-15-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
795-16-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
795-20-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
795-21-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
795-23-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
795-29-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
795-30-9	A	0.38	± 0.02
	B	0.06	± 0.02
	C	0.50	± 0.02
	D	0.19	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
796-15-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
796-17-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
796-18-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
796-19-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
796-4-9	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
821-2-9	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
821-3-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
821-4-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
821-5-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
821-6-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
821-7-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
821-9-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
823-1-9	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
823-2-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
825-10-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
825-11-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
825-12-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
825-14-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
825-7-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
826-10-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
826-8-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
826-9-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
841-1-9	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
843-2-9	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
845-3-9	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
846-5-9	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
871-59-3	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
875-100-3	A	0.59	± 0.02
	B	0.21	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
875-105-3	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
875-91-3	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
875-92-3	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
876-64-3	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
892-2-9	A	0.60	± 0.02
	B	0.33	± 0.02
	C	0.09	± 0.02
	D	0.51	± 0.02
892-3-9	A	0.60	± 0.02
	B	0.29	± 0.02
	C	0.09	± 0.02
	D	0.51	± 0.02
895-3-9	A	0.60	± 0.02
	B	0.33	± 0.02
	C	0.09	± 0.02
	D	0.51	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
895-6-9	A	0.60	± 0.02
	B	0.29	± 0.02
	C	0.09	± 0.02
	D	0.51	± 0.02
896-4-9	A	0.60	± 0.02
	B	0.29	± 0.02
	C	0.09	± 0.02
	D	0.51	± 0.02
KA-19-102	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-19-143	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-19-143-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-19-162	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-19-163	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-19-193	A	0.60	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-19-195-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-19-198-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-19-213	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-19-213-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-19-216	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-19-216-M06	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-19-68	A	0.98	± 0.02
	B	0.22	± 0.02
	C	0.11	± 0.02
	D	0.87	± 0.02
KA-19-83	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-39-100-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-39-102-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-39-44	A	0.48	± 0.02
	B	0.30	± 0.02
	C	0.41	± 0.02
	D	0.11	± 0.02
KA-39-82	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-39-83	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-39-85	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-39-94-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-185	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-59-185-MC7	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-59-186	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-59-187	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-59-188	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-59-189	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-230	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-236	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-251	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-260	A	0.59	± 0.02
	B	0.41	± 0.02
	C	0.28	± 0.02
	D	0.38	± 0.02
KA-59-277	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-292	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-59-304	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-313	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-316	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-59-317	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-59-324	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-59-353-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KA-59-391-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-59-392-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-393-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-437-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-438-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-439-M06	A	0.59	± 0.02
	B	0.28	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KA-59-57	A	0.62	± 0.02
	B	0.40	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02
KC-19-121	A	0.58	± 0.02
	B	0.39	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-19-122	A	0.58	± 0.02
	B	0.39	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02
KC-19-129	A	0.59	± 0.02
	B	0.41	± 0.02
	C	0.16	± 0.02
	D	0.47	± 0.02
KC-19-129-M06	A	0.59	± 0.02
	B	0.41	± 0.02
	C	0.16	± 0.02
	D	0.47	± 0.02
KC-19-161	A	0.77	± 0.02
	B	0.22	± 0.02
	C	0.25	± 0.02
	D	0.51	± 0.02
KC-19-169	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-170	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-177	A	0.64	± 0.02
	B	0.42	± 0.02
	C	0.19	± 0.02
	D	0.46	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-19-177-M06	A	0.64	± 0.02
	B	0.42	± 0.02
	C	0.19	± 0.02
	D	0.46	± 0.02
KC-19-226	A	0.64	± 0.02
	B	0.36	± 0.02
	C	0.19	± 0.02
	D	0.46	± 0.02
KC-19-254	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-255	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-256	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-261	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.19	± 0.02
	D	0.40	± 0.02
KC-19-262	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-19-307-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-308-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-327-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-328-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-19-329-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-39-108	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-39-109	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.19	± 0.02
	D	0.40	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-39-110	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-39-111	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-39-140-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-39-142-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-39-29	A	0.62	± 0.02
	B	0.40	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02
KC-39-36	A	0.48	± 0.02
	B	0.30	± 0.02
	C	0.41	± 0.02
	D	0.11	± 0.02
KC-39-45	A	0.62	± 0.02
	B	0.40	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-39-81	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-104	A	0.62	± 0.02
	B	0.40	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02
KC-59-128	A	0.62	± 0.02
	B	0.40	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02
KC-59-152	A	0.28	± 0.02
	B	0.00	± 0.02
	C	0.19	± 0.02
	D	0.09	± 0.02
KC-59-218	A	0.62	± 0.02
	B	0.40	± 0.02
	C	0.11	± 0.02
	D	0.47	± 0.02
KC-59-259	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-261	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-59-262	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-263	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-265	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-267	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-281	A	0.59	± 0.02
	B	0.41	± 0.02
	C	0.22	± 0.02
	D	0.38	± 0.02
KC-59-287	A	0.59	± 0.02
	B	0.41	± 0.02
	C	0.22	± 0.02
	D	0.38	± 0.02
KC-59-291	A	0.58	± 0.02
	B	0.39	± 0.02
	C	0.47	± 0.02
	D	0.11	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-59-383	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-411	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-425-M06	A	0.59	± 0.02
	B	0.25	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-444	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.19	± 0.02
	D	0.40	± 0.02
KC-59-445	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KC-59-446	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-447	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-59-448	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-557-M06	A	0.56	± 0.02
	B	0.31	± 0.02
	C	0.13	± 0.02
	D	0.44	± 0.02
KC-59-585-M06	A	0.59	± 0.02
	B	0.41	± 0.02
	C	0.22	± 0.02
	D	0.38	± 0.02
KC-59-604-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-605-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KC-59-609	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KC-59-609-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-59-660-M06	A	0.59	± 0.02
	B	0.41	± 0.02
	C	0.22	± 0.02
	D	0.38	± 0.02
KC-59-669-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KD-19-104	A	0.65	± 0.02
	B	0.22	± 0.02
	C	0.16	± 0.02
	D	0.49	± 0.02
KD-19-104-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-19-105-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-19-107-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KD-19-55	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-19-66	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-19-67	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-19-68	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-19-69	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-19-90	A	0.69	± 0.02
	B	0.28	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-19-94	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-19-95	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-39-27	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-39-28	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-39-37	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-39-42	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-110	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-120	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-125	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-59-126	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-128	A	0.66	± 0.02
	B	0.44	± 0.02
	C	0.16	± 0.02
	D	0.49	± 0.02
KD-59-129	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-161	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-163	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-164	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-165	A	0.99	± 0.02
	B	0.67	± 0.02
	C	0.19	± 0.02
	D	0.80	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-59-166	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KD-59-180-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-184-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KD-59-185	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KD-59-185-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KD-59-186	A	0.69	± 0.02
	B	0.31	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-186-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-59-187-M06	A	0.69	± 0.02
	B	0.31	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-193-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-199-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-201	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-201-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-202	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KD-59-202-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KD-59-52	A	0.53	± 0.02
	B	0.19	± 0.02
	C	0.16	± 0.02
	D	0.38	± 0.02
KD-59-58	A	0.53	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.38	± 0.02
KD-59-63	A	0.66	± 0.02
	B	0.44	± 0.02
	C	0.49	± 0.02
	D	0.16	± 0.02
KD-59-64	A	0.66	± 0.02
	B	0.22	± 0.02
	C	0.50	± 0.02
	D	0.16	± 0.02
KG-19-15-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KG-59-28	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KG-59-31-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KG-59-32-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KG-59-33-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KG-59-34-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KH-19-18	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-39-21	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-39-22	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-39-25-M06	A	0.89	± 0.02
	B	0.58	± 0.02
	C	0.19	± 0.02
	D	0.70	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KH-59-102-M06	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-59-103-M06	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-59-104-M06	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-59-63	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-59-64	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-59-65	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02
KH-59-66	A	0.94	± 0.02
	B	0.63	± 0.02
	C	0.19	± 0.02
	D	0.75	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KH-59-69	A	0.78	± 0.02
	B	0.22	± 0.02
	C	0.16	± 0.02
	D	0.12	± 0.02
KH-59-99-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KM-19-08	A	0.49	± 0.02
	B	0.30	± 0.02
	C	0.08	± 0.02
	D	0.41	± 0.02
KM-39-07	A	0.81	± 0.02
	B	0.59	± 0.02
	C	0.09	± 0.02
	D	0.71	± 0.02
KM-59-18	A	0.45	± 0.02
	B	0.27	± 0.02
	C	0.08	± 0.02
	D	0.38	± 0.02
KM-59-31	A	0.45	± 0.02
	B	0.27	± 0.02
	C	0.08	± 0.02
	D	0.38	± 0.02
KM-59-36	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KM-59-41	A	0.55	± 0.02
	B	0.34	± 0.02
	C	0.09	± 0.02
	D	0.46	± 0.02
KN-19-115	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-117	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-118	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-125	A	0.69	± 0.02
	B	0.34	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-145	A	0.69	± 0.02
	B	0.28	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-149	A	0.69	± 0.02
	B	0.28	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-19-151	A	0.69	± 0.02
	B	0.34	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-162	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-195-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-196-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-198-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-199-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KN-19-205-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-19-206-M06	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
KN-19-207-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-208-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-19-209-M06	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
KN-39-114-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-39-121-M06	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
KN-39-122-M06	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-39-71	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-39-72	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-39-73	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
KN-39-87	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-39-93	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-120	A	0.69	± 0.02
	B	0.50	± 0.02
	C	0.16	± 0.02
	D	0.53	± 0.02
KN-59-159	A	0.69	± 0.02
	B	0.50	± 0.02
	C	0.16	± 0.02
	D	0.53	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-59-183	A	0.69	± 0.02
	B	0.34	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-183-M06	A	0.69	± 0.02
	B	0.35	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-185	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-186	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-190	A	0.72	± 0.02
	B	0.44	± 0.02
	C	0.22	± 0.02
	D	0.50	± 0.02
KN-59-201-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-220	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-59-220-M07	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
KN-59-239	A	0.69	± 0.02
	B	0.28	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-242-M06	A	0.69	± 0.02
	B	0.34	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-247	A	0.69	± 0.02
	B	0.47	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-261	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-262	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-263	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-59-264	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-264-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-313-M06	A	0.69	± 0.02
	B	0.34	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-329-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-330-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KN-59-331-M06	A	0.59	± 0.02
	B	0.31	± 0.02
	C	0.16	± 0.02
	D	0.43	± 0.02
KN-59-332-M06	A	0.69	± 0.02
	B	0.38	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KN-59-361-M06	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
KN-59-367-M06	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
KN-59-368-M06	A	0.72	± 0.02
	B	0.50	± 0.02
	C	0.14	± 0.02
	D	0.58	± 0.02
KN-59-369-M06	A	0.69	± 0.02
	B	0.41	± 0.02
	C	0.19	± 0.02
	D	0.50	± 0.02
KS-89-108	A	1.31	± 0.02
	B	1.03	± 0.02
	C	0.00	± 0.02
	D	0.50	± 0.02
KS-89-164	A	1.31	± 0.02
	B	1.03	± 0.02
	C	0.00	± 0.02
	D	0.50	± 0.02
KS-89-55	A	0.90	± 0.02
	B	0.30	± 0.02
	C	0.40	± 0.02
	D	0.50	± 0.02

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 10 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KU-59-03	A	1.19	± 0.02
	B	1.00	± 0.02
	C	0.63	± 0.02
	D	0.56	± 0.02

B. Heat Shrinkable Sleeve Configurations

Table 11

HEAT SHRINKABLE SLEEVES FOR SPECIFIED COAX CONNECTORS AND COAX CABLES

Connector	Coax Cable	Heat Shrinkable Sleeve			
		Layer	Diameter (inch)	Length (inch)	
				Target	Tolerance
125-88-9	BMS13-65 Type 0F	First	3/16	3.60	± 0.06
		Second	1/4	4.20	± 0.06
		Third	3/8	4.30	± 0.06
	S280W503-2	First	3/16	3.60	± 0.06
		Second	1/4	4.20	± 0.06
		Third	3/8	4.30	± 0.06
125-91-9	BMS13-65 Type 0H	First	1/4	3.10	± 0.06
		Second	3/8	3.70	± 0.06
		Third	1/2	3.80	± 0.06
		Fourth	3/4	4.30	± 0.06
	S280W503-4	First	1/4	3.10	± 0.06
		Second	3/8	3.70	± 0.06
		Third	1/2	3.80	± 0.06
		Fourth	3/4	4.30	± 0.06

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 11 (continued)

Connector	Coax Cable	Heat Shrinkable Sleeve			
		Layer	Diameter (inch)	Length (inch)	
				Target	Tolerance
125-95-9	BMS13-65 Type 0G	First	3/16	3.70	±0.06
		Second	1/4	4.20	±0.06
		Third	3/8	4.40	±0.06
	S280W503-3	First	3/16	3.70	±0.06
		Second	1/4	4.20	±0.06
		Third	3/8	4.40	±0.06
126-58-9	BMS13-65 Type 0F	First	3/16	2.90	±0.06
		Second	1/4	3.50	±0.06
		Third	3/8	4.30	±0.06
	S280W503-2	First	3/16	2.90	±0.06
		Second	1/4	3.50	±0.06
		Third	3/8	4.30	±0.06
126-71-9	BMS13-65 Type 0G	First	3/16	2.90	±0.06
		Second	1/4	3.50	±0.06
		Third	3/8	4.30	±0.06
	S280W503-3	First	3/16	2.90	±0.06
		Second	1/4	3.50	±0.06
		Third	3/8	4.30	±0.06
2430-2-16	BMS13-65 Type 0G	First	1/4	2.00	±0.06
		Second	3/8	1.75	±0.06
		Third	3/8	1.50	±0.06
		Fourth	1/2	1.25	±0.06

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

Table 11 (continued)

Connector	Coax Cable	Heat Shrinkable Sleeve			
		Layer	Diameter (inch)	Length (inch)	
				Target	Tolerance
2985-3-()	BMS13-65 Type 0F	First	3/16	3.30	±0.06
		Second	1/4	4.00	±0.06
		Third	1/4	3.90	±0.06
		Fourth	3/8	3.90	±0.06
		Fifth	1/2	4.30	±0.06
	S280W503-2	First	3/16	3.30	±0.06
		Second	1/4	4.00	±0.06
		Third	1/4	3.90	±0.06
		Fourth	3/8	3.90	±0.06
		Fifth	1/2	4.30	±0.06
796-17-9	BMS13-65 Type 0G	First	1/4	2.00	±0.06
		Second	3/8	1.75	±0.06
		Third	3/8	1.50	±0.06
		Fourth	1/2	1.25	±0.06
KA-59-438-M06	RG-223	First	3/16	3.70	±0.06
		Second	1/4	4.20	±0.06
		Third	3/8	4.40	±0.06
KA-59-439-M06	72016	First	3/16	2.90	±0.06
		Second	1/4	3.50	±0.06
		Third	3/8	4.30	±0.06

C. Cable Preparation

For the general conditions that are applicable for the preparation of coax cable, refer to Subject 20-51-00.

- (1) Make a selection of a heat shrinkable sleeve from Table 4.
- (2) Put the specified number of heat shrinkable sleeves on the cable. Refer to Table 11.
- (3) If the connector and coax cable are not specified in Table 11, put a 1.5 inch length of heat shrinkable sleeve on the cable.

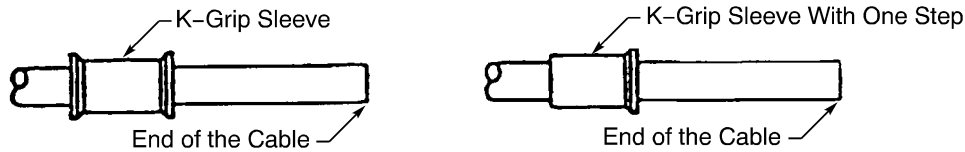
Make sure that the sleeve has the smallest diameter that can be moved easily on the cable.

- (4) Cut the end of the cable to make it perpendicular to the longitudinal axis of the cable.
- (5) Put the K-Grip sleeve on the cable. Refer to Figure 3.

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

If the K-Grip sleeve has one step, make sure that the end with the step is pointed forward to the end of the cable.



POSITION OF THE K-GRIP SLEEVE
Figure 3

- (6) If the cable dielectric is a metal, semi-rigid material, prepare the cable without trim jigs. Refer to Paragraph 5.A.
- (7) If the cable dielectric is not a metal, semi-rigid material:
 - (a) Make a selection of a cable jacket trim jig and a dielectric trim jig from Table 5.

NOTE: Preparation of the cable without a trim jig is a satisfactory alternative. Refer to Paragraph 5.A.

NOTE: If trim jigs are not specified for the connector, the cable must be prepared without trim jigs. Refer to Paragraph 5.A.

- (b) Prepare the cable with the trim jigs.

To prepare the cable with:

- A cable jacket trim jig with two slots, refer to Paragraph 5.B.
- A cable jacket trim jig with three slots, refer to Paragraph 5.C.

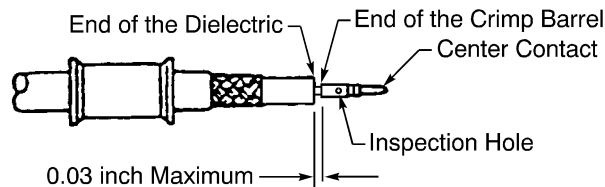
D. Center Contact Assembly - Crimp Type Contacts

For the general conditions that are applicable for the assembly of coax contacts, refer to Subject 20-51-00.

- (1) Find the center contact tool code. Refer to Table 7.
- (2) Make a selection of a contact crimp tool from Table 8.
Make sure that the tool is applicable for the tool code.
- (3) Put the conductor in the crimp barrel of the center contact. Refer to Figure 4.

Make sure that:

- All of the strands of the conductor are in the crimp barrel of the contact
- The conductor can be seen in the inspection hole of the contact
- The distance from the end of the dielectric to the rear end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE CENTER CONTACT ON THE CONDUCTOR
Figure 4

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS**

- (4) Crimp the contact.

Make sure that the crimp is between the inspection hole and the rear end of the crimp barrel.

- (5) Examine the contact assembly for these types of damage:
- The finish has damage
 - The crimp barrel of the contact has a crack.

NOTE: If the contact has damage, it must be replaced.

E. Center Contact Assembly - Solder Type Contacts

For the general conditions that are applicable for the assembly of coax contacts, refer to Subject 20-51-00.

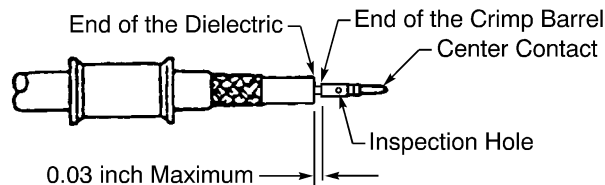
- (1) Make a selection of a Temperature Grade C solder. Refer to Subject 20-00-11.

CAUTION: DO NOT USE A TEMPERATURE GRADE D SOLDER. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CABLE CAN OCCUR.

- (2) Put the conductor in the solder barrel of the contact. Refer to Figure 5.

Make sure that:

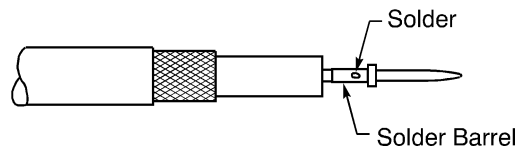
- All of the strands of the conductor are in the solder barrel of the contact
- The conductor can be seen in the inspection hole of the contact
- The distance from the end of the dielectric to the rear end of the solder barrel is not more than 0.03 inch.



POSITION OF THE CENTER CONTACT ON THE CONDUCTOR
Figure 5

- (3) Apply a small quantity of solder in the inspection hole of the contact. Refer to Figure 6.

CAUTION: DO NOT APPLY TOO MUCH HEAT TO THE CONTACT. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CONTACT, THE CONNECTOR OR THE CABLE CAN OCCUR.



SOLDER CONTACT ASSEMBLY
Figure 6

- (4) Remove all of the solder and the flux from the outer surface of the contact.

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- (5) Examine the contact for damage to the finish.

NOTE: If the contact has damage, the contact must be replaced.

- (6) If a solder access cover is supplied with the contact, install the cover.

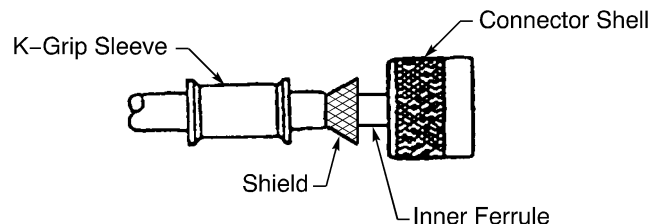
F. Connector Shell Installation

For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.

- (1) Find the K-Grip sleeve tool code. Refer to Table 7.
- (2) Make a selection of the K-Grip sleeve crimp tool from Table 9.
Make sure that the tool is applicable for the tool code.
- (3) Move the strands of the shield apart.
- (4) Put the connector shell on the end of the cable. Refer to Figure 7.

Make sure that:

- If the cable has one shield, the inner ferrule is between the dielectric and the shield
- If the cable has an inner shield and an outer shield, the inner ferrule is between the inner shield and the outer shield
- If the cable has an inner shield and an outer shield, no strands of the outer shield are between the inner ferrule and the dielectric.



POSITION OF THE CONNECTOR SHELL ON THE CABLE

Figure 7

- (5) If the inner ferrule does not move on the inner shield, cut the inner shield back until the ferrule can move on the shield.
- (6) Push the connector shell rearward until the center contact is fully installed in the shell.

Refer to:

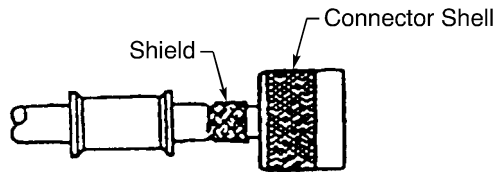
- Figure 8 for the position of the connector shell on the cable
- Figure 9 for the position of the pin contact in the plug connector
- Figure 10 for the position of the socket contact in the jack connector.

Make sure that:

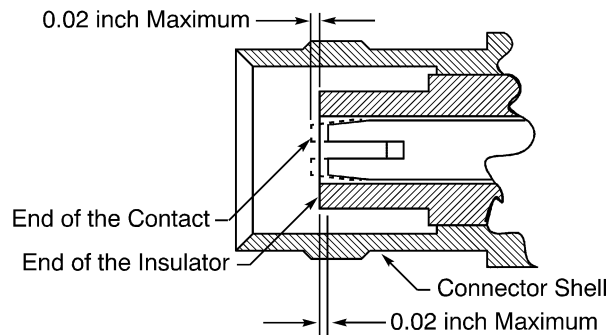
- The distance the forward end of the socket contact extends out from the end of the insulator is not more than 0.02 inch
- The distance from the forward end of the socket contact to the end of the insulator is not more than 0.02 inch
- The distance from the forward end of the pin contact to the end of the insulator is not more than 0.04 inch.

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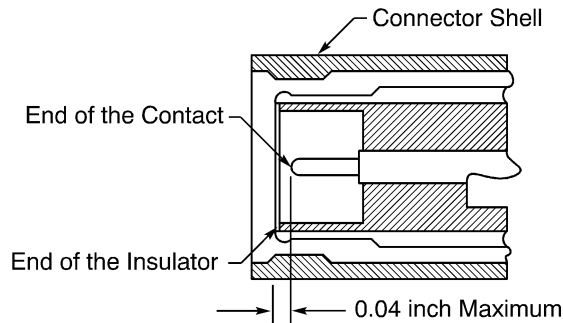
ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS



POSITION OF THE CONNECTOR SHELL ON THE CABLE
Figure 8



POSITION OF THE SOCKET CONTACT IN THE JACK CONNECTOR
Figure 9



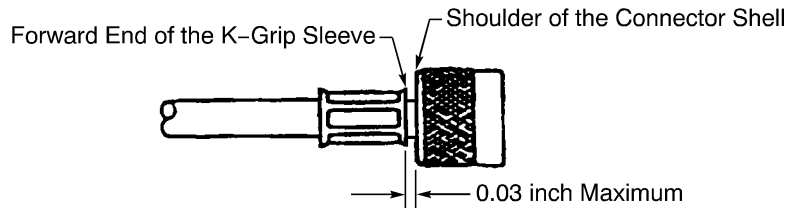
POSITION OF THE PIN CONTACT IN THE PLUG CONNECTOR
Figure 10

- (7) Hold the connector shell and lightly pull the cable to make sure that the contact is locked in the connector.
- (8) Push the K-Grip sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell.
- (9) Crimp the K-Grip sleeve. Refer to Figure 11.

Make sure that the distance from the forward end of the K-Grip sleeve to the shoulder of the connector shell is not more than 0.03 inch.

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS



POSITION OF THE K-GRIP SLEEVE

Figure 11

(10) Examine the K-Grip sleeve.

Make sure that:

- The dimples on each side of the crimp area do not have cracks
- The base metal of the sleeve in the crimp area cannot be seen.

G. Insulation Installation

If the connector and the coax cable are not specified in Table 12, refer to Paragraph 6.A. for the standard insulation configuration.

Table 12

SELECTION OF A HEAT SHRINKABLE SLEEVE INSTALLATION PROCEDURE

Connector	Coax Cable	Installation Procedure
125-88-9	BMS13-65 Type 0F	Paragraph 6.B.
	S280W503-2	Paragraph 6.B.
125-91-9	BMS13-65 Type 0H	Paragraph 6.C.
	S280W503-4	Paragraph 6.C.
125-95-9	BMS13-65 Type 0G	Paragraph 6.B.
	S280W503-3	Paragraph 6.B.
126-58-9	BMS13-65 Type 0F	Paragraph 6.D.
	S280W503-2	Paragraph 6.D.
126-71-9	BMS13-65 Type 0G	Paragraph 6.D.
	S280W503-3	Paragraph 6.D.
2430-2-16	BMS13-65 Type 0G	Paragraph 6.F.
2985-3-()	BMS13-65 Type 0F	Paragraph 6.E.
	S280W503-2	Paragraph 6.E.
796-17-9	BMS13-65 Type 0G	Paragraph 6.F.
KA-59-438-M06	RG-223	Paragraph 6.B.
KA-59-439-M06	72016	Paragraph 6.D.

4. CONNECTOR ASSEMBLY - RIGHT ANGLE CONNECTORS WITH SOLDER TYPE CONTACTS

For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.

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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

A. Cable Preparation Dimensions

**Table 13
CABLE PREPARATION DIMENSIONS**

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-59-73	A	0.58	±0.02
	B	0.39	±0.02
	C	0.11	±0.02
	D	0.47	±0.02
KC-59-222	A	0.62	±0.02
	B	0.40	±0.02
	C	0.11	±0.02
	D	0.47	±0.02
KM-59-20	A	0.61	±0.02
	B	0.42	±0.02
	C	0.08	±0.02
	D	0.54	±0.02

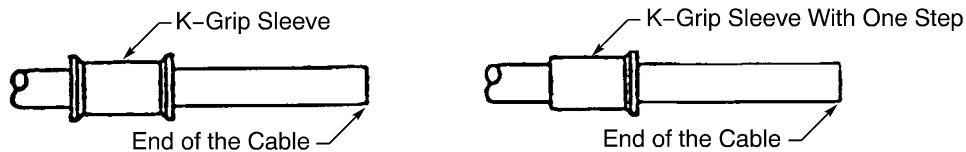
B. Cable Preparation

- (1) Make a selection of a heat shrinkable sleeve from Table 4.
- (2) Put a 1.5 inch length of heat shrinkable sleeve on the cable.

Make sure the sleeve has the smallest diameter that can be moved easily on the cable.

- (3) Cut the end of the cable to make it perpendicular to the longitudinal axis of the cable.
- (4) Put the K-Grip sleeve on the cable. Refer to Figure 12.

If the K-Grip sleeve has one step, make sure that the end with the step is pointed forward to the end of the cable.



**POSITION OF THE K-GRIP SLEEVE
Figure 12**

- (5) If the cable dielectric is a metal, semi-rigid material, prepare the cable without trim jigs. Refer to Paragraph 5.A.
- (6) If the cable dielectric is not a metal, semi-rigid material:

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- (a) Make a selection of a cable jacket trim jig and a dielectric trim jig from Table 5.

NOTE: Preparation of the cable without a trim jig is a satisfactory alternative. Refer to Paragraph 5.A.

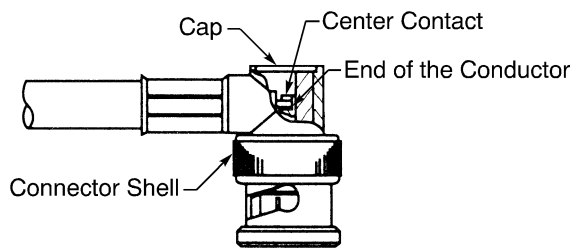
NOTE: If trim jigs are not specified for the connector, the cable must be prepared without trim jigs. Refer to Paragraph 5.A.

- (b) Prepare the cable with the trim jigs.

To prepare the cable with:

- A cable jacket trim jig with two slots, refer to Paragraph 5.B.
- A cable jacket trim jig with three slots, refer to Paragraph 5.C.

C. Connector Shell Installation



CONNECTOR SHELL INSTALLATION

Figure 13

Refer to Figure 13.

- (1) Make a selection of the K-Grip sleeve crimp tool from Table 9.

Make sure that the tool is applicable for the tool code.

- (2) Put the connector shell on the end of the cable.

Make sure that:

- If the cable has one shield, the inner ferrule is between the dielectric and the shield
- If the cable has an inner shield and an outer shield, the inner ferrule is between the inner shield and the outer shield
- If the cable has an inner shield and an outer shield, no strands of the outer shield are between the inner ferrule and the dielectric
- The end of the conductor is in the slot on the rear end of the contact.

- (3) If the inner ferrule does not move on the inner shield, cut the inner shield back until the ferrule can move on the shield.

- (4) Push the K-Grip sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell.

- (5) Crimp the K-Grip sleeve.

Make sure that the distance between the forward end of the K-Grip sleeve and the shoulder of the connector shell is not more than 0.03 inch.

- (6) Examine the K-Grip sleeve.

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Make sure that:

- The dimples on each side of the crimp area do not have cracks
 - The base metal of the sleeve in the crimp area cannot be seen.
- (7) Install the heat shrinkable sleeve. Refer to Paragraph 6.A.

D. Center Contact Assembly

- (1) Make a selection of a Temperature Grade C solder. Refer to Subject 20-00-11.

CAUTION: DO NOT USE A TEMPERATURE GRADE D SOLDER. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CABLE CAN OCCUR.

- (2) Put the center conductor into the slot on the rear end of the center contact.
(3) Apply a small quantity of solder to the end of the conductor and the end of the contact.

CAUTION: DO NOT APPLY TOO MUCH HEAT TO THE CONTACT. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CONTACT, THE CONNECTOR OR THE CABLE CAN OCCUR.

- (4) Hold the connector shell and lightly pull the cable to make sure that the solder joint is satisfactory.
(5) Put the access cap on the connector shell.
(6) Apply a small amount of solder around the edge of the cap.

CAUTION: DO NOT APPLY TOO MUCH HEAT TO THE CAP. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CAP, THE CONNECTOR OR THE CABLE CAN OCCUR.

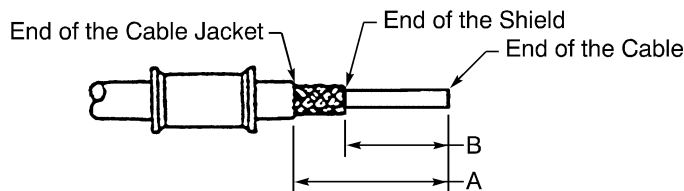
5. COAX CABLE PREPARATION**A. Cable Preparation - No Trim Jigs**

NOTE: If the cable has two shields, the shields are prepared as one shield.

- (1) Remove the necessary length of the cable jacket to make the distance from the end of the cable jacket to the end of the cable equal to dimension A.

Refer to Figure 14 and Table 10.

CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



CABLE JACKET REMOVAL
Figure 14

- (2) Remove the necessary length of shield to make the distance from the end of the cable jacket to the end of the shield equal to dimension B.

Refer to Figure 14 and Table 10.

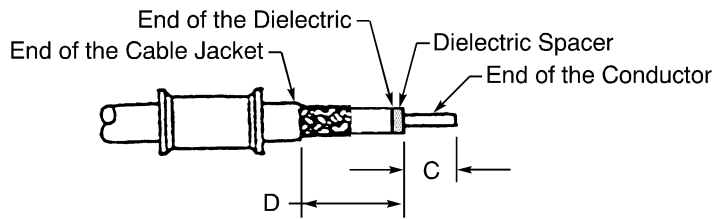
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CAUTION: DO NOT CAUSE DAMAGE TO THE DIELECTRIC. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

- (3) For a cable dielectric that is a metal, semi-rigid material:
 - (a) Remove the necessary length of the dielectric to make the distance from the end of the cable jacket to the end of the dielectric equal to dimension D minus the width of the dielectric spacer. Refer to Figure 15 and Table 10.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

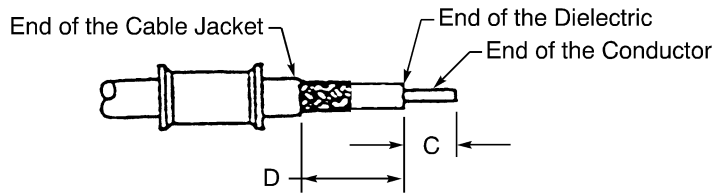


DIELECTRIC REMOVAL
Figure 15

- (b) Put the dielectric spacer on the end of the dielectric.
- (4) For a cable dielectric that is not a metal, semi-rigid material, remove the necessary length of the dielectric to make the distance from the end of the cable jacket to the end of the dielectric equal to dimension D.

Refer to Figure 16 and Table 10.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



DIELECTRIC REMOVAL
Figure 16

- (5) Remove the necessary length of the conductor to make the distance from the end of the dielectric to the end of the conductor equal to dimension C.

Refer to Figure 16 and Table 10.

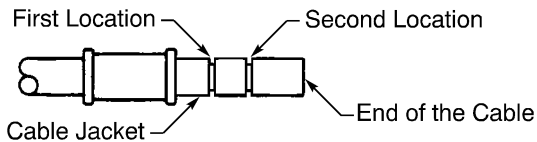
B. Cable Preparation - Cable Jacket Trim Jig with Two Slots

- (1) Put the trim jig on the end of the cable.
Make sure that the end of the trim jig is against the end of the cable.
- (2) Turn the cable in the jig, and at the same time, apply light pressure on the cable at the location of the blades. Refer to Figure 17.

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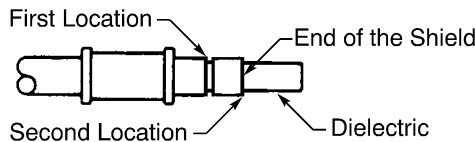
ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



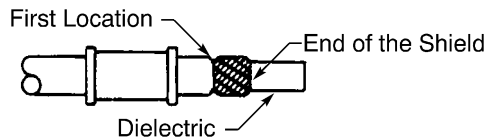
LOCATIONS OF THE CUTS ON THE CABLE JACKET
Figure 17

- (3) Remove the length of the cable jacket from the second location to the end of the cable. Refer to Figure 18.



CABLE JACKET REMOVAL
Figure 18

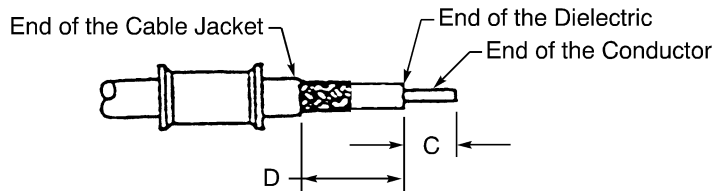
- (4) Remove the length of the shield from the second location to the end of the cable. Refer to Figure 18.
- (5) Remove the length of cable jacket from the first location to the end of the shield. Refer to Figure 19.



REMAINING CABLE JACKET REMOVAL
Figure 19

- (6) Put the dielectric trim jig on the end of the cable.
- (7) Remove the length of the dielectric that extends farther than the end of the trim jig.
Make sure that the distance from the end of the cable jacket to the end of the dielectric is equal to dimension D. Refer to Figure 20 and Table 10.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



DIELECTRIC REMOVAL
Figure 20

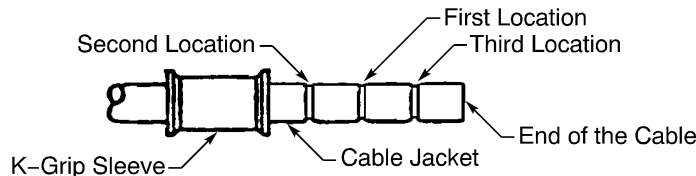
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ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS

- (8) Remove the necessary length of conductor to make the distance from the end of the dielectric to the end of the conductor equal to dimension C. Refer to Figure 20 and Table 10.

C. Cable Preparation - Cable Jacket Trim Jig with Three Slots

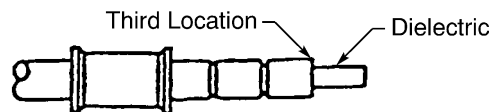
- (1) Put the trim jig on the end of the cable.
Make sure that the end of the trim jig is against the end of the cable.
- (2) Turn the cable in the jig, and at the same time, apply light pressure on the cable at the area of the blades. Refer to Figure 21.



LOCATION OF THE CUTS ON THE CABLE
Figure 21

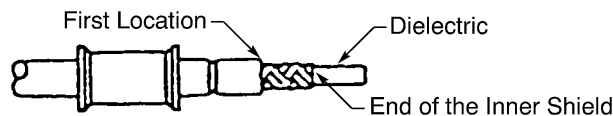
CAUTION: DO NOT CAUSE DAMAGE TO THE INNER SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

- (3) Remove the length of the cable jacket from the third location to the end of the cable. Refer to Figure 22.



CABLE JACKET REMOVAL
Figure 22

- (4) Remove the length of the outer and inner shields from the third location to the end of the cable. Refer to Figure 22.
- (5) Remove the length of the jacket from the first location to the end of the inner shield. Refer to Figure 23.



CABLE JACKET REMOVAL
Figure 23

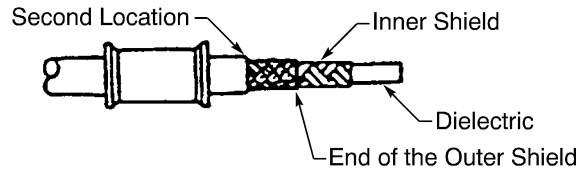
- (6) Remove the length of the outer shield from the first location to the end of the cable. Refer to Figure 23.

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CAUTION: DO NOT CAUSE DAMAGE TO THE INNER SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

- (7) Remove the cable jacket from the second location to the end of the outer shield. Refer to Figure 24.



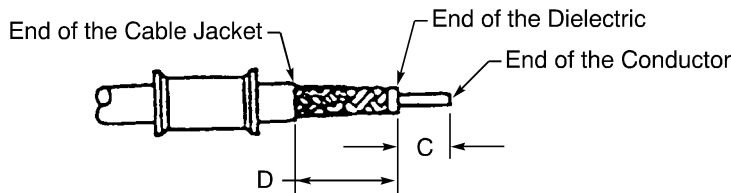
REMAINING CABLE JACKET REMOVAL

Figure 24

- (8) Put the dielectric trim jig on the end of the cable.
- (9) Remove the length of the dielectric that extends farther than the end of the trim jig.

Make sure that the distance from the end of the cable jacket to the end of the dielectric is equal to dimension D. Refer to Figure 25 and Table 10.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



DIELECTRIC REMOVAL

Figure 25

- (10) Remove the necessary length of conductor to make the distance from the end of the dielectric to the end of the conductor equal to dimension C. Refer to Figure 25 and Table 10.

6. INSULATION INSTALLATION CONFIGURATIONS

A. Heat Shrinkable Sleeve - Standard Configuration

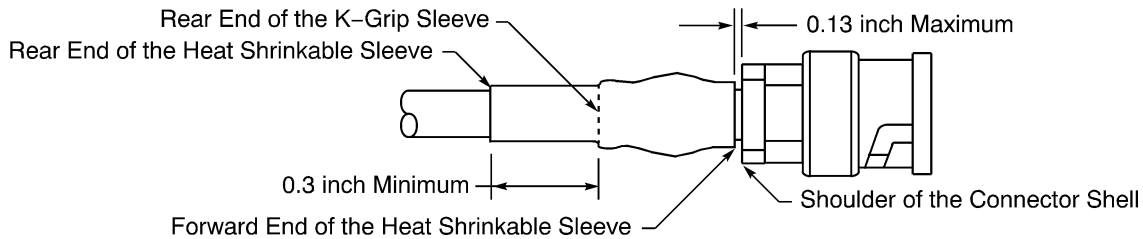
- (1) Push the sleeve forward until the end of the sleeve is against the shoulder of the connector shell. Refer to Figure 26.

Make sure that:

- The distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.13 inch
- The distance from the rear end of the K-Grip sleeve to the rear end of the sleeve is not more than 0.3 inch
- The sleeve does not make an interference with the installation of the connector.

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POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 26

(2) Shrink the sleeve into its position. Refer to Subject 20-10-14.

B. Heat Shrinkable Sleeves - 125-88-9, 125-95-9, and KA-59-438-M06 Connectors

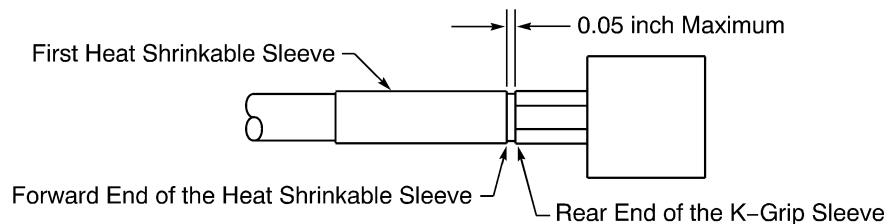
(1) Make a selection of a solvent from Table 4.

(2) Clean these areas:

- The K-Grip Sleeve
- The area of the connector shell with ribs
- 6 inches of the cable from the rear end of the K-Grip Sleeve.

(3) Push the first sleeve forward until the forward end of the sleeve is against the rear end of the K-Grip sleeve. Refer to Figure 27.

Make sure that the distance from the forward end of the sleeve to the rear end of the K-Grip sleeve is not more than 0.05 inch.



POSITION OF THE FIRST HEAT SHRINKABLE SLEEVE

Figure 27

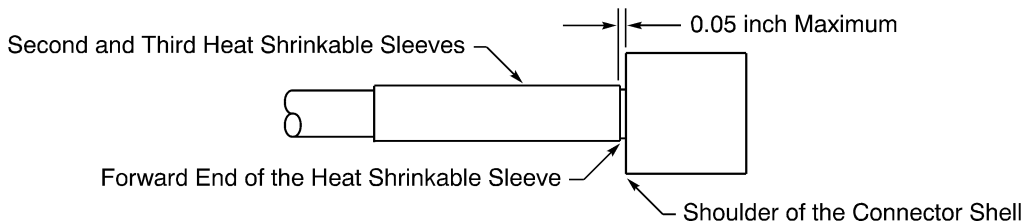
(4) Shrink the sleeve into its position. Refer to Subject 20-10-14.

(5) Push the second sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell. Refer to Figure 28.

Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.05 inch.

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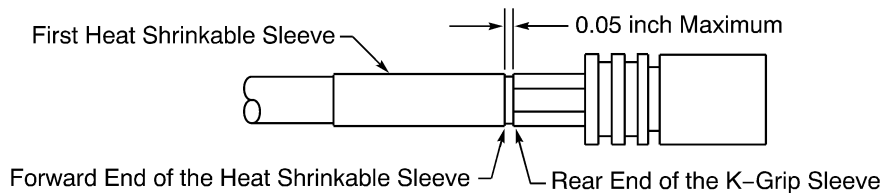


POSITION OF THE SECOND AND THIRD HEAT SHRINKABLE SLEEVES
Figure 28

- (6) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (7) Push the third sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell. Refer to Figure 28.
 Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.05 inch.
- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Heat Shrinkable Sleeves - 125-91-9 Connector

- (1) Make a selection of a solvent from Table 4.
- (2) Clean these areas:
 - The K-Grip Sleeve
 - The area of the connector shell with ribs
 - 6 inches of the cable from the rear end of the K-Grip Sleeve.
- (3) Push the first sleeve forward until the forward end of the sleeve is against the rear end of the K-Grip sleeve. Refer to Figure 29.
 Make sure that the distance from the forward end of the sleeve to the rear end of the K-Grip sleeve is not more than 0.05 inch.

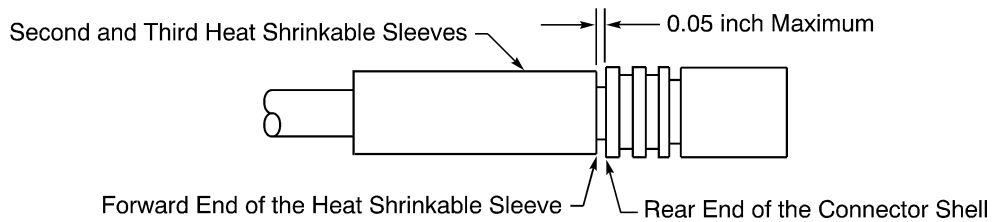


POSITION OF THE FIRST HEAT SHRINKABLE SLEEVE
Figure 29

- (4) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (5) Push the second sleeve forward until the forward end of the sleeve is against the rear end of the connector shell. Refer to Figure 30.
 Make sure that the distance from the forward end of the sleeve to the rear end of the connector shell is not more than 0.05 inch.

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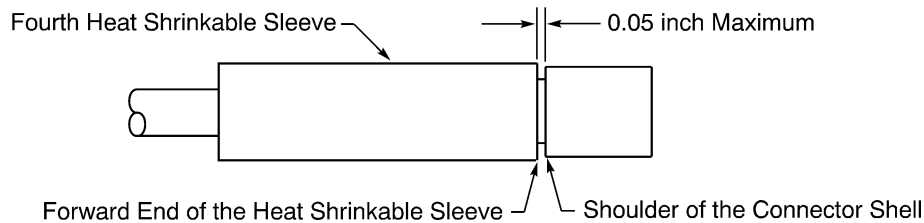
ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS



POSITION OF THE SECOND AND THIRD HEAT SHRINKABLE SLEEVES

Figure 30

- (6) Push the third sleeve forward until the forward end of the sleeve is against the rear end of the connector shell. Refer to Figure 30.
Make sure that the distance from the forward end of the sleeve to the rear end of the connector shell is not more than 0.05 inch.
- (7) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (8) Push the fourth sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell. Refer to Figure 31.
Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.05 inch.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 31

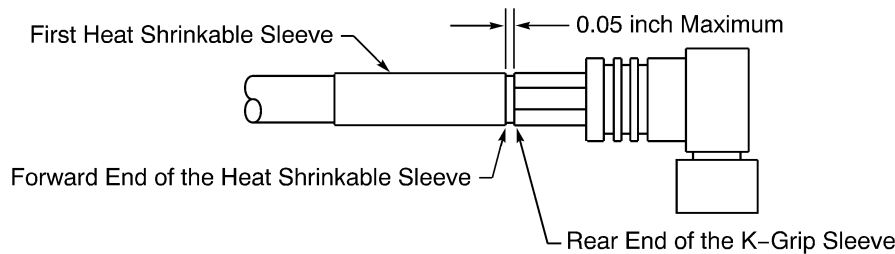
- (9) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Heat Shrinkable Sleeves - 126-58-9, 126-71-9, and KA-59-439-M06 Connectors

- (1) Make a selection of a solvent from Table 4.
- (2) Clean these areas:
 - The K-Grip Sleeve
 - The area of the connector shell with ribs
 - 6 inches of the cable from the rear end of the K-Grip Sleeve.
- (3) Push the first sleeve forward until the forward end of the sleeve is against the rear end of the K-Grip sleeve. Refer to Figure 32.
Make sure that the distance from the forward end of the sleeve to the rear end of the K-Grip sleeve is not more than 0.05 inch.

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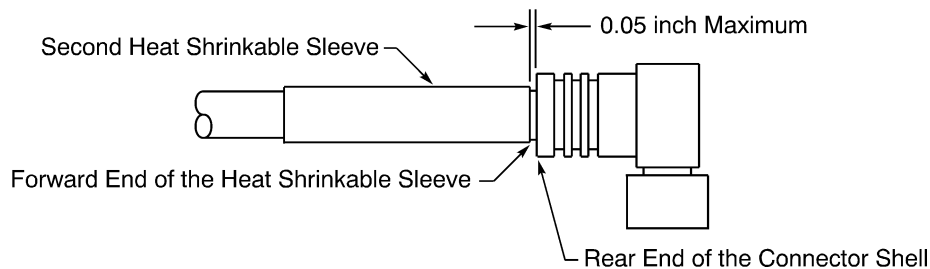


POSITION OF THE FIRST HEAT SHRINKABLE SLEEVE

Figure 32

- (4) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (5) Push the second sleeve forward until the forward end of the sleeve against the rear end of the connector shell. Refer to Figure 33.

Make sure that the distance from the forward end of the sleeve to the rear end of the connector shell is not more than 0.05 inch.

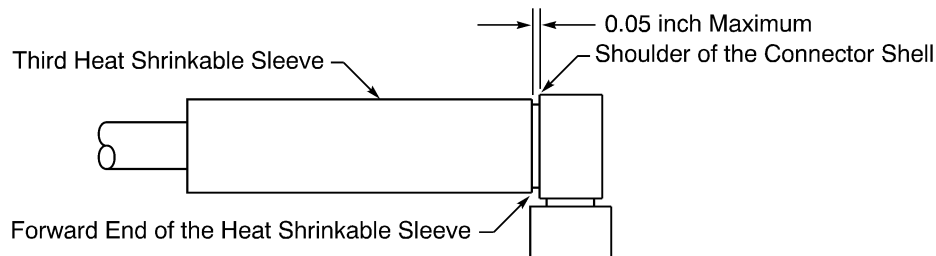


POSITION OF THE SECOND HEAT SHRINKABLE SLEEVE

Figure 33

- (6) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (7) Push the third sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell. Refer to Figure 34.

Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.05 inch.



POSITION OF THE THIRD HEAT SHRINKABLE SLEEVE

Figure 34

- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.

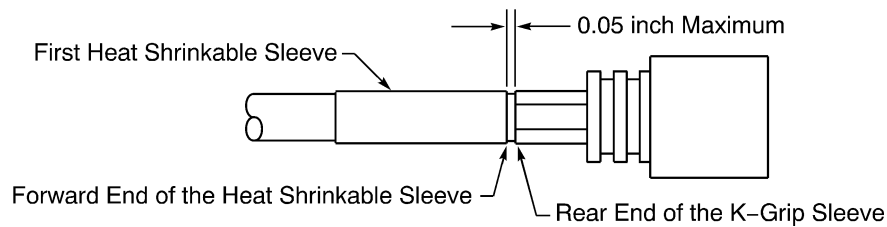
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E. Heat Shrinkable Sleeves - 2985-3-() Connectors

- (1) Make a selection of a solvent from Table 4.
- (2) Clean these areas:
 - The K-Grip Sleeve
 - The area of the connector shell with ribs
 - 6 inches of the cable from the rear end of the K-Grip Sleeve.
- (3) Push the first sleeve forward until the forward end of the sleeve is against the rear end of the K-Grip sleeve. Refer to Figure 35.

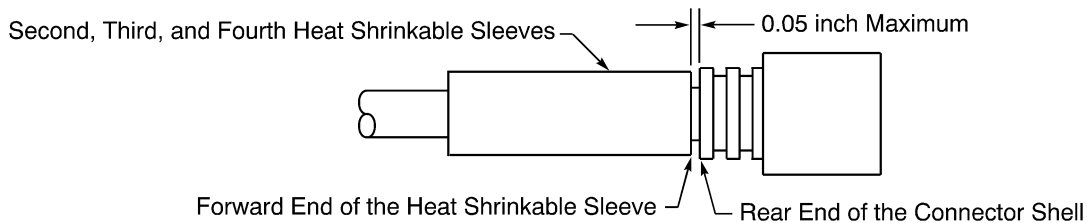
Make sure that the distance from the forward end of the sleeve to the rear end of the K-Grip sleeve is not more than 0.05 inch.



POSITION OF THE FIRST HEAT SHRINKABLE SLEEVE
Figure 35

- (4) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (5) Push the second sleeve forward until the forward end of the sleeve against the rear end of the connector shell. Refer to Figure 36.

Make sure that the distance from the forward end of the sleeve to the rear end of the connector shell is not more than 0.05 inch.



POSITION OF THE SECOND, THIRD AND FOURTH HEAT SHRINKABLE SLEEVES
Figure 36

- (6) Push the third sleeve forward until the forward end of the sleeve is against the rear end of the connector shell. Refer to Figure 36.

Make sure that the distance from the forward end of the sleeve to the rear end of the connector shell is not more than 0.05 inch.
- (7) Push the fourth sleeve forward until the forward end of the sleeve is against the rear end of the connector shell. Refer to Figure 36.

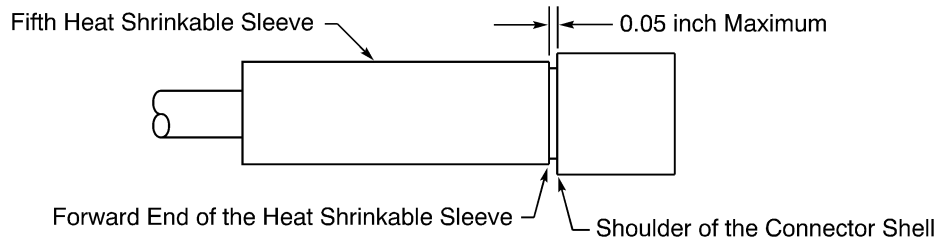
Make sure that the distance from the forward end of the sleeve to the rear end of the connector shell is not more than 0.05 inch.

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- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (9) Push the fifth sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell. Refer to Figure 37.

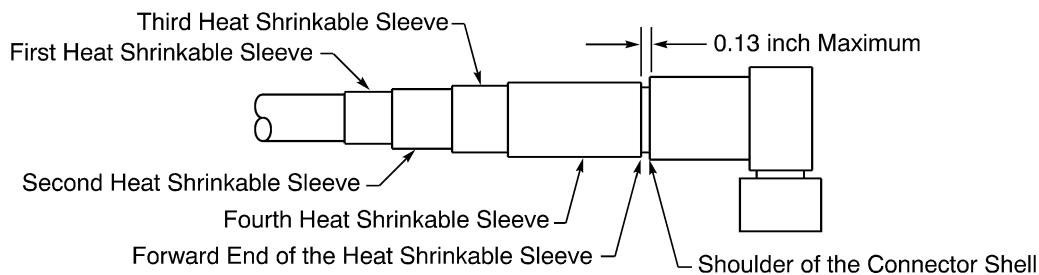
Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.05 inch.



POSITION OF THE FIFTH HEAT SHRINKABLE SLEEVE
Figure 37

- (10) Shrink the sleeve into its position. Refer to Subject 20-10-14.

F. Heat Shrinkable Sleeves - 2430-2-16 and 796-17-9 Connectors



POSITION OF THE HEAT SHRINKABLE SLEEVES
Figure 38

Refer to Figure 38.

- (1) Push the first sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell.
 Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.13 inch.
- (2) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (3) Push the second sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell.
 Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.13 inch.
- (4) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (5) Push the third sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell.

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Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.13 inch.

- (6) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (7) Push the fourth sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell.

Make sure that the distance from the forward end of the sleeve to the shoulder of the connector shell is not more than 0.13 inch.

7. CONNECTOR INSTALLATION

A. Connection of N, TNC, and SC Series Plugs and Jacks

**Table 14
CONNECTOR INSTALLATION TOOLS**

Tool	Part Number	Supplier
Torque Wrench	-	Any source
Wrench	76-101	Balmar
	ST2580-570	Boeing
	TG-70	Glenair

**Table 15
PLUG CONNECTOR TORQUE VALUES**

Connector	Torque Value (inch-pounds)	
	Minimum	Maximum
1201-()-()	6	10
1203-()-()	6	10
1205-()-()	6	10
1206-()-()	6	10
121-()-()	8	12
122-()-()	8	12
123-()-()	8	12
125-()-()	8	12
126-()-()	8	12
2435-()-()	8	12
2975-()-()	6	10
2985-()-()	6	10
821-()-()	6	10
825-()-()	6	10
KA-59-353-M06	8	12

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- (1) Make a selection of a torque wrench from Table 14.
- (2) Make a selection of a wrench from Table 14.
- (3) Fully engage the threads of the plug and the jack.
- (4) Tighten the plug to the specified torque value. Refer to Table 15.

8. APPROVED TOOL SUPPLIERS**A. Coax Cable Trim Jig Tools**

Table 16
TRIM JIG TOOL SUPPLIERS

Trim Jig	Supplier
KTB-10	Kings Electronics
KTB-2	Kings Electronics
KTD-108	Kings Electronics
KTD-122	Kings Electronics
KTD-123	Kings Electronics
KTD-124	Kings Electronics
KTD-133	Kings Electronics
KTD-137	Kings Electronics
KTD-138	Kings Electronics
KTD-145	Kings Electronics
KTD-150	Kings Electronics
KTD-154	Kings Electronics
KTD-159	Kings Electronics
KTD-161	Kings Electronics
KTD-166	Kings Electronics
KTD-172	Kings Electronics
KTD-184	Kings Electronics
KTD-208	Kings Electronics
KTD-216	Kings Electronics
KTD-218	Kings Electronics
KTD-225	Kings Electronics
KTD-233	Kings Electronics
KTD-25	Kings Electronics
KTD-255	Kings Electronics
KTD-26	Kings Electronics
KTD-268	Kings Electronics

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF KINGS WEATHERPROOF K-GRIP JUNIOR CONNECTORS**

Table 16 (continued)

Trim Jig	Supplier
KTD-28	Kings Electronics
KTD-35	Kings Electronics
KTD-38	Kings Electronics
KTD-402	Kings Electronics
KTD-403	Kings Electronics
KTD-404	Kings Electronics
KTD-405	Kings Electronics
KTD-43	Kings Electronics
KTD-437	Kings Electronics
KTD-50	Kings Electronics
KTD-51	Kings Electronics
KTD-98	Kings Electronics
KTJ-100	Kings Electronics
KTJ-102	Kings Electronics
KTJ-110	Kings Electronics
KTJ-113	Kings Electronics
KTJ-114	Kings Electronics
KTJ-117	Kings Electronics
KTJ-131	Kings Electronics
KTJ-137	Kings Electronics
KTJ-138	Kings Electronics
KTJ-144	Kings Electronics
KTJ-149	Kings Electronics
KTJ-150	Kings Electronics
KTJ-153	Kings Electronics
KTJ-154	Kings Electronics
KTJ-155	Kings Electronics
KTJ-160	Kings Electronics
KTJ-162	Kings Electronics
KTJ-174	Kings Electronics
KTJ-187	Kings Electronics
KTJ-190	Kings Electronics
KTJ-200	Kings Electronics

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Table 16 (continued)

Trim Jig	Supplier
KTJ-222	Kings Electronics
KTJ-223	Kings Electronics
KTJ-224	Kings Electronics
KTJ-225	Kings Electronics
KTJ-38	Kings Electronics
KTJ-41	Kings Electronics
KTJ-57	Kings Electronics
KTJ-58	Kings Electronics
KTJ-60	Kings Electronics
KTJ-65	Kings Electronics
KTJ-67	Kings Electronics
KTJ-68	Kings Electronics
KTJ-79	Kings Electronics
KTJ-83	Kings Electronics
KTJ-84	Kings Electronics
KTJ-92	Kings Electronics

B. Crimp Tools

**Table 17
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
227-1221-25	Amphenol
227-1221-57	Amphenol
227-1351-3	Amphenol
227-1351-4	Amphenol
227-944	Amphenol
227-956-4	Amphenol
612642	Buchanan
612648	Buchanan
612673	Buchanan
612675	Buchanan
612734	Buchanan

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Crimp Tool	Supplier
612739	Buchanan
612778	Buchanan
612807	Buchanan
683-51454-3	Kings Electronics
683-51470-1	Kings Electronics
CT-32	Schleuniger
HX23	Daniels
HX4	Daniels
KTH-1000	Kings Electronics
KTH-1061	Kings Electronics
KTH-1062	Kings Electronics
KTH-1078	Kings Electronics
KTH-1079	Kings Electronics
KTH-2001	Kings Electronics
KTH-2002	Kings Electronics
KTH-2003	Kings Electronics
KTH-2004	Kings Electronics
KTH-2007	Kings Electronics
KTH-2008	Kings Electronics
KTH-2011	Kings Electronics
KTH-2021	Kings Electronics
KTH-2022	Kings Electronics
KTH-2023	Kings Electronics
KTH-2042	Kings Electronics
KTH-2061	Kings Electronics
KTH-2062	Kings Electronics
KTH-2067	Kings Electronics
KTH-2081	Kings Electronics
KTH-2087	Kings Electronics
KTH-2101	Kings Electronics
KTH-2102	Kings Electronics
KTH-2103	Kings Electronics
KTH-2105	Kings Electronics

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Table 17 (continued)

Crimp Tool	Supplier
KTH-2106	Kings Electronics
KTH-2111	Kings Electronics
KTH-2127	Kings Electronics
KTH-2128	Kings Electronics
KTH-2138	Kings Electronics
KTH-2161	Kings Electronics
KTH-2177	Kings Electronics
KTH-2207	Kings Electronics
KTH-2211	Kings Electronics
KTH-2212	Kings Electronics
KTH-2213	Kings Electronics
KTH-2214	Kings Electronics
KTH-2216	Kings Electronics
KTH-2220	Kings Electronics
KTH-2229	Kings Electronics
KTH-2230	Kings Electronics
KTH-2231	Kings Electronics
KTH-2232	Kings Electronics
KTH-2235	Kings Electronics
KTH-2242	Kings Electronics
KTM-1000	Kings Electronics
KTM-1099	Kings Electronics
KTM-3000	Kings Electronics
KTM-4000	Kings Electronics
M22520/5-01	QPL
M22520/5-03	QPL
M22520/5-05	QPL
M22520/5-08	QPL
M22520/5-19	QPL
M22520/5-23	QPL
M22520/5-25	QPL
M22520/5-35	QPL
M22520/5-41	QPL

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Table 17 (continued)

Crimp Tool	Supplier
M22520/5-57	QPL
ST2352-5-1	Boeing
ST2352-5-2	Boeing
ST2352-5-Y	Boeing
ST2966M	Boeing
ST2966M-1	Boeing
ST2966M-13	Boeing
ST2966M-16	Boeing
ST2966M-6	Boeing
ST2966M-8	Boeing
WT-200	Thomas&Betts
Y119	Daniels
Y142	Daniels
Y1731	Daniels
Y197	Daniels
Y322	Daniels

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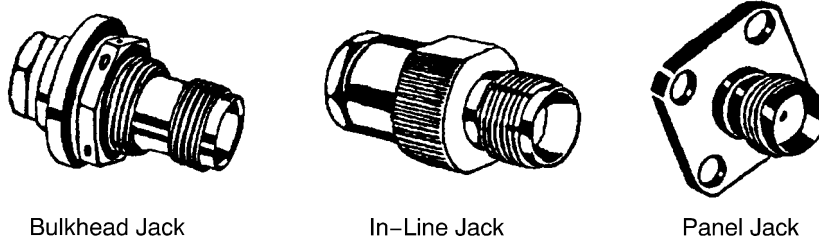
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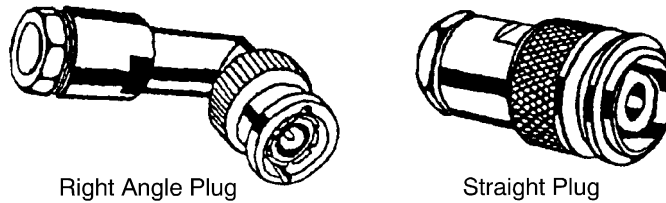
ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers and Description



CONVENTIONAL COAX PLUG CONNECTORS
Figure 1



CONVENTIONAL COAX JACK CONNECTORS
Figure 2

Table 1
COAX CONNECTOR PART NUMBERS

Part Number	Series	Configuration	Supplier
KA-19-181	TNC	Panel Jack	Kings Electronics
KA-59-21	TNC	Right Angle Plug	Kings Electronics
KC-19-110	BNC	Bulkhead Jack	Kings Electronics
KC-39-75	BNC	In-Line Jack	Kings Electronics
KC-59-66	BNC	Right Angle Plug	Kings Electronics
KD-59-03	C	Straight Plug	Kings Electronics
KD-59-04	C	Straight Plug	Kings Electronics
KD-59-08	C	Straight Plug	Kings Electronics
KD-59-130	C	Straight Plug	Kings Electronics
KD-59-56	C	Straight Plug	Kings Electronics
KN-59-298	N	Right Angle Plug	Kings Electronics
KN-59-51	N	Straight Plug	Kings Electronics
KN-59-72	N	Straight Plug	Kings Electronics



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**Table 2
ALTERNATIVE COAX CONNECTORS**

Specified Connector	Alternative Connector	
	Part Number	Assembly Procedure
KC-39-75	KC-39-108	Subject 20-51-15
KD-59-03	KD-59-164	Subject 20-51-15
KD-59-04	KD-59-164	Subject 20-51-15
KD-59-130	KD-59-161	Subject 20-51-15
KN-59-51	KN-59-261	Subject 20-51-15

B. Necessary Materials

**Table 3
NECESSARY MATERIALS**

Material	Part Number or Specification	Supplier
Primer	Product 7471, Primer T	Loctite
Sleeve, Heat Shrinkable	MIL-LT	Raychem
Solvent	Isopropyl Alcohol	Any Source
Thread Lock Compound	222	Loctite
	Product 081 Grade D	Loctite

2. CONNECTOR ASSEMBLY

A. Cable Preparation Dimensions

**Table 4
CABLE PREPARATION DIMENSIONS**

Connector	Dimension	Length (inch)	
		Target	Tolerance
KA-19-181	A	0.40	± 0.02
	B	0.11	± 0.02
	C	0.10	± 0.02
KA-59-21	A	0.38	± 0.02
	B	0.18	± 0.02
	C	0.06	± 0.02
KC-19-110	A	0.41	± 0.02
	B	0.13	± 0.02
	C	0.16	± 0.02

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Table 4 (continued)

Connector	Dimension	Length (inch)	
		Target	Tolerance
KC-39-75	A	0.34	± 0.02
	B	0.11	± 0.02
	C	0.11	± 0.02
KC-59-66	A	0.38	± 0.02
	B	0.18	± 0.02
	C	0.06	± 0.02
KD-59-03	A	0.38	± 0.02
	B	0.05	± 0.02
	C	0.22	± 0.02
KD-59-04	A	0.25	± 0.02
	B	0.05	± 0.02
	C	0.20	± 0.02
KD-59-08	A	0.38	± 0.02
	B	0.12	± 0.02
	C	0.16	± 0.02
KD-59-130	A	0.38	± 0.02
	B	0.12	± 0.02
	C	0.16	± 0.02
KD-59-56	A	0.38	± 0.02
	B	0.07	± 0.02
	C	0.16	± 0.02
KN-59-298	A	0.31	± 0.02
	B	0.05	± 0.02
	C	0.19	± 0.02
KN-59-51	A	0.44	± 0.02
	B	0.10	± 0.02
	C	0.16	± 0.02
KN-59-72	A	0.38	± 0.02
	B	0.09	± 0.02
	C	0.13	± 0.02

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ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS

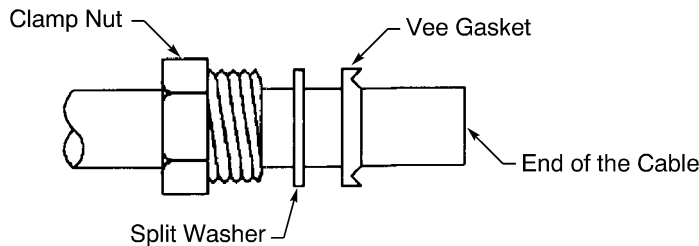
B. Cable Preparation

For the general conditions that are applicable for the preparation of coax cable, refer to Subject 20-51-00.

For the preparation of Times SF-226 cable, refer to Paragraph 2.C.

- (1) Cut the end of the cable to make it perpendicular to the longitudinal axis.
- (2) In this sequence, put these components on the cable:
 - The clamp nut
 - The split washer
 - The vee gasket.

Refer to Figure 3.

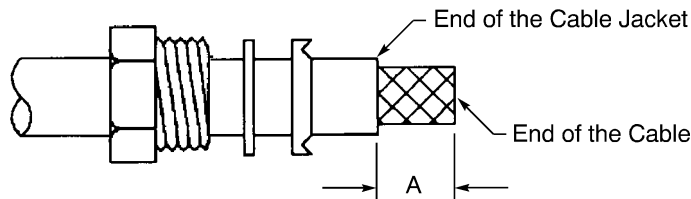


POSITION OF THE NUT, THE WASHER, AND THE GASKET ON THE CABLE
Figure 3

- (3) Remove the necessary length of the cable jacket to make the distance from the end of the jacket to the end of the cable equal to dimension A.

Refer to Figure 4 and Table 4.

CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



CABLE JACKET REMOVAL
Figure 4

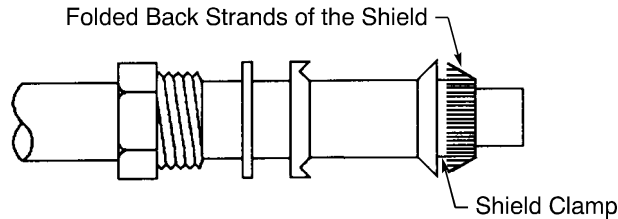
- (4) Put the shield clamp on the cable.
 Make sure that the inner shoulder of the clamp is against the end of the cable jacket.
- (5) Move the strands of the shield apart.
- (6) Fold the strands of the shield back on the shield clamp. Refer to Figure 5.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS

Make sure that the strands of the shield:

- Are parallel to the longitudinal axis of the cable
- Are symmetrical around the circumference of the clamp
- Do not make an overlap with each other.



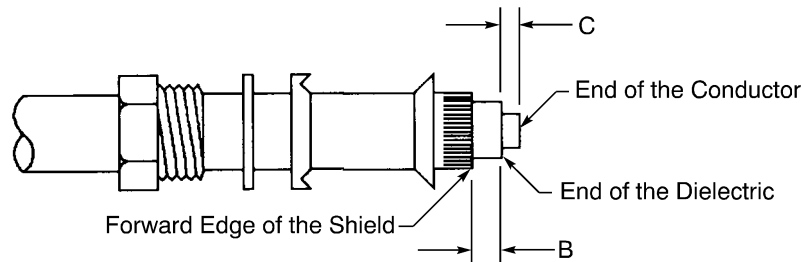
POSITION OF THE SHIELD ON THE SHIELD CLAMP

Figure 5

- (7) Remove the necessary length of shield to make the distance from the end of the shield to the forward end of the shield clamp flange equal to 0.03 inch maximum.
- (8) Remove the necessary length of dielectric to make the distance from the forward edge of the shield to the end of the dielectric equal to dimension B.

Refer to Figure 6 and Table 4.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



DIELECTRIC REMOVAL

Figure 6

- (9) If these components are supplied with the connector, put them on the end of the cable in this sequence:
 - The dielectric spacer
 - The cable position insulator.
- (10) Remove the necessary length of the center conductor to make the distance from the forward end of the dielectric to the end of the conductor equal to dimension C.

Refer to Figure 6 and Table 4.

NOTE: If a dielectric spacer and an insulator are installed, the distance from the end of the center conductor to the end of the insulator must be equal to dimension C.

STANDARD WIRING PRACTICES MANUAL

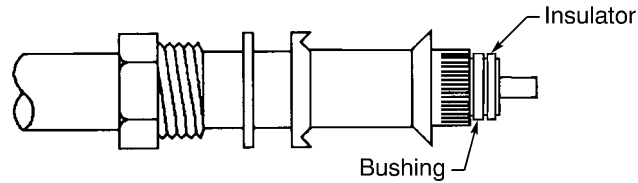
ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS

- (11) If these components are supplied with the connector, put them on the cable in this sequence:
- The retainer bushing
 - The insulator.

Refer to Figure 7.

Make sure that:

- The bushing is against the shield
- The shield clamp is against the bushing.



POSITION OF THE BUSHING AND THE INSULATOR ON THE CABLE

Figure 7

C. Preparation of the Times SF-226 Coax Cable for assembly of the KN-59-72 Connector

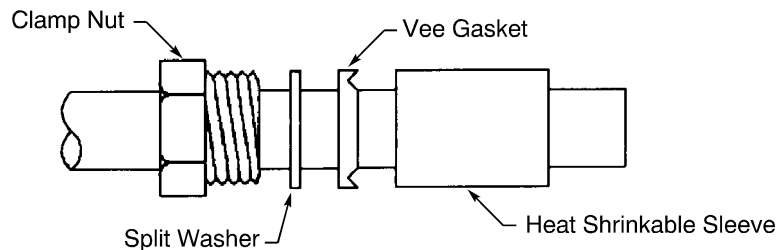
For the general conditions that are applicable for the preparation of coax cable, refer to Subject 20-51-00.

- (1) Make a selection of a 1/2 inch diameter heat shrinkable sleeve from Table 3.

NOTE: An equivalent sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

- (2) Cut the end of the cable to make it perpendicular to the longitudinal axis of the cable.
- (3) In this sequence, put these components on the cable:
- The clamp nut
 - The split washer
 - The vee gasket
 - A 1.00 inch ± 0.06 inch length of the heat shrinkable sleeve.

Refer to Figure 8.



POSITION OF THE NUT, THE WASHER, THE GASKET, AND THE SLEEVE ON THE CABLE

Figure 8

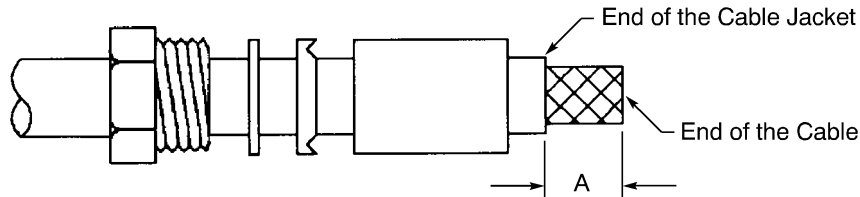
- (4) Remove the necessary length of the cable jacket to make the distance from the end of the cable jacket to the end of the cable equal to dimension A.

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ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS

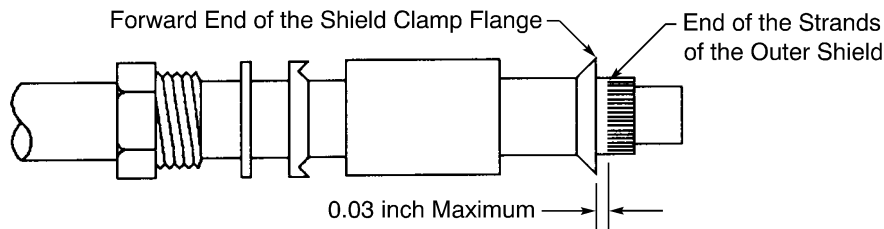
CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

Refer to Figure 9 and Table 4.



CABLE JACKET REMOVAL
Figure 9

- (5) Put the shield clamp on the end of the cable.
Make sure that the clamp is against the end of the cable jacket
- (6) Move the strands of the outer shield apart.
Make sure the strands are parallel to the longitudinal axis of the cable.
- (7) Fold the strands of the outer shield back on the shield clamp.
Make sure that the strands of the shield:
 - Are parallel to the longitudinal axis of the cable
 - Are symmetrical around the circumference of the clamp
 - Do not make an overlap with each other.
- (8) Remove the necessary length of shield to make the distance from the end of the shield to the forward end of the shield clamp flange equal to 0.03 inch maximum. Refer to Figure 10.



SHIELD REMOVAL
Figure 10

- (9) Remove the foil tape from the end of the cable to the forward end of the shield clamp.

CAUTION: DO NOT CUT OR BREAK THE STRANDS OF THE SHIELD. IF A STRAND OF THE SHIELD IS BROKEN, THE CABLE PREPARATION MUST BE DONE AGAIN.

- (10) Move the strands of the inner shield apart.
- (11) Fold the strands of the inner shield back on the shield clamp.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS

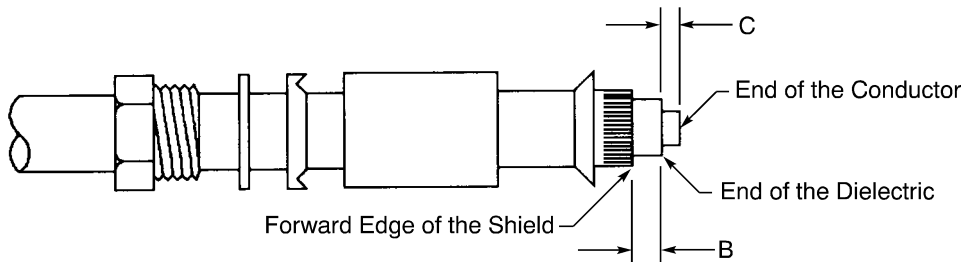
Make sure that the strands of the shield:

- Are parallel to the longitudinal axis of the cable
- Are symmetrical around the circumference of the clamp
- Do not make an overlap with a each other.

- (12) Remove the necessary length of the strands to align the ends with the end of the strands of the outer shield. Refer to Figure 10.
- (13) Remove the necessary length of the dielectric to make the distance from the forward edge of the shield to the end of the dielectric equal to dimension B.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

Refer to Figure 11 and Table 4.



DIELECTRIC REMOVAL
Figure 11

- (14) Remove the necessary length of the center conductor to make the distance from the forward end of the dielectric to the end of the conductor equal to dimension C.
Refer to Figure 11 and Table 4.

D. Center Contact Assembly

For the general conditions that are applicable for the assembly of coax contacts, refer to Subject 20-51-00.

- (1) Make a selection of a Temperature Grade C solder. Refer to Subject 20-00-11.

CAUTION: DO NOT USE A TEMPERATURE GRADE D SOLDER. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO THE CABLE CAN OCCUR.

- (2) Tin the center conductor.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN OCCUR.

- (3) Put the center conductor in the solder barrel of the center contact.

Make sure that:

- All of the strands of the conductor are in the solder barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the dielectric to the rear end of the solder barrel is not more than 0.03 inch.

- (4) Apply a small quantity of solder in the inspection hole of the contact.

STANDARD WIRING PRACTICES MANUAL

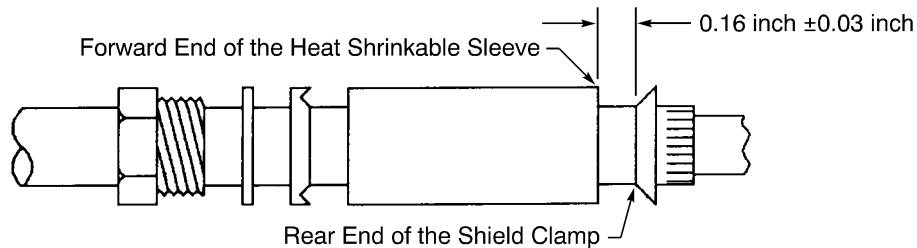
ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN OCCUR.

- (5) Remove all of the solder and the flux from the outer surface of the contact.
- (6) Examine the contact for damage to the finish.

NOTE: If the contact has damage, it must be replaced.

- (7) If a solder access cover is supplied with the contact, install the cover.
- (8) If the connector is supplied with a front insulator, put it on the center contact.
- (9) If a heat shrinkable sleeve is on the cable:
 - (a) Push the sleeve forward until the distance from the forward end of the sleeve to the rear of end of the shield clamp is equal to 0.16 inch \pm 0.03 inch. Refer to Figure 12.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 12

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.

E. Connector Shell Installation

For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.

Table 5
CLAMP NUT TORQUE VALUES

Connector	Torque Value (inch-pounds)	
	Minimum	Maximum
KA-19-181	28	32
KA-59-21	90	100
KC-19-110	40	50
KC-39-75	40	50
KC-59-66	40	50
KD-59-03	90	100
KD-59-04	90	100
KD-59-04	28	32

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ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS

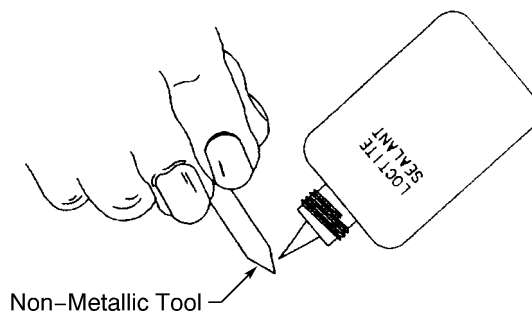
Table 5 (continued)

Connector	Torque Value (inch-pounds)	
	Minimum	Maximum
KD-59-130	40	50
KD-59-56	40	50
KN-59-298	90	100
KN-59-51	40	50
KN-59-72	90	100

- (1) Make a selection of a solvent from Table 3.
- (2) Make a selection of a primer from Table 3.
- (3) Make a selection of thread lock compound from Table 3.
- (4) Examine the threads on the rear of the connector shell for contamination or thread lock compound.
- (5) If the threads have material on them, clean the threads:
 - (a) Fully engage the threads the clamp nut and the threads of the connector.
 - (b) Remove the clamp nut from the connector shell.
- (6) Clean the clamp nut with a wiper and solvent.
- (7) Dry the nut with a clean wiper.
- (8) Apply the primer with a spray on the threads of the nut.
- (9) Let the primer to dry for 10 minutes minimum at room temperature.
- (10) Apply a layer of thread lock compound on the threads of the clamp nut.

CAUTION: THE THREAD LOCK COMPOUND DOES NOT MAKE A BOND IF THE COMPONENTS ARE ASSEMBLED MORE THAN 30 MINUTES AFTER THE COMPOUND IS APPLIED.

- (a) Put a small quantity of the compound on the tip of a non-metallic, pointed tool. Refer to Figure 13.



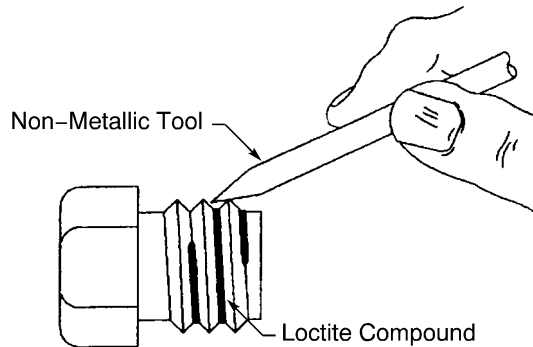
LOCATION OF THE THREAD LOCK COMPOUND ON THE TOOL
Figure 13

- (b) Apply a thin, smooth layer of the compound on one or two full threads of the nut. Refer to Figure 14.

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF KINGS CONVENTIONAL COAX CONNECTORS**

CAUTION: THREAD LOCK COMPOUND IS AN INSULATOR. TOO MUCH THREAD LOCK COMPOUND CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**LOCATION OF THE THREAD LOCK COMPOUND ON THE THREADS OF THE CLAMP NUT****Figure 14**

- (c) If too much thread lock compound is applied, remove the unwanted compound from the nut.
- (11) Push the vee gasket forward until it is against the rear end of the shield clamp.
 - (12) Push the split washer forward until it is against the vee gasket.
 - (13) Put a layer of the thread lock compound on the first two threads of the clamp nut.
 - (14) Push the clamp nut forward until it is against the washer.
 - (15) Put the contact assembly in the rear end of the connector shell.

Make sure that the shield clamp is aligned correctly against the rear end of the connector shell.

- (16) Fully engage the threads of the clamp nut and the threads of the connector shell.
- (17) Tighten the clamp nut to the specified torque value. Refer to Table 5.



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ASSEMBLY OF KINGS K-LOC COAX CONNECTORS

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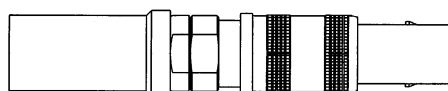
ASSEMBLY OF KINGS K-LOC COAX CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers and Description

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Series	Configuration	Supplier
1075-13-9	K-LOC	Straight Plug	Kings Electronics



**K-LOC COAX PLUG
Figure 1**

B. Necessary Materials

**Table 2
NECESSARY MATERIALS**

Material	Part Number or Specification	Supplier
Sleeve, Heat Shrinkable	DWP-125	Raychem

2. COAX CONNECTOR ASSEMBLY TOOLS

A. Coax Connector Crimp Tools

**Table 3
COAX CONNECTOR CRIMP TOOL CODES**

Connector	Tool Code	
	Center Contact	K-Grip Sleeve
1075-13-9	051H	213HLS

**Table 4
COAX CONNECTOR CRIMP TOOL TYPES**

Crimp Tool Basic Unit	Type
CT-32	Pneumatic
KTH-1000	Hand
KTM-1000	Electric
KTM-3000	Pneumatic
KTM-4000	Pneumatic

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ASSEMBLY OF KINGS K-LOC COAX CONNECTORS

**Table 5
COAX CONNECTOR CRIMP TOOLS**

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
051H	CT-32	-	KTH-2022	0.051
			KTH-2087	0.051
			KTH-2232	0.051
			KTH-2242	0.051
	KTH-1000	-	KTH-2022	0.051
			KTH-2087	0.051
			KTH-2232	0.051
			KTH-2242	0.051
	KTM-1000	KTM-1099	KTH-2022	0.051
			KTH-2087	0.051
			KTH-2232	0.051
			KTH-2242	0.051
	KTM-3000	-	KTH-2022	0.051
			KTH-2087	0.051
			KTH-2232	0.051
			KTH-2242	0.051
	KTM-4000	-	KTH-2022	0.051
			KTH-2087	0.051
			KTH-2232	0.051
			KTH-2242	0.051

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ASSEMBLY OF KINGS K-LOC COAX CONNECTORS

Table 5 (continued)

Tool Code	Crimp Tool			
	Basic Unit	Master Jaws	Die	
			Part Number	Opening (inch)
213HLS	CT-32	-	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
	KTH-1000	-	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
	KTM-1000	KTM-1099	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
	KTM-3000	-	KTH-2103	0.213
			KTH-2161	0.213
			KTH-2207	0.213
			KTH-2211	0.213
			KTH-2232	0.213
KTM-4000	-	KTH-2103	0.213	
		KTH-2161	0.213	
		KTH-2207	0.213	
		KTH-2211	0.213	
		KTH-2232	0.213	

3. CONNECTOR SEPARATION

A. Separation of the Plug and the Jack

- (1) Pull the outer ring of the plug rearward.
- (2) Pull the plug away from the jack.

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ASSEMBLY OF KINGS K-LOC COAX CONNECTORS

4. CONNECTOR ASSEMBLY

A. Cable Preparation

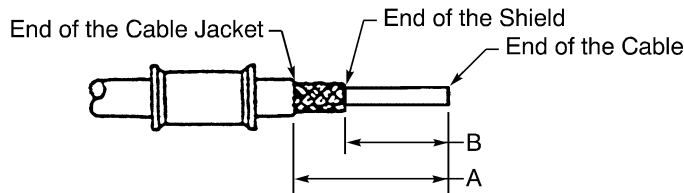
For the general conditions that are applicable for the preparation of coax cable, refer to Subject 20-51-00.

NOTE: If the cable has two shields, the shields are prepared as one shield.

**Table 6
CABLE PREPARATION DIMENSIONS**

Connector	Dimension	Length (inch)	
		Target	Tolerance
1075-13-9	A	0.94	±0.02
	B	0.63	±0.02
	C	0.19	±0.02
	D	0.75	±0.02

- (1) Make a selection of a heat shrinkable sleeve from Table 2.
Make sure the sleeve is the smallest diameter that can be moved easily on the cable.
- (2) Put a 1.5 inch length of heat shrinkable sleeve on the cable.
- (3) Cut the end of the cable to make it perpendicular to the longitudinal axis of the cable.
- (4) Put the K-Grip sleeve on the cable.
- (5) Prepare the cable jacket and shield. Refer to Figure 2 and Table 6.



**CABLE JACKET AND SHIELD REMOVAL
Figure 2**

- (a) Remove the necessary length of the cable jacket to make the distance from the end of the jacket to the end of the cable equal to dimension A.
CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.
 - (b) Remove the necessary length of shield to make the distance from the end of the cable jacket to the end of the shield equal to dimension B.
CAUTION: DO NOT CAUSE DAMAGE TO THE DIELECTRIC. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.
- (6) If the coax cable has a semi-solid dielectric, put the cable position insulator that is supplied with the connector on the center conductor.

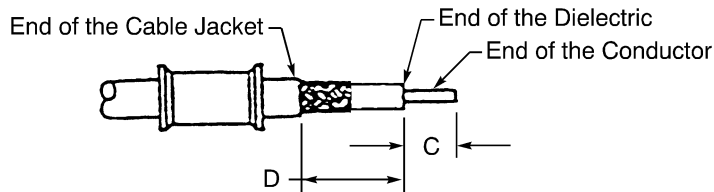
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ASSEMBLY OF KINGS K-LOC COAX CONNECTORS

- (7) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the center conductor equal to dimension C. Refer to Figure 3 and Table 6.

Make sure that the distance from the end of the cable jacket to the end of the dielectric is equal to dimension D.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



DIELECTRIC REMOVAL
Figure 3

B. Center Contact Assembly

For the general conditions that are applicable for the assembly of coax contacts, refer to Subject 20-51-00.

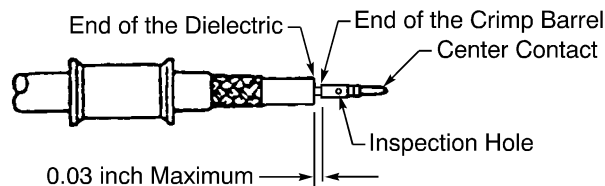
- (1) Find the center contact tool code. Refer to Table 3.
- (2) Make a selection of a contact crimp tool from Table 5.

Make sure the tool is applicable for the tool code.

- (3) Put the conductor in the crimp barrel of the center contact. Refer to Figure 4.

Make sure that:

- All of the strands of the conductor are in the crimp barrel of the contact
- The conductor can be seen in the inspection hole
- The distance from the end of the dielectric to the rear end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE CONTACT ON THE CONDUCTOR
Figure 4

- (4) Crimp the contact.

Make sure that the crimp is between the inspection hole and the rear end of the crimp barrel.

- (5) Examine the contact assembly for these types of damage:

- The base metal of the contact can be seen
- The crimp barrel of the contact has a crack.

NOTE: If the contact has damage, the contact must be replaced.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF KINGS K-LOC COAX CONNECTORS****C. K-Grip Assembly**

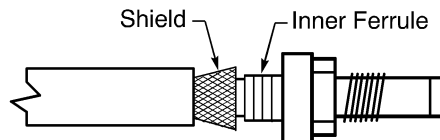
For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.

- (1) Find the K-Grip sleeve tool code. Refer to Table 3.
- (2) Make a selection of the K-Grip sleeve crimp tool from Table 5.
Make sure the tool is applicable for the tool code.
- (3) Put the connector shell on the end of the cable. Refer to Figure 5.

For a cable with one shield, make sure that:

- The inner ferrule is between the dielectric and the shield
- No strands of the shield are between the inner ferrule and the dielectric.

For a cable with an inner flat shield and an outer round shield, make sure that the inner ferrule is between the inner shield and the outer shield.

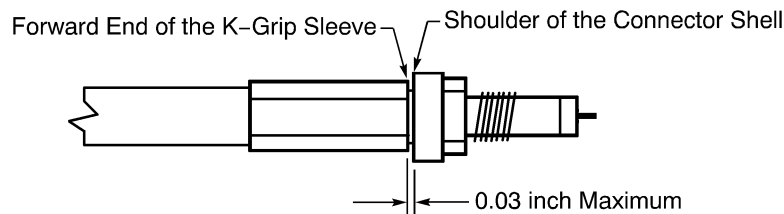


POSITION OF THE CONNECTOR SHELL ON THE CABLE

Figure 5

- (4) Push the K-Grip assembly rearward until the contact is fully installed in the connector shell.
- (5) Push the K-Grip sleeve forward until the forward end of the sleeve is against the shoulder of the connector shell.
- (6) Crimp the K-Grip sleeve. Refer to Figure 6.

Make sure that the distance between the forward end of the K-Grip sleeve and the shoulder of the connector shell is not more than 0.03 inch.



POSITION OF THE K-GRIP SLEEVE

Figure 6

- (7) Examine the K-Grip sleeve.

Make sure that:

- The dimples on each side of the crimp area do not have cracks
- The base metal of the sleeve in the crimp area cannot be seen.

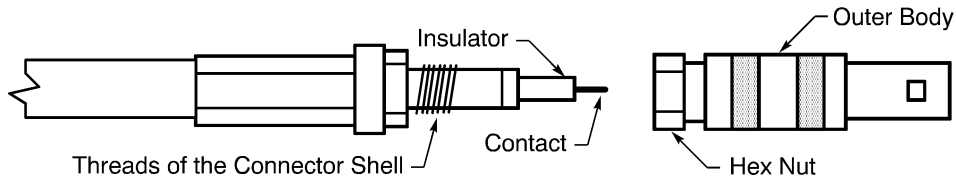
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-LOC COAX CONNECTORS

D. Installation of the Outer Body

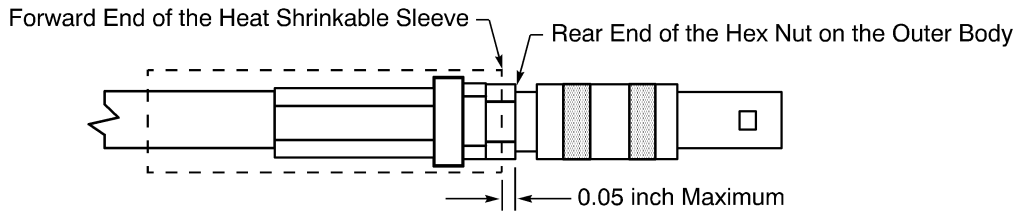
For the general conditions that are applicable for the assembly of coax connectors, refer to Subject 20-51-00.

- (1) Put the insulator on the center contact. Refer to Figure 7.



POSITION OF THE INSULATOR ON THE CENTER CONTACT
Figure 7

- (2) Fully engage the threads of the outer body with the threads of the connector shell.
- (3) Tighten the outer body with the hand.
- (4) Tighten the outer body approximately 1/16 of a turn more with a wrench.
- (5) Push the heat shrinkable sleeve forward until the forward end of the sleeve is a not more than 0.05 inch from the rear end of the hex nut on the outer body. Refer to Figure 8.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 8

- (6) Shrink the sleeve into its position. Refer to Subject 20-10-14.

5. CONNECTOR INSTALLATION

A. Connection of the Plug and the Jack

- (1) Pull the outer ring of the plug rearward.
- (2) Push the jack into the plug.
- (3) Release the outer ring of the plug.
- (4) Pull the jack lightly to make sure the plug is locked in the jack.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF KINGS K-LOC COAX CONNECTORS

6. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 7
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
CT-32	Schleuniger
KTH-1000	Kings Electronics
KTH-2022	Kings Electronics
KTH-2087	Kings Electronics
KTH-2103	Kings Electronics
KTH-2161	Kings Electronics
KTH-2207	Kings Electronics
KTH-2211	Kings Electronics
KTH-2232	Kings Electronics
KTH-2242	Kings Electronics
KTM-1000	Kings Electronics
KTM-1099	Kings Electronics
KTM-3000	Kings Electronics
KTM-4000	Kings Electronics

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ASSEMBLY OF TRIAX CABLE CONNECTORS

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	A. Connector Part Numbers	1
	B. Connector Description	1
2.	<u>CONNECTOR ASSEMBLY</u>	2
	A. Cable Preparation	2
	B. Contact Assembly	3
	C. Connector Assembly	3

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRIAX CABLE CONNECTORS

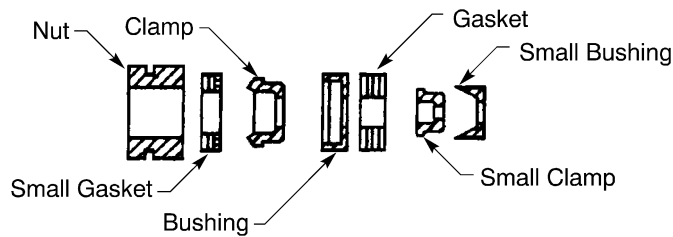
1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

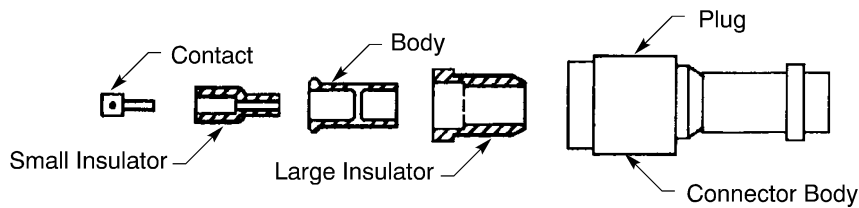
**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
31-30383-1	Amphenol
30382-1	Dage
30383-1	Dage

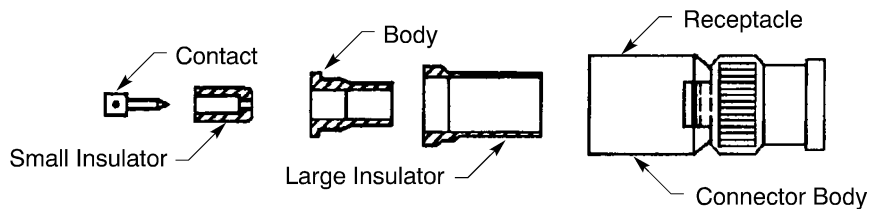
B. Connector Description



**TRIAX CONNECTOR CABLE COMPONENTS
Figure 1**



**TRIAX PLUG CONNECTOR
Figure 2**



**TRIAX RECEPTACLE CONNECTOR
Figure 3**

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF TRIAX CABLE CONNECTORS****2. CONNECTOR ASSEMBLY****A. Cable Preparation**

- (1) Cut the cable so that the end of the cable is perpendicular to the longitudinal axis of the cable.
- (2) Remove 1 inch \pm 1/16 inch of the outer jacket from the end of the cable.

CAUTION: DO NOT CUT THE SHIELD OF THE CABLE. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (3) Move the strands of the shield apart.
- (4) Cut the cable so that the distance from the end of the outer jacket to the end of the cable is 7/8 inch \pm 1/32 inch.

CAUTION: DO NOT CUT THE STRANDS OF THE SHIELD.

- (5) Put the strands of the shield flat against the cable so that they are parallel to the longitudinal axis of the cable.

Make sure that the end of the strands are beyond the end of the cable.

- (6) In this order, put these components on the cable:
 - The nut
 - The small gasket.

Refer to Figure 1.

NOTE: If it is necessary, the ends of the strands of the shield can be twisted together.

Make sure that the components are over all of the strands of the shield

- (7) Put the clamp on the cable so that the inner shoulder of the clamp is tight against end of the jacket.
- (8) Remove the necessary length of the shield so that the distance from the end of the shield to the end of the clamp is 5/32 inch \pm 1/32 inch.
- (9) Fold the strands of the shield back over the clamp so that they are flat and symmetrical against the cable.
- (10) In this order, put these components on the cable:
 - The bushing
 - The gasket

Refer to Figure 1.

- (11) Remove the necessary length of the inner jacket so that the distance from the gasket to the end of the jacket is 3/64 inch +0 inch, -1/32 inch.
- (12) Move the strands of the inner shield apart.

CAUTION: DO NOT CUT THE SHIELD OF THE CABLE. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (13) Remove a 1/8 inch \pm 1/16 inch length from the end of the cable.

CAUTION: DO NOT CUT THE STRANDS OF THE SHIELD.

- (14) Remove the necessary length of the inner jacket so that the forward edge of the inner jacket is aligned with the forward edge of the gasket.
- (15) Put the strands of the inner shield flat against the cable so that they are parallel to the longitudinal axis of the cable.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF TRIAX CABLE CONNECTORS**

Make sure that the end of the strands are beyond the end of the cable.

- (16) Put the small clamp over the strands of the inner shield so that the shoulder of the clamp is tight against the end of the inner jacket.

NOTE: If it is necessary, the ends of the strands of the shield can be twisted together.

- (17) Fold the strands of the inner shield back over the clamp so that they are flat and symmetrical.
- (18) Remove the necessary length of the strands of the inner shield so that the distance from the end of the strands to the rear edge of the clamp is $1/32$ inch \pm $1/64$ inch.
- (19) Put the small bushing on the cable so that the bushing is against the clamp.
- (20) Remove the necessary length of the dielectric so that the distance from the clamp to the end of the dielectric is $3/16$ inch \pm $1/32$ inch.

CAUTION: DO NOT CUT OR CAUSE ANY DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (21) Remove the necessary length of the inner conductor so that that the distance from the end of the dielectric to the end of the conductor is $5/64$ inch \pm $1/64$ inch.

B. Contact Assembly

- (1) Put the contact on the inner conductor.
- (2) Solder the contact.

CAUTION: DO NOT PUT MORE THAN THE NECESSARY QUANTITY OF SOLDER ON THE CONTACT AND CONDUCTOR. UNWANTED SOLDER ON THE INNER CONTACT CAN PREVENT THE INSERTION OF THE CONTACT INTO THE INSULATOR.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER.

C. Connector Assembly

Refer to:

- Figure 2 for the plug connector
- Figure 3 for the receptacle connector.

- (1) Put the small insulator onto the contact assembly.
- (2) Put the body onto the contact assembly.
- (3) Put the large insulator onto the contact assembly.
- (4) Put the connector body onto the contact assembly.
- (5) Engage the threads of the nut and the connector body.

Make sure that the groove in the small gasket is alined with the sharp edge of the clamp. Refer to Figure 1.

- (6) Torque the nut to 45 inch-pounds.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP 2-329083-1 COAX CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP 2-329083-1 COAX CONNECTORS

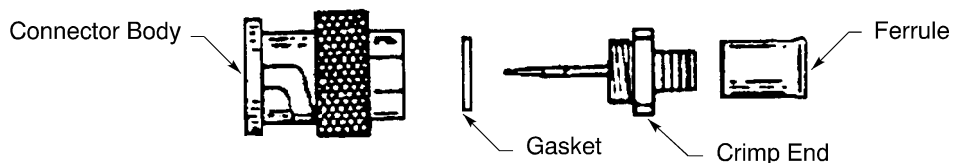
This Subject gives the procedures to assemble the AMP 2-329083-1 coax connector with the specified coax cables.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
2-329083-1	BNC Plug	AMP



**AMP 2-329083-1 BNC CONNECTOR
Figure 1**

B. Coax Cable Part Numbers

**Table 2
COAX CABLE PART NUMBERS**

Part Number	Specification	Supplier
M17/29-RG59	MIL-C-17/29	QPL
M17/30-RG62	MIL-C-17/30	QPL
M17/58-RG140	MIL-C-17/58	QPL
M17/97-RG210	MIL-C-17/97	QPL

2. CONNECTOR ASSEMBLY

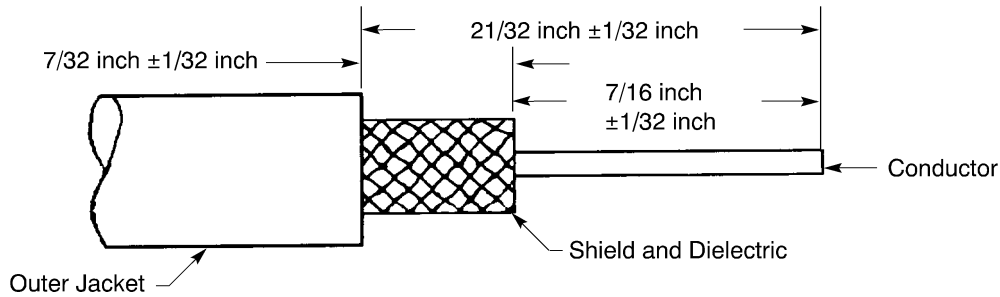
Refer to Subject 20-51-00 for the general conditions that are applicable for the assembly of coax connectors.

A. Cable Preparation

- (1) Put the ferrule on the cable.
- (2) Prepare the cable. Refer to Figure 2.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP 2-329083-1 COAX CONNECTORS



CABLE TRIM DIMENSIONS

Figure 2

- (a) Remove 21/32 inches \pm 1/32 inch of the outer jacket of the cable.
- (b) Remove 7/16 inch \pm 1/32 inch of the shield and dielectric.
- (3) Move the strands of the shield apart a small amount.

B. Connector Assembly

**Table 3
CONNECTOR CRIMP TOOLS**

Basic Tool		Die	
Part Number	Supplier	Part Number	Supplier
69141-1	AMP	-	AMP
69710	AMP	69224-1	AMP

- (1) Make a selection of a crimp tool from Table 3.
- (2) Push the prepared cable into the crimp end of the connector.
NOTE: The crimp end can be twisted a small amount to make it easier.
- (3) Push the crimp end under the expanded end of the shield.
NOTE: The crimp end can be twisted a small amount to make sure that the dielectric goes into the crimp end as far as possible.
- (4) Push the ferrule over the shield until the ferrule is against the shoulder of the crimp end of the connector.
- (5) Crimp the ferrule.
- (6) Put the gasket on the crimp end of the connector.
- (7) Engage the threads of the connector body and the crimp end.
- (8) Tighten connector body and crimp end of the connector with wrenches.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES

<u>Paragraph</u>		<u>Page</u>
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	B. Coaxiclamp Splice Part Numbers	2
	C. Coax Cable Part Numbers	2
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	A. Necessary Tools for Connector Assembly	2
	B. Cable Preparation	3
	C. Assembly of the Connector Body	5
	D. Assembly of the Center Contact	7
3.	<u>RG231 COAX CABLE REPAIR</u>	7
	A. Conditions for Repair	7
	B. Necessary Tools	7
	C. Cable Preparation	8
	D. Splice Assembly	10

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES

This Subject gives the procedures to:

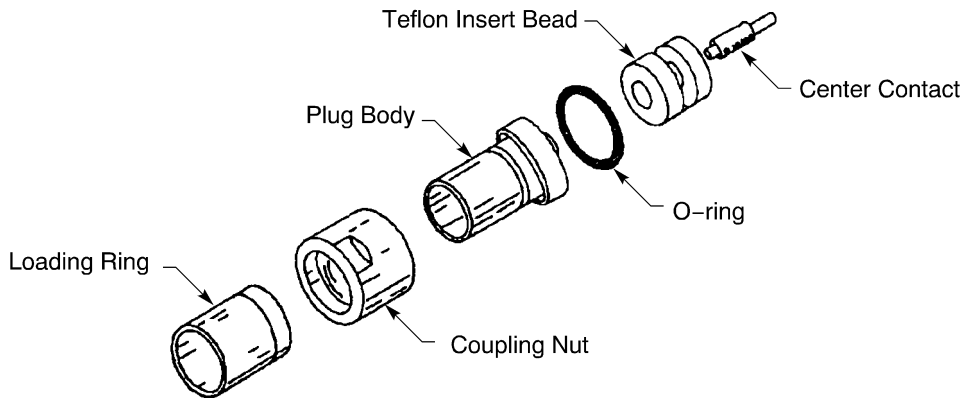
- Assemble the Coaxiclamp connector with the specified coax cable
- Repair the RG231 coax cable with a Coaxiclamp splice.

1. PART NUMBERS AND DESCRIPTION

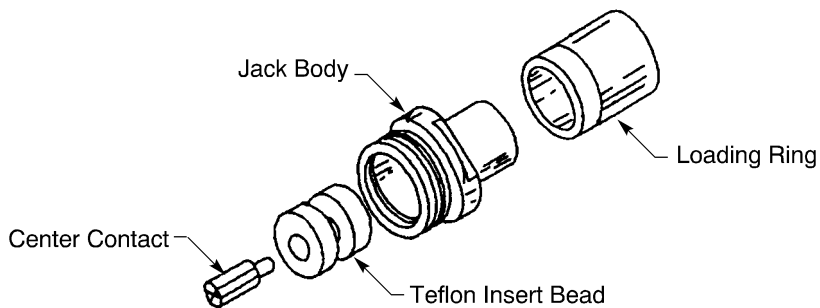
A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Connector Type	Supplier
331719	Plug	AMP
331843	Jack	AMP



**AMP 331719 COAXICLAMP PLUG
Figure 1**



**AMP 331843 COAXICLAMP JACK
Figure 2**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES

B. Coaxiclamp Splice Part Numbers

**Table 2
COAXICLAMP SPLICE PART NUMBERS**

Part Number	Supplier
331713	AMP

C. Coax Cable Part Numbers

**Table 3
COAX CABLE PART NUMBERS**

Part Number	Specification	Supplier
RG231/U	MIL-C-23806	QPL

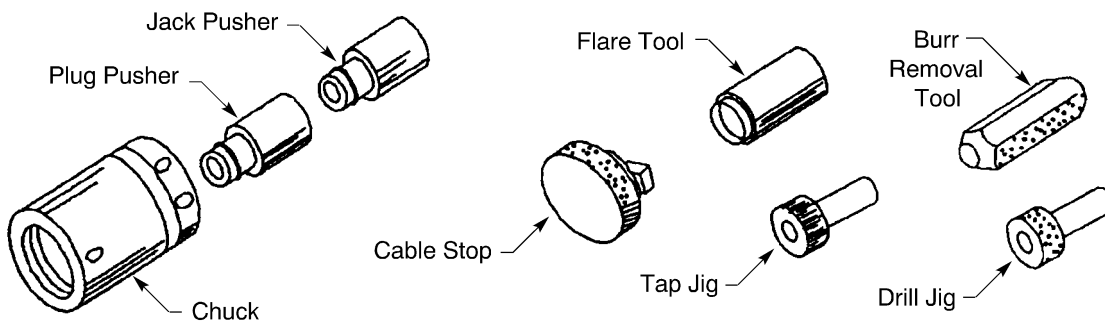
2. CONNECTOR ASSEMBLY

Refer to Subject 20-51-00 for the general conditions that are applicable for the assembly of coax connectors.

A. Necessary Tools for Connector Assembly

**Table 4
NECESSARY TOOLS**

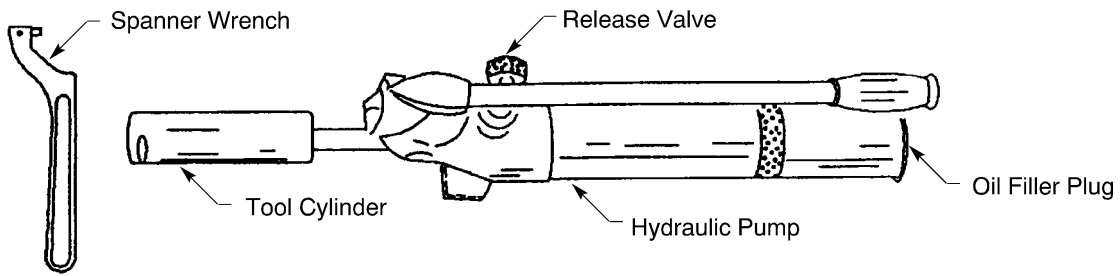
Tool	Part Number	Supplier
Applicator Kit	69468	AMP
Drill Jig	ST2218A	Boeing
Hydraulic Tool	69467	AMP
Hydraulic Tool With Flex Hose	69467-1	AMP



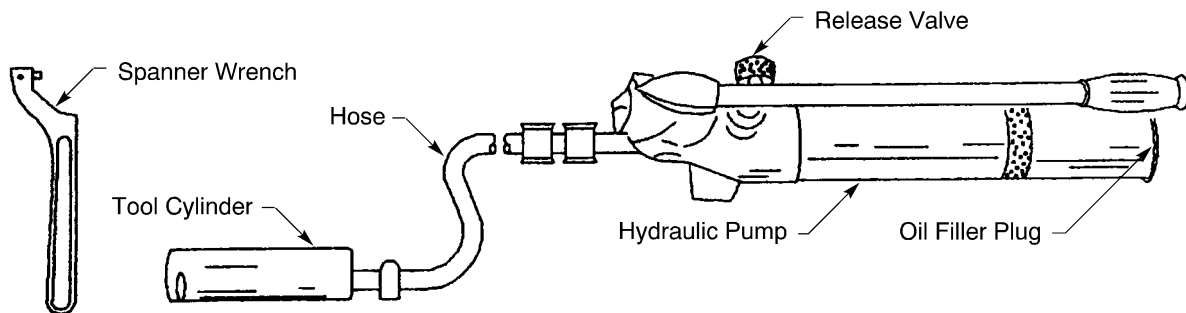
**CONTENTS OF THE AMP 69468 APPLICATOR KIT
Figure 3**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES



AMP 69467 HYDRAULIC TOOL
Figure 4



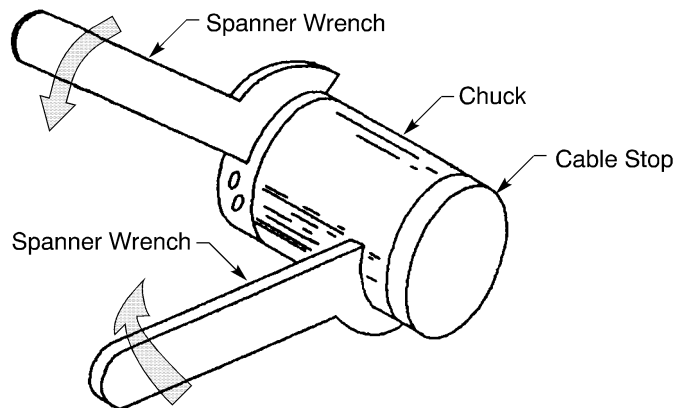
AMP 96467-1 HYDRAULIC TOOL WITH A FLEXIBLE HOSE
Figure 5

B. Cable Preparation

- (1) Cut the cable so that the end is perpendicular to the longitudinal axis of the cable.
- (2) Remove any burrs on the end of the cable.
- (3) Put the cable stop on the end of the chuck. Refer to Table 4 and Figure 3.
- (4) Put the chuck on the cable so that the end of the cable is against the cable stop.
- (5) Tighten the chuck with a pair of spanner wrenches. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES



POSITION OF THE SPANNER WRENCHES ON THE CHUCK

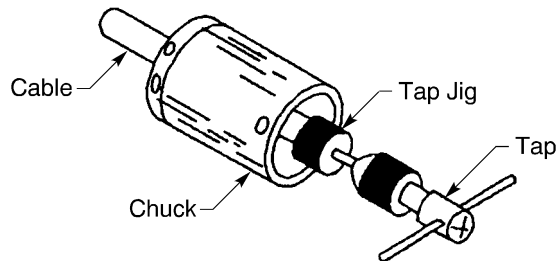
Figure 6

- (6) Remove the cable stop from end of the chuck.
- (7) If the coax cable has solid center conductor:
 - (a) Put the drill jig over the center conductor so that the end of the cable is against the jig.

NOTE: A satisfactory alternative for the AMP drill jig is given in Table 4.

 - (b) Drill the center of the conductor 0.25 inch to 0.40 inch with a 0.110 inch diameter drill bit.
 - (c) Remove the drill jig.
- (8) Put the tap jig on the cable so that:
 - The jig is over the center conductor
 - The end of the cable is against the jig.

Refer to Figure 7.



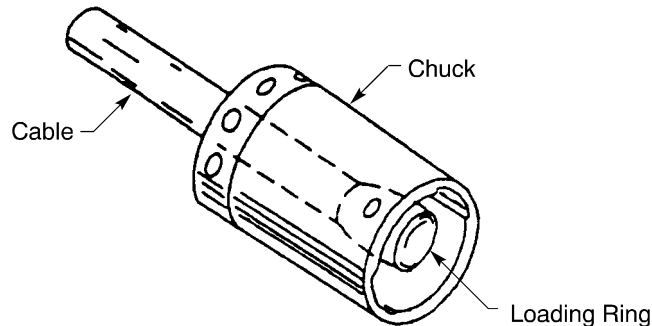
POSITION OF THE TAP JIG AND THE TAP ON THE CENTER CONDUCTOR

Figure 7

- (9) Put a 5-44 tap on the tap jig. Refer to Figure 7.
- (10) Turn the tap 8 turns to make a minimum of 7 threads in the center conductor.
- (11) Remove the tap and the tap jig from the cable.
- (12) Remove any burrs on the new threads of the conductor.
- (13) Put the loading ring on the cable. Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES**

Make sure that the large end of the ring is on the end of the cable.

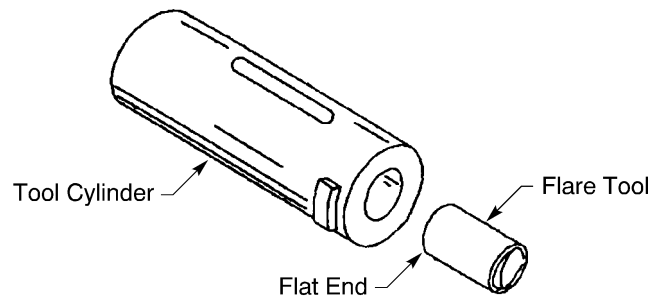
**POSITION OF THE LOADING RING****Figure 8**

(14) Make a selection of a hydraulic tool from Table 4.

Refer to:

- Figure 4 for the hydraulic tool without a flexible hose
- Figure 5 for the hydraulic tool with a flexible hose.

(15) Put the flat end of the flare tool into the hydraulic tool cylinder. Refer to Figure 9.

**POSITION OF THE FLARE TOOL IN THE TOOL CYLINDER****Figure 9**

(16) Put the tool cylinder into the chuck.

(17) Turn the cylinder approximately 1/4 of a turn to lock it in the chuck.

(18) Close the release valve on the hydraulic tool.

(19) Pump the handle of the hydraulic tool until:

- The flare tool is against the bottom of the chuck
- The pressure is released.

(20) Open the release valve.

(21) Remove tool cylinder from the chuck.

C. Assembly of the Connector Body

(1) Put the applicable pusher in the connector body. Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES**

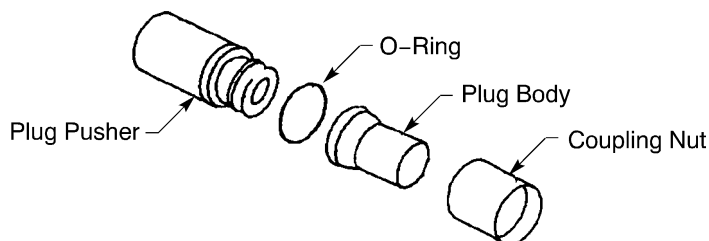
CAUTION: THE CONNECTOR BODY MUST BE PUSHED ONTO THE CABLE WITH THE CORRECT PUSHER.

NOTE: The plug pusher has a shoulder.

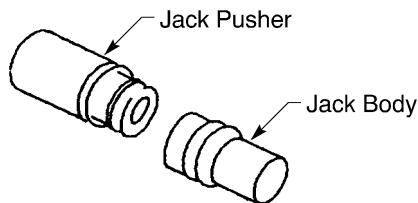
(2) For the plug, put these components on the body:

- The O-ring
- The pusher
- The coupling nut.

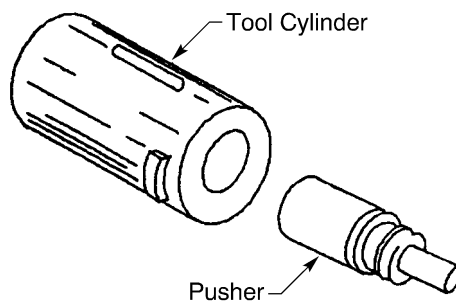
Refer to Figure 10.

**ASSEMBLY OF THE BODY OF THE PLUG CONNECTOR****Figure 10**

(3) For the jack, put the connector body on the pusher. Refer to Figure 11.

**ASSEMBLY OF THE BODY OF THE JACK CONNECTOR****Figure 11**

(4) Put the pusher in the tool cylinder. Refer to Figure 12.

**POSITION OF THE PUSHER IN THE TOOL CYLINDER****Figure 12**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES

- (5) Turn the cylinder approximately 1/4 of a turn to lock it in the chuck.
- (6) Close the release valve on the hydraulic tool.
- (7) Pump the handle until:
 - The pusher is against the bottom of the chuck
 - The pressure is released.
- (8) Open the release valve.
- (9) Remove the tool cylinder from the chuck.
- (10) Remove the pusher from the connector body.
- (11) Remove the chuck with the spanner wrenches.
- (12) Remove the pusher from the chuck.

D. Assembly of the Center Contact

- (1) Engage the threads of the contact with the center conductor.
- (2) Tighten the contact on the center conductor.
- (3) Put the Teflon insert bead on the center contact.
- (4) Pus the contact into the connector body until the insert bead and the contact are against the connector body.
- (5) Put the coupling nut on the connector.
- (6) Hold the clamp nut so that it does not move.

CAUTION: DAMAGE TO THE SWAGED CONNECTION CAN OCCUR IF THE CLAMP MOVES WHILE IT IS TIGHTENED.

- (7) Turn the plug or the jack with the torque wrench.
- (8) Torque the coupling nut 90 inch-pounds ± 5 inch-pounds.

3. RG231 COAX CABLE REPAIR

Refer to Subject 20-51-00 for the general conditions that are applicable for the preparation of coax cables.

A. Conditions for Repair

The cable must be replaced or repaired if the cable has:

- Any damage that goes through the jacket
- A dent or a depression that is greater than 3 inches in length
- A dent or a depression that is greater than 1/32 inch in depth.

B. Necessary Tools

**Table 5
NECESSARY TOOLS**

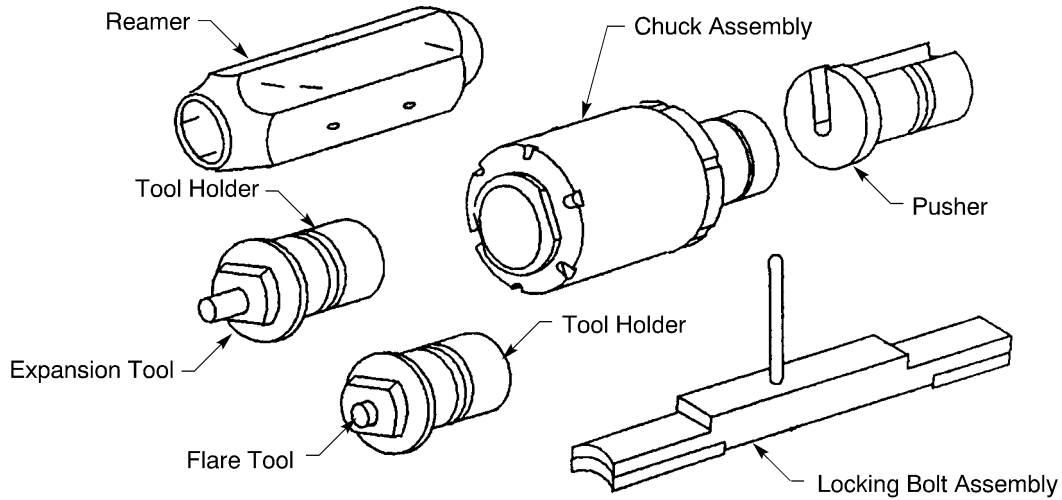
Tool	Part Number	Supplier
Applicator Kit	69658	AMP
Ratchet Tool	69634	AMP

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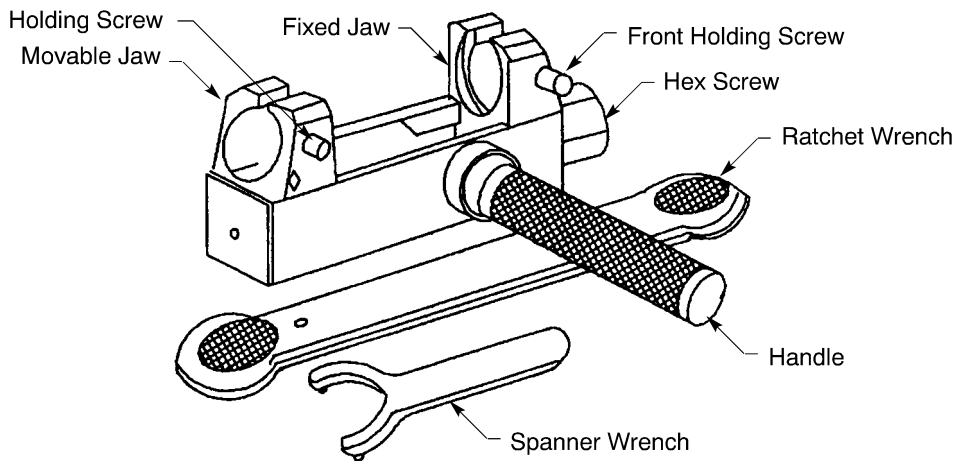
ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES

Refer to:

- Figure 13 for the applicator kit
- Figure 14 for the ratchet tool.



CONTENTS OF THE AMP 69658 APPLICATOR KIT
Figure 13



AMP 69634 RATCHET TOOL
Figure 14

NOTE: The handle and the holding screw can be assembled on either side of the ratchet tool.

C. Cable Preparation

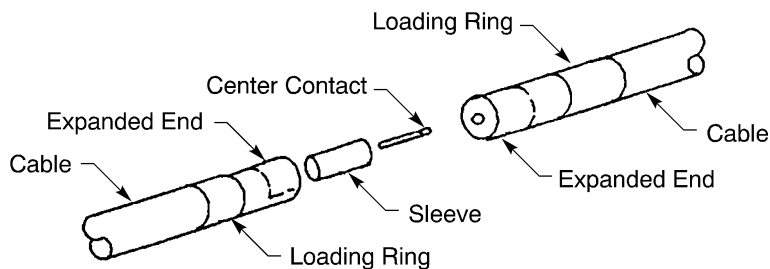
- (1) Make a selection of a splice from Table 2.
- (2) Cut each cable segment to make the end perpendicular to the longitudinal axis.
- (3) Remove any burrs from the end of each cable.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES**

(4) For the end of each cable:

- (a) Put a loading ring on the cable . Refer to Figure 15.

Make sure that the large end of the ring is toward the end of the cable.

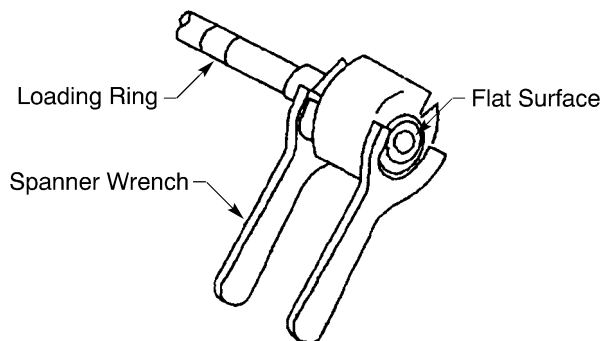


POSITION OF THE LOADING RING ON THE CABLE

Figure 15

- (b) Put the chuck on the cable. Refer to Figure 16.

Make sure that the flat surface of the chuck is aligned with the end of the cable.



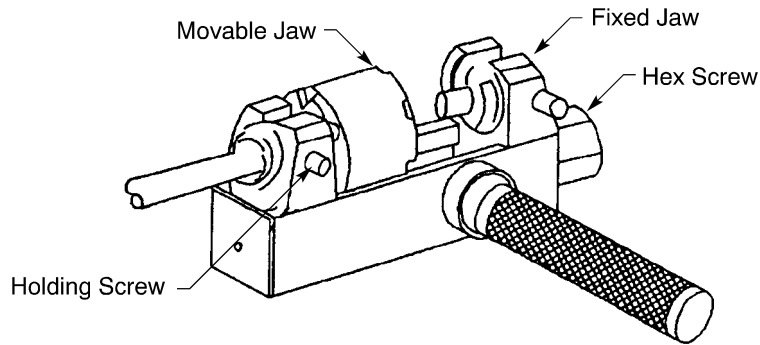
POSITION OF THE CHUCK ON THE CABLE

Figure 16

- (c) Tighten the chuck on the cable with a pair of spanner wrenches.
(d) Put the chuck in the movable jaw of the ratchet tool. Refer to Figure 17.

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ASSEMBLY OF AMP COAXICLAMP CONNECTORS AND SPLICES

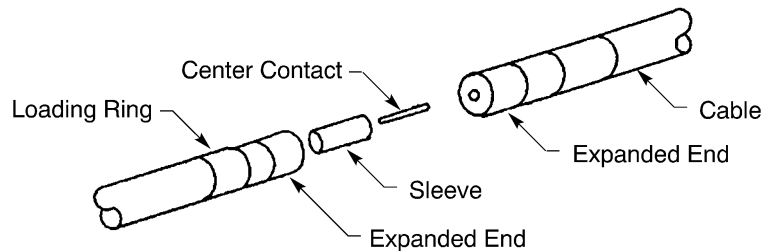


POSITION OF THE CHUCK IN THE RATCHET TOOL
Figure 17

- (e) Tighten the holding screw so that the chuck is held in position.
- (f) Put the flare tool on the tool holder.
- (g) Put the tool holder in the fixed jaw of the ratchet tool.
- (h) Turn the hex screw clockwise until the end of the cable is against the flare tool.
- (i) Turn hex screw counterclockwise until the tool holder can be removed.
- (j) Put the expander tool on the tool holder.
- (k) Put the tool holder into the fixed jaw of the ratchet tool.
- (l) Turn the hex screw clockwise until the cable is against the bottom of the expander tool.
 Make sure that the expander tool goes under the outer jacket of the cable.
- (m) Turn hex screw counterclockwise until the tool holder can be removed.
- (n) Remove the chuck from the ratchet tool.

D. Splice Assembly

- (1) Assemble the center contact. Refer to Figure 18.



CENTER CONTACT ASSEMBLY
Figure 18

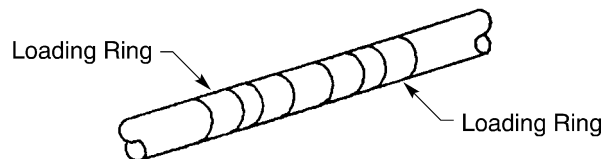
- (a) Put the center contact in the one end of the cable.
- (b) Put the sleeve on the contact.
- (c) Put the two ends of the cable together.

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Make sure that:

- The sleeve is under the jacket on the end of each cable
- The dielectrics of each cable are against each other.

Refer to Figure 19.

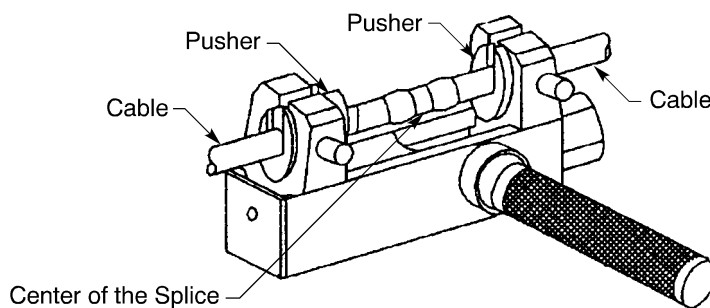


POSITION OF THE TWO ENDS OF THE CABLE

Figure 19

- (2) Put a pusher in each end of the ratchet tool.
- (3) Push loading ring toward the end of each cable.
- (4) Put the cable in the ratchet tool so that:
 - The center of the splice is aligned with the center of the tool.
 - Each cable is in the groove of the applicable pusher.

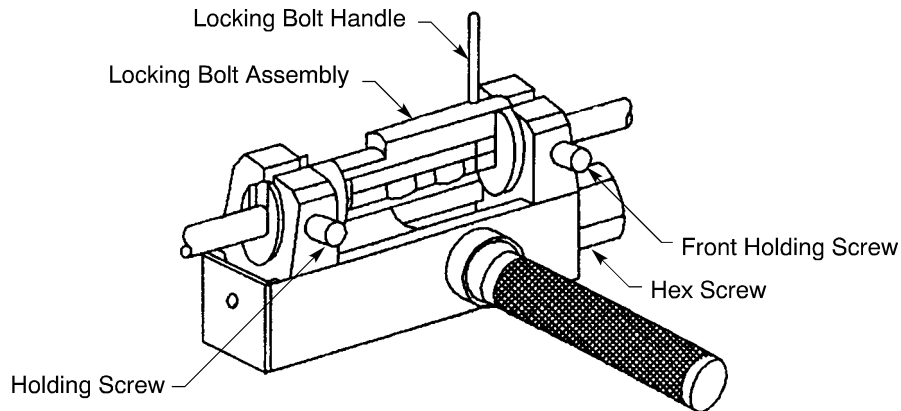
Refer to Figure 20.



POSITION OF THE SPLICE IN THE RATCHET TOOL

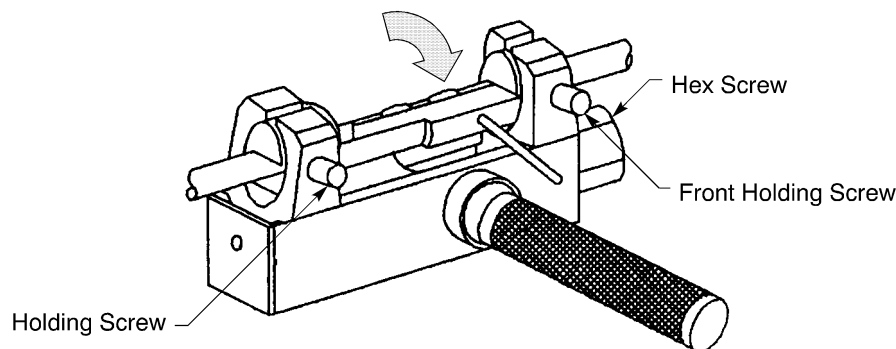
Figure 20

- (5) Put the locking bolt assembly in the ratchet tool. Refer to Figure 21.

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POSITION OF THE LOCKING BOLT ASSEMBLY IN THE RATCHET TOOL
Figure 21

- (6) Turn the handle of the locking bolt so that each pusher is in the locked position. Refer to Figure 22.



LOCKED POSITION OF THE PUSHERS
Figure 22

- (7) Tighten each holding screw so that the locking bolt stays in position.
- (8) To push the loading rings over the expanded ends of the cable, turn the hex screw clockwise with a ratchet wrench until the pushers are against the locking bolt assembly.
- (9) Loosen each holding screw.
- (10) Turn the locking bolt handle until it is in the vertical position. Refer to Figure 21.
- (11) Remove the locking bolt assembly.
- (12) Remove the cable from the ratchet tool.



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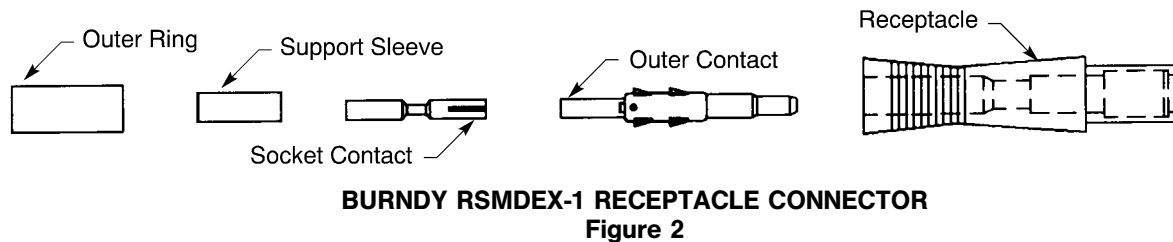
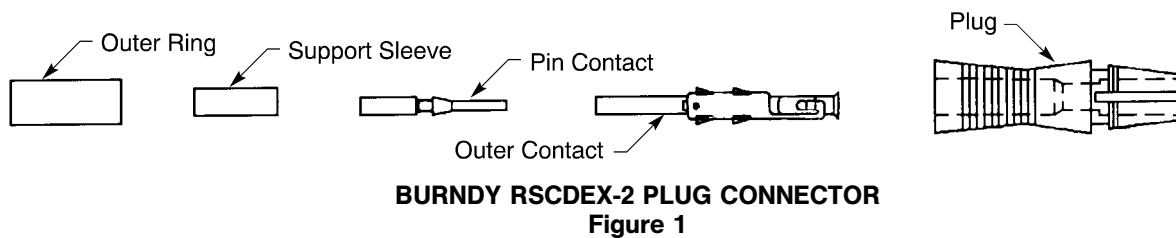
This Subject gives the procedures to assemble the Burndy RSCDEX-() coax connectors with the specified cables.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Configuration	Supplier
RSCDEX-2	Plug	Burndy
RSMDEX-1	Receptacle	Burndy



B. Coax Contact Part Numbers

**Table 2
COAX CONTACT KIT PART NUMBERS**

Connector	Kit		
	Part Number	Description	Supplier
RSCDEX-2	RCDXK-1	Coax Pin Contact Kit	Burndy
RSMDEX-1	RMDXK-1	Coax Socket Contact Kit	Burndy
RSMDEX-1	RMDXK-10	Coax Socket Contact Kit	Burndy

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ASSEMBLY OF BURNDY RSCDEX-() COAX CONNECTORS

**Table 3
COAX CONTACT KIT CONTENTS**

Kit	Contents		
	Part Number	Description	Supplier
RCDXK-1	RCDX60-2	Outer Contact	Burndy
	RCDXB055-1	Support Sleeve	Burndy
	RMD26L-1	Pin Contact	Burndy
	YOC-074	Outer Ring	Burndy
RMDXK-1	RFD26L-1	Socket Contact	Burndy
	RMDX60-2	Outer Contact	Burndy
	RMDXB055-1	Support Sleeve	Burndy
	YOC-074	Outer Ring	Burndy
RMDXK-10	RFD26-1	Socket Contact	Burndy
	RMDX60-2	Outer Contact	Burndy
	RMDXB055-3	Support Sleeve	Burndy
	YOC-074	Outer Ring	Burndy

C. Coax Cable Part Numbers

**Table 4
COAX CABLE PART NUMBERS**

Part Number	Supplier
5026A1018	Raychem
5026D1018	Raychem

2. CONNECTOR DISASSEMBLY

A. Coax Contact Removal

**Table 5
COAX CONTACT REMOVAL TOOLS**

Removal Tool	Supplier
RX20-25	Burndy
RXK20-25	Burndy

- (1) Make a selection of a coax contact removal tool from Table 5.
- (2) Push the tool into the contact cavity of the plug or the receptacle.
- (3) Pull the contact assembly and the tool from the contact cavity.

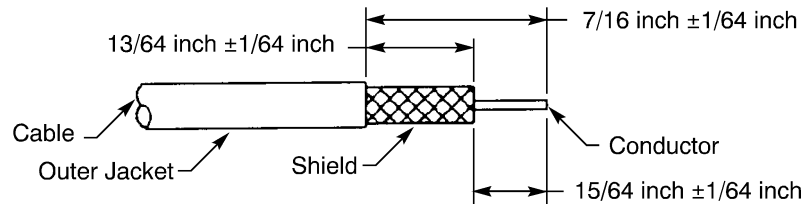
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ASSEMBLY OF BURNDY RSCDEX-() COAX CONNECTORS

3. CONNECTOR ASSEMBLY

Refer to Subject 20-51-00 for the general conditions that are applicable for the assembly of coax connectors.

A. Cable Preparation for the Assembly of Plug Connector



CABLE PREPARATION FOR A PLUG ASSEMBLY
Figure 3

Refer to Figure 3.

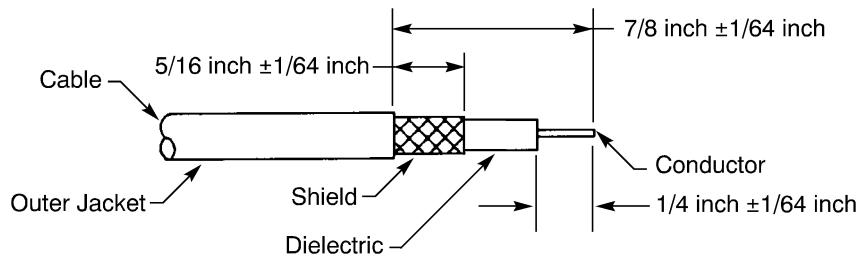
- (1) Cut the end of the cable perpendicular to the longitudinal axis of the cable.
- (2) Remove 7/16 inch ± 1/64 inch of the outer jacket from the end of the cable.

CAUTION: DO NOT CAUSE ANY DAMAGE TO THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY RELIABILITY OF THE CABLE OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

- (3) Remove 15/64 inch ± 1/64 inch of the shield and the dielectric from the end of the cable.

CAUTION: DO NOT CAUSE ANY DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY RELIABILITY OF THE CABLE OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

B. Cable Preparation for the Assembly of a Receptacle Connector



CABLE PREPARATION FOR A RECEPTACLE ASSEMBLY
Figure 4

Refer to Figure 4.

- (1) Cut the end of the cable perpendicular to the longitudinal axis of the cable.
- (2) Remove 7/8 inch ± 1/64 inch of the outer jacket from the end of the cable.

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ASSEMBLY OF BURNDY RSCDEX-() COAX CONNECTORS

CAUTION: DO NOT CAUSE ANY DAMAGE TO THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY RELIABILITY OF THE CABLE OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

- (3) Remove the necessary length of the shield.

Make sure that the distance from the end of the outer jacket to the end of the shield is 5/16 inch ± 1/64 inch.

CAUTION: DO NOT CAUSE ANY DAMAGE TO THE DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY RELIABILITY OF THE CABLE OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

- (4) Remove the necessary length of the dielectric.

Make sure that the distance from the end of the dielectric to the end of the cable is 1/4 inch ± 1/64 inch.

CAUTION: DO NOT CAUSE ANY DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY RELIABILITY OF THE CABLE OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM.

C. Coax Contact Assembly

**Table 6
COAX CONTACT CRIMP TOOLS**

Basic Unit		Locator		Die	
Part Number	Supplier	Part Number	Supplier	Part Number	Supplier
M10S-1	Burndy	SL-46	Burndy	S-26	Burndy

**Table 7
OUTER RING CRIMP TOOLS**

Basic Unit		Locator		Die	
Part Number	Supplier	Part Number	Supplier	Part Number	Supplier
M10S-1	Burndy	SL-47	Burndy	S-22	Burndy

- (1) Make a selection of a coax contact crimp tool from Table 6.
- (2) Make a selection of an outer ring crimp tool from Table 7.
- (3) Put the outer ring on the cable.

Refer to:

- Figure 1 for the plug connector
- Figure 2 for the receptacle connector.

- (4) Put the support sleeve on the cable.

Make sure that the sleeve is between the dielectric and the shield.

- (5) Put the pin or socket contact on the conductor.
- (6) Crimp the contact.
- (7) Put the outer contact on the cable.



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ASSEMBLY OF BURNDY RSCDEX-() COAX CONNECTORS

Make sure that:

- The barrel of the outer contact is between the shield and the body of the pin or socket contact
 - The pin or socket contact is locked in the body of the outer contact
 - The outer contact holds the pin or socket contact in position.
- (8) Push the outer ring forward until it stops.
- (9) Crimp the outer ring.

D. Coax Contact Insertion

- (1) Put the wired contact into the rear end of the connector.

Make sure the contact is fully inserted in the connector.

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ASSEMBLY OF BURNDY M22T() COAX CONNECTORS

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ASSEMBLY OF BURNDY M22T() COAX CONNECTORS

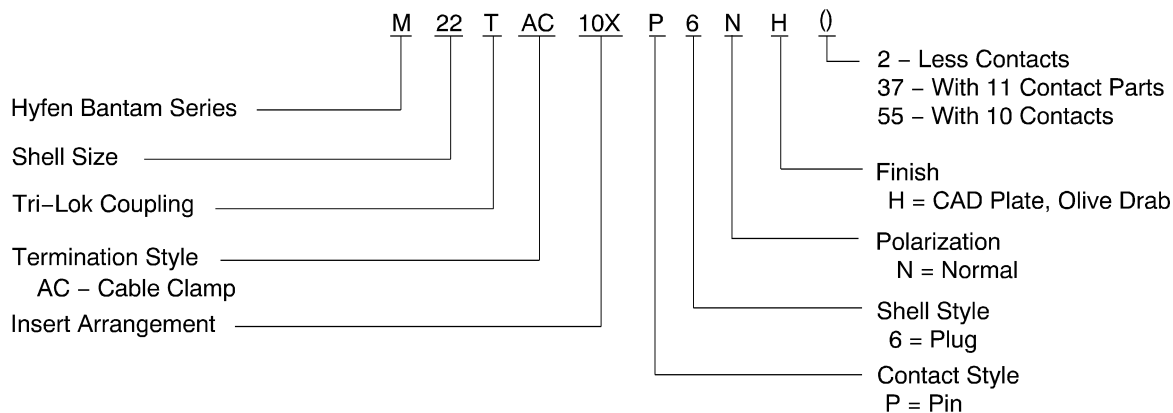
This Subject gives the procedure to assemble the Burndy M22T() coax connectors with the specified coax cables.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Supplier
M22T()	Burndy



**BURNDY M22T() COAX CONNECTOR PART NUMBER STRUCTURE
Figure 1**

B. Coax Contact Assembly Part Numbers

**Table 2
COAX CONTACT ASSEMBLY PART NUMBERS**

Part Number	Description	Supplier
RFM26W1D28	Center Contact	Burndy
RMMX110-1D28	Contact Body	Burndy
Y0C110	Hyring Ferrule	Burndy

C. Coax Cable Part Numbers

**Table 3
COAX CABLE PART NUMBERS**

Part Number	Specification	Supplier
M17/70-RG195	MIL-C-17/70	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY M22T() COAX CONNECTORS

2. CONNECTOR DISASSEMBLY

A. Contact Removal

NOTE: The contact assembly:

- Is released from the front of the connector
- Cannot be repaired.

**Table 4
COAX CONTACT REMOVAL TOOLS**

Removal Tool	Supplier
RX8-1	Burndy

- (1) Remove the cable clamp hardware.
- (2) Make a selection of a coax contact removal tool from Table 4.
- (3) Put the tip of the removal tool over the front of the contact.
- (4) Carefully push the tool into the connector body until the contact is pushed out the rear of the connector.
- (5) If it is necessary to replace the contact:
 - (a) Cut the contact off the wire.
 - (b) Discard the contact.

3. CONNECTOR ASSEMBLY

Refer to Subject 20-51-00 for the general conditions that are applicable for the assembly of coax connectors.

A. Contact Assembly

**Table 5
COAX CONTACT CRIMP TOOLS**

Basic Unit		Die		
Part Number	Supplier	Part Number	Size	Supplier
M8ND	Burndy	N22RVMT-10	Small	Burndy

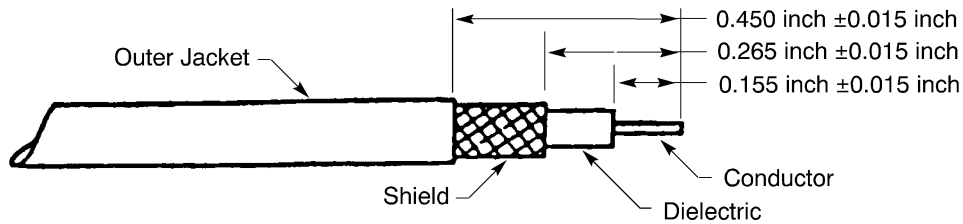
**Table 6
FERRULE CRIMP TOOLS**

Basic Unit		Die		
Part Number	Supplier	Part Number	Size	Supplier
M8ND	Burndy	N22RVMT-10	Large	Burndy

- (1) Make a selection of a contact crimp tool from Table 5.
- (2) Make a selection of a ferrule crimp tool from Table 6.
- (3) Prepare the cable. Refer to Figure 2.

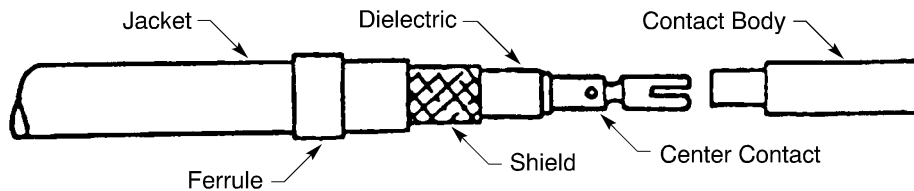
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ASSEMBLY OF BURNDY M22T() COAX CONNECTORS



CABLE PREPARATION
Figure 2

- (a) Remove 0.450 inch ± 0.015 inch of the outer jacket from the end of the cable.
- (b) Remove 0.265 inch ± 0.015 inch of the shield from the end of the cable.
- (c) Remove 0.155 inch ± 0.015 inch of the dielectric from the end of the cable.
- (4) Put the center conductor into the wire barrel of the center contact.
- (5) Crimp the contact. Refer to Figure 3.



POSITION OF THE CENTER CONTACT
Figure 3

- (6) Put the ferrule on the cable.
- (7) Push the contact body:
 - Under the shield
 - Over the center contact until it makes a click.
- (8) Push the ferrule over the shield until the forward edge of the ferrule is against the contact body.
- (9) Crimp the ferrule.

B. Contact Insertion

NOTE: It is not necessary to install contacts into contact cavities that are not used.

- (1) Manually push the wired contact into the contact cavity.
Make sure that the contact is fully inserted.

C. Connector Assembly

- (1) Put the cable clamp on the rear of the connector.



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ASSEMBLY OF BURNDY G6F12-88() COAX CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY G6F12-88() COAX CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Configuration	Supplier
G6G12-88PNH	Plug	Burndy
G6G12-88SNH	Receptacle	Burndy

B. Coax Contact Part Numbers

**Table 2
COAX CONTACT PART NUMBERS**

Part Number	Contact Type	Supplier
RCDX60-32D28	Socket	Burndy
RMDX60-32D28	Pin	Burndy

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 3
COAX CONTACT REMOVAL TOOLS**

Contact	Removal Tool
RMDX60-32D28	RX16D11-D1
RCDX60-32D28	RX16D11-D1

CAUTION: TO AVOID ANY DAMAGE TO THE CONNECTOR GROMMET, EACH CONTACT MUST BE FULLY REMOVED ONE AT A TIME.

- (1) Make a selection of a removal tool from Table 3.

CAUTION: DO NOT USE A PAIR OF PLIERS TO REMOVE A CONTACT. DAMAGE TO THE CONTACT CAN OCCUR.

- (2) Remove the grommet compression nut or strain relief clamp.

CAUTION: DO NOT TRY TO REMOVE THE GROMMET FROM THE CONNECTOR. THE GROMMET IS BONDED TO THE SHELL.

- (3) Put the plunger of the tool in the fully retracted position.

CAUTION: IF THE PLUNGER IS NOT IN THE FULLY RETRACTED POSITION, DAMAGE CAN OCCUR TO THE CONNECTOR OR THE CONTACTS, OR BOTH.

- (4) Put the end of the removal tool on the engaging end of the contact.
- (5) Push the tool into the contact cavity until it stops.

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ASSEMBLY OF BURNDY G6F12-88() COAX CONNECTORS

- (6) Hold the tool in position and lightly turn it back and forth to make sure that it is correctly engaged in the retention clip.
- (7) Push the plunger in to eject the contact from the contact cavity.
- (8) Manually remove the contact from the grommet.

3. CONNECTOR ASSEMBLY

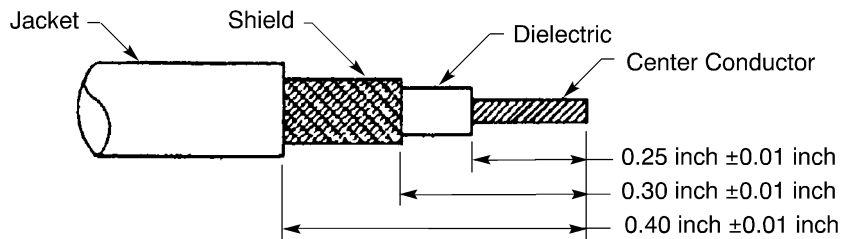
Refer to Subject 20-51-00 for the general conditions that are applicable for the assembly of coax connectors.

A. Contact Assembly

**Table 4
COAX CONTACT CRIMP TOOLS**

Contact	Crimp Tool		
	Basic Unit	Die Set	Stop Bushing
RMDX60-32D28	M10S-1	S-80	SL-105
RCDX60-32D28	M10S-1	S-80	SL-105

- (1) Make a selection of a coax contact crimp tool from Table 4.
- (2) Prepare the cable. Refer to Figure 1.



**COAX CABLE PREPARATION
Figure 1**

- (a) Remove 0.40 inch ±0.01 inch of the outer jacket from the end of the cable.
- (b) Remove 0.30 inch ±0.01 inch of the shield from the end of the cable.
- (c) Remove 0.25 inch ±0.01 inch of the dielectric from the end of the cable.
- (3) Put the center conductor in the wire barrel of the contact.
- (4) Crimp the contact.

B. Contact Insertion

- (1) Put each wired contact into the correct contact cavity by hand.



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ASSEMBLY OF BURNDY G6F12-88() COAX CONNECTORS

4. APPROVED TOOL SUPPLIERS

A. Coax Contact Crimp Tools

Table 5
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
M10S-1	Burndy
RX16D11-D1	Burndy
S-80	Burndy
SL-105	Burndy

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ASSEMBLY OF AMPHENOL 82-175 COAX CONNECTORS

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMPHENOL 82-175 COAX CONNECTORS**

This Subject gives the procedures to assemble the Amphenol 82-175 coax connectors with the specified coax cables.

1. PART NUMBERS AND DESCRIPTION**A. Connector Part Numbers**

Table 1
COAX CONNECTOR PART NUMBERS

Part Number	Supplier
82-175	Amphenol

B. Adapter Kit Part Numbers

Table 2
ADAPTER KIT PART NUMBERS

Part Number	Description	Supplier
82-887	Adapter Kit	Amphenol

C. Coax Cable Part Numbers

Table 3
COAX CABLE PART NUMBERS

Part Number	Description	Supplier
421-593	CUJAC	Amphenol
G87T325CU	Coaxitube	Precision Tube Company

2. CONNECTOR ASSEMBLY

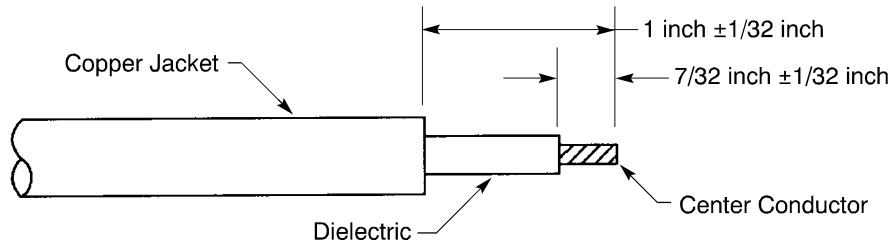
Refer to Subject 20-51-00 for the general conditions that are applicable for the assembly of coax connectors.

A. Contact Assembly

- (1) Remove these components from the coax connector package:
 - The jack body
 - The center contact.
- (2) Discard the remaining components.
- (3) Prepare the cable. Refer to Figure 1.

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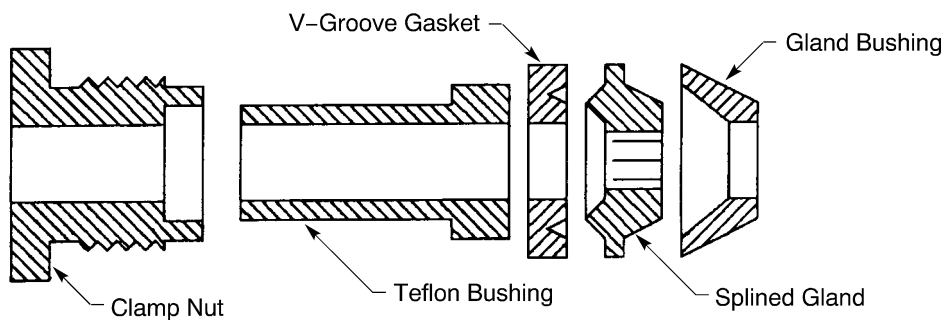
ASSEMBLY OF AMPHENOL 82-175 COAX CONNECTORS



CABLE PREPARATION
Figure 1

- (a) Cut the end of the cable.
Make sure that the end is perpendicular to the longitudinal axis.
 - (b) Lightly make a mark on the copper jacket $1 \text{ inch} \pm 1/32 \text{ inch}$ from the end of the cable with a tube cutter.
 - (c) Bend the cable at the mark approximately 30 degrees in each direction until the length of the copper jacket breaks at the mark.
 - (d) Remove $7/32 \text{ inch} \pm 1/32 \text{ inch}$ of the dielectric from the end cable.
- (4) In order, put these components from the adapter kit on the cable:
- The clamp nut
 - The teflon bushing
 - The V-groove gasket
 - The splined gland
 - The gland bushing.

Refer to Figure 2.



POSITION OF THE ADAPTER KIT COMPONENTS ON THE CABLE
Figure 2

- (5) Put the center contact on the center conductor.
Make sure that the end of the contact is a minimum of $1/32 \text{ inch}$ from the end of the dielectric.
- (6) Solder the contact.

B. Connector Assembly

- (1) Push the end of the cable into the jack body until it stops.



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ASSEMBLY OF AMPHENOL 82-175 COAX CONNECTORS

(2) In order, push these components into the jack body:

- The clamp nut
- The teflon bushing
- The V-groove gasket
- The splined gland
- The gland bushing.

Make sure that the components are aligned with each other.

(3) Torque the clamp nut 100 inch-pounds \pm 10 inch-pounds.

(4) Make an inspection of the center contact in relation to the dielectric.

Make sure that the forward end of the center contact is a maximum of 1/32 inch from the end of the dielectric.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 82-3292 COAX CONNECTORS

This Subject gives the procedure to assemble the Amphenol 82-3292 coax connectors with the specified coax cables.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Supplier
82-3292	Amphenol

B. Coax Cable Part Numbers

**Table 2
COAX CABLE PART NUMBERS**

Part Number	Supplier
BA14349	ITT Surprenant

2. CONNECTOR ASSEMBLY

Refer to Subject 20-51-00 for the general conditions that are applicable for assembly of coax connectors.

A. Cable Preparation

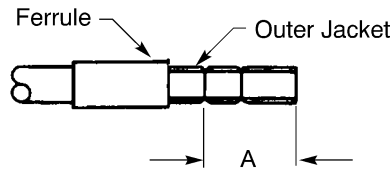
**Table 3
COAX CABLE TRIM DIMENSIONS**

Dimension	Target (inch)	Tolerance (inch)
A	0.687	0.02
B	0.390	0.02
C	0.187	0.02
D	0.500	0.02

- (1) Cut the end of the cable.
Make sure that the end is perpendicular to the longitudinal axis of the cable.
- (2) If a ferrule is supplied, put the ferrule on the cable.
Make sure that the end with the smaller outside diameter is pointed away from the end of the cable.
- (3) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to dimension A.
Refer to Table 3 and Figure 1.

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ASSEMBLY OF AMPHENOL 82-3292 COAX CONNECTORS

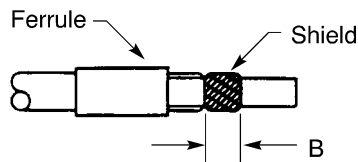


OUTER JACKET REMOVAL LENGTH

Figure 1

- (4) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the outer jacket equal to dimension B.

Refer to Table 3 and Figure 2.

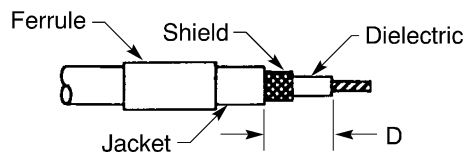


LENGTH OF THE SHIELD

Figure 2

- (5) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end outer jacket equal to dimension D.

Refer to Table 3 and Figure 3.

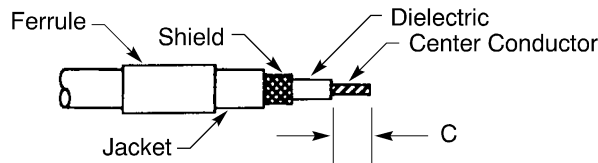


DIELECTRIC REMOVAL LENGTH

Figure 3

- (6) Remove the necessary length of the center conductor to make the distance from the end of the conductor to the end of the dielectric equal to dimension C.

Refer to Table 3 and Figure 4.



LENGTH OF THE CENTER CONDUCTOR

Figure 4

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 82-3292 COAX CONNECTORS

B. Connector Assembly

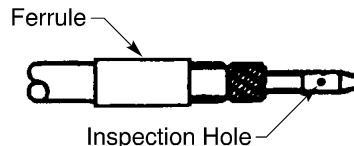
**Table 4
COAX CONTACT CRIMP TOOLS**

Basic Unit	Die		
	Part Number	Cavity	Dimension (inch)
227-944	-	B	0.100
M22520/5-01	227-1221-57	B	0.100

**Table 5
FERRULE CRIMP TOOLS**

Basic Unit	Die		
	Part Number	Cavity	Dimension (inch)
227-944	-	A	0.213
M22520/5-01	227-1221-57	A	0.213

- (1) Make a selection of a crimp tool from Table 4.
- (2) Make a selection of a ferrule crimp tool from Table 5.
- (3) In this sequence, put these components on the cable:
 - The outer ferrule
 - The cable position insulator
 - The seal ring.
- (4) Put the contact on the center conductor. Refer to Figure 5.

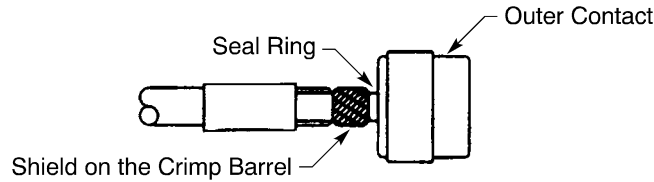


**POSITION OF THE CENTER CONDUCTOR ON THE CABLE
Figure 5**

- (5) Crimp the contact.
Make sure that strands of the center conductor can be seen in the inspection hole.
- (6) Push the crimp barrel of the outer contact rearward between the dielectric and the shield until it stops. Refer to Figure 6.
Make sure that the outer contact is locked in position.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 82-3292 COAX CONNECTORS



POSITION OF THE OUTER CONTACT

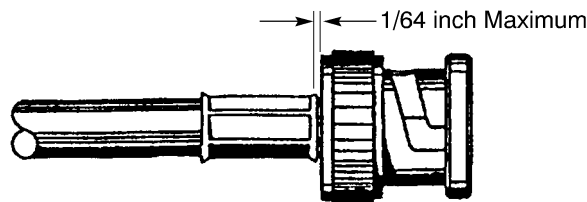
Figure 6

(7) Make the shield smooth and symmetrical around the rear end of the crimp barrel.

(8) Move the ferrule forward over the shield. Refer to Figure 7.

Make sure that:

- The seal ring is under the ferrule
- The seal ring is against the shoulder of the outer contact
- The distance from the end of the ferrule to the shoulder of the outer contact is not more than 1/64 inch.



POSITION OF THE FERRULE AGAINST THE OUTER CONTACT

Figure 7

(9) Crimp the ferrule.

3. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 6
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
227-1221-57	Amphenol
227-944	Amphenol
M22520/5-01	QPL



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ASSEMBLY OF ANDREWS 44ASN AND 40229 COAX CONNECTORS

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	C. Connector Body Assembly	4

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ANDREWS 44ASN AND 40229 COAX CONNECTORS

This subject gives the procedure to assemble the Andrews coax connectors with the specified coax cables.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Supplier
44ASN	Andrews
40229	Andrews

B. Coax Cable Part Numbers

**Table 2
COAX CABLE PART NUMBERS**

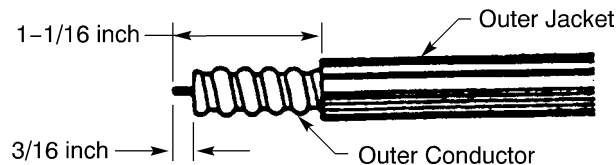
Part Number	Supplier
FSJ4-50	Andrews

2. CONNECTOR ASSEMBLY

Refer to Subject 20-51-00 for the general conditions that are applicable for the assembly of coax connectors.

A. Cable Preparation

- (1) Cut the end of the cable.
Make sure that the end is perpendicular to the longitudinal axis of the cable.
- (2) Remove 1-1/16 inches of the outer jacket from the end of the cable. Refer to Figure 1.



**CABLE PREPARATION
Figure 1**

- (3) Remove 3/16 inch of the outer conductor from the end of the cable.
 - (a) Lightly cut around the circumference of the outer conductor with a serrated knife or an equivalent tool.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INNER CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE.

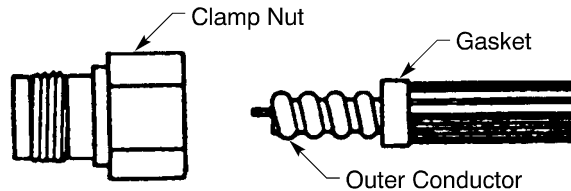
- (b) Remove any burrs on the outer conductor with a file.
- (4) Remove 3/16 inch of the foam from the end of the cable. Refer to Figure 1.
- (5) Put the gasket on the cable. Refer to Figure 2.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ANDREWS 44ASN AND 40229 COAX CONNECTORS

Make sure that the groove of the gasket is aligned with the corrugated groove of the outer conductor.

CAUTION: THE GASKET MUST BE AGAINST THE CORRUGATED GROOVE OF THE OUTER CONDUCTOR. A SEAL THAT IS NOT INSTALLED CORRECTLY CAN CAUSE UNSATISFACTORY PERFORMANCE.

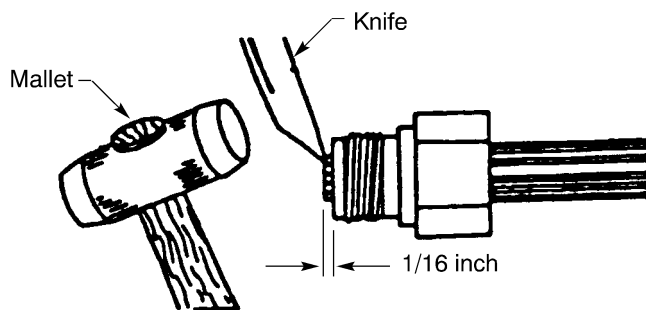


POSITION OF THE GASKET ON THE CABLE
Figure 2

- (6) Put a thin layer of silicone grease on:
 - The outside surface of the gasket
 - The inside surface of the clamp nut.
- (7) Put the clamp nut on the cable.
Make sure that the outer conductor is extended 1/16 inch from the end of the clamp nut.
- (8) Cut the edge of the outer conductor approximately 1/16 inch at 12 locations with a pair of fine wire cutters or a knife. Refer to Figure 3.

Make sure that the outer conductor is cut equally and symmetrically around the circumference.

NOTE: If a knife is used to cut the outer conductor, a mallet can be used to lightly hit the back edge of the knife.



LOCATIONS TO CUT THE OUTER CONDUCTOR
Figure 3

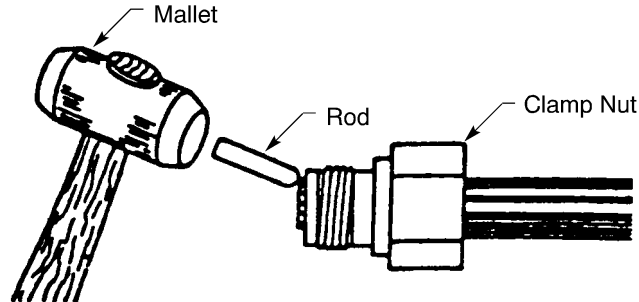
- (9) With a rod or an equivalent tool, bend each length between the locations where the outer conductor is cut. Refer to Figure 4.

Make sure that each part of the outer conductor is flat against the end of the clamp nut.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ANDREWS 44ASN AND 40229 COAX CONNECTORS

CAUTION: APPLY ONLY THE SUFFICIENT AMOUNT OF FORCE TO MAKE EACH PART OF THE END OF THE OUTER CONDUCTOR FLAT. THE THICKNESS OF THE METAL MUST NOT DECREASED.

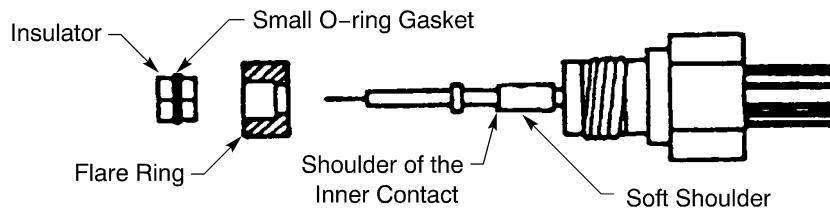


POSITION OF THE END OF THE OUTER CONDUCTOR AGAINST THE CLAMP NUT
Figure 4

- (10) Remove the unwanted parts of the outer conductor.
 Make sure that each end does not extend farther than the outside circumference of the clamp nut.

B. Inner Contact Assembly

- (1) Clean the inner conductor.
- (2) Put the inner contact on the inner conductor. Refer to Figure 5.



INNER CONTACT ASSEMBLY
Figure 5

- (3) Temporarily put the flare ring on the inner conductor.
 Make sure that:
 - The hole with the smaller diameter is pointed toward the cable
 - The rearward surface of the flare ring is flat against the shoulder of the inner contact.
- (4) Remove the flare ring.
- (5) Solder the inner contact.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER. DAMAGE TO THE CABLE CAN CAUSE UNSATISFACTORY PERFORMANCE.

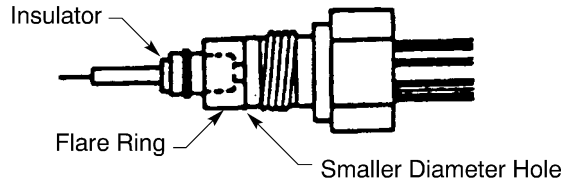
- (6) Immediately remove any unwanted solder.
- (7) Cut the foam dielectric to align the end of the dielectric with the end of the flat end of the outer conductor.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ANDREWS 44ASN AND 40229 COAX CONNECTORS

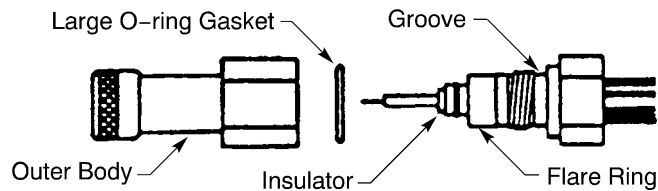
C. Connector Body Assembly

- (1) Remove the copper particles from the foam dielectric with a small wire brush.
- (2) Put the flare ring over the inner contact. Refer to Figure 6.
Make sure that the hole with the smaller inner diameter is against the outer conductor.



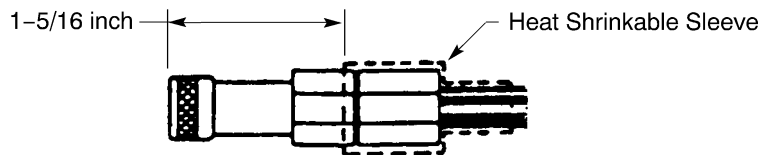
POSITION OF THE FLARE RING AND INSULATOR
Figure 6

- (3) Push the insulator into the inner contact until it makes a click.
- (4) Put the heat shrinkable sleeve on the cable.
- (5) Put a thick layer of silicone grease on the large O-ring gasket.
- (6) Put the O-ring in the groove for the gasket on the clamp nut. Refer to Figure 7.



CONNECTOR BODY ASSEMBLY
Figure 7

- (7) Push the outer body onto the contact assembly.
- (8) Engage the threads of the outer body and the clamp nut.
- (9) Torque the outer body 95 inch-pounds \pm 5 inch-pounds.
NOTE: Hold the clamp nut in position and turn the connector body.
- (10) Push the heat shrinkable sleeve forward until the forward end of the sleeve is 1-5/16 inch from the end of the connector connector body. Refer to Figure 8.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 8

- (11) Shrink the sleeve in position. Refer to Subject 20-10-14.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CABLEWAVE COAX CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CABLEWAVE COAX CONNECTORS

This subject gives the procedure to assemble the specified Cablewave coax connectors with the specified coax cables.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
COAX CONNECTOR PART NUMBERS**

Part Number	Supplier
75-500	Cablewave
76-500	Cablewave

B. Coax Cable Part Numbers

**Table 2
COAX CABLE PART NUMBERS**

Part Number	Description	Supplier
64-500	Coax Cable, Aluminum Sheath	Prodelin

2. CONNECTOR ASSEMBLY

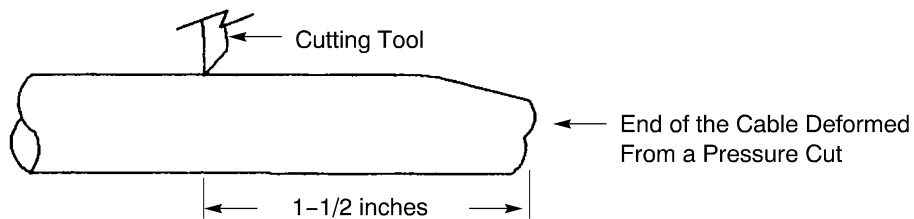
Refer to Subject 20-51-00 for the general conditions that are applicable for the assembly of coax connectors.

A. Cable Preparation

- (1) Make a selection of a tube cutting tool with a flat-sided blade.
- (2) Cut through the cable jacket and the outer conductor 1-1/2 inches from the end of the cable. Refer to Figure 1.

Make sure the flat side of the blade is opposite of the end of the cable.

CAUTION: TO PREVENT DEFORMATION OF THE OUTER CONDUCTOR, A FLAT-SIDED BLADE MUST BE USED.

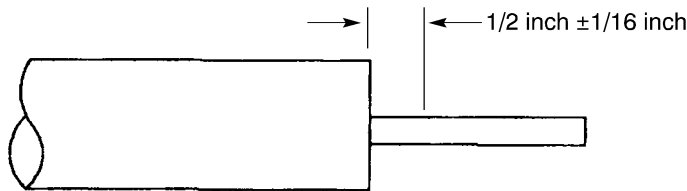


**CABLE JACKET AND OUTER CONDUCTOR REMOVAL
Figure 1**

- (3) Cut the hollow dielectric cores at the end of the outer conductor.
- (4) Remove the sheath and the core.
- (5) Cut the inner conductor 1/2 inch \pm 1/16 inch from the end of the outer conductor. Refer to Figure 2.

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ASSEMBLY OF CABLEWAVE COAX CONNECTORS



INNER CONDUCTOR PREPARATION
Figure 2

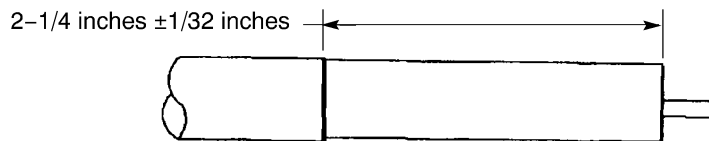
- (6) Hold the cable down and file the end of inner conductor to make the radius equal to or more than 1/32 inch.

NOTE: The inner conductor is the center contact.

CAUTION: MAKE SURE THAT NO PARTICLES GO INTO THE HOLLOW DIELECTRIC CORE.

- (7) Cut the outer jacket 2-1/4 inches \pm 1/32 inch from the end of the outer conductor. Refer to Figure 3.
- (8) Remove the jacket.

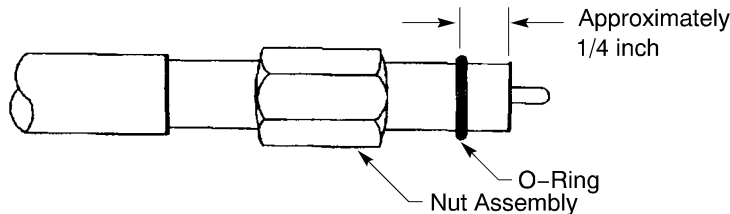
CAUTION: MAKE SURE THAT DAMAGE TO THE OUTER CONDUCTOR DOES NOT OCCUR WHEN THE JACKET IS REMOVED.



OUTER JACKET REMOVAL LENGTH
Figure 3

B. Connector Assembly

- (1) Put the nut assembly of connector on the cable.
- (2) Put the O-Ring approximately 1/4 inch from of the end of the cable. Refer to Figure 4.



POSITION OF THE O-RING
Figure 4

- (3) Hold the connector body against the end of the cable.
- (4) Engage the threads of the connector body and the nut assembly.

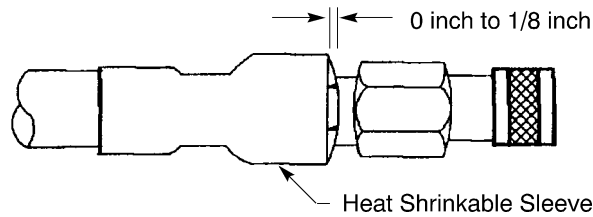
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF CABLEWAVE COAX CONNECTORS**

- (5) Manually tighten the nut.
- (6) Make one additional turn of the nut with a wrench.

CAUTION: ONLY THE NUT MUST BE TURNED. DO NOT TURN THE CONNECTOR BODY.

- (7) Put a 3 inch to 4 inch length of 1 inch diameter heat shrinkable sleeve on the assembly. Refer to Figure 5.

Make sure that the forward edge of the sleeve is 0 inch to 1/8 inch from the edge of the nut assembly.

**POSITION OF THE HEAT SHRINKABLE SLEEVE****Figure 5**

- (8) Shrink the sleeve in position. Refer to Subject 20-10-14.



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CONNECTOR ASSEMBLY WITH TRIAX CABLE

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STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Connector Type	Supplier
1965-12-9	Triax Cable	Kings
30382-1	Triax Cable	Dage
30391-1	Triax Cable	Dage
83-59	Right Angle UHF	Amphenol

B. Cable Adapter Part Numbers

**Table 2
TRIAx CABLE ADAPTER PART NUMBERS**

Part Number	Supplier
83-185	Amphenol

C. Cable Part Numbers

**Table 3
TRIAx CABLE PART NUMBERS**

Part Number	Cable Type	Supplier
10363	Triax	Raychem
7524D5011	Triax	Raychem
BA6416A	Triax	Surprenant

D. Necessary Materials

**Table 4
NECESSARY MATERIALS**

Material	Specification or Part Number	Supplier	Notes
Adhesive	S-1006	Raychem	-
	S-1009	Raychem	-
Catalyst, RTV	F	Dow Corning	Only For 3110 RTV Potting Compound
	S	Dow Corning	Only For 3110 RTV Potting Compound

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CONNECTOR ASSEMBLY WITH TRIAX CABLE

Table 4 (continued)

Material	Specification or Part Number	Supplier	Notes
Emery Cloth	No. 240	Any Source	-
	No. 320	Any Source	-
Masking Tape	1/2 Inch Width	Any Source	-
Naptha, aliphatic	TT-N-95	Any Source	-
Solvent	BMS 11-7	Boeing	-

**Table 5
APPROVED SUPPLIERS OF BOEING STANDARD SOLVENTS**

Boeing Specification	Approved Supplier
BMS 11-7	AZKO/Dexter Aerospace Finishes
	Barton Solvents
	Elf Atochem Turco Products
	Pratt and Lambert Industrial Coating

**Table 6
POTTING COMPOUNDS**

Temperature Grade	Cure Time (hours)	Part Number or Specification	Supplier	Description
A	48	MIL-S-8516	QPL	Polysulfide
	48	WS 516	J and R Industries	Polysulfide
C	2 (10 Percent Catalyst F)	3110 RTV	Dow Corning	Silicone
	6.5 (10 Percent Catalyst S)	3110 RTV	Dow Corning	Silicone

2. ASSEMBLY OF MIL-C-26482 AND MIL-C-26500 CONNECTORS WITH TRIAX CABLE

This paragraph gives the procedures to assemble connectors with these triax cables:

- Raychem 10363
- Raychem 7524D5011
- Surprenant BA6416A.

A. Connector Assembly with a Straight Heat Shrinkable Boot

This paragraph gives the procedure to assemble the connector with the Raychem 202A132-3-00 heat shrinkable boot.

- (1) Prepare the cable. Refer to Paragraph 2.C.
- (2) Discard the ferrule and the grommet nut if they are supplied with the connector.

NOTE: The ferrule and the grommet nut are not used for assembly of a connector with a heat shrinkable boot.

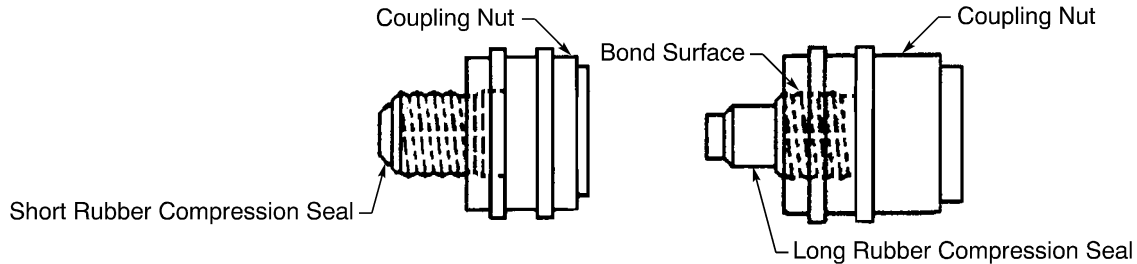
STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE

- (3) Make a selection of a 500 degree F hot air gun. Refer to Subject 20-10-14.

NOTE: A reflector is recommended.

- (4) For a connector that has a long rubber compression seal, prepare the surfaces of the boot, the connector and the cable that make a bond with an adhesive. Refer to Figure 1 and Paragraph 2.F.



BOND SURFACE OF A CONNECTOR WITH A LONG RUBBER COMPRESSION SEAL
Figure 1

- (5) Put the boot on the cable.
 (6) Assemble the connector.

Refer to:

- Subject 20-61-16 for the procedures to assemble a MIL-C-26482 type connector
- Subject 20-61-11 for the procedures to assemble a MIL-C-26500 type connector.

- (7) For a connector that that has a long rubber compression seal:
- (a) Make a selection of an adhesive from Table 4.
 - (b) Make a selection of a solvent from Table 4.
 - (c) Apply the adhesive on the bond surface of these components:
 - The boot
 - The connector
 - The cable.

Make sure that the adhesive extends 0.13 inch farther than the bond surface.

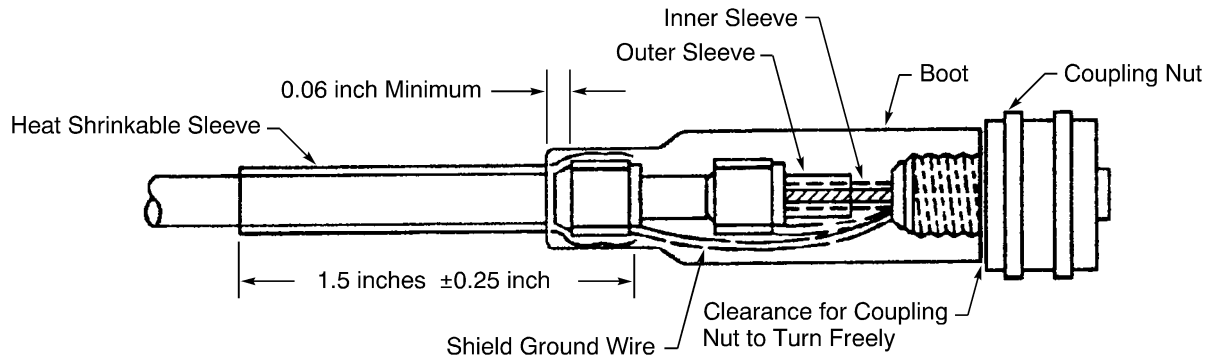
- (8) Move the boot into its position on the threads of the connector.
 Make sure that the coupling nut can be turned freely.

Refer to:

- Figure 2 for the installation of a boot on a connector that has a short rubber compression seal
- Figure 3 for the installation of a boot on a connector that has a long rubber compression seal.

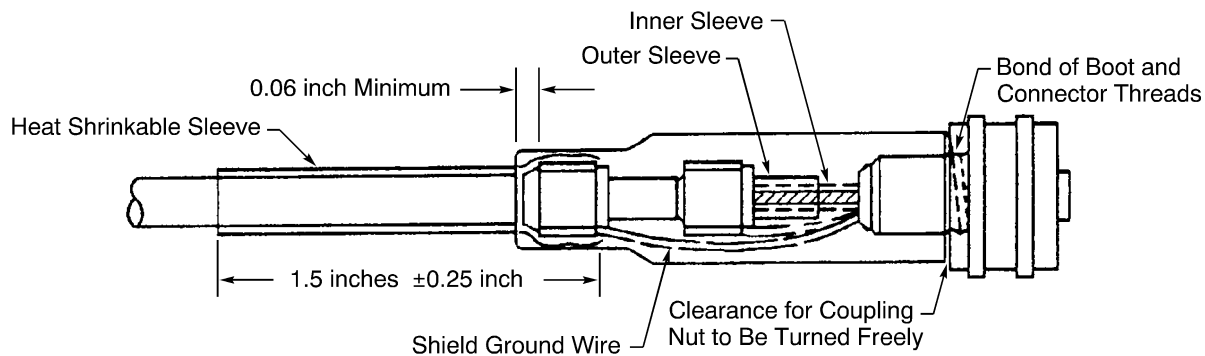
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CONNECTOR ASSEMBLY WITH TRIAX CABLE



INSTALLATION OF A BOOT ON A CONNECTOR THAT HAS A SHORT RUBBER COMPRESSION SEAL

Figure 2



INSTALLATION OF A BOOT ON A CONNECTOR THAT HAS A LONG RUBBER COMPRESSION SEAL

Figure 3

(9) Shrink the boot.

Make sure that:

- The intake air vent on the hot air gun is open
- The hot air gun is at the full operation temperature
- A heat shield is used to give the cable protection from damage
- Heat is applied for no longer than 40 seconds at one time.

(10) If unwanted adhesive is on the boot or the connector, remove the unwanted adhesive immediately with a clean wiper and solvent.

(11) If it is necessary to apply heat again, let the boot cool for 5 minutes before the heat is applied again.

(12) Seal the boot with potting compound. Refer to Paragraph 2.G.

B. Connector Assembly with a 90 Degree Heat Shrinkable Boot

This paragraph gives the procedure to assemble the connector with the Raychem 222A132-3-00 heat shrinkable boot.

(1) Prepare the cable. Refer to Paragraph 2.D.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE

(2) Discard the ferrule and the grommet nut if they are supplied with the connector.

NOTE: The ferrule and the grommet nut are not used for assembly of a connector with a heat shrinkable boot.

(3) Make a selection of an adhesive from Table 4.

(4) Make a selection of a 500 degree F hot air gun. Refer to Subject 20-10-14.

NOTE: A reflector is recommended.

(5) Prepare the boot. Refer to Paragraph 2.E.

(6) Prepare the surfaces of the boot, the connector, and the cable that make a bond with an adhesive. Refer to Paragraph 2.F.

(7) Put the boot on the cable.

(8) Assemble the connector.

Refer to:

- Subject 20-61-16 for the procedures to assemble a MIL-C-26482 type connector
- Subject 20-61-11 for the procedures to assemble a MIL-C-26500 type connector.

(9) Put the cable or wire harness in an approximate 90 degree position. Refer to Figure 17.

(10) Apply the adhesive on the bond surface of these components:

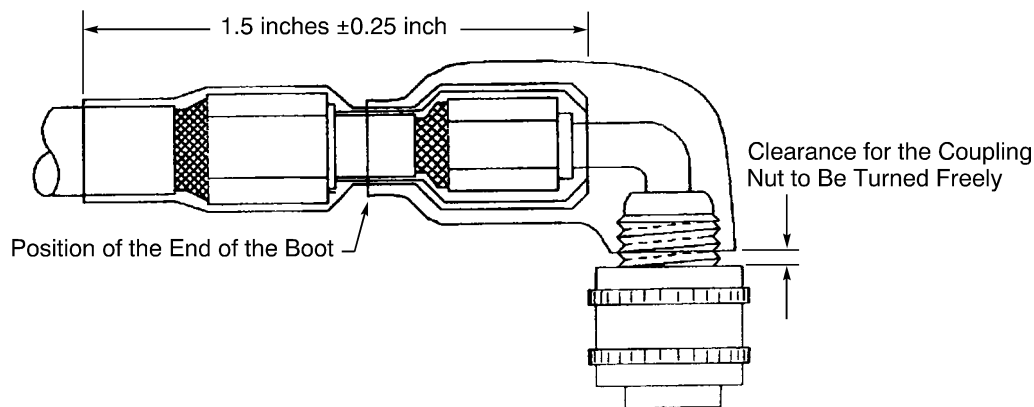
- The boot
- The connector
- The cable.

Make sure that the adhesive extends 0.13 inch farther than the bond surface.

(11) Move the boot into its position on the threads of the connector. Refer to Figure 4.

Make sure that:

- The coupling nut can be turned freely
- The boot assembly is in the correct clock position on the connector.



INSTALLATION OF A 90 DEGREE BOOT

Figure 4

(12) Shrink the boot.

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CONNECTOR ASSEMBLY WITH TRIAX CABLE

Make sure that:

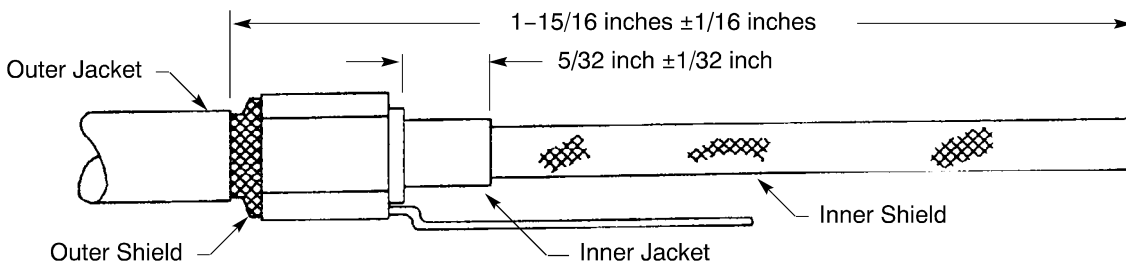
- The intake air vent on the hot air gun is open
- The hot air gun is at the full operation temperature
- A heat shield is used to give the cable protection from damage
- Heat is applied for no longer than 40 seconds at one time.

- (13) Remove the unwanted adhesive immediately with a clean wiper and solvent.
- (14) If it is necessary to apply heat again, let the boot cool for 5 minutes before the heat is applied again.
- (15) Seal the boot with potting compound. Refer to Paragraph 2.G.

C. Cable Preparation for Assembly with a Straight Heat Shrinkable Boot

- (1) Remove 1-15/16 inches \pm 1/16 inch of the outer jacket of the cable.
- (2) Install a shield ground wire to the outer shield at the end of the outer jacket.
Use mechanical ferrules. Refer to Figure 5 and Subject 20-10-15.
- (3) Remove the necessary length of the inner jacket so that the edge of the jacket is 5/32 inch \pm 1/32 inch from the ferrule on the outer shield.

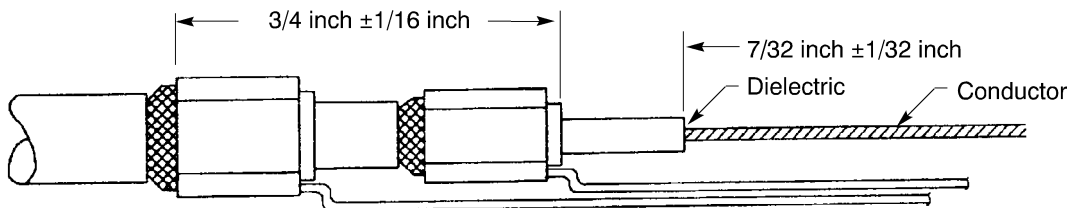
Refer to Figure 5.



TERMINATION OF THE OUTER SHIELD
Figure 5

- (4) Install a shield ground wire to the inner shield.
Use mechanical ferrules. Refer to Figure 6 and Subject 20-10-15.
- (5) Remove the necessary length of the dielectric so that the edge of the dielectric is 7/32 inch \pm 1/32 inch from the ferrule on the inner shield.

Refer to Figure 6.



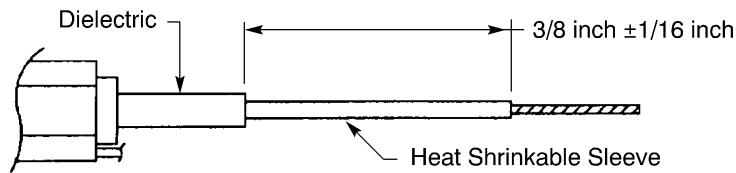
TERMINATION OF THE INNER SHIELD
Figure 6

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE

- (6) Put a 3/8 inch \pm 1/16 inch length of 3/32 inch diameter heat shrinkable sleeve over the center conductor. Refer to Figure 7.

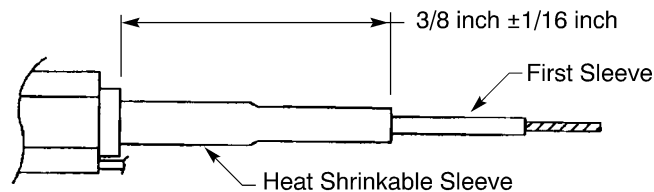
Make sure that the sleeve touches the end of the dielectric.



POSITION OF THE FIRST SLEEVE
Figure 7

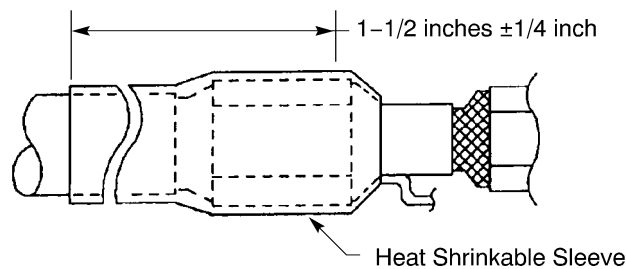
- (7) Shrink the sleeve in position.
- (8) Put a 7/16 inch \pm 1/16 inch length of 3/32 inch diameter of heat shrinkable sleeve on the dielectric and the first sleeve. Refer to Figure 8.

Make sure that the sleeve touches the ferrule of the inner shield.



POSITION OF THE SECOND SLEEVE
Figure 8

- (9) Shrink the sleeve in position.
- (10) Put a 1-1/2 inch \pm 1/4 inch length of 1/4 inch heat shrinkable sleeve on the outer shield termination. Refer to Figure 9.

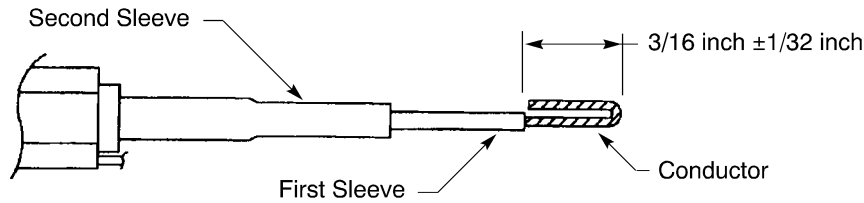


POSITION OF THE SLEEVE ON THE OUTER SHIELD TERMINATION
Figure 9

- (11) Shrink the sleeve in position.
- (12) Fold the center conductor back on itself so that the end of the conductor is 3/16 inch \pm 1/32 inch from the end of the sleeve. Refer to Figure 10.

STANDARD WIRING PRACTICES MANUAL

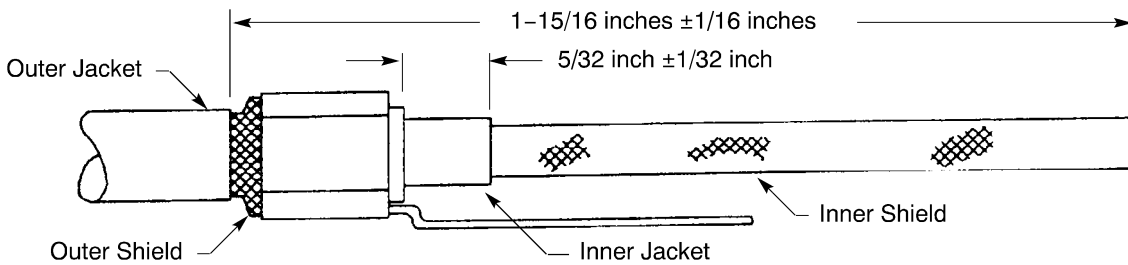
CONNECTOR ASSEMBLY WITH TRIAX CABLE



CONDUCTOR FOLDED BACK
Figure 10

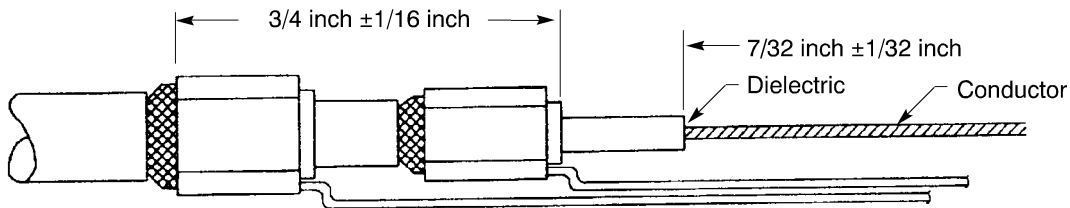
D. Cable Preparation for Assembly with a 90 Degree Heat Shrinkable Boot

- (1) Remove 1-15/16 inches \pm 1/16 inch of the outer jacket of the cable.
- (2) Install a shield ground wire to the outer shield at the end of the outer jacket.
Use mechanical ferrules. Refer to Figure 11 and Subject 20-10-15.
- (3) Remove the necessary length of the inner jacket so that the edge of the jacket is 5/32 inch \pm 1/32 inch from the ferrule on the outer shield.
Refer to Figure 11.



TERMINATION OF THE OUTER SHIELD
Figure 11

- (4) Install a shield ground wire to the inner shield.
Use mechanical ferrules. Refer to Figure 12 and Subject 20-10-15.
- (5) Remove the necessary length of the dielectric so that the edge of the dielectric is 7/32 inch \pm 1/32 inch from the ferrule on the inner shield.
Refer to Figure 12.



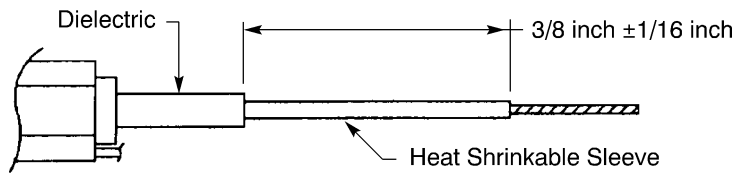
TERMINATION OF THE INNER SHIELD
Figure 12

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE

- (6) Put a 3/8 inch \pm 1/16 inch length of 3/32 inch diameter heat shrinkable sleeve over the center conductor. Refer to Figure 13.

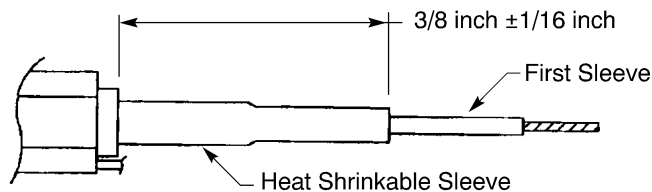
Make sure that the sleeve touches the end of the dielectric.



POSITION OF THE FIRST SLEEVE
Figure 13

- (7) Shrink the sleeve in position.
- (8) Put a 7/16 inch \pm 1/16 inch length of 3/32 inch diameter of heat shrinkable sleeve on the dielectric and the first sleeve. Refer to Figure 14.

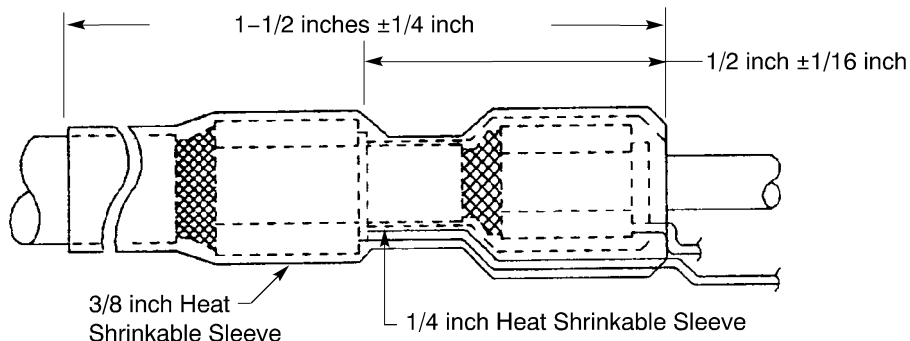
Make sure that the sleeve touches the ferrule of the inner shield.



POSITION OF THE SECOND SLEEVE
Figure 14

- (9) Shrink the sleeve in position.
- (10) Put a 1/2 inch \pm 1/16 inch length of 1/4 inch heat shrinkable sleeve on the second shield ferrule and the inner jacket. Refer to Figure 15.

Make sure that the sleeve is against the outer shield ferrule.



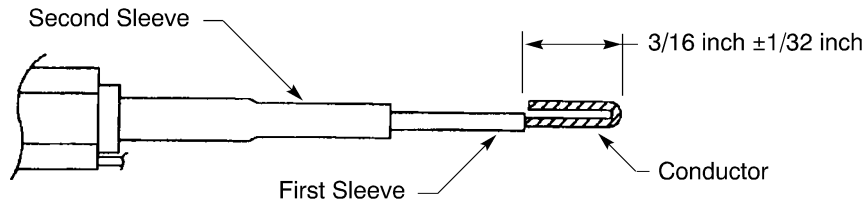
INSTALLATION OF INSULATION ON THE SHIELD TERMINATION
Figure 15

- (11) Shrink the sleeve into its position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE

- (12) Put a 1-1/2 inch \pm 1/4 inch length of 3/8 inch heat shrinkable sleeve on the inner shield termination. Refer to Figure 15.
- (13) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (14) Fold the center conductor back on itself so that the end of the conductor is 3/16 inch \pm 1/32 inch from the end of the sleeve. Refer to Figure 16.

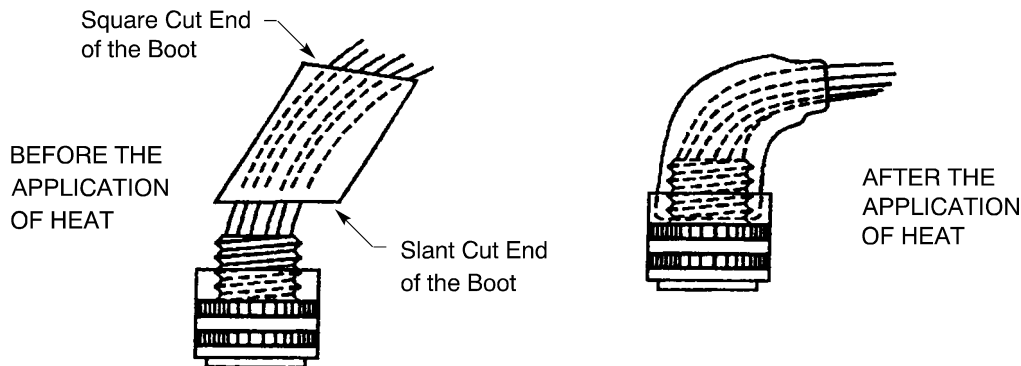


CONDUCTOR FOLDED BACK

Figure 16

E. Boot Preparation for a 90 Degree Heat Shrinkable Boot

For the conditions that are applicable to this procedure, refer to Paragraph 2.B.



PREPARATION OF A 90 DEGREE BOOT

Figure 17

Refer to Figure 17.

- (1) Put a 1/4 to 5/16 inch diameter rod approximately 0.5 inch into the square cut end of the boot. Refer to Figure 17.
- (2) Shrink the boot on the rod.
- (3) Let the boot cool.
- (4) Remove the rod from the boot.
- (5) For a connector that has a short rubber compression seal, do Step (1) through Step (4) again for the slant cut end of the boot. Refer to

F. Bond Surface Preparation

For the conditions that are applicable for this procedure, refer to Paragraph 2.B.

- (1) Make a selection of an aliphatic naphtha from Table 4.

STANDARD WIRING PRACTICES MANUAL**CONNECTOR ASSEMBLY WITH TRIAX CABLE**

- (2) Prepare the surfaces of the boot that must make a bond with the adhesive.
 - (a) Wind a piece of emery cloth around an applicable rod or tool.
 - (b) Make the bond surfaces rough.
 - (c) Shake the loose particles out of the boot.
 - (d) Clean the bond surfaces with a clean wiper and naphtha.
 - (e) Dry the boot with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE BOOT. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

- (3) Clean the other surfaces that must make a bond with the adhesive.
 - (a) Clean the bond surfaces of the connector threads with a clean wiper and naphtha.
 - (b) Dry the connector with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE CONNECTOR. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

- (c) Clean the bond surface on the cable with a clean wiper and naphtha.
Make sure to clean the insulation the cable approximately 1 inch farther than the bond surface.
- (d) Dry the insulation with a wiper immediately.

CAUTION: DO NOT LET THE NAPHTHA DRY ON THE INSULATION. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

G. Seal of the Boot with Potting Compound

For the conditions that are applicable for this procedure, refer to Paragraph 2.B.

- (1) Make a selection of a potting compound from Table 6.
- (2) If the potting compound is a silicone compound, make a selection of a catalyst from Table 4.
Refer to the manufacturer's instructions to mix the compound with the catalyst.
- (3) Fill the boot assembly with potting compound.
Make sure that air is not caught in the boot.

NOTE: To make a continuous flow of the potting compound, a constant pressure is recommended.

- (4) Lightly tap the boot on a solid surface or shake the boot to release air that is caught in the boot.
- (5) Let the potting compound cure for the specified time. Refer to Table 6.

3. ASSEMBLY OF AMPHENOL 83-59 RIGHT ANGLE UHF CONNECTORS WITH TRIAX CABLE

This paragraph gives the procedures assemble an Amphenol 83-185 cable adapter with these triax cables:

- Raychem 7524D5011
- Surprenant BA6416A.

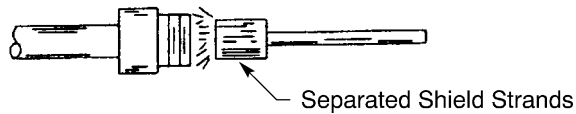
A. Cable Preparation

- (1) Put the 83-185 cable adapter on the cable.
Make sure that the small end is toward the end of the cable.
- (2) Cut the cable so that the end of the cable is perpendicular with its longitudinal axis.
- (3) Remove 7/8 inch to 5/16 inch of the outer jacket from the end of the cable.

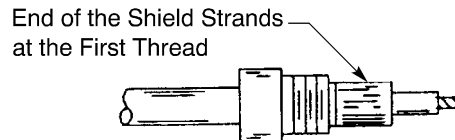
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STANDARD WIRING PRACTICES MANUAL**CONNECTOR ASSEMBLY WITH TRIAX CABLE**

- (4) Align the edge of the adapter with the edge of the outer jacket.
- (5) Open the outer shield braid and separate the strands.
- (6) Fold the shield strands back over the end of the adapter.
Make sure that the strands are applied evenly around the adapter.
- (7) Remove 27/32 inch to 29/32 inch of the inner jacket.
- (8) Open the inner shield braid and separate the strands.
- (9) Fold the shield strands back over the end of the adapter. Refer to Figure 18.
Make sure the strands are applied evenly around the adapter.

**POSITION OF THE INNER SHIELD****Figure 18**

- (10) Solder the shield strands to the adapter.
- (11) Remove the ends of the strands at the first thread of the adapter. Refer to Figure 19.

**TERMINATION OF THE INNER SHIELD****Figure 19**

- (12) Remove 5/8 inch to 11/16 inch of dielectric from the end of the cable.
- (13) Cut the conductor so that the end of the conductor is 1/8 inch to 3/16 inch for the end of the dielectric.

B. Connector Assembly

- (1) Remove the connector cap screw.
- (2) Align the slot of the contact with the cable axis.
- (3) Hold the shoulder of the adapter with pair of padded pliers.
- (4) Turn the connector body on the adapter.
Make sure to guide the center conductor into the slot of the pin.
- (5) Tighten the adapter on the body of the connector.
- (6) Solder the shield strands to the body of the connector through the four solder holes.
Make sure to:
 - Use only the necessary quantity of solder
 - Apply only the necessary amount of heat.
- (7) Solder the conductor in the slot of the connector pin.
- (8) Tighten the connector cap screws.

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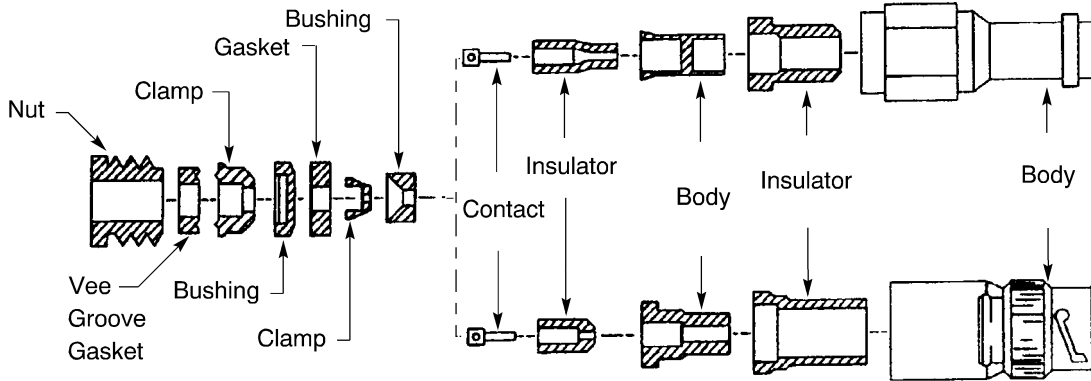
CONNECTOR ASSEMBLY WITH TRIAX CABLE

4. ASSEMBLY OF DAGE 30382-1 AND 30391-1 CONNECTORS WITH TRIAX CABLE

This paragraph gives the procedures to assemble the connectors with these triax cables:

- Raychem 10363
- Raychem 7524D5011
- Surprenant BA6416A.

A. Connector Description



DAGE 30382-1 AND 30391-1 CONNECTORS

Figure 20

B. Cable Preparation

Refer to Figure 20.

- (1) Cut the cable so that the end is perpendicular to its longitudinal axis.
- (2) Remove 1 inch \pm 1/16 inch of the outer jacket of the cable. Refer to Figure 21.



OUTER JACKET REMOVAL LENGTH

Figure 21

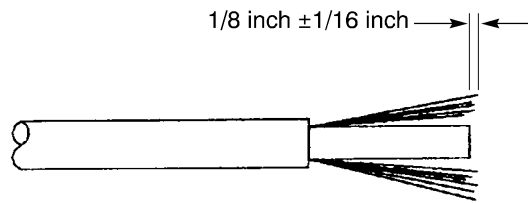
- (3) Open the shield braid and separate the strands.

CAUTION: DO NOT REMOVE THE PLATING ON THE SHIELD STRANDS.

- (4) Remove an additional 1/8 inch \pm 1/16 inch of the cable so that shield strands extend past the end of the cable. Refer to Figure 22.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE



OUTER SHIELD STRANDS EXTENDED PAST THE END OF THE CABLE

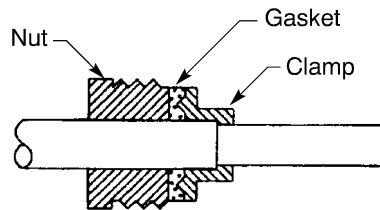
Figure 22

- (5) Put tape on the braid so the connector components can be moved over the shield strands.
- (6) In order, put these components over the tapes strands of the shield:
 - The nut
 - The vee groove gasket
 - The clamp.

Make sure that:

- The vee of the gasket is turned toward the clamp
- The inner shoulder of the clamp is tight against the end of the jacket.

Refer to Figure 23.

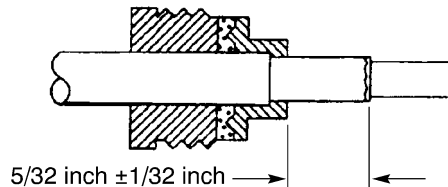


POSITION OF THE NUT, THE GASKET, AND THE CLAMP

Figure 23

- (7) Remove the necessary length of the taped strands of the shield so that the distance from the end of the strands to the clamp is $5/32 \text{ inch} \pm 1/32 \text{ inch}$.

Refer to Figure 24.



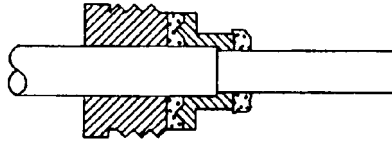
LENGTH OF THE TAPED STRANDS OF THE SHIELD

Figure 24

- (8) Remove the tape from the shield strands.
- (9) Fold the shield strands back over the clamp. Refer to Figure 25.

STANDARD WIRING PRACTICES MANUAL

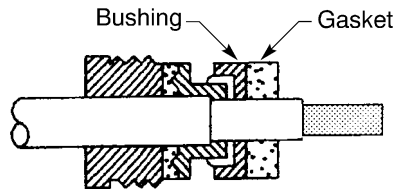
CONNECTOR ASSEMBLY WITH TRIAX CABLE



SHIELD STRANDS FOLDED BACK OVER THE CLAMP

Figure 25

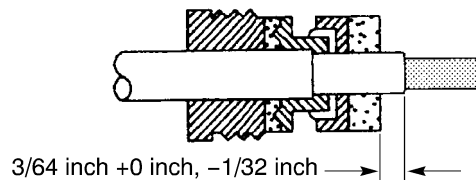
- (10) Put the bushing and the gasket on the cable and push them until the bushing is against the shield strands. Refer to Figure 26.



POSITION OF THE BUSHING AND THE GASKET

Figure 26

- (11) Remove the necessary length of the inner jacket so that the end of the jacket is $3/64$ inch $+0$ inch, $-1/32$ inch from the gasket. Refer to Figure 27.

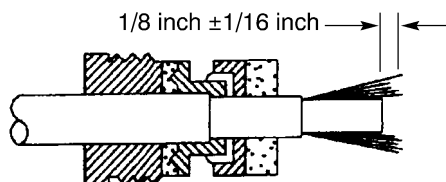


LENGTH OF THE BARE INNER JACKET

Figure 27

- (12) Open the inner shield and separate the strands.
(13) Remove $1/8$ inch $\pm 1/16$ inch from the end of the conductor so that the strands of the shield extend past the end of the cable. Refer to Figure 28.

CAUTION: DO NOT REMOVE THE PLATING ON THE SHIELD STRANDS.

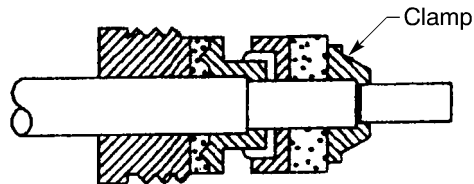


INNER SHIELD STRANDS EXTENDED PAST THE END OF THE CABLE

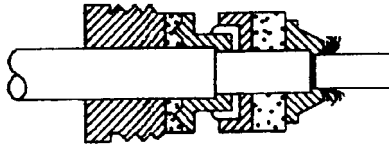
Figure 28

STANDARD WIRING PRACTICES MANUAL**CONNECTOR ASSEMBLY WITH TRIAX CABLE**

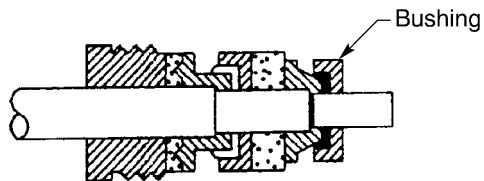
- (14) Put tape on the braid so the connector components can be moved over the shield strands.
- (15) Put the clamp on the cable and over the inner shield so that the shoulder of the clamp is tight against the end of the inner jacket. Refer to Figure 29.

**CLAMP POSITION OVER THE INNER SHIELD****Figure 29**

- (16) Remove the tape from the shield strands.
- (17) Fold the shield strands back over the clamp. Refer to Figure 30.

**STRANDS OF THE INNER SHIELD FOLDED OVER THE CLAMP****Figure 30**

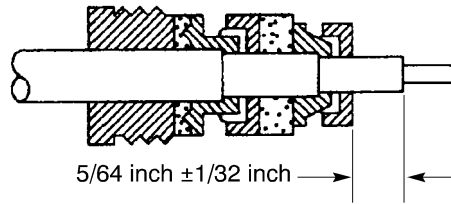
- (18) Remove the unwanted length of the shield strands. Refer to Figure 30.
- (19) Put the small bushing on the cable so that the bushing is tight against the shield strands. Refer to Figure 31.

**POSITION OF THE BUSHING****Figure 31**

- (20) Remove the necessary length of the dielectric so that the end of the dielectric is $5/64$ inch $\pm 1/32$ inch from the bushing. Refer to Figure 32.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE

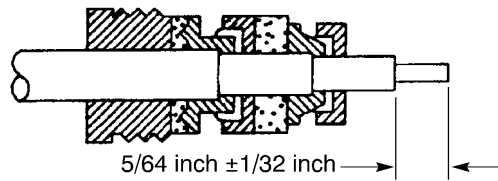


LENGTH OF THE BARE DIELECTRIC

Figure 32

- (21) Remove the necessary length of the conductor so that the end of the conductor is 5/64 inch \pm 1/32 inch from the end of the dielectric.

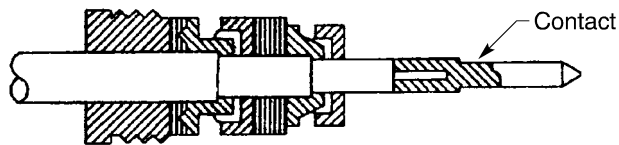
Refer to Figure 33.



LENGTH OF THE BARE CONDUCTOR

Figure 33

C. Contact Assembly



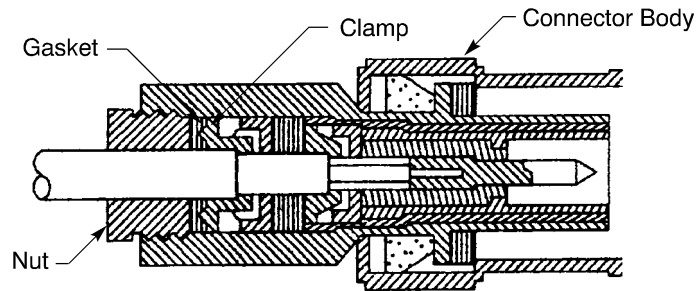
ASSEMBLED CONTACT

Figure 34

- (1) Solder the contact to the conductor. Refer to Figure 34.

CAUTION: DO NOT APPLY TOO MUCH HEAT. THE DIELECTRIC WILL NOT ENTER THE INSULATOR PROPERLY.

- (2) Remove any unwanted solder.

STANDARD WIRING PRACTICES MANUAL**CONNECTOR ASSEMBLY WITH TRIAX CABLE****D. Connector Assembly**

CONNECTOR ASSEMBLY
Figure 35

- (1) Put the assembled contact into the connector body. Refer to Figure 35.
Make sure the gasket is against the sharp edge of the clamp.
- (2) Torque the nut 45 inch-pounds \pm 5 inch-pounds.

5. ASSEMBLY OF KINGS 1965-12-9 CONNECTORS WITH TRIAX CABLE

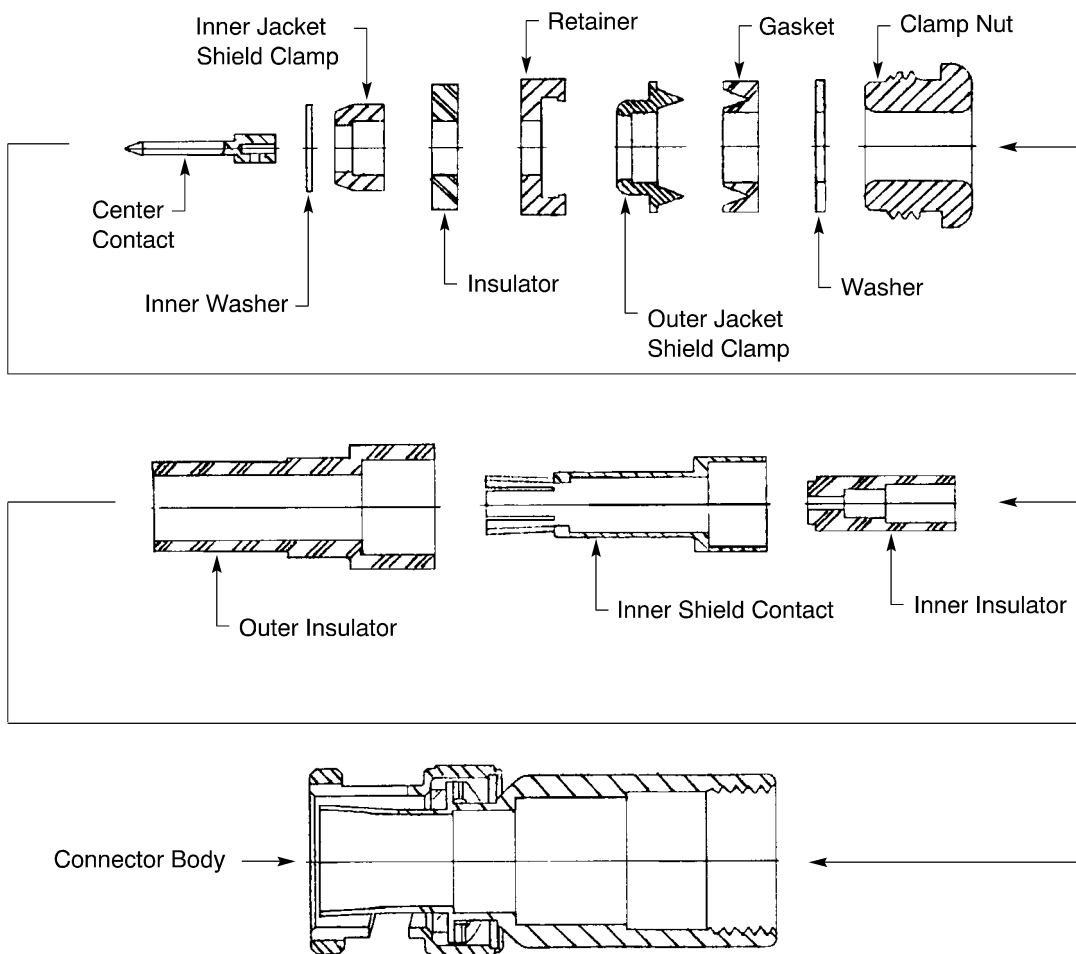
This paragraph gives the procedure to assemble the Kings 1965-12-9 connector with a Raychem 7524D5011 triax cable.

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CONNECTOR ASSEMBLY WITH TRIAX CABLE

A. Connector Description



KINGS 1965-12-9 TRIAX CONNECTOR
Figure 36

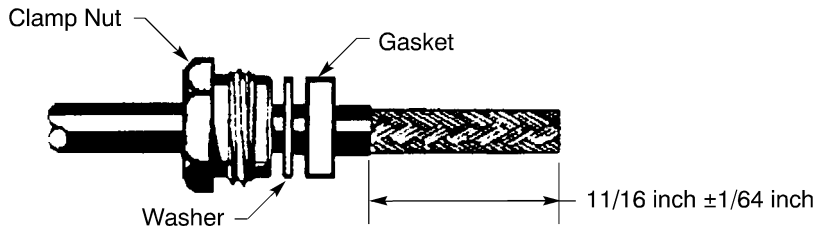
B. Cable Preparation

Refer to Figure 36.

- (1) Cut the cable so that the end is perpendicular to its longitudinal axis.
- (2) In order, put these components on the cable:
 - The clamp nut
 - The washer
 - The gasket.
- (3) Remove 11/16 inch \pm 1/64 inch of the outer jacket of the cable. Refer to Figure 37.

STANDARD WIRING PRACTICES MANUAL

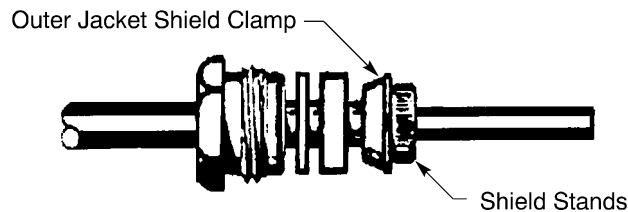
CONNECTOR ASSEMBLY WITH TRIAX CABLE



OUTER JACKET REMOVAL LENGTH

Figure 37

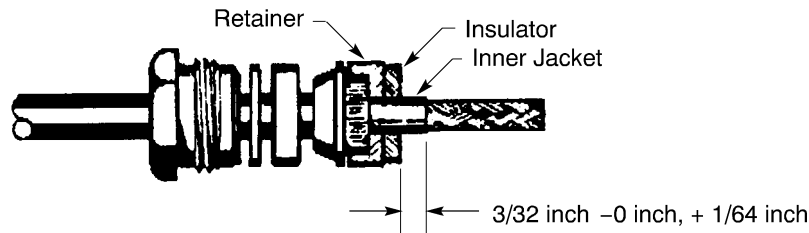
- (4) Put the outer jacket shield clamp over the outer shield and against the edge of the outer jacket.
- (5) Use a non-metallic pick to open the outer shield braid and separate the strands.
- (6) Fold the shield strands back over the clamp. Refer to Figure 38.



STRANDS OF THE OUTER SHIELD FOLDED OVER THE CLAMP

Figure 38

- (7) Remove the unwanted length of the shield strands. Refer to Figure 38.
- (8) Put the retainer and the insulator on the cable against the shield strands.
- (9) Remove the necessary length of the inner jacket so that the end of the jacket is 3/32 inch, - 0 inch, + 1/64 inch from the insulator. Refer to Figure 39.



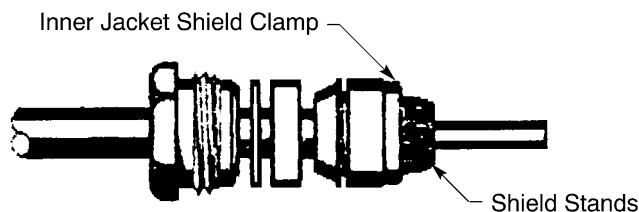
LENGTH OF THE BARE INNER JACKET

Figure 39

- (10) Put the inner jacket shield clamp over the inner shield and against the edge of the inner jacket.
- (11) Use a non-metallic pick to open the inner shield braid and separate the strands.
- (12) Fold the shield strands back over the clamp. Refer to Figure 40.

STANDARD WIRING PRACTICES MANUAL

CONNECTOR ASSEMBLY WITH TRIAX CABLE

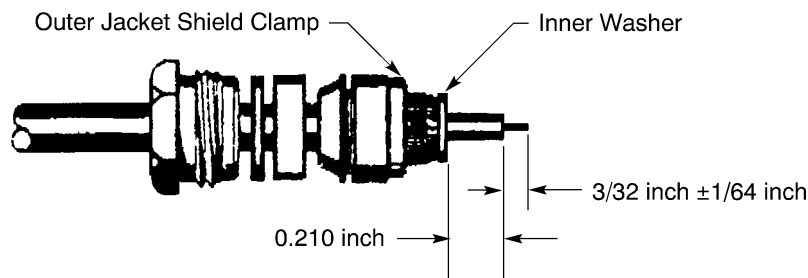


STRANDS OF THE INNER SHIELD FOLDED OVER THE CLAMP

Figure 40

- (13) Remove the unwanted length of the shield strands. Refer to Figure 40.
- (14) Put the inner washer on the cable against the shield strands.
- (15) Remove the necessary length of the dielectric so that the end of the dielectric is 0.210 inch from the washer. Refer to Figure 41.

Make sure that the length of the bare conductor is $3/32$ inch $\pm 1/64$ inch.

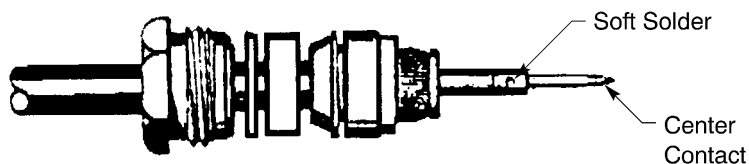


LENGTH OF THE BARE DIELECTRIC AND THE BARE CONDUCTOR

Figure 41

C. Contact Assembly

- (1) Solder the contact to the center conductor. Refer to Figure 42.



CONTACT SOLDERED TO THE CENTER CONDUCTOR

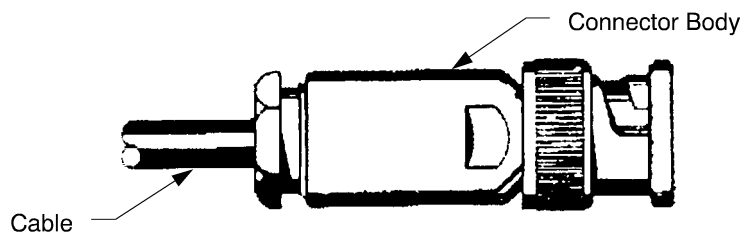
Figure 42

D. Connector Assembly

- (1) In order, put these components over the center contact:
 - The inner insulator
 - The inner shield contact
 - The outer insulator.
- (2) Put the assembled contact in the connector body. Refer to Figure 43.

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CONNECTOR ASSEMBLY WITH TRIAX CABLE



CONNECTOR ASSEMBLY
Figure 43

- (3) Turn the clamp nut to tighten the assembled contact in the connector body.
- (4) Torque the clamp nut 45 inch-pounds \pm 5 inch-pounds.



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ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE

This Subject gives the procedures for the assembly of a connector contact with a wire that is smaller than the size of the contact crimp barrel.

1. GENERAL CONDITIONS

A. Size of the Contact Crimp Barrel and the Wire

If the size of the wire conductor is smaller than the size of the contact crimp barrel, it is possible that the size of the conductor must be adjusted.

These are alternative configurations of the contact assembly:

- The conductor is folded back on itself; refer to Paragraph 2.A.
- One or more filler wires are installed adjacent to the conductor; refer to Paragraph 2.B.
- An eyelet is installed in the contact crimp barrel; refer to Paragraph 2.C.

2. CONTACT ASSEMBLY WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE

A. Contact Assembly with a Conductor That Is Folded Back

**Table 1
APPLICABLE CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Necessary Data for the Selection of a Crimp Tool	
		Adjusted Wire Size (AWG)	Crimp Barrel Size
24	16	20	16
22	16	20	16
20	12	14	12
18	12	14	12

- (1) Find the insulation removal length for the specified contact. Refer to the Subject that is applicable for the assembly of the connector.

Make sure that the insulation removal length is the length that is specified for:

- The crimp barrel size of the contact
- A wire size that is the same size as the size of the crimp barrel.

- (2) Multiply the insulation removal length by two.

NOTE: This becomes the necessary length of insulation to remove.

- (3) Remove the necessary length of insulation from the end of the wire.

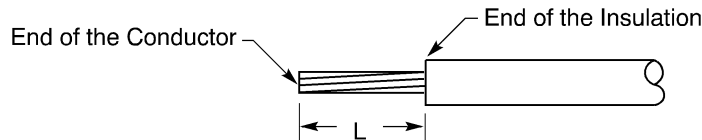
Refer to Figure 1 and Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE**

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR. THE MECHANICAL STRENGTH OF THE WIRE CAN BE DECREASED.

CAUTION: MAKE SURE THAT THE END OF THE INSULATION IS EQUAL AND SYMMETRICAL AROUND THE CIRCUMFERENCE OF THE CONDUCTOR. UNWANTED INSULATION IN THE CRIMP JOINT CAN INCREASE THE ELECTRICAL RESISTANCE.

CAUTION: MAKE SURE THAT THE BASE METAL OF THE CONDUCTOR CANNOT BE SEEN. CORROSION OF THE CONDUCTOR CAN OCCUR.

**INSULATION REMOVAL LENGTH****Figure 1**

- (4) Fold the conductor back. Refer to Figure 2.

Make sure that the distance from the end of the insulation to the end of the conductor is $1/2$ of the length of the insulation that is removed.

**CONDUCTOR FOLDED BACK****Figure 2**

- (5) Make a selection of a contact crimp tool.

Refer to:

- Table 1
- The Subject that is applicable for the assembly of the connector.

Make sure that the crimp tool from the applicable Subject for the connector is a tool that is specified for:

- The adjusted wire size that is specified for the selection of a crimp tool in Table 1
- The crimp barrel size that is specified for the selection of a crimp tool in Table 1.

- (6) Make the necessary adjustment of the crimp tool setting.

Make sure that the setting is applicable for the adjusted wire size that is specified for the selection of a crimp tool in Table 1.

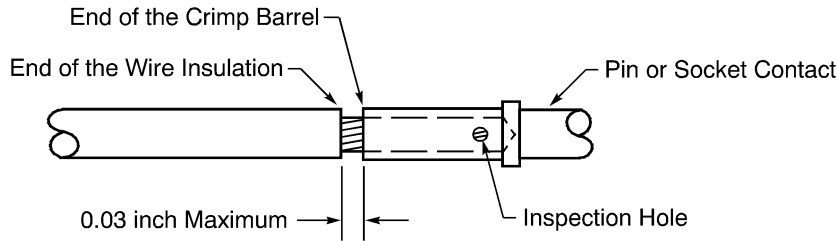
- (7) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 3.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 3

(8) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

B. Contact Assembly with Filler Wire

Table 2
APPLICABLE CONTACT CRIMP TOOLS AND FILLER WIRE

Wire Size (AWG)	Crimp Barrel Size	Filler Wire		Necessary Data for the Selection of a Crimp Tool	
		Quantity	Wire Size (AWG)	Adjusted Wire Size (AWG)	Crimp Barrel Size
24	16	1	18	16	16
22	16	1	18	16	16
20	12	2	16	12	12
	8	4	14	8	8
18	12	1	14	12	12
	8	4	14	8	8
16	8	4	14	8	8
14	8	2	12	8	8
12	8	2	12	8	8
10	8	3	16	8	8

- (1) Find the quantity and size of filler wire that are applicable for the wire size and crimp barrel size in Table 2.
- (2) Find the insulation removal length for the specified contact. Refer to the Subject that is applicable for the assembly of the connector.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE**

Make sure that the insulation removal length is the length that is specified for:

- The crimp barrel size of the contact
- A wire size that is the same size as the size of the crimp barrel.

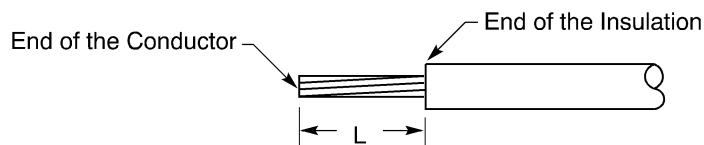
NOTE: This length is the necessary length of insulation to remove.

- (3) Remove the necessary length of insulation from the end of the wire and the end of each filler wire. Refer to Figure 4 and Subject 20-00-15.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR. THE MECHANICAL STRENGTH OF THE WIRE CAN BE DECREASED.

CAUTION: MAKE SURE THAT THE END OF THE INSULATION IS EQUAL AND SYMMETRICAL AROUND THE CIRCUMFERENCE OF THE CONDUCTOR. UNWANTED INSULATION IN THE CRIMP JOINT CAN INCREASE THE ELECTRICAL RESISTANCE.

CAUTION: MAKE SURE THAT THE BASE METAL OF THE CONDUCTOR CANNOT BE SEEN. CORROSION OF THE CONDUCTOR CAN OCCUR.



INSULATION REMOVAL LENGTH

Figure 4

- (4) Make a selection of a contact crimp tool.

Refer to:

- Table 2
- The Subject that is applicable for the assembly of the connector.

Make sure that the crimp tool from the applicable Subject for the connector is a tool that is specified for:

- The adjusted wire size that is specified for the selection of a crimp tool in Table 2
- The crimp barrel size that is specified for the selection of a crimp tool in Table 2.

- (5) Make the necessary adjustment of the crimp tool setting.

Make sure that the setting is applicable for the adjusted wire size that is specified for the selection of a crimp tool in Table 2.

- (6) Put the end of the wire and the end of each filler wire in the crimp barrel of the contact. Refer to Figure 5.

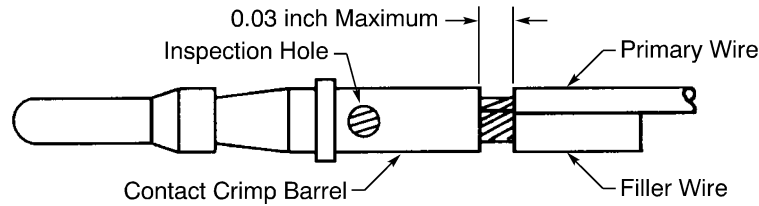
NOTE: If it is possible, put the primary wire in the center of the crimp barrel.

Make sure that:

- All of the strands of each conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation of the primary wire to the end of the crimp barrel is not more than 0.03 inch.

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ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE



POSITION OF THE WIRE AND THE FILLER WIRES IN THE CRIMP BARREL
Figure 5

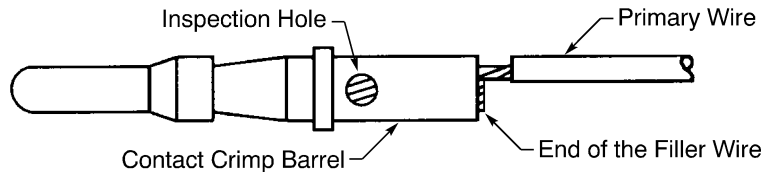
(7) Crimp the contact.

Make sure that:

- All of the strands of each conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation of the primary wire to the end of the crimp barrel is not more than 0.03 inch.

(8) Remove the unwanted length of the filler wires as close as possible to the end of the crimp barrel. Refer to Figure 6.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE STRANDS OF THE PRIMARY WIRE. THE MECHANICAL STRENGTH OF THE WIRE CAN BE DECREASED.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE
Figure 6

C. Contact Assembly with an Eyelet

Table 3
APPLICABLE CONTACT CRIMP TOOLS AND EYELETS

Wire Size (AWG)	Crimp Barrel Size	Eyelet	Necessary Data for the Selection of a Crimp Tool		
			Adjusted Wire Size (AWG)	Crimp Barrel Size	Special Instructions
24	16	CE46FC	20	16	-
		Y-6015-C	20	16	-
	12	CE66FC	14	12	Fold the conductor back
		Y-9015-C	14	12	Fold the conductor back

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE

Table 3 (continued)

Wire Size (AWG)	Crimp Barrel Size	Eyelet	Necessary Data for the Selection of a Crimp Tool		
			Adjusted Wire Size (AWG)	Crimp Barrel Size	Special Instructions
22	16	CE46FC	20	16	-
		Y-6015-C	20	16	-
	12	CE66FC	14	12	Fold the conductor back
		Y-9015-C	14	12	Fold the conductor back
20	12	CE66FC	14	12	-
		Y-9015-C	14	12	-
18	12	CE66FC	14	12	-
		Y-9015-C	14	12	-

Table 4
EYELET PART NUMBERS

Part Number	Plating Material	Supplier
CE46FC	Gold	Circon
CE66FC	Gold	Circon
Y-6015-C	Gold	International Eyelets
Y-9015-C	Gold	International Eyelets

- (1) Make a selection of the applicable eyelet from Table 3.
- (2) Find the insulation removal length for the specified contact. Refer to the Subject that is applicable for the assembly of the connector.
 Make sure that the insulation removal length is the length that is specified for:
 - The crimp barrel size of the contact
 - A wire size that is the same size as the size of the crimp barrel.

NOTE: If a folded back conductor is not specified in Table 3, this length is the necessary length of insulation to remove.
- (3) If a folded back conductor is specified in Table 3, multiply the insulation removal length by two.

NOTE: This becomes the necessary length of insulation to remove.
- (4) Remove the necessary length of insulation from the end of the wire.
 Refer to Figure 7 and Subject 20-00-15.

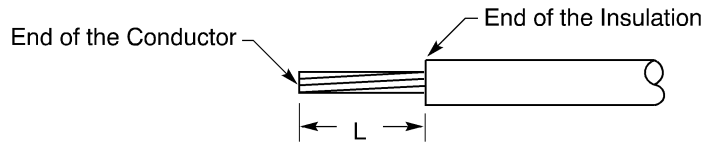
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ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR. THE MECHANICAL STRENGTH OF THE WIRE CAN BE DECREASED.

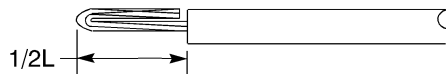
CAUTION: MAKE SURE THAT THE END OF THE INSULATION IS EQUAL AND SYMMETRICAL AROUND THE CIRCUMFERENCE OF THE CONDUCTOR. UNWANTED INSULATION IN THE CRIMP JOINT CAN INCREASE THE ELECTRICAL RESISTANCE.

CAUTION: MAKE SURE THAT THE BASE METAL OF THE CONDUCTOR CANNOT BE SEEN. CORROSION OF THE CONDUCTOR CAN OCCUR.



INSULATION REMOVAL LENGTH
Figure 7

- (5) If a folded back conductor is specified in Table 3, fold the conductor back. Refer to Figure 8. Make sure that the distance from the end of the insulation to the end of the conductor is 1/2 of the length of the insulation that is removed.



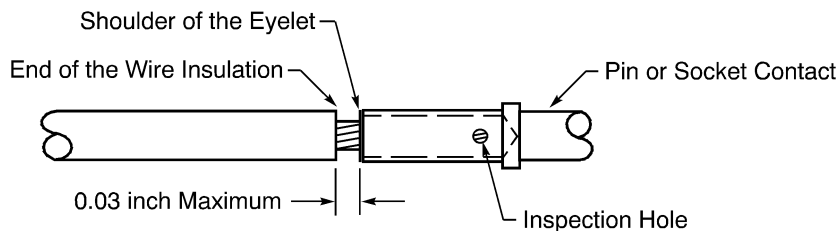
CONDUCTOR FOLDED BACK
Figure 8

- (6) Make a selection of a contact crimp tool.
Refer to:
- Table 3
 - The Subject that is applicable for the assembly of the connector.
- Make sure that the crimp tool from the applicable Subject for the connector is a tool that is specified for:
- The adjusted wire size that is specified for the selection of a crimp tool in Table 3
 - The crimp barrel size that is specified for the selection of a crimp tool in Table 3.
- (7) Make the necessary adjustment of the crimp tool setting.
Make sure that the setting is applicable for the adjusted wire size that is specified for the selection of a crimp tool in Table 3.
- (8) Put the eyelet in the crimp barrel of the contact.
Make sure that the shoulder of the eyelet is against the end of the crimp barrel.
- (9) Put the end of the wire in the eyelet. Refer to Figure 9.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF CONNECTOR CONTACTS WITH THE ADJUSTMENT OF THE CONDUCTOR SIZE**

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the shoulder of the eyelet is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL

Figure 9

(10) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the shoulder of the eyelet is not more that 0.03 inch.



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STANDARD WIRING PRACTICES MANUAL

CLEANING OF ELECTRICAL CONNECTORS

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STANDARD WIRING PRACTICES MANUAL**CLEANING OF ELECTRICAL CONNECTORS**

This Subject gives procedures to clean an electrical connector when the connector has too much contamination on the connector interface, but the replacement of the connector is not necessary.

1. GENERAL DATA**A. Recommended Solvents**

In order, the recommended solvents to clean all electrical connectors are:

- Isopropyl alcohol
- Methyl alcohol
- Acetone.

NOTE: When a fast turnaround is necessary, high temperature connectors can be cleaned with the recommended procedure to clean general purpose connectors with acetone. Refer to Paragraph 3.B.

Before any solvent is used, obey:

- The local environmental regulations
- The local necessary conditions for personnel safety.

NOTE: The solvents must only be used for authorized or approved purposes.

B. Conditions of Inspection

After an inspection:

- The connector must be replaced if the steel bayonet pins on the receptacle shell are worn
- The contacts must be replaced if the contacts are worn.

C. Personnel Safety

To make sure that the solvent does not touch the skin, any of these items can be used if they do not permit the solvent to touch the skin:

- Aprons
- Boots
- Coveralls
- Neoprene gloves
- Rubber gloves.

To make sure that the solvent does not touch an eye, any of these items can be used:

- Chemical goggles
- Approved eye protection.

To make sure that the solvent vapors do not get breathed, any of these conditions must occur:

- The area has a good air flow
- Respiratory protection is used.

D. Fire Safety Precautions

Refer to Subject 20-00-10 for the precautions in relation to the electrical power of the circuits.

STANDARD WIRING PRACTICES MANUAL**CLEANING OF ELECTRICAL CONNECTORS**

These conditions are applicable in an area where there are flammable solvents or vapors:

- All flames, smoking, sparks, and other sources of ignition must not occur
- Tools that are used must not make sparks
- Clothing, materials, or processes that can make electrostatic discharges must not be used
- All electrical equipment, such as lights, motors, wiring, etc., must meet the necessary electrical and fire codes
- The accumulation of vapors must be prevented by sufficient ventilation.
- Flammable solvents must be kept in closed containers
- Only the sufficient quantity of a flammable solvent must be used or kept near.

2. CLEANING OF GENERAL PURPOSE CONNECTORS WITH METHYL OR ISOPROPYL ALCOHOL

WARNING: METHYL ALCOHOL AND ISOPROPYL ALCOHOL ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY ON HAND IS NO MORE THAN IS NECESSARY TO CLEAN THE CONNECTOR.

A. Necessary Materials and Tools

These are the necessary tools and materials:

- Alcohol, either methyl or isopropyl
- A small, fine brush that is long enough to reach the bottom of the connector and has bristles that are not affected by methyl or isopropyl alcohol
- Swabs that do not have any lint
- An container of the sufficient size to catch any solvent
- Compressed air or nitrogen that is clean and dry.

B. Connector Cleaning with Methyl or Isopropyl Alcohol

- (1) Separate the plug and the receptacle.
- (2) Clean each connector:
 - (a) Apply the alcohol with a brush or swab.
 - (b) Brush the face of the connector until the contaminants have been dissolved.
 - (c) Flush the face of the connector with the sufficient quantity of alcohol to remove the contamination.
 - (d) Let the connector dry in the air for one hour.

When it is possible, put the connector in a position so that it is not fully on its side to let the solvent drain.

NOTE: A satisfactory alternative to decrease the time that is necessary for the connector to dry is to use compressed air or nitrogen.

STANDARD WIRING PRACTICES MANUAL**CLEANING OF ELECTRICAL CONNECTORS**

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN THE DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

CAUTION: THE CONNECTOR MUST BE FULLY DRY BEFORE THE PLUG IS INSTALLED. ANY REMAINING SOLVENT CAN CAUSE DAMAGE TO THE CONNECTOR OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM, OR BOTH.

- (3) Install the connectors again. Refer to the applicable maintenance manual.

NOTE: To make the installation easier, a silicone lubricant compound can be applied to the inner O-ring.

CAUTION: DO NOT PUT SILICONE LUBRICANT ON THE CONNECTOR INSERT OR THE CONTACTS. SILICONE CONTAMINATION CAUSES UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (4) Do the necessary functional tests.

3. CLEANING OF GENERAL PURPOSE CONNECTORS WITH ACETONE

WARNING: ACETONE IS VERY FLAMMABLE. MAKE SURE THAT THE QUANTITY ON HAND IS NO MORE THAN 0.25 PINT (0.125 LITER) IN A CLOSED, ONE PINT (0.5 LITER) SQUEEZE CONTAINER.

A. Necessary Materials and Tools

These are the necessary tools and materials:

- 0.25 pint (0.125 liter) of acetone
- A closed, one pint (0.5 liter) squeeze container
- A small, fine brush that is long enough to reach the bottom of the connector and has bristles that are not affected by acetone
- Swabs that do not have any lint
- An container of the sufficient size to catch any solvent
- Compressed air or nitrogen that is clean and dry.

B. Connector Cleaning with Acetone

- (1) Separate the plug and the receptacle.

WARNING: DO NOT SEPARATE THE CONNECTORS UNTIL THE TEMPERATURE IS LESS THAN 150 DEGREES F (65 DEGREES C). DAMAGE TO THE PLUG OR THE RECEPTACLE, OR BOTH CAN OCCUR.

CAUTION: DO NOT SEPARATE THE CONNECTORS UNTIL THE TEMPERATURE IS SUFFICIENTLY COOL ENOUGH, APPROXIMATELY 100 DEGREES F (28 DEGREES C), TO TOUCH WITH BARE HANDS.

- (2) Clean each connector:

- (a) Put 3 cc to 5 cc of acetone into the connector with the squeeze container.

WARNING: DO NOT PERMIT ANY DROPS OF ACETONE TO FALL ON THE ENGINE.

- (b) Brush the face of the connector until all of the contamination has been loosened.
(c) Let any remaining solvent drain from the connector into a container.
(d) Remove the unwanted solvent in the container from the work area.

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STANDARD WIRING PRACTICES MANUAL**CLEANING OF ELECTRICAL CONNECTORS**

- (e) Flush the connector with no more than 5 cc of the solvent to remove the thin film of contamination from the connector.

Make sure to catch the solvent in the container.

- (f) Remove the unwanted solvent in the container from the work area.
(g) If the connector has any remaining contamination, do Step (e) again.
(h) Dry the connector with compressed air or nitrogen.

Make sure the inside of the socket contacts and the inserts around the socket contacts are fully dry.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN THE DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

CAUTION: THE CONNECTOR MUST BE FULLY DRY BEFORE THE PLUG IS INSTALLED. ANY REMAINING SOLVENT CAN CAUSE DAMAGE TO THE CONNECTOR OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM, OR BOTH.

- (3) Install the connectors again. Refer to the applicable maintenance manual.

NOTE: To make the installation easier, a silicone lubricant compound can be applied to the inner O-ring.

CAUTION: DO NOT PUT SILICONE LUBRICANT ON THE CONNECTOR INSERT OR THE CONTACTS. SILICONE CONTAMINATION CAUSES UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (4) Do the necessary functional tests.

4. CLEANING OF WALTER KIDDE FIRE DETECTION SYSTEM CONNECTORS**A. General Conditions for Connector Cleaning**

Before any plug and receptacle in the sensing element loop are connected, they must be free from contamination.

These conditions are applicable for connectors with contamination:

- If it is thought that the connector is contaminated, the connector must be cleaned with acetone or alcohol; refer to Paragraph 4.D. or Paragraph 4.C.
- If any of the connectors in the fire detection system show possible contamination from liquids, the connector must be cleaned with acetone or alcohol; refer to Paragraph 4.D. or Paragraph 4.C.
- Whenever the flex cable connector has been disconnected, the sensing element connectors must be inspected and, if it is necessary, cleaned.

These conditions are applicable for connectors with corrosion:

- If the internal part of a connector shows corrosion or does not have the correct color, the connector must be cleaned with a grit blast; refer to Paragraph 4.E.
- If the connector is connected to the aircraft wiring, it is possible that it is better to replace it with a new connector
- If the connector is part of a sensing element, it possible that it is better to replace the sensing element with a serviceable spare and clean the connector in the maintenance facility.

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CLEANING OF ELECTRICAL CONNECTORS

B. Necessary Materials

CAUTION: ONLY THOSE CLEANERS SPECIFIED IN TABLE 1 CAN BE USED. OTHER SOLVENTS, ESPECIALLY ANY THAT ARE MADE WITH CHLORIDES MUST NOT BE USED.

**Table 1
NECESSARY MATERIALS**

Material	Part Number or Specification	Supplier
Acetone	-	Any source
Alcohol, Isopropyl	-	Any source
Alcohol, Methyl	-	Any source
Contact, Hooded Socket	802508	Walter Kidde
Grit, 100 Mesh Aluminum Oxide	AEX 602	Hunter Associates
Grit Blast Kit	Model AEC-K	Hunter Associates
Lubricant, Silicone	DC-4	Dow Chemical
	MIL-S-8660	QPL

NOTE: The grit blast kit has the sufficient quantity of aluminum oxide abrasive to clean approximately ten connectors.

C. Connector Cleaning with Methyl or Isopropyl Alcohol

This procedure is used to clean a connector if there is contamination from oil or other solutions in the connector cavity.

WARNING: METHYL ALCOHOL AND ISOPROPYL ALCOHOL ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY ON HAND IS NO MORE THAN IS NECESSARY TO CLEAN THE CONNECTOR.

- (1) Separate the plug and the receptacle.
- (2) If it is necessary, remove the hooded socket contact:
 - (a) Carefully pull the contact out with a small pair of needle nose pliers.
 - (b) Discard the contact; it cannot be used again.
- (3) Clean each connector:
 - (a) Apply the alcohol with a brush or swab.
 - (b) Brush the applicable surface of the connector until all of the contamination has been loosened.
 - (c) Flush the face of the connector with the sufficient quantity of alcohol to remove the contamination.
 - (d) Let the connector dry in the air for one hour.

When it is possible, put the connector in a position so that it is not fully on its side to let the solvent drain.

NOTE: A satisfactory alternative to decrease the time that is necessary for the connector to dry is to use compressed air or nitrogen.

STANDARD WIRING PRACTICES MANUAL**CLEANING OF ELECTRICAL CONNECTORS**

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN THE DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

CAUTION: THE CONNECTOR MUST BE FULLY DRY BEFORE THE PLUG IS INSTALLED. ANY REMAINING SOLVENT CAN CAUSE DAMAGE TO THE CONNECTOR OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM, OR BOTH.

D. Connector Cleaning with Acetone

This procedure is used to clean a connector if there is contamination from oil or other solutions in the connector cavity.

WARNING: ACETONE IS VERY FLAMMABLE. MAKE SURE THAT THE QUANTITY ON HAND IS NO MORE THAN 0.25 PINT (0.125 LITER) IN A CLOSED, ONE PINT (0.5 LITER) SQUEEZE CONTAINER.

- (1) Separate the plug and the receptacle.
- (2) If it is necessary, remove the hooded socket contact:
 - (a) Carefully pull the contact out with a small pair of needle nose pliers.
 - (b) Discard the contact; it cannot be used again.
- (3) Clean each connector:
 - (a) Put 3 cc to 5 cc of acetone into the connector with the squeeze container.
 - (b) Brush the face of the connector until all of the contamination has been loosened.
 - (c) Let any remaining solvent drain from the connector into a container.
 - (d) Remove the unwanted solvent in the container from the work area.
 - (e) Flush the connector with no more than 5 cc of the solvent to remove the thin film of contamination from the connector.

Make sure to catch the solvent in the container.

- (f) Remove the unwanted solvent in the container from the work area.
- (g) If the connector has any remaining contamination, do Step (e) again.
- (h) Dry the connector with compressed air or nitrogen.

Make sure the inside of the socket contacts and the inserts around the socket contacts are fully dry.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN THE DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

CAUTION: THE CONNECTOR MUST BE FULLY DRY BEFORE THE PLUG IS INSTALLED. ANY REMAINING SOLVENT CAN CAUSE DAMAGE TO THE CONNECTOR OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM, OR BOTH.

E. Connector Cleaning with Grit Blast

A grit blast gun:

- Can be used to clean a connector either on or off the aircraft
- Is used to clean a connector with corrosion or heavy contamination.

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WARNING: THE GRIT BLAST GUN MUST BE USED ONLY IN AREAS WITH SUFFICIENT VENTILATION. A RESPIRATOR WITH A DUST FILTER AND EYE PROTECTION MUST BE WORN BY THE OPERATOR SO THAT THE OPERATOR DOES NOT BREATHE THE ALUMINUM OXIDE DUST.

CAUTION: DUST FROM THE GRIT BLAST GUN IS ABRASIVE. OBEY THESE PRECAUTIONS:

- PUT A COVER ON OR REMOVE THE ACTUATOR RODS OR ANY OTHER POLISHED FINISHES
- KEEP THE COVER ON THE OIL TANK SCUPPER IN ORDER TO PREVENT CONTAMINATION OF THE ENGINE OIL SYSTEM.

- (1) Separate the plug and the receptacle.
- (2) If it is necessary, remove the hooded socket contact:
 - (a) Carefully pull the contact out with a small pair of needle nose pliers.
 - (b) Discard the contact; it cannot be used again.
- (3) Clean each connector:
 - (a) With a fine tool, carefully scrape away as much of the corrosion as possible.
 - (b) Attach the source of clean, dry compressed air or nitrogen to the grit blast gun.
 - (c) Set the air pressure of the grit blast gun at 20 psi to 25 psi.
 - (d) Clean the internal part of the connector with the grit blast.
Make sure to clean the bottom of the connector and around the base of the pin.
 - (e) Flush the connector with acetone or methyl alcohol.
 - (f) Dry the connector with compressed air or nitrogen.

WARNING: COMPRESSED GAS CAN BE DANGEROUS. TO PREVENT AN INJURY, CAREFULLY APPLY THE GAS IN THE DIRECTION AWAY FROM THE EYES, THE FACE, AND OTHER PERSONNEL.

CAUTION: THE CONNECTOR MUST BE FULLY DRY BEFORE THE PLUG IS INSTALLED. ANY REMAINING SOLVENT CAN CAUSE DAMAGE TO THE CONNECTOR OR UNSATISFACTORY PERFORMANCE OF THE SYSTEM, OR BOTH.

F. Connector Installation

- (1) After the connector is cleaned, install a new hooded socket contact, if it was removed:
 - (a) Putt the glazed end of the hooded socket contact on a 0.060 maximum diameter pin.
 - (b) Push the unglazed end onto the connector pin until it touches the bottom.
- (2) Install the plug in the receptacle to make the environmental seal.

CAUTION: IT IS ABSOLUTELY NECESSARY THAT THE ENVIRONMENTAL SEAL IS MADE.

- (a) Put a very light layer of silicone lubricant on the copper sealing gasket of the plug connector.

CAUTION: DO NOT PUT SILICONE LUBRICANT ON THE CONNECTOR INSERT OR THE CONTACTS. SILICONE CONTAMINATION CAUSES UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (b) Push the nose of the plug connector into the threaded bushing of the receptacle.
- (c) Engage the threads of the nut and the threaded bushing.

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CLEANING OF ELECTRICAL CONNECTORS

(d) Torque the nut approximately 50 inch-pounds to 70 inch-pounds.

NOTE: Use two wrenches to so that the connectors do not turn.

(3) Do the fire detection cockpit test.

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STANDARD WIRING PRACTICES MANUAL

REPLACEMENT OF CONTACTS

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STANDARD WIRING PRACTICES MANUAL**REPLACEMENT OF CONTACTS****1. CONTACT REPLACEMENT****A. General Conditions**

The replacement of a contact on a wire in a wire harness can occur a minimum of two times before the wire does not have sufficient length.

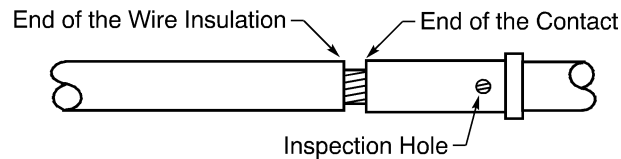
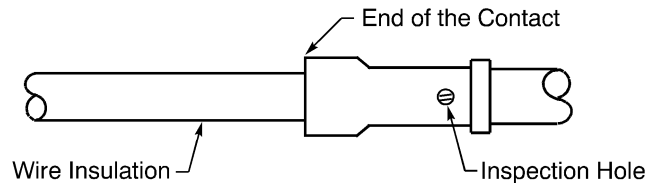
B. Replacement of a Contact

- (1) If applicable, remove the contact from the connector. Refer to the applicable Subject for the connector.
- (2) Cut the wire near the end:
 - The solder cup for solder type contacts
 - The crimp barrel for crimp type contacts.

Make sure to keep as much length of the wire as possible.

Refer to:

- Figure 1 for a contact without a wire insulation grip
- Figure 2 for a contact with a wire insulation grip.

**CONTACT WITHOUT A WIRE INSULATION GRIP****Figure 1****CONTACT WITH A WIRE INSULATION GRIP****Figure 2**

- (3) Assemble a new contact. Refer to the applicable Subject for the connector.

CAUTION: DO NOT CRIMP THE AREA OF A CONDUCTOR THAT HAS BEEN CRIMPED BEFORE. UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE CRIMP JOINT CAN OCCUR.



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SPECIAL PROTECTION OF ELECTRICAL CONNECTORS

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SPECIAL PROTECTION OF ELECTRICAL CONNECTORS

This subject gives the procedures to:

- Give special protection to a replacement connector
- Give special protection to a connector at some time after the initial protection.

1. GENERAL DATA

A. **Applicable Connectors**

Connectors that must have special protection are specified in:

- The Aircraft Maintenance Manual
- The applicable Service Bulletin or Service Letter.

CAUTION: THE SPECIAL PROTECTION OF CONNECTORS IS APPLICABLE ONLY FOR THE CONNECTORS IDENTIFIED IN THE AIRCRAFT MAINTENANCE MANUAL, THE SERVICE BULLETINS OR THE SERVICE LETTER.

The applicable Service Bulletins and Service Letter are:

- SB 737-26-1112
- SB 737-26-1114
- SB 737-24A1148
- SB 737-24-1149
- SL 737-24-171.

CAUTION: IF THE PROTECTION FROM CORROSION IS NOT SUFFICIENT, DAMAGE TO THE CONNECTOR OCCURS.

B. **Necessary Intervals for Special Protection**

Special protection must be applied to a connector:

- Again if the protection is removed or is not sufficient
- Again if the plug and receptacle are disconnected
- At specified intervals. Refer to Table 1.

**Table 1
SPECIAL PROTECTION INTERVALS**

Service Document	Interval
SB 737-26-1112	-
SB 737-26-1114	-
SB 737-24A1148	12 Months
SB 737-24-1149	12 Months
SL 737-24-171	24 Months

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STANDARD WIRING PRACTICES MANUAL**SPECIAL PROTECTION OF ELECTRICAL CONNECTORS****C. Necessary Conditions for Personal Safety**

These conditions are applicable when you use a corrosion inhibiting compound:

- The conditions for personal safety specified by the manufacturer must be obeyed
- The necessary local conditions for personal safety must be obeyed
- A corrosion inhibiting compound must not touch the skin or the eyes
- The fumes from a corrosion inhibiting compound must not be breathed.

It is recommended to use this personal protection equipment:

- Nitrile or latex rubber gloves
- Protective clothes
- Respiratory protection
- Chemical goggles or approved eye protection.

D. Necessary Conditions for Fire Safety

These conditions are applicable when you use a corrosion inhibiting compound:

- The conditions for fire safety specified by the manufacturer must be obeyed
- The necessary local conditions for fire safety must be obeyed
- The material must be kept in an approved closed container
- Only the quantity of material that is necessary to give protection to the connectors must be kept near the airplane
- The airplane must be electrostatically grounded; refer to the Aircraft Maintenance Manual.

For more safety practices, refer to Subject 20-00-10.

E. Necessary Materials and Tools

WARNING: CORROSION INHIBITING COMPOUNDS CAN BE DANGEROUS TO THE HEALTH. THE INSTRUCTIONS FROM THE MANUFACTURER SPECIFY THE NECESSARY SAFETY CONDITIONS. IF THE SPECIFIED CONDITIONS ARE NOT OBEYED, INJURY TO A PERSON CAN OCCUR.

WARNING: CORROSION INHIBITING COMPOUNDS ARE FLAMMABLE. THE INSTRUCTIONS FROM THE MANUFACTURER OF THE MATERIAL SPECIFY THE NECESSARY SAFETY CONDITIONS. IF THE SPECIFIED CONDITIONS ARE NOT OBEYED, INJURY TO A PERSON CAN OCCUR.

CAUTION: CORROSION INHIBITING COMPOUNDS ARE FLAMMABLE. THE INSTRUCTIONS FROM THE MANUFACTURER OF THE MATERIAL SPECIFY THE NECESSARY SAFETY CONDITIONS. IF THE SPECIFIED CONDITIONS ARE NOT OBEYED, DAMAGE TO EQUIPMENT CAN OCCUR.

Table 2**CORROSION INHIBITING COMPOUNDS FOR THE ENGAGING FACE OF A CONNECTOR**

Part Number	Description	Supplier
D5026NS	11 ounce aerosol can	Zip Chem
ZC-026	Non-aerosol bulk container	Zip Chem

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Table 3
CORROSION INHIBITING COMPOUNDS FOR THE EXTERNAL SURFACE OF A CONNECTOR

Part Number	Description	Supplier
Dinotrol AV25	13.5 ounce aerosol can	Dinol
	Non-aerosol bulk container	Dinol

Table 4
INSULATING COMPOUNDS

Part Number	Supplier
DC4	Dow Corning

Table 5
NECESSARY TOOLS

Tool	Supplier
Spray Equipment, Pump Action	An available source

2. INSPECTION FOR CORROSION

A. Connector Assembly Inspection

- (1) If it is necessary to remove dirt or other contamination to examine the surfaces for corrosion, clean the connector. Refer to Subject 20-10-04.
 Make sure that you only remove contamination that prevents the inspection of the connector for corrosion. Do not remove the corrosion or corrosion products at this time.
- (2) Disconnect the backshell. Refer to the applicable connector subject.
NOTE: Corrosion can make the operation of the backshell threads or coupling mechanism impossible.
- (3) Find the damage condition and the repair condition of the operation of the backshell threads and the coupling mechanism. Refer to Table 8.
- (4) Examine the internal and the external surfaces of the backshell for:
 - Corrosion material
 - Damage to the plated finish
 - Damage to the base metal
 - Damage to the threads.
- (5) Find the damage conditions and the repair conditions of the internal and external surfaces of the backshell. Refer to Table 8.
- (6) Examine the external surface of the connector for:
 - Corrosion material
 - Damage to the plated finish
 - Damage to the base metal
 - Damage to the threads or coupling mechanism.
- (7) Find the damage conditions and the repair conditions of the external surface of the connector. Refer to Table 6.

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SPECIAL PROTECTION OF ELECTRICAL CONNECTORS

- (8) Disconnect the plug and the receptacle. Refer to the applicable subject for the connector.
NOTE: Corrosion can make the operation of the connector coupling mechanism impossible.
- (9) Find the damage condition and the repair condition of the connector coupling mechanism. Refer to Table 6.
- (10) Examine the internal surface of the connector shell for:
 - Corrosion materials
 - Damage to the plated finish
 - Damage to the base metal.
- (11) Examine the connector contacts for:
 - Base metal that can be seen
 - Blue-green deposits
 - Black stains or red stains
 - Pits in the base metal.
- (12) Examine the connector for moisture.
- (13) Find the damage condition and the repair condition for the internal surfaces of the connector. Refer to Table 7.

B. Damage Conditions and Repair Conditions

**Table 6
DAMAGE AND REPAIR CONDITIONS - CONNECTOR EXTERNAL SURFACES**

Type of Damage	Damage Condition	Repair Condition	Reference
Layer of corrosion material	A heavy layer of white corrosion materials in most areas	Replacement of the connector	The applicable subject for the connector
	A medium layer of white corrosion materials in some areas	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
			Paragraph 5.C.
A light layer of white corrosion materials in some areas	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C. Paragraph 5.C.	
Damage to the plated finish on the shell	The color of the finish is completely gone in the areas with corrosion	Replacement of the connector	The applicable subject for the connector
	The color of the finish is faded in some areas	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
Paragraph 5.C.			
Damage to the base metal of the shell	Many pits or holes in the connector shell	Replacement of the connector	The applicable subject for the connector
	Some pits in the connector shell	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
Paragraph 5.C.			

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SPECIAL PROTECTION OF ELECTRICAL CONNECTORS

Table 6 (continued)

Type of Damage	Damage Condition	Repair Condition	Reference
Damage to the coupling mechanism	The coupling mechanism is impossible to operate because of the corrosion	Replacement of the connector	The applicable subject for the connector
	The coupling mechanism does not operate easily because of the corrosion	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
			Paragraph 5.C.
The coupling mechanism operates easily	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.	
		Paragraph 5.C.	
Damage to the threads	The threads are impossible to engage or disengage because of the corrosion	Replacement of the connector	The applicable subject for the connector
	The threads do not engage or disengage easily because of the corrosion	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
			Paragraph 5.C.
The threads engage and disengage easily	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.	
		Paragraph 5.C.	

Table 7

CORROSION DAMAGE AND REPAIR CONDITIONS - CONNECTOR INTERNAL SURFACES

Type of Damage	Damage Condition	Repair Condition	Reference
Layer of corrosion material	Corrosion materials on the surface of the shell	Replacement of the connector	The applicable subject for the connector
	Damage to the plated finish	Replacement of the connector	The applicable subject for the connector
	Pits in the base metal	Replacement of the connector	The applicable subject for the connector
Damage to a contact	Bare base metal	Replacement of the contact	The applicable subject for the connector
	Pits in the base metal	Replacement of the contact	The applicable subject for the connector
	Blue-green contamination	Replacement of the contact	The applicable subject for the connector
	Black stains or red stains	Replacement of the contact	The applicable subject for the connector

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Table 7 (continued)

Type of Damage	Damage Condition	Repair Condition	Reference
Damage to the connector	Moisture in the connector	Protection of the engaging face with corrosion inhibiting compound	Paragraph 3.B.
			Paragraph 5.B.

Table 8

CORROSION DAMAGE AND REPAIR CONDITIONS - BACKSHELL

Type of Damage	Damage Condition	Repair Condition	Reference
Layer of corrosion material	A heavy layer of white corrosion materials in most areas	Replacement of the backshell	Subject 20-60-09
	A medium layer of white corrosion materials	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
			Paragraph 5.C.
A light layer of white corrosion materials in some areas	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C. Paragraph 5.C.	
Damage to the plated finish	The color of the finish is completely gone in the areas with corrosion	Replacement of the backshell	Subject 20-60-09
	The color of the finish is faded in some areas	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C. Paragraph 5.C.
Damage to the base metal	Many pits or holes in the connector shell	Replacement of the backshell	Subject 20-60-09
	Some pits in the connector shell	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C. Paragraph 5.C.
Damage to the coupling mechanism	The coupling mechanism is impossible to operate because of the corrosion	Replacement of the backshell	Subject 20-60-09
	The coupling mechanism cannot operate easily because of the corrosion	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
			Paragraph 5.C.
The threads or the coupling mechanism operate easily	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C. Paragraph 5.C.	

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Table 8 (continued)

Type of Damage	Damage Condition	Repair Condition	Reference
Damage to the threads	The threads are impossible to engage or disengage because of the corrosion	Replacement of the backshell	Subject 20-60-09
	The threads cannot engage or disengage easily because of the corrosion	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
			Paragraph 5.C.
	The threads engage and disengage easily	Protection of the external surface with corrosion inhibiting compound	Paragraph 3.C.
Paragraph 5.C.			

3. CONNECTORS THAT CONNECT TO AN LRU

A. Applicable Conditions

Corrosion inhibiting compound must be applied to a connector:

- That is a replacement of a connector that has protection with corrosion inhibiting compound
- Again if the plug and the receptacle that have protection with corrosion inhibiting compound are disconnected
- Again if the corrosion inhibiting compound is removed or is not sufficient
- At specified intervals. Refer to Table 1.

CAUTION: PROTECTION WITH CORROSION INHIBITING COMPOUND MUST BE SUFFICIENT. IF THE PROTECTION FROM CORROSION IS NOT SUFFICIENT, DAMAGE TO THE CONNECTOR CAN OCCUR.

B. Protection of the Engaging Face

- (1) Clean the internal surfaces of the connector with isopropyl alcohol. Refer to Subject 20-60-01.
- (2) Make a selection of a corrosion inhibiting compound from Table 2.
- (3) If the corrosion inhibiting compound is not in an aerosol can, make a selection of equipment that can be used to apply the compound as a spray from Table 5.
- (4) Apply the compound to the engaging face of the connector as a spray. Refer to Figure 1.

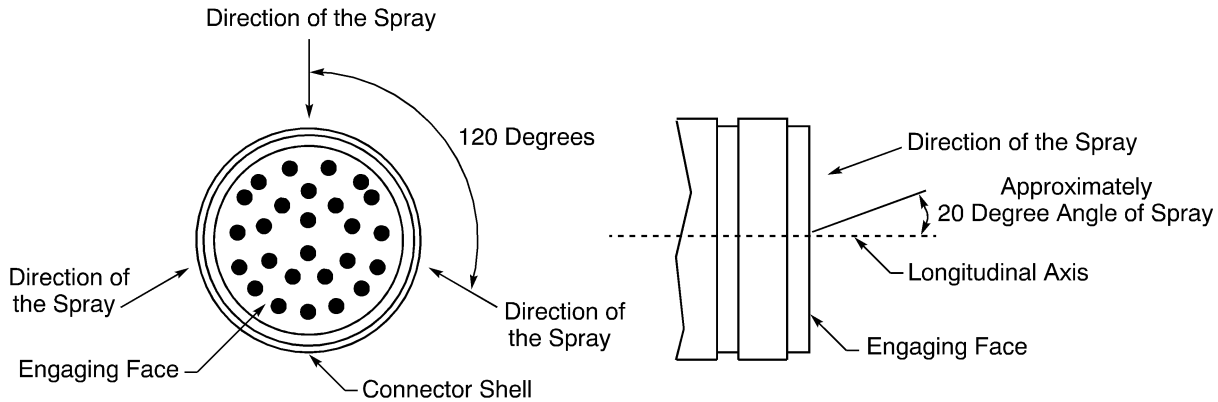
Make sure that a layer of compound is fully applied on each of these surfaces:

- The metal surfaces on the engaging face of the connector
- The rubber grommet
- The ground springs.

NOTE: It is not necessary to remove the corrosion inhibiting compound that gets on the contacts.

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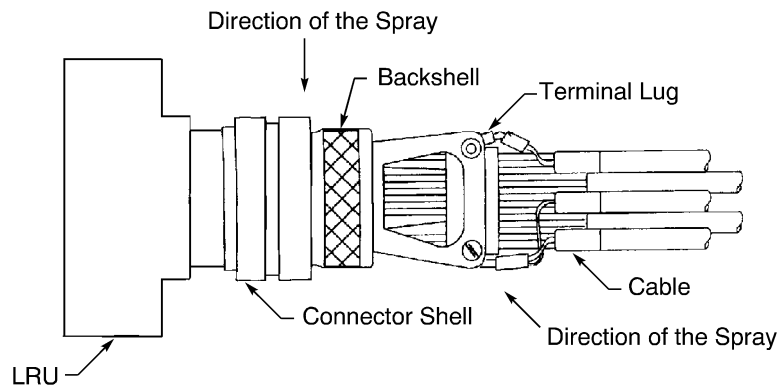


DIRECTION TO APPLY A SPRAY
Figure 1

- (a) Hold the nozzle 4 to 8 inches away from the engaging face of the connector approximately at a 20 degree angle from the longitudinal axis of the connector.
 - (b) Apply the compound across the engaging face with sprays of 2 seconds to 4 seconds.
 - (c) Move the nozzle direction approximately 120 degrees around the engaging face of the connector.
- NOTE:** As an alternative, the connector can be turned approximately 120 degrees.
- (d) Do Step (a) through Step (c) again.
 - (e) Do Step (a) through Step (b) again.
- (5) Do Step (4) again for the other engaging face of the connector.
 - (6) Let the connector dry in the air for a minimum of 20 minutes before it is assembled.

CAUTION: THE CONNECTOR MUST GIVEN PROTECTION FROM CONTAMINATION AFTER THE CORROSION INHIBITING COMPOUND IS APPLIED. CONTAMINATION IN THE CONNECTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

C. Protection of the External Surface



APPLICATION OF THE CORROSION INHIBITING COMPOUND
Figure 2

STANDARD WIRING PRACTICES MANUAL**SPECIAL PROTECTION OF ELECTRICAL CONNECTORS**

Refer to Figure 2.

CAUTION: THE NECESSARY BOND TESTS MUST BE DONE BEFORE THE CORROSION INHIBITING COMPOUND IS APPLIED.

CAUTION: THE NECESSARY OPERATIONAL TESTS MUST BE DONE BEFORE THE CORROSION INHIBITING COMPOUND IS APPLIED.

- (1) If the plug and receptacle are not connected, connect them. Refer to the applicable Subject for the connector and the Aircraft Maintenance Manual.
- (2) Clean the external surfaces of the connector with isopropyl alcohol. Refer to Subject 20-10-04.
- (3) Make a selection of a corrosion inhibiting compound from Table 3.
- (4) Make a selection of equipment that can be used to apply the compound as a spray from Table 5.
- (5) Apply compound to the external surface of the connector from the side of the connector until drops of the compound start to fall from the connector.

Make sure that a layer of compound is fully applied on each of these surfaces:

- The connector shell
- The backshell.

CAUTION: NONE OF THE CORROSION INHIBITING COMPOUND MUST BE REMOVED. DAMAGE TO THE CONNECTOR FROM CORROSION CAN OCCUR.

- (a) Hold the nozzle 4 inches to 8 inches away from the side of the connector.
- (b) Apply the compound across the connector with sprays of 2 seconds to 4 seconds.
- (c) Move the nozzle approximately 120 degrees around the outer surface of the connector.
NOTE: As an alternative, the connector can be turned approximately 120 degrees.
- (d) Do Step (a) through Step (c) again.
- (e) Do Step (a) through Step (b) again.
- (6) Apply compound to the external surface of the connector from the rear of the connector until drops of the compound start to fall from the connector.

Make sure that a layer of compound is fully applied on each of these surfaces:

- The connector shell
- The backshell
- The rubber grommet
- The terminal lugs.

CAUTION: NONE OF THE CORROSION INHIBITING COMPOUND MUST BE REMOVED. DAMAGE TO THE CONNECTOR FROM CORROSION CAN OCCUR.

- (a) Hold the nozzle 4 inches to 8 inches away from the rear of the connector approximately at a 45 degree angle from the longitudinal axis of the connector.
- (b) Apply the compound across the connector and the backshell with sprays of 2 seconds to 4 seconds.
- (c) Move the nozzle approximately 120 degrees around the connector.

NOTE: As an alternative, the connector can be turned approximately 120 degrees.

- (d) Do Step (a) through Step (c) again.

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(e) Do Step (a) through Step (b) again.

4. FENWAL CONNECTORS**A. Necessary Conditions**

Insulating compound must be applied to a connector:

- If the connector is a replacement of a connector that has protection with insulating compound
- Again if the compound is removed or is not sufficient.

CAUTION: IF THE PROTECTION FROM CORROSION WITH INSULATING COMPOUND IS NOT SUFFICIENT, DAMAGE TO THE CONNECTOR CAN OCCUR.

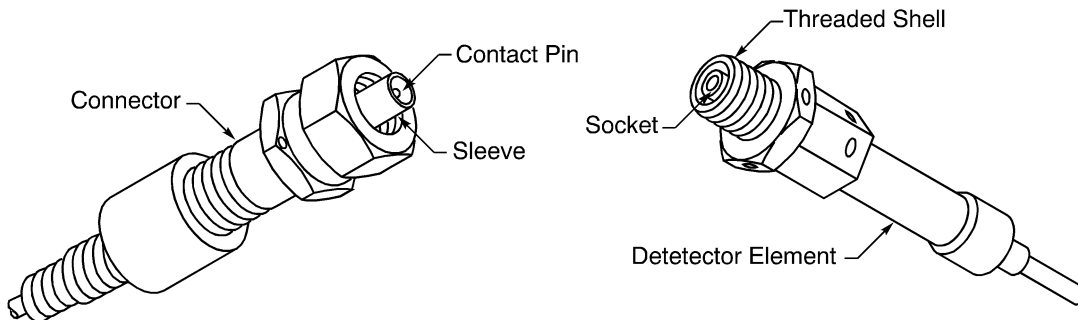
B. Protection of the Engaging Face

- (1) Make a selection of an insulating compound from Table 4.
- (2) Fill a syringe or an equivalent tool with the insulating compound.
- (3) Fill the inner surfaces of the connector full with insulating compound. Refer to Figure 3.

Make sure to fully fill these areas:

- The space between the sleeve and the contact pin
- The socket of the detector element
- The space between the socket and the threaded shell on the detector element connector.

CAUTION: THE CONNECTOR MUST BE ASSEMBLED OR GIVEN PROTECTION FROM CONTAMINATION AFTER THE INSULATING COMPOUND IS APPLIED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.



PROTECTION OF THE CONNECTOR
Figure 3

STANDARD WIRING PRACTICES MANUAL

SPECIAL PROTECTION OF ELECTRICAL CONNECTORS

5. OTHER CONNECTORS

A. Applicable Conditions

Corrosion inhibiting compound must be applied to a connector:

- That is a replacement of a connector that has protection with corrosion inhibiting compound
- Again if the plug and the receptacle that have protection with corrosion inhibiting compound are disconnected
- Again if the corrosion inhibiting compound is removed or is not sufficient
- At specified intervals. Refer to Table 1.

CAUTION: PROTECTION WITH CORROSION INHIBITING COMPOUND MUST BE SUFFICIENT. IF THE PROTECTION FROM CORROSION IS NOT SUFFICIENT, DAMAGE TO THE CONNECTOR CAN OCCUR.

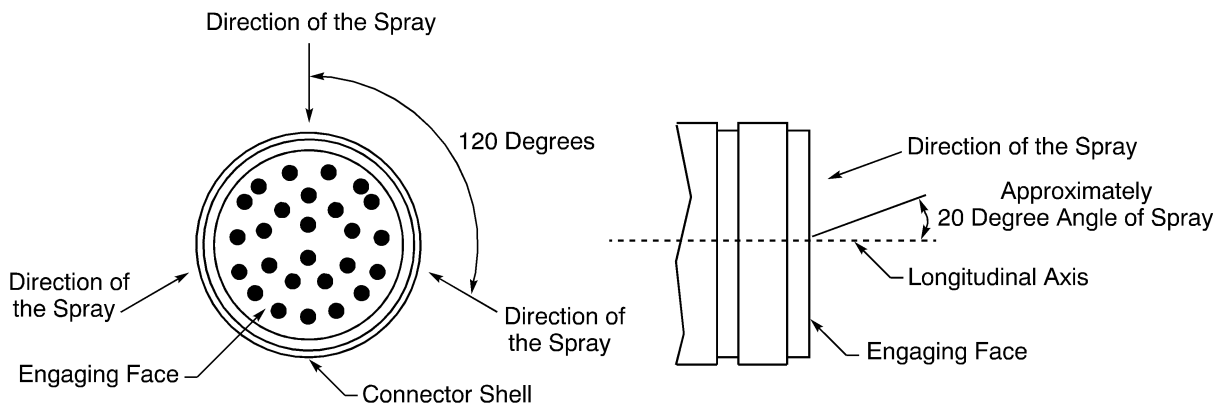
B. Protection of the Engaging Face

- (1) Clean the internal surfaces of the connector using isopropyl alcohol. Refer to Subject 20-60-01.
- (2) Make a selection of a corrosion inhibiting compound from Table 2.
- (3) If the corrosion inhibiting compound is not in an aerosol can, make a selection of equipment that can be used to apply the compound as a spray from Table 5.
- (4) Apply the compound to the engaging face of the connector as a spray. Refer to Figure 4.

Make sure that a layer of compound is fully applied on each of these surfaces:

- The metal surfaces on the engaging face of the connector
- The rubber grommet
- The ground springs.

NOTE: It is not necessary to remove the corrosion inhibiting compound that gets on the contacts.



DIRECTION TO APPLY A SPRAY
Figure 4

- (a) Hold the nozzle 4 inches to 8 inches away from the engaging face of the connector approximately at a 20 degree angle from the longitudinal axis of the connector.
- (b) Apply the compound across the engaging face with sprays of 2 seconds to 4 seconds.

STANDARD WIRING PRACTICES MANUAL

SPECIAL PROTECTION OF ELECTRICAL CONNECTORS

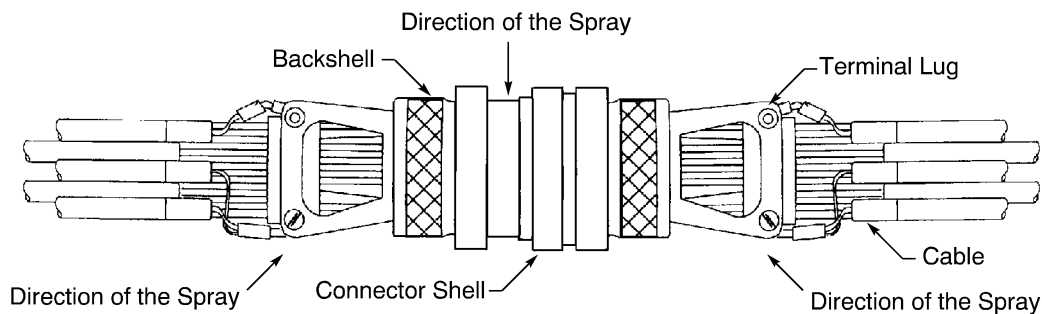
- (c) Move the nozzle direction approximately 120 degrees around the engaging face of the connector.

NOTE: As an alternative, the connector can be turned approximately 120 degrees.

- (d) Do Step (a) through Step (c) again.
- (e) Do Step (a) through Step (b) again.
- (5) Do Step (4) again for the other engaging face of the connector.
- (6) Let the connector dry in the air for a minimum of 20 minutes before it is assembled.

CAUTION: THE CONNECTOR MUST GIVEN PROTECTION FROM CONTAMINATION AFTER THE CORROSION INHIBITING COMPOUND IS APPLIED. CONTAMINATION IN THE CONNECTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

C. Protection of the External Surface



APPLICATION OF THE CORROSION INHIBITING COMPOUND

Figure 5

Refer to Figure 5.

CAUTION: THE NECESSARY BOND TESTS MUST BE DONE BEFORE THE CORROSION INHIBITING COMPOUND IS APPLIED.

CAUTION: THE NECESSARY OPERATIONAL TESTS MUST BE DONE BEFORE THE CORROSION INHIBITING COMPOUND IS APPLIED.

- (1) If the plug and receptacle are not connected, connect them. Refer to the applicable Subject for the connector.
- (2) Clean the external surfaces of the connector using Isopropyl Alcohol. Refer to Subject 20-60-01.
- (3) Make a selection of a corrosion inhibiting compound from Table 3.
- (4) Make a selection of equipment that can be used to apply the compound as a spray from Table 5.
- (5) Apply compound to the external surface of the connector from the side of the connector until drops of the compound start to fall from the connector.

Make sure that a layer of compound is fully applied on each of these surfaces:

- The connector shell
- The backshell.

STANDARD WIRING PRACTICES MANUAL**SPECIAL PROTECTION OF ELECTRICAL CONNECTORS**

CAUTION: NONE OF THE CORROSION INHIBITING COMPOUND MUST BE REMOVED. DAMAGE TO THE CONNECTOR FROM CORROSION CAN OCCUR.

- (a) Hold the nozzle 4 inches to 8 inches away from the side of the connector.
 - (b) Apply the compound across the connector with sprays of 2 seconds to 4 seconds.
 - (c) Move the nozzle approximately 120 degrees around the outer surface of the connector.
 - (d) Do Step (a) through Step (c) again.
 - (e) Do Step (a) through Step (b) again.
- (6) Apply compound to the external surface of the connector from the rear of the connector until drops of the compound start to fall from the connector.

Make sure that a layer of compound is fully applied on each of these surfaces:

- The connector shells
- The backshells
- The rubber grommets
- The terminal lugs.

CAUTION: NONE OF THE CORROSION INHIBITING COMPOUND MUST BE REMOVED. DAMAGE TO THE CONNECTOR FROM CORROSION CAN OCCUR.

- (a) Hold the nozzle 4 inches to 8 inches away from the rear of the connector approximately at a 45 degree angle from the longitudinal axis of the connector.
 - (b) Apply the compound across the connector and the backshell with sprays of 2 seconds to 4 seconds.
 - (c) Move the nozzle approximately 120 degrees around the connector.
- NOTE:** As an alternative, the connector can be turned approximately 120 degrees.
- (d) Do Step (a) through Step (c) again.
 - (e) Do Step (a) through Step (b) again.

6. REPLACEMENT OF CONNECTORS**A. Replacement of Connectors that Connect to an LRU**

- (1) Clean the connector.
Refer to:
 - Subject 20-10-04 for the procedures to clean the external surfaces of a connector
 - Subject 20-60-01 for the procedures to clean the internal surfaces of a connector.
- (2) Disassemble the connector. Refer to the applicable Subject for the connector.
- (3) Clean the contacts. Refer to Subject 20-60-01.
- (4) Examine these wire harness components:
 - The contacts
 - The backshell
 - The wires.
- (5) Replace or repair a component that has damage. Refer to the applicable Subject for the component.
- (6) Assemble the new connector. Refer to the applicable Subject for the connector.
- (7) Apply corrosion inhibiting compound on the engaging faces of the connector. Refer to Paragraph 3.B.

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STANDARD WIRING PRACTICES MANUAL**SPECIAL PROTECTION OF ELECTRICAL CONNECTORS**

CAUTION: THE CONNECTOR MUST BE ASSEMBLED OR GIVEN PROTECTION FROM CONTAMINATION AFTER THE CORROSION INHIBITING COMPOUND IS APPLIED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (8) Connect the connector to the LRU. Refer to the applicable Subject for the connector and the Aircraft Maintenance Manual.
- (9) After the connector is connected to the LRU, apply corrosion inhibiting compound on the external surface of the connector. Refer to Paragraph 3.C.

B. Replacement of a Fenwal Connector

- (1) Disassemble the connector. Refer to Subject 20-62-14.
- (2) Assemble the new connector. Refer to Subject 20-62-14.
- (3) Apply insulation compound on the engaging faces of the connector and the detector element. Refer to Paragraph 4.B.

CAUTION: THE CONNECTOR MUST BE ASSEMBLED OR GIVEN PROTECTION FROM CONTAMINATION AFTER THE INSULATING COMPOUND IS APPLIED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (4) After the connector is connected to the detector element, remove the insulating compound that is on the outer surface of the connector.

C. Replacement of Other Connectors

- (1) Clean the connector.

Refer to:

- Subject 20-10-04 for the procedures to clean the external surfaces of a connector
- Subject 20-60-01 for the procedures to clean the internal surfaces of a connector.

- (2) Disassemble the connector. Refer to the applicable Subject for the connector.
- (3) Clean the contacts. Refer to Subject 20-60-01.
- (4) Examine these wire harness components:
 - The contacts
 - The backshell
 - The wires.
- (5) Replace or repair a component that has damage. Refer to the applicable Subject for the component.
- (6) Assemble the new connector. Refer to the applicable Subject for the connector.
- (7) Apply corrosion inhibiting compound on the engaging faces of the connector. Refer to Paragraph 5.B.

CAUTION: THE CONNECTOR MUST BE ASSEMBLED OR GIVEN PROTECTION FROM CONTAMINATION AFTER THE CORROSION INHIBITING COMPOUND IS APPLIED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (8) Connect the plug and the receptacle. Refer to the applicable Subject for the connector.
- (9) Apply corrosion inhibiting compound on the external surface of the connector. Refer to Paragraph 5.C.

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INSTALLATION OF ELECTRICAL CONNECTORS

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INSTALLATION OF ELECTRICAL CONNECTORS

1. CIRCULAR CONNECTOR INSTALLATION TOOLS

A. Tool Part Numbers

NOTE: The tools given in Table 1 are:

- Used to install connectors and connector hardware
- Designed to be used in the field.

**Table 1
CIRCULAR CONNECTOR TOOLS**

Part Number	Description	Supplier	Special Instructions
600-006	Backshell Assembly Tool	Glenair	-
G77015	Replacement Jaws	Glenair	For TG69 pliers
M83507/15-0	Circular Connector Tool Kit	Glenair	-
TG69	Universal Soft Jaw Pliers	Glenair	For medium size connector shells
TG70	Mini Strap Wrench	Glenair	For small, threaded connectors
TG80	Circular Connector Tool Kit	Glenair	-

2. INSTALLATION OF RECEPTACLE CONNECTORS

A. General Conditions

For firewall receptacles, refer to Paragraph 2.B.

Receptacles must be installed with:

- The installation hardware in Table 2
- The screws located in 2 diagonally opposite installation holes
- The heads of the screws on the same side as the related plug
- The major keyway in the UP or FORWARD position, if it is not specified differently.

An adapter plate:

- Is not used when the shield of a cable is terminated through the connector or the cable clamp, or both
- Must have a conductive finish for a coax connector.

Refer to Paragraph 6. for the procedure to install an adapter plate.

**Table 2
NECESSARY INSTALLATION HARDWARE FOR RECEPTACLES**

Hardware	Quantity	Specification or Standard	Supplier	Special Instructions
Nut	2	BACN10NW1	QPL	Clip Nut
	2	BACN10JC04	QPL	Locknut
	2	BACN10XP()	QPL	Locknut
Screw	2	NAS1801-04	QPL	-
Washer	2	AN960-D4L	QPL	Installed under the screw head; necessary only in unpressurized areas

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INSTALLATION OF ELECTRICAL CONNECTORS

B. Firewall Receptacles

Firewall receptacles must be installed with:

- The installation hardware in Table 3
- The screws located in the 4 installation holes
- A layer of primer and sealant from Table 4 on the applicable surfaces of the connector flange
- The major keyway in the UP or FORWARD position, if it is not specified differently.

**Table 3
NECESSARY INSTALLATION HARDWARE FOR FIREWALL RECEPTACLES**

Hardware	Quantity	Specification or Standard	Supplier	Special Instructions
Locknut	4	BACN10JC()C	QPL	-
Screw	4	NAS1801-04	QPL	-
Washer	4	AN960C()L	QPL	-

**Table 4
NECESSARY INSTALLATION MATERIALS FOR FIREWALL RECEPTACLES**

Material	Part Number	Supplier
Primer	DAPCO1-100	D Aircraft Products Company
Sealant	DAPCOCAST 18-4	D Aircraft Products Company

C. Electrical Bonds

An electrical bond is necessary for:

- Receptacles that are installed on disconnect brackets and are attached to plugs that have specified torque values
- Engine firewall disconnects.

Refer to Subject 20-20-00.

3. INSTALLATION OF FEEDTHROUGH CONNECTORS

A. Connector Part Numbers

**Table 5
FEEDTHROUGH CONNECTOR PART NUMBERS**

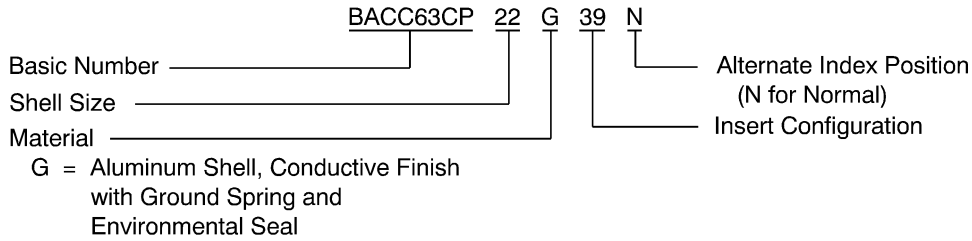
Part Number or Standard	Description	Supplier
BACC63CP()	Single Hole Mount	Boeing
BACC63CR()	Flange Mount	Boeing
CN1068A22A55N	Flange Mount	Cinch

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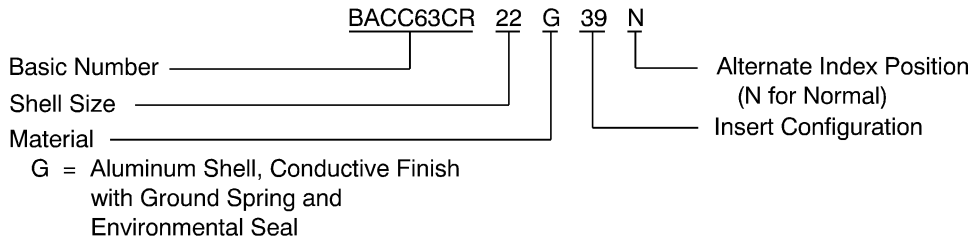
INSTALLATION OF ELECTRICAL CONNECTORS

Table 6
APPROVED SUPPLIERS OF BOEING STANDARD FEEDTHROUGH CONNECTORS

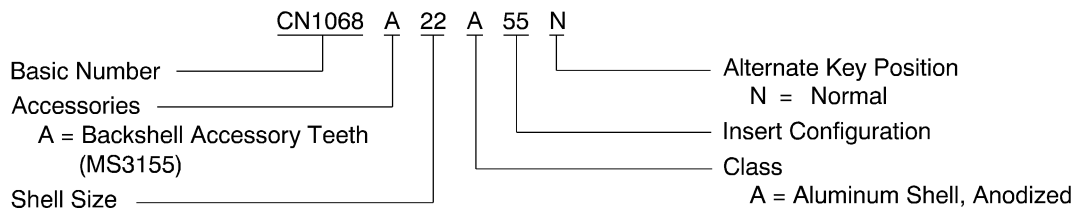
Boeing Standard	Supplier
BACC63CP()	RMS
BACC63CR()	RMS



BACC63CP() CONNECTOR PART NUMBER STRUCTURE
Figure 1



BACC63CR() CONNECTOR PART NUMBER STRUCTURE
Figure 2



CN1068() CONNECTOR PART NUMBER STRUCTURE
Figure 3

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INSTALLATION OF ELECTRICAL CONNECTORS

B. Necessary Materials

**Table 7
ABRASIVE MATERIALS**

Description	Specification	Supplier
Scotch-Brite Pad	Type A Very Fine	3M
Garnet Sandpaper	ANSI B74.18	An available source
Wet/Dry Sandpaper	ANSI B74.18 Grit size 280 or finer	An available source

**Table 8
CLEANING SOLVENTS**

Solvent	Specification	Supplier
Ethyl Alcohol, Denatured	AMS 3002	An available source
	ASTM E 1145 Type II	An available source
Isopropyl Alcohol	TT-I-735 Grade A	An available source
	TT-I-735 Grade B	An available source
Toluene	TT-T-548	An available source
Acetone	O-A-51	An available source
	ASTM D 329	An available source
Methyl Ethyl Keytone	ASTM D 740 Type I	An available source

**Table 9
FINISH MATERIALS**

Description	Cure Time (Hours)	Tack Free Time (Hours)	Specification	Supplier
Primer	4	1.5	BMS10-11 Type 1	QPL
Chemical Conversion Coating	-	-	Alodine 600	An available source

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INSTALLATION OF ELECTRICAL CONNECTORS

**Table 10
APPROVED SUPPLIERS OF BOEING STANDARD PRIMERS**

Boeing Specification	Supplier
BMS10-11 Type 1	Deft
	Tempo Paint
	Nihon Tokushu Toryo
	Hiratsuka
	Akzo Nobel
	Dexter Aerospace
	PRC-DeSoto
	Courtlands Aerospace

**Table 11
APPROVED SUPPLIERS OF CHEMICAL CONVERSION COATING**

Material	Supplier
Alodine 600	Henkel
	Nihon Parkerizing

C. Feedthrough Connector Installation - BACC63CP() Single Hole Mount

**Table 12
NECESSARY TOOLS**

Connector	Tool		
	Description	Special Instructions	Supplier
BACC63CP18	Torque Wrench	Tool must measure 600 inch-pounds minimum	An available source
	Breaker Bar, 1/2" Drive	Use with connector socket tool	An available source
	ST2580-436B-1	Box end wrench tool	Boeing
	ST2580-436B-6	Connector socket tool	Boeing
BACC63CP22	Torque Wrench	Tool must measure 600 inch-pounds minimum	An available source
	Breaker Bar, 1/2" Drive	Use with connector socket tool	An available source
	ST2580-436B-1	Box end wrench tool	Boeing
	ST2580-436B-6	Connector socket tool	Boeing

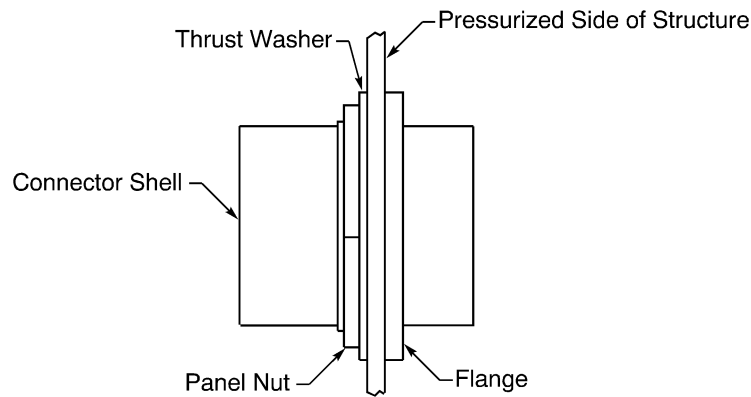
- (1) Make a selection of an abrasive from Table 7.
- (2) Make a selection of a cleaning solvent from Table 8.

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INSTALLATION OF ELECTRICAL CONNECTORS

- (3) Make a selection of a sealant that is applicable for an electrical connector shell bond. Refer to Subject 20-20-00.
- (4) Make a selection of a torque wrench, breaker bar, connector socket tool and box end wrench tool from Table 12.
- (5) Prepare the faying surface on the pressurized side of the structure. Refer to Subject 20-20-00. Make sure that the abrasive cleaning method is used.
- (6) Clean the faying surfaces of the structure with solvent and a clean wiper.
 - (a) Dispense solvent onto a clean wiper.
 - (b) Rub the faying surface with the solvent soaked wiper.
 - (c) When the wiper is dirty, replace it with a clean wiper.
 - (d) Do Step (a) through Step (c) again until the wiper is clean.
 - (e) Immediately dry the surface with another clean cloth.
- (7) Clean the faying surface of the connector with solvent and a clean wiper.
- (8) Apply a thin layer of sealant on the surface of the connector flange that will be against the structure.
- (9) From the pressurized side of the structure, align the flat spot on the connector with the flat spot in the cutout.
- (10) Insert the connector through the structure from the pressurized side of the structure. Refer to Figure 4.

Make sure that the pin contacts are on the pressurized side of the structure.



CONNECTOR INSTALLATION
Figure 4

- (11) Apply a thin layer of sealant on the surface of the thrust washer that will be against the structure.
- (12) Put the thrust washer on the unpressurized side of the connector. Refer to Figure 4.

Make sure that the sealant on the thrust washer is against the structure.
- (13) On the unpressurized side of the structure, engage the threads of the panel nut with the threads of the connector. Refer to Figure 4.
- (14) Tighten the panel nut with the hand.
- (15) Remove the excess sealant from the thrust washer.

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INSTALLATION OF ELECTRICAL CONNECTORS

- (16) On the unpressurized side of the structure, put the connector socket tool into the feedthrough connector.
- (17) Engage the box end wrench on the connector panel nut.
- (18) Torque the connector panel nut to 144 inch pounds.
- (19) Use the connector socket tool and breaker bar tool to align the connector flat spot with the cutout flat spot.
 - (a) Turn the connector clockwise and record the wrench position at the point of resistance.
 - (b) Turn the connector counter clockwise and record the wrench position at the point of resistance.
 - (c) Turn the connector to the point in the middle of the two recorded positions.
- (20) Hold the connector and, at the same time, torque the panel nut to 600 inch pounds.

CAUTION: DO NOT ALLOW THE FLAT SPOTS ON THE CONNECTOR AND THE CUTOUT IN THE STRUCTURE TO HOLD THE CONNECTOR WHILE THE PANEL NUT IS TIGHTENED. DAMAGE TO THE CONNECTOR OR THE STRUCTURE CAN OCCUR.

- (21) Remove the connector socket tool and box end wrench tool.
- (22) Do a test of the electrical resistance between the connector shell and the structure. Refer to Subject 20-20-00.
- (23) Apply a fillet seal on the pressurized side of the connector.
Make sure that the fillet seal is applied between the edge of the connector flange and the structure.
- (24) Apply the fillet seals on the unpressurized side of the connector.
 - (a) Apply a fillet seal between the structure and the thrust washer.
 - (b) Apply a fillet seal between the thrust washer and the edge of the panel nut.
 - (c) Apply a fillet seal between the edge of the panel nut and the connector.
- (25) If the area of the structure adjacent to the connector has bare metal:
 - (a) Make a selection of a primer from Table 9.
 - (b) Apply the primer to the bare metal on the pressurized side of the structure.
 - (c) Apply the primer to the bare metal on the unpressurized side of the structure.

D. Feedthrough Connector Installation - BACC63CR() Flange Mount

**Table 13
NECESSARY TOOLS**

Tool	Special Instructions	Supplier
Torque Wrench	Tool must measure 9 inch-pounds minimum	An available source

**Table 14
CONNECTOR INSTALLATION HARDWARE**

Hardware	Part Number	Quantity	Supplier
Screw	NAS1801-()-()	4	An available source
Washer	NAS1149D()J	4	An available source

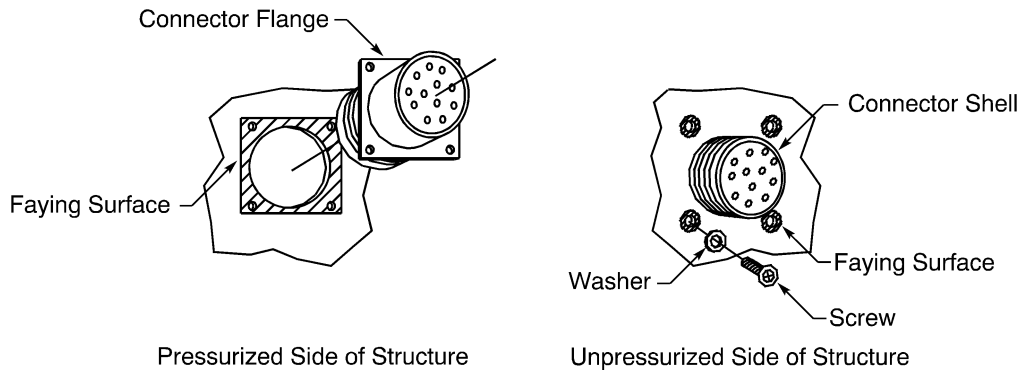
- (1) Make a selection of an abrasive from Table 7.

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INSTALLATION OF ELECTRICAL CONNECTORS

- (2) Make a selection of a cleaning solvent from Table 8.
- (3) Make a selection of a chemical conversion coat material from Table 9.
- (4) Make a selection of a sealant that is applicable for an electrical connector shell bond. Refer to Subject 20-20-00.
- (5) Make a selection of a torque wrench from Table 13.
- (6) Prepare the faying surface of the structure that touches the connector flange. Refer to Figure 5 and Subject 20-20-00.

Make sure that the abrasive cleaning method is used.



LOCATION OF THE FAYING SURFACES

Figure 5

- (7) Prepare the faying surfaces of the structure for each screw. Refer to Figure 5 and Subject 20-20-00. Make sure that the abrasive cleaning method is used.
- (8) Clean the faying surfaces on the structure.
 - (a) Dispense solvent onto a clean wiper.
 - (b) Rub the faying surface with the solvent soaked wiper.
 - (c) When the wiper is dirty, replace it with a clean wiper.
 - (d) Do Step (a) through Step (c) again until the wiper is clean.
- (9) Apply the chemical conversion coat material to the faying surface that touches the connector flange.

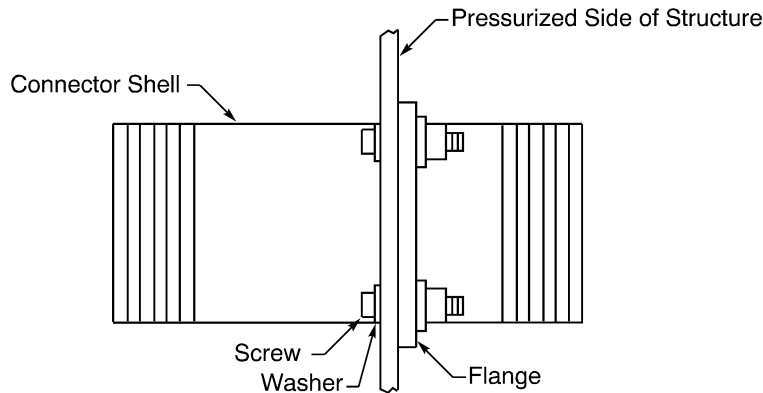
CAUTION: DO NOT APPLY CHEMICAL CONVERSION COAT MATERIAL TO THE CLEANED AREA THAT TOUCHES THE SCREW HEAD AND WASHER. THESE AREAS MUST BE BARE ALUMINUM.

- (10) Clean each side of the connector flange with solvent and a clean wiper.
- (11) Align and insert the connector through the cutout from the pressurized side of the structure. Refer to Figure 6.

Make sure that the pin contacts are on the pressurized side of the structure.

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INSTALLATION OF ELECTRICAL CONNECTORS



CONNECTOR INSTALLATION
Figure 6

- (12) Put a washer on each mounting screw. Refer to Figure 6.
- (13) Fully engage the threads of the mounting screws and the threads of the clinch nuts.
- (14) Torque the screws 9 inch-pounds to 12 inch-pounds.
- (15) Do a test of the electrical resistance between the connector shell and the structure. Refer to Subject 20-20-00.
- (16) Apply a fillet seal to the pressurized side of the connector.
 - (a) Apply a fillet seal between the edge of the connector flange and the structure.
 - (b) Apply a fillet seal to the clinch nuts.
 - (c) Apply a fillet seal to the screw threads.

NOTE: It is permitted to encapsulate the clinch nuts and screw threads with sealant.
- (17) Apply a fillet seal to the unpressurized side of the connector.
 - (a) Apply a fillet seal between the connector shell and the structure.
 - (b) Apply a fillet seal to the screw heads and washers.

NOTE: It is permitted to encapsulate the screw heads and washers with sealant.
- (18) If the area adjacent to the connector has bare metal:
 - (a) Make a selection of a primer from Table 9.
 - (b) Apply the primer to the bare metal on the pressurized side of the structure.
 - (c) Apply the primer to the bare metal on the unpressurized side of the structure.

E. Feedthrough Connector Installation - CN1068() Flange Mount

Table 15
NECESSARY TOOLS

Tool	Special Instructions	Supplier
Torque Wrench	Tool must measure 9 inch-pounds minimum	An available source

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**Table 16
CONNECTOR INSTALLATION HARDWARE**

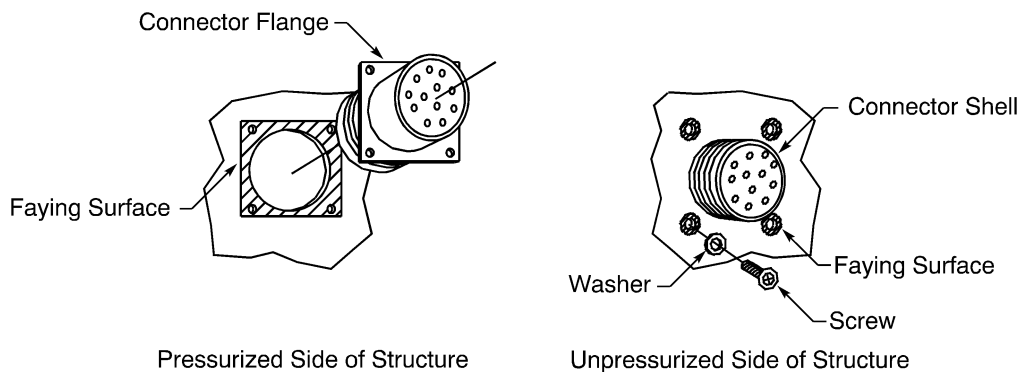
Hardware	Part Number	Quantity	Supplier
Nut	BACN11AG04	4	Boeing
	MS21042L04	4	An available source
Screw	NAS1801-04-8	4	An available source
Washer	AN960JD4	4	An available source
	NAS1149D432J	4	An available source

**Table 17
OBSOLETE CONNECTOR INSTALLATION HARDWARE**

Obsolete Part Number	Replacement Part Number	Supplier
MS21042L04	BACN11AG04	Boeing
AN960JD4	NAS1149DN432J	An available source

- (1) Make a selection of an abrasive from Table 7.
- (2) Make a selection of a cleaning solvent from Table 8.
- (3) Make a selection of a chemical conversion coat material from Table 9.
- (4) Make a selection of a sealant that is applicable for an electrical connector shell bond. Refer to Subject 20-20-00.
- (5) Make a selection of a torque wrench from Table 15.
- (6) Prepare the faying surface of the structure that touches the connector flange. Refer to Figure 7 and Subject 20-20-00.

Make sure that the abrasive cleaning method is used.



**LOCATION OF THE FAYING SURFACES
Figure 7**

- (7) Prepare the faying surfaces of the structure for each screw. Refer to Figure 7 and Subject 20-20-00. Make sure that the abrasive cleaning method is used.
- (8) Clean the faying surfaces on the structure.

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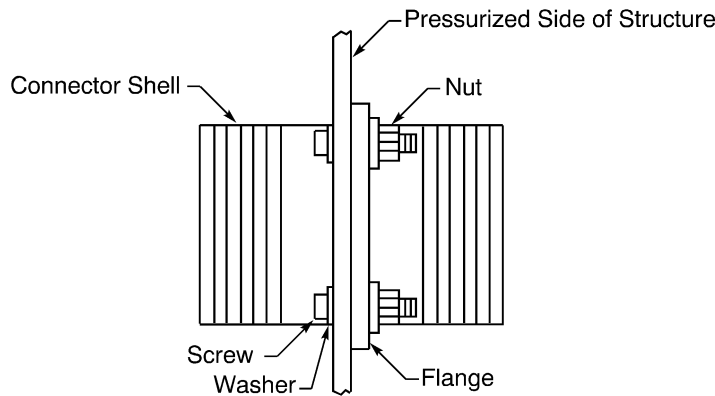
INSTALLATION OF ELECTRICAL CONNECTORS

- (a) Dispense solvent onto a clean wiper.
 - (b) Rub the faying surface with the solvent soaked wiper.
 - (c) When the wiper is dirty, replace it with a clean wiper.
 - (d) Do Step (a) through Step (c) again until the wiper is clean.
- (9) Apply the chemical conversion coat material to the faying surface that touches the connector flange.

CAUTION: DO NOT APPLY CHEMICAL CONVERSION COAT MATERIAL TO THE CLEANED AREA THAT TOUCHES THE SCREW HEAD AND WASHER. THESE AREAS MUST BE BARE ALUMINUM.

- (10) Clean each side of the connector flange with solvent and a clean wiper.
- (11) Align and insert the connector through the cutout from the pressurized side of the structure. Refer to Figure 8.

Make sure that the pin contacts are on the pressurized side of the structure.



CONNECTOR INSTALLATION
Figure 8

- (12) Put a washer on each mounting screw. Refer to Figure 8.
- (13) Fully engage the threads of the mounting screws and the threads of the nuts.
- (14) Torque the screws 7 inch-pounds to 9 inch-pounds.
- (15) Do a test of the electrical resistance between the connector shell and the structure. Refer to Subject 20-20-00.

Make sure that the resistance is less than 1.5 milliohms.

- (16) Apply a fillet seal to the pressurized side of the connector.
- (a) Apply a fillet seal between the edge of the connector flange and the structure.
 - (b) Apply a fillet seal to the nuts.
 - (c) Apply a fillet seal to the screw threads.

NOTE: It is permitted to encapsulate the nuts and screw threads with sealant.

- (17) Apply a fillet seal to the unpressurized side of the connector.
- (a) Apply a fillet seal between the connector shell and the structure.

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF ELECTRICAL CONNECTORS

- (b) Apply a fillet seal to the screw heads and washers.

NOTE: It is permitted to encapsulate the screw heads and washers with sealant.

- (18) If the area adjacent to the connector has bare metal:

- (a) Make a selection of a primer from Table 9.
- (b) Apply the primer to the bare metal on the pressurized side of the structure.
- (c) Apply the primer to the bare metal on the unpressurized side of the structure.

4. INSTALLATION OF PLUG CONNECTORS

A. ARINC 600 Connectors

ARINC 600 rack and panel connectors must be installed so that the connector tab at the lower edge of the connector touches the bottom of the tray while the mounting screws are tightened.

B. Matrix 42839KS14S5SX-190 Plugs of the Systron Donner Engine Fire Detector

These conditions are applicable:

- The connector must be torqued 50 inch-pounds +5 inch-pounds , -0 inch-pounds
- Putty must be put on the coupling ring of the plug and the receptacle body so that it can be seen if the connectors become loose.

5. CONNECTION OF PLUGS AND RECEPTACLES

A. Satisfactory Connections

**Table 18
CONDITIONS OF A SATISFACTORY CONNECTION**

Coupling Mechanism	Full Connection	
	Reference	Condition
Bayonet Coupling	Three axial stripes on the coupling ring of the plug and receptacle shell; three holes around coupling ring	Stripes on the plug and receptacle are aligned
		Bayonet pins can be seen in the holes of the coupling ring
		A click can be heard or felt
	Three holes around the plug coupling ring	Bayonet pins can be seen in the holes of the coupling ring
		A click can be heard or felt
	Holes in the plug coupling ring and a stripe around the circumference of the receptacle	Plug coupling ring over the color stripe on receptacle so that the stripe cannot be seen
Bayonet pins can be seen in the holes of the coupling ring		
A click can be heard or felt		
Breech Coupling	Axial stripe on the receptacle key and the coupling ring of the plug; color stripe around the rear shell of the plug	Color stripe on the rear shell of the plug cannot be seen
		Stripes on the receptacle key and coupling ring are aligned

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Table 18 (continued)

Coupling Mechanism	Full Connection	
	Reference	Condition
Threaded Coupling	None	Tightened by hand plus a maximum 1/8 turn more
		Lockwire installed if specified
	Color stripe around the circumference of the threaded end of the receptacle	Tightened by hand plus a maximum 1/8 turn more
		Engaging end of the coupling ring of the plug over the color stripe so that the stripe cannot be seen
Threaded, Self-Locking Coupling	Indicator windows with color stripe on the coupling ring of the plug	Tightened by hand plus a maximum 1/8 turn more
		Flag in the windows of the indicator is aligned with the color stripes
		Clicks that are heard and felt can be ignored
	Indicator slots in the coupling ring of the plug	Tightened by hand plus a maximum 1/8 turn more
		Indicator slots are filled with colored indicators
	Color indicator band on the receptacle shell	The coupling ring is fully tightened
Approximately three to five more clicks after the color indicator band cannot be seen		

B. Installation Torque for General Purpose, Threaded Connectors

NOTE: Connectors that need to be torqued are identified by a white or pink identification sleeve.

**Table 19
TORQUE VALUES FOR GENERAL PURPOSE CONNECTORS**

Connector Shell Size	Torque (inch-pound)	
	Minimum	Maximum
10	21	26
12	24	29
14	30	35
16	36	41
18	45	50
20	60	65
22	69	74
24	83	88
28	99	104
32	115	120



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6. INSTALLATION OF ADAPTER PLATES

A. Adapter Plate Part Numbers

**Table 20
ADAPTER PLATES**

Cutout	Connector Shell	Note	Boeing Standard
BACD2010-299	Size 24	Connector too large for cutout	-
	Size 22	Connector too large for cutout	-
	Size 20	Connector too large for cutout	-
	Size 18	Adapter not necessary	-
	Size 16	Adapter not necessary	-
	Size 14	Adapter not necessary	-
	Size 12	-	66-14850-1 BACA14BH10
	Size 10	-	66-13970-1 BACA14BH7
	Size 8	-	BACA14BH5
	Coax	-	66-18337-1
BACD2010-492	Size 24	Connector too large for cutout	-
	Size 22	Connector too large for cutout	-
	Size 20	Connector too large for cutout	-
	Size 18	Connector too large for cutout	-
	Size 16	Adapter not necessary	-
	Size 14	Adapter not necessary	-
	Size 12	Adapter not necessary	-
	Size 10	-	BACA14BH8
	Size 8	Adapter not available	-
	Coax	Adapter not available	-

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INSTALLATION OF ELECTRICAL CONNECTORS

Table 20 (continued)

Cutout	Connector Shell	Note	Boeing Standard	
BACD2010-493	Size 24	Connector too large for cutout	-	
	Size 22	Adapter not necessary	-	
	Size 20	Adapter not necessary	-	
	Size 18	Adapter not necessary	-	
	Size 16		-	69-37164-3
				BACA14BH12
	Size 14		-	69-37164-3
				BACA14BH12
	Size 12		-	69-37164-3
				BACA14BH12
	Size 10		-	66-13970-1
BACA14BH7				
Size 8		-	BACA14BH5	
Coax		-	66-18337-1	
BACD2010-575	Size 24	Connector too large for cutout	-	
	Size 22	Adapter not necessary	-	
	Size 20	Adapter not necessary	-	
	Size 18	Adapter not necessary	-	
	Size 16		-	69-37164-3
				BACA14BH12
	Size 14		-	69-37164-3
				BACA14BH12
	Size 12		-	69-37164-3
				BACA14BH12
	Size 10		-	66-13970-1
BACA14BH7				
Size 8		-	BACA14BH5	
Coax		-	66-18337-1	



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INSTALLATION OF ELECTRICAL CONNECTORS

Table 20 (continued)

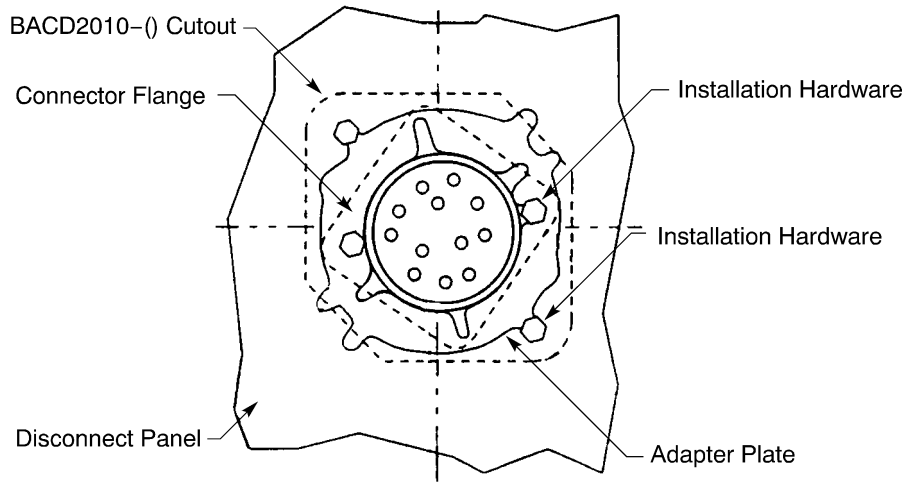
Cutout	Connector Shell	Note	Boeing Standard
BACD2010-617	Size 24	Adapter not necessary	-
	Size 22	Adapter not available	-
	Size 20	Adapter not available	-
	Size 18	Adapter not available	-
	Size 16	Adapter not available	-
	Size 14	Adapter not available	-
	Size 12	Adapter not available	-
	Size 10	Adapter not available	-
	Size 8	Adapter not available	-
	Coax	Adapter not available	-
BACD2010-640	Size 24	Adapter not necessary	-
	Size 22	Adapter not necessary	-
	Size 20	Adapter not necessary	-
	Size 18	-	BACA14BH14
	Size 16	-	69-37164-3
			BACA14BH12
	Size 14	-	69-37164-3
			BACA14BH12
	Size 12	-	69-37164-3
			BACA14BH12
Size 10	Adapter not available	-	
Size 8	Adapter not available	-	
Coax	Adapter not available	-	

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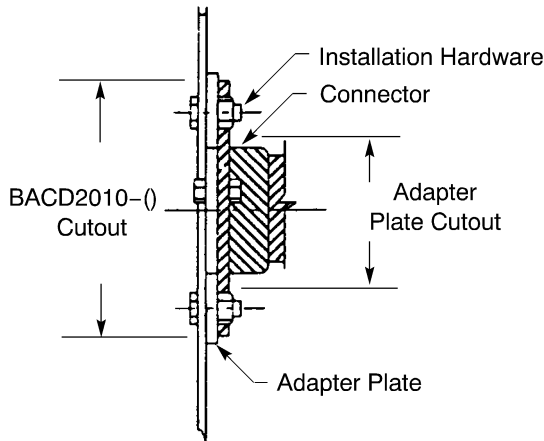
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INSTALLATION OF ELECTRICAL CONNECTORS

B. Adapter Plate Installation



FRONT VIEW OF AN ADAPTER INSTALLATION
Figure 9



SIDE VIEW OF AN ADAPTER INSTALLATION
Figure 10

- (1) Make a selection of an adapter plate from Table 20.
- (2) Put the adapter plate flat against the disconnect panel so that it is over the cutout.
- (3) Turn the adapter plate on the cutout to get the best fit:
 - The fastener holes on the adapter plate are aligned with the holes of the cutout
 - There is the minimum of plate movement when the screws and nuts are tightened.
- (4) Attach the adapter plate to the disconnect panel with the necessary installation hardware from Table 2 or Table 3.



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INSTALLATION OF ELECTRICAL CONNECTORS

- (5) Install the receptacle with the necessary installation hardware from Table 2 or Table 3. Refer to Figure 9 and Figure 10.
- (6) If the receptacle installation screws cannot be fully installed in the adapter plate because of the interference from the disconnect panel:
 - (a) Remove the adapter plate.
 - (b) Turn the plate over to its opposite side.
 - (c) Attach the plate to the panel again.
 - (d) Attach the connector to the plate again.

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INSTALLATION OF LOCKWIRE AND SAFETY CABLE ON ELECTRICAL CONNECTORS, CONNECTOR BACKSHELL CABLE CLAMPS AND SWITCH GUARDS

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STANDARD WIRING PRACTICES MANUAL**INSTALLATION OF LOCKWIRE AND SAFETY CABLE ON ELECTRICAL CONNECTORS, CONNECTOR BACKSHELL CABLE CLAMPS AND SWITCH GUARDS**

This subject gives the procedure to install lockwire or safety cable on electrical connectors, connector backshell cable clamps and switch guards.

1. GENERAL DATA**A. Definitions**

Lockwire:

- Is solid wire
- Gives the same performance as Safety Cable
- Requires no special tooling.

Safety Cable:

- Is stranded cable
- Gives the same performance as Lockwire
- Cannot be used on a connector jam nut that has holes drilled through the corners
- Requires a special tool that puts tension on the cable, crimps a ferrule on the end of the cable, and cuts off the excess cable.

B. Conditions for Lockwire and Safety Cable on Connectors, Connector Backshell Cable Clamps and Switch Guards

Lockwire or Safety Cable must be installed on a threaded connector when both of these conditions occur:

- The connector is not self-locking
- The connector is installed in an area that is not pressurized.

Lockwire or Safety Cable must be installed on a threaded connector if the connector had Lockwire or Safety cable before maintenance.

Lockwire or Safety Cable must be installed on the connector backshell cable clamp and the cable clamp screws if the backshell had lockwire or safety cable before maintenance.

Lockwire or Safety Cable must be installed on a switch guard if the switch guard had lockwire or safety cable before maintenance.

CAUTION: DO NOT INSTALL LOCKWIRE OR SAFETY CABLE ON SELF-LOCKING CONNECTORS BECAUSE SELF-LOCKING CONNECTORS DO NOT HAVE LOCKWIRE INSTALLATION HOLES.

CAUTION: IF IT IS NOT KNOWN IF LOCKWIRE OR SAFETY CABLE IS NECESSARY, INSTALL THE LOCKWIRE OR SAFETY CABLE .

The Lockwire or Safety Cable installed on electrical connectors and on connector backshell cable clamps:

- Must be 0.020 inch to 0.026 inch in diameter
- Must not be installed through an installation hole larger than 0.035 inch in diameter.

Lockwire or Safety Cable can be installed on a switch guard to prevent inadvertent switch operation.

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF LOCKWIRE AND SAFETY CABLE ON ELECTRICAL CONNECTORS, CONNECTOR BACKSHELL CABLE CLAMPS AND SWITCH GUARDS

C. Lockwire and Safety Cable Precautions

CAUTION: LOCKWIRE OR SAFETY CABLE THAT IS REMOVED FROM AN INSTALLATION MUST NOT BE USED AGAIN.

Lock Wire or Safety Cable must not be attached:

- From the cable clamp to the coupling nut of the connector
- From the grommet compression nut to the connector coupling nut
- To adjacent connector coupling nuts
- To fuel, oil, hydraulic, or oxygen lines.

NOTE: Safety Cable must not be attached to connector jam nuts that have holes drilled through the corners.

2. INSTALLATION OF LOCKWIRE

A. Selection of Lockwire

**Table 1
0.020 INCH DIAMETER LOCKWIRE FOR CONNECTORS AND BACKSHELLS**

Specification	Material	Supplier
MS20995NC20	Monel	An available source
MS20995N20	Inconel	An available source
MS20995C20	Corrosion Resistant Steel	An available source
NASM20995NC20	Monel	An available source
NASM20995N20	Inconel	An available source
NASM20995C20	Corrosion Resistant Steel	An available source

**Table 2
0.020 INCH DIAMETER LOCKWIRE FOR SWITCH GUARDS**

Specification or Description	Material	Plating	Color	Supplier
MS20995CY20	Copper	Cadmium	Yellow	An available source
0.020 inch diameter	Copper per QQ-W-343, Type S Annealed	Cadmium per QQ-P-416 Type II, Class 2	Yellow	An available source

(1) For connectors and backshell cable clamps, make a selection of a lockwire from Table 1.

NOTE: Monel wire is recommended.

CAUTION: WHEN LOCKWIRE IS INSTALLED, ONLY USE NEW LOCKWIRE.

(2) For switch guards, make a selection of a lockwire from Table 2.

CAUTION: WHEN LOCKWIRE IS INSTALLED, ONLY USE NEW LOCKWIRE.

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INSTALLATION OF LOCKWIRE AND SAFETY CABLE ON ELECTRICAL CONNECTORS, CONNECTOR BACKSHELL CABLE CLAMPS AND SWITCH GUARDS

B. Lockwire Installation

- (1) Cut a length of the lockwire.
Make sure that the length is twice the distance between the points where the lockwire will be attached.
- (2) Put one end of the lockwire through the lockwire installation hole at the first attachment point.
- (3) Pull the end of the lockwire until it is aligned with the other end.
- (4) Twist the lockwire.
Make sure that there are 9 to 12 twists per inch between the attachment points.
- (5) Put one end of the lockwire through the lockwire installation hole at the next attachment point.
Make sure that the lockwire is in the position that will keep the component from disengaging if the component becomes loose.
- (6) Twist the lockwire.
Make sure that there are 9 to 12 twists per inch between the attachment points.
- (7) Repeat steps Step (5) through Step (6) for each attachment point.
- (8) Twist the ends of the wire.
Make sure that there are 3 to 6 twists past the last attachment point.
- (9) Bend the end of the lockwire over.

3. INSTALLATION OF SAFETY CABLE

A. Necessary Materials

**Table 3
0.020-0.026 INCH DIAMETER SAFETY CABLE KITS**

Safety Cable Kit				Components of the Kit		
Description	Kit Part Number	Safety Cable Length (inches)	Supplier	Safety Cable Part Number	Ferrule Part Number	Supplier
0.020 - 0.026 inch diameter safety cable and ferrule	K20B06	6	Bergen	C20B06	F20B	Bergen
	K20B09	9		C20B09		
	K20B12	12		C20B12		
	K20B15	15		C20B15		
	K20B18	18		C20B18		
	K20B21	21		C20B21		
	K20B24	24		C20B24		

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**INSTALLATION OF LOCKWIRE AND SAFETY CABLE ON ELECTRICAL CONNECTORS, CONNECTOR BACKSHELL
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Table 3 (continued)

Safety Cable Kit				Components of the Kit		
Description	Kit Part Number	Safety Cable Length (inches)	Supplier	Safety Cable Part Number	Ferrule Part Number	Supplier
0.020 - 0.026 inch diameter safety cable and ferrule	C110-106	6	Daniels	A10-106	F10-1	Daniels
	C110-109	9		A10-109		
	C110-112	12		A10-112		
	C110-115	15		A10-115		
	C110-118	18		A10-118		
	C110-121	21		A10-121		
	C110-124	24		A10-124		
0.020 - 0.026 inch diameter safety cable and ferrule	BACC13AT2K6	6	Boeing	BACC13AT2C6	BAC~ C13AT2F	Boeing
	BACC13AT2K9	9		BACC13AT2C9		
	BAC~ C13AT2K12	12		BAC~ C13AT2C12		
	BAC~ C13AT2K15	15		BAC~ C13AT2C15		
	BAC~ C13AT2K18	18		BAC~ C13AT2C18		
	BAC~ C13AT2K21	21		BAC~ C13AT2C21		
	BAC~ C13AT2K24	24		BAC~ C13AT2C24		

Table 4

SAFETY CABLE TOOLS FOR 0.020-0.026 INCH DIAMETER SAFETY CABLE

Part Number	Description	Nose Length (inch)
M203	Safety Cable Tool - Pre Set Tension	3
SCT203	Safety Cable Tool - Pre Set Tension	3
SCT207	Safety Cable Tool - Pre Set Tension	7
SCTP203	Safety Cable Tool - Pneumatic	3
SCTP207	Safety Cable Tool - Pneumatic	7
SCTN20-3	3 Inch nose assembly	3
SCTN20-7	7 Inch nose assembly	7

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF LOCKWIRE AND SAFETY CABLE ON ELECTRICAL CONNECTORS, CONNECTOR BACKSHELL CABLE CLAMPS AND SWITCH GUARDS

B. Safety Cable Installation

- (1) Make a selection of a safety cable tool from Table 4.
- (2) Find the necessary length of safety cable.
 - (a) Add together:
 - The distance in inches from the first attachment point to the last attachment point
 - The length in inches of the tool nose
 - 5 inches for the length of safety cable the tool needs to put tension on the safety cable.
- (3) Make a selection of a safety cable from Table 3.
Make sure that the safety cable has sufficient length.
- (4) Put the end of the safety cable that does not have a ferrule through the installation hole at the first attachment point.
- (5) Put that same end of the cable through the installation holes in the other attachment points.
Make sure that:
 - The safety cable will stop the parts from becoming loose
 - The maximum length of the safety cable between each component is 6 inches.
- (6) Put a safety cable ferrule on the end of the cable and push it against the last attachment point.
- (7) Put the end of the cable through the hole in the tool nose and push the tool along the cable until the ferrule is against the last attachment point.
Make sure that:
 - The ferrule is fully seated in the tool nose
 - The tool nose is perpendicular to the safety cable.
- (8) Put the end of the safety cable in the cable entrance hole on the tool.
- (9) Increase the tension on the cable. Open and close the tool handle again and again until the cable has tension.
Allow the tool handle to fully open before you close it again.
- (10) When the cable has tension, release the handle to the full open position.
Make sure that the tool nose is perpendicular to the safety cable.
- (11) Fully close the handles to crimp the ferrule and cut the cable in one motion.
- (12) Pull the unwanted length of cable from the tool and discard it.

4. APPROVED TOOL SUPPLIERS

A. Safety Cable Tool Suppliers

**Table 5
SAFETY CABLE TOOL SUPPLIERS**

Part Number	Supplier
M203	Bergen
SCT203	Daniels
SCT207	Daniels
SCTP203	Daniels



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**INSTALLATION OF LOCKWIRE AND SAFETY CABLE ON ELECTRICAL CONNECTORS, CONNECTOR BACKSHELL
CABLE CLAMPS AND SWITCH GUARDS**

Table 5 (continued)

Part Number	Supplier
SCTP207	Daniels
SCTN20-3	Daniels
SCTN20-7	Daniels

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SEALING OF ELECTRICAL CONNECTORS

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A. Necessary Materials	9
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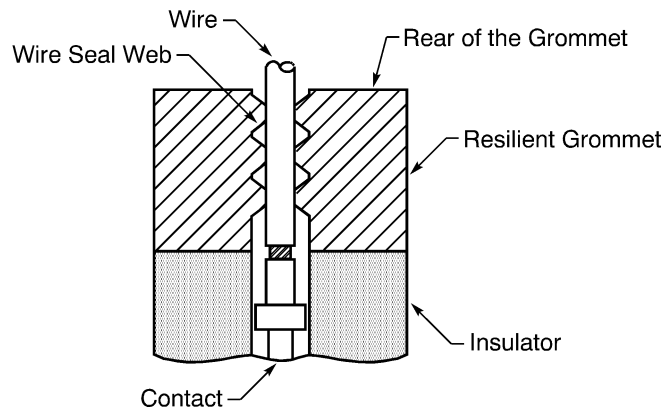
STANDARD WIRING PRACTICES MANUAL**SEALING OF ELECTRICAL CONNECTORS**

This Subject gives:

- The conditions that make the seal of an electrical connector necessary
- The procedures to seal an electrical connector.

1. GENERAL DATA**A. Environmentally Sealed Connectors**

An environmentally sealed connector has a resilient grommet with internal wire seal webs to seal the wires. Refer to Figure 1.



REAR END OF AN ENVIRONMENTALLY SEALED CONNECTOR

Figure 1

B. Applicable Conditions for the Seal of a Wire in a Contact Cavity

If it is specified for an environmentally sealed connector, and the O.D. of the wire is less than the minimum seal diameter of the grommet hole, the O.D. of the wire must be increased until the wire and the grommet make a seal.

Refer to the Subject that is applicable for the connector for the minimum O.D. for a satisfactory seal in the grommet hole.

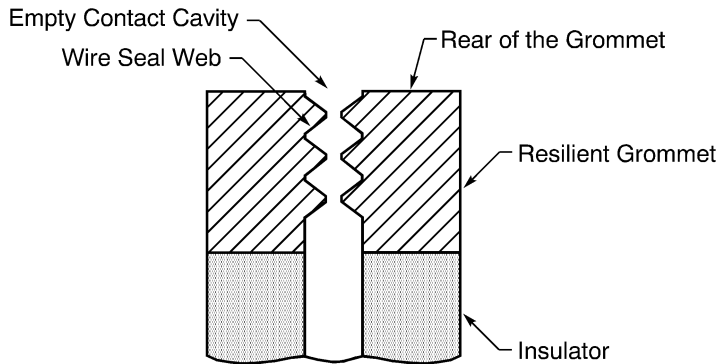
C. Applicable Conditions for the Seal of an Empty Contact Cavity

Refer to:

- Table 1 for the type of seal that is applicable for the type of connector and the location of the installation of the connector on the airplane
- Table 2 for the service conditions that are applicable for the seal of a contact cavity.

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SEALING OF ELECTRICAL CONNECTORS



EMPTY CONTACT CAVITY
Figure 2

Table 1
TYPES OF SEALS FOR AN EMPTY CONTACT CAVITY

Location of Installation	Connector Type	Type of Seal	Procedure
Firewall	Environmentally Sealed	A Temperature Grade D stub wire assembly in each empty contact cavity - The stub wire ends are protected, and the stub wires are held to prevent vibration damage to the adjacent wires.	Paragraph 3.E.
	Unsealed	None; unsealed connectors are not installed	-
Pressurized Area	Environmentally Sealed	A seal plug in each empty contact cavity	Paragraph 3.A.
		A seal rod in each empty contact cavity	Paragraph 3.B.
		An unwired contact and a seal plug in each empty contact cavity when it is specified in the connector assembly procedure	Paragraph 3.C.
	An unwired contact and a seal rod in each empty contact cavity when it is specified in the connector assembly procedure	Paragraph 3.D.	
Unsealed	None; an empty contact cavity can stay empty	-	
Unpressurized Area	Environmentally Sealed	A seal plug in each empty contact cavity	Paragraph 3.A.
	Unsealed	None; unsealed connectors are not installed	-

STANDARD WIRING PRACTICES MANUAL

SEALING OF ELECTRICAL CONNECTORS

Table 2
APPLICABLE SERVICE CONDITIONS FOR THE SEAL OF A CONTACT CAVITY

Location of Installation	Type of Seal	Type of Damage	Service Condition
Unpressurized Area	An unwired contact and a seal plug with the head out	The seal plug is missing	A seal plug must be installed with the head in when the first subsequent scheduled airplane maintenance occurs; refer to Table 1
	An unwired contact and a seal rod	The seal rod is missing	A seal plug must be installed with the head in when the first subsequent scheduled airplane maintenance occurs; refer to Table 1

D. Applicable Conditions for the Replacement of a Connector That Is Sealed with Potting Compound

A replacement connector must be sealed with potting compound when the connector that must be replaced has one of these seals:

- A right angle cable backshell that is filled with potting compound
- A potting adapter that is filled with potting compound.

Refer to Paragraph 4.B.

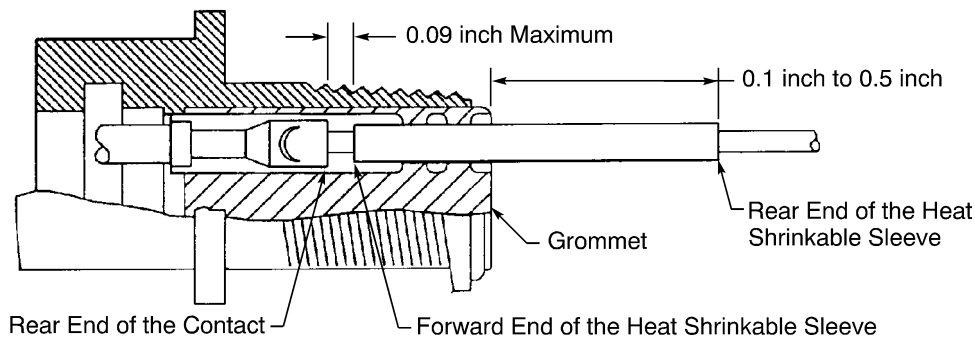
2. SEAL OF A WIRE IN A CONTACT CAVITY

A. Wire with an O.D. Less than the Minimum Seal Diameter of the Grommet Hole

This paragraph gives the procedure to make the O.D. of the wire equal to or larger than the minimum seal diameter of the grommet hole.

Table 3
HEAT SHRINKABLE SLEEVES

Temperature Grade	Part Number	Supplier
B	MIL-LT	Raychem
D	TFE 4X	Chemplast



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE WIRE
Figure 3

Refer to Figure 3.

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SEALING OF ELECTRICAL CONNECTORS

- (1) Make a selection of a heat shrinkable sleeve from Table 3.

NOTE: An alternative sleeve is satisfactory. Refer to Subject 20-00-11.

- (2) Put the necessary length of the sleeve on the wire.

Make sure that:

- The forward end of the sleeve is a maximum of 0.09 inch from the end of the contact
- The rear end of the sleeve is 0.1 inch to 0.5 inch from the end of the grommet.

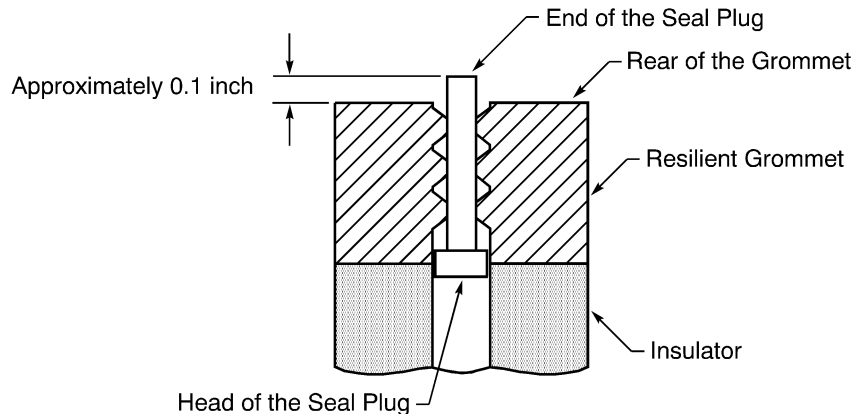
NOTE: If the necessary length of sleeve is not possible because a shield ground wire is installed, cut the sleeve to make the distance from the end of the sleeve to the insulation sleeve of the shield ground wire equal to a maximum of 0.12 inch.

- (3) Shrink the sleeve into its position. Refer to Subject 20-00-14.
- (4) If it is necessary to install one more sleeve, do Step (1) through Step (3) again.

3. SEAL OF AN EMPTY CONTACT CAVITY

A. Installation of a Seal Plug - Head In

For the conditions that are applicable for this procedure, refer to Paragraph 1.C.



POSITION OF THE SEAL PLUG IN THE CONTACT CAVITY - HEAD IN
Figure 4

Refer to Figure 4.

- (1) Make a selection of a seal plug. Refer to Subject 20-00-11.
- (2) From the rear of the connector, put the head of the seal plug in the contact cavity.
- (3) Push the seal plug into the contact cavity until it stops.
 Make sure that the seal plug is fully installed.
- (4) Remove the necessary length from the end of the seal plug to make the distance from the rear of the grommet to the end of the seal plug equal to approximately 0.1 inch.

CAUTION: MAKE SURE THAT THE SEAL PLUG DOES NOT CAUSE INTERFERENCE WITH THE CABLE CLAMP.

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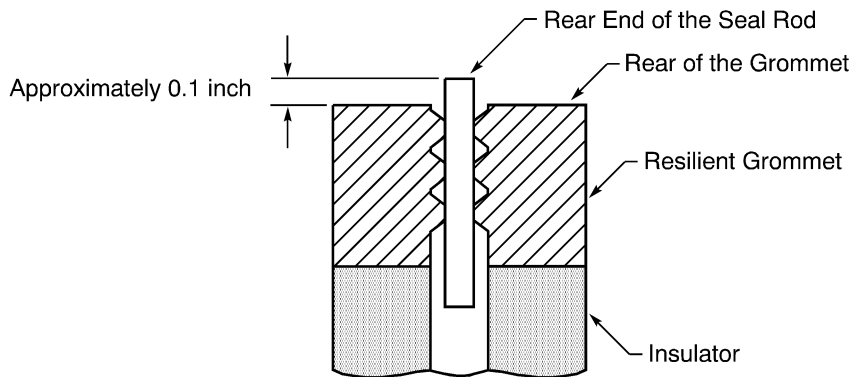
SEALING OF ELECTRICAL CONNECTORS

B. Installation of a Seal Rod

For the conditions that are applicable for this procedure, refer to Paragraph 1.C.

**Table 4
SEAL ROD LENGTH**

Contact Cavity Size	Seal Rod Length (inch)	
	Target	Tolerance
22	0.75	± 0.05
20	0.75	± 0.05
16	0.75	± 0.05
12	0.75	± 0.05
08	0.75	± 0.05



**POSITION OF THE SEAL ROD IN THE CONTACT CAVITY
Figure 5**

Refer to Figure 5.

- (1) Make a selection of a seal rod. Refer to Subject 20-00-11.
- (2) Cut the necessary length of the seal rod. Refer to Table 4.
- (3) From the rear of the connector, put one end of the seal rod in the contact cavity.
- (4) Push the seal rod into the contact cavity until the distance from the rear of the grommet to the rear end of the seal rod is approximately 0.1 inch.

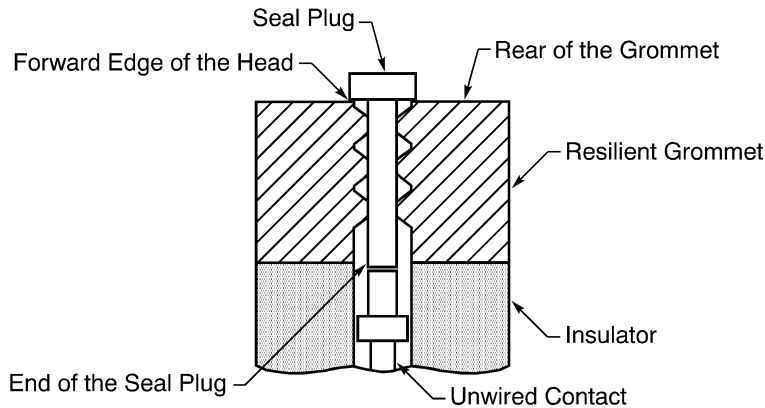
CAUTION: MAKE SURE THAT THE SEAL ROD DOES NOT CAUSE INTERFERENCE WITH THE CABLE CLAMP.

C. Installation of an Unwired Contact and a Seal Plug

For the conditions that are applicable for this procedure, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

SEALING OF ELECTRICAL CONNECTORS



POSITION OF THE SEAL PLUG IN A CONTACT CAVITY WITH AN UNWIRED CONTACT
Figure 6

Refer to Figure 6.

- (1) Install the unwired contact in the contact cavity. Refer to the Subject that is applicable for the assembly of the connector.

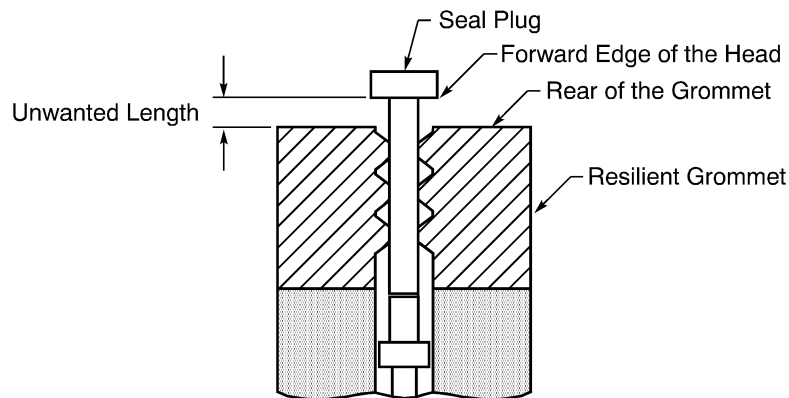
Make sure the contact is fully inserted in the contact cavity.

- (2) Make a selection of a seal plug. Refer to Subject 20-00-11.
- (3) From the rear of the connector, put the small end of the seal plug in the contact cavity.
- (4) Push the seal plug into the contact cavity until it stops.

Make sure that the forward edge of the head is against the rear of the grommet.

CAUTION: MAKE SURE THAT THE SEAL PLUG DOES NOT CAUSE AN INTERFERENCE WITH THE BACKSHELL.

- (5) If the forward edge of the head is not against the rear of the grommet, adjust the length of the seal plug.
 - (a) Measure the distance from the rear of the grommet to the forward edge of the head to find the unwanted length of the seal plug. Refer to Figure 7.



UNWANTED LENGTH OF THE SEAL PLUG
Figure 7

STANDARD WIRING PRACTICES MANUAL

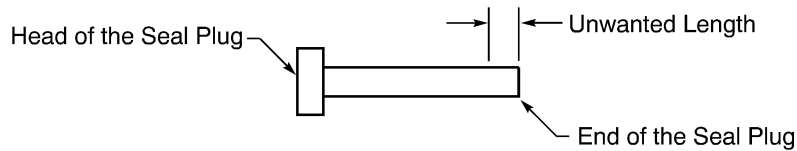
SEALING OF ELECTRICAL CONNECTORS

(b) Remove the unwanted length from the end of the seal plug. Refer to Figure 8.

Make sure that:

- The end of the seal plug is perpendicular to the longitudinal axis of the seal plug
- All the loose pieces are removed from the end of the seal plug.

CAUTION: LOOSE PIECES OF THE SEAL PLUG MUST NOT GO INTO THE CONTACT CAVITY. THE LOOSE PIECES CAN PREVENT THE SUBSEQUENT REMOVAL OF THE CONTACT.



REMOVAL OF THE UNWANTED LENGTH OF THE SEAL PLUG
Figure 8

(c) Do Step (3) and Step (4) again.

D. Installation of an Unwired Contact and a Seal Rod

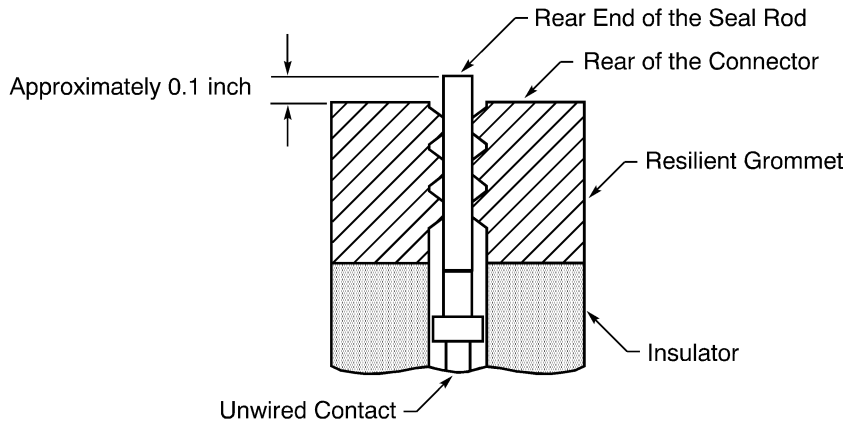
For the conditions that are applicable for this procedure, refer to Paragraph 1.C.

Table 5
SEAL ROD LENGTH

Contact Cavity Size	Seal Rod Length (inch)	
	Target	Tolerance
22	0.75	± 0.05
20	0.75	± 0.05
16	0.75	± 0.05
12	0.75	± 0.05
08	0.75	± 0.05

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SEALING OF ELECTRICAL CONNECTORS



POSITION OF THE SEAL ROD IN A CONTACT CAVITY WITH AN UNWIRED CONTACT
Figure 9

Refer to Figure 9.

- (1) Install the unwired contact in the contact cavity. Refer to the Subject that is applicable for the assembly of the connector.
 Make sure the contact is fully inserted in the contact cavity.
- (2) Make a selection of a seal rod. Refer to Subject 20-00-11.
- (3) Cut the necessary length of the seal rod. Refer to Table 5.
- (4) From the rear of the connector, put one end of the seal rod in the contact cavity.
- (5) Push the seal rod into the contact cavity until one of these conditions occurs:
 - The distance from the rear of the grommet to the rear end of the seal rod is approximately 0.1 inch.
 - The seal rod stops before the rear end is approximately 0.1 inch from the rear of the grommet.

CAUTION: MAKE SURE THAT THE SEAL ROD DOES NOT CAUSE INTERFERENCE WITH THE CABLE CLAMP.

- (6) If the seal rod stops before the rear end is approximately 0.1 inch from the rear of the grommet, remove the necessary length from the end of the rod.

E. Installation of Stub Wire Assembly

For the conditions that are applicable for this procedure, refer to Paragraph 1.C.

STANDARD WIRING PRACTICES MANUAL

SEALING OF ELECTRICAL CONNECTORS

**Table 6
STUB WIRE CONFIGURATIONS**

Contact Cavity Size	Stub Wire			
	Specification	Size (AWG)	Length (inch)	
			Minimum	Maximum
16	BMS13-31 Type 1 Class 1	16	5	10
	BMS13-58 Type 1 Class 1	16	5	10
	BMS13-60 Type 7 Class 1	16	5	10
20	BMS13-31 Type 1 Class 1	20	5	10
	BMS13-58 Type 1 Class 1	20	5	10
	BMS13-60 Type 7 Class 1	20	5	10

(1) Make a selection of a stub wire from Table 6.

NOTE: For a large number of stub wires, the wires can be cut at different lengths and put into small groups that can be attached to the wire harness.

- (2) Assemble a contact with the stub wire. Refer to the Subject that is applicable for the assembly of the connector.
- (3) Install the contact in the contact cavity. Refer to the Subject that is applicable for the assembly of the connector.
- (4) Assemble a Temperature Grade D, crimp type end cap without insulation removal on the other end of the stub wire. Refer to Subject 20-30-16.
- (5) Do Step (1) through Step (4) again for each remaining empty contact cavity.
- (6) Attach the stub wires to the surface of the wire harness. Refer to Subject 20-10-11.

4. SEAL OF A CONNECTOR WITH POTTING COMPOUND

A. Necessary Materials

**Table 7
NECESSARY MATERIALS**

Material	Part Number	Supplier	Notes
Catalyst, RTV	F	Dow Corning	Only for 3110 RTV Potting Compound
	S	Dow Corning	Only for 3110 RTV Potting Compound
Naphtha, Aliphatic	TT-N-95	Any Source	-

STANDARD WIRING PRACTICES MANUAL

SEALING OF ELECTRICAL CONNECTORS

**Table 8
POTTING COMPOUNDS**

Part Number	Supplier	Pot Life (minutes)	Cure Time (hours)	Special Instructions
3110 RTV	Dow Corning	25	2	10 Percent Catalyst F is necessary
		180	8.5	5 Percent Catalyst S is necessary
		120	6.5	10 Percent Catalyst S is necessary
		60	4	20 Percent Catalyst S is necessary
3145 RTV	Dow Corning	-	72	-
BMS8-68	Boeing	90	48	-

**Table 9
APPROVED SUPPLIERS OF BOEING STANDARD POTTING COMPOUNDS**

Boeing Standard	Supplier
BMS8-68	Flamemaster Chem Seal Division

**Table 10
POTTING COMPOUNDS PRIMERS**

Potting Compound	Part Number	Cure Time (hours)	Supplier
3110 RTV	1201 RTV	0.5	Dow Corning
3145 RTV	1200 RTV	1	Dow Corning
	1204 RTV	1	Dow Corning
BMS8-68	CS-3808	1	Flamemaster Chem Seal Division
	CS-9903	1	Flamemaster Chem Seal Division

B. Seal of a Connector

- (1) Make a selection of a potting compound from Table 8.
- (2) If a catalyst is specified, make a selection of a catalyst from Table 7.

CAUTION: IF A POT LIFE IS SPECIFIED, MAKE SURE THAT THE POTTING COMPOUND IS APPLIED BEFORE THE END OF THE POT LIFE. REFER TO TABLE 8.

- (3) Make a selection of a primer from Table 10.
- (4) Make a selection of an aliphatic naphtha from Table 7.
- (5) If the connector is assembled, remove the contacts. Refer to the applicable Subject for the connector.

STANDARD WIRING PRACTICES MANUAL

SEALING OF ELECTRICAL CONNECTORS

(6) Fully clean the inside of the right angle backshell or the potting adapter, the connector grommet, and the wires of the contact assemblies:

- (a) Hold the connector in the vertical position with the rear face of the connector pointed down.
- (b) Apply the necessary amount of naphtha with a soft brush to the rear face of the connector.

NOTE: Do not clean the coupling ring of the connector.

Make sure that the grey or white paint on the connector or the insert is not removed.

- (c) Immediately dry the connector with a wiper.

CAUTION: DO NOT LET NAPHTHA DRY ON THE CONNECTOR. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

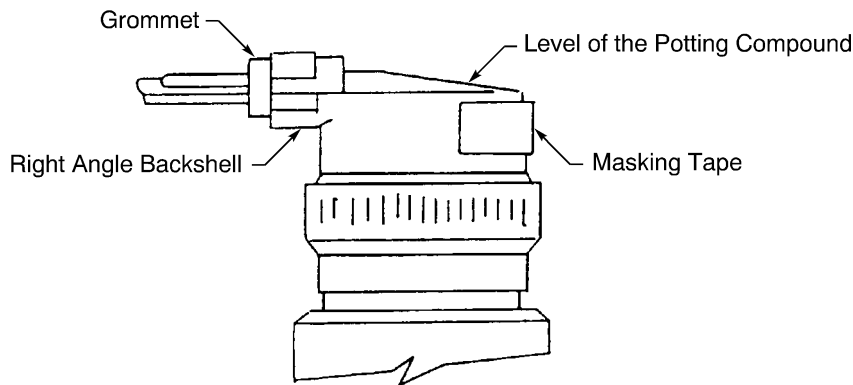
- (d) Apply the necessary quantity of naphtha with a soft brush to the wires of the wired contacts.

Make sure that the cleaned area of the wires extends at least one inch farther than the area of the wires that will potted.

- (e) Immediately dry the wires with a wiper.

CAUTION: DO NOT LET NAPHTHA DRY ON THE WIRES. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

- (7) Clean the insertion tool tip with the naphtha.
- (8) Install the contact assemblies. Refer to the applicable Subject for the connector assembly.
- (9) Put a layer of the primer on the cleaned area of the wires and the surface of the connector grommet.
- (10) Let the primer cure for the specified time. Refer to Table 10.
- (11) For connector that has a right angle backshell, fill the backshell with potting compound.



SEAL OF A CONNECTOR AND A RIGHT ANGLE BACKSHELL

Figure 10

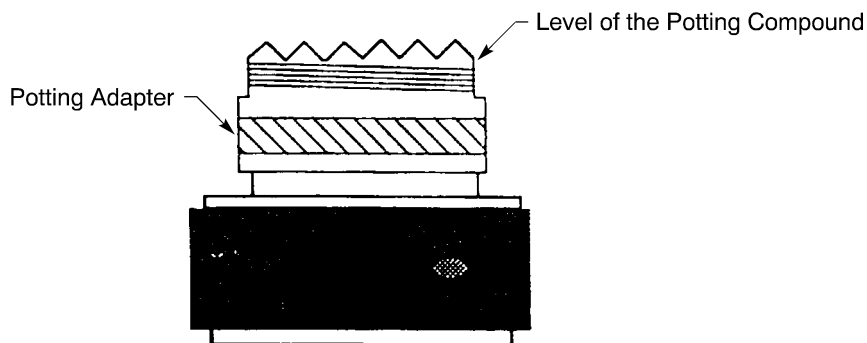
- (a) Put a layer of masking tape over the slot in the front of the backshell.
- (b) Fill the backshell with the potting compound until the compound is approximately level with the rear end of the backshell.

STANDARD WIRING PRACTICES MANUAL

SEALING OF ELECTRICAL CONNECTORS

CAUTION: IF A POT LIFE IS SPECIFIED, MAKE SURE THAT THE POTTING COMPOUND IS APPLIED BEFORE THE END OF THE POT LIFE. REFER TO TABLE 8.

- (12) For a connector that has a potting adapter, fill the adapter with potting compound until the compound is level with the bottom of the teeth. Refer to Figure 11.



SEAL OF A CONNECTOR AND A POTTING ADAPTER

Figure 11

- (13) Let the potting compound cure for the specified time. Refer to Table 8.



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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

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20-60-09 CONTENTS

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

This Subject gives the procedures to assemble strain relief backshells without a shield termination. For the procedures to assemble strain relief backshells with a shield termination, refer to Subject 20-25-12.

1. PART NUMBERS AND DESCRIPTION

A. Backshell Part Numbers

**Table 1
BACKSHELL PART NUMBERS**

Part Number	Configuration	Strain Relief	Description	Supplier
620AA028Z1(-)	Straight	Cable Clamp	Anti-Rotation Teeth, Stainless Steel	Glenair
627AS152XO32	Straight	Fixed Arm, Cable Clamp	Composite	Glenair
AS85049-38S()	Straight	Cable Clamp	Anti-Rotation Teeth, Aluminum	QPL
BACC10GH	Straight	Single Leg, Tie Bar	Aluminum	Boeing
BACC10HD	Straight	Cable Clamp	Stainless Steel	Boeing
BACC10HE	90 Degree	Cable Clamp	Stainless Steel	Boeing
BACC10HF	Straight	Cable Clamp	Aluminum	Boeing
BACC10HG	90 Degree	Cable Clamp	Aluminum	Boeing
BACC10JC	90 Degree	Single Leg, Tie Bar	Aluminum	Boeing
BACC10JV()A	Straight	Cable Clamp	Ground Spring, Aluminum	Boeing
BACC10JV()S	Straight	Cable Clamp	Ground Spring, Stainless Steel	Boeing
BACC10JW()A	90 Degree	Cable Clamp	Ground Spring, Aluminum	Boeing
BACC10JW()S	90 Degree	Cable Clamp	Ground Spring, Stainless Steel	Boeing
BACC10KA	Straight	Cable Clamp	Anti-Rotation Teeth, Stainless Steel	Boeing
BACC10KB	90 Degree	Cable Clamp	Anti-Rotation Teeth, Stainless Steel	Boeing
BACC10KC	45 Degree	Cable Clamp	Anti-Rotation Teeth, Stainless Steel	Boeing
BACC10KD	Straight	Cable Clamp	Anti-Rotation Teeth, Aluminum	Boeing
BACC10KE	90 Degree	Cable Clamp	Anti-Rotation Teeth, Aluminum	Boeing
BACC10KF	45 Degree	Cable Clamp	Anti-Rotation Teeth, Aluminum	Boeing

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

Table 1 (continued)

Part Number	Configuration	Strain Relief	Description	Supplier
BACC10MK	Swing Arm	Cable Clamp	Anti Rotation Teeth, Composite	Boeing
BACC10NC	Swing Arm	Cable Clamp	Anti Rotation Teeth, Composite	Boeing
G65217	Straight	Cable Clamp	Anti Rotation Teeth, Aluminum	Glenair
G8993-()	Straight	Cable Clamp	Anti-Rotation Teeth, Aluminum	Glenair
G8993M()	Straight	Cable Clamp	Anti-Rotation Teeth, Aluminum	Glenair
G8994-()	90 Degree	Cable Clamp	Anti-Rotation Teeth, Aluminum	Glenair
G8994M()	90 Degree	Cable Clamp	Anti-Rotation Teeth, Aluminum	Glenair
GTR21-()	90 Degree	Single Leg	Aluminum	Glenair
M85049-38S()	Straight	Cable Clamp	Anti-Rotation Teeth, Aluminum	QPL
S1347-()	90 Degree	Cable Clamp	Aluminum	Sunbank
S2277-()	45 Degree	Cable Clamp	Aluminum	Sunbank
S2408-()	Straight	Cable Clamp	Aluminum	Sunbank

Table 2

APPROVED SUPPLIERS OF BOEING STANDARD BACKSHELLS

Backshell	Supplier
BACC10GH	Glenair
	Sunbank
BACC10HD	Electro Adapter
	Glenair
	Sunbank
BACC10HE	Electro Adapter
	Glenair
	Sunbank
BACC10HF	Electro Adapter
	Glenair
	Sunbank

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

Table 2 (continued)

Backshell	Supplier
BACC10HG	Electro Adapter
	Glenair
	Sunbank
BACC10JC	Glenair
	Sunbank

**Table 3
OBSOLETE BACKSHELL PART NUMBERS**

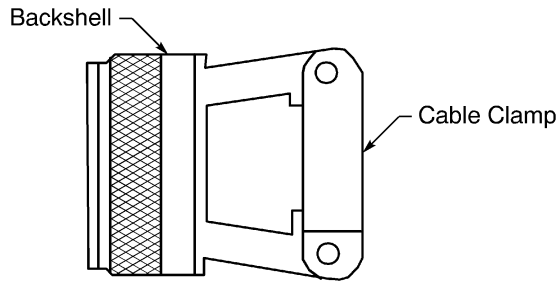
Obsolete Backshell	Replacement Backshell
BACC10HD	BACC10HD()A
	BACC10KA
BACC10HE	BACC10HE()A
	BACC10KB
BACC10HF	BACC10KD
BACC10HG	BACC10HG()A
	BACC10KE
M85049/38S	AS85049/38S

**Table 4
ALTERNATIVE BACKSHELLS**

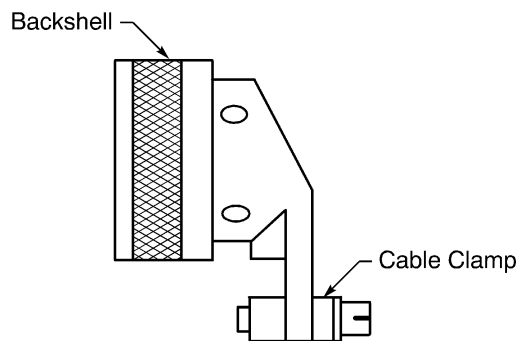
Specified Backshell	Alternative Backshell	
	Part Number	Supplier
G8993M()	BACC10HF()A	Boeing
	G8993-()	Glenair
G8993M()NF	BACC10HF()C	Glenair
G8994M()	BACC10HG()A	Boeing
	G8993-()	Glenair
G8994M()NF	BACC10HG()C	Glenair

STANDARD WIRING PRACTICES MANUAL

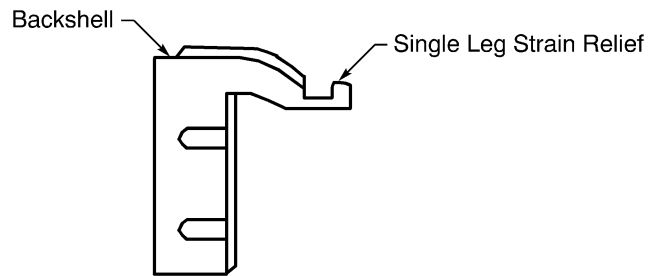
ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION



STRAIGHT BACKSHELL - CABLE CLAMP STRAIN RELIEF
Figure 1



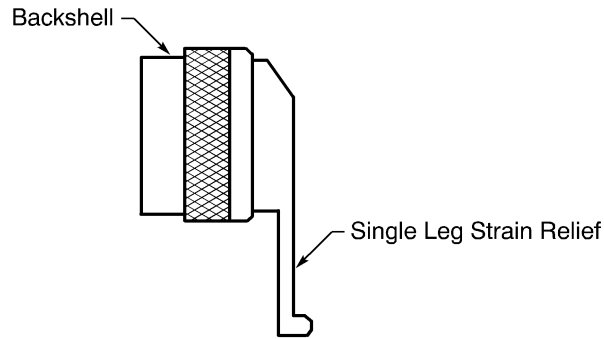
90 DEGREE BACKSHELL - CABLE CLAMP STRAIN RELIEF
Figure 2



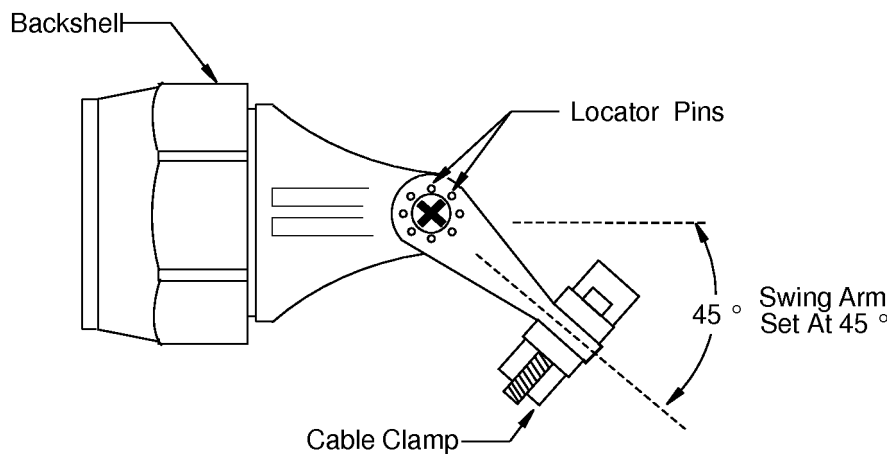
STRAIGHT BACKSHELL - SINGLE LEG STRAIN RELIEF
Figure 3

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION



90 DEGREE BACKSHELL - SINGLE LEG STRAIN RELIEF
Figure 4



BACKSHELL, SWING ARM
Figure 5

B. Spacer Part Numbers

Table 5
SPACER PART NUMBERS

Connector Shell Size		Spacer		Reference
Minimum	Maximum	Part Number	Supplier	
8	11	NAS42DD5-()	QPL	Figure 9
8	16	NAS1056C5-()	QPL	Figure 6
		NAS1056C6-()	QPL	Figure 6
		NAS1057T1-()	QPL	Figure 7
		NAS1057W1-()	QPL	Figure 7
		NAS43DD1-()	QPL	Figure 8
12	28	NAS42DD6-()	QPL	Figure 9

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

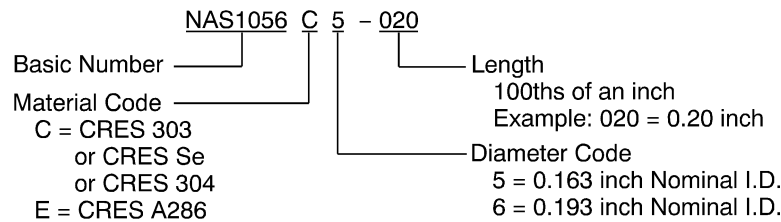
Table 5 (continued)

Connector Shell Size		Spacer		Reference
Minimum	Maximum	Part Number	Supplier	
18	28	NAS1056E5(-)	QPL	Figure 6
		NAS1056E6(-)	QPL	Figure 6
		NAS1057T3(-)	QPL	Figure 7
		NAS1057W3(-)	QPL	Figure 7
		NAS43DD3(-)	QPL	Figure 8
36	36	BACS13S297B	Boeing	-

Table 6

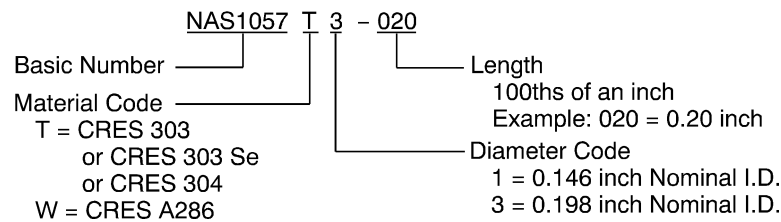
APPROVED SUPPLIERS OF BOEING STANDARD SPACERS

Spacer	Supplier
BACS13S	Thomas & Betts



NAS1056 SPACER PART NUMBER STRUCTURE

Figure 6

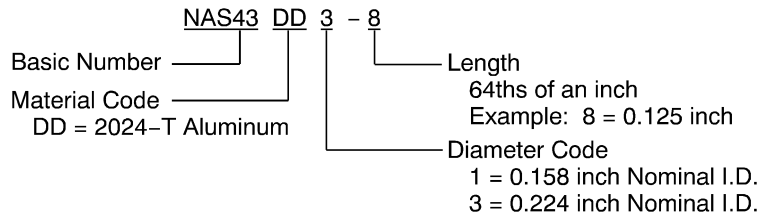


NAS1057 SPACER PART NUMBER STRUCTURE

Figure 7

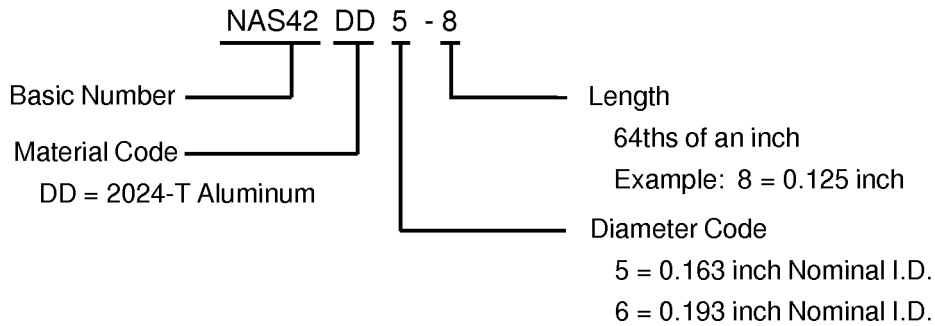
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION



NAS43 SPACER PART NUMBER STRUCTURE

Figure 8



NAS42 SPACER PART NUMBER STRUCTURE

Figure 9

2. NECESSARY TOOLS

A. Connector Backshell Tools for Metal Coupling Rings

Table 7

CONNECTOR BACKSHELL TOOLS

Backshell Tool	Part Number	Supplier
Screw Bit Driver	-	An available source
Strap Wrench	AT508K	Aircraft Tools
	ST2596G	Boeing
	ST2596C	Boeing
	TG-70	Glenair
Torque Driver	-	An available source

3. BACKSHELL DISASSEMBLY

A. Backshell Disassembly - Cable Clamp Strain Relief

- (1) If the backshell has safety wire, remove the safety wire from the cable clamp screws and the backshell coupling ring.
- (2) Remove the strain relief clamp screws.
- (3) Put the saddle bars, the screws, and the washers in a safe place.
- (4) Make a selection of a strap wrench from Table 7.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

(5) Disengage the threads of the backshell and the connector.

B. Backshell Disassembly - Single Leg Strain Relief

(1) Cut the heat shrinkable sleeve or the wire harness tie that holds the wire harness.

CAUTION: DO NOT CUT THE WIRE INSULATION. DAMAGE TO THE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE OR THE CABLE.

(2) Make a selection of a strap wrench from Table 7.

(3) Disengage the threads of the backshell and the connector.

4. BACKSHELL ASSEMBLY - SINGLE LEG STRAIN RELIEF

A. Applicable Conditions for Backshell Assembly

These conditions are applicable for a wire harness in a backshell with a single leg strain relief:

- Strain must not be put on the wires
- The wires must not have tension that pulls the seal webs of the grommet out of their shape
- The crimp barrel of a contact cannot be seen in the rear grommet of an environmental connector
- Thread lock compound must be applied on the threads of the backshell in some assembly or installation configurations; refer to Table 8.

Table 8

CONDITIONS FOR BACKSHELL ASSEMBLY WITH THREAD LOCK COMPOUND

Assembly or Installation Configuration	Backshell Assembly Condition
A backshell on a Temperature Grade C or Temperature Grade D wire harness	Thread lock compound is not necessary
A backshell that has anti-rotation teeth	Thread lock compound is not necessary
A backshell that has thread lock compound on the initial assembly	Thread lock compound must be applied
A right angle backshell on a Temperature Grade A or Temperature Grade B wire harness in the unpressurized area that does not have anti-rotation teeth or safety wire	Thread lock compound must be applied
The initial assembly of a backshell that is supplied with thread lock compound	Thread lock compound is not necessary

B. Necessary Materials

Table 9

NECESSARY MATERIALS

Material	Temperature Grade	Description	Part Number	Supplier
Sleeve, Heat Shrinkable	-	Single Wall	CRN	Raychem
	-	Meltable Inner Liner	DWP-125	Raychem

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

Table 9 (continued)

Material	Temperature Grade	Description	Part Number	Supplier
Tape	D	Silicone	912-10X12	Arlon
			Scotch 70	3M
		PTFE	P-212HD	Permacel
			P-421	Permacel
			P-440	Permacel
Thread Lock Compound	-	-	222	Loctite
			Vibratite	The Oakland Corporation

**Table 10
SOLVENTS**

Part Number	Supplier
BMS11-7	Boeing
Turco 4460BK	ELF Atochem

**Table 11
APPROVED SUPPLIERS OF BOEING STANDARD SOLVENTS**

Boeing Standard	Supplier
BMS11-7	Barton Solvents
	Elf Atochem
	AKZO/Dexter Aerospace
	Pratt and Lambert Industrial Coating Division

C. Backshell Assembly with a Heat Shrinkable Sleeve

- (1) Make a selection of a strap wrench from Table 7.
- (2) Make a selection of a heat shrinkable sleeve from Table 9.

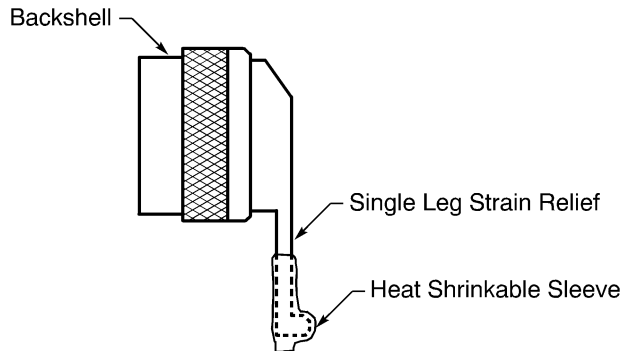
Make sure that the sleeve has the smallest diameter that can be moved easily on the wire harness and the strain relief leg.

NOTE: An equivalent sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

- (3) If the backshell does not have a heat shrinkable sleeve installed on the strain relief leg:
 - (a) Make a selection of a heat shrinkable sleeve with a meltable inner liner from Table 9.
 - (b) Put a 0.75 inch length of heat shrinkable sleeve on the end of the strain relief leg. Refer to Figure 10.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 10

- (c) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (4) Put a length of heat shrinkable sleeve on the wire harness.
Make sure that the length of the sleeve is approximately equal to the length of the strain relief leg.
- (5) Put the backshell on the wire harness.
Make sure that the strain relief leg is pointed away from the end of the wire harness.
- (6) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (7) If thread lock compound is necessary, apply the thread lock compound. Refer to Table 8.
 - (a) Make a selection a thread lock compound from Table 9.
 - (b) Make a selection of a solvent from Table 10.
 - (c) Clean the thread surfaces with solvent.
 - (d) Dry the thread surfaces with an absorbent wiper.
 - (e) Put one or two drops of the thread lock compound on the threads of the backshell.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (8) Fully engage the threads of the backshell and the connector.
- (9) Tighten the backshell with the strap wrench.
Make sure that the backshell does not make more than 1/8 turn with the strap wrench.

CAUTION: DO NOT TIGHTEN THE BACKSHELL MORE THAN NECESSARY. DAMAGE TO THE BACKSHELL CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR OR THE BACKSHELL.

- (10) Try to loosen the backshell manually.

NOTE: The backshell is installed correctly when the backshell does not move in relation to the connector.

- (11) If the backshell is loose, do Step (9) and Step (10) again.
- (12) Put the wires into their positions.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

Make sure that:

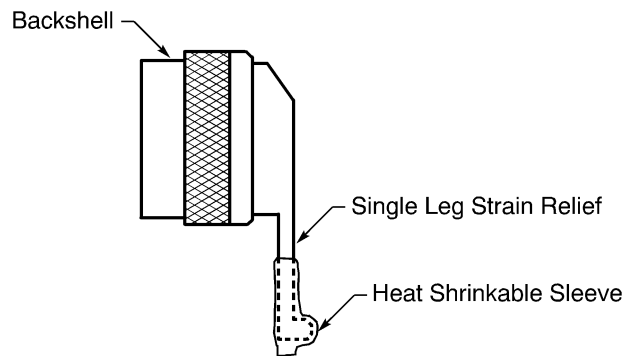
- The wires do not go across each other where the wires are against the strain relief leg
 - Strain is not put on the wires.
- (13) Push the heat shrinkable sleeve forward on the wire harness and the leg of the clamp until the rear end of the sleeve aligned with the end of the leg.

Make sure that the sleeve does not extend farther than the end of the strain relief leg.

- (14) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Backshell Assembly with a Wire Harness Tie

- (1) Make a selection of a strap wrench from Table 7.
- (2) Make a selection of a tape from Table 9.
- (3) If the backshell does not have a heat shrinkable sleeve installed on the strain relief leg:
 - (a) Make a selection of a heat shrinkable sleeve with a meltable inner liner from Table 9.
 - (b) Put a 0.75 inch length of heat shrinkable sleeve on the end of the strain relief leg. Refer to Figure 11.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 11

- (c) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (4) Put the backshell on the wire harness.
 Make sure that the strain relief leg is pointed away from the end of the wire harness.
- (5) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (6) If thread lock compound is necessary, apply the thread lock compound. Refer to Table 8.
 - (a) Make a selection a thread lock compound from Table 9.
 - (b) Make a selection of a solvent from Table 10.
 - (c) Clean the thread surfaces with solvent.
 - (d) Dry the thread surfaces with an absorbent wiper.
 - (e) Put one or two drops of the thread lock compound on the threads of the backshell.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (7) Fully engage the threads of the backshell and the connector.
- (8) Tighten the backshell with the strap wrench.

Make sure that the backshell does not make more than 1/8 turn with the strap wrench.

CAUTION: DO NOT TIGHTEN THE BACKSHELL MORE THAN NECESSARY. DAMAGE TO THE BACKSHELL CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR OR THE BACKSHELL.

- (9) Try to loosen the backshell manually.

NOTE: The backshell is installed correctly when the backshell does not move in relation to the connector.

- (10) If the backshell is loose, do Step (8) and Step (9) again.
- (11) Put the wires into their positions.

Make sure that:

- The wires do not go across each other where the wires are against the strain relief leg
- Strain is not put on the wires.

- (12) Wind two or more layers of tape on the area of the wire harness that is against the strain relief leg.
- (13) Assemble a lacing tape wire harness tie or a plastic tie strap wire harness tie on the wire harness and the leg of the backshell. Refer to Subject 20-10-11.

5. BACKSHELL ASSEMBLY - CABLE CLAMP STRAIN RELIEF

For the procedures to assemble a strain relief backshell with a shield termination, refer to Subject 20-25-12.

A. Applicable Conditions for Backshell Assembly

These conditions are applicable for a wire harness in a backshell with a cable clamp:

- Strain must not be put on the wires
- The wires must not have tension that pulls the seal webs of the grommet out of their shape
- The crimp barrel of a contact cannot be seen in the rear grommet of an environmental connector
- When a wire makes an exit from the rear of the connector grommet at an angle that is less than 60 degrees; the distance from the rear of the grommet to the bend must be 0.10 inch minimum
- Safety wire must be installed on the coupling ring of the backshell if the applicable conditions occur; refer to Subject 20-60-07
- Thread lock compound must be applied on the threads of the backshell in some assembly or installation configurations; refer to Table 12.

Table 12
CONDITIONS FOR BACKSHELL ASSEMBLY WITH THREAD LOCK COMPOUND

Assembly or Installation Configuration	Backshell Assembly Condition
A backshell on a Temperature Grade C or Temperature Grade D wire harness	Thread lock compound is not necessary
A backshell that has anti-rotation teeth	Thread lock compound is not necessary
A backshell that has thread lock compound on the initial assembly	Thread lock compound must be applied

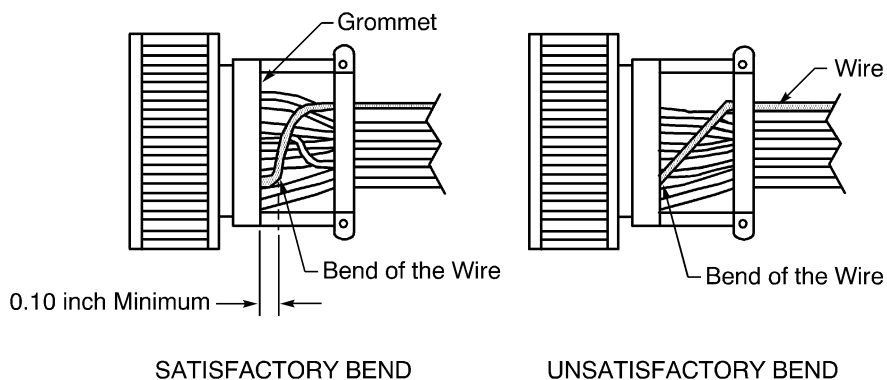
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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

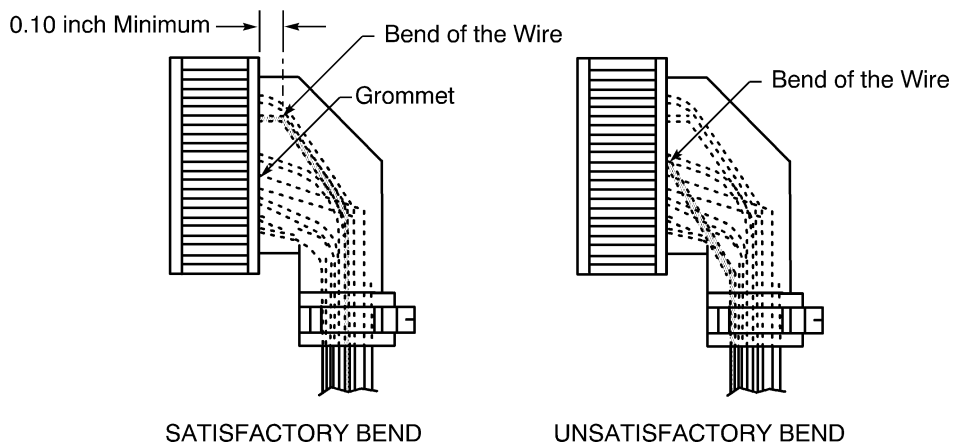
Table 12 (continued)

Assembly or Installation Configuration	Backshell Assembly Condition
A right angle backshell on a Temperature Grade A or Temperature Grade B wire harness in the unpressurized area that does not have anti-rotation teeth or safety wire	Thread lock compound must be applied



BEND OF THE WIRE IN A STRAIGHT BACKSHELL

Figure 12



BEND OF THE WIRE IN A 90 DEGREE BACKSHELL

Figure 13

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

B. Applicable Conditions for Strain Relief Assembly

These conditions are applicable for the assembly of the strain relief:

- The wires must not go across each other in the cable clamp
- The wire harness must have a minimum of two layers of tape for protection
- The tape must not be between the saddle bar and the backshell leg
- The wire harness must be held tightly in the cable clamp
- The cable clamp must not crush the wire harness
- The cable clamp screws must be tight.

The diameter of a wire harness must be increased when these conditions occur:

- The cable clamp does not hold the wire harness tightly
- The wire harness has a small number of wires
- The contact assemblies are installed only near the outer edge of the connector grommet

These conditions are applicable for the layers of tape:

- The forward and rear edges of the tape must extend a minimum of 0.06 inch farther than the edges of the saddle bar
- The edge of one layer is a maximum of 0.05 inch from the edge of a different layer
- For U shaped tape, each layer makes a 100 percent overlap.

Spacers must be installed between the saddle bar and the backshell leg when these conditions occur:

- The diameter of the wire harness is much larger than the diameter of the clamp
- The clamp crushes the wire harness before the screws are fully tightened.

C. Necessary Materials

**Table 13
NECESSARY MATERIALS**

Material	Temperature Grade	Description	Part Number or Specification	Supplier
Filler Rod	C	Silicone	69B47691-()	Boeing
			BMS1-52	Boeing
	D	PTFE	AMS 3656	QPL
Tape	D	Silicone	912-10X12	Arlon
			Scotch 70	3M
		PTFE	P-212HD	Permacel
			P-421	Permacel
			P-440	Permacel
Tape, U Shaped	C	Silicone, 0.5 inch width	10-62034-1	Boeing
		Silicone, 0.4 inch width	10-62034-2	Boeing
Thread Lock Compound	-	-	222	Loctite
			Vibratite	The Oakland Corporation

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**Table 14
SOLVENTS**

Part Number	Supplier
BMS11-7	Boeing
Turco 4460BK	ELF Atochem

**Table 15
APPROVED SUPPLIERS OF BOEING STANDARD SOLVENTS**

Boeing Standard	Supplier
BMS11-7	Barton Solvents
	Elf Atochem
	AKZO/Dexter Aerospace
	Pratt and Lambert Industrial Coating Division

D. Backshell Assembly

- (1) Make a selection of a strap wrench from Table 7.
- (2) Put the necessary backshell components on the wire harness.
Make sure that the cable clamp of the backshell is pointed away from the end of the wire harness.
- (3) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (4) Put the wires into their positions.
Make sure that:
 - The wires do not go across each other
 - The wires do not have tension that pulls the seal web out of its shape
 - Strain is not put on the wires.
- (5) If thread lock compound is necessary or specified, apply the thread lock compound. Refer to Table 12.
 - (a) Make a selection a thread lock compound from Table 13.
 - (b) Make a selection of a solvent from Table 14.
 - (c) Clean the thread surfaces with solvent.
 - (d) Dry the thread surfaces with an absorbent wiper.
 - (e) For a connector that is on the engine side of a firewall, put a thin layer of the thread lock compound on:
 - One or two threads of the backshell around the full circumference of the backshell
 - One or two threads of the connector around the full circumference of the connector.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

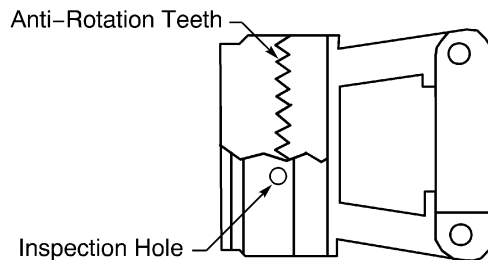
CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (f) For a connector that is not on the engine side of a firewall, put one or two drops of the thread lock compound on the threads of the backshell.

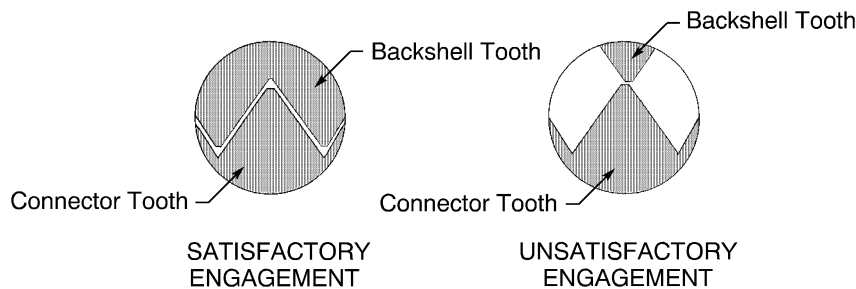
CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (g) Fully engage the threads of the backshell and the connector.
- (6) If the backshell has anti-rotation teeth, examine the teeth of the backshell through the inspection hole. Refer to Figure 14.

Make sure that the backshell teeth are engaged with the connector teeth. Refer to Figure 15.



BACKSHELL WITH ANTI-ROTATION TEETH
Figure 14



ENGAGEMENT OF THE CONNECTOR TEETH AND THE BACKSHELL TEETH
Figure 15

- (7) Tighten the backshell on the connector with the strap wrench.

Make sure that:

- The backshell does not make more than 1/8 turn with the strap wrench
- The backshell is in the correct clock position.

CAUTION: DO NOT TIGHTEN THE BACKSHELL MORE THAN NECESSARY. DAMAGE TO THE BACKSHELL CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR OR THE BACKSHELL.

- (8) If the backshell has set screws, tighten one of the set screws.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

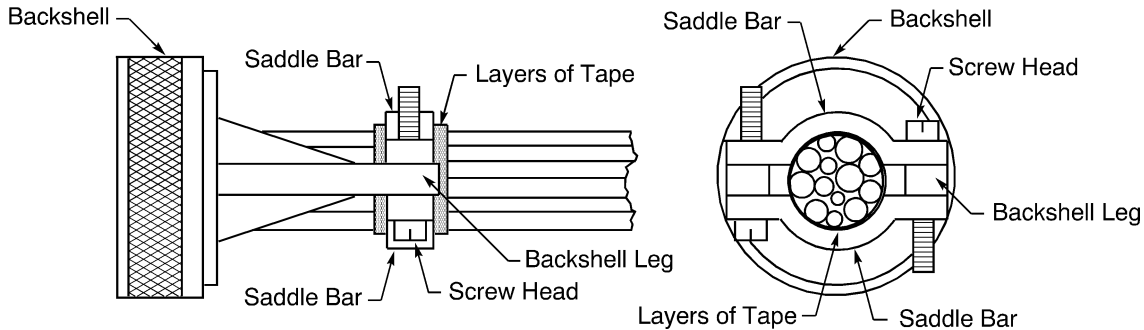
(9) Try to loosen the backshell manually.

NOTE: The backshell is installed correctly when the backshell does not move in relation to the connector.

(10) If the backshell is loose, do Step (7) again.

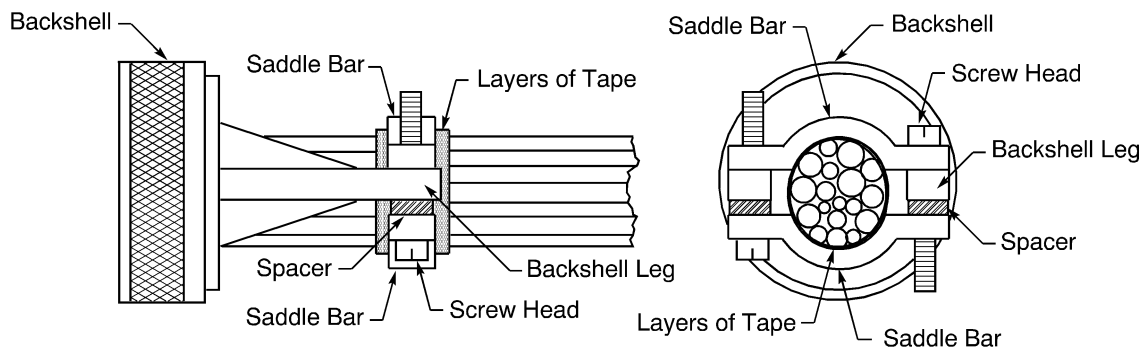
(11) Assemble the strain relief. Refer to Paragraph 5.E.

E. Strain Relief Assembly - Straight Backshell



CONFIGURATION OF THE CABLE CLAMP

Figure 16



CONFIGURATION OF THE CABLE CLAMP WITH SPACERS

Figure 17

Refer to Figure 16 and Figure 17.

- (1) Align the screw holes in a saddle bar with the screw holes in the legs of the backshell.
- (2) Make a mark on the wire harness at the center of the width of the saddle bar.
- (3) Make a selection of a tape from Table 13.

Make sure that the tape is a minimum of 0.12 inch wider than the saddle bar.

NOTE: An equivalent tape is a satisfactory alternative. Refer to Subject 20-00-11.

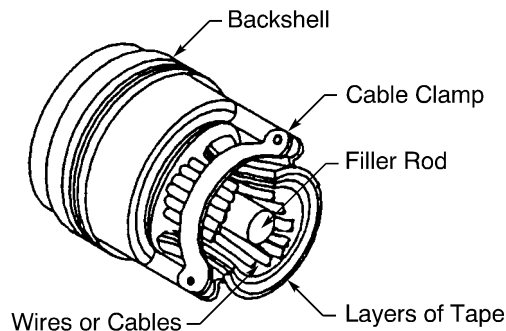
NOTE: A thicker tape is recommended when the difference between the initial diameter of the wire harness and the inner diameter of the strain relief is large.

- (4) If the assembled contacts are installed only near the outer edge of the connector grommet:

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

- (a) Make a selection of a filler rod from Table 13.
- (b) Put the filler rod in the center of the group of wires where the saddle bar goes across the wire harness. Refer to Figure 18.

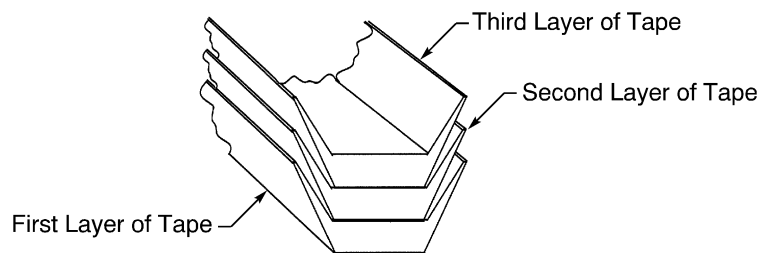


POSITION OF THE FILLER ROD
Figure 18

- (5) Put a minimum of two layers of tape on the wires or cables at the location of the mark.

Make sure that:

- The outer diameter of the wire harness with the layers of tape is larger than the inner diameter of the strain relief
- The center of the layers of tape is aligned with the center of the saddle bar
- The edge of the tape extends a minimum of 0.06 inch farther than each edge of the saddle bar
- The edge of one layer of the tape is a maximum of 0.05 inch from the edge of a different layer of tape
- For U shaped tape, each layer of tape makes a 100 percent overlap.

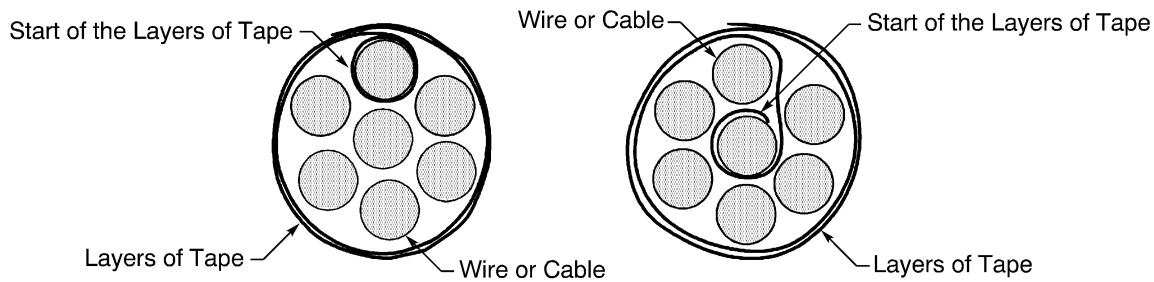


CONFIGURATION OF THE LAYERS OF U SHAPED TAPE
Figure 19

- (a) Wind the tape around one wire to hold it in its position. Refer to Figure 20.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION



FIRST CONFIGURATION

SECOND CONFIGURATION

CONFIGURATIONS OF THE LAYERS OF TAPE

Figure 20

- (b) Continue to wind the tape around the wire harness until the tape is fully installed.
- (6) If lockwashers are supplied with the backshell, put a lockwasher on each screw.
- (7) Align the screw holes in the saddle bars with the screw holes in the legs of the backshell.
- (8) Put a screw through a hole in the saddle bar.
From the rear of the backshell, make sure that the head of the screw on the right is pointed up and the head of the screw on the left is pointed down.
- (9) Put a screw through the hole in the saddle bar that is on the opposite side of the backshell legs.
- (10) If spacers are necessary, specified, or installed on the initial backshell assembly, install spacers:
 - (a) Make a selection of a spacer from Table 5.
Make sure that the spacer is the smallest that can make a tight fit of the wire harness in the strain relief.
NOTE: A minimum of two spacers are necessary, one for each screw.
NOTE: The initial spacers can be installed again if they do not have damage.
 - (b) Put one spacer on each screw.
Make sure that the spacers are on the same side of the backshell legs.
- (11) Engage the threads of screws and the threads of the nuts.
- (12) Tighten the cable clamp screws.
Make sure that:
 - The cable clamp does not crush or pinch the wire harness
 - If the saddle bar and the backshell leg do not touch, the distance between the saddle bar and the backshell leg is approximately equal on each side of the cable clamp
 - The layers of tape are not pinched between the saddle bars and the backshell leg
 - The screws do not cause an interference with a wire harness or a component.**NOTE:** It is not necessary for the saddle bars to touch the legs of the backshell.
- (13) If the wire harness is not held tightly:
 - (a) Remove the cable clamp screws.
 - (b) Wind two layers of tape on the wire harness on the existing layers of tape.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION**

- (c) Do Step (11) through Step (12) again.
- (14) If screws are too long and screws with a shorter length are not available, cut off the unwanted length. Make sure that the end of the screw is smooth and has no rough edges.

CAUTION: DO NOT LET METAL SAWDUST OR THE UNWANTED LENGTH OF THE SCREW FALL ON OR INTO THE WIRE HARNESS OR ON THE REAR GROMMET OF THE CONNECTOR. SHARP METAL PIECES CAN CAUSE DAMAGE TO THE WIRES AND THE CONNECTOR.

- (15) If safety wire is necessary, install safety wire on each screw.

Refer to Subject 20-60-07 for:

- The applicable conditions that make the installation of the safety wire on the cable clamp screw necessary
- The procedures to install the safety wire.

F. Strain Relief Assembly - 45 Degree or 90 Degree Backshell

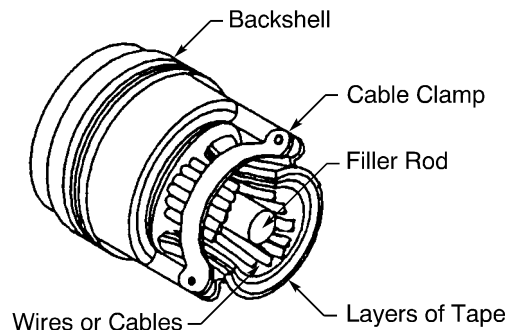
- (1) Align the screw holes in a saddle bar with the screw holes in the legs of the backshell.
- (2) Make a mark on the wire harness at the center of the width of the saddle bar.
- (3) Make a selection of a tape from Table 13.

Make sure that the tape is a minimum of 0.12 inch wider than the saddle bar.

NOTE: An equivalent tape is a satisfactory alternative. Refer to Subject 20-00-11.

NOTE: A thicker tape is recommended when the difference between the initial diameter of the wire harness and the inner diameter of the strain relief is large.

- (4) If the assembled contacts are installed only near the outer edge of the connector grommet:
 - (a) Make a selection of a filler rod from Table 13.
 - (b) Put the filler rod in the center of the group of wires where the saddle bar goes across the wire harness. Refer to Figure 21.



POSITION OF THE FILLER ROD
Figure 21

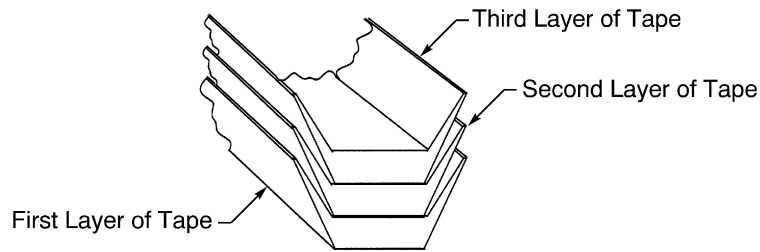
- (5) Put a minimum of two layers of tape on the wires or cables at the location of the mark.

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ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION

Make sure that:

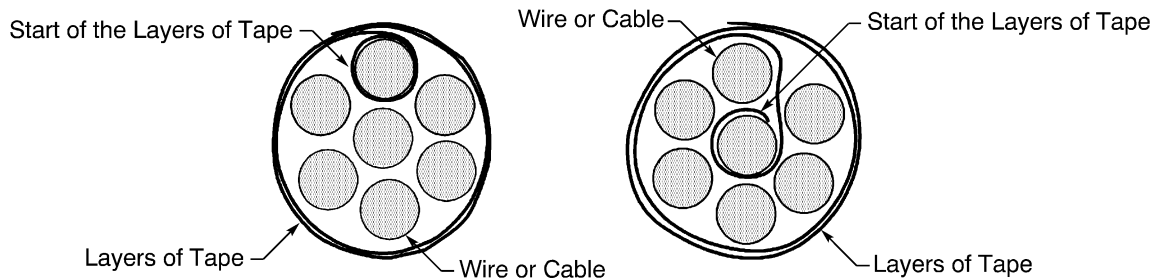
- The outer diameter of the wire harness with the layers of tape is larger than the inner diameter of the strain relief
- The center of the layers of tape is aligned with the center of the saddle bar
- The edge of the tape extends a minimum of 0.06 inch farther than each edge of the saddle bar
- The edge of one layer of the tape is a maximum of 0.05 inch from the edge of a different layer of tape
- For U shaped tape, each layer of tape makes a 100 percent overlap.



CONFIGURATION OF THE LAYERS OF U SHAPED TAPE

Figure 22

(a) Wind the tape around one wire to hold it in its position. Refer to Figure 23.



FIRST CONFIGURATION

SECOND CONFIGURATION

CONFIGURATIONS OF THE LAYERS OF TAPE

Figure 23

- (b) Continue to wind the tape around the wire harness until the tape is fully installed.
- (6) If lockwashers are supplied with the backshell, put a lockwasher on each screw.
- (7) Align the screw holes in the saddle bars with the screw holes in the legs of the backshell.
- (8) Put a screw through each hole in the saddle bar.
- (9) If spacers are necessary, specified, or installed on the initial backshell assembly, install spacers:
 - (a) Make a selection of a spacer from Table 5.

Make sure that the spacer is the smallest that can make a tight fit of the wire harness in the strain relief.

NOTE: A minimum of two spacers are necessary, one for each screw.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF STRAIN RELIEF BACKSHELLS WITHOUT A SHIELD TERMINATION**

NOTE: The initial spacers can be installed again if they do not have damage.

- (b) Put one spacer on each screw.
- (10) Engage the threads of screws and the threads of the nuts.
- (11) Tighten the cable clamp screws.

Make sure that:

- The cable clamp does not crush or pinch the wire harness
- If the saddle bar and the backshell leg do not touch, the distance between the saddle bar and the backshell leg is approximately equal on each side of the cable clamp
- The layers of tape are not pinched between the saddle bars and the backshell leg
- The screws do not cause an interference with a wire harness or a component.

NOTE: It is not necessary for the saddle bars to touch the legs of the backshell.

- (12) If the wire harness is not held tightly:
- (a) Remove the cable clamp screws.
- (b) Wind two layers of tape on the wire harness on the existing layers of tape.
- (c) Do Step (10) through Step (11) again.
- (13) If screws are too long and screws with a shorter length are not available, cut off the unwanted length. Make sure that the end of the screw is smooth and has no rough edges.

CAUTION: DO NOT LET METAL SAWDUST OR THE UNWANTED LENGTH OF THE SCREW FALL ON OR INTO THE WIRE HARNESS OR ON THE REAR GROMMET OF THE CONNECTOR. SHARP METAL PIECES CAN CAUSE DAMAGE TO THE WIRES AND THE CONNECTOR.

- (14) If safety wire is necessary, install safety wire on each screw.

Refer to Subject 20-60-07 for:

- The applicable conditions that make the installation of the safety wire on the cable clamp screw necessary
- The procedures to install the safety wire.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CONNECTORS WITH FRONT RELEASE CONTACTS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF CONNECTORS WITH FRONT RELEASE CONTACTS

This Subject gives the general maintenance data for the disassembly and assembly of connectors that have front release contacts.

1. PART NUMBERS AND DESCRIPTION

A. Backshell Assembly Part Numbers

**Table 1
BACKSHELL COMPONENT PART NUMBERS**

Description	Part Number	Supplier
Conduit Adapter	6930-06-()	Icore
	6930-09-()	Icore
	712-148	Glenair
	G8148	Glenair
	MS27557	QPL
Convoluted Tube	120 Series	Glenair
	MS48 Series	Raychem
Convoluted Tube Adapter	710 Series	Glenair

**Table 2
BACKSHELL ASSEMBLY TOOLS**

Tool	Part Number	Supplier
Strap Wrench	TG-70	Glenair
	AT 508K	Aircraft Tools, Inc.

B. Necessary Materials

**Table 3
NECESSARY MATERIALS**

Material	Part Number	Supplier
Thread Locking Compound	222	Loctite
	Vibratite	The Oakland Corporation

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF CONNECTORS WITH FRONT RELEASE CONTACTS****2. CONNECTOR DISASSEMBLY****A. Disassembly of the Backshell Components**

Connector backshell components can be:

- A backshell adapter
- A cable clamp adapter
- A strain relief adapter
- A strain relief clamp
- A conduit adapter
- A convoluted tube adapter
- A convoluted tube.

- (1) Disconnect each component from the connector.
- (2) Push each component away from rear of the connector.

B. Contact Removal

- (1) Make a selection of a contact removal tool. Refer to the applicable Subject for the connector.

CAUTION: DO NOT USE PLIERS TO REMOVE A CONTACT. THE PLIERS CAN CAUSE DAMAGE TO THE CONTACT AND THE CONNECTOR GROMMET.

- (2) At the front of the connector, axially align the tool with the contact cavity.

Make sure that the plunger of the removal tool is fully retracted.

- (3) Push the tool into the contact cavity until it stops.

NOTE: The retention clips in the contact cavity begin to open when resistance is felt.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (4) Push the plunger of the tool so that the shoulder of the contact is pushed out beyond the retention clips.
- (5) Carefully remove the tool straight out of the contact cavity.
- (6) Pull the contact out of the grommet from the rear of the connector.

C. Removal of Seal Plugs and Seal Rods

- (1) Make a selection of a pair of pliers.

CAUTION: MAKE SURE THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If necessary, remove the plastic tie strap or the wire harness tie that is less than 6 inches from the connector.
- (3) Hold the end of the seal plug or the seal rod tightly in the jaws of the pliers.

NOTE: If it is necessary, a seal rod can be pushed out of the contact cavity from the front of the connector with the engaging end of another contact.

- (4) Carefully pull the seal plug or seal rod straight out of the contact cavity.

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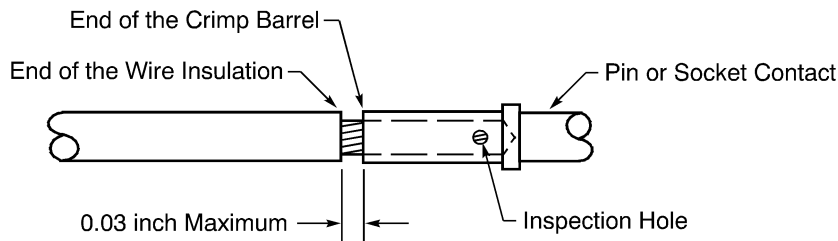
3. CONNECTOR ASSEMBLY

A. Contact Assembly

- (1) Make a selection of the contact. Refer to:
 - The applicable Subject for the connector
 - The Wiring Diagram Manual.
- (2) Prepare the wire. Refer to:
 - The applicable Subject for the connector
 - Subject 20-00-15 for the insulation removal procedures.
- (3) Make a selection of a crimp tool. Refer to:
 - The applicable Subject for the connector
 - Subject 20-00-12 for alternative contact crimp tools.
- (4) For a contact without an insulation support barrel:
 - (a) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 1.

Make sure that:

 - All of the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole
 - The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN A CONTACT WITHOUT AN INSULATION SUPPORT BARREL
Figure 1

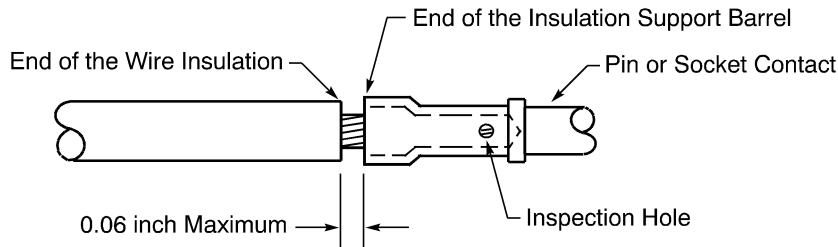
- (b) Crimp the contact.
- (5) For a contact with an insulation support barrel and a wire that has an O.D. that is larger than the insulation support barrel:
 - (a) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 2.

Make sure that:

 - All of the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole
 - The distance from the end of the insulation to the crimp barrel is not more than 0.06 inch.

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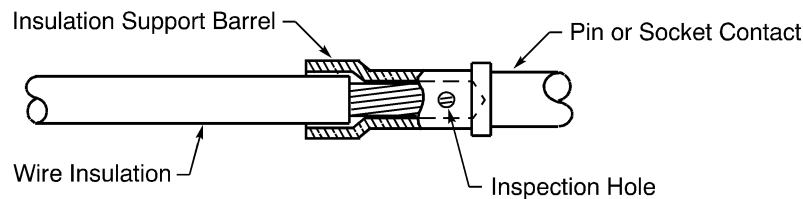


POSITION OF THE WIRE THAT HAS AN O.D. THAT IS LARGER THAN THE INSULATION SUPPORT BARREL
Figure 2

- (b) Crimp the contact.
- (6) For all other contacts with an insulation support barrel:
 - (a) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 3.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The wire insulation is in the insulation support barrel.



POSITION OF THE WIRE IN A CONTACT WITH AN INSULATION SUPPORT BARREL
Figure 3

- (b) Crimp the contact.

B. Contact Insertion

This procedure can be used to insert either of these contacts in a contact cavity:

- A wired contact
 - An unwired contact.
- (1) Put the necessary connector assembly components on the wire harness.
 - (2) If the connector has a single-leg clamp, put either of these materials on the wire harness:
 - Heat shrinkable sleeve
 - Filler tape and a wire harness tie.

Refer to Subject 20-60-09.

- (3) Make a selection of a contact insertion tool. Refer to the applicable Subject for the connector.

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Make sure that the tip of the insertion tool:

- Is not bent
- Does not have any damage
- Does not have any sharp edges.

(4) Examine the contact.

Make sure that the contact:

- Is straight
- Does not have any damage.

(5) Put the insertion tool on the contact so that the tool and the contact are axially aligned.

NOTE: For a size 20 contact, make sure that the insertion tool tip:

- Is against the insulation support barrel of the contact
- Is not against the rear edge of the support barrel of the contact.

(6) Axially align the contact with the contact cavity at the rear face of the grommet.

NOTE: For the contact cavities that are adjacent to the outer edge of the connector, make sure that the open side of the tool tip is pointed toward the outer edge of the grommet.

(7) Push the contact into the contact cavity until it stops.

(8) If it is necessary to make the insertion of the contact easier:

- (a) Make a selection of a lubricant. Refer to Subject 20-00-11.
- (b) Put a small quantity of lubricant on either or both of these surfaces:
 - The tip of the insertion tool
 - The rear face of the connector grommet.

CAUTION: DO NOT PUT LUBRICANT ON ANY OTHER SURFACE. DAMAGE TO THE CONDUCTOR OR TO THE WIRED CONTACT OR BOTH CAN CAUSE UNSATISFACTORY PERFORMANCE.

CAUTION: DO NOT PUT MORE THAN THE NECESSARY QUANTITY OF LUBRICANT ON THE SURFACE. DAMAGE TO THE CONDUCTOR OR TO THE WIRED CONTACT OR BOTH CAN CAUSE UNSATISFACTORY PERFORMANCE.

(9) Carefully pull the insertion tool straight out of the contact cavity.

(10) Pull lightly on the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

(11) If the contact is not locked in the contact cavity:

- (a) Pull the contact out of the contact cavity.
- (b) Do Step (5) through Step (10) again.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF CONNECTORS WITH FRONT RELEASE CONTACTS****C. Seal of an Empty Contact Cavity**

Refer to Subject 20-60-08 for:

- The necessary conditions to seal an empty contact cavity
- The procedures to seal an empty contact cavity if applicable.

4. BACKSHELL ASSEMBLY

Refer to:

- Subject 20-25-12 for strain relief backshells
- Subject 20-25-13 for peripheral backshells
- Subject 20-25-14 for backshells with shield terminator bands.

A. Assembly of a Strain Relief Clamp

Refer to Subject 20-60-09.

B. Assembly of a Single Leg Strain Relief Clamp

Refer to Subject 20-60-09.

- (1) If it is necessary, install a safety wire. Refer to Subject 20-60-07.

C. Assembly of a Conduit Adapter

- (1) Make a selection of a conduit adapter from Table 1.
- (2) Make a selection of a thread locking compound from Table 3.
- (3) Put two drops of the thread locking compound on the adapter threads so that each drop of the thread locking compound is applied:
 - At opposite locations on the circumference of the adapter
 - To a minimum of two threads.
- (4) Engage the threads of the conduit adapter and the connector.
- (5) Manually tighten the adapter.

Make sure that the wires do not cause tension on the contacts.
- (6) Make a selection of a strap wrench from Table 2.
- (7) Hold the connector with a pair of soft jaw connector plug pliers.
- (8) Tighten the adapter a maximum of 1/8 turn.
- (9) Install a conduit fitting:
 - (a) Put one drop of the thread locking compound on the threads of the adapter.
 - (b) Put one drop of the thread locking compound on the threads of the removable cover.
 - (c) Dry the thread locking compound for a minimum of 30 minutes.
 - (d) Engage the threads of the conduit fitting and the adapter.

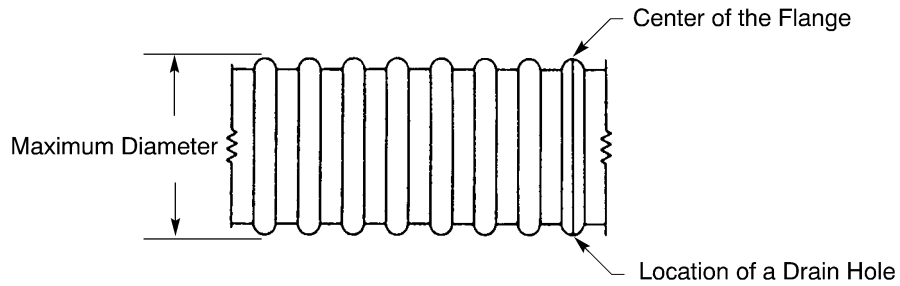
Make sure that the wires do not cause tension on the contacts.
 - (e) Manually tighten the fitting.

D. Installation of a Convolute Tube

- (1) Make a selection of a convolute tube from Table 1.
- (2) Prepare the tube. Refer to Figure 4.

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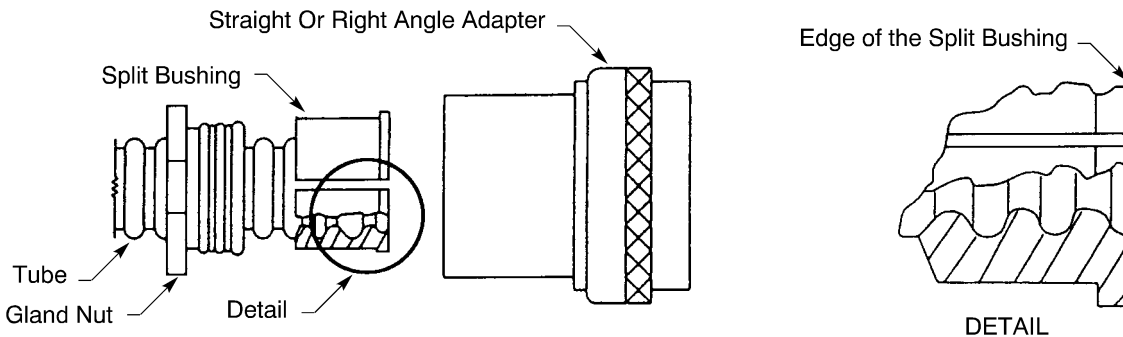
ASSEMBLY OF CONNECTORS WITH FRONT RELEASE CONTACTS



PREPARATION OF THE CONVOLUTED TUBE

Figure 4

- (a) Cut the necessary length of tube so that each end of the tube is cut at the center of the flange at the maximum diameter of the tube.
- (b) Remove any burrs from the ends of the tube.
- (c) Make the necessary number of drain holes in the tube at the necessary locations.
Make sure that each drain hole:
 - Has a diameter of 3/32 inch + 1/32 inch, -0 inch
 - Is in the center of the flange at the maximum diameter of the tube.
- (3) Make a selection of an convoluted tube adapter from Table 1.
- (4) Assemble the adapter. Refer to Figure 5.



ASSEMBLY OF THE CONVOLUTED TUBE ADAPTER

Figure 5

- (a) Put the gland nut on the tube.
- (b) Put the split bushing on the tube so that the end of the bushing with the larger diameter is aligned with the edge of the tube.
Make sure that the end of the tube is 0 inch to + 1/16 inch from the end of the split bushing.
- (c) Make a selection of a thread locking compound from Table 3.
- (d) Put two drops of the thread locking compound on the threads of the adapter.
- (e) Put the adapter on the tube.
Make sure that the position of the split bushing does not change.
- (f) Engage the threads of the gland nut and the adapter.



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Make sure that the master key is in the correct position.

- (g) Manually tighten the gland nut.
- (5) Engage the threads of the adapter and the connector.
- (6) Tighten the gland nut until:
 - Not more than two threads of the gland nut are can be seen outside of the adapter
 - The thread locking plug in the gland nut cannot be seen.

CAUTION: DO NOT TIGHTEN THE GLAND NUT MORE THAN NECESSARY. DAMAGE TO THE TUBE, THE BUSHING, OR THE ADAPTER CAN OCCUR.

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MIL-C-26500 FRONT RELEASE CONNECTORS

This Subject gives the procedures for the selection and the assembly of MIL-C-26500 type connectors.

1. GENERAL DATA

A. Location of Connector Part Number Data

Table 1 gives:

- The supplier part number for a MIL-C-26500 type connector that is interchangeable and has the same performance as a connector with a Boeing Standard part number
- The Military Standard part number for a MIL-C-26500 type connector that is interchangeable and has the same performance as the connector with the Boeing Standard part number
- The supplier part number for a MIL-C-26500 type connector that is not equivalent to a Boeing Standard connector
- The location of connector part number data.

Table 2 gives a description of the MIL-C-26500 type connectors in this subject.

Table 18 gives the part number data of Boeing Standard connectors and the part number data for:

- The supplier connector that is interchangeable and has the same performance as the Boeing Standard connector
- The Military Standard connector that is interchangeable and has the same performance as the Boeing Standard connector.

Paragraph 3. gives the part number data of supplier connectors that are not equivalent to Boeing Standard connectors.

**Table 1
MIL-C-26500 TYPE CONNECTOR PART NUMBERS**

Boeing Standard	Boeing Specification	Part Number	Supplier	Reference
-	-	1167A()	Cinch	Paragraph 3.G.
-	-	48-16V()	Amphenol	Paragraph 3.A.
-	-	48-7164-()	Amphenol	Paragraph 3.B.
-	-	CN0900-329	Cinch	Paragraph 3.C.
-	-	CN0977()	Cinch	Paragraph 3.D.
-	-	CN0986()	Cinch	Paragraph 3.E.
-	-	CN1004-()	Cinch	Paragraph 3.F.
-	-	R0710()J()	RMS	Paragraph 3.J.
-	-	R0711()M()	RMS	Paragraph 3.K.
-	-	R0721()	RMS	Paragraph 3.L.
-	-	ZZB-R()	Pyle-National	Paragraph 3.H.
-	-	ZZL-R()	Pyle-National	Paragraph 3.H.
-	-	ZZW-R()	Pyle-National	Paragraph 3.I.
-	-	ZZY-R()	Pyle-National	Paragraph 3.I.
-	10-60479-()	-	Boeing	Paragraph 2.L.
-	10-60479-5	-	Boeing	Paragraph 2.L.

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Table 1 (continued)

Boeing Standard	Boeing Specification	Part Number	Supplier	Reference
-	280T10()-()	-	Boeing	Paragraph 2.M.
-	280U001()-()	-	Boeing	Paragraph 2.N.
-	280U2028()-()	-	Boeing	Paragraph 2.O.
-	280W0002-1	BACC63BP18D8SN	Boeing	Paragraph 2.P.
-	65B414()-()	-	Boeing	Paragraph 2.Q.
-	69B4181()-()	-	Boeing	Paragraph 2.R.
BACC45FL()	-	-	Boeing	Paragraph 2.A.
BACC45FM()	-	48-00R()	Amphenol	Paragraph 2.B.
		C48-00R()	Cinch	Paragraph 2.B.
		MS24264R()-T()	QPL	Paragraph 2.B.
		R0719()	RMS	Paragraph 2.B.
		ZZY()-17()	Pyle-National	Paragraph 2.B.
BACC45FN()	-	48-10R()	Amphenol	Paragraph 2.C.
		BMS24264R()-B()	Deutsch	Paragraph 2.C.
		C48-10R()	Cinch	Paragraph 2.C.
		MS24264R()-B()	QPL	Paragraph 2.C.
		R0717()	RMS	Paragraph 2.C.
		ZZW()-17()	Pyle-National	Paragraph 2.C.
BACC45FP()	-	48-03R()	Amphenol	Paragraph 2.D.
		C48-03R()	Cinch	Paragraph 2.D.
		MS24265R()-T()	QPL	Paragraph 2.D.
		ZZY()-15()	Pyle-National	Paragraph 2.D.
BACC45FS()	-	48-06R()	Amphenol	Paragraph 2.B.
		C48-06R()	Cinch	Paragraph 2.B.
		MS24266R()-T()	QPL	Paragraph 2.B.
		R0718()	RMS	Paragraph 2.B.
		ZZY()-10()	Pyle-National	Paragraph 2.B.
BACC45FT()	-	48-16R()	Amphenol	Paragraph 2.C.
		BMS24266R()-B()	Deutsch	Paragraph 2.C.
		C48-16R()	Cinch	Paragraph 2.C.
		MS24266R()-B()	QPL	Paragraph 2.C.
		R0716()	RMS	Paragraph 2.C.
		ZZW()-10()	Pyle-National	Paragraph 2.C.

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Table 1 (continued)

Boeing Standard	Boeing Specification	Part Number	Supplier	Reference
BACC63AE()	-	FPK-11()	Pyle-National	Paragraph 2.E.
BACC63AF()	-	FPK-17()	Pyle-National	Paragraph 2.E.
BACC63BN()	-	48-63N()	Amphenol	Paragraph 2.F.
		C0909()	Cinch	Paragraph 2.F.
		R0712()	RMS	Paragraph 2.F.
BACC63BP()	-	48-06R()	Amphenol	Paragraph 2.G.
		AAY-()-12()	Amphenol-Pyle	Paragraph 2.G.
		CN0966()	Cinch	Paragraph 2.G.
		R0710()	RMS	Paragraph 2.G.
		ZZY-()-12()	Pyle-National	Paragraph 2.G.
BACC63BV()	-	48-00R()	Amphenol	Paragraph 2.H.
		AAY-()-17()	Amphenol-Pyle	Paragraph 2.H.
		CN0967()	Cinch	Paragraph 2.H.
		R0711()	RMS	Paragraph 2.H.
		ZZY-()-17()	Pyle-National	Paragraph 2.H.
BACC63CB()	-	CN1020A()	Cinch	Paragraph 2.I.
		R0700()	RMS	Paragraph 2.I.
BACC63CC()	-	CN1021A()	Cinch	Paragraph 2.I.
		R0701()	RMS	Paragraph 2.I.
BACC63CS()	-	R770()	RMS	Paragraph 2.J.
BACC63X()	-	FPK-11()	Pyle-National	Paragraph 2.K.
BACC63Y()	-	FPK-17()	Pyle-National	Paragraph 2.K.
-	S283A202-11	CN1159-11	Cinch	Paragraph 2.S.
-	S283A202-12	CN1159-12	Cinch	Paragraph 2.S.
-	S283T025-2	CN1156-2	Cinch	Paragraph 2.T.
-	S283T025-4	CN1156-4	Cinch	Paragraph 2.T.

Table 2

DESCRIPTION OF MIL-C-26500 TYPE CONNECTORS

Connector	Description
10-60479-()	Bayonet Coupled Connector with Shielded Contact
10-60479-5	Bulkhead Feed Through, Hermetically Sealed Receptacle
1167A()	Modified BACC63BV Receptacle



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Table 2 (continued)

Connector	Description
280T10()-()	Modified BACC45FN or BACC45FT Connector
280U001()-()	Modified BACC45FN or BACC45FT Connector
280U2028-()	BACC63CB or BACC63CC Connector with Special Shielded Contact
280W0002-1	Modified BACC63BP Plug
48-16V()	Bayonet Coupled Plug, Viton Elastomer
65B414()-()	Modified BACC45FN or BACC45FT Connector
69B4181()-()	Modified BACC45F() or BACC63() Connector
BACC45FL()	Thread Coupled Plug with RFI Shielding Capability
BACC45FM()	Thread Coupled Receptacle
BACC45FN()	Bayonet Coupled Receptacle
BACC45FP()	Thread Coupled, Single Hole Mount Receptacle
BACC45FS()	Thread Coupled Plug
BACC45FT()	Bayonet Coupled Plug
BACC63AE()	Thread Coupled, Fire Barrier Plug
BACC63AF()	Thread Coupled, Fire Barrier Receptacle
BACC63BN()	Bayonet Coupled, Vibration Resistant Plug
BACC63BP()	Self Locking, Thread Coupled, Vibration Resistant Plug
BACC63BV()	Self Locking, Thread Coupled, Vibration Resistant Receptacle
BACC63CB()	Bayonet Coupled, Vibration Resistant Plug with Ground Spring
BACC63CC()	Bayonet Coupled, Vibration Resistant Receptacle
BACC63CS()	Thread Coupled, Closure Rib Receptacle
BACC63X()	Thread Coupled, Fire Barrier Plug
BACC63Y()	Thread Coupled, Fire Barrier Receptacle
C0900-246-()	Coupling Ring Polarity Adapter
CN0900-329	Bayonet Coupled Plug with Laynard Release
CN0977()	Bayonet Coupled, Hydraulic Fluid Resistant Plug
CN0986()	Thread Coupled, Hydraulic Fluid Resistant Plug
CN1004-()	Thread Coupled, Hydraulic Fluid Resistant Plug
R0710(J)	Self Locking, Thread Coupled, Vibration Resistant, Hydraulic Fluid Resistant Plug with Ground Spring
R0711(M)	Thread Coupled, Vibration Resistant, Hydraulic Fluid Resistant Receptacle
R0721()	Bayonet Coupled, Single Hole Mount Receptacle
S283A202-11	Thread Coupled Plug with Special Shielded Contact

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Table 2 (continued)

Connector	Description
S283A202-12	Thread Coupled Plug with Special Shielded Contact
S283T025-()	Thread Coupled Plug
ZZB-R()	Bayonet Coupled Connector, Stainless Steel Shell
ZZL-R()	Thread Coupled Connector, Stainless Steel Shell
ZZW-R()	Bayonet Coupled Connector, Stainless Steel Shell
ZZY-R()	Thread Coupled Connector, Stainless Steel Shell

B. Selection of Connectors

This paragraph gives the decision sequence to make a selection of:

- A connector to replace a connector that is in service
- A connector for a new installation.

Refer to Paragraph 1.A. for the part numbers and description of the connectors.

- (1) Make a selection of a connector that has the Boeing Standard number.
- (2) If the connector with the Boeing Standard number is not available, make a selection of an alternative connector that:
 - Has the supplier's part number
 - Is interchangeable and has the same performance as the Boeing Standard connector.
- (3) If the connector with the supplier's part number is not available, make a selection of a a permitted alternative equivalent connector that:
 - Has the Military Standard part number
 - Is interchangeable and has the same performance as the Boeing Standard connector.

Refer to Table 3.

NOTE: The Equipment List or the connector container can specify a Boeing Standard BACC45F() number when the connector shell has a Military Standard part number mark.

Table 3

RELATION BETWEEN THE BOEING STANDARD AND THE MILITARY STANDARD FOR MIL-C-26500 TYPE CONNECTORS

MIL-C-26500 Connector	Boeing Standard	Military Standard
Bayonet Coupled Plug	BACC45FT()	MS24266R-B()
Bayonet Coupled Receptacle	BACC45FN()	MS24264R-B()
Thread Coupled Plug	BACC45FS()	MS24266R-T()
Thread Coupled Receptacle	BACC45FM()	MS24264R-T()
Thread Coupled, Single Hole Mount Receptacle	BACC45FP()	MS24265R-T()



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C. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 4 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

Table 4
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL

Connector	Contact Cavity Size	Minimum Wire O.D. (inch)
017832-3000	20	0.035
	16	0.068
	12	0.106
BACC45FM	20	0.035
	16	0.068
	12	0.106
BACC45FN	20	0.035
	16	0.068
	12	0.106
BACC45FP	20	0.035
	16	0.068
	12	0.106
BACC45FS	20	0.035
	16	0.068
	12	0.106
BACC45FT	20	0.035
	16	0.068
	12	0.106
BACC63BP	20	0.035
	16	0.068
	12	0.106
BACC63BV	20	0.035
	16	0.068
	12	0.106
BACC63CB	20	0.035
	16	0.068
	12	0.106

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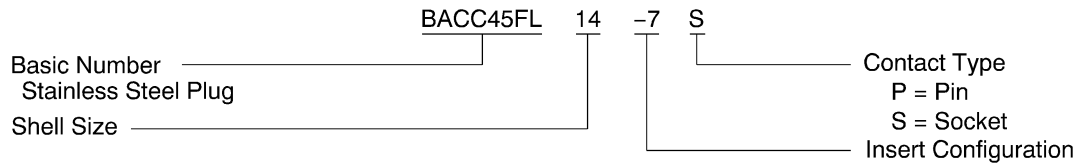
Table 4 (continued)

Connector	Contact Cavity Size	Minimum Wire O.D. (inch)
BACC63CC	20	0.035
	16	0.068
	12	0.106
MIL-C-26500	20	0.040
	16	0.068
	12	0.106
R0710	20	0.040
	16	0.068
	12	0.106
R0711	20	0.040
	16	0.068
	12	0.106
R0724	20	0.040
	16	0.068
	12	0.106

2. BOEING STANDARD CONNECTOR PART NUMBER AND DESCRIPTION

A. BACC45FL Thread Coupled Plug with RFI Shielding Capability

The BACC45FL plug connects to the BACC63BV stainless steel receptacle.



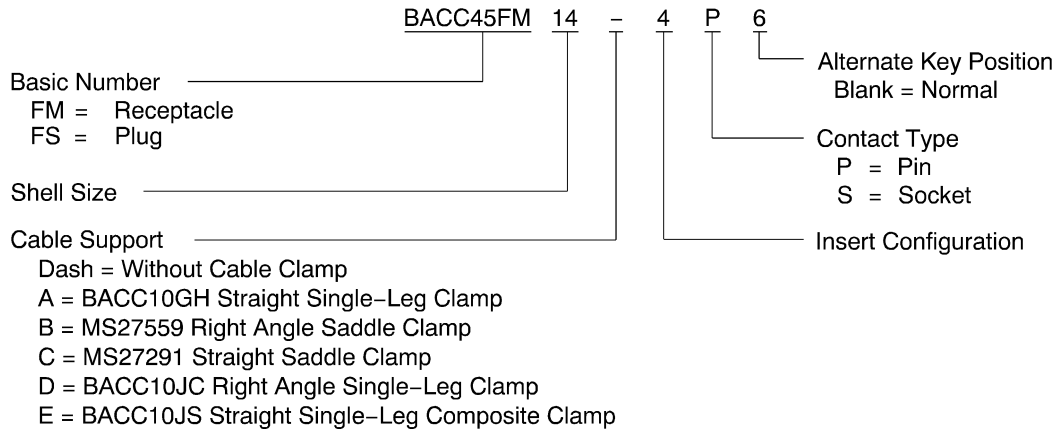
BOEING BACC45FL CONNECTOR PART NUMBER STRUCTURE

Figure 1

STANDARD WIRING PRACTICES MANUAL

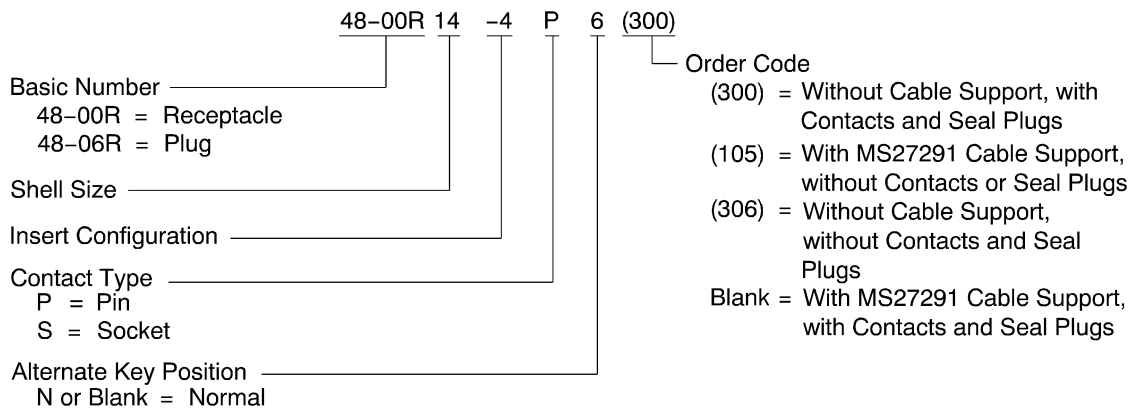
MIL-C-26500 FRONT RELEASE CONNECTORS

B. BACC45FM and BACC45FS Thread Coupled Connector



BOEING BACC45FM AND BACC45FS CONNECTOR PART NUMBER STRUCTURE

Figure 2

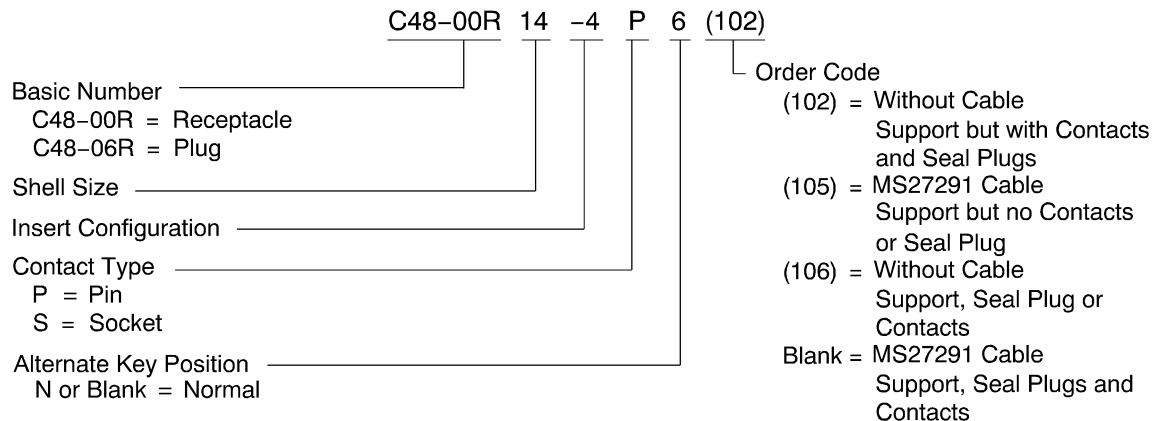


AMPHENOL BACC45FM AND BACC45FS CONNECTOR PART NUMBER STRUCTURE

Figure 3

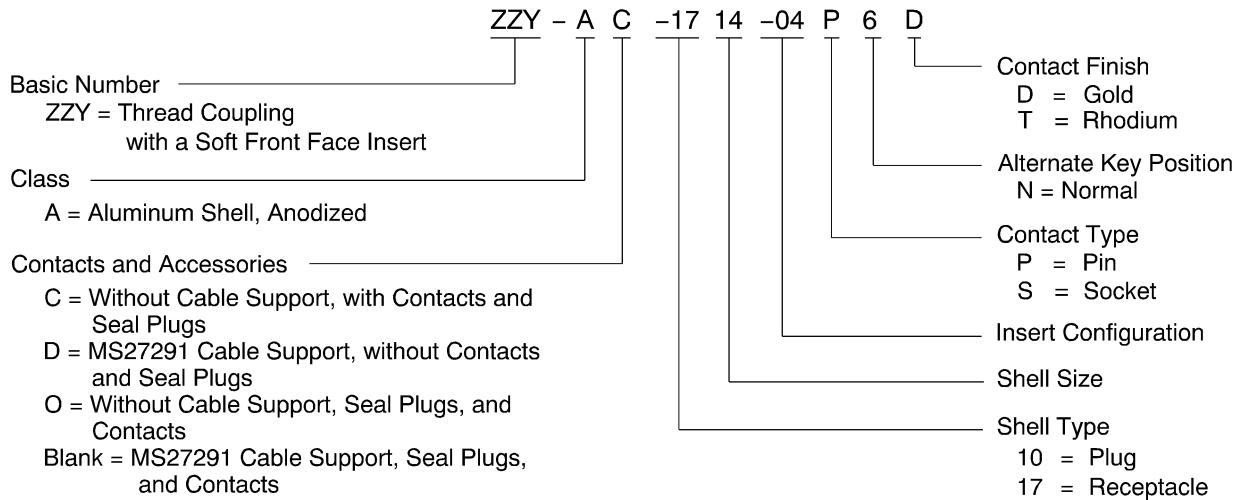
STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS



CINCH BACC45FM AND BACC45FS CONNECTOR PART NUMBER STRUCTURE

Figure 4

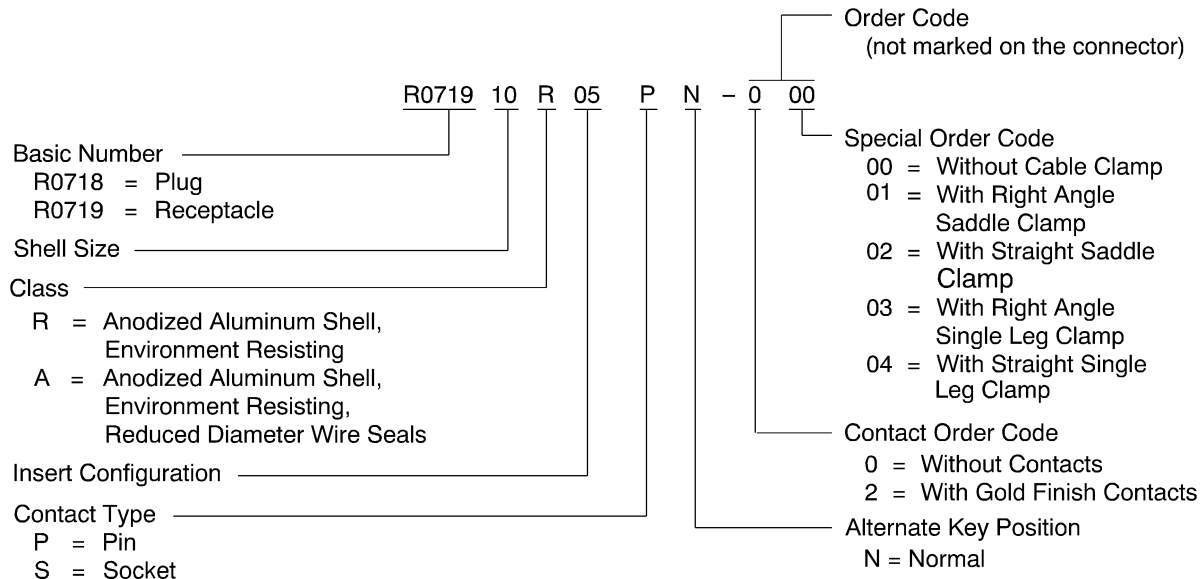


PYLE-NATIONAL BACC45FM AND BACC45FS CONNECTOR PART NUMBER STRUCTURE

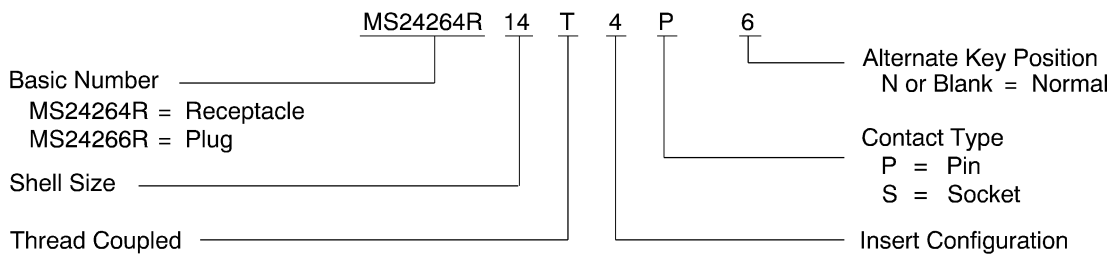
Figure 5

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS



RMS BACC45FM AND BACC45FS CONNECTOR PART NUMBER STRUCTURE
Figure 6

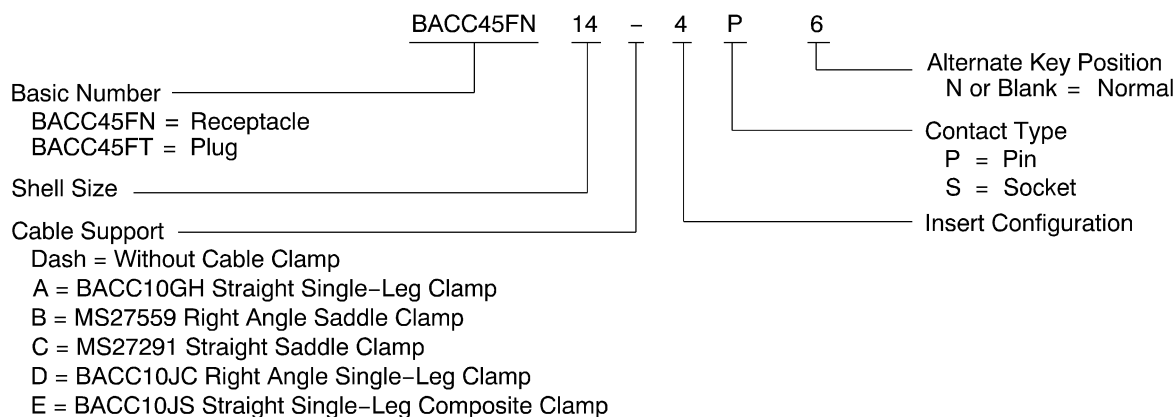


MILITARY BACC45FM AND BACC45FS CONNECTOR PART NUMBER STRUCTURE
Figure 7

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MIL-C-26500 FRONT RELEASE CONNECTORS

C. BACC45FN and BACC45FT Bayonet Coupled Connector



BOEING BACC45FN AND BACC45FT CONNECTOR PART NUMBER STRUCTURE
 Figure 8

Table 5
REPLACEMENT BACC45FN CONNECTOR PART NUMBERS

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
BACC45FN10-2S	Boeing	BACC454FN10-20S	Boeing
BACC45FN10-2S9	Boeing	BACC454FN10-20S9	Boeing
BACC45FN10A2P	Boeing	BACC454FN10A20P	Boeing
BACC45FN10A2S	Boeing	BACC454FN10A20S	Boeing

Table 6
REPLACEMENT BACC45FT CONNECTOR PART NUMBERS

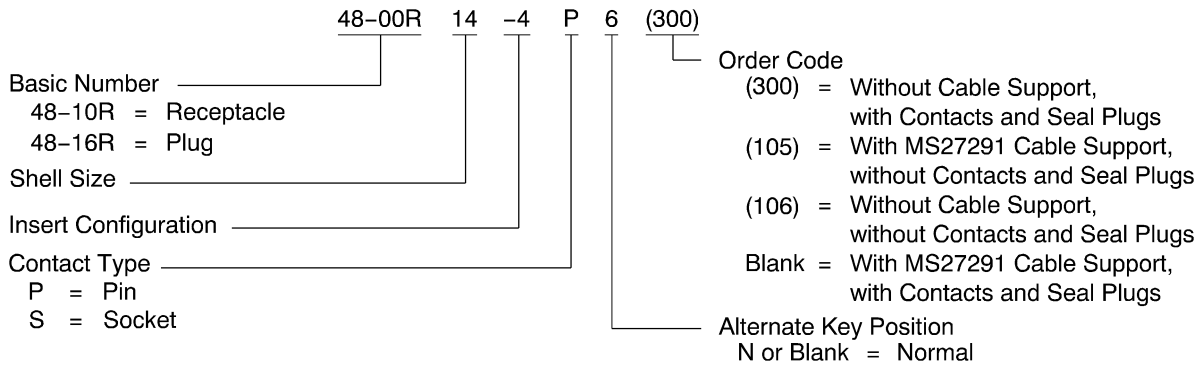
Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
BACC45FT10-2P	Boeing	BACC454FT10-20P	Boeing
BACC45FT10-2S	Boeing	BACC454FT10-20S	Boeing
BACC45FT10A2P	Boeing	BACC454FT10A20P	Boeing
BACC45FT10A2P9	Boeing	BACC454FT10A20P9	Boeing
BACC45FT10A2S	Boeing	BACC454FT10A20S	Boeing
BACC45FT10A2S6	Boeing	BACC454FT10A20S6	Boeing
BACC45FT10A2S7	Boeing	BACC454FT10A20S7	Boeing
BACC45FT10B2S	Boeing	BACC454FT10B20S	Boeing
BACC45FT10B2S7	Boeing	BACC454FT10B20S7	Boeing
BACC45FT10C2P	Boeing	BACC454FT10C20P	Boeing

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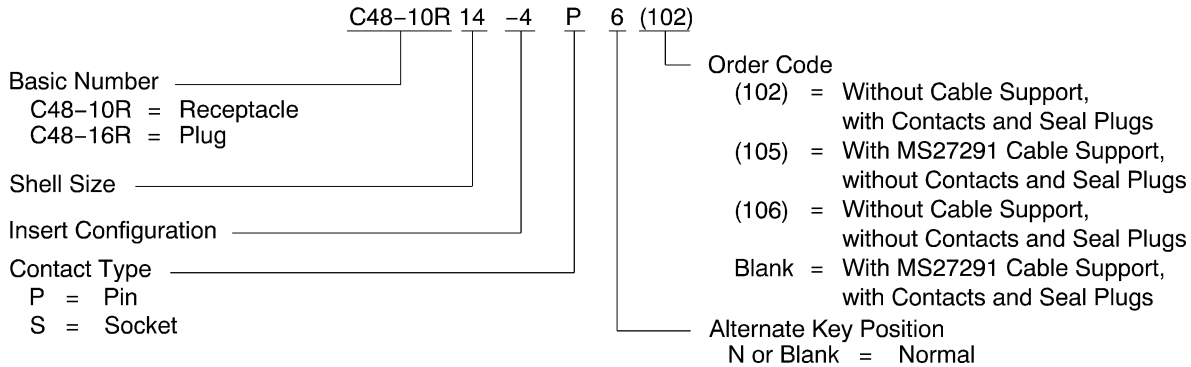
Table 6 (continued)

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
BACC45FT10C2S	Boeing	BACC454FT10C20S	Boeing
BACC45FT10D2S	Boeing	BACC454FT10D20S	Boeing
BACC45FT10D2S7	Boeing	BACC454FT10D20S7	Boeing



AMPHENOL BACC45FN AND BACC45FT CONNECTOR PART NUMBER STRUCTURE

Figure 9

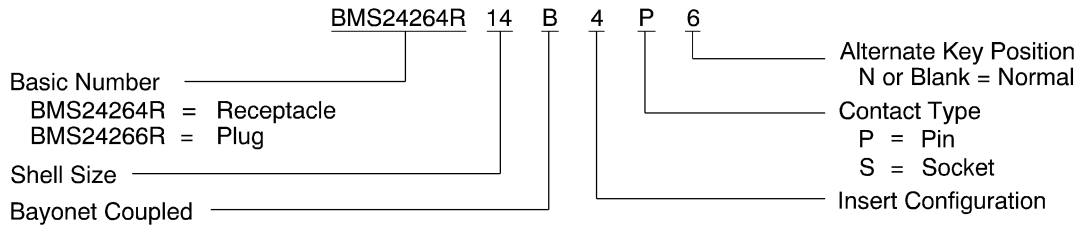


CINCH BACC45FN AND BACC45FT CONNECTOR PART NUMBER STRUCTURE

Figure 10

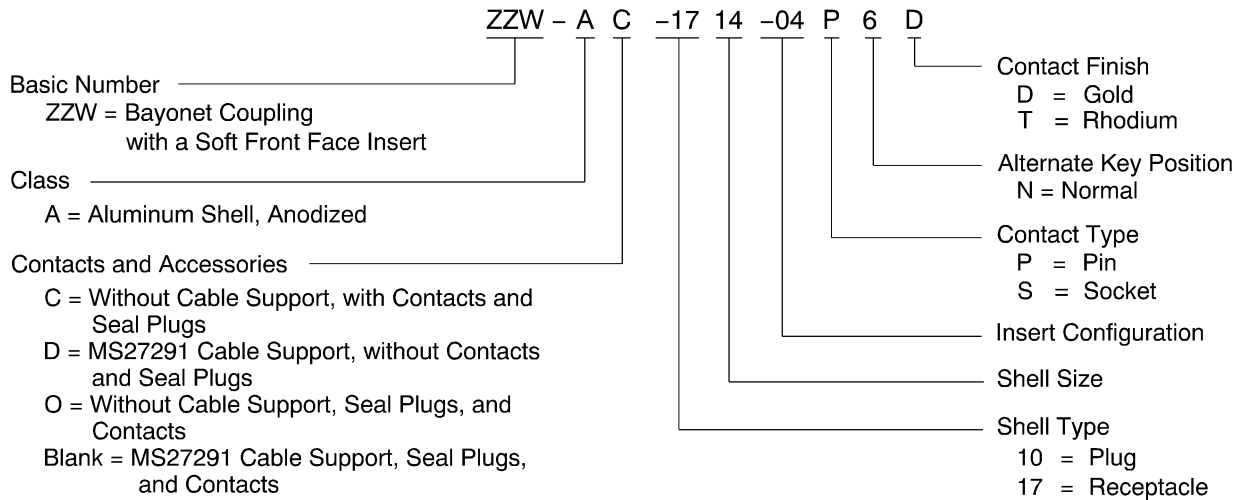
STANDARD WIRING PRACTICES MANUAL

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DEUTSCH BACC45FN AND BACC45FT CONNECTOR PART NUMBER STRUCTURE

Figure 11

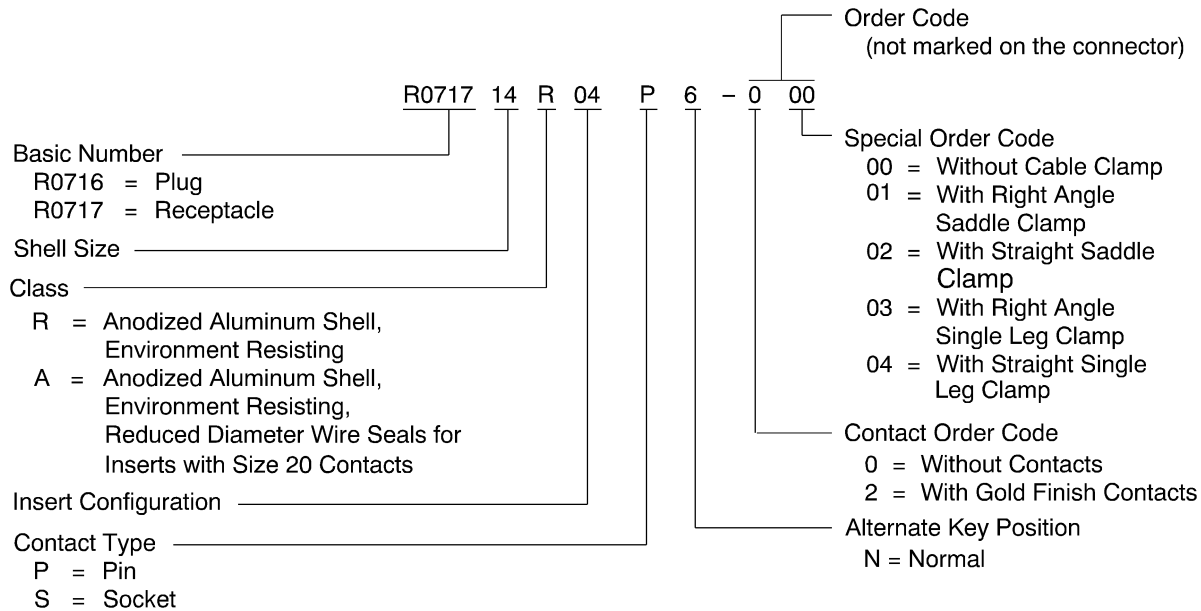


PYLE-NATIONAL BACC45FN AND BACC45FT CONNECTOR PART NUMBER STRUCTURE

Figure 12

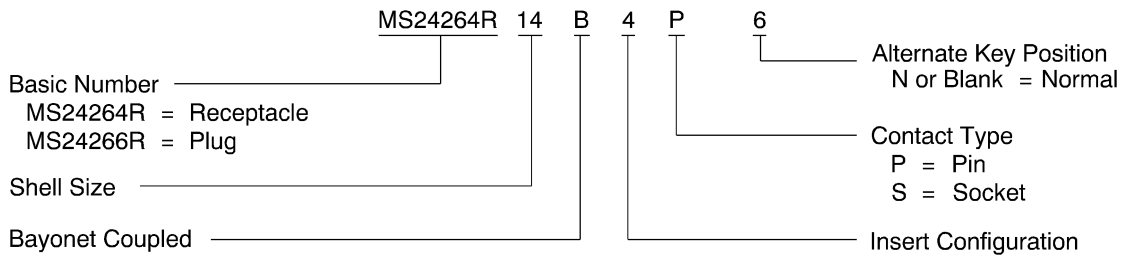
STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS



RMS BACC45FN AND BACC45FT CONNECTOR PART NUMBER STRUCTURE

Figure 13

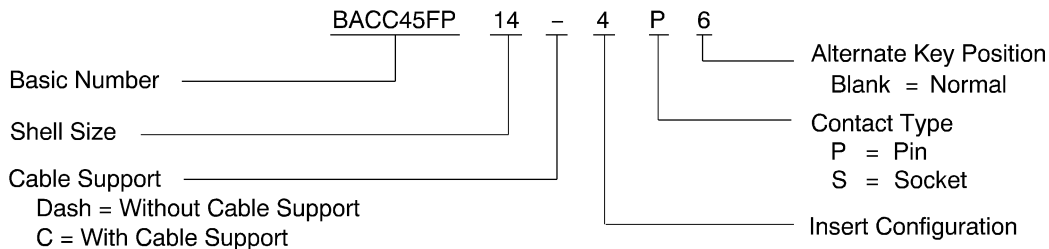


MILITARY BACC45FN AND BACC45FT CONNECTOR PART NUMBER STRUCTURE

Figure 14

D. BACC45FP Thread Coupled, Single Hole Mount Receptacle

The BACC45FP receptacle connects to a BACC45FS Plug.

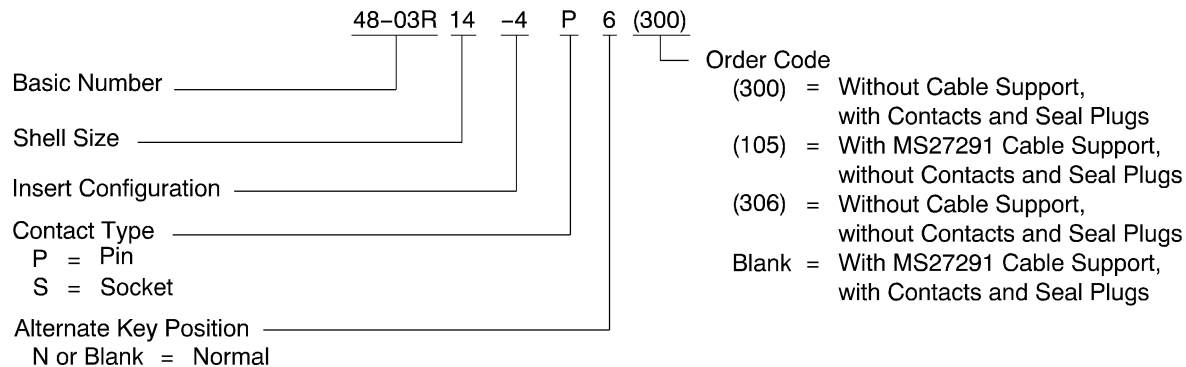


BOEING BACC45FP CONNECTOR PART NUMBER STRUCTURE

Figure 15

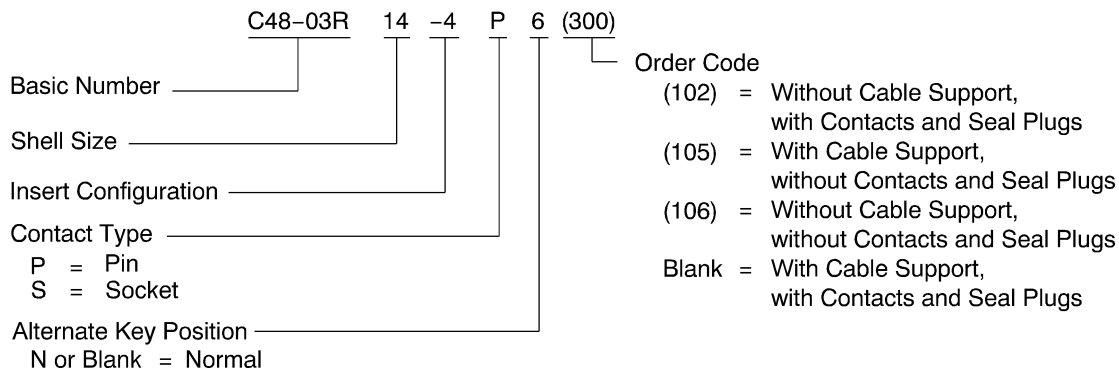
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MIL-C-26500 FRONT RELEASE CONNECTORS



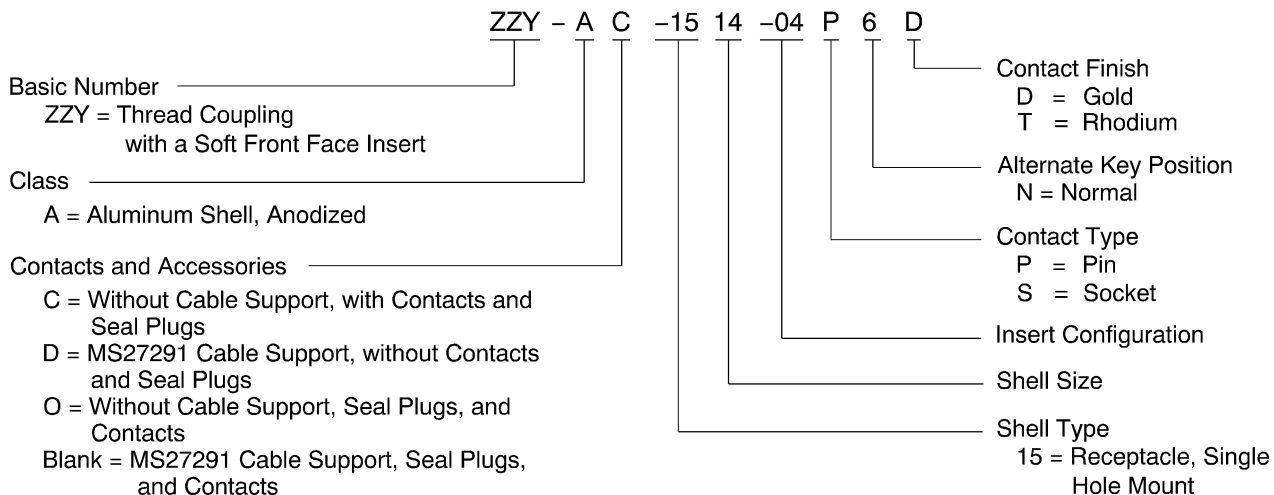
AMPHENOL BACC45FP CONNECTOR PART NUMBER STRUCTURE

Figure 16



CINCH BACC45FP CONNECTOR PART NUMBER STRUCTURE

Figure 17

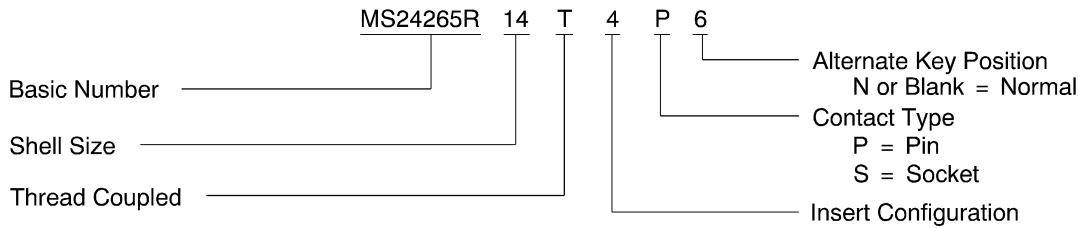


PYLE-NATIONAL BACC45FP CONNECTOR PART NUMBER STRUCTURE

Figure 18

STANDARD WIRING PRACTICES MANUAL

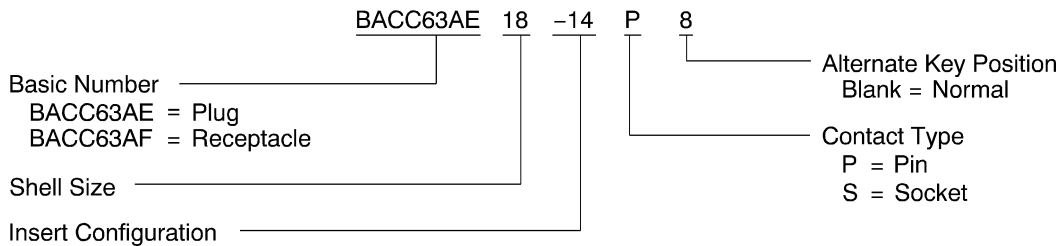
MIL-C-26500 FRONT RELEASE CONNECTORS



MILITARY BACC45FP CONNECTOR PART NUMBER STRUCTURE

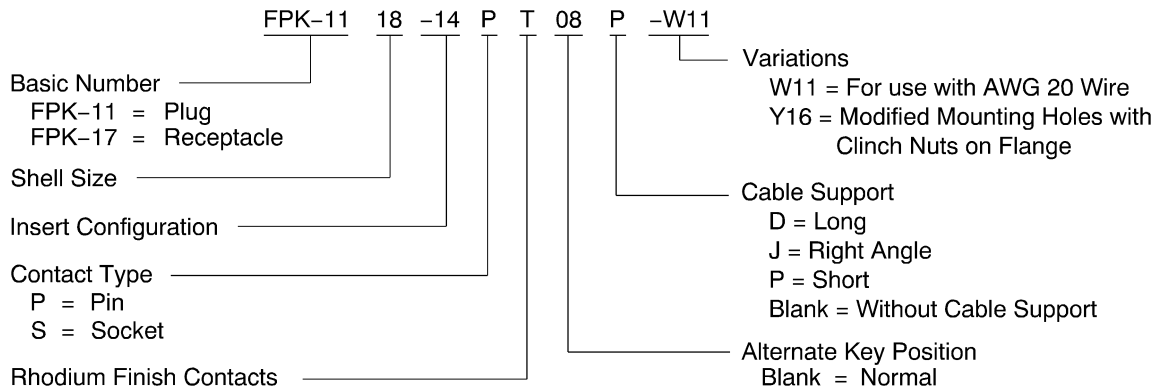
Figure 19

E. BACC63AE and BACC63AF Thread Coupled, Fire Barrier Connector



BOEING BACC63AE AND BACC63AF CONNECTOR PART NUMBER STRUCTURE

Figure 20



PYLE-NATIONAL BACC63AE AND BACC63AF CONNECTOR PART NUMBER STRUCTURE

Figure 21

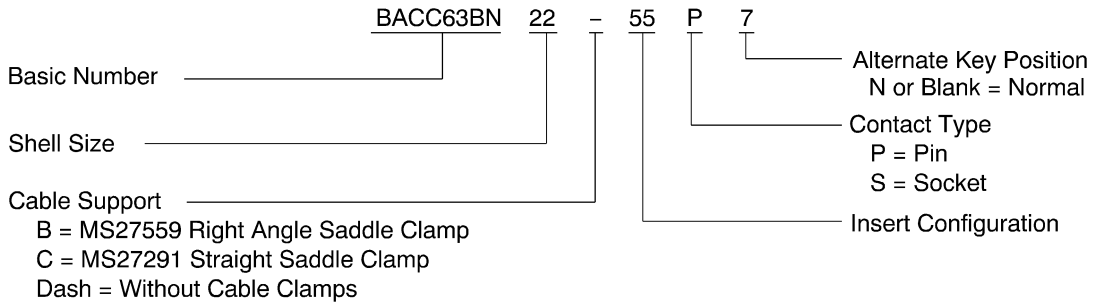
F. BACC63BN Bayonet Coupled, Vibration Resistant Plug

The BACC63BN plug:

- Is the same as the BACC45FT plug, with more vibration resistance
- Engages with MIL-C-26500 type bayonet receptacles.

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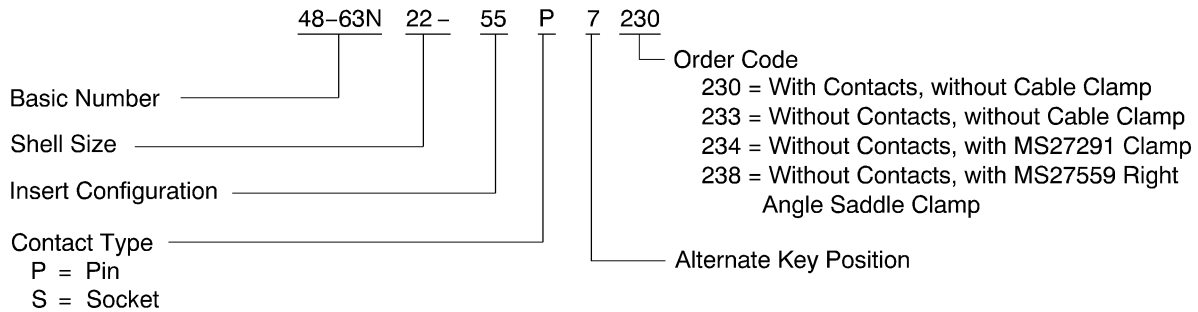
BOEING BACC63BN CONNECTOR PART NUMBER STRUCTURE

Figure 22

Table 7

REPLACEMENT BACC63BN CONNECTOR PART NUMBERS

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BN10-2PN	Boeing	BACC63BN10-20PN	Boeing
BACC63BN10B2PN	Boeing	BACC63BN10B20PN	Boeing
BACC63BN10C2PN	Boeing	BACC63BN10C20PN	Boeing
BACC63BN10-2SN	Boeing	BACC63BN10-20SN	Boeing
BACC63BN10B2SN	Boeing	BACC63BN10B20SN	Boeing
BACC63BN10C2SN	Boeing	BACC63BN10C20SN	Boeing

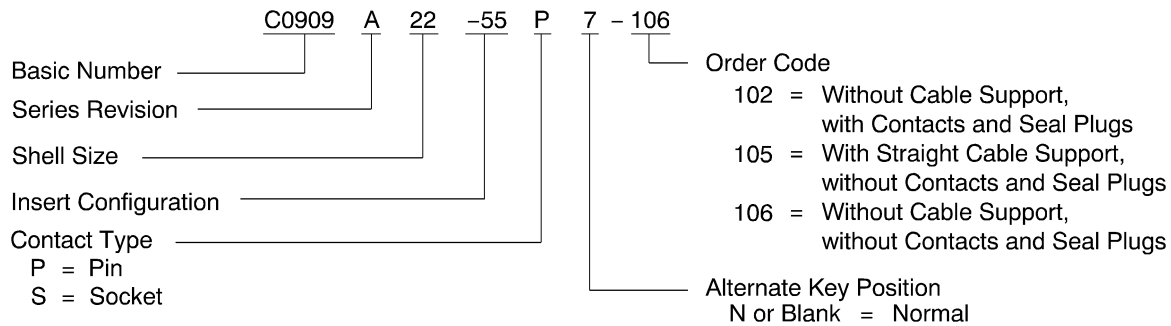


AMPHENOL BACC63BN CONNECTOR PART NUMBER STRUCTURE

Figure 23

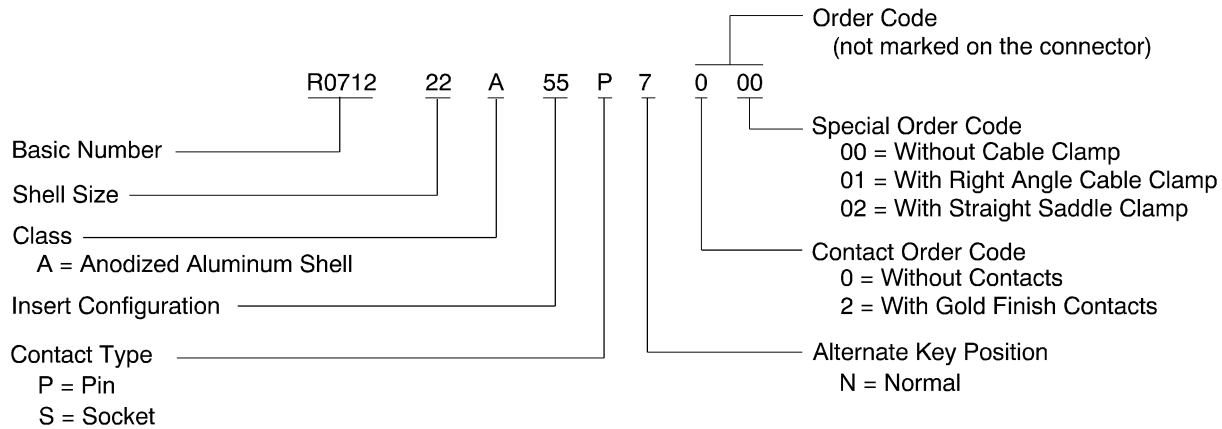
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CINCH BACC63BN CONNECTOR PART NUMBER STRUCTURE

Figure 24



RMS BACC63BN CONNECTOR PART NUMBER STRUCTURE

Figure 25

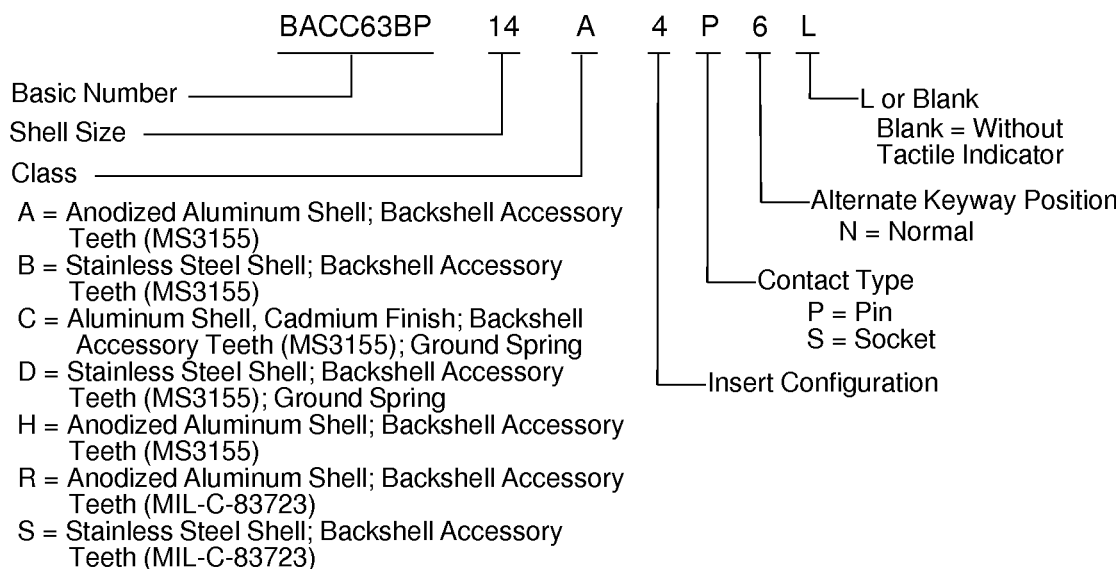
G. BACC63BP Self Locking, Thread Coupled, Vibration Resistant Plug

The BACC63BP plug:

- Is similar to the BACC45FS plug, with more vibration resistance
- Has a self-locking feature
- Engages with BACC63BV and other MIL-C-26500 type thread coupled receptacles.

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BOEING BACC63BP CONNECTOR PART NUMBER STRUCTURE

Figure 26

Table 8

ALTERNATIVE BACC63BP CONNECTOR PART NUMBERS

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP10A20SN	Boeing	BACC63BP10H20SN	Boeing
BACC63BP10A5S10L	Boeing	BACC63BP10H5S10	Boeing
BACC63BP10A5S6	Boeing	BACC63BP10H5S6	Boeing
BACC63BP10A5S6L	Boeing	BACC63BP10H5S6	Boeing
BACC63BP10A5S7	Boeing	BACC63BP10H5S7	Boeing
BACC63BP10A5S7L	Boeing	BACC63BP10H5S7	Boeing
BACC63BP10A5S8	Boeing	BACC63BP10H5S8	Boeing
BACC63BP10A5S8L	Boeing	BACC63BP10H5S8	Boeing
BACC63BP10A5SN	Boeing	BACC63BP10H5SN	Boeing
BACC63BP10A5SNL	Boeing	BACC63BP10H5SN	Boeing
BACC63BP10H20SN	Boeing	BACC63BP10A20SN	Boeing
BACC63BP10H5S10L	Boeing	BACC63BP10A5S10	Boeing
BACC63BP10H5S6	Boeing	BACC63BP10A5S6	Boeing
BACC63BP10H5S6L	Boeing	BACC63BP10A5S6	Boeing
BACC63BP10H5S7	Boeing	BACC63BP10A5S7	Boeing
BACC63BP10H5S7L	Boeing	BACC63BP10A5S7	Boeing



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Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP10H5S8	Boeing	BACC63BP10A5S8	Boeing
BACC63BP10H5S8L	Boeing	BACC63BP10A5S8	Boeing
BACC63BP10H5SN	Boeing	BACC63BP10A5SN	Boeing
BACC63BP10H5SNL	Boeing	BACC63BP10A5SN	Boeing
BACC63BP10B5S10L	Boeing	BACC63BP10D5S10	Boeing
BACC63BP10B5S6L	Boeing	BACC63BP10D5S6	Boeing
BACC63BP10B5S7L	Boeing	BACC63BP10D5S7	Boeing
BACC63BP10B5S8L	Boeing	BACC63BP10D5S8	Boeing
BACC63BP10B5SN	Boeing	BACC63BP10D5SN	Boeing
BACC63BP10B5SNL	Boeing	BACC63BP10D5SN	Boeing
BACC63BP10R5S10L	Boeing	BACC63BP10A5S10	Boeing
	Boeing	BACC63BP10H5S10	Boeing
BACC63BP10R5S6L	Boeing	BACC63BP10A5S6	Boeing
	Boeing	BACC63BP10H5S6	Boeing
BACC63BP10R5S7L	Boeing	BACC63BP10A5S7	Boeing
	Boeing	BACC63BP10H5S7	Boeing
BACC63BP10R5S8L	Boeing	BACC63BP10A5S8	Boeing
	Boeing	BACC63BP10H5S8	Boeing
BACC63BP10R5SNL	Boeing	BACC63BP10A5SN	Boeing
	Boeing	BACC63BP10H5SN	Boeing
BACC63BP10S5S6L	Boeing	BACC63BP10B5S6	Boeing
BACC63BP10S5SNL	Boeing	BACC63BP10B5SN	Boeing
BACC63BP12A12S6L	Boeing	BACC63BP12H12S6	Boeing
BACC63BP12A12S8L	Boeing	BACC63BP12H12S8	Boeing
BACC63BP12A12SN	Boeing	BACC63BP12H12SN	Boeing
BACC63BP12A12SNL	Boeing	BACC63BP12H12SN	Boeing
BACC63BP12A3S10	Boeing	BACC63BP12H3S10	Boeing
BACC63BP12A3S10L	Boeing	BACC63BP12H3S10	Boeing
BACC63BP12A3S6	Boeing	BACC63BP12H3S6	Boeing
BACC63BP12A3S6L	Boeing	BACC63BP12H3S6	Boeing
BACC63BP12A3S8	Boeing	BACC63BP12H3S8	Boeing
BACC63BP12A3S8L	Boeing	BACC63BP12H3S8	Boeing

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Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP12A3S9	Boeing	BACC63BP12H3S9	Boeing
BACC63BP12A3S9L	Boeing	BACC63BP12H3S9	Boeing
BACC63BP12A3SN	Boeing	BACC63BP12H3SN	Boeing
BACC63BP12A3SNL	Boeing	BACC63BP12H3SN	Boeing
BACC63BP12H12S6L	Boeing	BACC63BP12A12S6	Boeing
BACC63BP12H12S8L	Boeing	BACC63BP12A12S8	Boeing
BACC63BP12H12SN	Boeing	BACC63BP12A12SN	Boeing
BACC63BP12H12SNL	Boeing	BACC63BP12A12SN	Boeing
BACC63BP12H3S10	Boeing	BACC63BP12A3S10	Boeing
BACC63BP12H3S10L	Boeing	BACC63BP12A3S10	Boeing
BACC63BP12H3S6	Boeing	BACC63BP12A3S6	Boeing
BACC63BP12H3S6L	Boeing	BACC63BP12A3S6	Boeing
BACC63BP12H3S8	Boeing	BACC63BP12A3S8	Boeing
BACC63BP12H3S8L	Boeing	BACC63BP12A3S8	Boeing
BACC63BP12H3S9	Boeing	BACC63BP12A3S9	Boeing
BACC63BP12H3S9L	Boeing	BACC63BP12A3S9	Boeing
BACC63BP12H3SN	Boeing	BACC63BP12A3SN	Boeing
BACC63BP12H3SNL	Boeing	BACC63BP12A3SN	Boeing
BACC63BP12B3S6L	Boeing	BACC63BP12D3S6	Boeing
BACC63BP12B3S7L	Boeing	BACC63BP12D3S7	Boeing
BACC63BP12B3SN	Boeing	BACC63BP12D3SN	Boeing
BACC63BP12B3SNL	Boeing	BACC63BP12D3SN	Boeing
BACC63BP12R12SNL	Boeing	BACC63BP12A12SN	Boeing
	Boeing	BACC63BP12H12SN	Boeing
BACC63BP12R3S10L	Boeing	BACC63BP12A3S10	Boeing
	Boeing	BACC63BP12H3S10	Boeing
BACC63BP12R3S6L	Boeing	BACC63BP12A3S6	Boeing
	Boeing	BACC63BP12H3S6	Boeing
BACC63BP12R3S7L	Boeing	BACC63BP12A3S7	Boeing
	Boeing	BACC63BP12H3S7	Boeing
BACC63BP12R3S8L	Boeing	BACC63BP12A3S8	Boeing
	Boeing	BACC63BP12H3S8	Boeing

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Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP12R3S9L	Boeing	BACC63BP12A3S9	Boeing
	Boeing	BACC63BP12H3S9	Boeing
BACC63BP12R3SNL	Boeing	BACC63BP12A3SN	Boeing
	Boeing	BACC63BP12H3SN	Boeing
BACC63BP12S3PN	Boeing	BACC63BP12B3PN	Boeing
BACC63BP12S3PNL	Boeing	BACC63BP12B3PN	Boeing
BACC63BP12S3S6L	Boeing	BACC63BP12B3S6	Boeing
BACC63BP12S3S7L	Boeing	BACC63BP12B3S7	Boeing
BACC63BP12S3SNL	Boeing	BACC63BP12B3SN	Boeing
BACC63BP14A15S7	Boeing	BACC63BP14H15S7	Boeing
BACC63BP14A15S7L	Boeing	BACC63BP14H15S7	Boeing
BACC63BP14A15SN	Boeing	BACC63BP14H15SN	Boeing
BACC63BP14A15SNL	Boeing	BACC63BP14H15SN	Boeing
BACC63BP14A3SNL	Boeing	BACC63BP14H3SN	Boeing
BACC63BP14A4SN	Boeing	BACC63BP14H4SN	Boeing
BACC63BP14A4SNL	Boeing	BACC63BP14H4SN	Boeing
BACC63BP14A7S6	Boeing	BACC63BP14H7S6	Boeing
BACC63BP14A7S6L	Boeing	BACC63BP14H7S6	Boeing
BACC63BP14A7S7	Boeing	BACC63BP14H7S7	Boeing
BACC63BP14A7S7L	Boeing	BACC63BP14H7S7	Boeing
BACC63BP14A7S8L	Boeing	BACC63BP14H7S8	Boeing
BACC63BP14A7S9	Boeing	BACC63BP14H7S9	Boeing
BACC63BP14A7S9L	Boeing	BACC63BP14H7S9	Boeing
BACC63BP14A7SN	Boeing	BACC63BP14H7SN	Boeing
BACC63BP14A7SNL	Boeing	BACC63BP14H7SN	Boeing
BACC63BP14H15S7	Boeing	BACC63BP14A15S7	Boeing
BACC63BP14H15S7L	Boeing	BACC63BP14A15S7	Boeing
BACC63BP14H15SN	Boeing	BACC63BP14A15SN	Boeing
BACC63BP14H15SNL	Boeing	BACC63BP14A15SN	Boeing
BACC63BP14H3SNL	Boeing	BACC63BP14A3SN	Boeing
BACC63BP14H4SN	Boeing	BACC63BP14A4SN	Boeing
BACC63BP14H4SNL	Boeing	BACC63BP14A4SN	Boeing

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP14H7S6	Boeing	BACC63BP14A7S6	Boeing
BACC63BP14H7S6L	Boeing	BACC63BP14A7S6	Boeing
BACC63BP14H7S7	Boeing	BACC63BP14A7S7	Boeing
BACC63BP14H7S7L	Boeing	BACC63BP14A7S7	Boeing
BACC63BP14H7S8L	Boeing	BACC63BP14A7S8	Boeing
BACC63BP14H7S9	Boeing	BACC63BP14A7S9	Boeing
BACC63BP14H7S9L	Boeing	BACC63BP14A7S9	Boeing
BACC63BP14H7SN	Boeing	BACC63BP14A7SN	Boeing
BACC63BP14H7SNL	Boeing	BACC63BP14A7SN	Boeing
BACC63BP14B3SNL	Boeing	BACC63BP14D3SN	Boeing
BACC63BP14B7S6L	Boeing	BACC63BP14D7S6	Boeing
BACC63BP14B7S7L	Boeing	BACC63BP14D7S7	Boeing
BACC63BP14B7S8L	Boeing	BACC63BP14D7S8	Boeing
BACC63BP14B7SN	Boeing	BACC63BP14D7SN	Boeing
BACC63BP14B7SNL	Boeing	BACC63BP14D7SN	Boeing
BACC63BP14R15S7L	Boeing	BACC63BP14A15S7	Boeing
	Boeing	BACC63BP14H15S7	Boeing
BACC63BP14R15S8L	Boeing	BACC63BP14A15S8	Boeing
	Boeing	BACC63BP14H15S8	Boeing
BACC63BP14R15SNL	Boeing	BACC63BP14A15SN	Boeing
	Boeing	BACC63BP14H15SN	Boeing
BACC63BP14R3SNL	Boeing	BACC63BP14A3SN	Boeing
	Boeing	BACC63BP14H3SN	Boeing
BACC63BP14R4SNL	Boeing	BACC63BP14A4SN	Boeing
	Boeing	BACC63BP14H4SN	Boeing
BACC63BP14R7S6L	Boeing	BACC63BP14A7S6	Boeing
	Boeing	BACC63BP14H7S6	Boeing
BACC63BP14R7S7L	Boeing	BACC63BP14A7S7	Boeing
	Boeing	BACC63BP14H7S7	Boeing
BACC63BP14R7S8L	Boeing	BACC63BP14A7S8	Boeing
	Boeing	BACC63BP14H7S8	Boeing

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP14R7S9L	Boeing	BACC63BP14A7S9	Boeing
	Boeing	BACC63BP14H7S9	Boeing
BACC63BP14R7SN	Boeing	BACC63BP14A7SN	Boeing
	Boeing	BACC63BP14H7SN	Boeing
BACC63BP14R7SNL	Boeing	BACC63BP14A7SN	Boeing
	Boeing	BACC63BP14H7SN	Boeing
BACC63BP14S7P6L	Boeing	BACC63BP14B7P6	Boeing
BACC63BP14S7PNL	Boeing	BACC63BP14B7PN	Boeing
BACC63BP14S7S6L	Boeing	BACC63BP14B7S6	Boeing
BACC63BP14S7S7L	Boeing	BACC63BP14B7S7	Boeing
BACC63BP14S7SNL	Boeing	BACC63BP14B7SN	Boeing
BACC63BP16A10S6	Boeing	BACC63BP16H10S6	Boeing
BACC63BP16A10S6L	Boeing	BACC63BP16H10S6	Boeing
BACC63BP16A10S7L	Boeing	BACC63BP16H10S7	Boeing
BACC63BP16A10SN	Boeing	BACC63BP16H10SN	Boeing
BACC63BP16A10SNL	Boeing	BACC63BP16H10SN	Boeing
BACC63BP16A24S6L	Boeing	BACC63BP16H24S6	Boeing
BACC63BP16A24S7L	Boeing	BACC63BP16H24S7	Boeing
BACC63BP16A24S8L	Boeing	BACC63BP16H24S8	Boeing
BACC63BP16A24SN	Boeing	BACC63BP16H24SN	Boeing
BACC63BP16A24SNL	Boeing	BACC63BP16H24SN	Boeing
BACC63BP16H10S6	Boeing	BACC63BP16A10S6	Boeing
BACC63BP16H10S6L	Boeing	BACC63BP16A10S6	Boeing
BACC63BP16H10S7L	Boeing	BACC63BP16A10S7	Boeing
BACC63BP16H10SN	Boeing	BACC63BP16A10SN	Boeing
BACC63BP16H10SNL	Boeing	BACC63BP16A10SN	Boeing
BACC63BP16H24S6L	Boeing	BACC63BP16A24S6	Boeing
BACC63BP16H24S7L	Boeing	BACC63BP16A24S7	Boeing
BACC63BP16H24S8L	Boeing	BACC63BP16A24S8	Boeing
BACC63BP16H24SN	Boeing	BACC63BP16A24SN	Boeing
BACC63BP16H24SNL	Boeing	BACC63BP16A24SN	Boeing
BACC63BP16B10S6L	Boeing	BACC63BP16D10S6	Boeing

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP16B10S7L	Boeing	BACC63BP16D10S7	Boeing
BACC63BP16B10SN	Boeing	BACC63BP16D10SN	Boeing
BACC63BP16B10SNL	Boeing	BACC63BP16D10SN	Boeing
BACC63BP16B24S6L	Boeing	BACC63BP16D24S6	Boeing
BACC63BP16R10S6L	Boeing	BACC63BP16A10S6	Boeing
	Boeing	BACC63BP16H10S6	Boeing
BACC63BP16R10S7L	Boeing	BACC63BP16A10S7	Boeing
	Boeing	BACC63BP16H10S7	Boeing
BACC63BP16R10SNL	Boeing	BACC63BP16A10SN	Boeing
	Boeing	BACC63BP16H10SN	Boeing
BACC63BP16R24SNL	Boeing	BACC63BP16A24SN	Boeing
	Boeing	BACC63BP16H24SN	Boeing
BACC63BP16S10PNL	Boeing	BACC63BP16B10PN	Boeing
BACC63BP16S10S6L	Boeing	BACC63BP16B10S6	Boeing
BACC63BP16S10SNL	Boeing	BACC63BP16B10SN	Boeing
BACC63BP18A11S9L	Boeing	BACC63BP18H11S9	Boeing
BACC63BP18A14S6L	Boeing	BACC63BP18H14S6	Boeing
BACC63BP18A14S9	Boeing	BACC63BP18H14S9	Boeing
BACC63BP18A14S9L	Boeing	BACC63BP18H14S9	Boeing
BACC63BP18A14SN	Boeing	BACC63BP18H14SN	Boeing
BACC63BP18A14SNL	Boeing	BACC63BP18H14SN	Boeing
BACC63BP18A31S6	Boeing	BACC63BP18H31S6	Boeing
BACC63BP18A31S6L	Boeing	BACC63BP18H31S6	Boeing
BACC63BP18A31S7L	Boeing	BACC63BP18H31S7	Boeing
BACC63BP18A31S8L	Boeing	BACC63BP18H31S8	Boeing
BACC63BP18A31SN	Boeing	BACC63BP18H31SN	Boeing
BACC63BP18A31SNL	Boeing	BACC63BP18H31SN	Boeing
BACC63BP18A8S8	Boeing	BACC63BP18H8S8	Boeing
BACC63BP18A8S8L	Boeing	BACC63BP18H8S8	Boeing
BACC63BP18A8SN	Boeing	BACC63BP18H8SN	Boeing
BACC63BP18A8SNL	Boeing	BACC63BP18H8SN	Boeing
BACC63BP18H11S9L	Boeing	BACC63BP18A11S9	Boeing

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP18H14S6L	Boeing	BACC63BP18A14S6	Boeing
BACC63BP18H14S9	Boeing	BACC63BP18A14S9	Boeing
BACC63BP18H14S9L	Boeing	BACC63BP18A14S9	Boeing
BACC63BP18H14SN	Boeing	BACC63BP18A14SN	Boeing
BACC63BP18H14SNL	Boeing	BACC63BP18A14SN	Boeing
BACC63BP18H31S6	Boeing	BACC63BP18A31S6	Boeing
BACC63BP18H31S6L	Boeing	BACC63BP18A31S6	Boeing
BACC63BP18H31S7L	Boeing	BACC63BP18A31S7	Boeing
BACC63BP18H31S8L	Boeing	BACC63BP18A31S8	Boeing
BACC63BP18H31SN	Boeing	BACC63BP18A31SN	Boeing
BACC63BP18H31SNL	Boeing	BACC63BP18A31SN	Boeing
BACC63BP18H8S8	Boeing	BACC63BP18A8S8	Boeing
BACC63BP18H8S8L	Boeing	BACC63BP18A8S8	Boeing
BACC63BP18H8SN	Boeing	BACC63BP18A8SN	Boeing
BACC63BP18H8SNL	Boeing	BACC63BP18A8SN	Boeing
BACC63BP18B14S6	Boeing	BACC63BP18D14S6	Boeing
BACC63BP18B14S6L	Boeing	BACC63BP18D14S6	Boeing
BACC63BP18B14SN	Boeing	BACC63BP18D14SN	Boeing
BACC63BP18B14SNL	Boeing	BACC63BP18D14SN	Boeing
BACC63BP18R11S9L	Boeing	BACC63BP18A11S9	Boeing
	Boeing	BACC63BP18H11S9	Boeing
BACC63BP18R14S6L	Boeing	BACC63BP18A14S6	Boeing
	Boeing	BACC63BP18H14S6	Boeing
BACC63BP18R14SNL	Boeing	BACC63BP18A14SN	Boeing
	Boeing	BACC63BP18H14SN	Boeing
BACC63BP18R31S6L	Boeing	BACC63BP18A31S6	Boeing
	Boeing	BACC63BP18H31S6	Boeing
BACC63BP18R31S7L	Boeing	BACC63BP18A31S7	Boeing
	Boeing	BACC63BP18H31S7	Boeing
BACC63BP18R31S8	Boeing	BACC63BP18A31S8	Boeing
	Boeing	BACC63BP18H31S8	Boeing

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP18R31S8L	Boeing	BACC63BP18A31S8	Boeing
	Boeing	BACC63BP18H31S8	Boeing
BACC63BP18R31SNL	Boeing	BACC63BP18A31SN	Boeing
	Boeing	BACC63BP18H31SN	Boeing
BACC63BP18R8S8L	Boeing	BACC63BP18A8S8	Boeing
	Boeing	BACC63BP18H8S8	Boeing
BACC63BP18R8SN	Boeing	BACC63BP18A8SN	Boeing
	Boeing	BACC63BP18H8SN	Boeing
BACC63BP18R8SNL	Boeing	BACC63BP18A8SN	Boeing
	Boeing	BACC63BP18H8SN	Boeing
BACC63BP18S14P6L	Boeing	BACC63BP18B14P6	Boeing
BACC63BP18S14PN	Boeing	BACC63BP18B14PN	Boeing
BACC63BP18S14PNL	Boeing	BACC63BP18B14PN	Boeing
BACC63BP18S14S6L	Boeing	BACC63BP18B14S6	Boeing
BACC63BP18S14SNL	Boeing	BACC63BP18B14SN	Boeing
BACC63BP20A16S6L	Boeing	BACC63BP20H16S6	Boeing
BACC63BP20A16SN	Boeing	BACC63BP20H16SN	Boeing
BACC63BP20A16SNL	Boeing	BACC63BP20H16SN	Boeing
BACC63BP20A39SNL	Boeing	BACC63BP20H39SN	Boeing
BACC63BP20A41S7L	Boeing	BACC63BP20H41S7	Boeing
BACC63BP20A41SNL	Boeing	BACC63BP20H41SN	Boeing
BACC63BP20R16SNL	Boeing	BACC63BP20H16SN	Boeing
BACC63BP22A19S6L	Boeing	BACC63BP22H19S6	Boeing
BACC63BP22A19SNL	Boeing	BACC63BP22H19SN	Boeing
BACC63BP22A55S8L	Boeing	BACC63BP22H55S8	Boeing
BACC63BP22A55SNL	Boeing	BACC63BP22H55SN	Boeing
BACC63BP20H16S6L	Boeing	BACC63BP20A16S6	Boeing
BACC63BP20H16SN	Boeing	BACC63BP20A16SN	Boeing
BACC63BP20H16SNL	Boeing	BACC63BP20A16SN	Boeing
BACC63BP20H39SNL	Boeing	BACC63BP20A39SN	Boeing
BACC63BP20H41S7L	Boeing	BACC63BP20A41S7	Boeing
BACC63BP20H41SNL	Boeing	BACC63BP20A41SN	Boeing

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP22H19S6L	Boeing	BACC63BP22A19S6	Boeing
BACC63BP22H19SNL	Boeing	BACC63BP22A19SN	Boeing
BACC63BP22H55S8L	Boeing	BACC63BP22A55S8	Boeing
BACC63BP22H55SNL	Boeing	BACC63BP22A55SN	Boeing
BACC63BP22B19S6L	Boeing	BACC63BP22D19S6	Boeing
BACC63BP22B19SNL	Boeing	BACC63BP22D19SN	Boeing
BACC63BP22R19S6L	Boeing	BACC63BP22A19S6	Boeing
	Boeing	BACC63BP22H19S6	Boeing
BACC63BP22R19SNL	Boeing	BACC63BP22A19SN	Boeing
	Boeing	BACC63BP22H19SN	Boeing
BACC63BP22R55S8L	Boeing	BACC63BP22A55S8	Boeing
	Boeing	BACC63BP22H55S8	Boeing
BACC63BP22S19P6L	Boeing	BACC63BP22B19P6	Boeing
BACC63BP22S19PNL	Boeing	BACC63BP22B19PN	Boeing
BACC63BP22S19SNL	Boeing	BACC63BP22B19SN	Boeing
BACC63BP24A30S6	Boeing	BACC63BP24H30S6	Boeing
BACC63BP24A30S6L	Boeing	BACC63BP24H30S6	Boeing
BACC63BP24A30S7	Boeing	BACC63BP24H30S7	Boeing
BACC63BP24A30S7L	Boeing	BACC63BP24H30S7	Boeing
BACC63BP24A30S8L	Boeing	BACC63BP24H30S8	Boeing
BACC63BP24A30SN	Boeing	BACC63BP24H30SN	Boeing
BACC63BP24A30SNL	Boeing	BACC63BP24H30SN	Boeing
BACC63BP24H30S6	Boeing	BACC63BP24A30S6	Boeing
BACC63BP24H30S6L	Boeing	BACC63BP24A30S6	Boeing
BACC63BP24H30S7	Boeing	BACC63BP24A30S7	Boeing
BACC63BP24H30S7L	Boeing	BACC63BP24A30S7	Boeing
BACC63BP24H30S8L	Boeing	BACC63BP24A30S8	Boeing
BACC63BP24H30SN	Boeing	BACC63BP24A30SN	Boeing
BACC63BP24H30SNL	Boeing	BACC63BP24A30SN	Boeing
BACC63BP24R30S6L	Boeing	BACC63BP24A30S6	Boeing
	Boeing	BACC63BP24H30S6	Boeing

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 8 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BP24R30SNL	Boeing	BACC63BP24A30SN	Boeing
	Boeing	BACC63BP24H30SN	Boeing
BACC63BP24S30P6L	Boeing	BACC63BP24B30P6	Boeing
BACC63BP24S30PNL	Boeing	BACC63BP24B30PN	Boeing
BACC63BP28A42S6L	Boeing	BACC63BP28H42S6	Boeing
BACC63BP28A42SNL	Boeing	BACC63BP28H42SN	Boeing
BACC63BP28H42S6L	Boeing	BACC63BP28A42S6	Boeing
BACC63BP28H42SNL	Boeing	BACC63BP28A42SN	Boeing

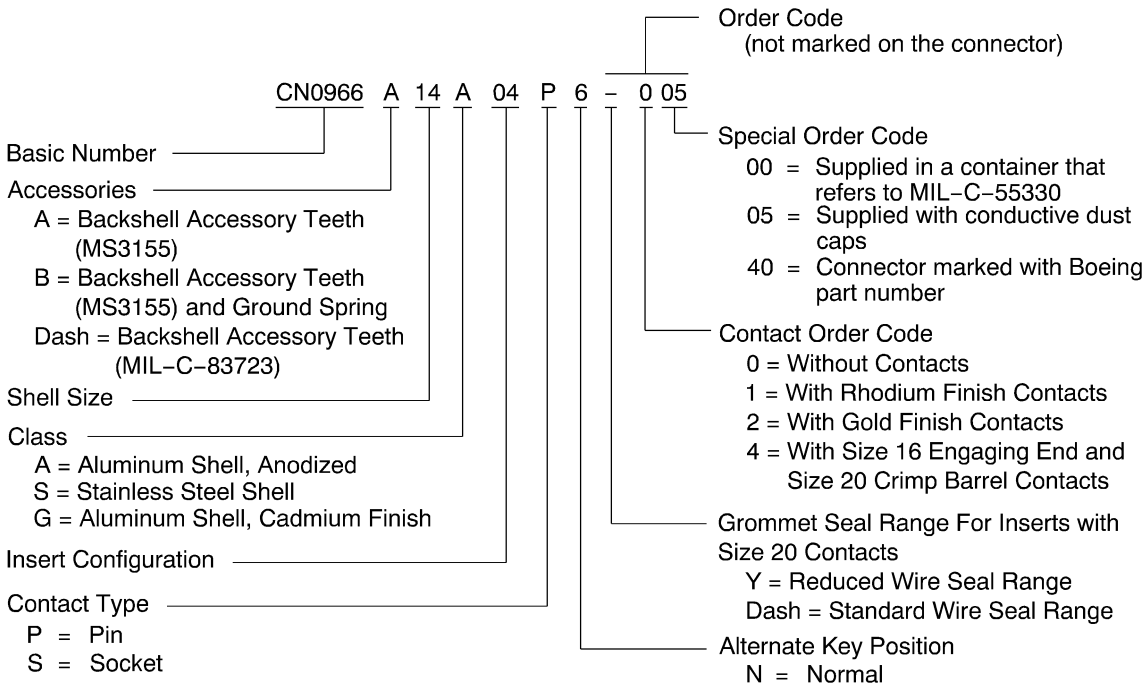


AMPHENOL BACC63BP CONNECTOR PART NUMBER STRUCTURE

Figure 27

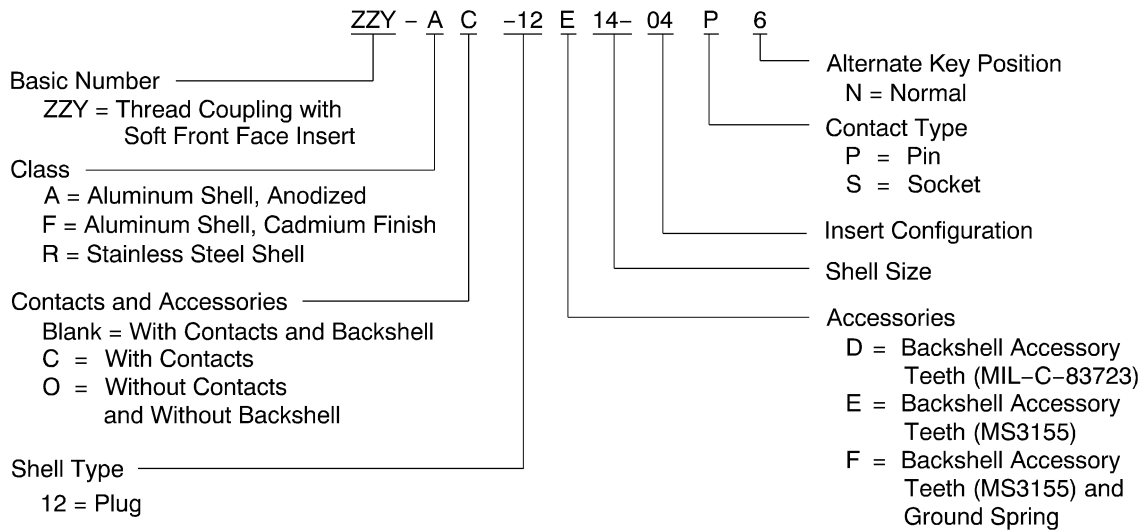
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MIL-C-26500 FRONT RELEASE CONNECTORS



CINCH BACC63BP CONNECTOR PART NUMBER STRUCTURE

Figure 28

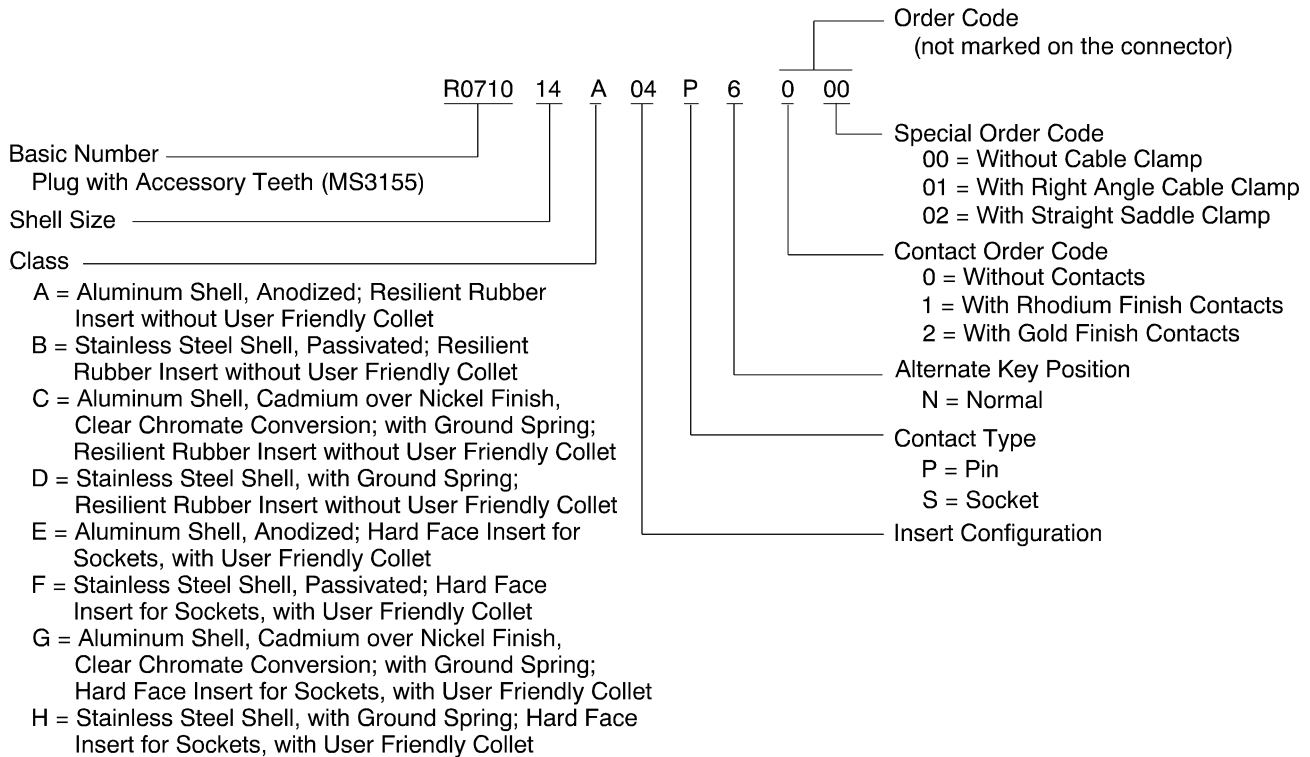


PYLE-NATIONAL BACC63BP CONNECTOR PART NUMBER STRUCTURE

Figure 29

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MIL-C-26500 FRONT RELEASE CONNECTORS



RMS BACC63BP CONNECTOR PART NUMBER STRUCTURE

Figure 30

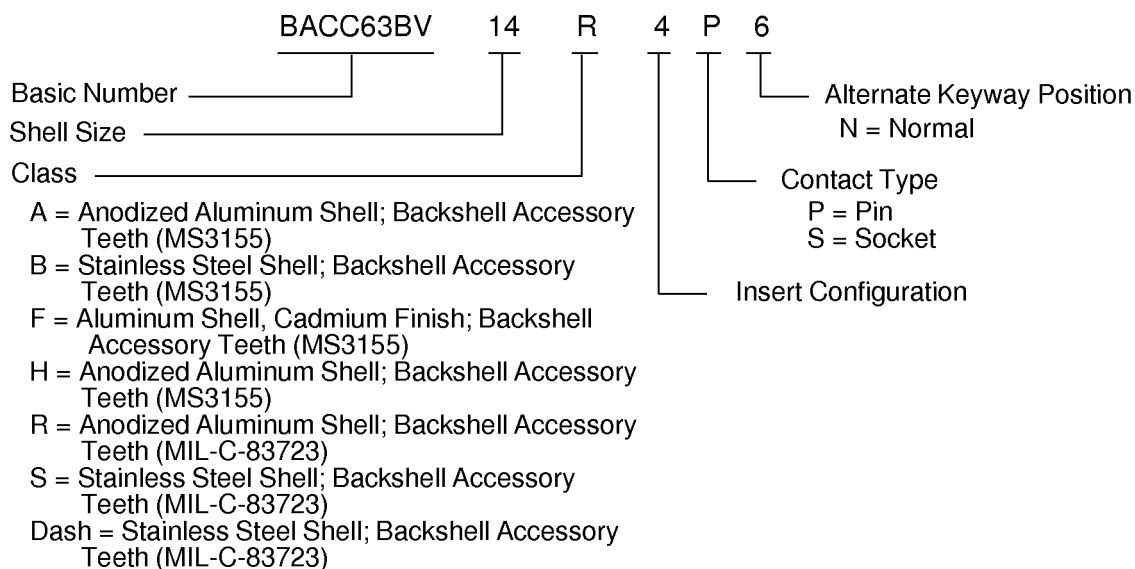
H. BACC63BV Thread Coupled, Vibration Resistant Receptacle

The BACC63BV receptacle:

- Is similar to the BACC45FM receptacle
- Engages with BACC63BP and other MIL-C-26500 type thread coupled plugs.

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MIL-C-26500 FRONT RELEASE CONNECTORS



BOEING BACC63BV CONNECTOR PART NUMBER STRUCTURE

Figure 31

Table 9

ALTERNATIVE BACC63BV CONNECTOR PART NUMBERS

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV12A12P8	Boeing	BACC63BV12H12P8	Boeing
BACC63BV12A12PN	Boeing	BACC63BV12H12PN	Boeing
BACC63BV12A12S6	Boeing	BACC63BV12H12S6	Boeing
BACC63BV12A12S7	Boeing	BACC63BV12H12S7	Boeing
BACC63BV12A12S8	Boeing	BACC63BV12H12S8	Boeing
BACC63BV12A12S9	Boeing	BACC63BV12H12S9	Boeing
BACC63BV12A12SN	Boeing	BACC63BV12H12SN	Boeing
BACC63BV12A3S6	Boeing	BACC63BV12H3S6	Boeing
BACC63BV12A3S7	Boeing	BACC63BV12H3S7	Boeing
BACC63BV12A3S9	Boeing	BACC63BV12H3S9	Boeing
BACC63BV12A3SN	Boeing	BACC63BV12H3SN	Boeing
BACC63BV12H12P8	Boeing	BACC63BV12A12P8	Boeing
BACC63BV12H12PN	Boeing	BACC63BV12A12PN	Boeing
BACC63BV12H12S6	Boeing	BACC63BV12A12S6	Boeing
BACC63BV12H12S7	Boeing	BACC63BV12A12S7	Boeing
BACC63BV12H12S8	Boeing	BACC63BV12A12S8	Boeing



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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV12H12S9	Boeing	BACC63BV12A12S9	Boeing
BACC63BV12H12SN	Boeing	BACC63BV12A12SN	Boeing
BACC63BV12H3S6	Boeing	BACC63BV12A3S6	Boeing
BACC63BV12H3S7	Boeing	BACC63BV12A3S7	Boeing
BACC63BV12H3S9	Boeing	BACC63BV12A3S9	Boeing
BACC63BV12H3SN	Boeing	BACC63BV12A3SN	Boeing
BACC63BV12R12S8	Boeing	BACC63BV12A12S8	Boeing
	Boeing	BACC63BV12H12S8	Boeing
BACC63BV12R12S9	Boeing	BACC63BV12A12S9	Boeing
	Boeing	BACC63BV12H12S9	Boeing
BACC63BV12R3S7	Boeing	BACC63BV12A3S7	Boeing
	Boeing	BACC63BV12H3S7	Boeing
BACC63BV12R3S9	Boeing	BACC63BV12A3S9	Boeing
	Boeing	BACC63BV12H3S9	Boeing
BACC63BV12R3SN	Boeing	BACC63BV12A3SN	Boeing
	Boeing	BACC63BV12H3SN	Boeing
BACC63BV12S3S6	Boeing	BACC63BV12B3S6	Boeing
BACC63BV12S3S7	Boeing	BACC63BV12B3S7	Boeing
BACC63BV12S3SN	Boeing	BACC63BV12B3SN	Boeing
BACC63BV14A15P7	Boeing	BACC63BV14H15P7	Boeing
BACC63BV14A15S6	Boeing	BACC63BV14H15S6	Boeing
BACC63BV14A3S6	Boeing	BACC63BV14H3S6	Boeing
BACC63BV14A3SN	Boeing	BACC63BV14H3SN	Boeing
BACC63BV14A4P	Boeing	BACC63BV14H4P	Boeing
BACC63BV14A4PN	Boeing	BACC63BV14H4PN	Boeing
BACC63BV14A4S6	Boeing	BACC63BV14H4S6	Boeing
BACC63BV14A7P6	Boeing	BACC63BV14H7P6	Boeing
BACC63BV14A7PN	Boeing	BACC63BV14H7PN	Boeing
BACC63BV14A7S6	Boeing	BACC63BV14H7S6	Boeing
BACC63BV14A7S7	Boeing	BACC63BV14H7S7	Boeing
BACC63BV14A7S8	Boeing	BACC63BV14H7S8	Boeing
BACC63BV14A7S9	Boeing	BACC63BV14H7S9	Boeing

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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV14A7SN	Boeing	BACC63BV14H7SN	Boeing
BACC63BV14H15P7	Boeing	BACC63BV14A15P7	Boeing
BACC63BV14H15S6	Boeing	BACC63BV14A15S6	Boeing
BACC63BV14H3S6	Boeing	BACC63BV14A3S6	Boeing
BACC63BV14H3SN	Boeing	BACC63BV14A3SN	Boeing
BACC63BV14H4P	Boeing	BACC63BV14A4P	Boeing
BACC63BV14H4PN	Boeing	BACC63BV14A4PN	Boeing
BACC63BV14H4S6	Boeing	BACC63BV14A4S6	Boeing
BACC63BV14H7P6	Boeing	BACC63BV14A7P6	Boeing
BACC63BV14H7PN	Boeing	BACC63BV14A7PN	Boeing
BACC63BV14H7S6	Boeing	BACC63BV14A7S6	Boeing
BACC63BV14H7S7	Boeing	BACC63BV14A7S7	Boeing
BACC63BV14H7S8	Boeing	BACC63BV14A7S8	Boeing
BACC63BV14H7S9	Boeing	BACC63BV14A7S9	Boeing
BACC63BV14H7SN	Boeing	BACC63BV14A7SN	Boeing
BACC63BV14R3S6	Boeing	BACC63BV14A3S6	Boeing
	Boeing	BACC63BV14H3S6	Boeing
BACC63BV14R4P	Boeing	BACC63BV14A4P	Boeing
	Boeing	BACC63BV14H4P	Boeing
BACC63BV14R7S	Boeing	BACC63BV14A7S	Boeing
	Boeing	BACC63BV14H7S	Boeing
BACC63BV14R7S6	Boeing	BACC63BV14A7S6	Boeing
	Boeing	BACC63BV14H7S6	Boeing
BACC63BV14R7S7	Boeing	BACC63BV14A7S7	Boeing
	Boeing	BACC63BV14H7S7	Boeing
BACC63BV14R7S8	Boeing	BACC63BV14A7S8	Boeing
	Boeing	BACC63BV14H7S8	Boeing
BACC63BV14R7S9	Boeing	BACC63BV14A7S9	Boeing
	Boeing	BACC63BV14H7S9	Boeing
BACC63BV14R7SN	Boeing	BACC63BV14A7SN	Boeing
	Boeing	BACC63BV14H7SN	Boeing
BACC63BV14S7P7	Boeing	BACC63BV14B7P7	Boeing

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV14S7PN	Boeing	BACC63BV14B7PN	Boeing
BACC63BV14S7S6	Boeing	BACC63BV14B7S6	Boeing
BACC63BV14S7SN	Boeing	BACC63BV14B7SN	Boeing
BACC63BV16A10P6	Boeing	BACC63BV16H10P6	Boeing
BACC63BV16A10P7	Boeing	BACC63BV16H10P7	Boeing
BACC63BV16A10PN	Boeing	BACC63BV16H10PN	Boeing
BACC63BV16A10S6	Boeing	BACC63BV16H10S6	Boeing
BACC63BV16A10S7	Boeing	BACC63BV16H10S7	Boeing
BACC63BV16A10S8	Boeing	BACC63BV16H10S8	Boeing
BACC63BV16A10S9	Boeing	BACC63BV16H10S9	Boeing
BACC63BV16A10SN	Boeing	BACC63BV16H10SN	Boeing
BACC63BV16A24P7	Boeing	BACC63BV16H24P7	Boeing
BACC63BV16A24P8	Boeing	BACC63BV16H24P8	Boeing
BACC63BV16A24PN	Boeing	BACC63BV16H24PN	Boeing
BACC63BV16A24S6	Boeing	BACC63BV16H24S6	Boeing
BACC63BV16A24S7	Boeing	BACC63BV16H24S7	Boeing
BACC63BV16A24S8	Boeing	BACC63BV16H24S8	Boeing
BACC63BV16A24SN	Boeing	BACC63BV16H24SN	Boeing
BACC63BV16H10P6	Boeing	BACC63BV16A10P6	Boeing
BACC63BV16H10P7	Boeing	BACC63BV16A10P7	Boeing
BACC63BV16H10PN	Boeing	BACC63BV16A10PN	Boeing
BACC63BV16H10S6	Boeing	BACC63BV16A10S6	Boeing
BACC63BV16H10S7	Boeing	BACC63BV16A10S7	Boeing
BACC63BV16H10S8	Boeing	BACC63BV16A10S8	Boeing
BACC63BV16H10S9	Boeing	BACC63BV16A10S9	Boeing
BACC63BV16H10SN	Boeing	BACC63BV16A10SN	Boeing
BACC63BV16H24P7	Boeing	BACC63BV16A24P7	Boeing
BACC63BV16H24P8	Boeing	BACC63BV16A24P8	Boeing
BACC63BV16H24PN	Boeing	BACC63BV16A24PN	Boeing
BACC63BV16H24S6	Boeing	BACC63BV16A24S6	Boeing
BACC63BV16H24S7	Boeing	BACC63BV16A24S7	Boeing
BACC63BV16H24S8	Boeing	BACC63BV16A24S8	Boeing

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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV16H24SN	Boeing	BACC63BV16A24SN	Boeing
BACC63BV16R10P6	Boeing	BACC63BV16A10P6	Boeing
BACC63BV16R10P7	Boeing	BACC63BV16A10P7	Boeing
	Boeing	BACC63BV16H10P7	Boeing
BACC63BV16R10PN	Boeing	BACC63BV16A10PN	Boeing
	Boeing	BACC63BV16H10PN	Boeing
BACC63BV16R10SN	Boeing	BACC63BV16A10SN	Boeing
	Boeing	BACC63BV16H10SN	Boeing
BACC63BV16R24S6	Boeing	BACC63BV16A24S6	Boeing
	Boeing	BACC63BV16H24S6	Boeing
BACC63BV16R24SN	Boeing	BACC63BV16A24SN	Boeing
	Boeing	BACC63BV16H24SN	Boeing
BACC63BV16S10P6	Boeing	BACC63BV16B10P6	Boeing
BACC63BV16S10SN	Boeing	BACC63BV16B10SN	Boeing
BACC63BV18A11P9	Boeing	BACC63BV18H11P9	Boeing
BACC63BV18A11S7	Boeing	BACC63BV18H11S7	Boeing
BACC63BV18A11S9	Boeing	BACC63BV18H11S9	Boeing
BACC63BV18A11SN	Boeing	BACC63BV18H11SN	Boeing
BACC63BV18A14PN	Boeing	BACC63BV18H14PN	Boeing
BACC63BV18A14S6	Boeing	BACC63BV18H14S6	Boeing
BACC63BV18A14S7	Boeing	BACC63BV18H14S7	Boeing
BACC63BV18A14S8	Boeing	BACC63BV18H14S8	Boeing
BACC63BV18A14S9	Boeing	BACC63BV18H14S9	Boeing
BACC63BV18A14SN	Boeing	BACC63BV18H14SN	Boeing
BACC63BV18A31P7	Boeing	BACC63BV18H31P7	Boeing
BACC63BV18A31P8	Boeing	BACC63BV18H31P8	Boeing
BACC63BV18A31S6	Boeing	BACC63BV18H31S6	Boeing
BACC63BV18A31S7	Boeing	BACC63BV18H31S7	Boeing
BACC63BV18A31S8	Boeing	BACC63BV18H31S8	Boeing
BACC63BV18A31S9	Boeing	BACC63BV18H31S9	Boeing
BACC63BV18A31SN	Boeing	BACC63BV18H31SN	Boeing
BACC63BV18A8PN	Boeing	BACC63BV18H8PN	Boeing

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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV18A8SN	Boeing	BACC63BV18H8SN	Boeing
BACC63BV18H11P9	Boeing	BACC63BV18A11P9	Boeing
BACC63BV18H11S7	Boeing	BACC63BV18A11S7	Boeing
BACC63BV18H11S9	Boeing	BACC63BV18A11S9	Boeing
BACC63BV18H11SN	Boeing	BACC63BV18A11SN	Boeing
BACC63BV18H14PN	Boeing	BACC63BV18A14PN	Boeing
BACC63BV18H14S6	Boeing	BACC63BV18A14S6	Boeing
BACC63BV18H14S7	Boeing	BACC63BV18A14S7	Boeing
BACC63BV18H14S8	Boeing	BACC63BV18A14S8	Boeing
BACC63BV18H14S9	Boeing	BACC63BV18A14S9	Boeing
BACC63BV18H14SN	Boeing	BACC63BV18A14SN	Boeing
BACC63BV18H31P7	Boeing	BACC63BV18A31P7	Boeing
BACC63BV18H31P8	Boeing	BACC63BV18A31P8	Boeing
BACC63BV18H31S6	Boeing	BACC63BV18A31S6	Boeing
BACC63BV18H31S7	Boeing	BACC63BV18A31S7	Boeing
BACC63BV18H31S8	Boeing	BACC63BV18A31S8	Boeing
BACC63BV18H31S9	Boeing	BACC63BV18A31S9	Boeing
BACC63BV18H31SN	Boeing	BACC63BV18A31SN	Boeing
BACC63BV18H8PN	Boeing	BACC63BV18A8PN	Boeing
BACC63BV18H8SN	Boeing	BACC63BV18A8SN	Boeing
BACC63BV18R11P9	Boeing	BACC63BV18A11P9	Boeing
	Boeing	BACC63BV18H11P9	Boeing
BACC63BV18R14S6	Boeing	BACC63BV18A14S6	Boeing
	Boeing	BACC63BV18H14S6	Boeing
BACC63BV18R14S7	Boeing	BACC63BV18A14S7	Boeing
	Boeing	BACC63BV18H14S7	Boeing
BACC63BV18R14S8	Boeing	BACC63BV18A14S8	Boeing
	Boeing	BACC63BV18H14S8	Boeing
BACC63BV18R14S9	Boeing	BACC63BV18A14S9	Boeing
	Boeing	BACC63BV18H14S9	Boeing
BACC63BV18R14SN	Boeing	BACC63BV18A14SN	Boeing
	Boeing	BACC63BV18H14SN	Boeing

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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV18R31P7	Boeing	BACC63BV18A31P7	Boeing
	Boeing	BACC63BV18H31P7	Boeing
BACC63BV18R31S8	Boeing	BACC63BV18A31S8	Boeing
	Boeing	BACC63BV18H31S8	Boeing
BACC63BV18R31S9	Boeing	BACC63BV18A31S9	Boeing
	Boeing	BACC63BV18H31S9	Boeing
BACC63BV18R31SN	Boeing	BACC63BV18A31SN	Boeing
	Boeing	BACC63BV18H31SN	Boeing
BACC63BV18R8SN	Boeing	BACC63BV18A8SN	Boeing
	Boeing	BACC63BV18H8SN	Boeing
BACC63BV18S14PN	Boeing	BACC63BV18B14PN	Boeing
BACC63BV18S14S6	Boeing	BACC63BV18B14S6	Boeing
BACC63BV18S14SN	Boeing	BACC63BV18B14SN	Boeing
BACC63BV20A25PN	Boeing	BACC63BV20H25PN	Boeing
BACC63BV20A28S6	Boeing	BACC63BV20H28S6	Boeing
BACC63BV20A28S8	Boeing	BACC63BV20H28S8	Boeing
BACC63BV20A28SN	Boeing	BACC63BV20H28SN	Boeing
BACC63BV20A39PN	Boeing	BACC63BV20H39PN	Boeing
BACC63BV20A39S6	Boeing	BACC63BV20H39S6	Boeing
BACC63BV20A39S7	Boeing	BACC63BV20H39S7	Boeing
BACC63BV20A39S9	Boeing	BACC63BV20H39S9	Boeing
BACC63BV20A39SN	Boeing	BACC63BV20H39SN	Boeing
BACC63BV20A41P7	Boeing	BACC63BV20H41P7	Boeing
BACC63BV20A41PN	Boeing	BACC63BV20H41PN	Boeing
BACC63BV20A41S6	Boeing	BACC63BV20H41S6	Boeing
BACC63BV20A41SN	Boeing	BACC63BV20H41SN	Boeing
BACC63BV20H25PN	Boeing	BACC63BV20A25PN	Boeing
BACC63BV20H28S6	Boeing	BACC63BV20A28S6	Boeing
BACC63BV20H28S8	Boeing	BACC63BV20A28S8	Boeing
BACC63BV20H28SN	Boeing	BACC63BV20A28SN	Boeing
BACC63BV20H39PN	Boeing	BACC63BV20A39PN	Boeing
BACC63BV20H39S6	Boeing	BACC63BV20A39S6	Boeing

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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV20H39S7	Boeing	BACC63BV20A39S7	Boeing
BACC63BV20H39S9	Boeing	BACC63BV20A39S9	Boeing
BACC63BV20H39SN	Boeing	BACC63BV20A39SN	Boeing
BACC63BV20H41P7	Boeing	BACC63BV20A41P7	Boeing
BACC63BV20H41PN	Boeing	BACC63BV20A41PN	Boeing
BACC63BV20H41S6	Boeing	BACC63BV20A41S6	Boeing
BACC63BV20H41SN	Boeing	BACC63BV20A41SN	Boeing
BACC63BV20R25PN	Boeing	BACC63BV20A25PN	Boeing
	Boeing	BACC63BV20H25PN	Boeing
BACC63BV20R28S6	Boeing	BACC63BV20A28S6	Boeing
	Boeing	BACC63BV20H28S6	Boeing
BACC63BV20R28S8	Boeing	BACC63BV20A28S8	Boeing
	Boeing	BACC63BV20H28S8	Boeing
BACC63BV20R28SN	Boeing	BACC63BV20A28SN	Boeing
	Boeing	BACC63BV20H28SN	Boeing
BACC63BV20R39S6	Boeing	BACC63BV20A39S6	Boeing
	Boeing	BACC63BV20H39S6	Boeing
BACC63BV20R39S7	Boeing	BACC63BV20A39S7	Boeing
	Boeing	BACC63BV20H39S7	Boeing
BACC63BV20R39S8	Boeing	BACC63BV20A39S8	Boeing
	Boeing	BACC63BV20H39S8	Boeing
BACC63BV20R39S9	Boeing	BACC63BV20A39S9	Boeing
	Boeing	BACC63BV20H39S9	Boeing
BACC63BV20R39SN	Boeing	BACC63BV20A39SN	Boeing
	Boeing	BACC63BV20H39SN	Boeing
BACC63BV20R41S7	Boeing	BACC63BV20A41S7	Boeing
	Boeing	BACC63BV20H41S7	Boeing
BACC63BV20R41S8	Boeing	BACC63BV20A41S8	Boeing
	Boeing	BACC63BV20H41S8	Boeing
BACC63BV22A12S6	Boeing	BACC63BV22H12S6	Boeing
BACC63BV22A19P6	Boeing	BACC63BV22H19P6	Boeing
BACC63BV22A19PN	Boeing	BACC63BV22H19PN	Boeing

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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV22A19S6	Boeing	BACC63BV22H19S6	Boeing
BACC63BV22A19S7	Boeing	BACC63BV22H19S7	Boeing
BACC63BV22A19S8	Boeing	BACC63BV22H19S8	Boeing
BACC63BV22A19S9	Boeing	BACC63BV22H19S9	Boeing
BACC63BV22A19SN	Boeing	BACC63BV22H19SN	Boeing
BACC63BV22A55P8	Boeing	BACC63BV22H55P8	Boeing
BACC63BV22A55P9	Boeing	BACC63BV22H55P9	Boeing
BACC63BV22A55PN	Boeing	BACC63BV22H55PN	Boeing
BACC63BV22A55S6	Boeing	BACC63BV22H55S6	Boeing
BACC63BV22A55S7	Boeing	BACC63BV22H55S7	Boeing
BACC63BV22A55S8	Boeing	BACC63BV22H55S8	Boeing
BACC63BV22A55S9	Boeing	BACC63BV22H55S9	Boeing
BACC63BV22A55SN	Boeing	BACC63BV22H55SN	Boeing
BACC63BV22H12S6	Boeing	BACC63BV22A12S6	Boeing
BACC63BV22H19P6	Boeing	BACC63BV22A19P6	Boeing
BACC63BV22H19PN	Boeing	BACC63BV22A19PN	Boeing
BACC63BV22H19S6	Boeing	BACC63BV22A19S6	Boeing
BACC63BV22H19S7	Boeing	BACC63BV22A19S7	Boeing
BACC63BV22H19S8	Boeing	BACC63BV22A19S8	Boeing
BACC63BV22H19S9	Boeing	BACC63BV22A19S9	Boeing
BACC63BV22H19SN	Boeing	BACC63BV22A19SN	Boeing
BACC63BV22H55P8	Boeing	BACC63BV22A55P8	Boeing
BACC63BV22H55P9	Boeing	BACC63BV22A55P9	Boeing
BACC63BV22H55PN	Boeing	BACC63BV22A55PN	Boeing
BACC63BV22H55S6	Boeing	BACC63BV22A55S6	Boeing
BACC63BV22H55S7	Boeing	BACC63BV22A55S7	Boeing
BACC63BV22H55S8	Boeing	BACC63BV22A55S8	Boeing
BACC63BV22H55S9	Boeing	BACC63BV22A55S9	Boeing
BACC63BV22H55SN	Boeing	BACC63BV22A55SN	Boeing
BACC63BV22R19P6	Boeing	BACC63BV22A19P6	Boeing
	Boeing	BACC63BV22H19P6	Boeing

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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV22R19PN	Boeing	BACC63BV22A19PN	Boeing
	Boeing	BACC63BV22H19PN	Boeing
BACC63BV22R19S7	Boeing	BACC63BV22A19S7	Boeing
	Boeing	BACC63BV22H19S7	Boeing
BACC63BV22R55P8	Boeing	BACC63BV22A55P8	Boeing
	Boeing	BACC63BV22H55P8	Boeing
BACC63BV22R55S6	Boeing	BACC63BV22A55S6	Boeing
	Boeing	BACC63BV22H55S6	Boeing
BACC63BV22R55S7	Boeing	BACC63BV22A55S7	Boeing
	Boeing	BACC63BV22H55S7	Boeing
BACC63BV22R55S8	Boeing	BACC63BV22A55S8	Boeing
	Boeing	BACC63BV22H55S8	Boeing
BACC63BV22R55S9	Boeing	BACC63BV22A55S9	Boeing
	Boeing	BACC63BV22H55S9	Boeing
BACC63BV22R55SN	Boeing	BACC63BV22A55SN	Boeing
	Boeing	BACC63BV22H55SN	Boeing
BACC63BV22S19P6	Boeing	BACC63BV22B19P6	Boeing
BACC63BV22S19PN	Boeing	BACC63BV22B19PN	Boeing
BACC63BV22S19S6	Boeing	BACC63BV22B19S6	Boeing
BACC63BV22S19SN	Boeing	BACC63BV22B19SN	Boeing
BACC63BV24A30P6	Boeing	BACC63BV24H30P6	Boeing
BACC63BV24A30P7	Boeing	BACC63BV24H30P7	Boeing
BACC63BV24A30P8	Boeing	BACC63BV24H30P8	Boeing
BACC63BV24A30PN	Boeing	BACC63BV24H30PN	Boeing
BACC63BV24A30S6	Boeing	BACC63BV24H30S6	Boeing
BACC63BV24A30S7	Boeing	BACC63BV24H30S7	Boeing
BACC63BV24A30S8	Boeing	BACC63BV24H30S8	Boeing
BACC63BV24A30S9	Boeing	BACC63BV24H30S9	Boeing
BACC63BV24A30SN	Boeing	BACC63BV24H30SN	Boeing
BACC63BV24A43S6	Boeing	BACC63BV24H43S6	Boeing
BACC63BV24A43S7	Boeing	BACC63BV24H43S7	Boeing
BACC63BV24A43S8	Boeing	BACC63BV24H43S8	Boeing

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Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV24A43SN	Boeing	BACC63BV24H43SN	Boeing
BACC63BV24H30P6	Boeing	BACC63BV24A30P6	Boeing
BACC63BV24H30P7	Boeing	BACC63BV24A30P7	Boeing
BACC63BV24H30P8	Boeing	BACC63BV24A30P8	Boeing
BACC63BV24H30PN	Boeing	BACC63BV24A30PN	Boeing
BACC63BV24H30S6	Boeing	BACC63BV24A30S6	Boeing
BACC63BV24H30S7	Boeing	BACC63BV24A30S7	Boeing
BACC63BV24H30S8	Boeing	BACC63BV24A30S8	Boeing
BACC63BV24H30S9	Boeing	BACC63BV24A30S9	Boeing
BACC63BV24H30SN	Boeing	BACC63BV24A30SN	Boeing
BACC63BV24H43S6	Boeing	BACC63BV24A43S6	Boeing
BACC63BV24H43S7	Boeing	BACC63BV24A43S7	Boeing
BACC63BV24H43S8	Boeing	BACC63BV24A43S8	Boeing
BACC63BV24H43SN	Boeing	BACC63BV24A43SN	Boeing
BACC63BV24R30P6	Boeing	BACC63BV24A30P6	Boeing
	Boeing	BACC63BV24H30P6	Boeing
BACC63BV24R30PN	Boeing	BACC63BV24A30PN	Boeing
	Boeing	BACC63BV24H30PN	Boeing
BACC63BV24R30S6	Boeing	BACC63BV24A30S6	Boeing
	Boeing	BACC63BV24H30S6	Boeing
BACC63BV24R30S7	Boeing	BACC63BV24A30S7	Boeing
	Boeing	BACC63BV24H30S7	Boeing
BACC63BV24R30S8	Boeing	BACC63BV24A30S8	Boeing
	Boeing	BACC63BV24H30S8	Boeing
BACC63BV24S30P6	Boeing	BACC63BV24B30P6	Boeing
BACC63BV24S30PN	Boeing	BACC63BV24B30PN	Boeing
BACC63BV24S30S6	Boeing	BACC63BV24B30S6	Boeing
BACC63BV24S30SN	Boeing	BACC63BV24B30SN	Boeing
BACC63BV28A42S6	Boeing	BACC63BV28H42S6	Boeing
BACC63BV28A42SN	Boeing	BACC63BV28H42SN	Boeing
BACC63BV28H42S6	Boeing	BACC63BV28A42S6	Boeing
BACC63BV28H42SN	Boeing	BACC63BV28A42SN	Boeing

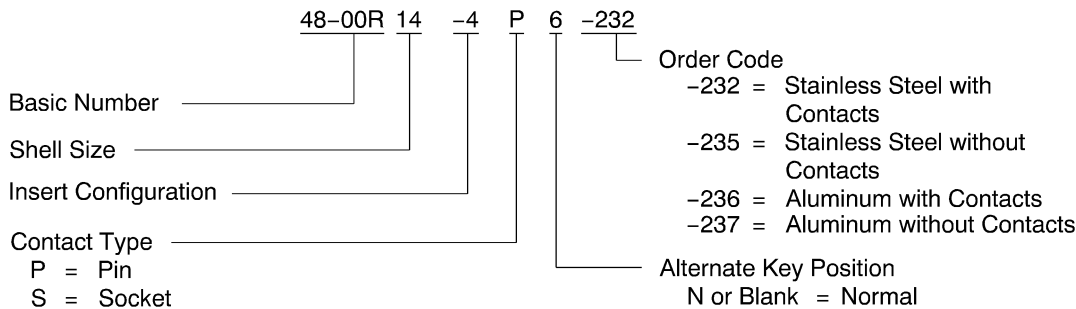
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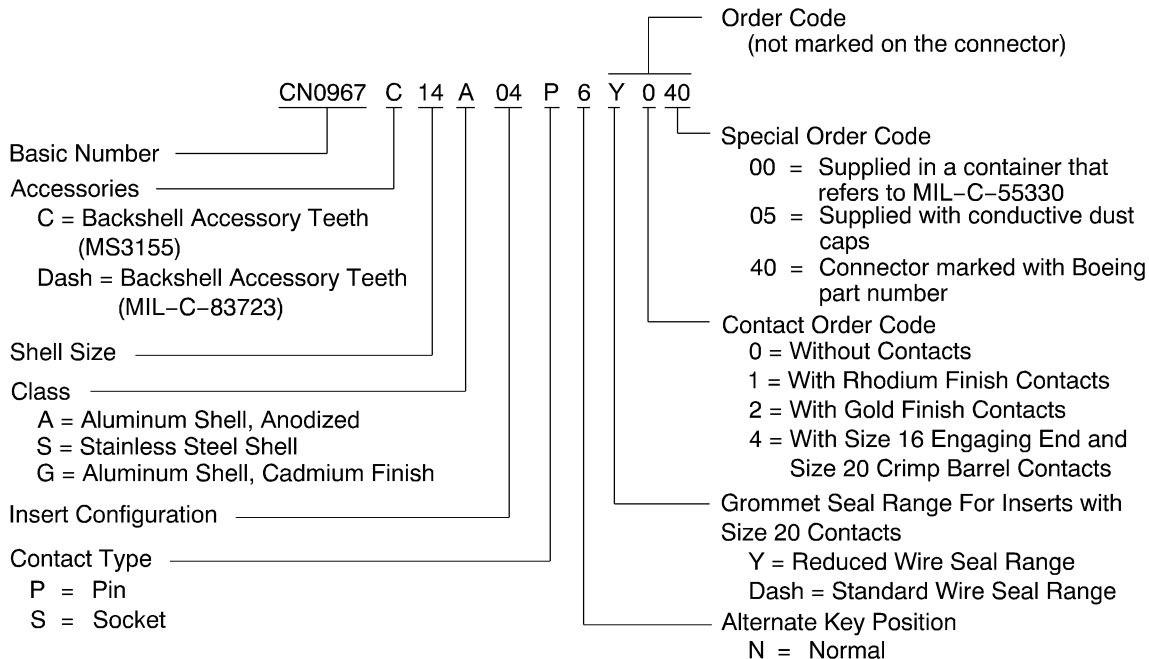
Table 9 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
BACC63BV28R42S6	Boeing	BACC63BV28A42S6	Boeing
	Boeing	BACC63BV28H42S6	Boeing
BACC63BV28R42S9	Boeing	BACC63BV28A42S9	Boeing
	Boeing	BACC63BV28H42S9	Boeing



AMPHENOL BACC63BV CONNECTOR PART NUMBER STRUCTURE

Figure 32

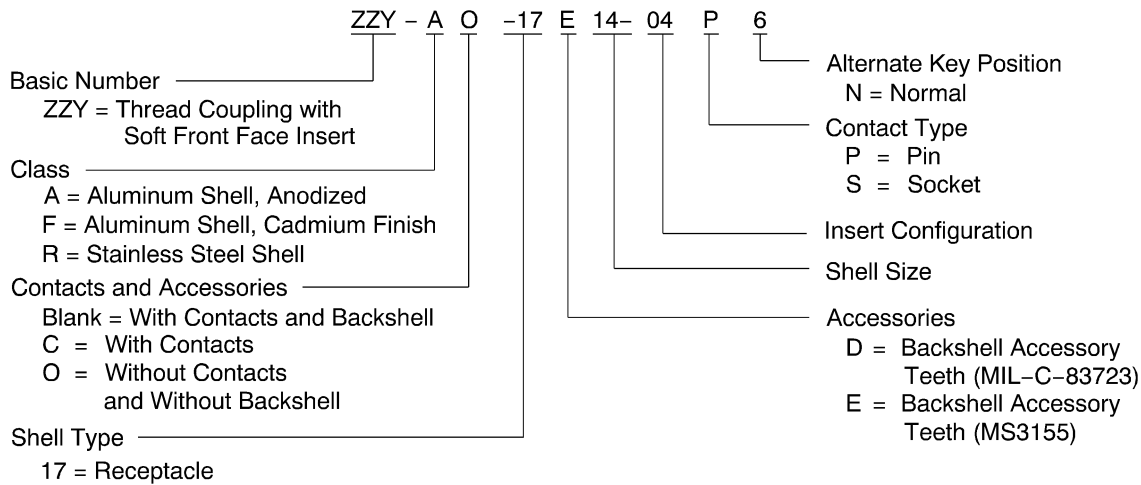


CINCH BACC63BV CONNECTOR PART NUMBER STRUCTURE

Figure 33

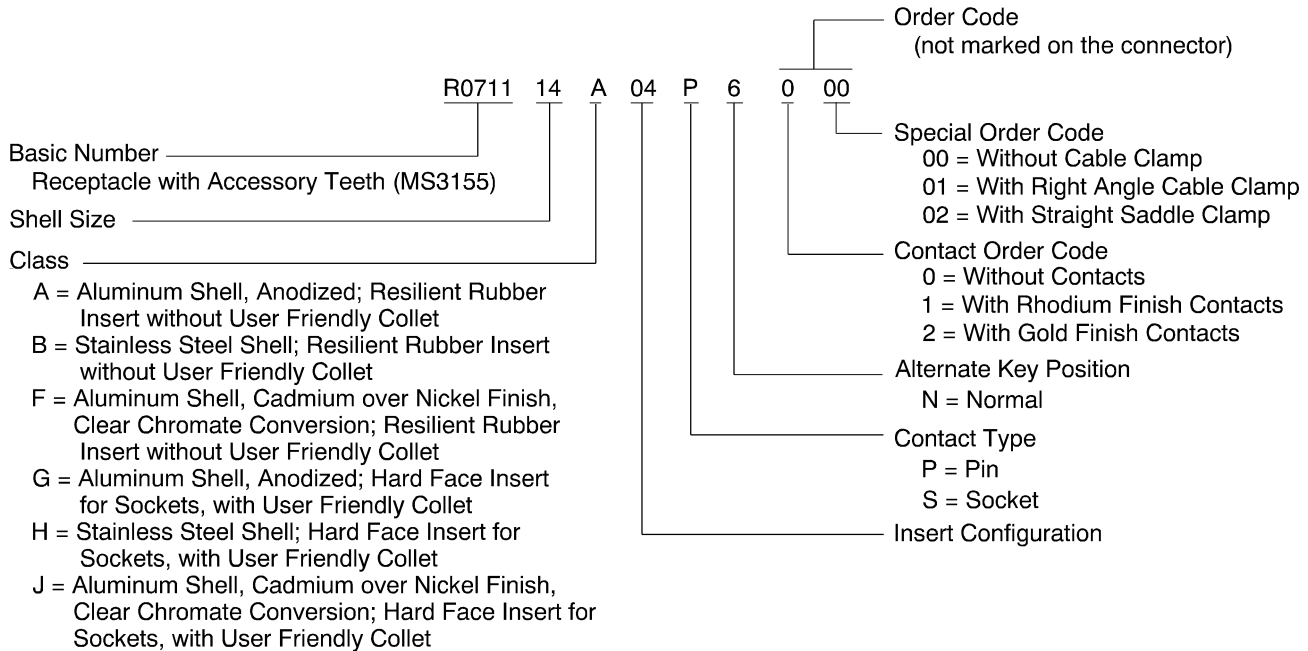
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PYLE-NATIONAL BACC63BV CONNECTOR PART NUMBER STRUCTURE

Figure 34



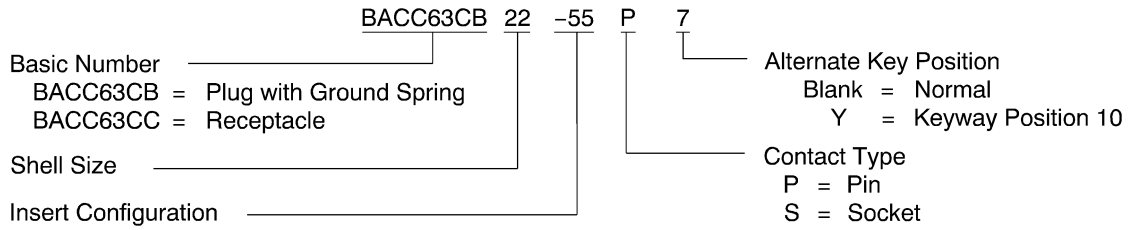
RMS BACC63BV CONNECTOR PART NUMBER STRUCTURE

Figure 35

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MIL-C-26500 FRONT RELEASE CONNECTORS

I. BACC63CB and BACC63CC Bayonet Coupled, Vibration Resistant Connector



BOEING BACC63CB AND BACC63CC CONNECTOR PART NUMBER STRUCTURE

Figure 36

Table 10

REPLACEMENT BACC63CB CONNECTOR PART NUMBERS

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
BACC63CB10-2SN	Boeing	BACC63CB10-20SN	Boeing

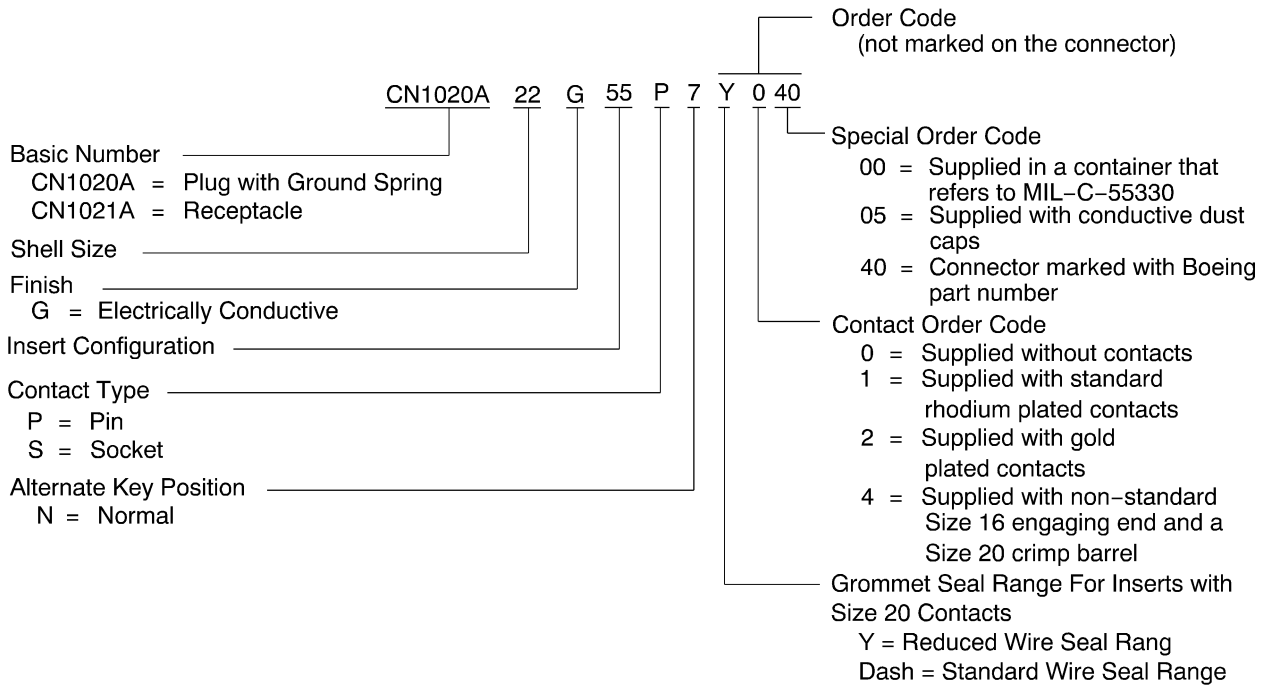
Table 11

REPLACEMENT BACC63CC CONNECTOR PART NUMBERS

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
BACC63CC10-2PN	Boeing	BACC63CC10-20PN	Boeing
BACC63CC10-2SN	Boeing	BACC63CC10-20SN	Boeing

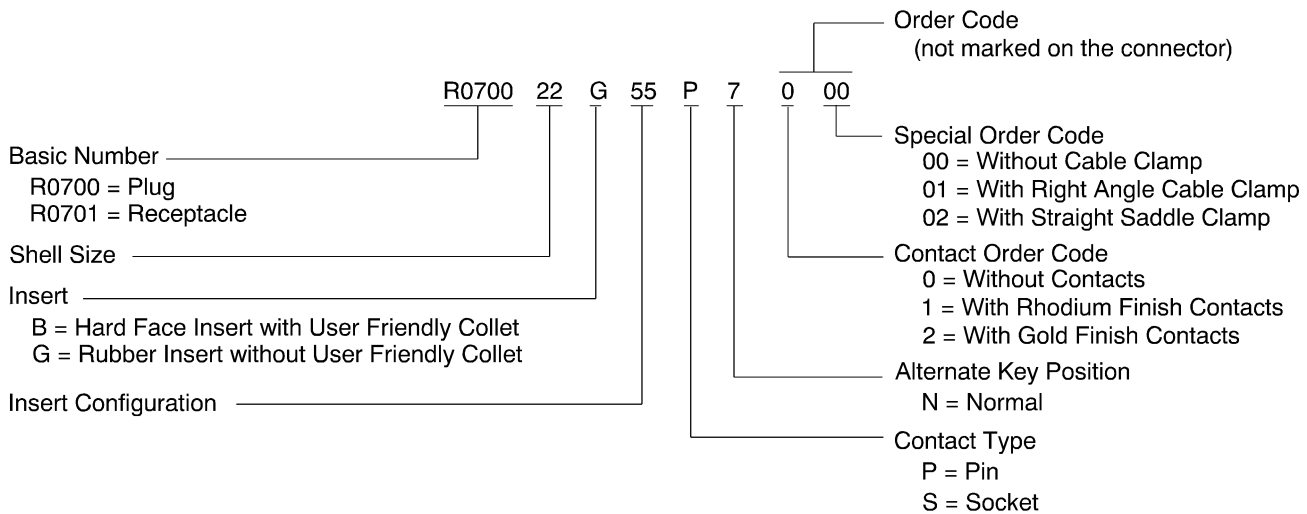
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CINCH BACC63CB AND BACC63CC CONNECTOR PART NUMBER STRUCTURE

Figure 37



RMS BACC63CB AND BACC63CC CONNECTOR PART NUMBER STRUCTURE

Figure 38

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

J. Boeing BACC63CS16G24P7 Threaded Coupled, Closure Rib Receptacle

**Table 12
Connector Part Numbers**

Boeing Standard	Part Number	Supplier
BACC63CS16G24S7	R770G0001S7000	RMS

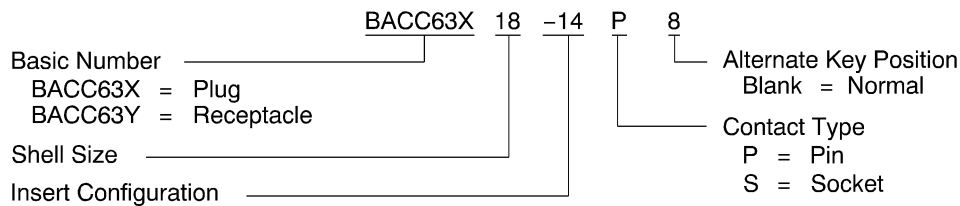
The BACC63CS connector is a connector that has these features:

- An extended length, shell size 16, MIL-C-26500 type, aluminum receptacle shell
- Keyway position 7
- Insert configuration 16-24
- Twenty four size 20 contact cavities
- Socket contacts
- Is intended to mate with a BACC63BP plug connector.

Refer to:

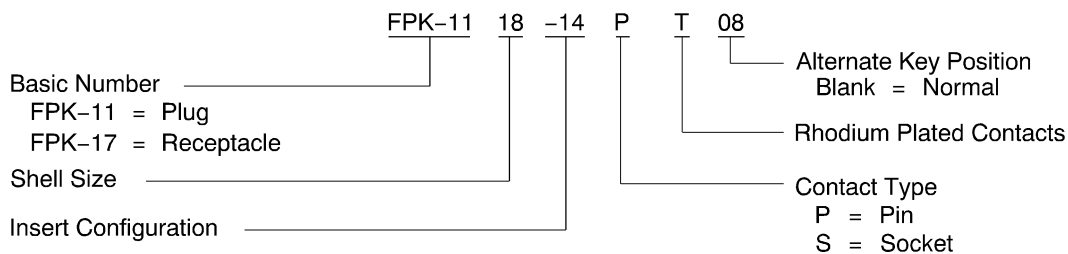
- Figure 62 for the 16-24 insert configuration
- Table 26 for the part numbers for the standard size 2020 BACC47CP socket contacts.

K. BACC63X and BACC63Y Thread Coupled, Fire Barrier Connector



BOEING BACC63X AND BACC63Y CONNECTOR PART NUMBER STRUCTURE

Figure 39



PYLE-NATIONAL BACC63X AND BACC63Y CONNECTOR PART NUMBER STRUCTURE

Figure 40

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L. Boeing 10-60479-() Bayonet Coupled Connector

The 10-60479-() connectors have:

- Two or ten size 16 standard contacts
- One size 2 shielded contact as a replacement for the standard size 8 contact or the M39029/54-343 size 2 shielded contact or the M39029/55-345 size 2 shielded contact.

The 10-60479-5 bulkhead feed through connector:

- Is hermetically sealed
- Has a size 14 shell
- Has two size 16 pin contacts
- Has one size 2 shielded pin contact
- Engages with Boeing 10-60479-1 plug connector.

Refer to:

- Table 13 for the connector configuration, and the contact part numbers and quantity
- Table 14 for the supplier part number for the connector.

**Table 13
BOEING 10-60479-() CONNECTOR PART NUMBERS**

Boeing Specification	Components of the Boeing Specification						
	Connector			Contact			
	Insert Configuration	Shell		Type	Part Number	Size	Quantity
		Style	Keyway Position				
10-60479-1	14-3	Plug	Normal	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	2
10-60479-6	14-3	Receptacle	Normal	Shielded	10-60479-41	2	1
				Standard	BACC47CN2()	16	2
10-60479-12	18-11	Plug	Normal	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	10
10-60479-16	14-3	Plug	6	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	2
10-60479-17	14-3	Plug	7	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	2
10-60479-18	14-3	Plug	8	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	2
10-60479-19	14-3	Plug	9	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	2
10-60479-66	14-3	Receptacle	6	Shielded	10-60479-41	2	1
				Standard	BACC47CN2()	16	2

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Table 13 (continued)

Boeing Specification	Components of the Boeing Specification						
	Connector			Contact			
	Insert Configuration	Shell		Type	Part Number	Size	Quantity
		Style	Keyway Position				
10-60479-67	14-3	Receptacle	7	Shielded	10-60479-41	2	1
				Standard	BACC47CN2()	16	2
10-60479-68	14-3	Receptacle	8	Shielded	10-60479-41	2	1
				Standard	BACC47CN2()	16	2
10-60479-69	14-3	Receptacle	9	Shielded	10-60479-41	2	1
				Standard	BACC47CN2()	16	2
10-60479-126	18-11	Plug	6	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	10
10-60479-127	18-11	Plug	7	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	10
10-60479-128	18-11	Plug	8	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	10
10-60479-129	18-11	Plug	9	Shielded	10-60479-44	2	1
				Standard	BACC47CP2()	16	10

Table 14

SUPPLIER PART NUMBERS FOR BOEING 10-60479-() CONNECTORS

Boeing Specification	Part Number	Supplier
10-60479-1	48-16R14-2/1S	Amphenol
	CN0940-1	Cinch
	R0760-1	RMS
10-60479-5	48-7005	Amphenol
	CN0940-5	Cinch
10-60479-6	48-10R14-2/1P	Amphenol
	CN0940-6	Cinch
10-60479-12	48-16R18-10/1S	Amphenol
	CN0940-12	Cinch
	R0760-12	RMS

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Table 14 (continued)

Boeing Specification	Part Number	Supplier
10-60479-16	48-16R14-2/1S6	Amphenol
	CN0940-16	Cinch
	R0760-16	RMS
10-60479-17	48-16R14-2/1S7	Amphenol
	CN0940-17	Cinch
	R0760-17	RMS
10-60479-18	48-16R14-2/1S8	Amphenol
	CN0940-18	Cinch
	R0760-18	RMS
10-60479-19	48-16R14-2/1S9	Amphenol
	CN0940-19	Cinch
	R0760-19	RMS
10-60479-66	48-10R14-2/1P9	Amphenol
	CN0940-66	Cinch
10-60479-67	48-10R14-2/1P7	Amphenol
	CN0940-67	Cinch
10-60479-68	48-10R14-2/1P8	Amphenol
	CN0940-68	Cinch
10-60479-69	48-10R14-2/1P9	Amphenol
	CN0940-69	Cinch
10-60479-126	48-16R18-10/1S6	Amphenol
	CN0940-126	Cinch
	R0760-126	RMS
10-60479-127	48-16R18-10/1S7	Amphenol
	CN0940-127	Cinch
	R0760-127	RMS
10-60479-128	48-16R18-10/1S8	Amphenol
	CN0940-128	Cinch
	R0760-128	RMS
10-60479-129	48-16R18-10/1S9	Amphenol
	CN0940-129	Cinch
	R0760-129	RMS

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M. Boeing 280T10()-() Bayonet Coupled Connector

The 280T10()-() connector is a connector with one of these configurations:

- A BACC45FN or BACC45FT connector that has one or more size 1 shielded contacts as a replacement for the size 12 standard contacts
- A BACC45FN or BACC45FT connector that has one or more size 12 coax contacts as a replacement for the size 12 standard contacts
- A shorting plug assembly that is not repairable
- A shorting receptacle assembly that is not repairable.

Refer to Table 15 for the connector part number, and the shielded or coax contact part number and quantity.

For the configuration of standard contacts, refer to:

- Figure 8
- Table 38.

**Table 15
BOEING 280T10()-() CONNECTOR PART NUMBERS**

Boeing Specification	Components of the Boeing Specification				
	Connector Part Number	Notes	Coax or Shielded Contact		
			Part Number	Type	Quantity
280T1000-1	BACC45FN20-28S	-	C48-1227-02	Shielded	2
			48-1227-02	Shielded	2
280T1000-2	BACC45FN20-28S6	-	C48-1227-02	Shielded	4
			48-1227-02	Shielded	4
280T1000-3	BACC45FN20-28S7	-	C48-1227-02	Shielded	2
			48-1227-02	Shielded	2
280T1000-4	BACC45FN20-28S9	-	C48-1227-02	Shielded	2
			48-1227-02	Shielded	2
280T1000-5	BACC45FT20-28P9	-	C48-1226-02	Shielded	2
			48-1226-02	Shielded	2
280T1000-6	BACC45FT20-28P6	-	C48-1226-02	Shielded	4
			48-1226-02	Shielded	4
280T1000-7	BACC45FN20-28S	-	C48-1227-02	Shielded	3
			48-1227-02	Shielded	3
280T1000-8	BACC45FT20-28P	-	C48-1226-02	Shielded	3
			48-1226-02	Shielded	3
280T1000-9	BACC45FN20-28S7	-	C48-1227-02	Shielded	3
			48-1227-02	Shielded	3



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Table 15 (continued)

Boeing Specification	Components of the Boeing Specification				
	Connector Part Number	Notes	Coax or Shielded Contact		
			Part Number	Type	Quantity
280T1000-10	BACC45FT20-28P9	-	C48-1226-02	Shielded	1
			48-1226-02	Shielded	1
280T1000-11	BACC45FN20-28S7	-	C48-1227-02	Shielded	1
			48-1227-02	Shielded	1
280T1000-12	BACC45FN20-28S9	-	C48-1227-02	Shielded	1
			48-1227-02	Shielded	1
280T1000-13	BACC45FN20-28S9	-	C48-1227-02	Shielded	3
			48-1227-02	Shielded	3
280T1000-14	BACC45FT20-28S6	-	C48-1227-02	Shielded	4
			48-1227-02	Shielded	4
280T1000-15	BACC45FN20-28P6	-	C48-1226-02	Shielded	4
			48-1226-02	Shielded	4
280T1000-16	BACC45FN20-28S6	-	C48-1227-02	Shielded	3
			48-1227-02	Shielded	3
280T1000-17	BACC45FT20-28P6	-	C48-1226-02	Shielded	3
			48-1226-02	Shielded	3
280T1000-18	BACC45FN20-28S8	-	C48-1227-02	Shielded	1
			48-1227-02	Shielded	1
280T1000-19	BACC45FT20-28P8	-	C48-1226-02	Shielded	1
			48-1226-02	Shielded	1
280T1000-20	BACC45FN20-28S6	-	C48-1227-02	Shielded	1
			48-1227-02	Shielded	1
280T1000-21	BACC45FT20-28P6	-	C48-1226-02	Shielded	1
			48-1226-02	Shielded	1
280T1000-22	BACC45FN20-28S9	-	C48-1227-02	Shielded	4
			48-1227-02	Shielded	4
280T1000-23	BACC45FN20-28S	-	C48-1227-02	Shielded	1
			48-1227-02	Shielded	1
280T1000-24	BACC45FN20-28S8	-	C48-1227-02	Shielded	2
			48-1227-02	Shielded	2

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Table 15 (continued)

Boeing Specification	Components of the Boeing Specification				
	Connector Part Number	Notes	Coax or Shielded Contact		
			Part Number	Type	Quantity
280T1000-25	BACC45FT20-28P8	-	C48-1226-02	Shielded	2
			48-1226-02	Shielded	2
280T1000-26	BACC45FT20-28P	-	C48-1226-02	Shielded	1
			48-1226-02	Shielded	1
280T1000-27	BACC45FT20-28S	-	C48-1227-02	Shielded	3
			48-1227-02	Shielded	3
280T1000-28	BACC45FN20-28P	-	C48-1226-02	Shielded	1
			48-1226-02	Shielded	1
280T1000-100	BACC45FN20-28S	-	CRC280-2	Coax	1
280T1000-101	BACC45FN20-28P	-	CRM280-2	Coax	1
280T1000-102	BACC45FN20-28S	-	CRC280-3	Coax	2
280T1000-103	BACC45FN20-28S6	-	CRC280-3	Coax	4
280T1000-104	BACC45FN20-28S7	-	CRC280-3	Coax	2
280T1000-105	BACC45FN20-28S9	-	CRC280-3	Coax	2
280T1000-106	BACC45FT20-28P9	-	CRM280-3	Coax	2
280T1000-107	BACC45FT20-28P6	-	CRM280-3	Coax	4
280T1000-108	BACC45FN20-28S	-	CRC280-3	Coax	3
280T1000-109	BACC45FT20-28P	-	CRM280-3	Coax	3
280T1000-110	BACC45FN20-28S7	-	CRC280-3	Coax	3
280T1000-111	BACC45FT20-28P9	-	CRM280-3	Coax	1
280T1000-112	BACC45FN20-28S7	-	CRC280-3	Coax	1
280T1000-113	BACC45FN20-28S9	-	CRC280-3	Coax	1
280T1000-114	BACC45FN20-28S9	-	CRC280-3	Coax	3
280T1000-115	BACC45FT20-28S6	-	CRC280-3	Coax	4
280T1000-116	BACC45FN20-28P6	-	CRM280-3	Coax	4
280T1000-117	BACC45FN20-28S6	-	CRC280-3	Coax	3
280T1000-118	BACC45FT20-28P6	-	CRM280-3	Coax	3
280T1000-119	BACC45FN20-28S8	-	CRC280-3	Coax	1
280T1000-120	BACC45FT20-28P8	-	CRM280-3	Coax	1
280T1000-121	BACC45FN20-28S6	-	CRC280-3	Coax	1
280T1000-122	BACC45FT20-28P6	-	CRM280-3	Coax	1

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Table 15 (continued)

Boeing Specification	Components of the Boeing Specification				
	Connector Part Number	Notes	Coax or Shielded Contact		
			Part Number	Type	Quantity
280T1000-123	BACC45FN20-28S9	-	CRC280-3	Coax	4
280T1000-124	BACC45FN20-28S	-	CRC280-3	Coax	1
280T1000-125	BACC45FN20-28S8	-	CRC280-3	Coax	2
280T1000-126	BACC45FT20-28P8	-	CRM280-3	Coax	2
280T1000-127	BACC45FT20-28P	-	CRM280-3	Coax	1
280T1000-128	BACC45FT20-28S	-	CRC280-3	Coax	1
280T1000-129	BACC45FN20-28P	-	CRM280-3	Coax	1
280T1000-132	BACC45FN20-28S	-	CRC280-4	Coax	2
280T1000-133	BACC45FN20-28S6	-	CRC280-4	Coax	4
280T1000-134	BACC45FN28-28S7	-	CRC280-4	Coax	2
280T1000-135	BACC45FN20-28S9	-	CRC280-4	Coax	2
280T1000-136	BACC45FT20-28P9	-	CRM280-4	Coax	2
280T1000-137	BACC45FT20-28P6	-	CRM280-4	Coax	4
280T1000-138	BACC45FN20-28S	-	CRC280-4	Coax	3
280T1000-139	BACC45FT20-28P	-	CRM280-4	Coax	3
280T1000-140	BACC45FN20-28S7	-	CRC280-4	Coax	3
280T1000-141	BACC45FT20-28P9	-	CRM280-4	Coax	1
280T1000-142	BACC45FN20-28S7	-	CRC280-4	Coax	1
280T1000-143	BACC45FN20-28S9	-	CRC280-4	Coax	1
280T1000-144	BACC45FN20-28S9	-	CRC280-4	Coax	3
280T1000-145	BACC45FT20-28S6	-	CRC280-4	Coax	4
280T1000-146	BACC45FN20-28P6	-	CRM280-4	Coax	4
280T1000-147	BACC45FN20-28S6	-	CRC280-4	Coax	3
280T1000-148	BACC45FT20-28P6	-	CRM280-4	Coax	3
280T1000-149	BACC45FN20-28S8	-	CRC280-4	Coax	1
280T1000-150	BACC45FT20-28P8	-	CRM280-4	Coax	1
280T1000-151	BACC45FN20-28S6	-	CRC280-4	Coax	1
280T1000-152	BACC45FT20-28P6	-	CRM280-4	Coax	1
280T1000-153	BACC45FN20-28S9	-	CRC280-4	Coax	4
280T1000-154	BACC45FN20-28S	-	CRC280-4	Coax	1
280T1000-155	BACC45FN20-28S8	-	CRC280-4	Coax	2

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Table 15 (continued)

Boeing Specification	Components of the Boeing Specification				
	Connector Part Number	Notes	Coax or Shielded Contact		
			Part Number	Type	Quantity
280T1000-156	BACC45FT20-28P8	-	CRM280-4	Coax	2
280T1000-157	BACC45FT20-28P	-	CRM280-4	Coax	1
280T1000-158	BACC45FT20-28S	-	CRC280-4	Coax	1
280T1000-159	BACC45FN20-28P	-	CRM280-4	Coax	1
280T1000-160	BACC45FT20-28S6	-	CRC280-4	Coax	3
280T1000-161	BACC45FT20-28S7	-	CRC280-4	Coax	4
280T1000-162	BACC45FT20-28S8	-	CRC280-4	Coax	4
280T1000-163	BACC45FT20-28S	-	CRC280-4	Coax	2
280T1003-1	BPL280T1003-1	Shorting receptacle supplied by BAE Systems Controls Inc.	-	-	-
280T1004-1	BPL280T1004	Shorting plug assembly supplied by BAE Systems Controls Inc.	-	-	-
280T1004-8	BPL280T1004	Shorting plug assembly supplied by BAE Systems Controls Inc.	-	-	-
280T1004-10	BPL280T1004	Shorting plug assembly supplied by BAE Systems Controls Inc.	-	-	-
280T1021-1	BACC45FT22-32P	-	C48-1226-02	Shielded	4
			48-1226-02	Shielded	4
280T1021-2	BACC45FN22-32S	-	C48-1227-02	Shielded	4
			48-1227-02	Shielded	4
280T1021-3	BACC45FT22-32P8	-	C48-1226-02	Shielded	4
			48-1226-02	Shielded	4
280T1021-4	BACC45FN22-32S8	-	C48-1227-02	Shielded	4
			48-1227-02	Shielded	4
280T1021-5	BACC45FT22-32P6	-	C48-1226-02	Shielded	4
			48-1226-02	Shielded	4
280T1021-6	BACC45FN22-32S6	-	C48-1227-02	Shielded	4
			48-1227-02	Shielded	4
280T1021-51	BACC45FT22-32P	-	CRM280-4	Coax	4
280T1021-52	BACC45FN22-32S	-	CRC280-4	Coax	4

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Table 15 (continued)

Boeing Specification	Components of the Boeing Specification				
	Connector Part Number	Notes	Coax or Shielded Contact		
			Part Number	Type	Quantity
280T1021-53	BACC45FT22-32P8	-	CRM280-4	Coax	4
280T1021-54	BACC45FN22-32S8	-	CRC280-4	Coax	4
280T1021-55	BACC45FT22-32P6	-	CRM280-4	Coax	4
280T1021-56	BACC45FN22-32S6	-	CRC280-4	Coax	4

N. Boeing 280U001()-() Connector

The 280U001()-() connector is a BACC45() or BACC63() connector with one of these configurations:

- One or more size 1 shielded contacts as a replacement for the size 12 standard contacts
- One or more size 12 coax contacts as a replacement for the size 12 standard contacts
- Size 2 shielded contacts as a replacement for the size 8 standard contacts or the other size 2 shielded contacts.

Refer to Table 16 for the connector part number, and the shielded or coax contact part number and quantity.

For the configuration of the standard contacts, refer to:

- Table 38
- Figure 8 for BACC45FN and BACC45FT connectors
- Figure 36 for BACC63CB and BACC63CC connectors.

**Table 16
BOEING 280U001()-() CONNECTOR PART NUMBERS**

Boeing Specification	Components of the Boeing Specification			
	Connector Part Number	Shielded or Coax Contact		
		Part Number	Type	Quantity
280U0013-1	BACC45FT18-8S	C48-1227-02	Shielded	8
		48-1227-02		
280U0013-51	BACC45FT18-8S	CRC280-4	Coax	8
280U0013-101	BACC45FT18-8S	CRC280-2	Coax	8
280U0013-151	BACC63CC20-28SN	CRC280-4	Coax	1
280U0013-152	BACC63CC20-28SN	CRC280-3	Coax	1
280U0013-201	BACC63CB20-28PN	CRM280-3	Coax	1
280U0013-202	BACC63CB20-28PN	CRM280-4	Coax	1
280U0014-1	BACC45FT22-12P	C48-1226-02	Shielded	12
		48-1226-02		
280U0019-1	BACC45FN18-11S	CN0900-336	Shielded	1

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Table 16 (continued)

Boeing Specification	Components of the Boeing Specification			
	Connector Part Number	Shielded or Coax Contact		
		Part Number	Type	Quantity
280U0019-51	BACC45FN18-11S	CRMEF-502	Coax	1

O. Boeing 280U2028-() Connector

The 280U2028-() connector is a BACC63CB or BACC63CC connector with one size 12 coax contact as a replacement for one size 12 standard contact.

Refer to Table 17 for the connector part number, and the shielded contact part number and quantity.

For the configuration of the standard contacts, refer to:

- Figure 36
- Table 38.

**Table 17
BOEING 280U2028-() CONNECTOR PART NUMBERS**

Boeing Specification	Components of the Boeing Specification		
	Connector Part Number	Coax Contact	
		Part Number	Quantity
280U2028-100	BACC63CB20-28SN	CRC280-4	1
280U2028-106	BACC63CB20-28S6	CRC280-4	1
280U2028-107	BACC63CB20-28S7	CRC280-4	1
280U2028-108	BACC63CB20-28S8	CRC280-4	1
280U2028-109	BACC63CB20-28S9	CRC280-4	1
280U2028-200	BACC63CC20-28PN	CRM280-4	1
280U2028-206	BACC63CC20-28P6	CRM280-4	1
280U2028-207	BACC63CC20-28P7	CRM280-4	1
280U2028-208	BACC63CC20-28P8	CRM280-4	1
280U2028-209	BACC63CC20-28P9	CRM280-4	1
280U2028-300	BACC63CC20-28SN	CRC280-4	1
280U2028-306	BACC63CC20-28S6	CRC280-4	1
280U2028-400	BACC63CB20-28PN	CRM280-4	1
280U2028-406	BACC63CB20-28PN	CRM280-4	1

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P. Boeing 280W0002-1 Self Locking, Threaded Coupled Connector

NOTE: The 280W0002-1 connector is the subject of an FAA Airworthiness Directive and a Boeing Service Bulletin.

If you must apply the mark on this connector again, use the procedures in SOPM 20-50-10.

Make sure that you can read the mark.

The Boeing 280W0002-1 connector:

- Is a BACC63BP plug that has special contacts; refer to Table 18
- Has insert configuration 18-8; refer to Table 38 and Figure 63
- Has eight special size 12 contacts; refer to Table 31
- Has a backshell that is filled with potting compound.

NOTE: If a connector that has potting requires maintenance, the connector shell must be replaced, and new potting material must be applied to the new connector assembly; refer to Subject 20-60-08.

**Table 18
BOEING 280W0002-1 CONNECTOR PART NUMBER**

Boeing Specification	Components of the Boeing Specification					
	Connector Part Number	Contact				
		Part Number	Size	Type	Quantity	Reference
280W0002-1	BACC63BP18D8SN	31D-1212-903	1212	Socket	8	Table 31

Q. Boeing 65B414()-() Bayonet Coupled Connector

The 65B414()-() connector is a BACC45FN or BACC45FT connector with one, two, three, or four size 1 shielded contacts as a replacement for the same number of size 12 standard contacts.

Refer to Table 19 for the connector part number, and the shielded contact part number and quantity.

For the configuration of the standard contacts, refer to:

- Figure 8
- Table 38.

**Table 19
BOEING 65B414()-() CONNECTOR PART NUMBERS**

Boeing Specification	Components of the Boeing Specification		
	Connector Part Number	Shielded Contact	
		Part Number	Quantity
65B41429-1	BACC45FT20C28P	48-1226-02	1
65B41429-2	BACC45FT20C28P6	48-1226-02	1
65B41429-3	BACC45FT20C28P7	48-1226-02	1
65B41429-4	BACC45FT20C28P8	48-1226-02	1
65B41429-5	BACC45FT20C28P9	48-1226-02	1
65B41429-6	BACC45FT20C28S	48-1227-02	1



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Table 19 (continued)

Boeing Specification	Components of the Boeing Specification		
	Connector Part Number	Shielded Contact	
		Part Number	Quantity
65B41429-7	BACC45FT20C28S6	48-1227-02	1
65B41429-8	BACC45FT20C28S7	48-1227-02	1
65B41429-9	BACC45FT20C28S8	48-1227-02	1
65B41429-10	BACC45FT20C28S9	48-1227-02	1
65B41429-11	BACC45FN20-28P	48-1226-02	1
65B41429-12	BACC45FN20-28P6	48-1226-02	1
65B41429-13	BACC45FN20-28P7	48-1226-02	1
65B41429-14	BACC45FN20-28P8	48-1226-02	1
65B41429-15	BACC45FN20-28P9	48-1226-02	1
65B41429-16	BACC45FN20-28S	48-1227-02	1
65B41429-17	BACC45FN20-28S6	48-1227-02	1
65B41429-18	BACC45FN20-28S7	48-1227-02	1
65B41429-19	BACC45FN20-28S8	48-1227-02	1
65B41429-20	BACC45FN20-28S9	48-1227-02	1
65B41430-1	BACC45FT20C28P	48-1226-02	2
65B41430-2	BACC45FT20C28P6	48-1226-02	2
65B41430-3	BACC45FT20C28P7	48-1226-02	2
65B41430-4	BACC45FT20C28P8	48-1226-02	2
65B41430-5	BACC45FT20C28P9	48-1226-02	2
65B41430-6	BACC45FT20C28S	48-1227-02	2
65B41430-7	BACC45FT20C28S6	48-1227-02	2
65B41430-8	BACC45FT20C28S7	48-1227-02	2
65B41430-9	BACC45FT20C28S8	48-1227-02	2
65B41430-10	BACC45FT20C28S9	48-1227-02	2
65B41430-11	BACC45FN20-28P	48-1226-02	2
65B41430-12	BACC45FN20-28P6	48-1226-02	2
65B41430-13	BACC45FN20-28P7	48-1226-02	2
65B41430-14	BACC45FN20-28P8	48-1226-02	2
65B41430-15	BACC45FN20-28P9	48-1226-02	2
65B41430-16	BACC45FN20-28S	48-1227-02	2
65B41430-17	BACC45FN20-28S6	48-1227-02	2

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Table 19 (continued)

Boeing Specification	Components of the Boeing Specification		
	Connector Part Number	Shielded Contact	
		Part Number	Quantity
65B41430-18	BACC45FN20-28S7	48-1227-02	2
65B41430-19	BACC45FN20-28S8	48-1227-02	2
65B41430-20	BACC45FN20-28S9	48-1227-02	2
65B41431-1	BACC45FT20C28P	48-1226-02	3
65B41431-2	BACC45FT20C28P6	48-1226-02	3
65B41431-3	BACC45FT20C28P7	48-1226-02	3
65B41431-4	BACC45FT20C28P8	48-1226-02	3
65B41431-5	BACC45FT20C28P9	48-1226-02	3
65B41431-6	BACC45FT20C28S	48-1227-02	3
65B41431-7	BACC45FT20C28S6	48-1227-02	3
65B41431-8	BACC45FT20C28S7	48-1227-02	3
65B41431-9	BACC45FT20C28S8	48-1227-02	3
65B41431-10	BACC45FT20C28S9	48-1227-02	3
65B41431-11	BACC45FN20-28P	48-1226-02	3
65B41431-12	BACC45FN20-28P6	48-1226-02	3
65B41431-13	BACC45FN20-28P7	48-1226-02	3
65B41431-14	BACC45FN20-28P8	48-1226-02	3
65B41431-15	BACC45FN20-28P9	48-1226-02	3
65B41431-16	BACC45FN20-28S	48-1227-02	3
65B41431-17	BACC45FN20-28S6	48-1227-02	3
65B41431-18	BACC45FN20-28S7	48-1227-02	3
65B41431-19	BACC45FN20-28S8	48-1227-02	3
65B41431-20	BACC45FN20-28S9	48-1227-02	3
65B41432-1	BACC45FT20C28P	48-1226-02	4
65B41432-2	BACC45FT20C28P6	48-1226-02	4
65B41432-3	BACC45FT20C28P7	48-1226-02	4
65B41432-4	BACC45FT20C28P8	48-1226-02	4
65B41432-5	BACC45FT20C28P9	48-1226-02	4
65B41432-6	BACC45FT20C28S	48-1227-02	4
65B41432-7	BACC45FT20C28S6	48-1227-02	4
65B41432-8	BACC45FT20C28S7	48-1227-02	4

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Table 19 (continued)

Boeing Specification	Components of the Boeing Specification		
	Connector Part Number	Shielded Contact	
		Part Number	Quantity
65B41432-9	BACC45FT20C28S8	48-1227-02	4
65B41432-10	BACC45FT20C28S9	48-1227-02	4
65B41432-11	BACC45FN20-28P	48-1226-02	4
65B41432-12	BACC45FN20-28P6	48-1226-02	4
65B41432-13	BACC45FN20-28P7	48-1226-02	4
65B41432-14	BACC45FN20-28P8	48-1226-02	4
65B41432-15	BACC45FN20-28P9	48-1226-02	4
65B41432-16	BACC45FN20-28S	48-1227-02	4
65B41432-17	BACC45FN20-28S6	48-1227-02	4
65B41432-18	BACC45FN20-28S7	48-1227-02	4
65B41432-19	BACC45FN20-28S8	48-1227-02	4
65B41432-20	BACC45FN20-28S9	48-1227-02	4

R. Boeing 69B4181(-) Connector

The 69B4181(-) connector is a BACC45F() or BACC63() connector with one Boeing standard size 2 shielded contact as a replacement for one of these contacts:

- The standard size 8 contact
- The M39029/54-343 size 2 shielded contact
- The M39029/55-345 size 2 shielded contact.

Refer to:

- Table 20 for the part numbers of the connector and shielded contact.
- Table 21 for the 10-60479(-) connectors that are equivalent to the 69B41813(-) connectors
- Table 13 for the configuration of the 10-60479(-) connectors.

For the configuration of the standard contacts, refer to:

- Table 38
- Figure 2 for the BACCFM connectors
- Figure 8 for the BACCFN and BACCFT connectors
- Figure 31 for the BACC63BV connectors
- Figure 36 for the BACC63CB and BACC63CC connectors.



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Table 20
BOEING 69B4181()-() CONNECTOR PART NUMBERS

Table with 3 columns: Boeing Specification, Connector Part Number, and Shielded Contact. It lists various connector specifications and their corresponding part numbers and shielded contact identifiers.

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Table 20 (continued)

Boeing Specification	Components of the Boeing Specification	
	Connector Part Number	Shielded Contact
69B41817-6	BACC45FN18-11P10	10-60479-41
69B41817-7	BACC63CC18-11PN	10-60479-41
69B41817-8	BACC63CC18-11P6	10-60479-41
69B41817-9	BACC63CC18-11P7	10-60479-41
69B41818-1	BACC45FT18-11S	10-60479-44
69B41818-2	BACC45FT18-11S6	10-60479-44
69B41818-3	BACC45FT18-11S7	10-60479-44
69B41818-4	BACC45FT18-11S8	10-60479-44
69B41818-5	BACC45FT18-11S9	10-60479-44
69B41818-6	BACC45FT18-11S10	10-60479-44
69B41818-7	BACC63CB18-11SN	10-60479-44
69B41818-8	BACC63CB18-11S6	10-60479-44
69B41818-9	BACC63CB18-11S7	10-60479-44
69B41818-10	BACC63CB18-11S8	10-60479-44
69B41818-11	BACC63CB18-11S9	10-60479-44
69B41819-1	BACC45FM18-11S7	10-60479-44
69B41819-2	BACC45FM18-11S9	10-60479-44
69B41819-3	BACC63BV18F11S7	10-60479-44
69B41819-4	BACC63BV18F11S9	10-60479-44

Table 21

EQUIVALENT 69B41813-() AND 10-60479-() CONNECTORS

69B41813-() Connector	Equivalent 10-60479-() Connector
69B41813-1	10-60479-1
69B41813-2	10-60479-16
69B41813-3	10-60479-17
69B41813-4	10-60479-18
69B41813-5	10-60479-19
69B41813-6	-

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S. Boeing S283A202-() Threaded Coupled Plug

Refer to:

- Table 22 for the contact data for the connector
- Table 1 for the supplier part number of the connector.

**Table 22
BOEING S283A202-() CONNECTOR PART NUMBERS**

Boeing Specification	Contact Components of the Boeing Specification			
	Type	Part Number	Size	Quantity
S283A202-11	Standard	BACC47CP2T	16	16
	Shielded	S283U007-7	2	1
S283A202-12	Standard	BACC47CP2T	16	20
	Shielded	S283U007-7	2	2

T. Boeing S283T025-() Threaded Coupled Plug

Refer to:

- Table 23 for the contact data for the connector
- Table 1 for the supplier part number of the connector.

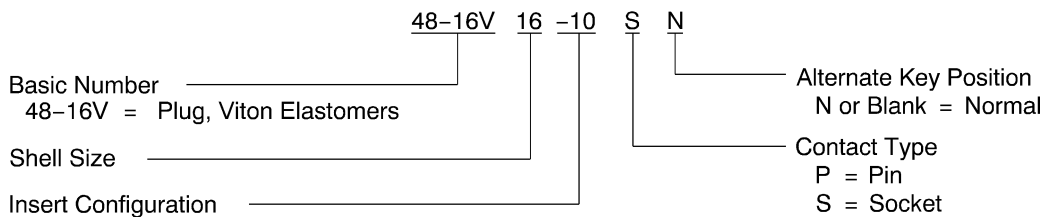
**Table 23
BOEING S283T025-() CONNECTOR PART NUMBERS**

Boeing Specification	Contact Components of the Boeing Specification			
	Type	Part Number	Size	Quantity
S283T025-2	Standard	BACC47CP2()	16	16
	Shielded	S283U007-7	2	1
S283T025-4	Standard	BACC47CP2()	16	8
	Shielded	S283U007-7	2	1

3. SUPPLIER CONTROLLED CONNECTOR PART NUMBERS AND DESCRIPTION

A. Amphenol 48-16V() Bayonet Coupled Plug

The 48-16V() connector has Viton elastomer grommets.



AMPHENOL 48-16V() CONNECTOR PART NUMBER STRUCTURE
Figure 41

STANDARD WIRING PRACTICES MANUAL**MIL-C-26500 FRONT RELEASE CONNECTORS****B. Amphenol 48-7164-() Connectors**

The Amphenol 48-7164-() connector part numbers are defined as:

- 48-7164-1S has socket contacts
- 48-7164-2P has pin contacts.

NOTE: Discard the size 2020 contacts that are supplied with these connectors. Use BACC47CN1 and BACC47CP1 contacts for AWG 20, AWG 22 and AWG 24 wire in these connectors.

Refer to Paragraph 13.B. for the installation of the 48-7164-1S connector.

C. Cinch CN0900-329 Bayonet Coupled Plug

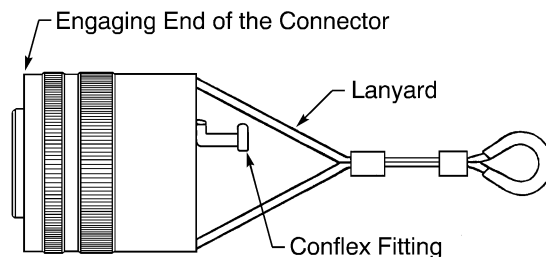
The Cinch CN0900-329 connector is the same as the BACC45FT connector with:

- A lanyard release
- An Icore Plastics 6930-06-023-13 conflex fitting.

The connector has this configuration:

- Size 10 shell
- Insert configuration 10-5
- 5 size 20 standards socket contacts
- Normal polarization.

Refer to Figure 42.



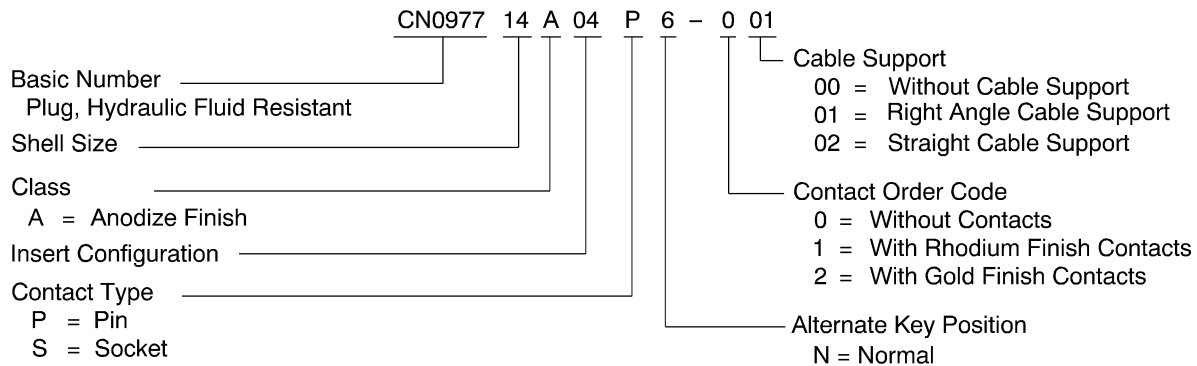
CINCH CN0900-329 CONNECTOR
Figure 42

D. Cinch CN0977() Bayonet Coupled, Hydraulic Fluid Resistant Plug

The CN0977() connector has ethylene-propylene elastomer grommets that are hydraulic fluid resistant.

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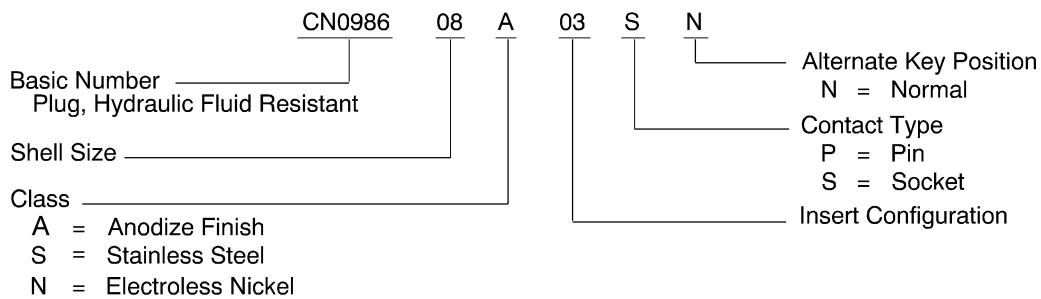


CINCH CN0977() CONNECTOR PART NUMBER STRUCTURE

Figure 43

E. Cinch CN0986() Thread Coupled, Hydraulic Fluid Resistant Plug

The CN0986() connector has ethylene-propylene elastomer grommets that are hydraulic fluid resistant.



CINCH CN0986() CONNECTOR PART NUMBER STRUCTURE

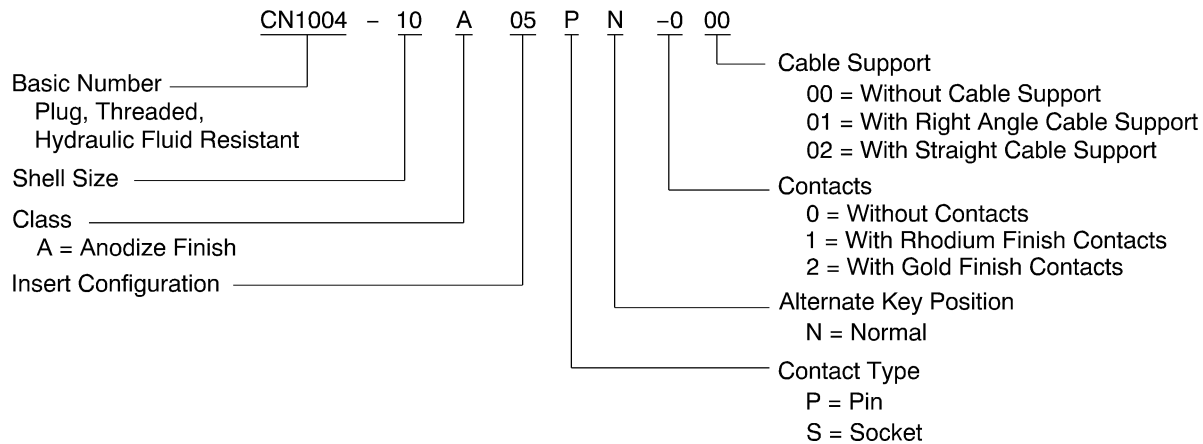
Figure 44

F. Cinch CN1004-() Thread Coupled, Hydraulic Fluid Resistant Plug

The CN1004-() connector has ethylene-propylene elastomer grommets that are hydraulic fluid resistant.

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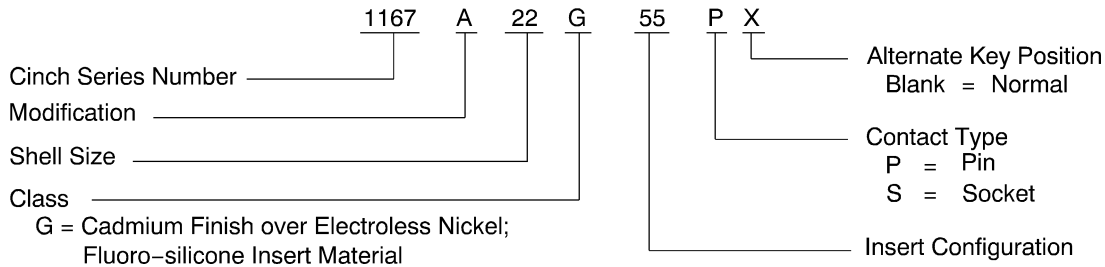
CINCH CN1004(-) CONNECTOR PART NUMBER STRUCTURE

Figure 45

G. Cinch 1167A() Thread Coupled Receptacle

The 1167A() connector is almost the same as the BACC63BV receptacle, with these features:

- The body of the connector is longer than the BACC63BV receptacle
- The front of the receptacle flange touches the back of the panel where the receptacle is attached
- Engages with the BACC63BP Plug
- Can be assembled with a BACC10HF backshell.



CINCH 1167A() CONNECTOR PART NUMBER STRUCTURE

Figure 46

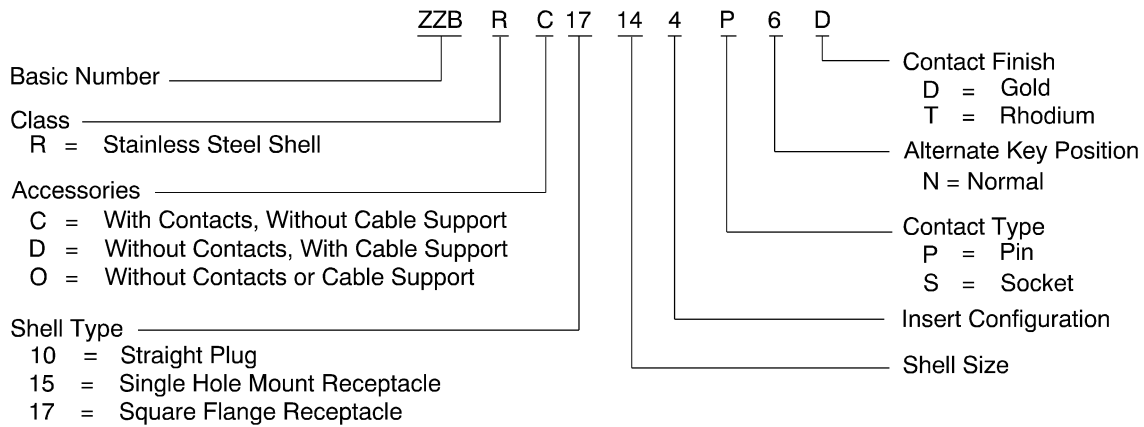
H. Pyle-National ZZB-R() and ZZW-R() Bayonet Coupled, Stainless Steel Connector

The Pyle-National ZZB-R() connector is the same as the BACC45FN and BACC45FT connectors, with a stainless steel shell with a rigid pin front.

NOTE: The Pyle-National ZZW-R() connector is a permitted alternative for the Pyle-National ZZB-R()connector.

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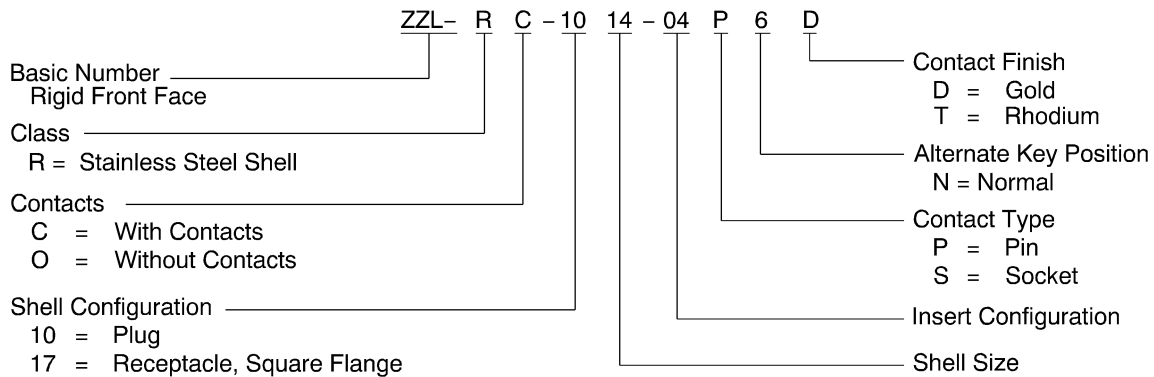
PYLE-NATIONAL ZZB-R() CONNECTOR PART NUMBER STRUCTURE

Figure 47

I. Pyle-National ZZL-R() and ZZY-R() Thread Coupled, Stainless Steel Connector

The Pyle-National ZZL-R() connector is the same as the BACC45FM and BACC45FS connectors, with a stainless steel shell and a rigid front face.

NOTE: The Pyle-National ZZY-R() connector is a permitted alternative for the Pyle-National ZZL-R()connector.



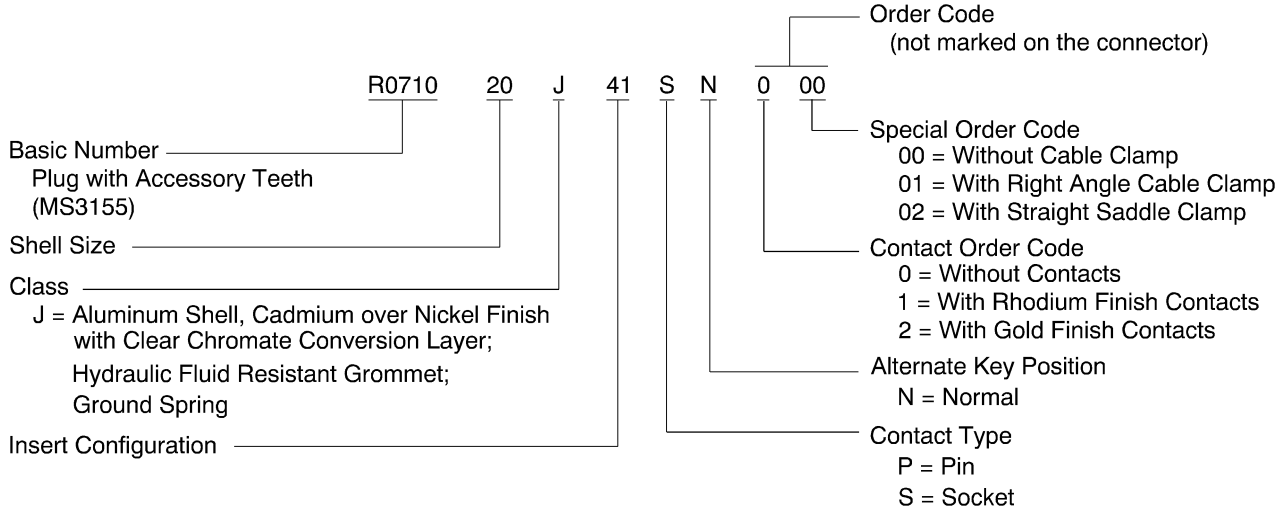
PYLE-NATIONAL ZZL-R() CONNECTOR PART NUMBER STRUCTURE

Figure 48

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

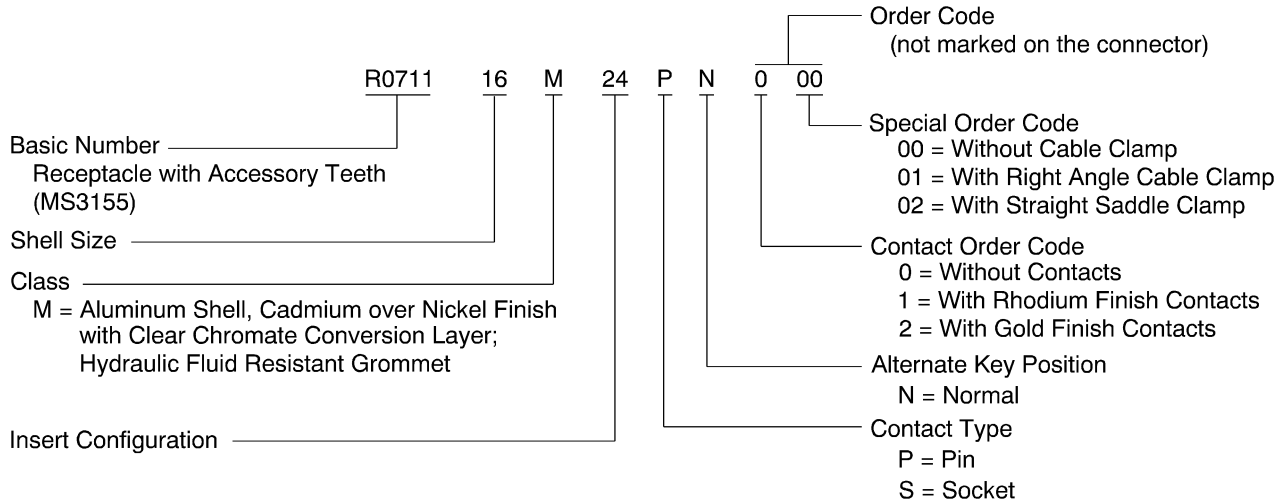
J. RMS R0710(J) Self Locking, Thread Coupled, Vibration Resistant, Hydraulic Fluid Resistant Plug with a Ground Spring



RMS R0710(J) CONNECTOR PART NUMBER STRUCTURE

Figure 49

K. RMS R0711(M) Thread Coupled, Vibration Resistant, Hydraulic Fluid Resistant Receptacle



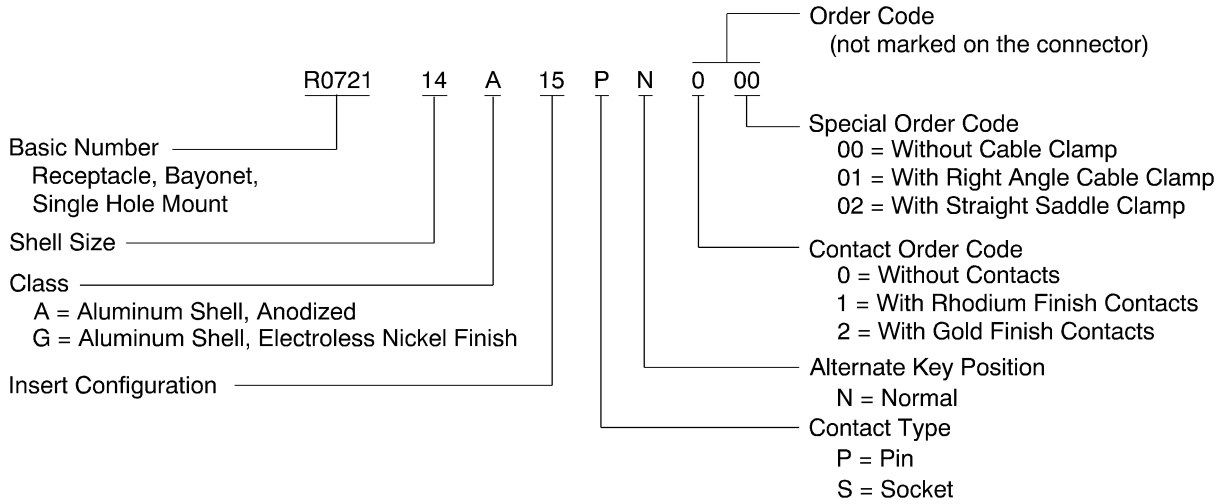
RMS R0711(M) CONNECTOR PART NUMBER STRUCTURE

Figure 50

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

L. RMS R0721() Bayonet Coupled, Single Hole Mount Receptacle



RMS R0721() CONNECTOR PART NUMBER STRUCTURE

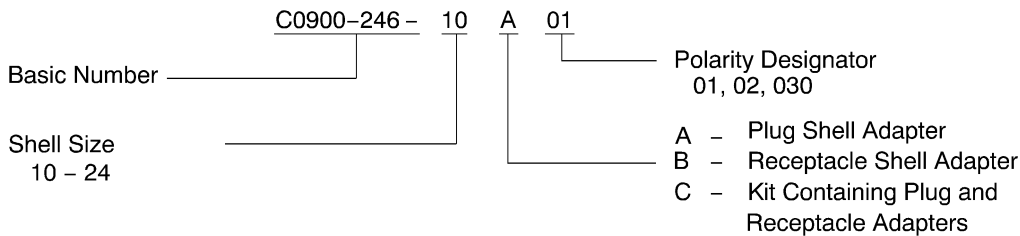
Figure 51

M. Cinch Coupling Ring Polarity Adapter

Table 24

COUPLING RING POLARITY ADAPTER PART NUMBERS

Part Number	Supplier
C0900-246-()	Cinch



CINCH COUPLING RING POLARITY ADAPTER PART NUMBER STRUCTURE

Figure 52

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

4. CONTACT PART NUMBERS AND DESCRIPTION

A. General Data

The MIL-C-26500 connectors can accept these types of contacts:

- Standard contacts
- Special Purpose contacts
- Thermocouple contacts
- Shielded contacts
- Coax contacts.

The standard contacts have one of these finishes:

- Rhodium
- Gold
- Localized Gold.

NOTE: Contacts with these finishes are interchangeable and are applicable for all installations.

The special purpose contacts have crimp barrels that can accept a conductor that is one, two, or four wire gauge sizes larger than the size of the engaging end. For example, a contact with a size 20 engaging end and a size 18 crimp barrel.

The thermocouple contacts are made with one of these materials:

- Alumel
- Chromel
- Constantan.

B. Selection of Recommended and Alternative Contacts

This paragraph gives the decision sequence to make a selection of:

- A contact to replace a contact that is in service
- A contact for a new installation.

These conditions identify the necessary contact for the connector assembly:

- The electrical and mechanical performance of the contact
- The insert configuration of the connector
- The size of the contact cavity in the connector
- The type of contact, pin or socket
- The size of the wire.

**Table 25
LOCATION OF CONTACT PART NUMBER DATA**

Contact Group	Specification	Reference
Standard	Boeing	Table 26
	Supplier	Table 27
	Military	Table 28
Thermocouple	Supplier	Table 29
	Military	Table 30
Special Purpose	Supplier	Table 31

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Table 25 (continued)

Contact Group	Specification	Reference
Shielded	Boeing	Table 32
	Military	Table 35
	Supplier	Table 36
Shielded Potted	Boeing	Table 33
Coax	Supplier	Table 37

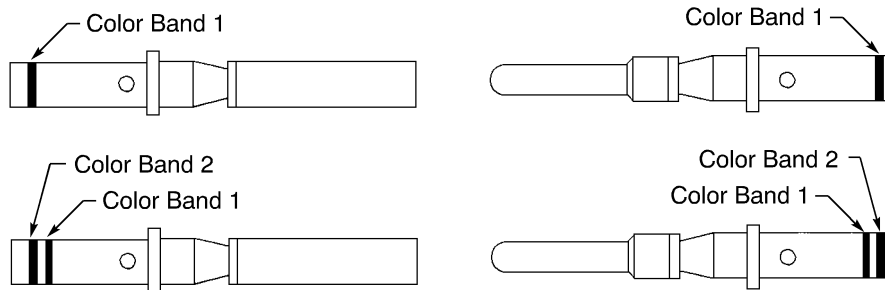
Refer to Table 25.

- (1) Make a selection of a contact that has the Boeing Standard number.
- (2) If the contact with the Boeing Standard number is not available, make a selection of an alternative contact that:
 - Has the supplier's part number
 - Is interchangeable with a contact that has the Boeing Standard number.

NOTE: The contact with the supplier's part number is a Boeing qualified contact that gives the same performance as the contact that has the Boeing Standard number.

- (3) If the contact with the supplier's part number is not available, make a selection of a permitted alternative equivalent contact that has the Military Standard number.

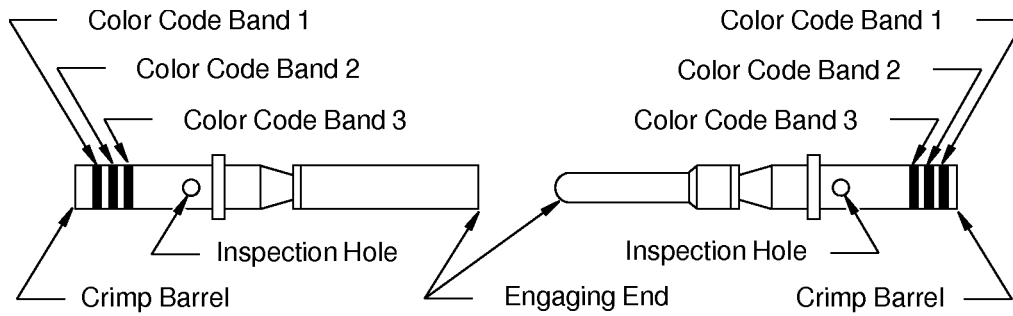
C. Standard Contacts



COLOR CODE BANDS OF THE BOEING STANDARD CONTACT
Figure 53

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS



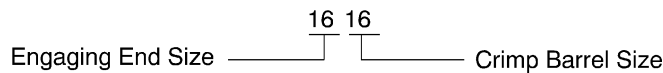
SOCKET CONTACT

PIN CONTACT

COLOR CODE BANDS OF THE MILITARY STANDARD CONTACT

Figure 54

The contact size of standard contacts gives the size of the contact engaging end and the size of the contact crimp barrel. Refer to Figure 55.



EXAMPLE OF CONTACT SIZE

Figure 55

**Table 26
BOEING STANDARD CONTACT PART NUMBERS**

Contact Size	Contact Type	Finish	Boeing Standard	Color Code	
				Band	Color
2020	Pin	Rhodium	BACC47CN1	1	Red
		Gold	BACC47CN1A	1	Red
		Localized Gold	BACC47CN1S	1	Red
	Socket	Gold	BACC47CP1A	1	Red
		Localized Gold	BACC47CP1S	1	Red
				2	Black
		Rhodium	BACC47CP1T	1	Red

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Table 26 (continued)

Contact Size	Contact Type	Finish	Boeing Standard	Color Code	
				Band	Color
1616	Pin	Rhodium	BACC47CN2	1	Blue
		Gold	BACC47CN2A	1	Blue
		Localized Gold	BACC47CN2S	1	Blue
	2			Black	
	Socket	Gold	BACC47CP2A	1	Blue
		Localized Gold	BACC47CP2S	1	Blue
				2	Black
		Rhodium	BACC47CP2T	1	Blue
1212	Pin	Rhodium	BACC47CN3	1	Yellow
		Gold	BACC47CN3A	1	Yellow
		Localized Gold	BACC47CN3S	1	Yellow
				2	Black
	Socket	Gold	BACC47CP3A	1	Yellow
		Localized Gold	BACC47CP3S	1	Yellow
				2	Black
		Rhodium	BACC47CP3T	1	Yellow

NOTE: Black color code for band 2 on size 16 and size 12 contacts with localized gold finish occur only on contacts made in 1998 and after.

Table 27

ALTERNATIVE PART NUMBERS FOR BOEING STANDARD CONTACTS

Boeing Standard	Part Number	Supplier
BACC47CN1A	317-2020-901	Tri-Star
	48-2335-09	Amphenol
	LRM20W-16DJ5	Burndy
	ZZL4020-36LD-H139	Pyle-National
BACC47CN1S	317-2020-901-L	Tri-Star
	ZZL4020-36LD-H148	Pyle-National
BACC47CN1	417-2020-901	Tri-Star
	48-2335-02	Amphenol
	C48-2335-02	Cinch
	LRM20W-16F74	Burndy
	ZZL-4020-36LT	Pyle-National

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Table 27 (continued)

Boeing Standard	Part Number	Supplier
BACC47CP1A	248-136-2002S-09	Amphenol
	318-2020-901	Tri-Star
	LRC20W-15DJ5	Burndy
	ZZL4120-36LD-H139	Pyle-National
BACC47CP1S	318-2020-901-L	Tri-Star
	LP-807105-205	Amphenol
	ZZL4120-36LD-H148	Pyle-National
BACC47CP1T	248-136-2007S-02	Amphenol
	418-2020-901	Tri-Star
	LRC20W-15F74	Burndy
	ZZL-4120-36LT	Pyle-National
BACC47CN2A	10-807100-165	Amphenol
	317-1616-902	Tri-Star
	LRM16M-16DJ5	Burndy
	ZZL4016-36LD-H139	Pyle-National
BACC47CN2S	317-1616-902-L	Tri-Star
	ZZL4016-36LD-H148	Pyle-National
BACC47CN2	417-1616-902	Tri-Star
	48-1825-02	Amphenol
	LRM16M-15F74	Burndy
	ZZL-4016-36LT	Pyle-National
BACC47CP2A	10-807103-165	Amphenol
	318-1616-902	Tri-Star
	LRC16M-15DJ5	Burndy
	ZZL4116-36LD-H139	Pyle-National
BACC47CP2S	318-1616-902-L	Tri-Star
	LP-807103-165	Amphenol
	ZZL4116-36LD-H148	Pyle-National
BACC47CP2T	248-136-1600S-02	Amphenol
	418-1616-902	Tri-Star
	LRC16M-15F74	Burndy
	ZZL-4116-36LT	Pyle-National

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Table 27 (continued)

Boeing Standard	Part Number	Supplier
BACC47CN3A	10-807100-125	Amphenol
	317-1212-903	Tri-Star
	LRM12Z-16DJ5	Burndy
	ZZL4012-36LD-H139	Pyle-National
BACC47CN3S	317-1212-903-L	Tri-Star
	ZZL4012-36LD-H148	Pyle-National
BACC47CN3	417-1212-903	Tri-Star
	48-1827-02	Amphenol
	LRM12Z-15F74	Burndy
	ZZL-4012-36LT	Pyle-National
BACC47CP3A	10-807103-125	Amphenol
	318-1212-903	Tri-Star
	LRC12Z-15DJ5	Burndy
	ZZL4112-36LD-H139	Pyle-National
BACC47CP3S	318-1212-903-L	Tri-Star
	LP-807103-125	Amphenol
	ZZL4112-36LD-H148	Pyle-National
BACC47CP3T	248-136-1200S-02	Amphenol
	412-1212-903	Tri-Star
	LRC12Z-15F74	Burndy
	ZZL-4112-36LT	Pyle-National

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

**Table 28
ALTERNATIVE EQUIVALENT MILITARY CONTACT PART NUMBERS**

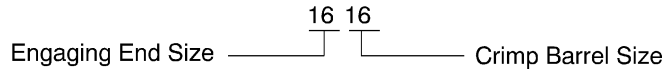
Contact Size	Contact Type	Finish	Part Number	Color Code		Supplier		
				Band or Dot	Color			
2020	Pin	Gold	M39029/31-241	1	Red	QPL		
				2	Yellow			
				3	Brown			
	Socket	Rhodium	MS24254-20P	1	Red	QPL		
				Gold	M39029/32-260	1	Red	QPL
						2	Blue	
3	Black							
1	Red	QPL						
1616	Pin	Gold	M39029/31-229	1	Red	QPL		
				2	Red			
				3	White			
	Socket	Rhodium	MS24254-16P	1	Blue	QPL		
				Gold	M39029/32-248	1	Red	QPL
						2	Yellow	
3	Gray							
1	Blue	QPL						
1212	Pin	Gold	M39029/31-235	1	Red	QPL		
				2	Orange			
				3	Green			
	Socket	Rhodium	MS24254-12P	1	Yellow	QPL		
				Gold	M39029/32-254	1	Red	QPL
						2	Green	
3	Yellow							
1	Yellow	QPL						

D. Thermocouple Contacts

The contact size of thermocouple contacts gives the size of the contact engaging end and the size of the contact crimp barrel. Refer to Figure 56.

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EXAMPLE OF CONTACT SIZE
Figure 56

Table 29
THERMOCOUPLE CONTACT PART NUMBERS

Contact Size	Contact Type	Material	Part Number	Supplier
2020	Pin	Alumel	48-2247	Amphenol
			LRM20W-9	Burndy
			ZZL-4020-10R	Pyle-National
		Chromel	48-2178	Amphenol
			LRM20W-10	Burndy
			ZZL-4020-10P	Pyle-National
	Constantan	LRM20W-12	Burndy	
		ZZL-4020-10N	Pyle-National	
	Socket	Alumel	48-2233	Amphenol
			LRC20W-9	Burndy
			ZZL-4120-10R	Pyle-National
		Chromel	48-2176	Amphenol
			LRC20W-10	Burndy
			ZZL-4120-10P	Pyle-National
Constantan		LRC20W-12	Burndy	
		ZZL-4120-10N	Pyle-National	

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Table 29 (continued)

Contact Size	Contact Type	Material	Part Number	Supplier
1616	Pin	Alumel	48-2358	Amphenol
			LRM16M-9	Burndy
			ZZL-4016-10R	Pyle-National
		Chromel	48-2180	Amphenol
			LRM16M-10	Burndy
			ZZL-4016-10P	Pyle-National
	Constantan	LRM16M-12	Burndy	
		ZZL-4016-10N	Pyle-National	
	Socket	Alumel	48-2359	Amphenol
			LRC16M-9	Burndy
			ZZL-4116-10R	Pyle-National
		Chromel	48-2182	Amphenol
LRC16M-10			Burndy	
ZZL-4116-10P			Pyle-National	
Constantan		LRC16M-12	Burndy	
		ZZL-4116-10N	Pyle-National	
1212	Pin	Alumel	48-2244	Amphenol
			ZZL-4012-10R	Pyle-National
		Chromel	48-2184	Amphenol
			ZZL-4012-10P	Pyle-National
	Constantan	48-2185	Amphenol	
		ZZL-4012-10N	Pyle-National	
	Socket	Alumel	48-2095	Amphenol
			ZZL-4112-10R	Pyle-National
		Chromel	48-2096	Amphenol
			ZZL-4112-10P	Pyle-National
Constantan		48-2186	Amphenol	
		ZZL-4112-10N	Pyle-National	

Refer to Figure 53 for the color code bands on a contact.

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**Table 30
ALTERNATIVE EQUIVALENT MILITARY THERMOCOUPLE CONTACT PART NUMBERS**

Contact Size	Contact Type	Material	Part Number	Color Code		Supplier
				Band	Color	
2020	Pin	Chromel	M39029/31-225	1	Red	QPL
				2	Red	
				3	Blue	
		Alumel	M39029/31-226	1	Red	QPL
				2	Red	
				3	Blue	
		Constantan	M39029/31-227	1	Red	QPL
				2	Red	
				3	Violet	
	Socket	Chromel	M39029/32-244	1	Red	QPL
				2	Yellow	
				3	Yellow	
		Alumel	M39029/32-245	1	Red	QPL
				2	Yellow	
				3	Green	
Constantan	M39029/32-246	1	Red	QPL		
		2	Yellow			
		3	Blue			

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Table 30 (continued)

Contact Size	Contact Type	Material	Part Number	Color Code		Supplier
				Band	Color	
1616	Pin	Chromel	M39029/31-231	1	Red	QPL
				2	Orange	
				3	Brown	
		Alumel	M39029/31-232	1	Red	QPL
				2	Orange	
				3	Red	
	Constantan	M39029/31-233	1	Red	QPL	
			2	Orange		
			3	Orange		
	Socket	Chromel	M39029/32-250	1	Red	QPL
				2	Green	
				3	Black	
		Alumel	M39029/32-251	1	Red	QPL
				2	Green	
				3	Brown	
Constantan		M39029/32-252	1	Red	QPL	
			2	Green		
			3	Red		

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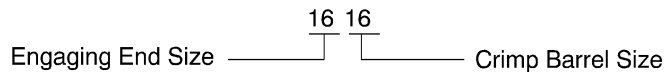
MIL-C-26500 FRONT RELEASE CONNECTORS

Table 30 (continued)

Contact Size	Contact Type	Material	Part Number	Color Code		Supplier	
				Band	Color		
1212	Pin	Chromel	M39029/31-237	1	Red	QPL	
				2	Orange		
				3	Violet		
		Alumel	M39029/31-238	1	Red		QPL
				2	Orange		
				3	Gray		
	Constantan	M39029/31-239	1	Red	QPL		
			2	Orange			
			3	White			
	Socket	Chromel	M39029/32-256	1	Red	QPL	
				2	Green		
				3	Blue		
Alumel		M39029/32-257	1	Red	QPL		
			2	Green			
			3	Violet			
Constantan		M39029/32-258	1	Red	QPL		
			2	Green			
			3	Gray			

E. Special Purpose Contacts

The contact size of special purpose contacts gives the size of the contact engaging end and the size of the contact crimp barrel. Refer to Figure 57.



EXAMPLE OF CONTACT SIZE
Figure 57



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**Table 31
SUPPLIER PART NUMBERS FOR SPECIAL PURPOSE CONTACTS**

Contact Size	Contact Type	Part Number	Supplier
2018	Socket	P-209541-D	Pyle-National
	Pin	P-209553-D	
	Socket	248-136-2018S-02	Amphenol
	Pin	48-100-5008P-02	
		48-100-5014P-02	
2016	Socket	P209439-D	Pyle-National
		P209439-T	
		248-136-2016S-02	Amphenol
	Pin	31A-2016-035	Tri-Star
		317-2016-035	
	Socket	318-2016-035	Amphenol
	Pin	48-100-5007P-02	
		48-100-5012P-02	
1614	Socket	248-136-1614S-02	Amphenol
	Pin	48-100-5021P-02	Amphenol
	Pin	P-208575-P	Pyle-National
	Socket	P-208575-S	Pyle-National
1212	Socket	31D-1212-903	Tri-Star
1210	Socket	248-136-1210S-02	Amphenol
	Pin	48-100-5020P-02	Amphenol
	Pin	P-204540	Pyle-National
	Socket	P-204541	Pyle-National

F. Boeing Shielded Contacts

**Table 32
BOEING STANDARD SHIELDED CONTACT PART NUMBERS**

Shielded Contact Size	Contact Cavity Size	Center Contact Size	Finish	Contact Type	Boeing Standard
1	12	22	Gold	Pin	BACC47EX1
				Socket	BACC47EZ1
2	8	20	Gold	Pin	BACC47EX2
				Socket	BACC47EZ2

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CAUTION: THE BOEING STANDARD POTTED SHIELDED CONTACTS IN TABLE 33 ARE NOT INTERCHANGEABLE.

**Table 33
BOEING STANDARD POTTED SHIELDED CONTACT PART NUMBERS**

Shielded Contact Size	Contact Cavity Size	Center Contact Size	Finish	Contact Type	Boeing Standard
2	8	20	Rhodium	Pin	10-60479-41
					60B40037-16
					60B40147-16
				Socket	10-60479-44
					60B40037-15
					60B40147-15
S283U007-7					

**Table 34
SUPPLIER PART NUMBERS FOR BOEING STANDARD SHIELDED CONTACTS**

Boeing Standard or Specification	Part Number	Supplier
10-60479-41	48-1292-02	Amphenol
	CN0940-41	Cinch
10-60479-44	48-2979-02	Amphenol
	CN0940-44	Cinch
60B40037-15	48-2979-02	Amphenol
	CN0940-44	Cinch
60B40037-16	48-1292-02	Amphenol
	CN0940-41	Cinch
60B40147-15	CN0958-15	Cinch
60B40147-16	CN0958-16	Cinch
BACC47EX1	21-33500-3	Amphenol
	319-12CX-547	Tri-Star
	C48-1226-03	Cinch
BACC47EX2	21-33504-60	Amphenol
	319-08CX-548	Tri-Star
	C48-2187-03	Cinch
BACC47EZ1	21-33501-3	Amphenol
	310-12CX-547	Tri-Star
	C48-1227-03	Cinch

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Table 34 (continued)

Boeing Standard or Specification	Part Number	Supplier
BACC47EZ2	21-33505-60	Amphenol
	310-08CX-548	Tri-Star
	C48-2188-03	Cinch
S283U007-7	CN1036-7	Cinch

G. Military Shielded Contacts

Table 35

MILITARY SHIELDED CONTACT PART NUMBERS

Shielded Contact Size	Contact Cavity Size	Center Contact Size	Contact Type	Part Number	Finish	Supplier
1	12	22	Pin	MS27184-22P	Gold	QPL
				M39029/54-342	Gold	QPL
			Socket	MS27185-22S	Gold	QPL
				M39029/55-344	Gold	QPL
2	8	20	Pin	MS27184-20P	Gold	QPL
				M39029/54-343	Gold	QPL
			Socket	MS27185-20S	Gold	QPL
				M39029/55-345	Gold	QPL

H. Supplier Shielded Contacts

CAUTION: THE SUPPLIER SHIELDED CONTACTS IN TABLE 36 ARE NOT INTERCHANGEABLE.

Table 36

SUPPLIER SHIELDED CONTACT PART NUMBERS

Shielded Contact Size	Contact Cavity Size	Center Contact Size	Finish	Contact Type	Part Number	Supplier
1	12	22	Rhodium	Pin	48-1226-02	Amphenol
					C48-1226-02	Cinch
				Socket	48-1227-02	Amphenol
					C48-1227-02	Cinch
2	8	20	Rhodium	Socket	CN0900-336	Cinch

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I. Coax Contacts

CAUTION: THE COAX CONTACTS IN TABLE 37 ARE NOT INTERCHANGEABLE.

**Table 37
COAX CONTACT PART NUMBERS**

Contact Size	Contact Type	Part Number	Supplier
12	Pin	CRM280-2	Cory Components
		CRM280-3	Cory Components
		CRM280-4	Cory Components
	Socket	CRC280-2	Cory Components
		CRC280-3	Cory Components
		CRC280-4	Cory Components
8	Socket	CRMEF-502	Cory Components

5. INSERT CONFIGURATIONS

A. MIL-C-26500 Type Connectors

NOTE: The insert configurations that are specified in Table 38 include the connector shell size as the first part of the configuration. Refer to Table 1 for the part number structure that is applicable for the connector.

NOTE: The contact cavity size that is specified in Table 38 is equivalent to the size of the engaging end of the contact.

**Table 38
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
8-2	2	20	Figure 58
8-3	3	20	Figure 58
10-2A	2	20	Figure 59
10-2	2	16	Figure 59
10-5	5	20	Figure 59
10-20	2	16	Figure 59
12-3	3	16	Figure 60
12-12	12	20	Figure 60
14-3	1	8	Figure 61
	2	16	
14-4	4	12	Figure 61
14-7	7	16	Figure 61

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 38 (continued)

Insert Configuration	Contact Cavity		Reference
	Count	Size	
14-12	3	16	Figure 61
	9	20	
14-15	15	20	Figure 61
16-10	10	16	Figure 62
16-24	24	20	Figure 62
18-8	8	12	Figure 63
18-11	1	8	Figure 63
	10	16	
18-14	14	16	Figure 63
18-31	31	20	Figure 63
20-16	16	16	Figure 64
20-25	19	20	Figure 64
	6	12	
20-28	24	20	Figure 64
	4	12	
20-39	2	16	Figure 64
	37	20	
20-41	41	20	Figure 64
22-12	12	12	Figure 65
22-19	19	16	Figure 65
22-32	26	20	Figure 65
	6	12	
22-39	27	20	Figure 65
	12	16	
22-55	55	20	Figure 65
24-30	30	16	Figure 66
24-43	20	16	Figure 66
	23	20	
24-57	2	12	Figure 66
	55	20	
24-61	61	20	Figure 66

20-61-11

STANDARD WIRING PRACTICES MANUAL

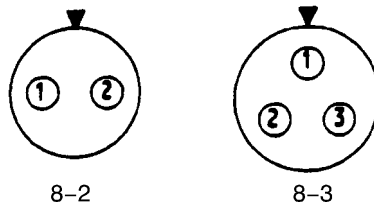
MIL-C-26500 FRONT RELEASE CONNECTORS

Table 38 (continued)

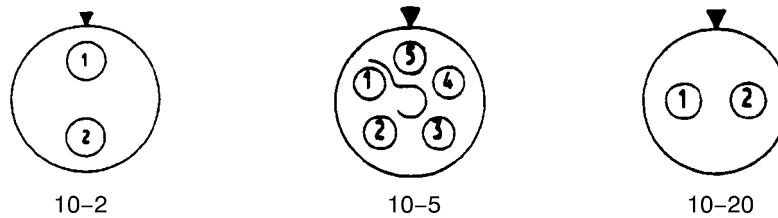
Insert Configuration	Contact Cavity		Reference
	Count	Size	
28-40	36	16	Figure 67
	4	12	
28-42	42	16	Figure 67

NOTE: Figure 58 through Figure 67 show the front face of an insert that has pins. The view of the front face of an insert that has sockets is a mirror image of this view.

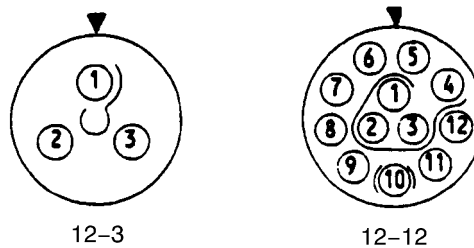
NOTE: The triangle at the top of each insert configuration in Figure 58 through Figure 67 shows the location of the major polarization key in relation to the location of the contacts.



8-() INSERT CONFIGURATIONS
Figure 58



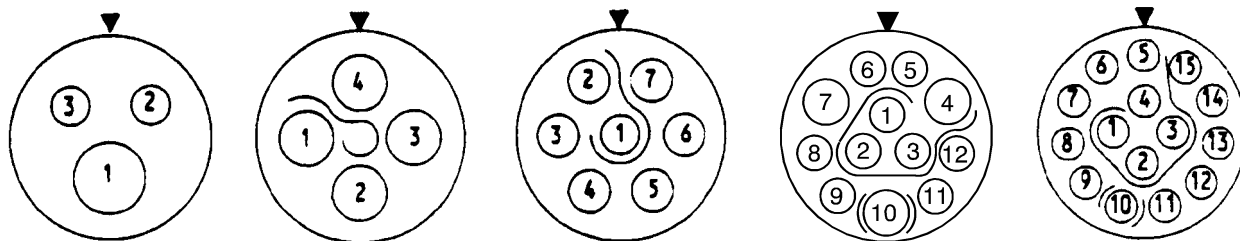
10-() INSERT CONFIGURATIONS
Figure 59



12-() INSERT CONFIGURATIONS
Figure 60

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS



14-3

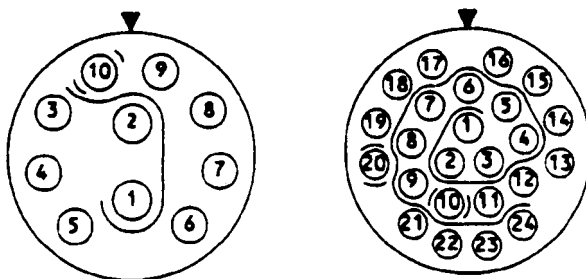
14-4

14-7

14-12

14-15

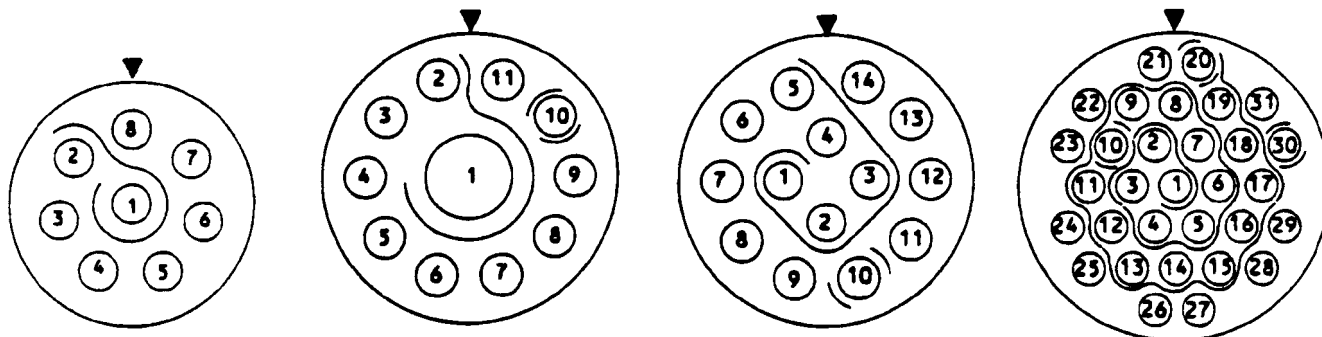
14-() INSERT CONFIGURATIONS
Figure 61



16-10

16-24

16-() INSERT CONFIGURATIONS
Figure 62



18-8

18-11

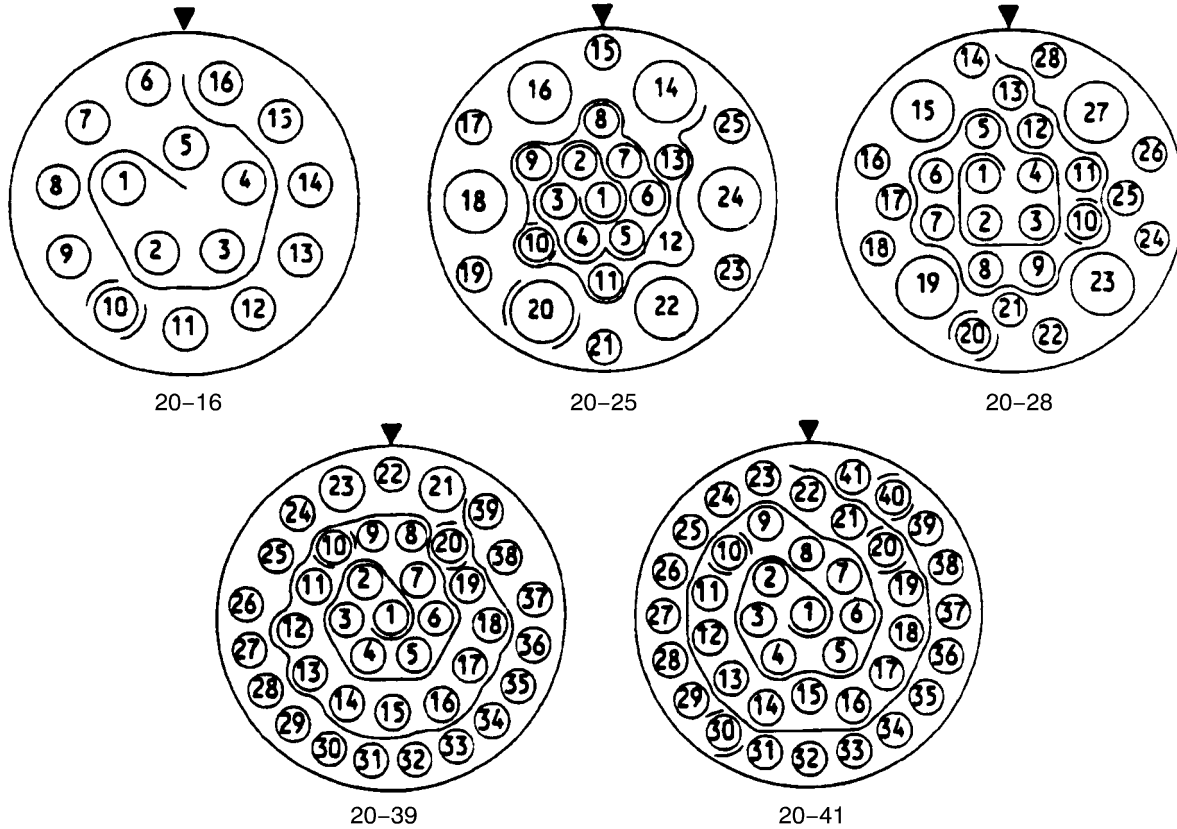
18-14

18-31

18-() INSERT CONFIGURATIONS
Figure 63

STANDARD WIRING PRACTICES MANUAL

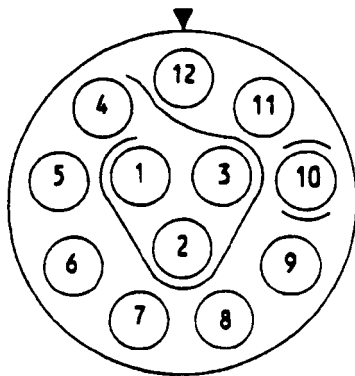
MIL-C-26500 FRONT RELEASE CONNECTORS



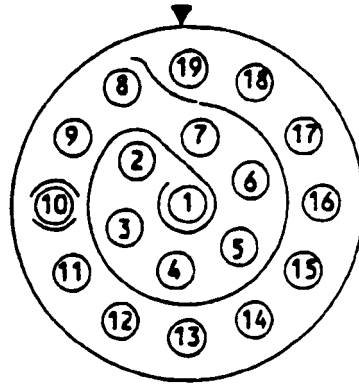
20-() INSERT CONFIGURATIONS
Figure 64

STANDARD WIRING PRACTICES MANUAL

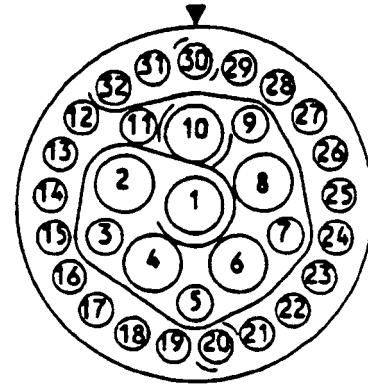
MIL-C-26500 FRONT RELEASE CONNECTORS



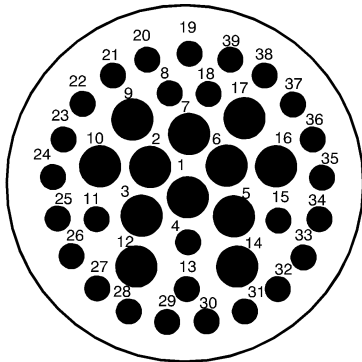
22-12



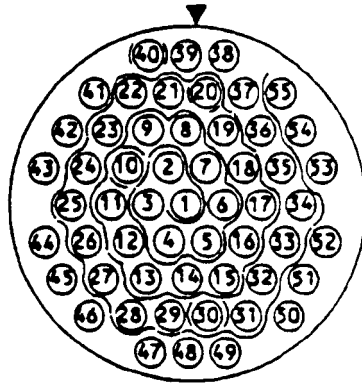
22-19



22-32



22-39

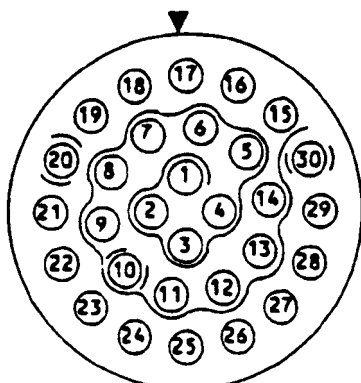


22-55

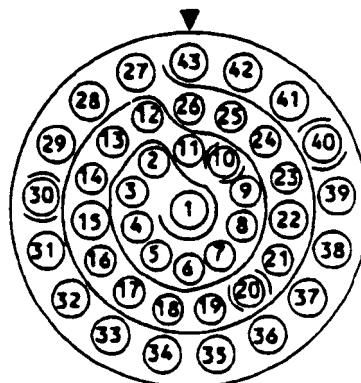
22-() INSERT CONFIGURATIONS
Figure 65

STANDARD WIRING PRACTICES MANUAL

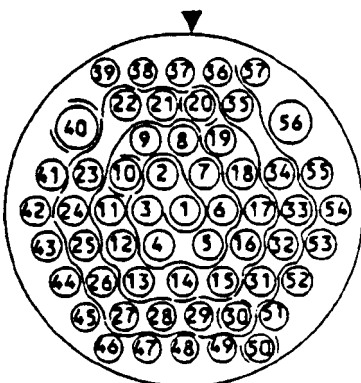
MIL-C-26500 FRONT RELEASE CONNECTORS



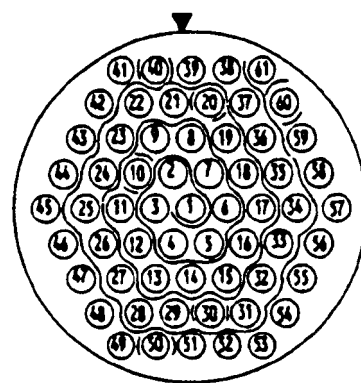
24-30



24-43

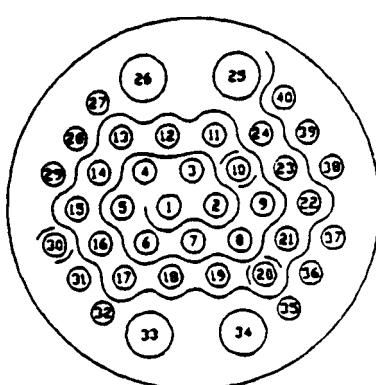


24-57

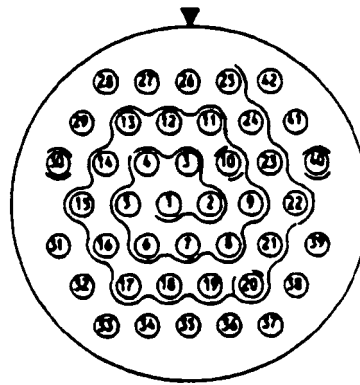


24-61

24-() INSERT CONFIGURATIONS
Figure 66



28-40



28-42

28-() INSERT CONFIGURATIONS
Figure 67

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6. CONNECTOR DISASSEMBLY

A. Cinch CN0900-329 Connector Separation

- (1) Turn the coupling ring clockwise until the bayonet pins of the plug are disengaged from the receptacle.

NOTE: As an alternative for connector separation, pull the lanyard straight away from the rear of the connector.

B. Backshell Removal

- (1) Remove the backshell components from the connector.

Refer to:

- Subject 20-60-09 for a strain relief clamp
- Subject 20-25-12 for a strain relief backshell with a shield termination
- Subject 20-25-13 for a peripheral backshell
- Subject 20-25-14 for a backshell with a shield terminator band.

NOTE: A backshell is also known as a strain relief clamp.

Make sure that the rear grommet is not removed from the connector.

CAUTION: DAMAGE TO THE CONNECTOR OCCURS IF THE REAR GROMMET IS REMOVED.

C. Contact Removal

Refer to:

- Paragraph 6.D. for the removal of a shielded contact
- Paragraph 6.E. for the removal of a coax contact.

**Table 39
CONTACT REMOVAL TOOLS**

Contact Engaging End Size	Removal Tool
20	294-89
	AT 2020
	ATML 1907
	DRK20
	M81969/19-06
	M81969/19-07
	MS24256R20
	RX20-24
	RX20-24V5
	ST2220-3-13
	ZZL-R-9511-20



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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 39 (continued)

Contact Engaging End Size	Removal Tool
16	294-97
	AT 2016
	ATML 1908
	DRK16
	DRK56-16
	MS24256R16
	MS24256-16
	M81969/19-01
	M81969/19-08
	MS24256R16
	RX16-7
	RX16-8
	ST2220-3-14
	ZZL-R-9511-16
12	294-73
	AT 2012
	ATML 1909
	DRK12
	DRK56-12
	M81969/19-02
	M81969/19-09
	MS24256R12
	MS90456-12
	RTX12-7
	RX12-7
	ST2220-3-15
	ZZL-R-9511-12

- (1) Make a selection of a recommended contact removal tool from Table 39.
- (2) Examine the removal tool.

WARNING: DO NOT USE A REMOVAL TOOL THAT HAS A BENT TIP OR BIT. AN INJURY CAN OCCUR.

- (3) If it is necessary, remove the backshell components from the connector. Refer to Paragraph 6.B. Make sure that the rear grommet is not removed from the connector.

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MIL-C-26500 FRONT RELEASE CONNECTORS

CAUTION: DAMAGE TO THE CONNECTOR WILL OCCUR IF THE REAR GROMMET IS REMOVED.

- (4) Push the backshell components away from the connector.
- (5) At the front face of the connector, axially align the tool with the contact cavity.
Make sure that the plunger of the removal tool is fully retracted.

CAUTION: DO NOT INSERT THE TOOL INTO THE REAR GROMMET OF THE CONNECTOR. DAMAGE TO THE CONNECTOR WILL OCCUR.

- (6) Push the tool into the contact cavity until it stops.

NOTE: The retention clips in the contact cavity begin to open when resistance is felt.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (7) Hold the tool against the connector, and at the same time, push the plunger of the tool until the contact moves rearward in the connector.
- (8) Carefully pull the tool out from the contact cavity.
Make sure that the removal tool stays axially aligned with the contact cavity.
- (9) Pull the contact out from the rear of the connector.

D. Shielded Contact Removal

**Table 40
SHIELDED CONTACT REMOVAL TOOLS**

Shielded Contact Size	Connector Cavity Size	Removal Tool
1	12	294-73
		M81969/19-02
		MS24256R12
2	8	294-127
		M81969/19-03

- (1) Make a selection of a shielded contact removal tool from Table 40.
- (2) Examine the removal tool.

WARNING: DO NOT USE A REMOVAL TOOL THAT HAS A BENT TIP OR BIT. AN INJURY CAN OCCUR.

- (3) If it is necessary, remove the backshell components from the connector. Refer to Paragraph 6.B.
Make sure that the rear grommet is not removed from the connector.

CAUTION: DAMAGE TO THE CONNECTOR WILL OCCUR IF THE REAR GROMMET IS REMOVED.

- (4) Push the backshell components away from the connector.
- (5) If the contact is a size 2 shielded contact with a seal boot or an O-ring:
 - (a) Pull the seal boot or the O-ring until it is away from the rear grommet.
 - (b) Move the seal boot or the O-ring away from the connector.

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MIL-C-26500 FRONT RELEASE CONNECTORS

- (6) Remove the shielded contacts from the connector.

Make sure that the center contact is not removed from the shielded contact.

CAUTION: DAMAGE TO THE SHIELDED CONTACT AND THE CONNECTOR CAN OCCUR IF THE CENTER CONTACT IS REMOVED FROM THE SHIELD.

- (a) At the front face of the connector, axially align the tool with the contact cavity.

Make sure that the plunger of the removal tool is fully retracted.

CAUTION: DO NOT INSERT THE TOOL INTO THE REAR GROMMET OF THE CONNECTOR. DAMAGE TO THE CONNECTOR WILL OCCUR.

- (b) Push the tool into the contact cavity until it stops.

NOTE: The retention clips in the contact cavity begin to open when resistance is felt.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (c) Hold the tool against the connector, and at the same time, push the plunger of the tool until the contact moves rearward in the connector.

- (d) Carefully pull the tool out of the contact cavity.

Make sure that the removal tool stays axially aligned with the contact cavity.

- (e) Pull the contact out from the rear of the connector.

E. Coax Contact Removal

**Table 41
COAX CONTACT REMOVAL TOOLS**

Contact Size	Removal Tool
12	294-73
	M81969/19-02
	MS24256R12
8	294-127
	M81969/19-03

- (1) Make a selection of a coax contact removal tool from Table 41.

- (2) Examine the removal tool.

WARNING: DO NOT USE A REMOVAL TOOL THAT HAS A BENT TIP OR BIT. AN INJURY CAN OCCUR.

- (3) If it is necessary, remove the backshell components from the connector. Refer to Paragraph 6.B. Make sure that the rear grommet is not removed from the connector.

CAUTION: DAMAGE TO THE CONNECTOR WILL OCCUR IF THE REAR GROMMET IS REMOVED.

- (4) Push the backshell components away from the connector.

- (5) Remove the coax contact from the connector.

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Make sure that the center contact is not removed from the coax contact.

CAUTION: DAMAGE TO THE COAX CONTACT AND THE CONNECTOR CAN OCCUR IF THE CENTER CONTACT IS REMOVED.

- (a) At the front face of the connector, axially align the tool with the contact cavity.

Make sure that the plunger of the removal tool is fully retracted.

CAUTION: DO NOT INSERT THE TOOL INTO THE REAR GROMMET OF THE CONNECTOR. DAMAGE TO THE CONNECTOR WILL OCCUR.

- (b) Push the tool into the contact cavity until it stops.

NOTE: The retention clips in the contact cavity begin to open when resistance is felt.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (c) Hold the tool against the connector, and at the same time, push the plunger of the tool until the contact moves rearward in the connector.

- (d) Carefully pull the tool out of the contact cavity.

Make sure that the removal tool stays axially aligned with the contact cavity.

- (e) Pull the contact out from the rear of the connector.

F. Seal Plug and Seal Rod Removal

- (1) If an unwired contact is in the contact cavity, refer to Paragraph 6.C. for the procedure to remove the contact.

NOTE: The seal plug or the seal rod is removed with the contact.

- (2) Make a selection of a pair of pliers.

CAUTION: MAKE SURE THAT THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (3) Tightly hold the end of the seal plug or the seal rod in the jaws of the pliers.

- (4) Carefully pull the seal plug or the seal rod straight out of the contact cavity.

7. WIRE PREPARATION**A. Wire Preparation**

For the assembly of MIL-C-26500 type connectors with triax cable, refer to Subject 20-53-05.

For the preparation of:

- Champlain 24-00033 and Champlain 24-00034 wire, refer to Paragraph 7.B.
- Rockbestos or Cerro H22-4000 wire, refer to Paragraph 7.C.
- Belden 8787 cable, refer to Paragraph 7.D.
- S280T007-1 coil cable, refer to Paragraph 7.E.
- Champlain 51-04569 and 51-04570 cables, refer to Paragraph 7.F.

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**Table 42
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Target	Tolerance	
24	20	0.19	± 0.02	-
		0.28	± 0.02	For Pyle National ZZL-4()20-10() contacts only
	16	0.50	± 0.03	Fold the conductor back
22	20	0.19	± 0.02	-
		0.28	± 0.02	For Pyle National ZZL-4()20-10() contacts only
	16	0.50	± 0.03	Fold the conductor back
20	20	0.19	± 0.02	-
		0.28	± 0.02	For Pyle National ZZL-4()20-10() contacts only
	16	0.25	± 0.02	-
	12	0.50	± 0.03	Fold the conductor back
18	18	0.25	± 0.02	-
	16	0.25	± 0.02	-
	12	0.50	± 0.03	Fold the conductor back
16	16	0.25	± 0.02	-
	12	0.25	± 0.02	-
15	16	0.25	± 0.02	-
	12	0.25	± 0.02	-
14	14	0.25	± 0.02	-
	12	0.25	± 0.02	-
13	14	0.25	± 0.02	-
	12	0.25	± 0.02	-
12	12	0.25	± 0.02	-

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

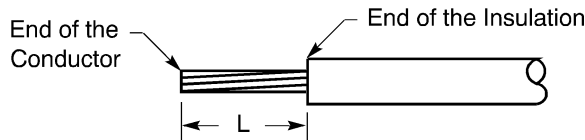
- Figure 68
- Table 42 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.

NOTE: Refer to Subject 20-60-00:

- If the wire size and a larger crimp barrel are not given in Table 42
- For alternatives to the assembly of a contact with a conductor that is folded back.

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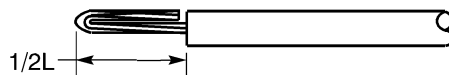
MIL-C-26500 FRONT RELEASE CONNECTORS



INSULATION REMOVAL LENGTH

Figure 68

(2) If it is specified, fold the conductor back. Refer to Figure 69.



FOLDED BACK CONDUCTOR

Figure 69

(3) Measure the O.D. of the wire.

(4) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.C.

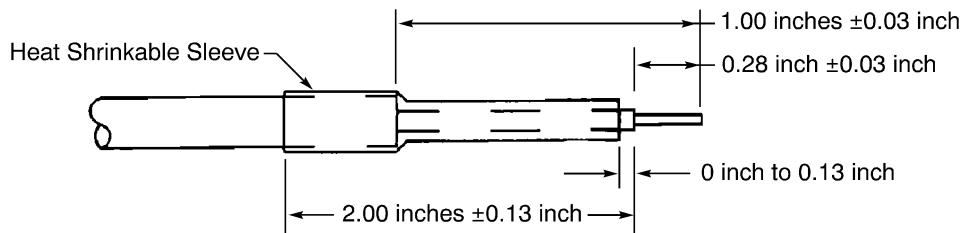
B. Preparation of Champlain 24-00033 and Champlain 24-00034 Wire

Table 43

NECESSARY MATERIALS

Material	Part Number	Description	Supplier
Sleeve, Heat Shrinkable	TFE 4X	3/16 inch diameter	Chemplast
			Zeus Industrial Products

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.



PREPARATION OF CHAMPLAIN 24-00034 FIRE RESISTANT WIRE

Figure 70

Refer to Figure 70.

(1) Make a selection of a heat shrinkable sleeve from Table 43.

(2) Remove 1.00 inches ± 0.03 inch of the outer jacket from the end of the wire. Refer to Subject 20-00-15.

(3) Remove 1.00 inches ± 0.03 inch of the layer of braid from the end of the wire. Refer to Subject 20-00-15.

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CAUTION: DO NOT CAUSE DAMAGE TO THE INNER RUBBER LAYER. DAMAGE TO THE RUBBER LAYER CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (4) Remove 0.28 inch \pm 0.03 inch of the inner rubber layer from the end of the wire. Refer to Subject 20-00-15.
- (5) Remove 0.28 inch \pm 0.03 inch of the inner tape wrap from the end of the wire. Refer to Subject 20-00-15.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (6) Put a 2.0 inch \pm 0.13 inch length of heat shrinkable sleeve on the wire.
- (7) Align the forward end of the sleeve and the end of the inner rubber layer.

Make sure that:

- The forward end of the sleeve does not extend farther than the end of the inner rubber layer
- The distance from the forward end of the sleeve to the end of the inner rubber layer is not more than 0.13 inch.

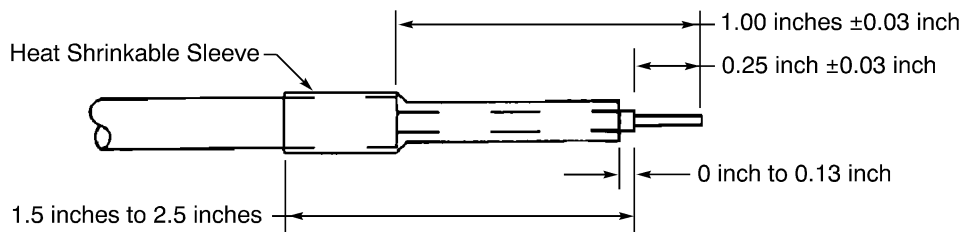
- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Preparation of Rockbestos or Cerro H22-4000 Wire

**Table 44
NECESSARY MATERIALS**

Material	Part Number	Description	Supplier
Sleeve, Heat Shrinkable	TFE 4X	1/4 inch diameter	Chemplast
			Zeus Industrial Products

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.



**PREPARATION OF ROCKBESTOS OR CERRO H22-4000 WIRE
Figure 71**

Refer to Figure 71.

- (1) Make a selection of a heat shrinkable sleeve from Table 44.
- (2) Remove 1.00 inches \pm 0.03 inch of the outer braid from the end of the wire. Refer to Figure 71 and Subject 20-00-15.
- (3) Remove 1.00 inches \pm 0.03 inch of the clear inner wrap from the end of the wire.

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CAUTION: DO NOT CAUSE DAMAGE TO THE INNER INSULATION LAYER. DAMAGE TO THE INNER LAYER CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (4) Remove 0.25 inch \pm 0.02 inch of the inner insulation from the end of the wire. Refer to Subject 20-00-15.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (5) Put a 1.5 inch to 2.5 inch length of heat shrinkable sleeve on the wire.
- (6) Align the forward end of the sleeve and the end of the inner insulation.

Make sure that:

- The forward end of the sleeve does not extend farther than the end of the inner insulation
- The distance from the forward end of the sleeve to the end of the inner insulation is not more than 0.13 inch.

- (7) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Preparation of Belden 8787 Cable

**Table 45
NECESSARY MATERIALS**

Material	Part Number or Description	Supplier
Seal Sleeve, Heat Shrinkable	DWP-125	Raychem (Tyco)
Sleeve, Heat Shrinkable	Grade B, Class 1	Refer to Subject 20-00-11.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (1) Make a selection of a 3/8 inch diameter heat shrinkable seal sleeve from Table 45.
- (2) Put a 1.5 inch \pm 0.2 inch length of the heat shrinkable sleeve on the cable.
- (3) Remove 1.5 inches \pm 0.1 inch of the outer jacket from the end of the cable.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE INSULATION OF THE INNER WIRE. DAMAGE TO THE INSULATION WILL CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

CAUTION: DO NOT CAUSE DAMAGE TO THE UNINSULATED SHIELD DRAIN WIRES. DAMAGE TO THE DRAIN WIRES CAN DECREASE THE STRENGTH OF THE DRAIN WIRES.

- (4) Remove the necessary length of the red foil tape and the green foil tape.
Make sure that the end of each foil tape is not more than 0.06 inch from the end of the outer jacket.

- (5) Remove the necessary length of the clear Mylar tape.
Make sure that the distance from the end of the tape to the end of the outer jacket is not more than 0.06 inch.

CAUTION: DO NOT CAUSE DAMAGE TO THE UNINSULATED SHIELD DRAIN WIRES. DAMAGE TO THE DRAIN WIRES CAN DECREASE THE STRENGTH OF THE DRAIN WIRES.

- (6) Put the heat shrinkable sleeve on the outer jacket.
- (7) If it is necessary to assemble a contact on the drain wire:
 - (a) Make a selection of a 1/16 inch diameter heat shrinkable sleeve from Table 45.

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- (b) Put a 1.20 inches ± 0.06 inch length of the heat shrinkable sleeve on the drain wire.
Make sure that the rear end of the sleeve is against the end of the outer jacket.
- (c) Shrink the sleeve on the drain wire into its position. Refer to Subject 20-10-14.
- (8) If it is not necessary to assemble a contact on the drain wire, cut the necessary length from the end of the drain wire.
Make sure that the distance from the end of the outer jacket to the end of the drain wire is not more than 0.06 inch.
- (9) Remove the necessary length of insulation from the end of the wires. Refer to Paragraph 7.A.

E. Preparation of S280T007-1 Coil Cable

**Table 46
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (1) Make a selection of a heat shrinkable sleeve from Table 46.
Make sure that the sleeve has the smallest possible diameter that will move easily on the cable.
- (2) Put a 1.00 inch ± 0.13 inch length of the heat shrinkable sleeve on the cable.
- (3) Remove the necessary length of insulation from the end of the wires. Refer to Paragraph 7.A.
- (4) Push the sleeve to the end of the cable until the forward end of the sleeve makes a 0.5 inch minimum overlap with the end of the cable jacket.
- (5) Shrink the sleeve into its position. Refer to Subject 20-10-14.

F. Preparation of Champlain 51-04569 and 51-04570 Cables

**Table 47
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	TFE 4X	Zeus Industrial Products

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (1) Assemble a shield ground wire.
NOTE: The shield ground wire can be assembled with one of these procedures:
 - A mechanical ferrule
 - A solder sleeve.
- (a) Make a selection of one of these:
 - A mechanical ferrule from Subject 20-10-15
 - A solder sleeve from Table 48.

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**Table 48
SOLDER SLEEVE PART NUMBERS**

Part Number	Supplier
D-108-02	Raychem
D-108-11	Raychem

- (b) Make a selection of a heat shrinkable sleeve from Table 47.
- (c) Assemble the shield ground wire. Refer to Subject 20-10-15.
- (2) Remove the necessary length of insulation from the end of the wires. Refer to Paragraph 7.A.

8. CONTACT ASSEMBLY

A. Selection of a Crimp Tool

**Table 49
RECOMMENDED CONTACT CRIMP TOOLS FOR ONE WIRE IN THE CRIMP BARREL**

Wire Size (AWG)	Contact Size	Crimp Tool				Code
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
24	2020	M22520/1-01	2	M22520/1-02	Red	B
		M22520/2-01	5	M22520/2-02	-	A
	1616	M22520/1-01	4	M22520/1-02	Blue	I
22	2020	M22520/1-01	3	M22520/1-02	Red	D
		M22520/2-01	6	M22520/2-02	-	C
	1616	M22520/1-01	5	M22520/1-02	Blue	J
20	2020	M22520/1-01	4	M22520/1-02	Red	F
		M22520/2-01	7	M22520/2-02	-	E
	1616	M22520/1-01	4	M22520/1-02	Blue	I
	1212	M22520/1-01	6	M22520/1-02	Yellow	M
18	2018	M22520/1-01	5	M22520/1-02	Red	H
		M22520/2-01	8	M22520/2-02	-	G
	1616	M22520/1-01	5	M22520/1-02	Blue	J
	1212	M22520/1-01	7	M22520/1-02	Yellow	N
16	2016	M22520/1-01	6	M22520/1-02	Red	H
		M22520/2-01	8	M22520/2-02	-	G
	1616	M22520/1-01	6	M22520/1-02	Blue	K
	1212	M22520/1-01	6	M22520/1-02	Yellow	M
15	1614	M22520/1-01	7	M22520/1-02	Blue	L
	1212	M22520/1-01	7	M22520/1-02	Yellow	N

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Table 49 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Code
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
14	1614	M22520/1-01	7	M22520/1-02	Blue	L
	1212	M22520/1-01	7	M22520/1-02	Yellow	N
13	1614	M22520/1-01	7	M22520/1-02	Blue	L
	1212	M22520/1-01	7	M22520/1-02	Yellow	N
12	1212	M22520/1-01	8	M22520/1-02	Yellow	O
10	1210	M22520/1-01	8	M22520/1-02	Yellow	N

Table 50

ALTERNATIVE EQUIVALENT CONTACT CRIMP TOOLS FOR ONE WIRE IN THE CRIMP BARREL

Wire Size (AWG)	Contact Size	Crimp Tool				Code
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
24	2020	85-220	5	M22520/2-02	-	A
		85-550	2	M22520/1-02	Red	B
		WA22	5	M22520/2-02	-	A
		WA22LC	5	M22520/2-02	-	A
		WA27F	2	M22520/1-02	Red	B
	1616	85-550	4	M22520/1-02	Blue	I
		WA27F	4	M22520/1-02	Blue	I
22	2020	85-220	6	M22520/2-02	-	C
		WA22	6	M22520/2-02	-	C
		WA22LC	6	M22520/2-02	-	C
		WA27F	3	M22520/1-02	Red	D
	1616	85-550	5	M22520/1-02	Blue	J
		WA27F	5	M22520/1-02	Blue	J

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Table 50 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				
		Basic Unit		Locator		Code
		Part Number	Setting	Part Number	Color	
20	2020	85-220	7	M22520/2-02	-	E
		85-550	4	M22520/1-02	Red	F
		WA22	7	M22520/2-02	-	E
		WA22LC	7	M22520/2-02	-	E
		WA27F	4	M22520/1-02	Red	F
	1616	85-550	4	M22520/1-02	Blue	I
		WA27F	4	M22520/1-02	Blue	I
	1212	85-550	6	M22520/1-02	Yellow	M
		WA27F	6	M22520/1-02	Yellow	M
	18	2018	WA22	8	M22520/2-02	-
WA27F			5	M22520/1-02	Red	H
1616		85-550	5	M22520/1-02	Blue	J
		WA27F	5	M22520/1-02	Blue	J
1212		85-550	7	M22520/1-02	Yellow	N
		WA27F	7	M22520/1-02	Yellow	N
16	1212	85-550	6	M22520/1-02	Yellow	M
		WA27F	6	M22520/1-02	Yellow	M
15	1212	85-550	7	M22520/1-02	Yellow	N
		WA27F	7	M22520/1-02	Yellow	N
14	1212	85-550	7	M22520/1-02	Yellow	N
		WA27F	7	M22520/1-02	Yellow	N
13	1212	85-550	7	M22520/1-02	Yellow	N
		WA27F	7	M22520/1-02	Yellow	N
12	1212	85-550	8	M22520/1-02	Yellow	O
		WA27F	8	M22520/1-02	Yellow	O
10	1210	WA27F	8	M22520/1-02	Yellow	N

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**Table 51
ALTERNATIVE PERMITTED CONTACT CRIMP TOOLS FOR ONE WIRE IN THE CRIMP BARREL**

Wire Size (AWG)	Contact Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Die Set	Part Number	Color
24	2020	M10S	-	S-5	SL-3	-
22	2020	M10S	-	S-6	SL-3	-
		ST2220-1-Y	-	-	ST2220-1-1	-
20	2020	M10S	-	S-6	SL-3	-
		ST2220-1-Y	-	-	ST2220-1-1	-
	1616	M10S	-	S-7	SL-2	-
		ST2220-1-Y	-	-	ST2220-1-2	-
18	2018	M22520/2-01	8	-	K250	-
	2016	M22520/2-01	8	-	K977	-
		WA22	8	-	K977	-
	1616	M10S	-	S-7	SL-2	-
		ST2220-1-Y	-	-	ST2220-1-2	-
16	2016	M22520/2-01	8	-	K977	-
		ST2220-1-Y	-	-	ST2220-1-45	-
	1616	85-550	6	-	M22520/1-02	Blue
		M10S	-	S-7	SL-3	-
		ST2220-1-Y	-	-	ST2220-1-2	-
		WA27F	6	-	M22520/1-02	Blue
15	1614	WA27F	7	-	M22520/1-02	Blue
14	1614	WA27F	7	-	M22520/1-02	Blue
	1212	M10S	-	S-8	SL-4	-
		ST2220-1-Y	-	-	ST2220-1-3	-
13	1614	WA27F	7	-	M22520/1-02	Blue
12	1212	M10S	-	S-8	SL-4	-
		ST2220-1-Y	-	-	ST2220-1-2	-

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Table 52
CONTACT CRIMP TOOLS FOR TWO WIRES IN THE CRIMP BARREL

Two Wires in the Crimp Barrel		Contact			Crimp Tool			
Size of the First Wire (AWG)	Size of the Second Wire (AWG)	Size	Part Number	Supplier	Basic Unit		Locator	
					Part Number	Setting	Part Number	Color
22	22	2018	P-209541-D	Pyle-National	M22520/1-01	4	M22520/1-02	Red
					M22520/2-01	7	M22520/2-02	-
		2016	P-209439-D	Pyle-National	M22520/1-01	4	M22520/1-02	Red
					M22520/2-01	7	M22520/2-02	-
	16	1614	P-208575-S	Pyle-National	M22520/1-01	7	M22520/1-02	Blue
					WA27F	7	M22520/2-02	Blue

Table 53
CONTACT CRIMP TOOL REFERENCES FOR TWO WIRES IN THE CRIMP BARREL

Two Wires in the Crimp Barrel		Contact			Crimp Tool	
Size of the First Wire (AWG)	Size of the Second Wire (AWG)	Size	Part Number or Specification	Supplier	Reference for the Basic Unit and the Locator	Setting
24	24	2020	BACC47CN1()	Boeing	Table 49	for AWG 20
			BACC47CP1()			
		1616	BACC47CN2()			
			BACC47CP2()			

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Table 53 (continued)

Two Wires in the Crimp Barrel		Contact			Crimp Tool		
Size of the First Wire (AWG)	Size of the Second Wire (AWG)	Size	Part Number or Specification	Supplier	Reference for the Basic Unit and the Locator	Setting	
22	22	1616	BACC47CN2()	Boeing	Table 49	for AWG 18	
			BACC47CP2()				
		2018	P-209541-D	Pyle-National	Boeing	Table 49	for AWG 18
			P-209553-D				
			10-807107-20T				
			10-807107-205				
			10-807120-20T				
			10-807120-205				
			248-136-2018S-02	Amphe~ nol			
			48-100-5008P-02				
48-100-5014P-02							
22	20	1616	BACC47CN2()	Boeing	Table 49	for AWG 18	
			BACC47CP2()				
		2016	P-209439-D	Pyle-National	Boeing	Table 49	for AWG 16
			P-209439-T				
			10-807118-20T				
			10-807118-205				
			10-807155-20T				
			10-807155-205				
			248-136-2016S-02	Amphe~ nol			
			31A-2016-035	Tri-Star			
			317-2016-035				
			318-2016-035				
			48-100-5012P-02	Amphe~ nol			
48-100-5007P-02							

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Table 53 (continued)

Two Wires in the Crimp Barrel		Contact			Crimp Tool			
Size of the First Wire (AWG)	Size of the Second Wire (AWG)	Size	Part Number or Specification	Supplier	Reference for the Basic Unit and the Locator	Setting		
22	18	2016	P-209439-D	Pyle-National	Table 49	for AWG 16		
			10-807118-20T	Boeing				
			10-807118-20S					
			10-807155-20T					
			10-807155-20S					
			248-136-2016S-02	Amphe-nol				
			31A-2016-035	Tri-Star				
			318-2016-035					
			48-100-5007P-02	Amphe-nol				
			48-100-5012P-02					
20	20	1212	BACC47CN3()	Boeing	Table 49	for AWG 16		
			BACC47CP3()					
		2016	P-209439-D	Pyle-National	Table 49	for AWG 16		
			10-807118-20T	Boeing				
			10-807118-20S					
			10-807155-20T					
			10-807155-20S					
			248-136-2016S-02	Amphe-nol				
			31A-2016-035	Tri-Star				
			318-2016-035					
			48-100-5007P-02	Amphe-nol				
			48-100-5012P-02					
		20	18	1212	BACC47CN3()	Boeing	Table 49	for AWG 16
					BACC47CP3()			

(1) If the contact is to be terminated to one wire, make a selection of a recommended crimp tool from Table 49.

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(2) If the recommended crimp tool is not available:

(a) Identify the code of the recommended crimp tool. Refer to Table 49.

NOTE: A crimp tool code is assigned to a crimp tool and is related to:

- The basic unit
- The setting of the basic unit
- The locator
- The color of the locator.

For example, for an AWG 24 wire in a contact that has a size 20 engaging end and a size 20 crimp barrel, the recommended crimp tool from Table 49 is:

- An M22520/1-01 basic unit at a setting of 2
- An M22520/1-02 locator at red.

This crimp tool has a crimp tool code of B.

(b) Make a selection of an alternative equivalent crimp tool from Table 50 that has the same crimp tool code for the same wire size and contact size.

NOTE: Crimp tools that have the same crimp tool code attach a contact to a wire in a way that is mechanically equivalent.

In the example for an AWG 24 wire in a contact that has a size 20 engaging end and a size 20 crimp barrel with a crimp tool code of B, the alternative equivalent crimp tool is:

- An 85-550 or a WA27F basic unit at a setting of 2
- An M22520/1-02 locator at red.

(3) If the alternative equivalent crimp tool is not available, make a selection of an alternative permitted crimp tool from Table 51.

(4) If the contact is to be terminated to two wires:

(a) Make a selection of a crimp tool from Table 52.

(b) If the contact part number is not shown in Table 52, refer to Table 53 for the reference to a crimp tool and a locator for the contact size.

(c) Use the contact size to make a selection of a crimp tool and locator from Table 49.

NOTE: A crimp tool and a locator selected from Table 50 or Table 51 is a satisfactory alternative.

(d) Use the wire size specified in Table 53 under Setting to find the crimp tool setting in Table 49 or Table 50 or Table 51.

B. Contact Assembly

This paragraph gives the procedure to assemble:

- A standard contact
- A thermocouple contact
- A special purpose contact.

For the procedure to assemble:

- A shielded contact, refer to Paragraph 9.
- A coax contact, refer to Paragraph 10.

(1) Make a selection of the contact. Refer to the Wiring Diagram Manual.

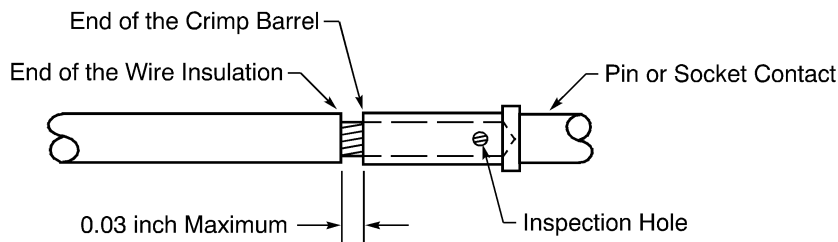
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- (2) Prepare the wire. Refer to:
 - Paragraph 7. for the wire preparation procedure
 - Subject 20-00-15 for the insulation removal procedures.
- (3) Make a selection of a crimp tool. Refer to Paragraph 8.A.
- (4) For a contact without an insulation support barrel:
 - (a) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 72.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

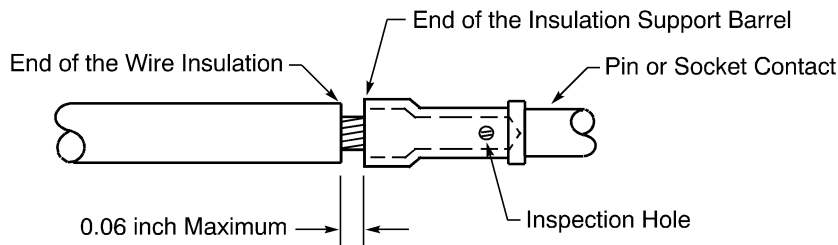


POSITION OF THE WIRE IN A CONTACT WITHOUT AN INSULATION SUPPORT BARREL
Figure 72

- (b) Crimp the contact.
- (5) For a contact with an insulation support barrel and a wire that has an O.D. that is larger than the insulation support barrel:
 - (a) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 73.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.06 inch.



POSITION OF THE WIRE THAT HAS AN O.D. THAT IS LARGER THAN THE INSULATION SUPPORT BARREL
Figure 73

- (b) Crimp the contact.
- (6) For all other contacts with an insulation support barrel:

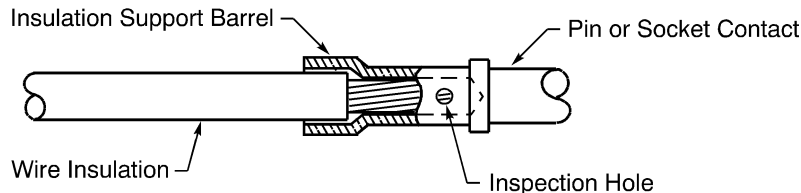
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(a) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 74.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The wire insulation is in the insulation support barrel.



POSITION OF THE WIRE IN A CONTACT WITH AN INSULATION SUPPORT BARREL

Figure 74

(b) Crimp the contact.

9. SHIELDED CONTACT ASSEMBLY

A. Assembly of a Size 1 Shielded Contact

For the procedure to assemble:

- MS39029/54-342 and MS27184-22P contacts, refer to Paragraph 9.B.
- 48-122()-02 and C48-122()-02 contacts with RG-174 or RG-179 coax cable, refer to Paragraph 9.C.

**Table 54
CENTER CONTACT CRIMP TOOLS**

Wire Size (AWG)	Center Contact Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
22	22	M22520/2-01	6	M22520/2-33
			6	K74S
			5	294-1631
		ST2220-1-Y	-	ST2220-1-47

**Table 55
FERRULE CRIMP TOOLS**

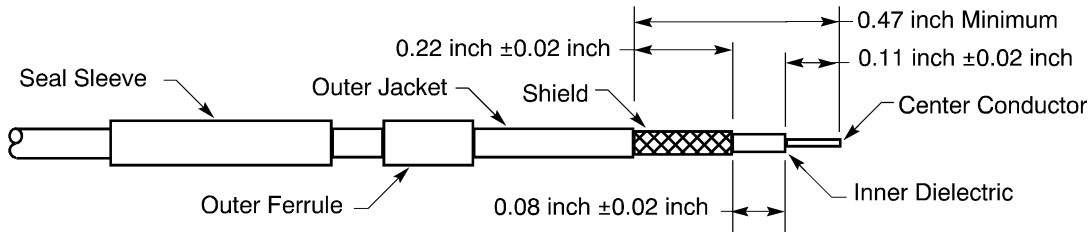
Basic Unit	Die
M22520/5-01	M22520/5-08
	M22520/5-35
WT-200	-

- (1) Make a selection of a center contact crimp tool from Table 54.
- (2) Make a selection of a ferrule crimp tool from Table 55.

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(3) Prepare the cable. Refer to Figure 75.



CABLE PREPARATION
Figure 75

(a) Put the seal sleeve on the cable.

NOTE: A one inch length of heat shrinkable sleeve with the smallest diameter that can move freely on the outer jacket is a satisfactory alternative to the seal sleeve.

(b) Put the outer ferrule on the cable.

(c) Remove a minimum of 0.47 inch of the jacket from the end of the cable.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.

(d) Remove the necessary length of the shield to make the distance from the end of the cable jacket to the end of the shield equal to 0.22 inch \pm 0.02 inch.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

(e) Remove the necessary length of the inner dielectric to make the distance from the end of the shield to the end of the inner dielectric equal to 0.08 inch \pm 0.02 inch.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

(f) Remove the necessary length of the center conductor to make the distance from the end of the dielectric to the end of the conductor equal to 0.11 inch \pm 0.02 inch.

(4) If the strands of the center conductor are apart, twist the strands together in their initial direction.

(5) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.

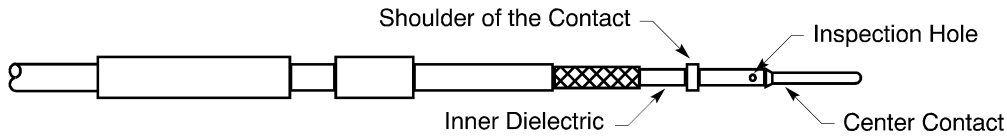
Refer to Figure 76.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

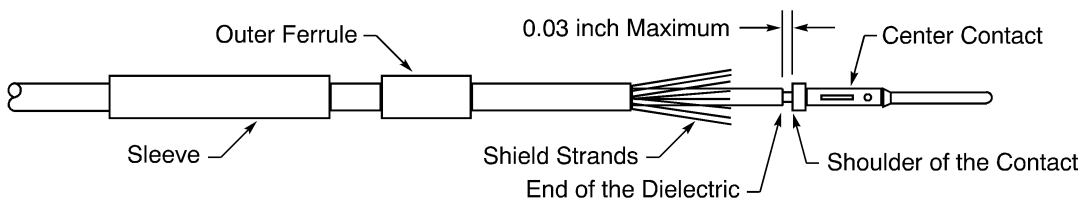
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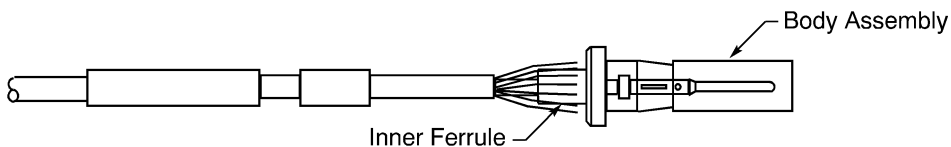
POSITION OF THE CENTER CONTACT ON THE CABLE
Figure 76

- (6) Crimp the center contact. Refer to Figure 77.
 Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.
- (7) Move the strands of the shield apart. Refer to Figure 77.



CONFIGURATION OF THE SHIELD STRANDS
Figure 77

- (8) Put the body assembly on the center contact. Refer to Figure 78.
 Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT
Figure 78

- (9) Push the center contact into the body assembly until it is locked in the body assembly.
- (10) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

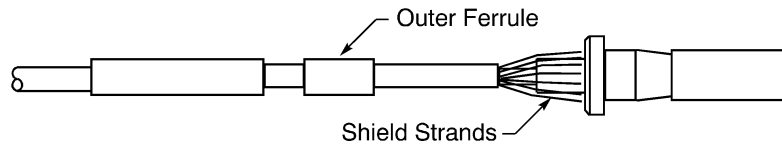
CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (11) If the center contact moves out of the body assembly, do Step (9) and Step (10) again.
- (12) Put the strands of the shield on the inner ferrule. Refer to Figure 79.
 Make sure that the strands of the shield are symmetrical around the inner ferrule.

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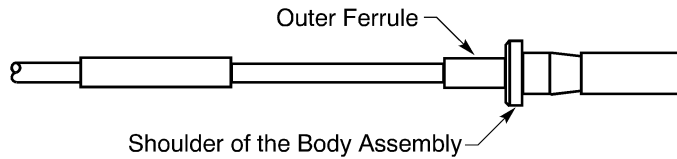
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POSITION OF THE SHIELD ON THE INNER FERRULE

Figure 79

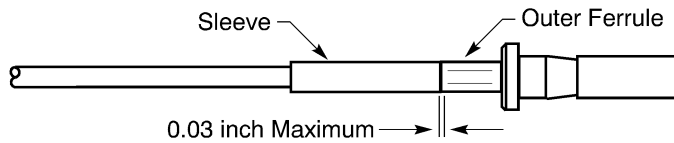
- (13) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 80.



POSITION OF THE OUTER FERRULE

Figure 80

- (14) Crimp the outer ferrule.
- (15) If the seal sleeve is on the cable, push the sleeve forward until the forward end of the sleeve is against the rear end of the outer ferrule. Refer to Figure 81.
Make sure that the distance between the forward end of the seal sleeve and the rear end of the outer ferrule is not more than 0.03 inch.



POSITION OF THE SLEEVE

Figure 81

- (16) If a heat shrinkable sleeve is on the cable:
 - (a) Push the sleeve to the end of the cable until the forward end of the sleeve is against the rear end of the outer ferrule. Refer to Figure 81.
Make sure that the distance between the forward end of the sleeve and the rear end of the outer ferrule is not more than 0.03 inch.
 - (b) Shrink the sleeve in its position. Refer Subject 20-10-14.

B. Assembly of MS39029/54-342 and MS27184-22P Size 1 Shielded Contacts

**Table 56
NECESSARY MATERIALS**

Material	Part Number or Description	Supplier
Heat Shrinkable Sleeve	Grade B, Class 1	Refer to Subject 20-00-11.
Seal Sleeve	DWP-125	Raychem (Tyco)

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NOTE: For alternative sleeve part numbers, refer to Subject 20-00-11.

**Table 57
CENTER CONTACT CRIMP TOOLS**

Wire Size (AWG)	Center Contact Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	ST2220-1-Y	-	ST2220-1-15A	-
22	20	M22520/1-01	3	M22520/1-02	-
		M22520/2-01	6	M22520/2-02	-
		ST2220-1-Y	-	ST2220-1-15A	-
20	20	ST2220-1-Y	-	ST2220-1-15A	-
		WA22	7	-	-
		WA27F	4	M22520/1-02	Red
18	20	M22520/1-01	5	M22520/1-02	Red
		WA27F	5	M22520/1-02	Red

**Table 58
FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
612648	612661	-
M22520/5-01	M22520/5-39	-
ST965-1	-	-
WT-202-06-08	-	S

- (1) Make a selection of a center contact crimp tool from Table 57.
- (2) Make a selection of a ferrule crimp tool from Table 58.
- (3) Put the necessary components on the cable:

NOTE: The seal boot, the seal sleeve, and the outer ferrule in the contact kit are not applicable for this procedure. They can be discarded.

- (a) For a Raychem 55A6087 cable, or a Boeing 10-60816-61 cable, put these sleeves on the cable in this sequence:
 - A 0.50 inch \pm 0.05 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.06 inch length of 3/16 inch diameter seal sleeve.

Refer to Table 56.

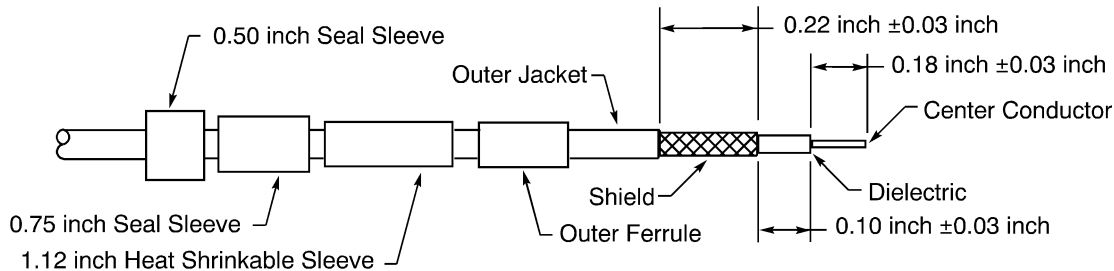
STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

- (b) For all other cables, put these sleeves on the cable in this sequence:
- A 0.50 inch \pm 0.05 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.06 inch length of 3/16 inch diameter seal sleeve
 - A 1.12 inch \pm 0.12 inch length of 1/8 inch diameter heat shrinkable sleeve.

Refer to Table 56.

- (c) Put a BACS13S156C outer ferrule on the cable.
- (4) Prepare the cable. Refer to Figure 82.



CABLE PREPARATION
Figure 82

- (a) Remove a minimum of 0.59 inch of the jacket from the end of the cable.
- CAUTION:** DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.
- (b) Remove the necessary length of the shield to make the distance from the end of the cable jacket to the end of the shield equal to 0.22 inch \pm 0.03 inch.
- CAUTION:** DO NOT CUT OR MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
- (c) Remove the necessary length of the inner dielectric to make the distance from the end of the shield to the end of the inner dielectric equal to 0.10 inch \pm 0.03 inch.
- CAUTION:** DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
- (d) Remove the necessary length of the center conductor to make the distance from the end of the dielectric to the end of the conductor equal to 0.18 inch \pm 0.03 inch.
- (5) If the strands of the center conductor are apart, twist the strands together in their initial direction.
- (6) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.

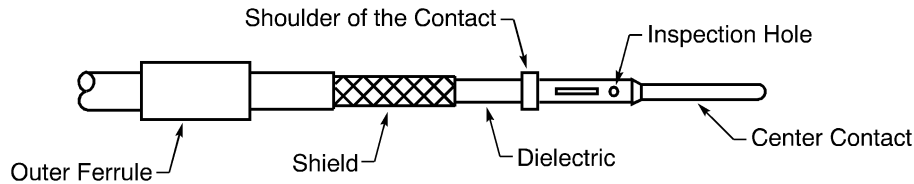
Refer to Figure 83.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

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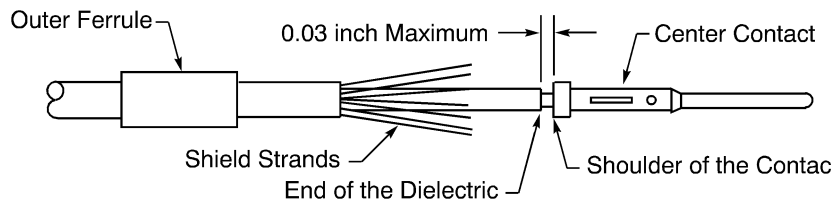
MIL-C-26500 FRONT RELEASE CONNECTORS



POSITION OF THE CENTER CONTACT ON THE CABLE

Figure 83

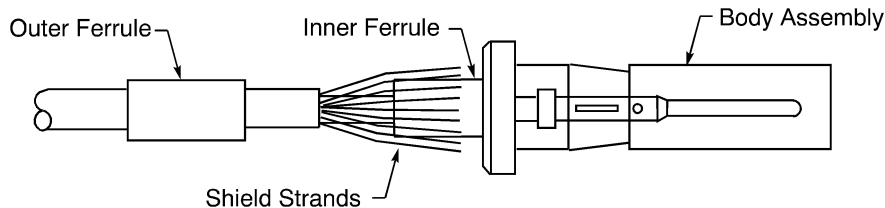
- (7) Crimp the center contact.
Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.
- (8) Move the strands of the shield apart. Refer to Figure 84.



CONFIGURATION OF THE SHIELD STRANDS

Figure 84

- (9) Put the body assembly on the center contact. Refer to Figure 85.
Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT

Figure 85

- (10) Push the center contact into the body assembly until it is locked in the body assembly.
- (11) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

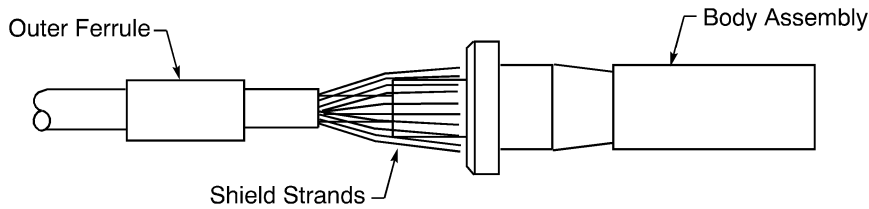
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (12) If the center contact moves out of the body assembly, do Step (10) and Step (11) again.
- (13) Put the strands of the shield on the inner ferrule. Refer to Figure 86.

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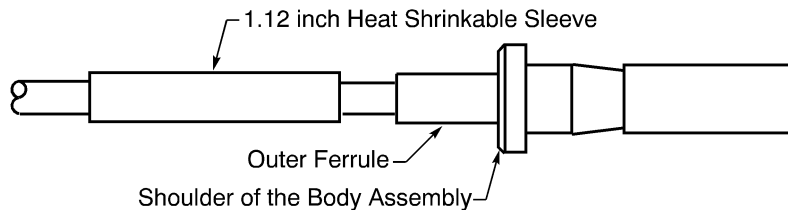
Make sure that the strands of the shield are symmetrical around the inner ferrule.



POSITION OF THE SHIELD ON THE INNER FERRULE

Figure 86

- (14) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 87.

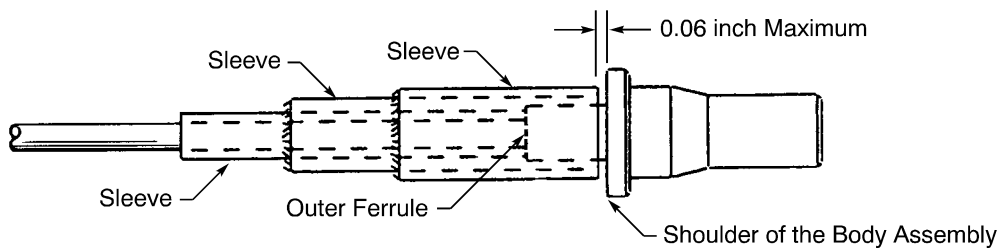


POSITION OF THE OUTER FERRULE

Figure 87

- (15) Crimp the outer ferrule.
- (16) Assemble the heat shrinkable sleeves:
 - (a) If the 1.12 inch sleeve is specified, push the 1.12 inch sleeve to the end of the cable until the forward end of the sleeve is against the rear end of the outer ferrule.
 - (b) Shrink the sleeve in its position. Refer Subject 20-10-14.
 - (c) Push the 0.75 inch sleeve on the outer ferrule until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 88.

Make sure that the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.



POSITION OF THE HEAT SHRINKABLE SLEEVES

Figure 88

- (d) Shrink the sleeve in its position. Refer Subject 20-10-14.

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- (e) Push the 0.50 inch sleeve on the 0.75 inch sleeve until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 88.

Make sure the distance between the forward end of the sleeve and the shoulder is a maximum of 0.06 inch.

- (f) Shrink the sleeve in its position. Refer Subject 20-10-14.

C. Assembly of Amphenol 48-12(-)-() and Cinch C48-12(-)-() Size 1 Shielded Contacts

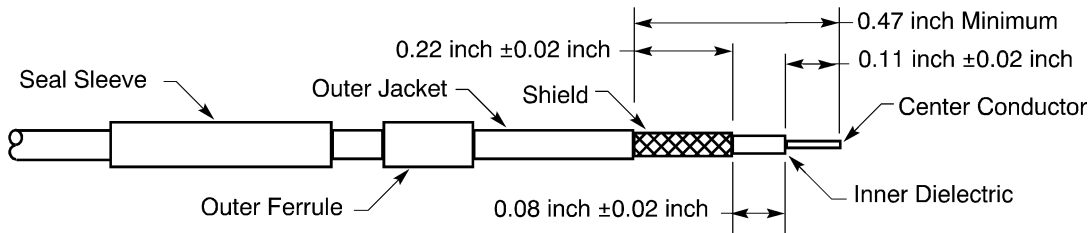
**Table 59
CENTER CONTACT CRIMP TOOLS**

Basic Unit		Locator
Part Number	Setting	
M22520/2-01	1	M22520/2-33
	1	K74S

**Table 60
FERRULE CRIMP TOOLS**

Basic Unit	Die
M22520/5-01	M22520/5-08
ST965-5	-
WT-200	-

- (1) Make a selection of a center contact crimp tool from Table 59.
- (2) Make a selection of a ferrule crimp tool from Table 60.
- (3) Prepare the cable. Refer to Figure 89.



**CABLE PREPARATION
Figure 89**

- (a) Put the seal sleeve on the cable.
NOTE: A one inch length of heat shrinkable sleeve with the smallest diameter that can move freely on the outer jacket is a satisfactory alternative to the seal sleeve.
- (b) Put the outer ferrule on the cable.
- (c) Remove a minimum of 0.47 inch of the jacket from the end of the cable.

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MIL-C-26500 FRONT RELEASE CONNECTORS

CAUTION: DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.

- (d) Remove the necessary length of the shield to make the distance from the end of the cable jacket to the end of the shield equal to 0.22 inch \pm 0.02 inch.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (e) Remove the necessary length of the inner dielectric to make the distance from the end of the shield to the end of the inner dielectric equal to 0.08 inch \pm 0.02 inch.

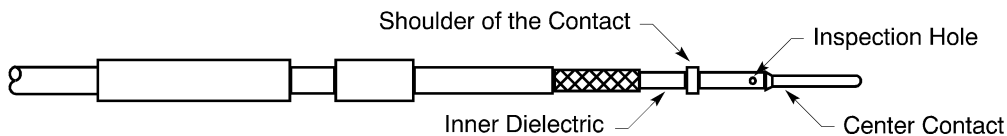
CAUTION: DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (f) Remove the necessary length of the center conductor to make the distance from the end of the dielectric to the end of the conductor equal to 0.11 inch \pm 0.02 inch.
- (4) If the strands of the center conductor are apart, twist the strands together in their initial direction.
- (5) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.

Refer to Figure 90.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

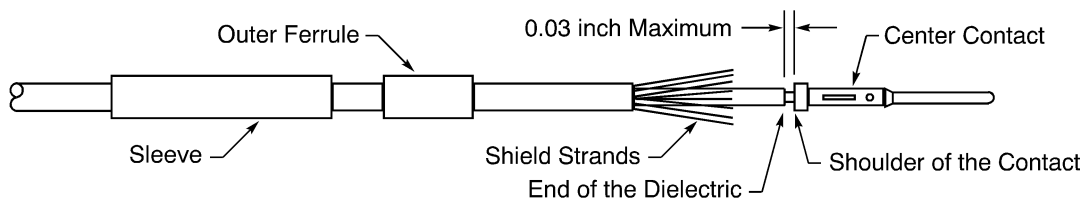


POSITION OF THE CENTER CONTACT ON THE CABLE
Figure 90

- (6) Crimp the center contact.

Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.

- (7) Move the strands of the shield apart. Refer to Figure 91.



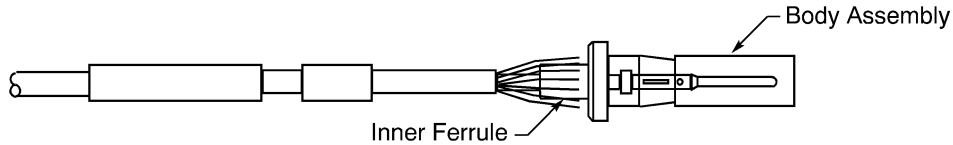
CONFIGURATION OF THE SHIELD STRANDS
Figure 91

- (8) Put the body assembly on the center contact. Refer to Figure 92.

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MIL-C-26500 FRONT RELEASE CONNECTORS

Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT
Figure 92

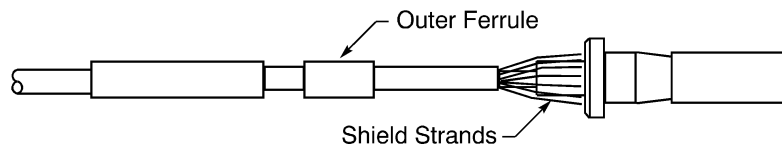
- (9) Push the center contact into the body assembly until it is locked in the body assembly.
- (10) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

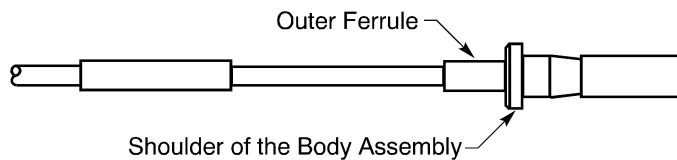
- (11) If the center contact moves out of the body assembly, do Step (9) and Step (10) again.
- (12) Put the strands of the shield on the inner ferrule. Refer to Figure 93.

Make sure that the strands of the shield are symmetrical around the inner ferrule.



POSITION OF THE SHIELD ON THE INNER FERRULE
Figure 93

- (13) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 94.

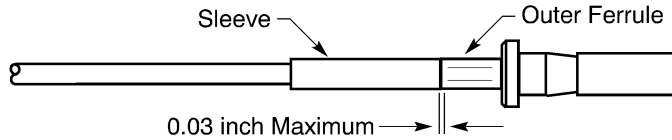


POSITION OF THE OUTER FERRULE
Figure 94

- (14) Crimp the outer ferrule.
 - (15) If the seal sleeve is on the cable, push the sleeve forward until the forward end of the sleeve is against the rear end of the outer ferrule. Refer to Figure 95.
- Make sure that the distance between the seal sleeve and the outer ferrule is not more than 0.03 inch.

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MIL-C-26500 FRONT RELEASE CONNECTORS



POSITION OF THE SLEEVE
Figure 95

- (16) If a heat shrinkable sleeve is on the cable:
- (a) Push the sleeve toward the end of the cable until the forward end of the sleeve is against the rear end of the outer ferrule. Refer to Figure 95.
Make sure that the distance between the forward end of the sleeve and the rear end of the outer ferrule is less than or equal to 0.03 inch.
 - (b) Shrink the sleeve in its position. Refer Subject 20-10-14.

D. Assembly of a Size 2 Shielded Contact

For the procedure to assemble:

- An Amphenol 48-2187-02 shielded contact, refer to Paragraph 9.E.
- A Cinch CN0940-41 or a CN0940-44 shielded contact, refer to Paragraph 9.E.
- A Cinch CN0900-336 shielded contact, refer to Paragraph 9.F.
- An S283U007-1 shielded contact, refer to Paragraph 9.G.
- A 10-60479-41 or a 10-60479-44 potted shielded contact, refer to Paragraph 9.H.
- A 60B40037-15 or a 60B40037-16 potted shielded contact, refer to Paragraph 9.I.
- A 60B40147-15 or a 60B40147-16 potted shielded contact, refer to Paragraph 9.I.
- A 10-60479-41 or a 10-60479-44 shielded contact with BMS13-65 Type 0F cable, refer to Paragraph 9.J.

Table 61
NECESSARY MATERIALS

Material	Part Number or Description	Supplier
Heat Shrinkable Sleeve	Grade B, Class 1	Refer to Subject 20-00-11.
Seal Sleeve	DWP-125	Raychem (Tyco)

NOTE: For alternative sleeve part numbers, refer to Subject 20-00-11.

Table 62
CENTER CONTACT CRIMP TOOLS

Wire Size (AWG)	Center Contact Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
20	20	M22520/2-01	7	M22520/2-24
			7	K75S-1
		ST2220-1-Y	-	ST2220-1-15A

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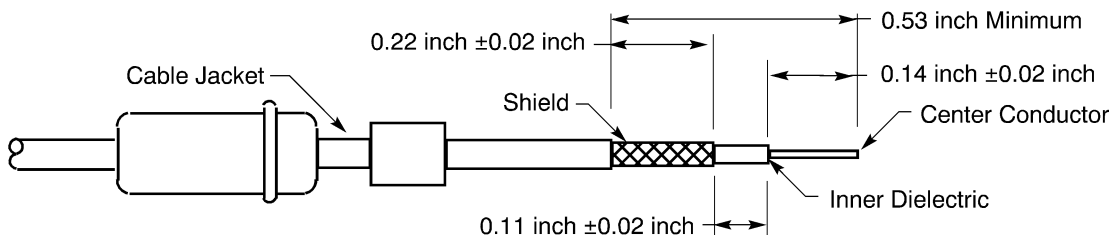
MIL-C-26500 FRONT RELEASE CONNECTORS

**Table 63
FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
612648	612661	-
M22520/5-01	M22520/5-10	-
	M22520/5-39	-
ST965-1	-	-
WT-202	-	-
WT-202-06-08	-	S

- (1) Make a selection of a center contact crimp tool from Table 62.
- (2) Make a selection of a ferrule crimp tool from Table 63.
- (3) If a seal boot must be installed, put the boot on the cable.
- (4) If a seal boot is not installed, put the heat shrinkable sleeves on the cable.
 - (a) For a Raychem 55A6087 cable or a Boeing 10-60816-61 cable, put these sleeves on the cable in this sequence:
 - A 0.5 inch \pm 0.1 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.20 inch length of 3/16 inch diameter seal sleeve.
 Refer to Table 61.
 - (b) For all other cables, put these sleeves on the cable in this sequence:
 - A 0.5 inch \pm 0.1 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.20 inch length of 3/16 inch diameter seal sleeve
 - A 1.3 inch \pm 0.1 inch length of 1/8 inch diameter heat shrinkable sleeve.
 Refer to Table 61.
- (5) Put the outer ferrule on the cable.

NOTE: The BACS13C156C ferrule is a satisfactory alternative to the Amphenol 48-1540-02 ferrule for the MS27184-20P or MS27185-20S contacts.
- (6) Prepare the cable. Refer to Figure 96.



**CABLE PREPARATION
Figure 96**

- (a) Remove a minimum of 0.53 inch of the jacket from the end of the cable.

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CAUTION: DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.

- (b) Remove the necessary length of the shield to make the distance from the end of the cable jacket to the end of the shield equal to 0.22 inch \pm 0.02 inch.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (c) Remove the necessary length of the inner dielectric to make the distance from the end of the shield to the end of the dielectric equal to 0.11 inch \pm 0.02 inch.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (d) Remove the necessary length of the center conductor to make the distance from the end of the inner dielectric to the end of the conductor equal to 0.14 inch \pm 0.02 inch.

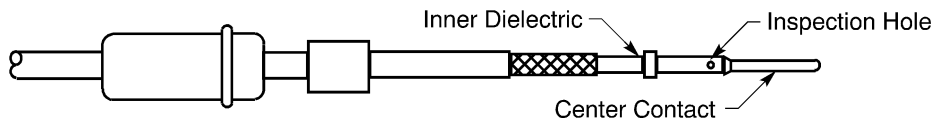
(7) Assemble the contact:

- (a) If the strands of the center conductor are apart, twist the strands together in their initial direction.
- (b) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

Refer to Figure 97.

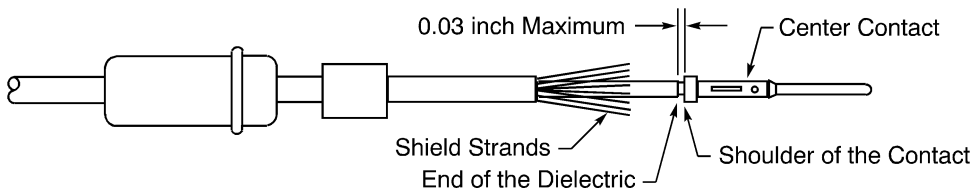


POSITION OF THE CENTER CONTACT ON THE CABLE
Figure 97

- (c) Crimp the center contact.

Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.

(8) Move the strands of the shield apart. Refer to Figure 98.



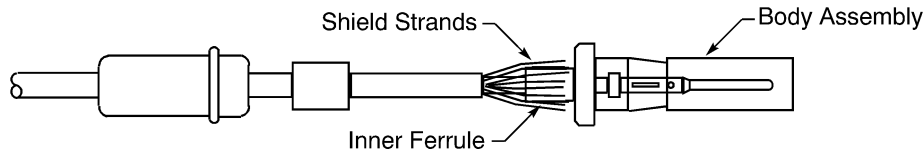
CONFIGURATION OF THE SHIELD STRANDS
Figure 98

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- (9) Put the body assembly on the center contact. Refer to Figure 99.

Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT

Figure 99

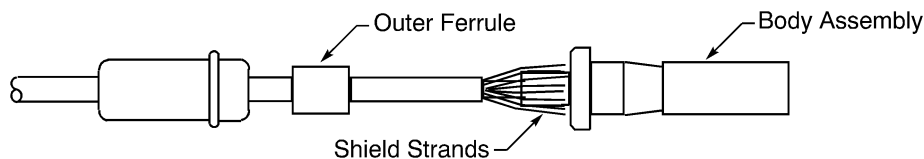
- (10) Put the center contact in the inner ferrule of the body assembly.
- (11) Push the center contact into the body assembly until it is locked in the body assembly.
- (12) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (13) If the center contact moves out of the body assembly, do Step (11) and Step (12) again.
- (14) Put the strands of the shield on the inner ferrule. Refer to Figure 100.

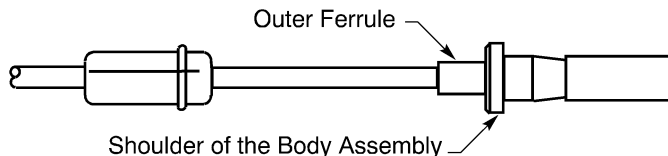
Make sure that the strands of the shield are symmetrical around the inner ferrule.



POSITION OF THE SHIELD ON THE INNER FERRULE

Figure 100

- (15) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 101.



POSITION OF THE OUTER FERRULE

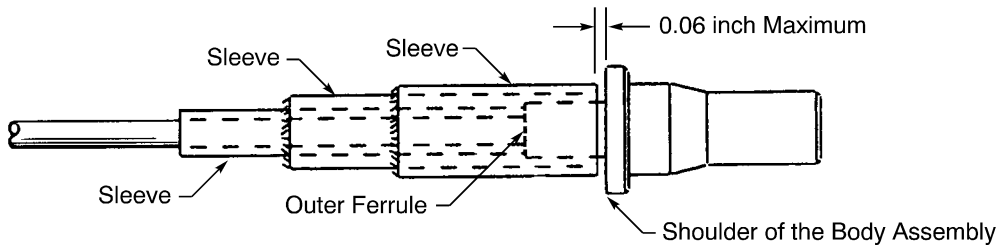
Figure 101

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- (16) Crimp the outer ferrule.
- (17) If it is applicable, assemble the heat shrinkable sleeves:
 - (a) If the 1.3 inch sleeve is specified, push the 1.3 inch sleeve to the end of the cable until the forward end of the sleeve is against the rear end of the outer ferrule. Refer to Figure 102.
 - (b) Shrink the sleeve in its position. Refer Subject 20-10-14.
 - (c) Push the 0.75 inch sleeve on the outer ferrule until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 102.

Make sure the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.



POSITION OF THE HEAT SHRINKABLE SLEEVES
Figure 102

- (d) Shrink the sleeve in its position. Refer Subject 20-10-14.
 - (e) Push the 0.5 inch sleeve on the 0.75 inch sleeve until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 102.
- Make sure the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.
- (f) Shrink the sleeve in its position. Refer Subject 20-10-14.

E. Assembly of Cinch CN0940-41, CN0940-44 and Amphenol 48-2187-02 Size 2 Shielded Contacts

Table 64
NECESSARY MATERIALS

Material	Part Number or Description	Supplier
Heat Shrinkable Sleeve	Grade B, Class 1	Refer to Subject 20-00-11.
Seal Sleeve	DWP-125	Raychem (Tyco)

NOTE: For alternative sleeve part numbers, refer to Subject 20-00-11.

Table 65
CENTER CONTACT CRIMP TOOLS

Wire Size (AWG)	Center Contact Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	ST2220-1-Y	-	ST2220-1-15A	-

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Table 65 (continued)

Wire Size (AWG)	Center Contact Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
22	20	M22520/1-01	3	M22520/1-02	-
		M22520/2-01	6	M22520/2-02	-
		ST2220-1-Y	-	ST2220-1-15A	-
20	20	ST2220-1-Y	-	ST2220-1-15A	-
		WA22	7	-	-
		WA27F	4	M22520/1-02	Red
18	20	M22520/1-01	5	M22520/1-02	Red
		WA27F	5	M22520/1-02	Red

**Table 66
FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
612648	612661	-
M22520/5-01	M22520/5-10	-
	M22520/5-39	-
ST965-1	-	-
WT-202	-	-
WT-202-06-08	-	S

- (1) Make a selection of a center contact crimp tool from Table 65.
- (2) Make a selection of a ferrule crimp tool from Table 66.
- (3) Put the necessary components on the cable.

NOTE: The seal sleeve, the seal boot, and the outer ferrule in the contact kit are not applicable for this procedure. They can be discarded.

- (a) For a Raychem 55A6087 cable or a Boeing 10-60816-61 cable, put these sleeves on the cable in this sequence:
 - A 0.50 inch \pm 0.05 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.06 inch length of 3/16 inch diameter seal sleeve.

Refer to Table 64.

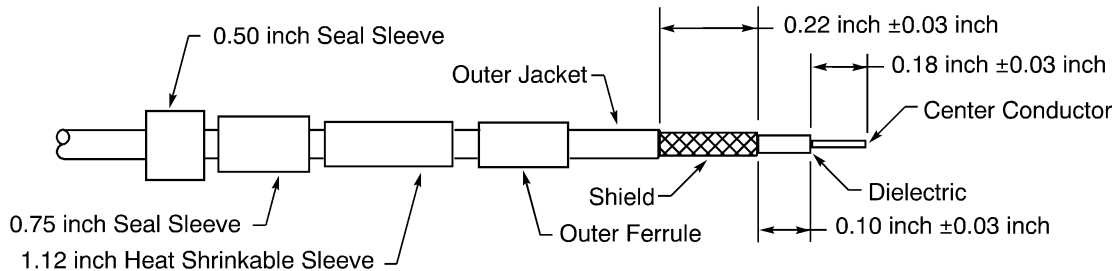
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- (b) For all other cables, put these sleeves on the cable in this sequence:
 - A 0.50 inch \pm 0.05 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.06 inch length of 3/16 inch diameter seal sleeve
 - A 1.12 inch \pm 0.12 inch length of 1/8 inch diameter heat shrinkable sleeve.

Refer to Table 64.

- (c) Put a BACS13S156C outer ferrule on the cable
- (4) Prepare the cable. Refer to Figure 103.



CABLE PREPARATION
Figure 103

- (a) Remove a minimum of 0.59 inch of the jacket from the end of the cable.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.
- (b) Remove the necessary length of the shield to make the distance from the end of the cable jacket to the end of the shield equal to 0.22 inch \pm 0.03 inch.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
- (c) Remove the necessary length of the inner dielectric to make the distance from the end of the shield to the end of the dielectric equal to 0.10 inch \pm 0.03 inch.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
- (d) Remove the necessary length of the center conductor to make the distance from the end of the inner dielectric to the end of the conductor equal to 0.18 inch \pm 0.03 inch.
- (5) Assemble the contact:
 - (a) If the strands of the center conductor are apart, twist the strands together in their initial direction.
 - (b) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.

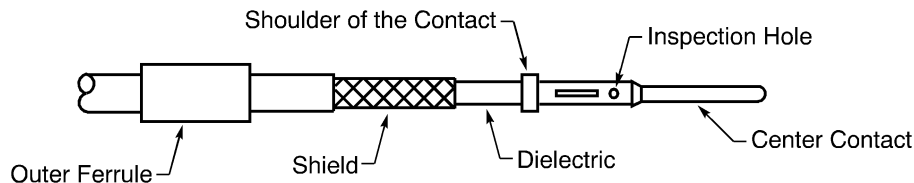
STANDARD WIRING PRACTICES MANUAL

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Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

Refer to Figure 104.



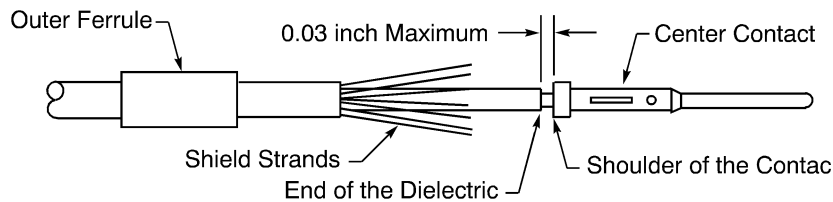
POSITION OF THE CENTER CONTACT ON THE CABLE

Figure 104

(c) Crimp the center contact.

Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.

(6) Move the strands of the shield apart. Refer to Figure 105.

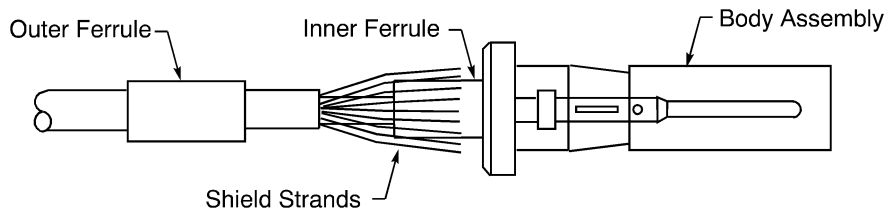


CONFIGURATION OF THE SHIELD STRANDS

Figure 105

(7) Put the body assembly on the center contact. Refer to Figure 106.

Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT

Figure 106

(8) Push the center contact into the body assembly until it is locked in the body assembly.

(9) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

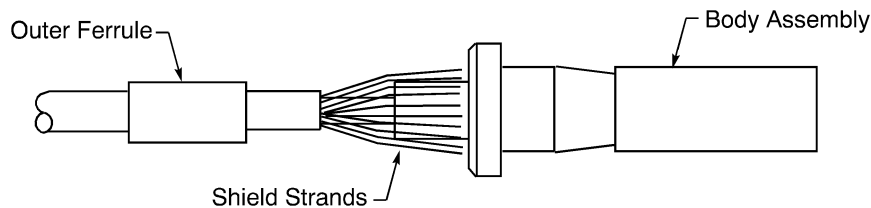
STANDARD WIRING PRACTICES MANUAL

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CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

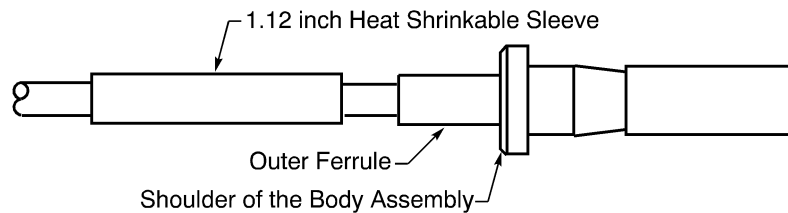
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (10) If the center contact moves out of the body assembly, do Step (8) and Step (9) again.
- (11) Put the strands of the shield on the inner ferrule. Refer to Figure 107.
Make sure that the strands of the shield are symmetrical around the inner ferrule.



POSITION OF THE SHIELD ON THE INNER FERRULE
Figure 107

- (12) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 108.



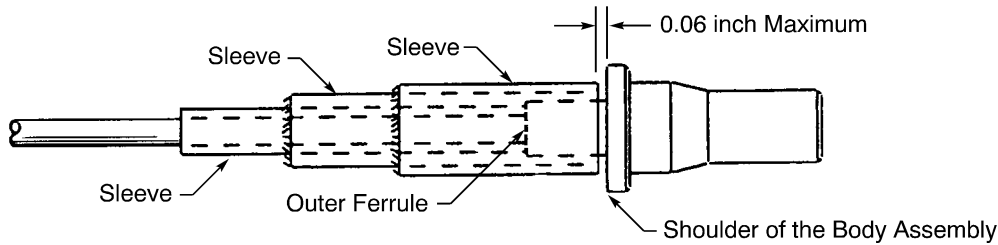
POSITION OF THE OUTER FERRULE
Figure 108

- (13) Crimp the outer ferrule.
- (14) Assemble the heat shrinkable sleeves:
 - (a) If the 1.12 inch sleeve is specified, push the 1.12 inch sleeve to the end of the cable until the forward end of the sleeve is against the rear end of the outer ferrule.
 - (b) Shrink the sleeve in its position. Refer Subject 20-10-14.
 - (c) Push the 0.75 inch sleeve on the outer ferrule until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 109.

Make sure that the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.

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POSITION OF THE HEAT SHRINKABLE SLEEVES
Figure 109

- (d) Shrink the sleeve in its position. Refer Subject 20-10-14.
- (e) Push the 0.50 inch sleeve on the 0.75 inch sleeve until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 109.
 Make sure that the distance between the forward end of the sleeve and the shoulder is a maximum of 0.06 inch.
- (f) Shrink the sleeve in its position. Refer Subject 20-10-14.

F. Assembly of a Cinch CN0900-336 Size 2 Shielded Contact

Table 67
CENTER CONTACT CRIMP TOOLS

Wire Size (AWG)	Center Contact Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
20	20	M22520/2-01	7	M22520/2-24
			7	K75S-1

Table 68
FERRULE CRIMP TOOLS

Basic Unit	Die
M22520/5-01	Y322

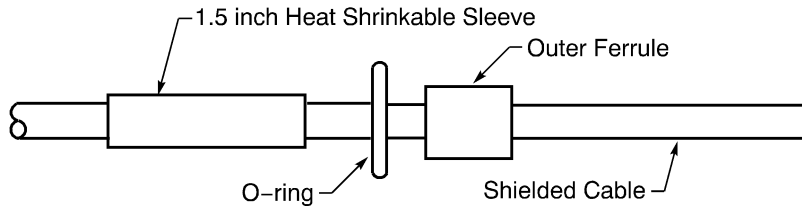
- (1) Make a selection of a center contact crimp tool from Table 67.
- (2) Make a selection of a ferrule crimp tool from Table 68.
- (3) Make a selection of a 1/8 inch diameter, or a 3/16 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (4) Put these components on the cable in this sequence:
 - A 1.5 inch length of the heat shrinkable sleeve
 - The O-ring
 - The outer ferrule.

NOTE: These components are supplied with the contact.

Refer to Figure 110.

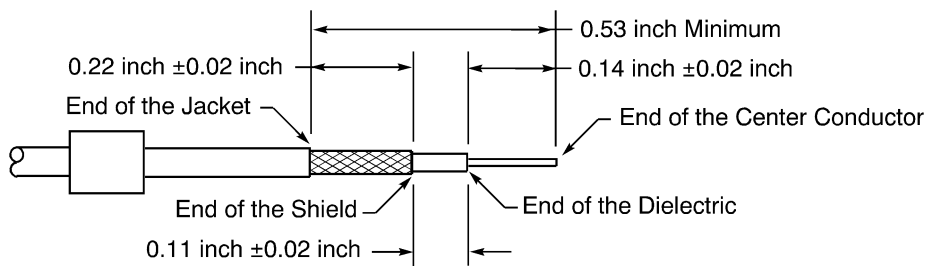
STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS



POSITION OF THE O-RING AND THE OUTER FERRULE ON THE CABLE
Figure 110

(5) Prepare the cable. Refer to Figure 111.



CABLE PREPARATION
Figure 111

- (a) Remove a minimum of 0.53 inch of the jacket from the end of the cable.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
 - (b) Remove the necessary length of the shield to make the distance from the end of the cable jacket to the end of the shield equal to 0.22 inch \pm 0.02 inch.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
 - (c) Remove the necessary length of the inner dielectric to make the distance from the end of the shield to the end of the dielectric equal to 0.11 inch \pm 0.02 inch.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
 - (d) Remove the necessary length of the center conductor to make the distance from the end of the inner dielectric to the end of the conductor equal to 0.14 inch \pm 0.02 inch.
- (6) Assemble the contact:
- (a) If the strands of the center conductor are apart, twist the strands together in their initial direction.
 - (b) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.

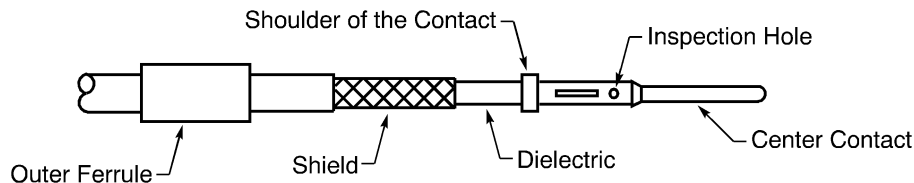
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Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

Refer to Figure 112.



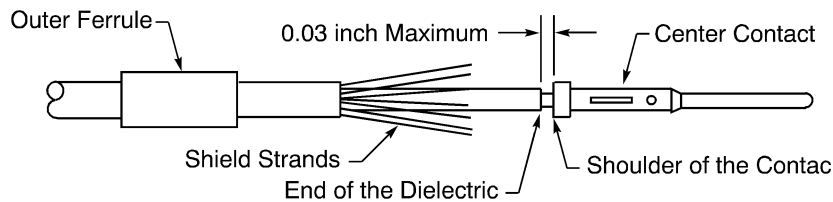
POSITION OF THE CENTER CONTACT ON THE CABLE

Figure 112

(c) Crimp the center contact.

Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.

(7) Move the strands of the shield apart. Refer to Figure 113.

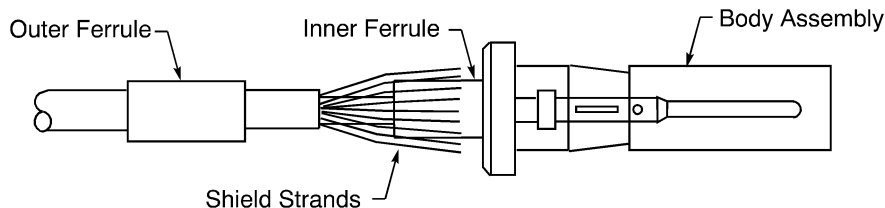


CONFIGURATION OF THE SHIELD STRANDS

Figure 113

(8) Put the body assembly on the center contact. Refer to Figure 114.

Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT

Figure 114

(9) Push the center contact into the body assembly until it is locked in the body assembly.

(10) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

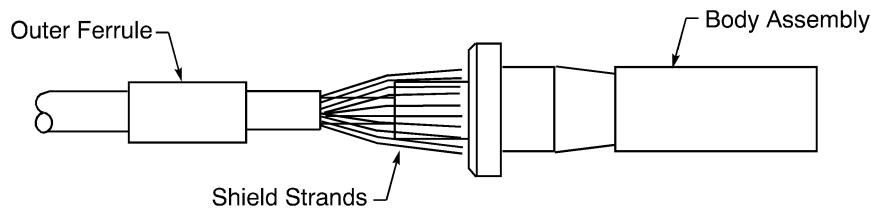
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CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

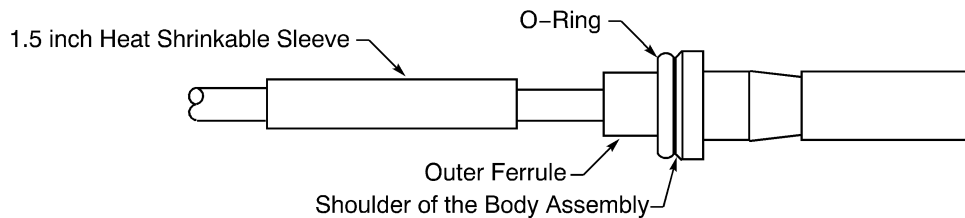
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (11) If the center contact moves out of the body assembly, do Step (9) and Step (10) again.
- (12) Put the strands of the shield on the inner ferrule. Refer to Figure 115.
Make sure that the strands of the shield are symmetrical around the inner ferrule.



POSITION OF THE SHIELD ON THE INNER FERRULE
Figure 115

- (13) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 116.



POSITION OF THE OUTER FERRULE
Figure 116

- (14) Crimp the outer ferrule.
- (15) Push the O-ring forward to the end of the cable until the O-ring is against the rear end of the outer ferrule. Refer to Figure 116.
- (16) Push the heat shrinkable sleeve forward to the end of the cable until the forward end of the sleeve is against the O-ring.
- (17) Shrink the sleeve in its position. Refer to Subject 20-10-14.

G. Assembly of Boeing S283U007-7 and Cinch CN1036-7 Size 2 Shielded Contacts

This procedure is to assemble the contact with:

- A wire with one shield
- A wire with two shields.

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**Table 69
NECESSARY MATERIALS**

Material	Part Number or Description	Supplier
Potting Compound	BMS8-68	QPL
	RTV 3110	Dow Corning
Heat Shrinkable Sleeve	Grade B, Class 1	Refer to Subject 20-00-11.
Seal Sleeve	DWP-125	Raychem (Tyco)
Solvent, Aliphatic Naphtha	TT-N-95 Type II	An available source

NOTE: For alternative sleeve part numbers, refer to Subject 20-00-11.

**Table 70
PRIMER MATERIALS**

Potting Compound	Primer	
	Part Number	Supplier
BMS8-68	CS 3808	Flamemaster Corporation Chem Seal Division
	CS 9903	Flamemaster Corporation Chem Seal Division
RTV 3110	RTV 1201	Dow Corning

**Table 71
CENTER CONTACT CRIMP TOOLS**

Basic Unit		Locator
Part Number	Setting	
M22520/2-01	7	M22520/2-24
		K75S

**Table 72
FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
612648	612661	-
M22520/5-01	M22520/5-10	-
	M22520/5-39	-
WT-202	-	-
ST965-1	-	-
WT-202-06-08	-	S

(1) Make a selection of a center contact crimp tool from Table 71.

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- (2) Make a selection of a ferrule crimp tool from Table 72.
- (3) Make a selection of these materials from Table 69:
 - A solvent
 - A potting compound.
- (4) Make a selection of a primer from Table 70.
- (5) For a wire with two shields:
 - Assemble a shield ground wire with the outer shield; refer to Subject 20-10-15
 - Assemble the contact with the inner shield and the center conductor.

Make sure that the location of the outer shield ground wire does not prevent the correct assembly of the shielded contact.

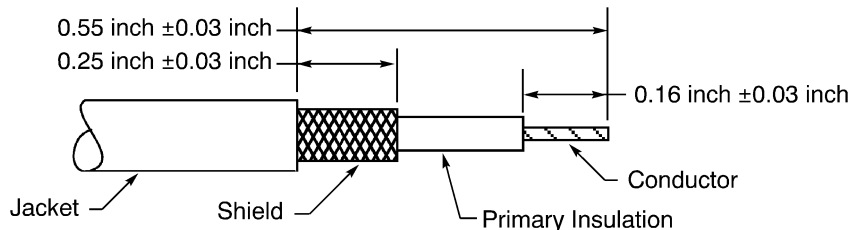
- (6) Discard the seal boot in the contact kit.
- (7) For a Boeing 10-60816-61 shielded wire, put these sleeves on the wire in this sequence:
 - A 0.50 inch \pm 0.06 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.06 inch length of 3/16 inch diameter seal sleeve.

Refer to Table 69 and Figure 120.

- (8) For all other wire type codes, put these sleeves on the wire in this sequence:
 - A 0.50 inch \pm 0.06 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.06 inch length of 3/16 inch diameter seal sleeve
 - A 0.75 inch \pm 0.06 inch length of 1/8 inch diameter heat shrinkable sleeve.

Refer to Table 69 and Figure 120.

- (9) Put the ferrule on the cable.
- (10) Prepare the cable. Refer to Figure 117.



CABLE PREPARATION
Figure 117

- (a) Remove 0.55 inch \pm 0.03 inch of the jacket from the end of the cable.
 - (b) Remove the necessary length of the shield to make the distance between the end of the shield and the end of the jacket equal to 0.25 inch \pm 0.03 inch.
 - (c) Remove the necessary length of the primary insulation to make the distance between the end of the insulation and the end of the conductor equal to 0.16 inch \pm 0.03 inch.
- (11) Assemble the center contact:
 - (a) If the strands of the conductor are apart, twist the strands together in their initial direction.
 - (b) Push the conductor into the crimp barrel of the center contact until the primary insulation is against the shoulder of the center contact.

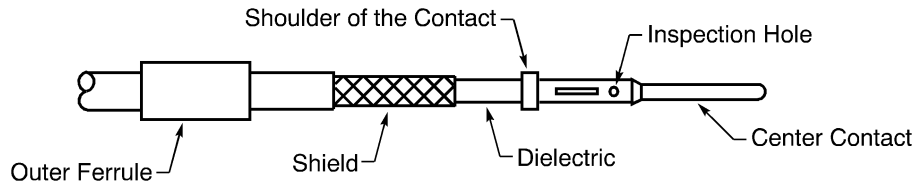
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Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

Refer to Figure 118.



POSITION OF THE CENTER CONTACT ON THE CABLE

Figure 118

(c) Crimp the center contact.

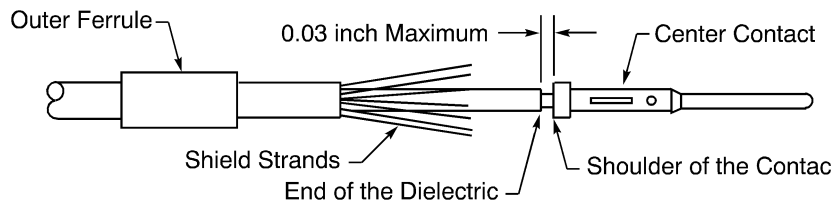
Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.

- (12) Clean the primary insulation and the center contact with the solvent.
- (13) Let the solvent dry.
- (14) Apply a thin layer of primer to the primary insulation.
- (15) Apply a thin layer of primer to the center contact assembly.

Make sure that no primer is applied to the engaging end of the center contact.

CAUTION: PRIMER ON THE ENGAGING END OF CENTER CONTACT CAN CAUSE UNSATISFACTORY OPERATION OF THE CONTACT.

- (16) Let the primer dry.
- (17) Move the strands of the shield apart. Refer to Figure 119.



CONFIGURATION OF THE SHIELD STRANDS

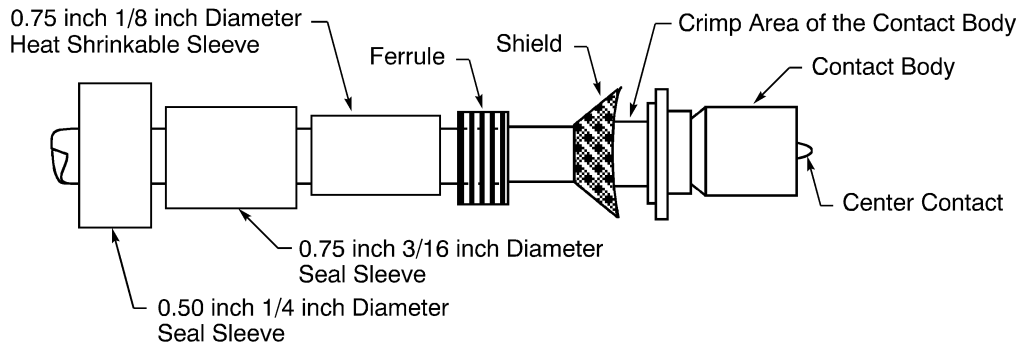
Figure 119

- (18) Put the body assembly on the center contact.
- (19) Put the body assembly on the center contact. Refer to Figure 120.

Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.

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POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT

Figure 120

- (20) Push the center contact into the body assembly until it is locked in the body assembly. Refer to Figure 120.

NOTE: The end of the center contact will be approximately 0.03 inch forward from the end of the contact body.

- (21) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

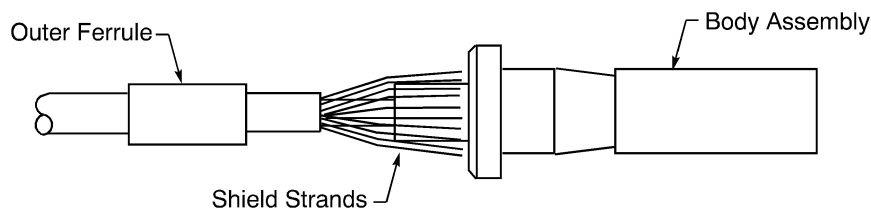
CAUTION: DO NOT PULL ON THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (22) If the center contact moves out of the body assembly, do Step (20) and Step (21) again.

- (23) Put the strands of the shield on the inner ferrule. Refer to Figure 121.

Make sure that the strands of the shield are symmetrical around the inner ferrule.



POSITION OF THE SHIELD ON THE INNER FERRULE

Figure 121

- (24) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly.

- (25) Remove the remaining shield strands that extend farther than the forward end of the ferrule.

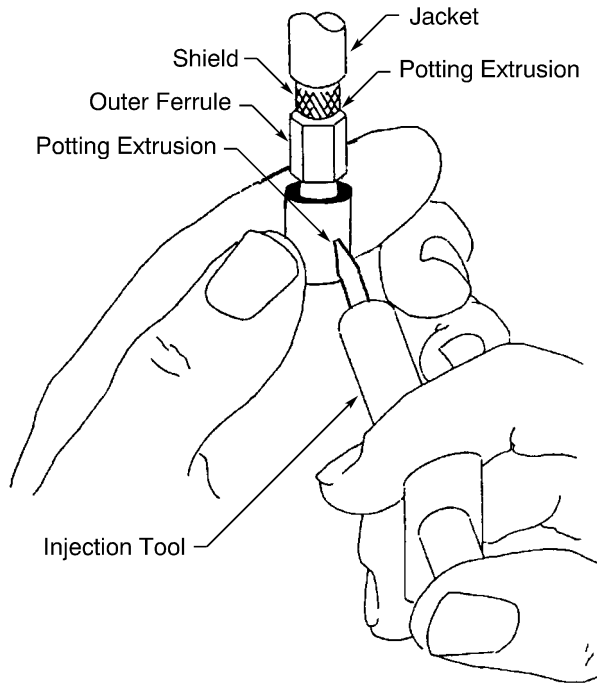
- (26) Crimp the ferrule.

NOTE: A distance of 0.03 inch between the contact shoulder and the crimp ferrule is permitted.

- (27) Seal the contact with the potting compound. Refer to Figure 122.

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POSITION OF THE INJECTION TOOL IN THE FILLER HOLE OF THE SHIELDED CONTACT
Figure 122

- (a) Hold the shielded contact assembly in a vertical position.
 Make sure that the engaging end of the contact is pointed down.
- (b) Put the end of the injection tool into one of the potting filler holes in the contact body assembly.
- (c) Push the plunger of the injection tool.
 Make sure that the potting compound goes into the contact and starts to flow out of the other filler hole.
- (d) Cause a blockage of this hole to stop the flow of the potting material from the hole.
- (e) Continue to push the plunger of the injection tool until the potting material starts to flow out between the shield and the outer ferrule.
- (f) Remove the injection tool from the filler hole.
- (g) Remove the blockage from the other filler hole.
- (h) Cure the potting compound.

CAUTION: OBEY THE MANUFACTURER'S INSTRUCTIONS TO CURE THE POTTING COMPOUND. POTTING COMPOUND THAT IS NOT CURED CORRECTLY CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONTACT.

- (28) Push the 0.75 inch length of 1/8 inch diameter sleeve to the end of the cable until the forward end of the sleeve is against the rear end of the outer ferrule.

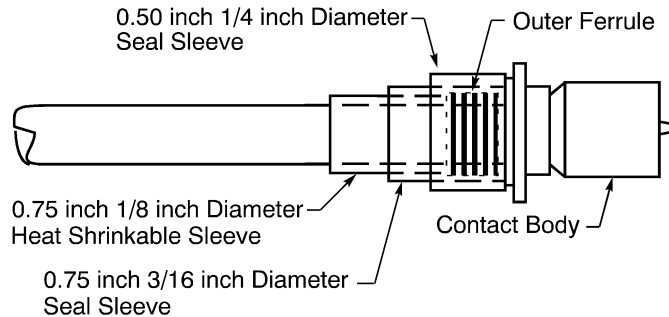
Make sure that the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.

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Refer to Figure 123.

NOTE: This step is not applicable for Boeing 10-60816-61 shielded wire.



COMPLETED CONTACT ASSEMBLY

Figure 123

- (29) Shrink the sleeve in its position. Refer to Subject 20-10-14.
- (30) Push the 0.75 inch length of 3/16 inch diameter sleeve on the outer ferrule until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 123.
Make sure that the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.
- (31) Shrink the sleeve in its position. Refer to Subject 20-10-14.
- (32) Push the 0.50 inch sleeve on the 0.75 inch sleeve until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 123.
Make sure that the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.
- (33) Shrink the sleeve in its position. Refer to Subject 20-10-14.

H. Assembly of Boeing 10-60479-() Size 2 Potted Shielded Contacts

**Table 73
NECESSARY MATERIALS**

Material	Part Number or Description	Supplier
Potting Compound	BMS8-68	QPL
	RTV 3110	Dow Corning
Sleeve, Heat Shrinkable	Grade B, Class 1	Refer to Subject 20-00-11.
Sleeve, Seal	DWP-125	Raychem (Tyco)
Solvent, Aliphatic Naphtha	TT-N-95 Type II	An available source
Injection Tool	-	An available source

NOTE: For alternative sleeve part numbers, refer to Subject 20-00-11.

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**Table 74
PRIMER MATERIALS**

Potting Compound	Primer	
	Part Number	Supplier
BMS8-68	CS 3808	Flamemaster Corporation Chem Seal Division
	CS 9903	Flamemaster Corporation Chem Seal Division
RTV 3110	RTV 1201	Dow Corning

**Table 75
CENTER CONTACT CRIMP TOOLS**

Wire Size (AWG)	Center Contact Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	ST2220-1-Y	-	ST2220-1-15A	-
22	20	M22520/1-01	3	M22520/1-02	-
		M22520/2-01	6	M22520/2-02	-
		ST2220-1-Y	-	ST2220-1-15A	-
20	20	ST2220-1-Y	-	ST2220-1-15A	-
		WA22	7	-	-
		WA27F	4	M22520/1-02	Red
18	20	M22520/1-01	5	M22520/1-02	Red
		WA27F	5	M22520/1-02	Red

**Table 76
FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
612648	612661	-
M22520/5-01	M22520/5-10	-
	M22520/5-39	-
ST965-1	-	-
WT-202	-	-
WT-202-06-08	-	S

- (1) Make a selection of a center contact crimp tool from Table 75.
- (2) Make a selection of a ferrule crimp tool from Table 76.

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(3) Make a selection of these materials from Table 73:

- A solvent
- A potting compound.

(4) Make a selection of a primer from Table 74.

(5) Put the necessary components on the cable.

NOTE: The seal sleeve, the seal boot, and the outer ferrule in the contact kit are not applicable for this procedure. They can be discarded.

(a) For a Raychem 55A6087 cable or a Boeing 10-60816-61 cable, put these sleeves on the cable in this sequence:

- A 0.50 inch ± 0.05 inch length of 1/4 inch diameter seal sleeve
- A 0.75 inch ± 0.06 inch length of 3/16 inch diameter seal sleeve.

Refer to Table 73.

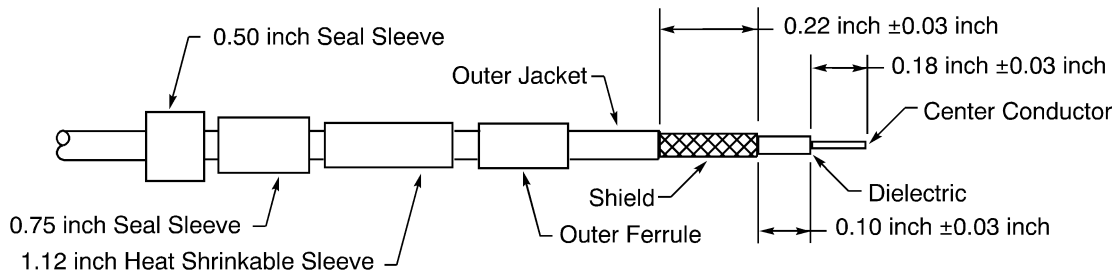
(b) For all other cables, put these sleeves on the cable in this sequence:

- A 0.50 inch ± 0.05 inch length of 1/4 inch diameter seal sleeve
- A 0.75 inch ± 0.06 inch length of 3/16 inch diameter seal sleeve
- A 1.12 inch ± 0.12 inch length of 1/8 inch diameter heat shrinkable sleeve.

Refer to Table 73.

(c) Put a BACS13S156C outer ferrule on the cable.

(6) Prepare the cable. Refer to Figure 124.



CABLE PREPARATION

Figure 124

(a) Remove a minimum of 0.59 inch of the jacket from the end of the cable.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.

(b) Remove the necessary length of the shield to make the distance from the end of the cable jacket to the end of the shield equal to 0.22 inch ± 0.03 inch.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

(c) Remove the necessary length of the inner dielectric to make the distance from the end of the shield to the end of the dielectric equal to 0.10 inch ± 0.03 inch.

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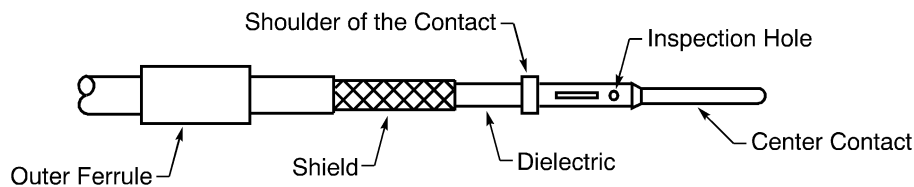
CAUTION: DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (d) Remove the necessary length of the center conductor to make the distance from the end of the inner dielectric to the end of the conductor equal to 0.18 inch \pm 0.03 inch.
- (7) Assemble the contact:
 - (a) If the strands of the center conductor are apart, twist the strands together in their initial direction.
 - (b) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

Refer to Figure 125.

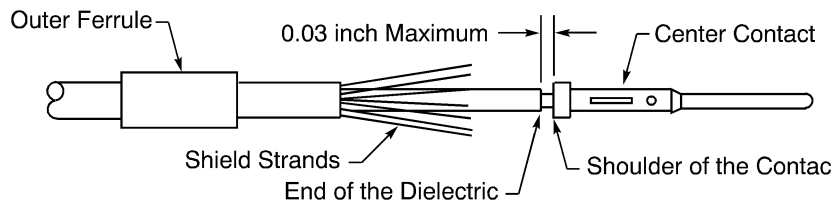


POSITION OF THE CENTER CONTACT ON THE CABLE
Figure 125

- (c) Crimp the center contact.
 Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.
- (8) Clean the center contact assembly with the solvent.
- (9) Apply a thin layer of the primer to the center contact assembly.
 Make sure that no primer is applied to the engaging end of the center contact.

CAUTION: PRIMER ON THE CENTER CONTACT CAN CAUSE UNSATISFACTORY OPERATION OF THE CONTACT.

- (10) Let the primer dry.
- (11) Move the strands of the shield apart. Refer to Figure 126.



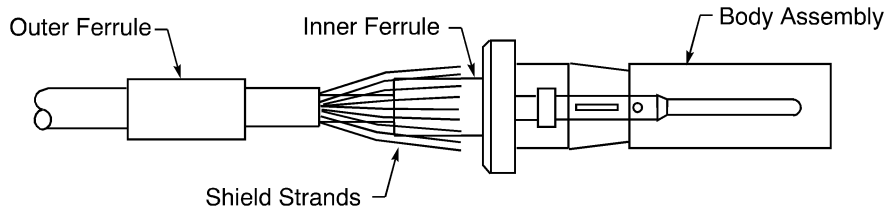
CONFIGURATION OF THE SHIELD STRANDS
Figure 126

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- (12) Put the body assembly on the center contact. Refer to Figure 127.

Make sure that the inner ferrule of the body assembly is between the shield strands and the inner dielectric.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT
Figure 127

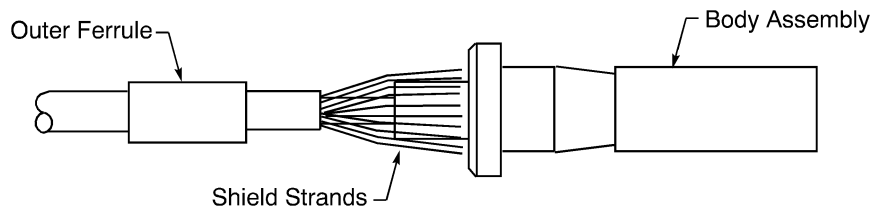
- (13) Push the center contact into the body assembly until it is locked in the body assembly.
 (14) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (15) If the center contact moves out of the body assembly, do Step (13) and Step (14) again.
 (16) Put the strands of the shield on the inner ferrule. Refer to Figure 128.

Make sure that the strands of the shield are symmetrical around the inner ferrule.

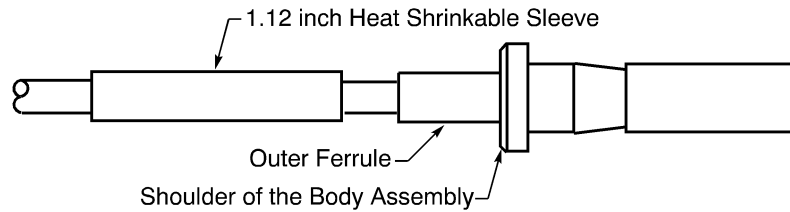


POSITION OF THE SHIELD ON THE INNER FERRULE
Figure 128

- (17) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 129.

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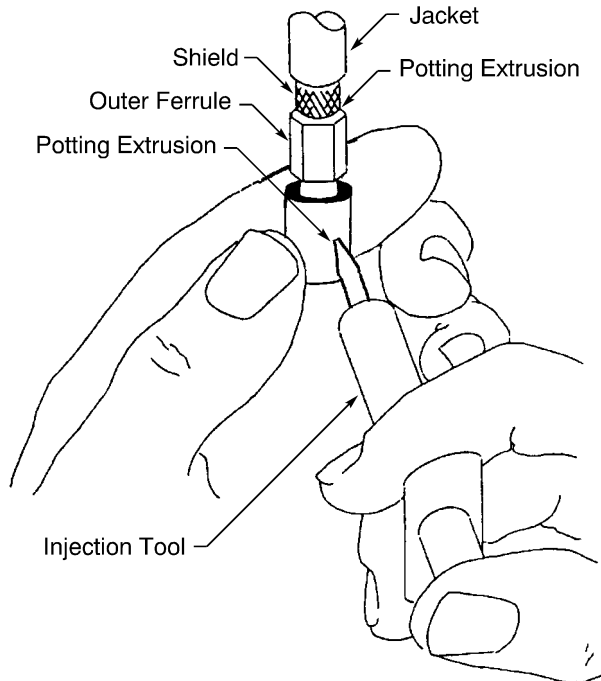
MIL-C-26500 FRONT RELEASE CONNECTORS



POSITION OF THE OUTER FERRULE

Figure 129

- (18) Crimp the outer ferrule.
- (19) If the 1.12 inch sleeve is specified, push the 1.12 inch sleeve to the end of the cable until the forward end of the sleeve is against the rear end of the outer ferrule.
- (20) Shrink the sleeve in its position. Refer Subject 20-10-14.
- (21) Seal the contact with the potting compound. Refer to Figure 130.



POSITION OF THE INJECTION TOOL IN THE FILLER HOLE OF THE SHIELDED CONTACT

Figure 130

- (a) Hold the shielded contact assembly in a vertical position.
Make sure that the engaging end of the contact is pointed down.
- (b) Put the end of the injection tool into one of the potting filler holes in the contact body assembly.
- (c) Push the plunger of the injection tool.
Make sure that the potting compound goes into the contact and starts to flow out of the other filler hole.

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- (d) Make a blockage of the other filler hole to stop the flow of the potting material.
- (e) Continue to push the plunger of the injection tool until the potting material starts to flow out between the shield and the outer ferrule.
- (f) Remove the injection tool from the filler hole.
- (g) Remove the blockage from the other filler hole.
- (h) Cure the potting compound.

CAUTION: OBEY THE MANUFACTURER'S INSTRUCTIONS TO CURE THE POTTING COMPOUND. POTTING COMPOUND THAT IS NOT CURED CORRECTLY CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONTACT.

- (22) Assemble the remaining heat shrinkable sleeves:
 - (a) Push the 0.75 inch sleeve on the outer ferrule until the forward end of the sleeve is against the shoulder of the body assembly.
Make sure that the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.
 - (b) Shrink the sleeve in its position. Refer Subject 20-10-14.
 - (c) Push the 0.50 length of sleeve on the 0.75 inch sleeve until the forward end of the sleeve is against the shoulder of the body assembly.
Make sure that the distance between the forward end of the sleeve and the shoulder is a maximum of 0.06 inch.
 - (d) Shrink the sleeve in its position. Refer Subject 20-10-14.

I. Assembly of Boeing 60B40147-() and 60B40037-() Size 2 Potted Shielded Contacts

**Table 77
NECESSARY MATERIALS**

Description	Material	Supplier
Potting Compound	RTV 11	General Electric Silicones
	RTV 3110	Dow Corning
Primer	RTV 1201	Dow Corning
	A-4094	Dow Corning
Solvent	Standard 265 Thinner	Chevron USA Incorporated
Solvent, Aliphatic Naphtha	TT-N-95 Type II	An available source

**Table 78
CENTER CONTACT CRIMP TOOLS**

Wire Size (AWG)	Center Contact Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
20	20	M22520/2-01	7	M22520/2-24
			7	K75S-1

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**Table 79
FERRULE CRIMP TOOLS**

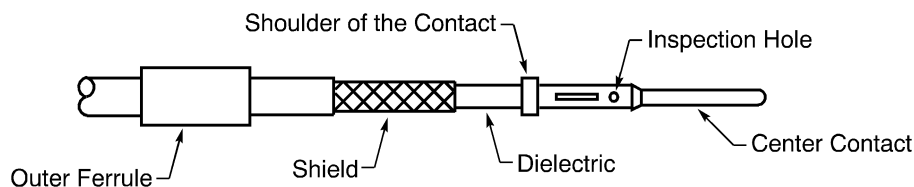
Basic Unit	Die	
	Part Number	Cavity
612648	612661	-
M22520/5-01	M22520/5-10	-
	M22520/5-39	-
ST965-1	-	-
WT-202	-	-
WT-202-06-08	-	S

- (1) Make a selection of a center contact crimp tool from Table 78.
- (2) Make a selection of a ferrule crimp tool from Table 79.
- (3) Make a selection of these materials from Table 77:
 - A solvent
 - A primer
 - A potting compound.
- (4) Prepare the cable.
 - (a) Remove 0.57 inch \pm 0.06 inch of the jacket from the end of the cable.
 - (b) Remove 0.45 inch \pm 0.05 inch of the shield from the end of the cable.
 - (c) Remove 0.45 inch \pm 0.05 inch of the dielectric from the end of the conductor.
- (5) Assemble the contact.
 - (a) If the strands of the center conductor are apart, twist the strands together in their initial direction.
 - (b) Push the center conductor into the crimp barrel of the center contact until the dielectric is against the shoulder of the center contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The dielectric is against the shoulder of the center contact.

Refer to Figure 131.



**POSITION OF THE CENTER CONTACT ON THE CABLE
Figure 131**

- (c) Crimp the center contact.

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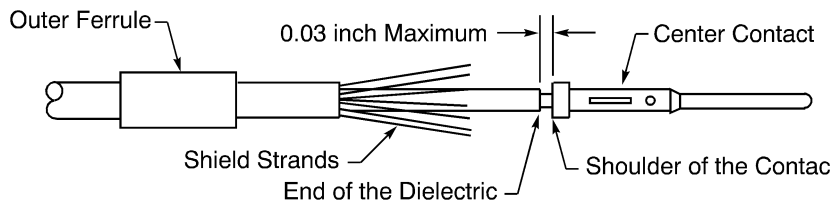
Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.

- (d) Clean the center contact assembly with the solvent.
- (e) Apply a thin layer of the primer to the center contact assembly.

Make sure that no primer is applied to the engaging end of the center contact.

CAUTION: PRIMER ON THE CENTER CONTACT CAN CAUSE UNSATISFACTORY OPERATION OF THE CONTACT.

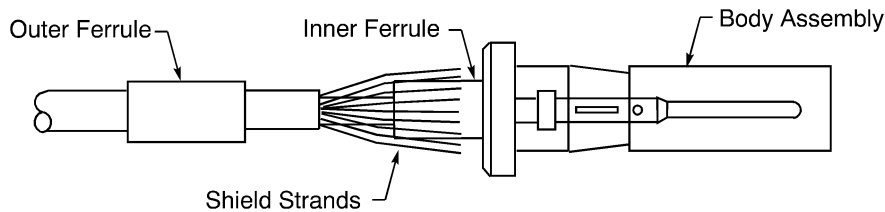
- (f) Let the primer dry.
- (g) Move the strands of the shield apart. Refer to Figure 132.



CONFIGURATION OF THE SHIELD STRANDS
Figure 132

- (h) Put the body assembly on the center contact. Refer to Figure 133.

Make sure that the inner ferrule of the body assembly is between the shield strands and the dielectric.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT
Figure 133

- (i) Push the center contact into the body assembly until it is locked in the body assembly.
- (j) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

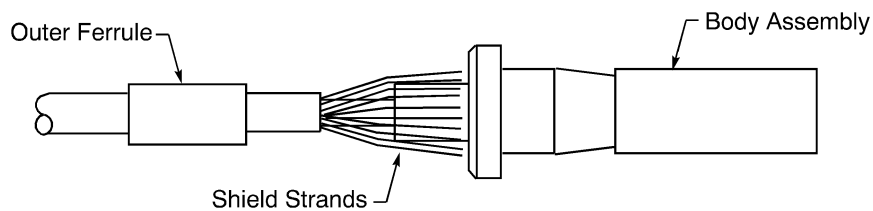
CAUTION: DO NOT PULL ON THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

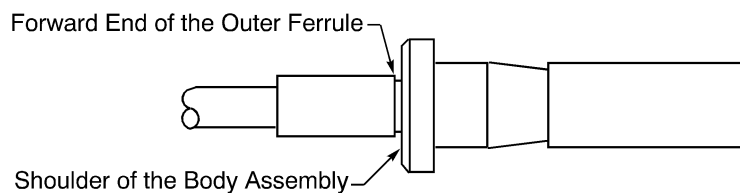
- (k) If the center contact moves out of the body assembly, do Step (i) and Step (j) again.
- (l) Put the strands of the shield on the inner ferrule. Refer to Figure 134.

STANDARD WIRING PRACTICES MANUAL**MIL-C-26500 FRONT RELEASE CONNECTORS**

Make sure that the strands of the shield are symmetrical around the inner ferrule.

**POSITION OF THE SHIELD ON THE INNER FERRULE****Figure 134**

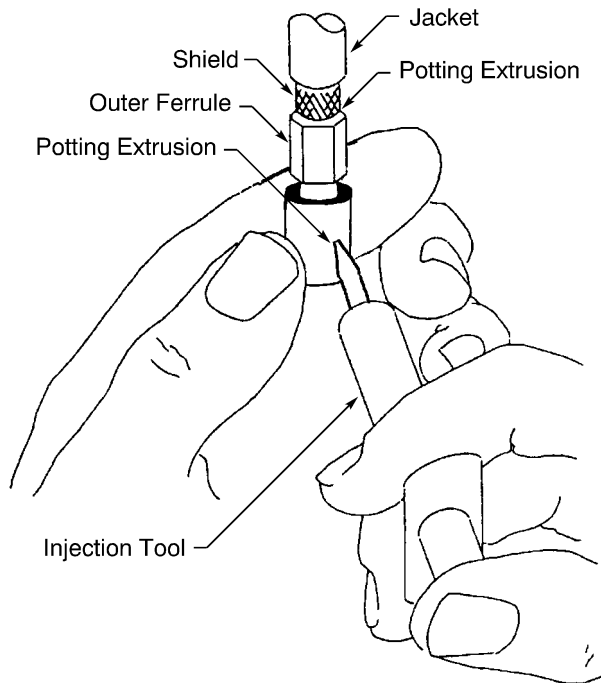
- (m) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 135.

**POSITION OF THE OUTER FERRULE****Figure 135**

- (n) Crimp the outer ferrule.
- (6) Seal the contact with the potting compound. Refer to Figure 136.

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POSITION OF THE INJECTION TOOL IN THE FILLER HOLE OF THE SHIELDED CONTACT
Figure 136

- (a) Hold the shielded contact assembly in a vertical position.
Make sure that the engaging end of the contact is pointed down.
- (b) Put the end of the injection tool into one of the potting filler holes in the contact body assembly.
- (c) Push the plunger of the injection tool.
Make sure that the potting compound goes into the contact and starts to flow out of the other filler hole.
- (d) Cause a blockage of this hole to stop the flow of the potting material from the hole.
- (e) Continue to push the plunger of the injection tool until the potting material starts to flow out between the shield and the outer ferrule.
- (f) Remove the injection tool from the filler hole.
- (g) Remove the blockage from the other filler hole.
- (h) Cure the potting compound.

CAUTION: OBEY THE MANUFACTURER'S INSTRUCTIONS TO CURE THE POTTING COMPOUND. POTTING COMPOUND THAT IS NOT CURED CORRECTLY CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONTACT.

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J. Assembly of Boeing 10-60479-() Size 2 Shielded Contacts with a BMS13-65 Type 0F Cable

**Table 80
NECESSARY MATERIALS**

Material	Part Number	Supplier
Seal Sleeve	DWP-125	Raychem

NOTE: For alternative sleeve part numbers, refer to Subject 20-00-11.

**Table 81
CENTER CONTACT CRIMP TOOLS**

Wire Size (AWG)	Center Contact Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
22	20	M22520/2-01	6	M22520/2-24
		ST2220-1-Y	-	ST2220-1-15A

**Table 82
FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
612648	612661	-
M22520/5-01	M22520/5-10	-
	M22520/5-39	-
ST965-1	-	-
WT-202	-	-
WT-202-06-08	-	S

- (1) Make a selection of a center contact crimp tool from Table 81.
- (2) Make a selection of a ferrule crimp tool from Table 82.
- (3) Put the necessary components on the cable.

NOTE: The seal sleeve, the seal boot, and the outer ferrule in the contact kit are not applicable for this procedure. They can be discarded.

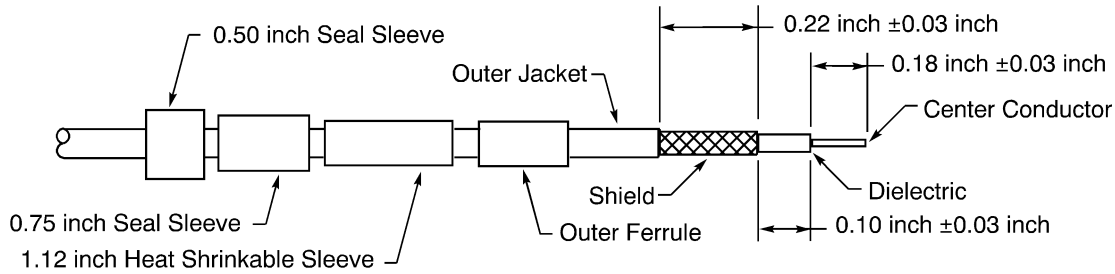
- (a) Put these sleeves on the cable in this sequence:
 - A 0.50 inch \pm 0.05 inch length of 1/4 inch diameter seal sleeve
 - A 0.75 inch \pm 0.06 inch length of 3/16 inch diameter seal sleeve
 - A 1.12 inch \pm 0.12 inch length of 1/8 inch diameter heat shrinkable sleeve.

Refer to Table 80.

- (b) Put a BACS13S156C outer ferrule on the cable
- (4) Prepare the cable. Refer to Figure 137.

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CABLE PREPARATION

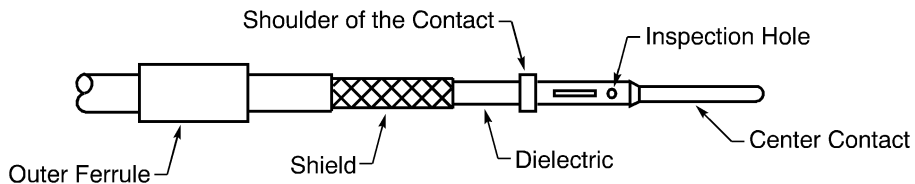
Figure 137

- (a) Remove a minimum of 0.59 inch of the jacket from the end of the cable.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.
- (b) Remove the necessary length of the shield to make the distance from the end of the cable jacket to the end of the shield equal to 0.22 inch ± 0.03 inch.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
- (c) Remove the necessary length of the inner dielectric to make the distance from the end of the shield to the end of the dielectric equal to 0.10 inch ± 0.03 inch.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
- (d) Remove the necessary length of the center conductor to make the distance from the end of the inner dielectric to the end of the conductor equal to 0.18 inch ± 0.03 inch.
- (5) Assemble the contact:
 - (a) If the strands of the center conductor are apart, twist the strands together in their initial direction.
 - (b) Push the center conductor into the crimp barrel of the center contact until the inner dielectric is against the shoulder of the center contact.
 - Make sure that:
 - All of the strands of the conductor are in the crimp barrel
 - The strands of the conductor can be seen in the inspection hole
 - The dielectric is against the shoulder of the center contact.

Refer to Figure 138.

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POSITION OF THE CENTER CONTACT ON THE CABLE

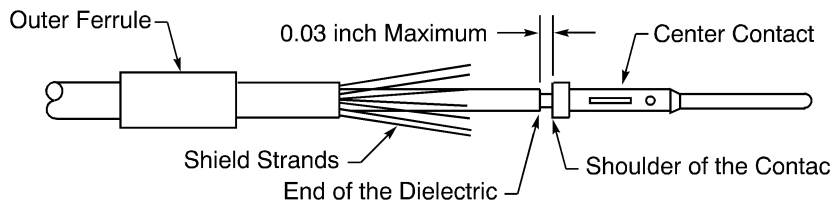
Figure 138

(c) Crimp the center contact.

Make sure that the distance from the end of the dielectric to the contact is not more than 0.03 inch.

(6) Move the strands of the round conductor shield apart. Refer to Figure 139.

Make sure that the strands of the flat conductor shield stay against the dielectric.

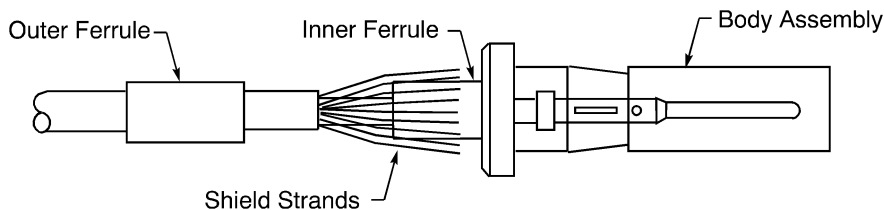


CONFIGURATION OF THE SHIELD STRANDS

Figure 139

(7) Put the body assembly on the center contact. Refer to Figure 140.

Make sure that the inner ferrule of the body assembly is between the round conductor shield and the flat conductor shield.



POSITION OF THE BODY ASSEMBLY ON THE CENTER CONTACT

Figure 140

(8) Push the center contact into the body assembly until it is locked in the body assembly.

(9) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.

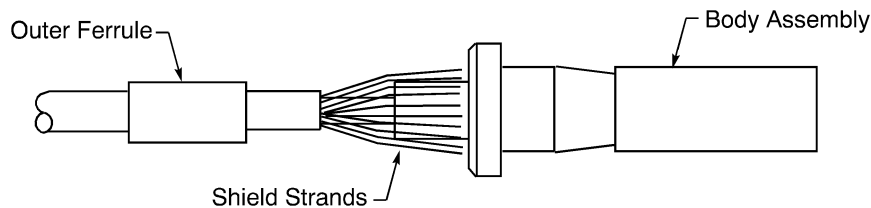
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CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

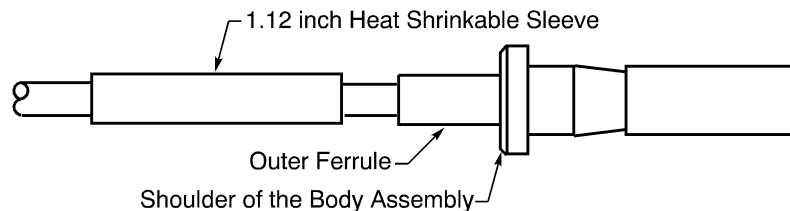
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (10) If the center contact moves out of the body assembly, do Step (8) and Step (9) again.
- (11) Put the strands of the shield on the inner ferrule. Refer to Figure 141.
Make sure that the strands of the shield are symmetrical around the inner ferrule.



POSITION OF THE SHIELD ON THE INNER FERRULE
Figure 141

- (12) Push the outer ferrule forward to the end of the cable until the forward end of the outer ferrule is against the shoulder of the body assembly. Refer to Figure 142.



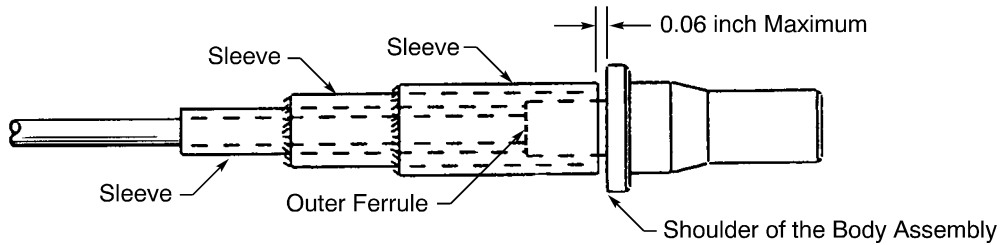
POSITION OF THE OUTER FERRULE
Figure 142

- (13) Crimp the outer ferrule.
- (14) Assemble the heat shrinkable sleeves:
 - (a) Push the 1.12 inch sleeve to the end of the cable until the forward end of the sleeve is against the rear end of the outer ferrule.
 - (b) Shrink the sleeve in its position. Refer Subject 20-10-14.
 - (c) Push the 0.75 inch sleeve on the outer ferrule until the forward end of the sleeve is against the shoulder of the body assembly. Refer to Figure 143.

Make sure that the distance between the forward end of the sleeve and the shoulder is not more than 0.06 inch.

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POSITION OF THE HEAT SHRINKABLE SLEEVES
Figure 143

- (d) Shrink the sleeve in its position. Refer Subject 20-10-14.
- (e) Push the 0.5 inch sleeve on the 0.75 inch sleeve until the forward end of the sleeve is against the shoulder of the body assembly.
 Make sure that the distance between the end of the sleeve and the shoulder is not more than 0.06 inch.
- (f) Shrink the sleeve in its position. Refer Subject 20-10-14.

10. COAX CONTACT ASSEMBLY

A. Assembly of Cory CRC280-(), CRM280-(), and CRMEF-502 Coax Contacts

Table 83
COAX CENTER CONTACT CRIMP TOOL

Coax Contact	Basic Unit		Locator
	Part Number	Setting	
CRC280-2	M22520/2-01	5	K709
CRC280-3	M22520/2-01	5	K709
CRC280-4	M22520/2-01	5	K709
CRM280-2	M22520/2-01	5	M22520/2-14
CRM280-3	M22520/2-01	6	M22520/2-14
CRM280-4	M22520/2-01	5	M22520/2-14
CRMEF-502	M22520/2-01	6	M22520/2-37

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**Table 84
COAX CONTACT BODY CRIMP TOOL**

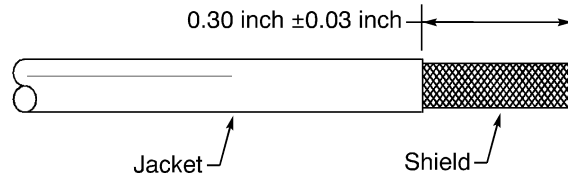
Coax Contact	Basic Unit	Die	
		Part Number	Cavity
CRC280-2	612648	612642	B
	KTH-1000	KTH-2007	A
	M22520/5-01	M22520/5-05	B
		M22520/5-41	B
		Y197	B
CRC280-3	M22520/5-01	M22520/5-39	B
		Y139	B
CRC280-4	612648	612642	B
	KTH-1000	KTH-2007	A
	M22520/5-01	M22520/5-05	B
		M22520/5-41	B
		Y197	B
CRM280-2	612648	612642	B
	KTH-1000	KTH-2007	A
	M22520/5-01	M22520/5-05	B
		M22520/5-41	B
		Y197	B
CRM280-3	M22520/5-01	M22520/5-39	B
		Y139	B
CRM280-4	612648	612642	B
	KTH-1000	KTH-2007	A
	M22520/5-01	M22520/5-05	B
		M22520/5-41	B
		Y197	B
CRMEF-502	612648	612642	B
	KTH-1000	KTH-2007	A
	M22520/5-01	M22520/5-05	B
		M22520/5-41	B
		Y197	B

- (1) Make a selection of a center contact crimp tool from Table 83.
- (2) Make a selection of a contact body crimp tool from Table 84.

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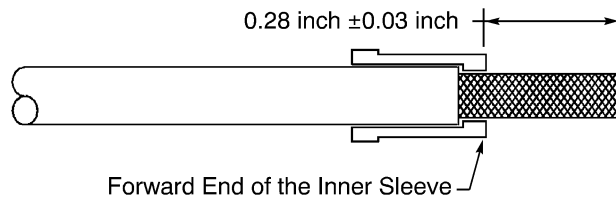
MIL-C-26500 FRONT RELEASE CONNECTORS

- (3) Cut the end of the cable.
Make sure that the end is perpendicular to the longitudinal axis.
- (4) Remove 0.30 inch \pm 0.03 inch of the outer jacket from the end of the cable. Refer to Figure 144.



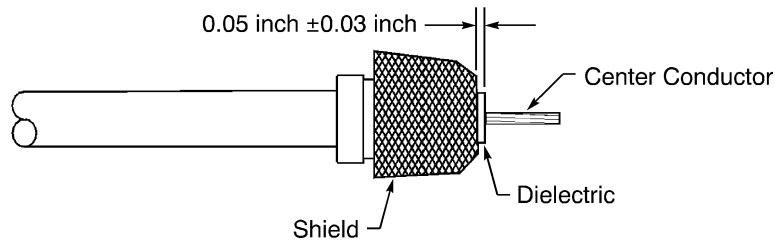
OUTER JACKET REMOVAL LENGTH
Figure 144

- (5) Put the inner sleeve on the cable. Refer to Figure 145.
Make sure that:
 - The inner shoulder of the sleeve is against the end of the cable jacket
 - The distance from the forward end of the inner sleeve to the end of the cable is 0.28 inch \pm 0.03 inch.



POSITION OF THE INNER SLEEVE
Figure 145

- (6) Fold the outer shield with round strands back. Refer to Figure 146.
Make sure that strands of the outer shield are against the inner sleeve.



POSITION OF THE OUTER SHIELD
Figure 146

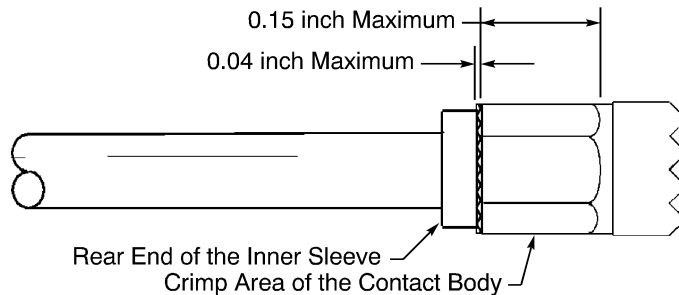
- (7) Remove the necessary length of the inner shield with flat strands.
Make sure that the end of the inner shield is aligned with the forward end of the inner sleeve.

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MIL-C-26500 FRONT RELEASE CONNECTORS

CAUTION: DO NOT CAUSE DAMAGE TO THE ROUND STRANDS OF THE OUTER SHIELD. DAMAGE TO THE OUTER SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OR RELIABILITY OF THE COAX CABLE.

- (8) Remove the necessary length of the dielectric.
Make sure that the distance from the forward end of the inner sleeve to the end of the dielectric is 0.05 inch \pm 0.03 inch.
- (9) Put the center contact on the center conductor.
- (10) Crimp the center contact.
- (11) Put the body of the contact on the cable.
Make sure that:
 - The barrel is on the shield
 - The center contact is fully inserted in the body.
- (12) To make sure that the center contact is locked, hold the body of the contact and lightly pull the cable.
- (13) If it is necessary, remove a short length of the shield to align the end of the shield with the rear end of the contact body.
- (14) Crimp the contact body. Refer to Figure 147.
Make sure that the distance between the flange of the inner sleeve and the rear end of the contact body is not more than 0.04 inch.



CRIMP OF THE CONTACT BODY
Figure 147

11. CONTACT INSERTION

A. Contact Insertion

Refer to:

- Paragraph 11.B. for the insertion of a shielded contact
- Paragraph 11.C. for the insertion of a coax contact.

This procedure can be used to insert these contacts in a contact cavity:

- A wired contact
- An unwired contact.

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

**Table 85
CONTACT INSERTION TOOLS**

Contact Size	Wire O.D. (inch)	Basic Unit	Bit
2020	More than 0.06	294-88	-
		AT 1020	-
	Less than 0.06	ATB 1067	-
	-	DAK20	-
	Less than 0.06	DAK351	-
	More than 0.06	MS24256A20	-
		M81969/17-03	-
	Less than 0.06	RTM20-5	-
		RTPIT-085B	DAK602-2
	More than 0.06	RTPIT-085B	ST2220-2-1
	Less than 0.06	RTPIT-120B	DAK602-2
	More than 0.06	RTPIT-120B	ST2220-2-1
	Less than 0.06	ST2220-2	DAK602-2
	More than 0.06	ST2220-2	ST2220-2-1
-	ZZL-R-9510-20	-	
2018	-	RTPIT-085B	ST2220-2-1
		RTPIT-120B	ST2220-2-1
		ST2220-2	ST2220-2-1
2016	-	RTPIT-085B	ST2220-2-1
		RTPIT-120B	ST2220-2-1
		ST2220-2	ST2220-2-1

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 85 (continued)

Contact Size	Wire O.D. (inch)	Basic Unit	Bit
1616	Less than 0.088	294-96	-
		AT 1016	-
		ATBO1108	-
		ATBO1108-16	-
		ATBO1108-90	-
	-	DAK55-16	-
		MS24256A16	-
	Less than 0.088	M81969/17-04	-
	-	MS90455-16	-
		RTM16-2	-
	Less than 0.088	RTPIT-085B	ST2220-2-4
	Between 0.088 and 0.130	RTPIT-085B	ST2220-2-4A
	Less than 0.088	RTPIT-120B	ST2220-2-4
	Between 0.088 and 0.130	RTPIT-120B	ST2220-2-4A
Less than 0.088	ST2220-2	ST2220-2-4	
Between 0.088 and 0.130	ST2220-2	ST2220-2-4A	
Less than 0.088	ZZL-R-9510-16	-	
1212	-	294-72	-
		AT 1012	-
		DAK55-12	-
		MS24256A12	-
		M81969/17-05	-
		MS90455-12	-
		RTM12-5	-
		RTPIT-120B	ST2220-2-5
		ST2220-2	ST2220-2-5
		ZZL-R-9510-12	-

- (1) Make a selection of a contact insertion tool from Table 85.
Refer to Subject 20-00-16 to find the O.D. of the wire.
- (2) Examine the tool.

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WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE PERSON.

CAUTION: DO NOT USE A TOOL WITH:

- A TIP THAT IS BENT
- A TIP THAT IS FLARED
- A TIP THAT IS BROKEN
- A TIP THAT HAS A CRACK.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (3) Put the necessary connector assembly components on the wire harness.
- (4) Examine the contact.

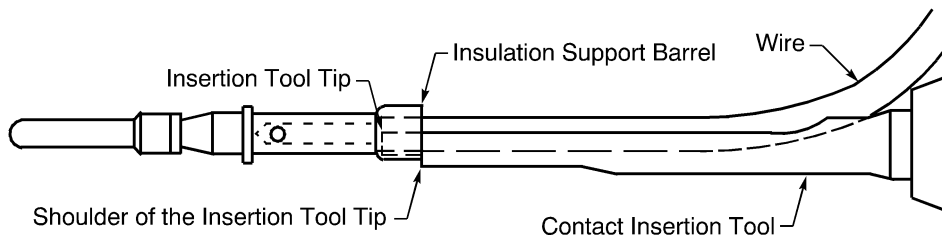
Make sure that the contact:

- Is straight
- Does not have damage.

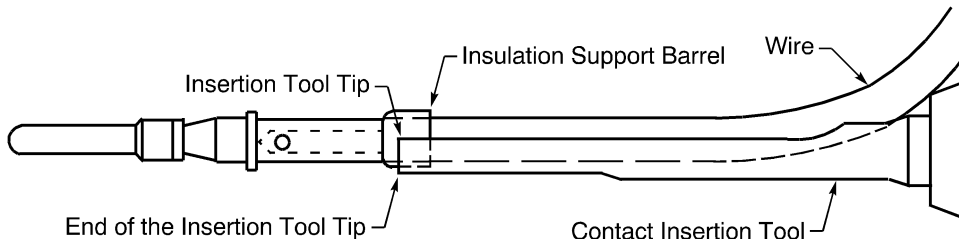
- (5) Put the contact assembly in the insertion tool.

For a size 20 contact, refer to:

- Figure 148 for the correct position of the insertion tool tip on the contact assembly with a wire O.D. less than 0.06 inch
- Figure 149 for the correct position of the insertion tool tip on the contact assembly with a wire O.D. more than 0.06 inch.



POSITION OF THE INSERTION TOOL TIP INSIDE THE WIRE INSULATION BARREL FOR SIZE 20 CONTACTS AND A WIRE O.D. LESS THAN 0.06 INCH
Figure 148



POSITION OF THE INSERTION TOOL TIP OUTSIDE THE WIRE INSULATION BARREL FOR SIZE 20 CONTACTS AND A WIRE O.D. MORE THAN 0.06 INCH
Figure 149

- (6) From the rear of the connector, axially align the insertion tool and the contact cavity.

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

CAUTION: DAMAGE TO THE CONNECTOR OCCURS IF A TOOL IS INSERTED INTO THE FRONT FACE OF THE CONNECTOR.

- (7) Carefully push the insertion tool into the contact cavity until it stops.

CAUTION: DO NOT TURN THE INSERTION TOOL AT THE SAME TIME THAT THE TOOL IS PUSHED IN THE GROMMET. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (8) If it is necessary to make the insertion of the contact easier:
 - (a) Put a small quantity of isopropyl alcohol or denatured alcohol on one of these surfaces or each of these surfaces:
 - The contact
 - The rear face of the connector grommet.

CAUTION: DO NOT PUT LUBRICANT ON ANOTHER SURFACE. DAMAGE TO THE CONDUCTOR OR TO THE WIRED CONTACT CAN CAUSE UNSATISFACTORY PERFORMANCE.

CAUTION: DO NOT PUT MORE THAN THE NECESSARY QUANTITY OF LUBRICANT ON THE SURFACE. DAMAGE TO THE CONDUCTOR OR TO THE WIRED CONTACT CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (9) Carefully pull the insertion tool straight out of the contact cavity.
- (10) To make sure that the contact is locked in the contact cavity, lightly pull on the wire.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (11) If the contact is not locked in the contact cavity:
 - (a) Pull the contact out of the contact cavity.
 - (b) Do Step (4) through Step (10) again.

B. Shielded Contact Insertion

**Table 86
SHIELDED CONTACT INSERTION TOOLS**

Shielded Contact		Connector Cavity Size	Insertion Tool
Part Number	Size		
10-60479-41	2	8	DAK623
10-60479-44	2	8	DAK623
48-2187-02	2	8	DAK623
MS27184-22P	1	12	DAK623
MS39029/54-342	1	12	DAK623
S283U007-7	2	8	DAK623

STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

**Table 87
SHIELDED CONTACT INSERTION TOOLS**

Shielded Contact Size	Connector Cavity Size	Insertion Tool
1	12	294-72
		M81969/17-05
		MS24256A12
2	8	294-128
		M81969/17-06

- (1) Make a selection of an insertion tool from:
 - Table 86 for a 10-60479-() shielded contact
 - Table 86 for a 48-2187-02 shielded contact
 - Table 86 for an MS27184-22P or an MS39029/54-342 shielded contact
 - Table 86 for an S283U007-7 shielded contact
 - Table 87 for all other shielded contacts.

- (2) Examine the tool.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE PERSON.

CAUTION: DO NOT USE A TOOL WITH:

- A TIP THAT IS BENT
- A TIP THAT IS FLARED
- A TIP THAT IS BROKEN
- A TIP THAT HAS A CRACK.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (3) Put the necessary connector assembly components on the wire harness.
- (4) Examine the contact.

Make sure that the contact:

- Is straight
- Does not have damage.

- (5) Put the contact assembly in the insertion tool.
- (6) From the rear of the connector, axially align the insertion tool and the contact cavity.

CAUTION: DAMAGE TO THE CONNECTOR OCCURS IF A TOOL IS INSERTED INTO THE FRONT FACE OF THE CONNECTOR.

- (7) Carefully push the insertion tool into the contact cavity until it stops.

CAUTION: DO NOT TURN THE INSERTION TOOL AT THE SAME TIME THAT THE TOOL IS PUSHED IN THE GROMMET. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (8) Carefully remove the tool from the contact cavity.
- (9) To make sure that the contact is locked, lightly pull the wire.

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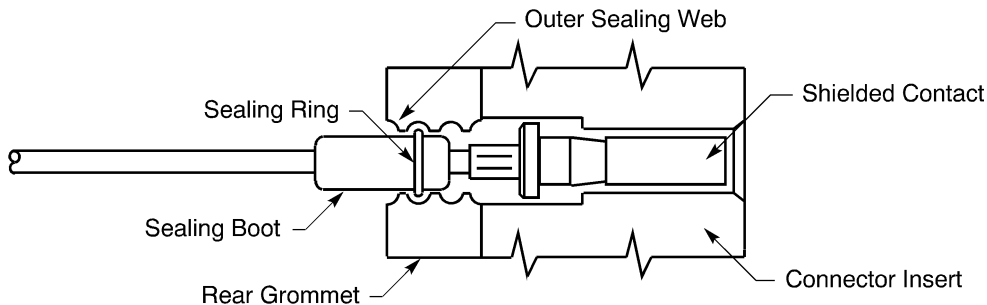
MIL-C-26500 FRONT RELEASE CONNECTORS

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (10) If the contact is not locked in the contact cavity, do Step (7) through Step (9) again.
- (11) For the Cinch CN0900-336 contacts:
 - (a) Make a selection of a blunt tool.
 - (b) Carefully push the O-ring into the rear grommet to make the O-ring go behind the outer sealing web of the grommet.
- (12) For all other size 2 shielded contacts, push the sealing boot into the contact cavity of the rear grommet. Refer to Figure 150.

Make sure that the sealing ring on the sealing boot is behind the outer sealing web in the rear grommet.



POSITION OF THE THE SEALING RING BEHIND THE OUTER SEALING WEB
Figure 150

C. Coax Contact Insertion

Table 88
COAX CONTACT INSERTION TOOLS

Contact Size	Insertion Tool
12	294-72
	M81969/17-05
	MS24256A12
8	294-128
	M81969/17-06

- (1) Make a selection of a coax contact insertion tool from Table 88.
- (2) Make a selection of a coax contact insertion tool from Table 88.

STANDARD WIRING PRACTICES MANUAL**MIL-C-26500 FRONT RELEASE CONNECTORS**

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE PERSON.

CAUTION: DO NOT USE A TOOL WITH:

- A TIP THAT IS BENT
- A TIP THAT IS FLARED
- A TIP THAT IS BROKEN
- A TIP THAT HAS A CRACK.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (3) Put the necessary connector assembly components on the wire harness.
- (4) Examine the contact.

Make sure that the contact:

- Is straight
- Does not have damage.

- (5) Put the contact assembly in the insertion tool.
- (6) From the rear of the connector, axially align the insertion tool with the contact cavity.

CAUTION: DAMAGE TO THE CONNECTOR OCCURS IF A TOOL IS INSERTED INTO THE FRONT FACE OF THE CONNECTOR.

- (7) Carefully push the tool straight into the correct contact cavity until it stops.

CAUTION: DO NOT TURN THE INSERTION TOOL AT THE SAME TIME THAT THE TOOL IS PUSHED IN THE GROMMET. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (8) Carefully remove the tool from the contact cavity.
- (9) To make sure that the contact is locked, lightly pull the wire.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE CABLE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE CABLE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (10) If the contact is not locked in the contact cavity, do Step (7) through Step (9) again.

12. SEAL OF AN EMPTY CONTACT CAVITY**A. Seal of an Empty Contact Cavity**

All empty contact cavities must be sealed.

Refer to:

- Subject 20-60-08 to seal an empty standard contact cavity
- Paragraph 12.B. to seal an empty shielded contact cavity with a Boeing 10-60479-() potted shielded contact
- Paragraph 12.C. to seal an empty shielded contact cavity with an Amphenol 217-2026 seal plug.

B. Seal of an Empty Shielded Contact Cavity with a 10-60479-() Potted Shielded Contact

A satisfactory alternative to this procedure is the seal of an empty shielded contact cavity with an Amphenol 217-2026 seal plug. Refer to Paragraph 12.C.

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MIL-C-26500 FRONT RELEASE CONNECTORS

- (1) Assemble a 10-60479-() potted shielded contact without a center contact. Refer to Paragraph 9.H.

Make sure that:

- The center contact is not installed
 - The potting compound is sufficiently dry.
- (2) Make a selection of an insertion tool from Table 86.
 - (3) Put the tip of the insertion tool over the end of the unwired shielded contact.
 - (4) From the rear of the connector, push the tool straight into the correct contact cavity until it stops.
 - (5) Carefully remove the tool from the contact cavity.
 - (6) Push the sealing boot into the grommet.
 - (7) Push a size 16 seal plug or seal rod into the wire hole of the boot until the seal plug is against the contact.

C. Seal of an Empty Shielded Contact Cavity with an Amphenol 217-2026 Seal Plug

A satisfactory alternative to this procedure is the seal of an empty shielded contact cavity with a Boeing 10-60479-() potted shielded contact. Refer to Paragraph 12.B.

- (1) Align the plug with the contact cavity.

Make sure that the end with the grooves is pointed to the contact cavity.

- (2) Push the plug into the contact cavity until it is locked in the cavity.

13. INSTALLATION OF COUPLING RING POLARITY ADAPTERS

A. Installation of Cinch Adapters

Refer to Paragraph 3.M. for the adapter configurations and part numbers.

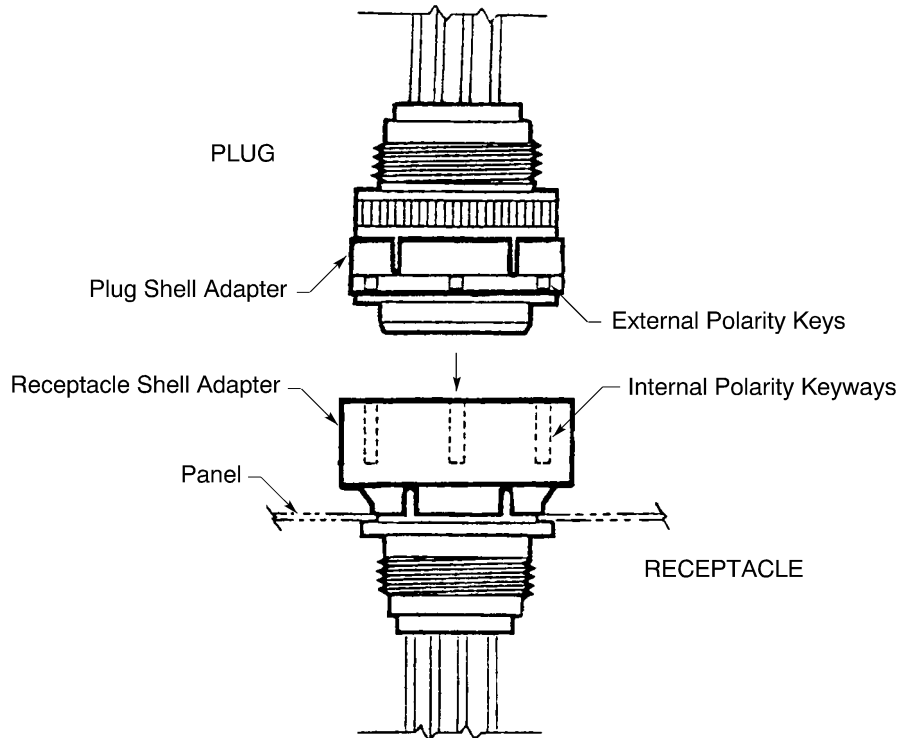
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COUPLING RING POLARITY ADAPTERS

Figure 151

- (1) To install the plug shell adapter:
 - (a) Put the adapter on the plug. Refer to Figure 151.
Make sure that the end with the external polarity keys is pointed to the engaging face of the plug.
 - (b) Push the adapter on the coupling ring or the plug until the retention device is locked.
- (2) To install the receptacle shell adapter:
 - (a) Put the adapter on the receptacle. Refer to Figure 151.
Make sure that the end with the internal polarity keyways is pointed to the engaging face of the receptacle.
 - (b) Push the adapter over the receptacle until one of these conditions occur:
 - The adapter retention device is locked
 - The adapter is against the panel of the mounted receptacle.

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B. Installation of the Amphenol 48-7164-1S connector

**Table 89
NECESSARY MATERIALS**

Description	Description	Part Number	Supplier
Alcohol	Isopropyl	-	An available source
Thread Lock Compound	-	222	Loctite
		271	Loctite

**Table 90
NECESSARY TOOLS**

Tool	Description	Part Number	Supplier
Wiper	Cloth	-	An available source
Torque Tool	-	-	An available source

- (1) Make a selection of an alcohol and a thread lock compound from Table 89.
- (2) Make a selection of a wiper and a torque tool from Table 90.
- (3) Clean the threads of the 48-7164-1S connector body and retainer nut with the wiper moist with isopropyl alcohol.
- (4) Apply two drops of the thread lock compound on the threads of the 48-7164-1S connector body and the threads of the retainer nut.
- (5) Install the connector.
- (6) Torque the retainer nut to 46 inch-pounds ± 10 inch-pounds.

14. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 91
REMOVAL TOOL SUPPLIERS**

Removal Tools	Supplier
294-73	Amphenol
294-89	Amphenol
294-97	Amphenol
294-127	Amphenol
AT 2012	Astro
AT 2016	Astro
AT 2020	Astro
ATML 1907	Astro
ATML 1908	Astro
ATML 1909	Astro

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Table 91 (continued)

Removal Tools	Supplier
DRK12	Daniels
DRK16	Daniels
DRK20	Daniels
DRK56-12	Daniels
DRK56-16	Daniels
M81969/19-01	QPL
M81969/19-02	QPL
M81969/19-03	QPL
M81969/19-06	QPL
M81969/19-07	QPL
M81969/19-08	QPL
M81969/19-09	QPL
MS24256R12	QPL
MS24256-16	QPL
MS24256R16	QPL
MS24256R20	QPL
MS90456-12	QPL
RTX12-7	Burndy
RX12-7	Burndy
RX16-7	Burndy
RX16-8	Burndy
RX20-24	Burndy
RX20-24V5	Burndy
ST2220-3-13	Boeing
ST2220-3-14	Boeing
ST2220-3-15	Boeing
ZZL-R-9511-12	Pyle-National
ZZL-R-9511-16	Pyle-National
ZZL-R-9511-20	Pyle-National

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B. Contact Insertion Tools

Table 92
INSERTION TOOL SUPPLIERS

Insertion Tools	Supplier
294-72	Amphenol
294-88	Amphenol
294-96	Amphenol
294-128	Amphenol
AT 1012	Astro
AT 1016	Astro
AT 1020	Astro
ATB 1067	Astro
ATBO1108	Astro
ATBO1108-16	Astro
ATBO1108-90	Astro
DAK20	Daniels
DAK351	Daniels
DAK55-12	Daniels
DAK55-16	Daniels
DAK602-2	Daniels
DAK623	Daniels
M81969/17-03	QPL
M81969/17-04	QPL
M81969/17-05	QPL
M81969/17-06	QPL
MS24256A12	QPL
MS24256A16	QPL
MS24256A20	QPL
MS90455-12	QPL
MS90455-16	QPL
RTM12-5	Burndy
RTM16-2	Burndy
RTM20-5	Burndy
RTPIT-085B	Russtech
RTPIT-120B	Russtech

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 92 (continued)

Insertion Tools	Supplier
ST2220-2	Boeing
ST2220-2-1	Boeing
ST2220-2-4	Boeing
ST2220-2-4A	Boeing
ST2220-2-5	Boeing
ZZL-R-9510-12	Pyle-National
ZZL-R-9510-16	Pyle-National
ZZL-R-9510-20	Pyle-National

C. Crimp Tools

Table 93
CRIMP TOOL SUPPLIERS

Crimp Tools	Supplier
294-1631	Amphenol
612642	Buchanan
612648	Buchanan
612661	Buchanan
85-220	Balmar
85-550	Balmar
K709	Daniels
K74S	Daniels
K75S	Daniels
K75S-1	Daniels
K977	Daniels
KTH-1000	Kings
KTH-2007	Kings
M10S	Burndy
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
M22520/2-14	QPL

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MIL-C-26500 FRONT RELEASE CONNECTORS

Table 93 (continued)

Crimp Tools	Supplier
M22520/2-24	QPL
M22520/2-33	QPL
M22520/2-37	QPL
M22520/5-41	QPL
M22520/5-01	QPL
M22520/5-05	QPL
M22520/5-08	QPL
M22520/5-10	QPL
M22520/5-35	QPL
M22520/5-39	QPL
M22520/5-41	QPL
S-5	Burndy
S-6	Burndy
S-7	Burndy
S-8	Burndy
SL-2	Burndy
SL-3	Burndy
SL-4	Burndy
ST2220-1-1	Boeing
ST2220-1-2	Boeing
ST2220-1-3	Boeing
ST2220-1-15A	Boeing
ST2220-1-45	Boeing
ST2220-1-47	Boeing
ST2220-1-Y	Boeing
ST965-1	Boeing
ST965-5	Boeing
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels
WT-200	Thomas&Betts
WT-202	Thomas&Betts
WT-202-06-08	Thomas&Betts

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STANDARD WIRING PRACTICES MANUAL

MIL-C-26500 FRONT RELEASE CONNECTORS

Table 93 (continued)

Crimp Tools	Supplier
Y139	Daniels
Y197	Daniels
Y322	Daniels

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 67 SERIES AND CINCH CN0906 SERIES CONNECTORS

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3.	<u>CONNECTOR ASSEMBLY</u>	2
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 67 SERIES AND CINCH CN0906 SERIES CONNECTORS

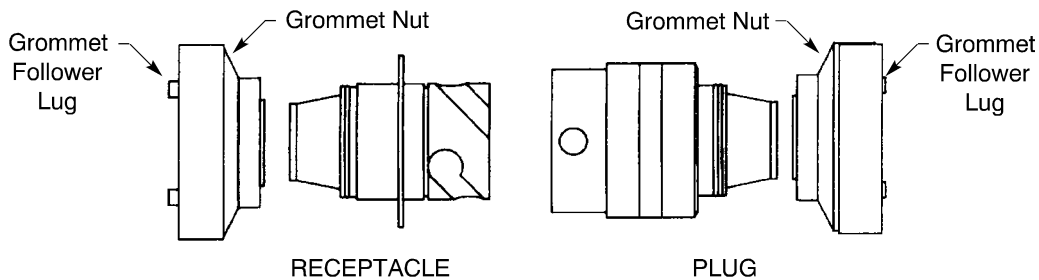
1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Connector Type	Supplier
67-906	Receptacle	Amphenol
67-907	Plug	Amphenol
CN0906-06E14-12P	Plug	Cinch
CN0906-02E14-12S	Receptacle	Cinch

B. Connector Description



**CONNECTOR RECEPTACLE AND PLUG
Figure 1**

C. Contact Part Numbers

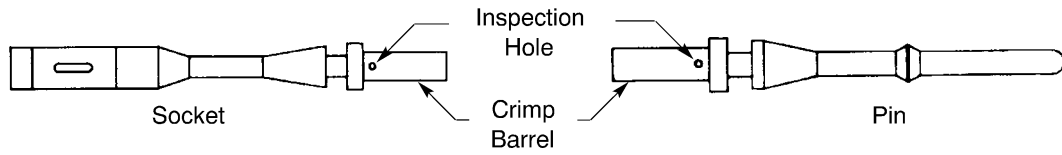
**Table 2
CONTACT PART NUMBERS**

Contact Size		Part Number	Contact Type	Supplier
Engaging End	Crimp Barrel			
20	20	10-827767-000	Socket	Amphenol
		67-1890-03	Pin	Amphenol
		CN0906-2000P-02	Pin	Cinch
		CN0906-2000S-02	Socket	Cinch

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 67 SERIES AND CINCH CN0906 SERIES CONNECTORS

D. Contact Description



TYPICAL CONTACT
Figure 2

2. CONNECTOR DISASSEMBLY

A. Safety Wire Removal

- (1) Remove the safety wire between the grommet nut and the grommet follower.
- (2) Loosen the grommet nut.
- (3) Push the nut over the wire.

CAUTION: DO NOT TRY TO REMOVE THE INTEGRAL GROMMET FROM THE SHELL.

B. Contact Removal

Table 3
CONTACT REMOVAL TOOLS

Engaging End Size	Contact Type	Removal Tool	
		Handle	Tip
20	Pin	294-152	294-1034
		ST-2220-2	ST-2220-3-16
	Socket	294-152	294-1033
		ST-2220-2	ST-2220-3-17

- (1) Make a selection of a contact removal tool from Table 3.
- (2) Carefully put the tip of the tool on the engaging end of the contact so that the tool is against the front face of the connector insert.
- (3) Pull the wire and the tool from the contact cavity at the same time.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

Table 4
BELT OR REEL MOUNTED CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Block
		Part Number	Setting	
24	20	612916	Blue	Yellow

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 67 SERIES AND CINCH CN0906 SERIES CONNECTORS

Table 4 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Block
		Part Number	Setting	
22	20	11148	Red	Red
		612916	Yellow	Red
20	20	612916	Yellow	Blue

**Table 5
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
24	20	M22520/2-01	5	K149
		WA22	5	K149
22	20	M22520/2-01	6	K149
		ST2220-1-Y	Fixed	ST2220-1-12
		WA22	6	K149
20	20	M22520/2-01	7	K149
		ST2220-1-Y	Fixed	ST2220-1-12
		WA22	7	K149
18	20	M22520/2-01	8	K149
		ST2220-1-Y	Fixed	ST2220-1-12
		WA22	8	K149

- (1) Remove 0.34 inch ±0.03 inch of wire insulation.
- (2) Make a selection of a crimp tool from Table 4 or Table 5.
- (3) Put the contact in the locator.
- (4) Put the wire in the crimp barrel of the contact until it hits the bottom.

Make sure that:

- All of the conductor strands are in the crimp barrel
 - The wire is visible through the inspection hole.
- (5) Crimp the contact.
 - (6) Remove the wired contact from the tool.

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ASSEMBLY OF AMPHENOL 67 SERIES AND CINCH CN0906 SERIES CONNECTORS

B. Contact Insertion

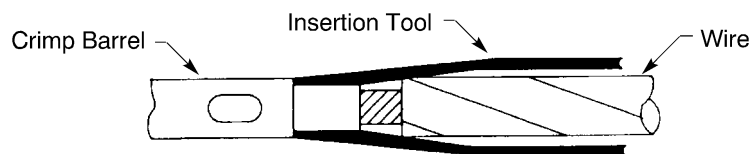
**Table 6
CONTACT INSERTION TOOLS**

Engaging End Size	Insertion Tool	
	Handle	Tip
20	294-152	294-1096
	ST-2220-2	ST-2220-2-15

- (1) Make a selection an insertion tool from Table 6.
- (2) Install spare contacts in all of the unused contact cavities.
- (3) Put the wired contact in the tool. Refer to Figure 3.

Make sure that:

- The tool tip is against the shoulder of the contact
- The inner shoulder of the tool is against the end of the contact.



**POSITION OF THE CONTACT IN THE INSERTION TOOL
Figure 3**

- (4) Push the contact into the connector.
- (5) Align the contact and the tool so that they are perpendicular to the rear face of the grommet.
- (6) Push the contact into the contact cavity until the stepped part of the tool tip is within 0.375 inch of the grommet.
- (7) Carefully pull the tool from the connector.
- (8) To make sure that each contact is completely inserted, hold the wire and pull slowly until the thumb and forefinger slip along the wire.

CAUTION: DO NOT PULL THE WIRE WITH A SUDDEN FORCE OR INDENT THE WIRES WITH THE FINGERNAILS.

- (9) Insert a filler rod in all spare contacts.

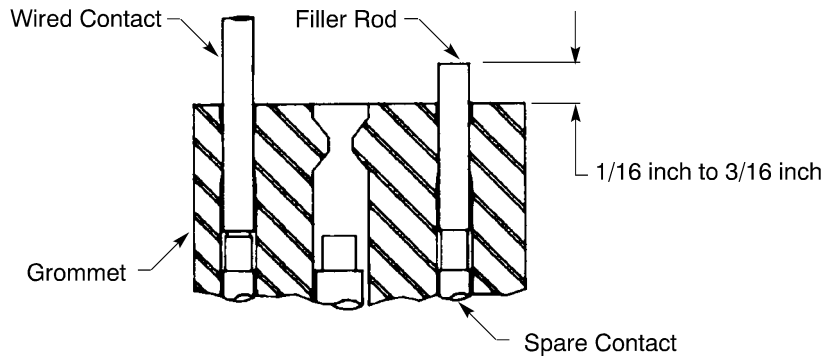
Make sure that the end of the filler rod is against the end of the crimp barrel.

- (10) Remove the unwanted length of the filler. Refer to Figure 4.

Make sure that the end of the filler is 1/16 inch to 3/16 inch from the face of the grommet.

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ASSEMBLY OF AMPHENOL 67 SERIES AND CINCH CN0906 SERIES CONNECTORS

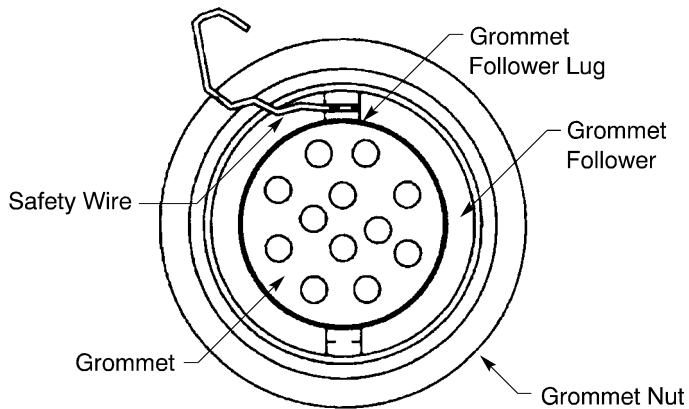


FILLER ROD INSTALLATION
Figure 4

C. Connector Assembly

- (1) Push the grommet nut against the connector backshell.
- (2) Hold the grommet follower lugs and turn the follower to align the keyway in the grommet follower with the key in the shell.
- (3) Tighten the grommet nut with pliers until the nut stops.

D. Safety Wire Installation



SAFETY WIRE INSTALLATION
Figure 5

- (1) When it is necessary, install safety wire on the grommet nut and grommet follower lug. Refer to Figure 5.
- (2) If the grommet nut holes are more than 0.38 inch apart:
 - (a) Use the double twist method. Refer to Figure 5 and Subject 20-60-07.
 - (b) Install the safety wire between the grommet follower lug and the grommet nut.
 - (c) Install the safety wire in any one of the grommet nut holes.
- (3) If the grommet nut holes are less than 0.38 inch apart:

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 67 SERIES AND CINCH CN0906 SERIES CONNECTORS

- (a) Use the single wire method. Refer to Subject 20-60-07.
- (b) Install the safety wire so that the wire is tightens when the grommet nut is loosened.
- (c) Twist the wires 3 to 5 turns at the end of the wire.
- (d) Bend the end of the wire back.

4. APPROVED TOOL SUPPLIERS

A. Removal Tool Suppliers

**Table 7
REMOVAL TOOL SUPPLIERS**

Tool	Supplier
294-152	Amphenol
294-1033	Amphenol
294-1034	Amphenol
ST-2220-2	Boeing
ST-2220-3-16	Boeing
ST-2220-3-17	Boeing

B. Insertion Tool Suppliers

**Table 8
INSERTION TOOL SUPPLIERS**

Tool	Supplier
294-1096	Amphenol
294-152	Amphenol
ST-2220-2	Boeing
ST-2220-2-15	Boeing

C. Crimp Tool Suppliers

**Table 9
CRIMP TOOL SUPPLIERS**

Tool	Supplier
11148	Buchanan
612916	Buchanan
K149	Daniels
M22520/2-01	QPL
ST2220-1-12	Boeing



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ASSEMBLY OF AMPHENOL 67 SERIES AND CINCH CN0906 SERIES CONNECTORS

Table 9 (continued)

Tool	Supplier
ST2220-1-Y	Boeing
WA22	Daniels

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ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS

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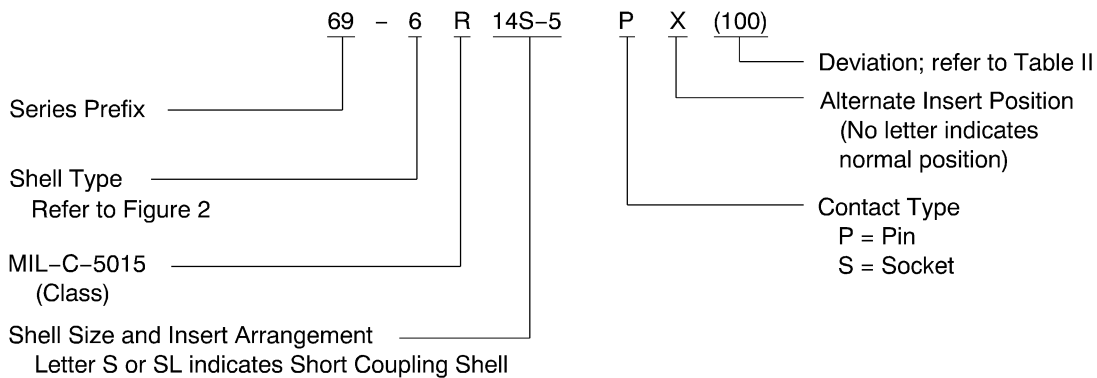
ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
69-()R()	Connector	Amphenol
69-6()R	Square Flange Receptacle	Amphenol
69-0()R	Straight Plug	Amphenol



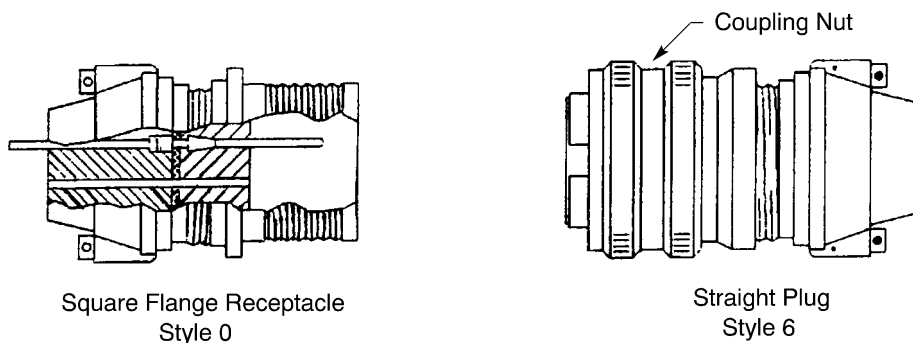
**AMPHENOL 69 SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1**

**Table 2
AMPHENOL 69 SERIES CONNECTOR DEVIATIONS**

Deviation	Description
100	Connector supplied with contacts
101	Connector supplied without contacts
135	Same as 100 with cable clamp 69-1500X
155	Same as 100 with 90 degree angle, and Glenair adapter containing metal grommet follower with cable clamp
170	Silicone elastomer, nylon grommet follower, rhodium plated contacts

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS



TYPICAL AMPHENOL 69 SERIES CONNECTOR

Figure 2

B. Contact Part Numbers

CAUTION: ONLY CONNECTORS THAT HAVE SHORT COUPLING SHELLS WITH A LETTER S OR SL IN THE SHELL SIZE PART NUMBER USE 16S (SHORT) CONTACTS.

**Table 3
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
16	16	Pin	69-1120-03	Amphenol
		Socket	69-1105-03	Amphenol
	16S	Pin	69-1125-03	Amphenol
		Socket	69-1110-03	Amphenol
12	12	Pin	69-1115-03	Amphenol
		Socket	69-1100-03	Amphenol
4	4	Pin	-	-
		Socket	203-10104-1	Cannon

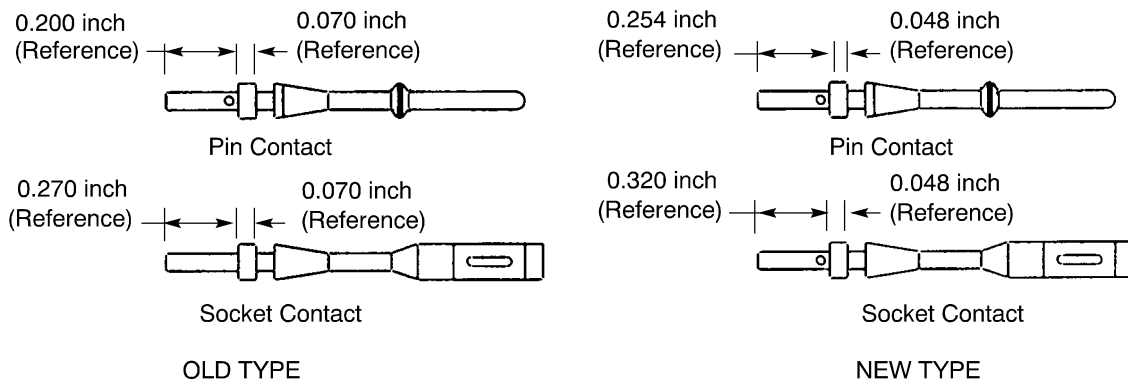
C. Filler Sleeve Part Numbers

**Table 4
CANNON FILLER SLEEVES**

Wire Size	Filler Sleeve	Supplier
8	252-0128-000	Cannon
6	252-0127-001	Cannon

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS



AMPHENOL 69 SERIES CONNECTOR TYPICAL CONTACTS

Figure 3

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 5
CONTACT REMOVAL TOOLS**

Contact Engaging End Size	Removal Tool		
	Type	Handle	Bit
16	Pin	-	294-466
	Socket	-	294-467
	Pin	-	ATA 0249
	Socket	-	ATA 0250
12	Pin	-	294-469
	Socket	-	294-470
	Pin	-	ATA 0252
	Socket	-	ATA 0253
4	Socket	294-1283	294-1288

**Table 6
INSERTION AND REMOVAL TOOL KITS**

Contact Engaging End Size	Tool Kit	Supplier
16	294-39	Amphenol
	ATA 3069	Astro
12	294-40	Amphenol
	ATA 3095	Astro

NOTE: The tool kits include the handle and the insertion and removal bits.

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ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS

NOTE: The backshell must be removed from the connector before the contacts can be removed.

- (1) Make a selection of a removal tool from Table 5.
- (2) At the front face of the connector, axially align the tool and the contact cavity.
- (3) Push the tool into the contact cavity until the contact moves out from the rear of the connector.
Make sure that the removal tool stays axially aligned with the contact cavity.
- (4) Carefully remove the tool from the contact cavity.
- (5) Pull the contact out of the contact cavity from the rear of the connector.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 7
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Target	Tolerance	
24	16	1/2	1/32	Fold the conductor back on itself
22	16	1/2	1/32	Fold the conductor back on itself
20	16	9/32	1/32	-
	12	1/2	1/32	Fold the conductor back on itself
18	16	9/32	1/32	-
	12	1/2	1/32	Fold the conductor back on itself
16	16	9/32	1/32	-
	12	1/2	1/32	Fold the conductor back on itself
14	12	9/32	1/32	-
12	12	9/32	1/32	-
8	4	9/32	1/32	-
6	4	9/32	1/32	-

**Table 8
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	16	M22520/1-01	2	M22520/1-02	Blue
22	16	M22520/1-01	3	M22520/1-02	Blue
20	16	M22520/1-01	4	M22520/1-02	Blue
	12	M22520/1-01	4	M22520/1-02	Yellow

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ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS

Table 8 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
18	16	M22520/1-01	5	M22520/1-02	Blue
	12	M22520/1-01	5	M22520/1-02	Yellow
16	16	M22520/1-01	6	M22520/1-02	Blue
	12	M22520/1-01	6	M22520/1-02	Yellow
14	12	M22520/1-01	7	M22520/1-02	Yellow
12	12	M22520/1-01	8	M22520/1-02	Yellow
8	4	13642	-	ST2354-2	-
6	4	13642	-	ST2354-2	-

- (1) Remove the correct length of wire insulation. Refer to Table 7.
- (2) Make a selection of a crimp tool from Table 8.
- (3) Insert the wire into the crimp barrel of the contact.
- (4) Crimp the contact onto the wire.

B. Contact Insertion

**Table 9
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	
	Handle	Bit
16	-	294-465
16	-	ATA 0251
12	-	294-468
12	-	ATA 0254
4	294-1283	294-1290-04

**Table 10
INSERTION AND REMOVAL TOOL KITS**

Crimp Barrel Size	Tool Kit	Supplier
16	294-39	Amphenol
	ATA 3069	Astro
12	294-40	Amphenol
	ATA 3095	Astro

NOTE: The tool kits include the handle and the insertion and removal bits.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS**

Table 11
SOCKET CONTACT INSERTION GUIDES

Crimp Barrel Size	Insertion Guide
16	ST2216-16A
12	ST2216-12A
4	200-908-136-02

- (1) Loosen the grommet clamp nut on the connector so that only two or three threads are engaged.
- (2) Install spare contacts in the unused contact cavities of the connector.

CAUTION: MAKE SURE THAT SIZE 16S (SHORT) CONTACTS ARE ONLY INSTALLED IN THE CONNECTORS WITH SHORT COUPLING SHELLS. THESE CONNECTORS HAVE THE LETTER S OR SL IN THE SHELL SIZE PORTION OF THE PART NUMBER.

- (3) Make a selection the correct insertion tool from Table 9.
- (4) If the contact is a socket, make a selection the correct insertion guide from Table 11.

CAUTION: TO PREVENT DAMAGE TO THE CONNECTOR, USE INSERTION GUIDES TO HELP WITH THE INSERTION OF SOCKET CONTACTS.

- (5) Place the wired or unwired contact in the insertion tool with the tip of the tool up against the contact shoulder.
- (6) Align the contact and the insertion tool perpendicular to the back face of the grommet.

CAUTION: KEEP THE CONTACT AND INSERTION TOOL PERPENDICULAR TO THE BACK FACE OF THE GROMMET DURING THE INSERTION.

NOTE: To make the contact easier to insert, both the contact and insertion tool may be lubricated with isopropyl alcohol.

- (7) If the contact is a socket, insert the flat side on the shank of the guide toward the indent in the engagement pressure spring.
- (8) Carefully guide the contact through the grommet hole.

CAUTION: AVOID INJURY TO THE HAND BY THE INSERTION GUIDE DURING THE INSERTION.

- (9) Push the contact into the contact cavity until it fully seats in the connector.

On the engaging face of the connector:

- The ends of the socket contacts should be approximately 0.10 inch below the surface of the insert
- The front shoulder of the pin contacts should be less than 0.12 inch below the surface of the insert.

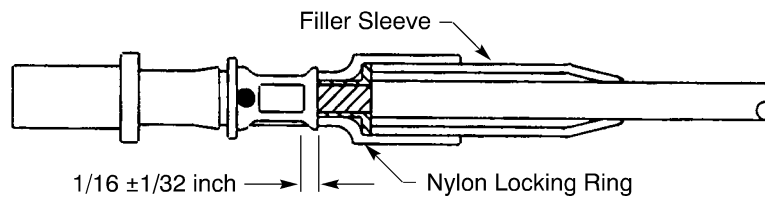
- (10) Make sure that each contact is fully seated in the contact cavity:
 - (a) Gently grasp each wire between the thumb and the forefinger
 - (b) Slowly pull until the thumb and forefinger slip on the wire.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS**

CAUTION: DO NOT INDENT THE WIRE INSULATION WITH THE FINGERNAILS.

4. AMPHENOL 69-0R32-17S(170) CONNECTOR ASSEMBLY**A. Contact Assembly**

- (1) Put the grommet clamp nut over the wires so that the threaded end points with toward the connector.
- (2) Put the nylon grommet follower over the wires so that the open end points toward the connector.
Make sure that each wire is in its correct contact position.
- (3) Remove 11/16 inch \pm 1/16 inch of wire insulation.
- (4) Put a 1-3/4 inch \pm 1/8 inch length of 1/4 inch PD heat shrinkable sleeve over each wire and place the forward edge 0 inch to 1/16 inch from the edge of the insulation.
- (5) Shrink the sleeve into place. Refer to Subject 20-10-14.
- (6) Put a 2 inch \pm 1/8 inch length of 3/8 inch PD sleeve over the first sleeve and place the forward edge 0 inch to 1/16 inch from the edge of the insulation.
- (7) Shrink that sleeve into place. Refer to Subject 20-10-14.
- (8) For AWG 8 wire:
 - (a) Make a selection of a 0.5 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
 - (b) Put a 2-1/2 inch \pm 1/8 inch length of the sleeve on the two PD sleeves applied in Step (4) and Step (6) 0 inch to 1/16 inch from the edge of the insulation.
 - (c) Shrink that sleeve into place. Refer to Subject 20-10-14.
- (9) Install a filler sleeve. Refer to Figure 4.
 - (a) Make a selection of a filler sleeve from Table 4.
 - (b) Put a filler sleeve over each conductor with the flanged end against the wire insulation.
 - (c) Put a nylon locking ring over each sleeve.



203-10104-1 CONTACT ASSEMBLY
Figure 4

- (10) Put a Cannon 203-10104-1 contact on each wire with the end of the wire barrel against the nylon locking ring.
- (11) Make a selection of a crimp tool from Table 8.
- (12) Crimp the contact onto the wire.
Make sure that the edge of the crimp is 1/16 inch \pm 1/32 inch from the end of the wire barrel. Refer to Figure 4.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS

B. Contact Insertion

- (1) Insert the contacts into the connector by hand.

NOTE: To make the contact easier to insert, the grommet may be lightly lubricated with isopropyl alcohol.

C. Connector Assembly

- (1) Push the nylon grommet follower over the grommet.
- (2) Push the grommet clamp nut over the grommet follower.
- (3) Tighten the nut.

5. APPROVED TOOL SUPPLIERS

A. Crimp Tool Suppliers

**Table 12
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
13642	Thomas & Betts
M22520/1-01	QPL
M22520/1-02	QPL
ST2354-2	Boeing

B. Insertion Tool Suppliers

**Table 13
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
294-1290-04	Amphenol
294-465	Amphenol
294-468	Amphenol
ATA 0251	Astro
ATA 0254	Astro

C. Removal Tool Suppliers

**Table 14
REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
294-1283	Amphenol
294-1288	Amphenol



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ASSEMBLY OF AMPHENOL 69 SERIES CONNECTORS

Table 14 (continued)

Removal Tool	Supplier
294-466	Amphenol
294-467	Amphenol
294-469	Amphenol
294-470	Amphenol
ATA 0249	Astro
ATA 0250	Astro
ATA 0252	Astro
ATA 0253	Astro

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH DS SERIES CONNECTORS

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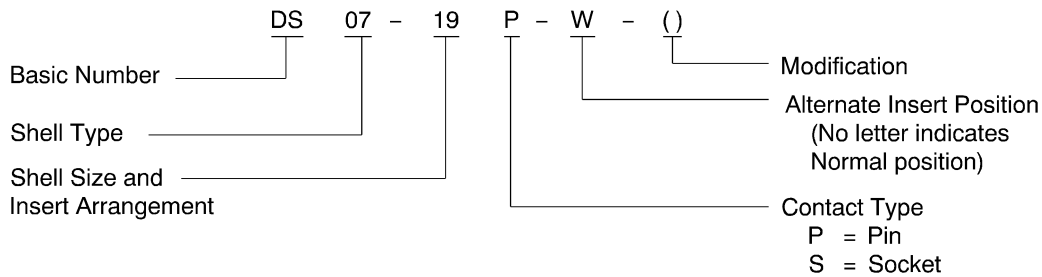
ASSEMBLY OF DEUTSCH DS SERIES CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

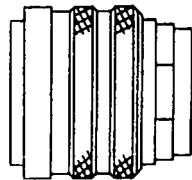
**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
DS()	Plug	Deutsch



DEUTSCH DS SERIES CONNECTOR PART NUMBER STRUCTURE

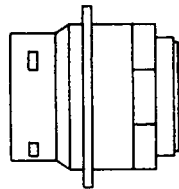
Figure 1



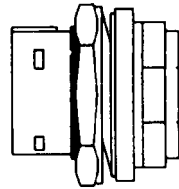
Straight Plug
Style 07

DEUTSCH DS CONNECTOR PLUG

Figure 2



Square Flange Receptacle
Style 00



Jam Nut Mounting Receptacle
Style 04

DEUTSCH DS CONNECTOR RECEPTACLES

Figure 3

STANDARD WIRING PRACTICES MANUAL

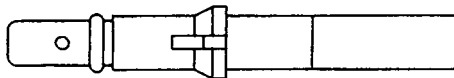
ASSEMBLY OF DEUTSCH DS SERIES CONNECTORS

B. Contact Part Numbers

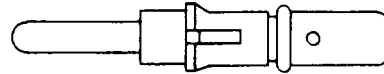
**Table 2
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Socket	800-20/30-1	Deutsch
		Pin	800-20/32-1	Deutsch
16	16	Socket	200-16/30-3	Deutsch
		Pin	800-16/32-1	Deutsch
12	12	Socket	200-12/30-3	Deutsch
		Pin	800-12/32-1	Deutsch

C. Contact Description

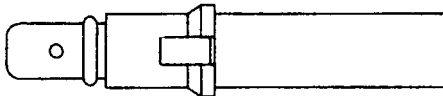


Socket

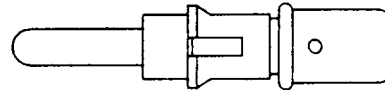


Pin

**SIZE 20 CONTACTS
Figure 4**

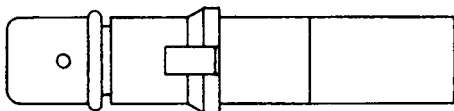


Socket

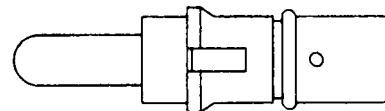


Pin

**SIZE 16 CONTACTS
Figure 5**



Socket



Pin

**SIZE 12 CONTACTS
Figure 6**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH DS SERIES CONNECTORS

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Engaging End Size	Removal Tool	Supplier
20	DRK51-20	Daniels
	M15515-20	Deutsch
16	DRK51-16	Daniels
	M15515-16	Deutsch
12	DRK51-12	Daniels
	M15515-12	Deutsch

**Table 4
COAX CONTACT REMOVAL TOOLS**

Removal Tool	Supplier
M15513-25	Deutsch

- (1) Make a selection of a removal tool from Table 3 or Table 4.
- (2) Pull the extraction rod handle of the tool back to its full retracted position.
- (3) Carefully push the tip of the tool over the engaging end of the contact until the tip reaches a definite stop in the contact cavity.
- (4) To remove the contact from the connector, hold the tool firmly in position and push the extraction rod handle.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 5
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Minimum	Maximum	
24	20	3/16	7/32	Fold the conductor back on itself
22	20	3/16	7/32	Fold the conductor back on itself
	16	7/32	1/4	Fold the conductor back on itself
20	20	3/16	7/32	Fold the conductor back on itself
	16	7/32	1/4	Fold the conductor back on itself
18	16	7/32	1/4	-
16	16	7/32	1/4	-

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ASSEMBLY OF DEUTSCH DS SERIES CONNECTORS

Table 5 (continued)

Wire Size (AWG)	Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Minimum	Maximum	
14	12	7/32	1/4	-
12	12	7/32	1/4	-

Table 6
CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Supplier	Part Number	Supplier
24	20	MS3191-1	-	QPL	11096-1	Buchanan
22	20	294-358	0.039	Amphenol	ST967C-3	Boeing
		294-80	0.039	Amphenol	ST967C-3	Boeing
		MS3191-1	-	QPL	11096-1	Buchanan
	16	ST940	0.039	Boeing	ST967C-4	Boeing
20	20	11743	-	Buchanan	-	-
		294-358	0.039	Amphenol	ST967C-3	Boeing
		294-80	0.039	Amphenol	ST967C-3	Boeing
	16	11743	-	Buchanan	-	-
		MS3191-1	-	QPL	11096-2	Buchanan
		ST940	0.039	Boeing	ST967C-4	Boeing
18	16	11743	-	Buchanan	-	-
		MS3191-1	-	QPL	11096-2	Buchanan
		ST940	0.039	Boeing	ST967C-4	Boeing
16	16	11743	-	Buchanan	-	-
		MS3191-1	-	QPL	11096-2	Buchanan
		ST940	0.039	Boeing	ST967C-4	Boeing
14	12	11743	-	Buchanan	-	-
		MS3191-1	-	QPL	11096-3	Buchanan
		ST940	0.066	Boeing	ST967C-5	Boeing
12	12	11743	-	Buchanan	-	-
		MS3191-1	-	QPL	11096-3	Buchanan
		ST940	0.066	Boeing	ST967C-5	Boeing

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NOTE: The ST940 is a 294-80 crimp tool with special Buchanan indentors.

- (1) Remove the wire insulation. Refer to Table 5.
- (2) Make a selection of a crimp tool from Table 6.
Make sure to use the Buchanan 11743 crimp tool for nickel plated wire.
- (3) Put the contact in the tool.
- (4) Put the wire in the crimp barrel of the contact.
Make sure that all the strands of the conductor are in the crimp barrel.
- (5) Crimp the contact.

B. Spare Contact Installation

- (1) Install spare contacts in all unused contact cavities. Refer to Paragraph 3.C.
Make sure to install the spare contacts before the wired contacts.

NOTE: Spare coax contacts are not required.

- (2) Install seal rods in all unwired contacts. Refer to Subject 20-60-08.

C. Contact Insertion

**Table 7
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	Supplier
20	DAK51-20	Daniels
	M15513-20	Deutsch
16	DAK55-16	Daniels
	M15513-16	Deutsch
12	DAK55-12	Daniels
	M15513-12	Deutsch
	M81969/17-05	QPL
	MS24256A12	QPL

**Table 8
COAX CONTACT INSERTION TOOLS**

Insertion Tool	Supplier
M15513-25	Deutsch

- (1) Make a selection of an insertion tool from Table 7 or Table 8.
- (2) Put the contact in the tool.
- (3) Align the contact and the tool so they are perpendicular to the back face of the grommet.
- (4) Carefully push the contact into the grommet hole until it clicks.
- (5) Carefully pull the tool from the connector.



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- (6) Examine the contacts from the engaging end of the connector to make sure that all the contacts are completely inserted.

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1. GENERAL DATA

A. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

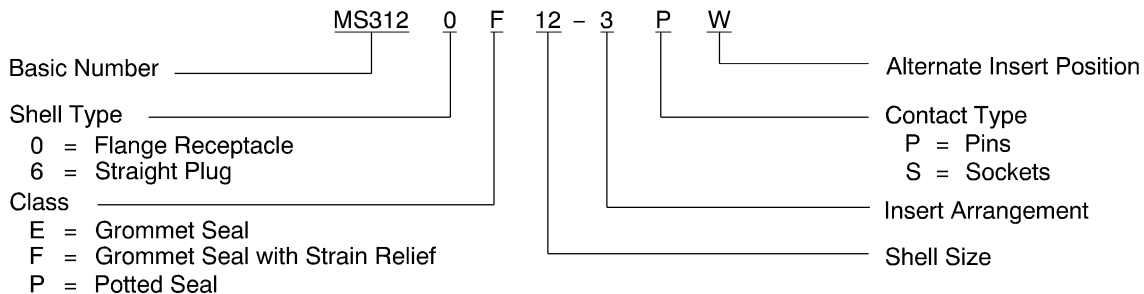
Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
MIL-C-26482	Series I; front release, rear removal crimp contacts	20	0.047
		16	0.066
		12	0.097

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

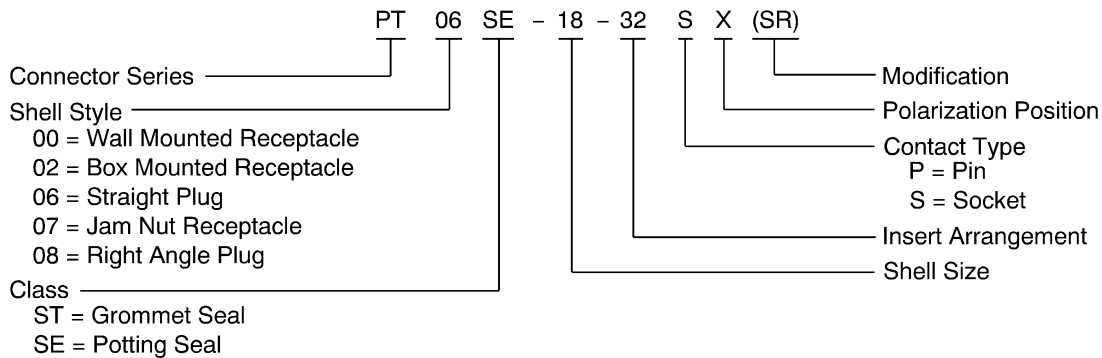
Part Number	Supplier	Reference
KPSE()	Deutsch	Figure 5
L()T()	Burndy	Figure 3
LPT()	Burndy	Figure 4
MS3120()	QPL	Figure 1
MS3126()	QPL	Figure 1
PT()S()	Bendix	Figure 2



**MS312() SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1**

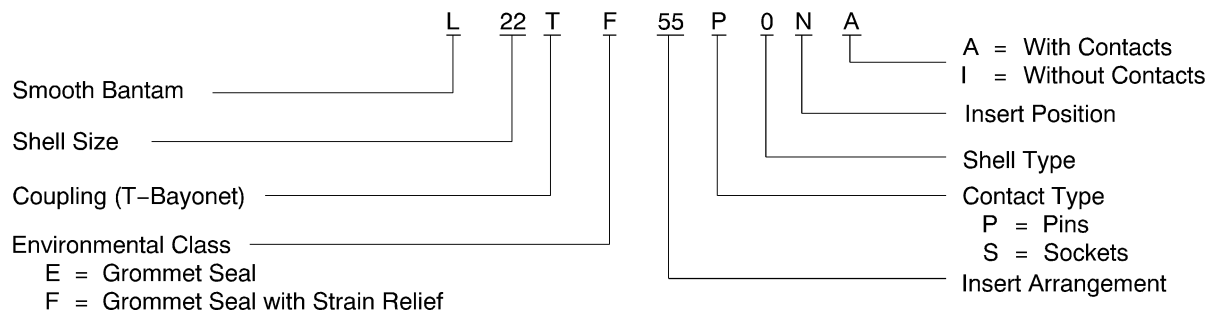
STANDARD WIRING PRACTICES MANUAL

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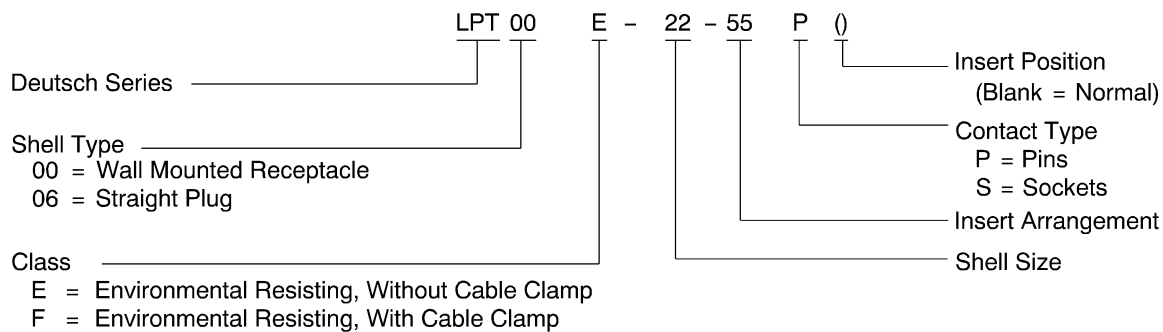
BENDIX PT(S) SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 2



BURNDY L SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 3

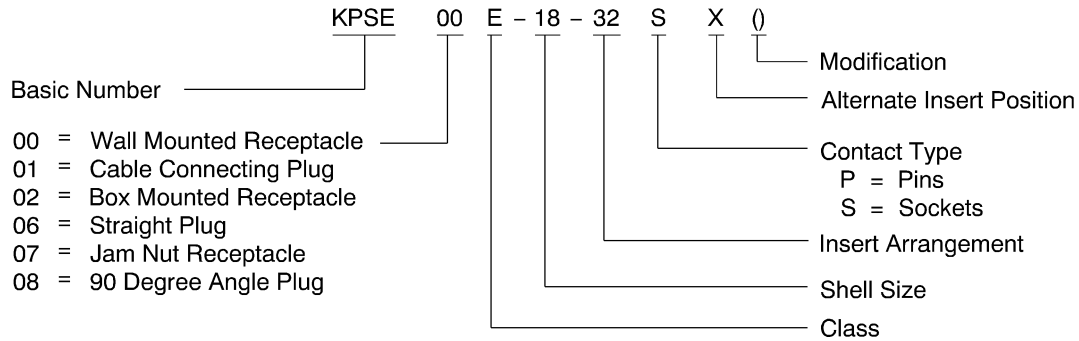


DEUTSCH LPT(S) SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 4

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ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS



ITT CANNON KPSE() SERIES CONNECTOR PART NUMBER STRUCTURE

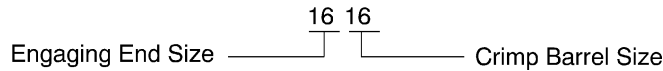
Figure 5

B. Contact Part Numbers

Table 3 gives the standard front release crimp type contacts for MIL-C-26482 Series I connectors.

NOTE: Satisfactory alternative contacts are specified in:

- Table 4 for the standard MIL-C-26500 connector contacts
- Table 5 for the Boeing Standard MIL-C-26500 type connector contacts.



EXAMPLE OF CONTACT SIZE

Figure 6

Table 3

STANDARD MIL-C-26482 SERIES I CONNECTOR CONTACT PART NUMBERS

Contact Size	Contact Type	Part Number	Supplier
2020	Pin	030-9036-000	Cannon
		LRM20W-28DJ5	Burndy
		LRM20W-5DE5	Burndy
		M39029/31-240	QPL
		M39029/31-241	QPL
		MS3192A20-20A	QPL
	Socket	031-9074-002	Cannon
		LRC20W-28DJ5	Burndy
		LRC20W-5DE5	Burndy
		M39029/32-259	QPL
		MS3193A20-20A	QPL

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Table 3 (continued)

Contact Size	Contact Type	Part Number	Supplier
1616	Pin	030-9032-003	Cannon
		LRM16M-28DJ5	Burndy
		LRM16M-5DE5	Burndy
		M39029/31-228	QPL
		MS3192-16-16A	QPL
	Socket	031-9095-003	Cannon
		LRC16M-28DJ5	Burndy
		LRC16M-5DE5	Burndy
		M39029/32-247	QPL
		MS3193-16-16A	QPL
1212	Pin	LRM12Z-28DJ5	Burndy
		LRM12Z-5DE5	Burndy
		M39029/31-234	QPL
		MS3192-12-12A	QPL
	Socket	LRC12Z-28DJ5	Burndy
		LRC12Z-5DE5	Burndy
		M39029/32-253	QPL
		MS3193-12-12A	QPL

Table 4

STANDARD MIL-C-26500 CONNECTOR CONTACT PART NUMBERS

Contact Size	Contact Type	Part Number	Supplier
2020	Pin	M39029/31-241	QPL
		ZZL-4020-36LD	Pyle-National
	Socket	M39029/32-260	QPL
		ZZL-4120-36LD	Pyle-National
1616	Pin	M39029/31-229	QPL
		ZZL-4016-36LD	Pyle-National
	Socket	M39029/32-248	QPL
		ZZL-4116-36LD	Pyle-National



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Table 4 (continued)

Contact Size	Contact Type	Part Number	Supplier
1212	Pin	M39029/31-235	QPL
		ZZL-4012-36LD	Pyle-National
	Socket	M39029/32-254	QPL
		ZZL-4112-36LD	Pyle-National

Table 5

BOEING STANDARD MIL-C-26500 TYPE CONNECTOR CONTACT PART NUMBERS

Contact Size	Contact Type	Boeing Standard
1212	Pin	BACC47CN3
		BACC47CN3A
		BACC47CN3S
	Socket	BACC47CP3A
		BACC47CP3S
		BACC47CP3T
1616	Pin	BACC47CN2
		BACC47CN2A
		BACC47CN2S
	Socket	BACC47CP2A
		BACC47CP2S
		BACC47CP2T
2020	Pin	BACC47CN1
		BACC47CN1A
		BACC47CN1S
	Socket	BACC47CP1A
		BACC47CP1S
		BACC47CP1T

Table 6

SUPPLIER PART NUMBERS FOR BOEING STANDARD CONTACTS

Boeing Standard	Part Number	Supplier
BACC47CN1	417-2020-901	Tri-Star
	48-2335-02	Amphenol
	LRM20W-16F74	Burndy
	ZZL-4020-36LT	Pyle-National

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Table 6 (continued)

Boeing Standard	Part Number	Supplier
BACC47CN1A	317-2020-901	Tri-Star
	48-2335-09	Amphenol
	LRM20W-16DJ5	Burndy
	ZZL-4020-36LD	Pyle-National
BACC47CN1S	317-2020-901-L	Tri-Star
	ZZL-4020-36LD-H148	Pyle-National
BACC47CN2	417-1616-902	Tri-Star
	48-1825-02	Amphenol
	LRM16M-15F74	Burndy
	ZZL-4016-36LT	Pyle-National
BACC47CN2A	10-807100-165	Amphenol
	317-1616-902	Tri-Star
	LRM16M-16DJ5	Burndy
	ZZL-4016-36LD-H139	Pyle-National
BACC47CN2S	317-1616-902-L	Tri-Star
	ZZL-4016-36LD-H148	Pyle-National
BACC47CN3	417-1212-903	Tri-Star
	48-1827-02	Amphenol
	LRM12Z-15F74	Burndy
	ZZL-4012-36LT	Pyle-National
BACC47CN3A	10-807100-125	Amphenol
	317-1212-903	Tri-Star
	LRM12Z-16DJ5	Burndy
	ZZL-4012-36LD-H139	Pyle-National
BACC47CN3S	317-1212-903-L	Tri-Star
	ZZL-4012-36LD-H148	Pyle-National
BACC47CP1A	248-136-2002S-09	Amphenol
	318-2020-901	Tri-Star
	LRC20W-15DJ5	Burndy
	ZZL-4120-36LD	Pyle-National
BACC47CP1S	318-2020-901-L	Tri-Star
	LP-807105-205	Amphenol
	ZZL-4120-36LD-H148	Pyle-National

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Table 6 (continued)

Boeing Standard	Part Number	Supplier
BACC47CP1T	248-136-2001S-02	Amphenol
	418-2020-901	Tri-Star
	LRC20W-15F74	Burndy
	ZZL-4120-36LT	Pyle-National
BACC47CP2A	10-807103-165	Amphenol
	318-1616-902	Tri-Star
	LRC16M-15DJ5	Burndy
	ZZL-4116-36LD-H139	Pyle-National
BACC47CP2S	318-1616-902-L	Tri-Star
	LP-807103-165	Amphenol
	ZZL-4116-36LD-H148	Pyle-National
BACC47CP2T	248-136-1600S-02	Amphenol
	418-1616-902	Tri-Star
	LRC16M-15F74	Burndy
	ZZL-4116-36LT	Pyle-National
BACC47CP3A	10-807103-125	Amphenol
	318-1212-903	Tri-Star
	LRC12Z-15DJ5	Burndy
	ZZL-4112-36LD-H139	Pyle-National
BACC47CP3S	318-1212-903-L	Tri-Star
	LP-807103-125	Amphenol
	ZZL-4112-36LD-H148	Pyle-National
BACC47CP3T	248-136-1200S-02	Amphenol
	412-1212-903	Tri-Star
	LRC12Z-15F74	Burndy
	ZZL-4112-36LT	Pyle-National

3. INSERT CONFIGURATIONS

A. MIL-C-26482 Series I Connectors

NOTE: The insert configurations that are specified in Table 7 include the connector shell size as the first part of the configuration. Refer to Table 2 for the part number structure that is applicable for the connector.

NOTE: The contact cavity size that is specified in Table 7 is equivalent to the size of the engaging end of the contact.

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**Table 7
CONNECTOR INSERT CONFIGURATIONS**

Insert	Contact Cavity		Reference
	Count	Size	
8-2	2	20	Figure 7
8-3	3	20	Figure 7
8-4	4	20	Figure 7
8-33	3	20	Figure 7
10-6	6	20	Figure 8
10-98	6	20	Figure 8
12-3	3	16	Figure 9
12-8	8	20	Figure 9
12-10	10	20	Figure 9
14-5	5	16	Figure 10
14-12	8	20	Figure 10
	4	16	
14-15	14	20	Figure 10
	1	16	
14-18	18	20	Figure 10
14-19	19	20	Figure 10
16-8	8	16	Figure 11
16-23	22	20	Figure 11
	1	16	
16-26	26	20	Figure 11
16A99	21	20	Figure 11
18-8	8	12	Figure 12
18-11	11	16	Figure 12
18A28	26	20	Figure 12
	2	16	
18-30	29	20	Figure 12
	1	16	
18-32	32	20	Figure 12
20-16	16	16	Figure 13
20-24	24	20	Figure 13

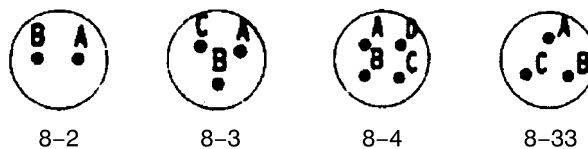
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS

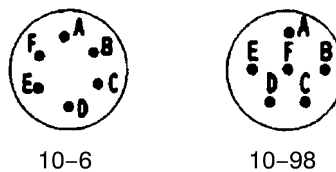
Table 7 (continued)

Insert	Contact Cavity		Reference
	Count	Size	
20-39	37	20	Figure 13
	2	16	
20-41	41	20	Figure 13
22-12	12	12	Figure 14
22-21	21	16	Figure 14
22-32	32	20	Figure 14
22-34	34	20	Figure 14
22-36	36	20	Figure 14
22-41	27	20	Figure 14
	14	16	
22-55	55	20	Figure 14
24A8	1	20	Figure 15
	7	Coax	
24A31	31	16	Figure 15
24A57	55	20	Figure 15
	2	12	
24-61	61	20	Figure 15

NOTE: Figure 7 through Figure 15 show the front face of an insert that has pins. The view of the front face of an insert that has sockets is the mirror image of this view.



8-() INSERT CONFIGURATIONS
Figure 7

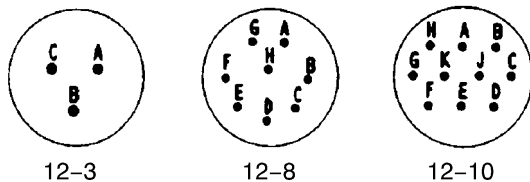


10-() INSERT CONFIGURATIONS
Figure 8

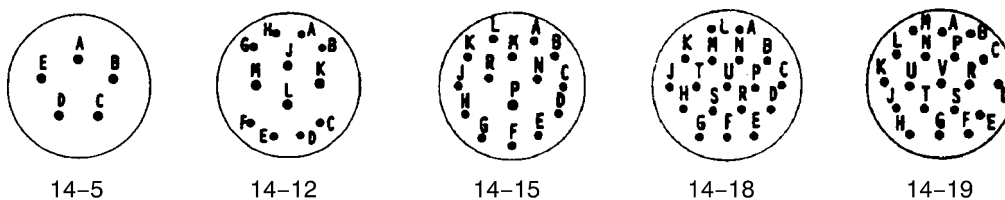
20-61-16

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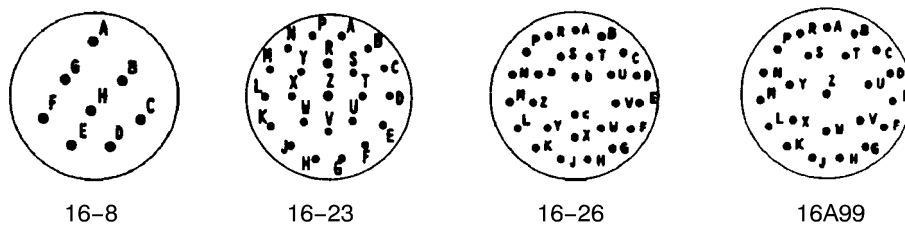
ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS



12-) INSERT CONFIGURATIONS
Figure 9



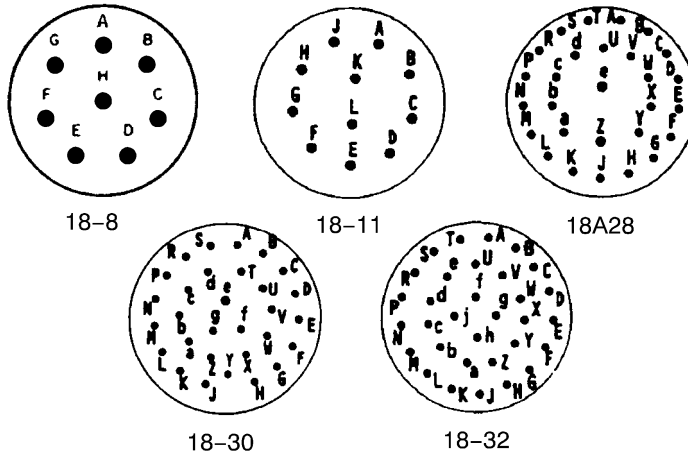
14-) INSERT CONFIGURATIONS
Figure 10



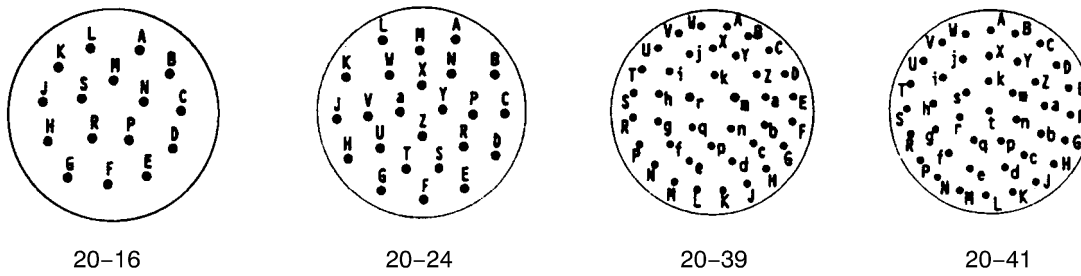
16-) INSERT CONFIGURATIONS
Figure 11

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ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS



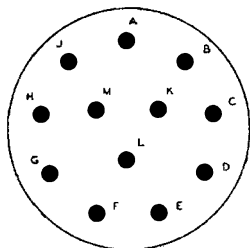
18-() INSERT CONFIGURATIONS
Figure 12



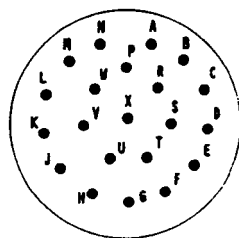
20-() INSERT CONFIGURATIONS
Figure 13

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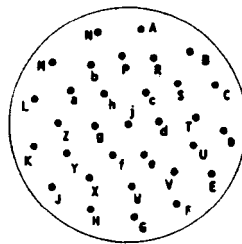
ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS



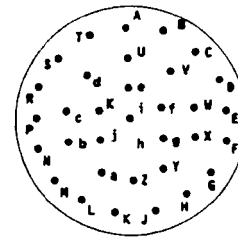
22-12



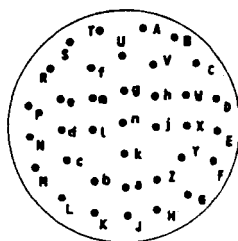
22-21



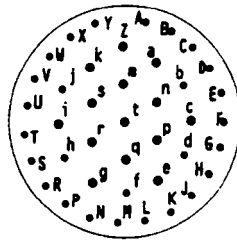
22-32



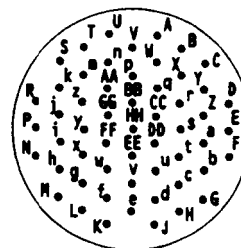
22-34



22-36

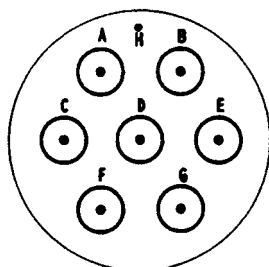


22-41

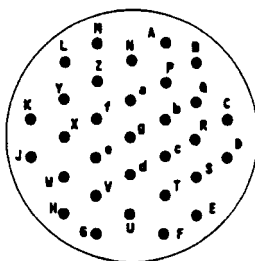


22-55

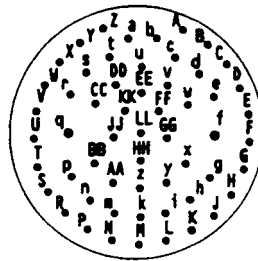
22-() INSERT CONFIGURATIONS
Figure 14



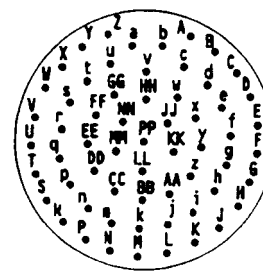
24A8



24A31



24A57



24-61

24-() INSERT CONFIGURATIONS
Figure 15

4. CONNECTOR DISASSEMBLY

A. Seal Plug and Seal Rod Removal

Table 8
NECESSARY TOOLS

Tool	Type
Pliers	Needle Nose

(1) Make a selection of a pliers from Table 8.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS

CAUTION: MAKE SURE THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, remove a plastic tie strap or a wire harness tie that is less than 6 inches from the connector.
- (3) Hold the end of the seal plug or the seal rod tightly in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod from the contact cavity.

B. Contact Removal

**Table 9
CONTACT REMOVAL TOOLS**

Contact Engaging End Size	Removal Tool
20	294-89
	AT 2020
	ATML 1907
	DRK20
	M81969/19-07
	MS24256R20
	RX 20-24
	ZZL-R-9511-20
16	294-97
	AT 2016
	ATML 1908
	DRK16
	M81969/19-08
	MS24256R16
	RX 16-7
	ZZL-R-9511-16
12	294-73
	AT 2012
	ATML 1909
	DRK12
	M81969/19-09
	MS24256R12
	RTX 12-7
	ZZL-R-9511-12

- (1) Make a selection of a contact removal tool from Table 9.

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ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS

- (2) If it is necessary, remove the backshell components from the connector.
- (3) Push the backshell components rearward away from the connector.
- (4) At the front of the connector, axially align the removal tool and the contact cavity.
Make sure that the plunger of the removal tool is fully retracted.
- (5) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT USE MORE FORCE THAN THE FORCE THAT IS NECESSARY TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Push the plunger of the tool until the contact starts to come out of the contact cavity.
- (7) Carefully pull the tool out from the contact cavity.
Make sure that the removal tool stays axially aligned with the contact cavity.
- (8) Pull the contact out of the contact cavity from the rear of the connector.

5. CONNECTOR ASSEMBLY

A. Wire Preparation

For the assembly of a MIL-C-26482 Series I connector with triax cable, refer to Subject 20-53-05.

For the preparation of RG108 twinax cable, refer to Paragraph 5.B.

**Table 10
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	20	0.19	±0.03	-
	16	0.50	±0.03	Fold the conductor back on itself
22	20	0.19	±0.03	-
	16	0.50	±0.03	Fold the conductor back on itself
20	20	0.19	±0.03	-
	16	0.25	±0.03	-
	12	0.50	±0.03	Fold the conductor back on itself
18	16	0.25	±0.03	-
	12	0.50	±0.03	Fold the conductor back on itself
16	16	0.25	±0.03	-
	12	0.25	±0.03	-
14	12	0.25	±0.03	-
12	12	0.25	±0.03	-

- (1) Remove the necessary length of insulation from the end of the wire.

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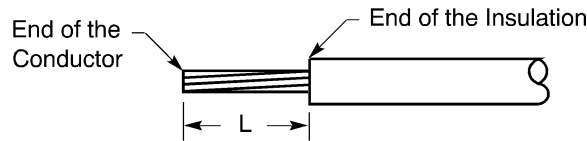
ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS

Refer to:

- Figure 16
- Table 10 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.

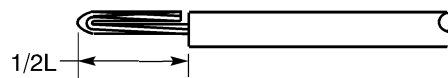
NOTE: Refer to Subject 20-60-00:

- If the wire size and a larger crimp barrel size are not given in Table 10
- For the alternatives to the assembly of a contact with a conductor that is folded back.



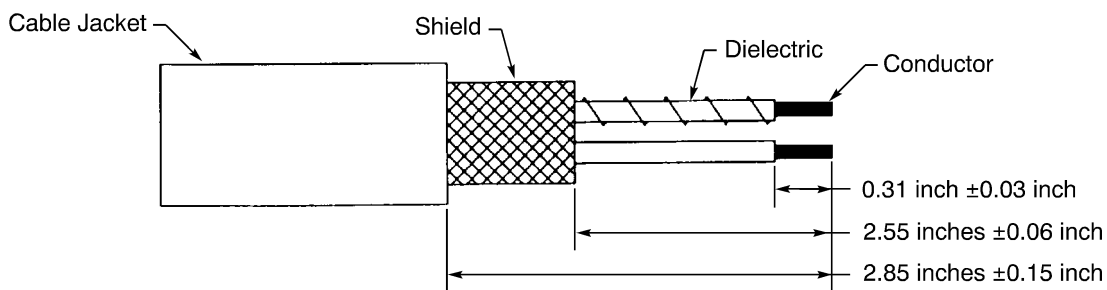
INSULATION REMOVAL LENGTH
Figure 16

- (2) Measure the O.D. of the wire.
- (3) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.A.
- (4) If it is specified, fold the conductor back. Refer to Figure 17.



FOLDED BACK CONDUCTOR
Figure 17

B. Preparation of RG108 Twinax Cable



RG108 TWINAX CABLE PREPARATION
Figure 18

Refer to Figure 18.

- (1) Remove 2.85 inches ± 0.15 inch of the jacket from the end of the cable.
- (2) Remove 2.55 inches ± 0.06 inch of the shield from the end of the cable.
- (3) Remove 0.31 inch ± 0.03 inch of the dielectric from the each conductor.

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- (4) Assemble a shield ground wire. Refer to Subject 20-10-15.
Make sure that the size of the shield ground wire is AWG 20.

C. Contact Assembly

**Table 11
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-02	-
		MS3191-1	-	MS3191-20	Red
	16	M22520/1-01	4	M22520/1-02	Blue
		MS3191-1	-	MS3191-16	Blue
	22	20	M22520/1-01	3	M22520/1-02
M22520/2-01			6	M22520/2-02	-
MS3191-1			-	MS3191-20	Red
16		M22520/1-01	5	M22520/1-02	Blue
		MS3191-1	-	MS3191-16	Blue
20		20	M22520/1-01	4	M22520/1-02
	M22520/2-01		7	M22520/2-02	-
	MS3191-1		-	MS3191-20	Red
	16	M22520/1-01	4	M22520/1-02	Blue
		MS3191-1	-	MS3191-16	Blue
	12	M22520/1-01	6	M22520/1-02	Yellow
MS3191-1		-	MS3191-12	Yellow	
18	16	M22520/1-01	5	M22520/1-02	Blue
		MS3191-1	-	MS3191-16	Blue
	12	M22520/1-01	7	M22520/1-02	Yellow
		MS3191-1	-	MS3191-12	Yellow
16	16	M22520/1-01	6	M22520/1-02	Blue
		MS3191-1	-	MS3191-16	Blue
	12	M22520/1-01	6	M22520/1-02	Yellow
		MS3191-1	-	MS3191-12	Yellow
14	12	M22520/1-01	7	M22520/1-02	Yellow
		MS3191-1	-	MS3191-12	Yellow

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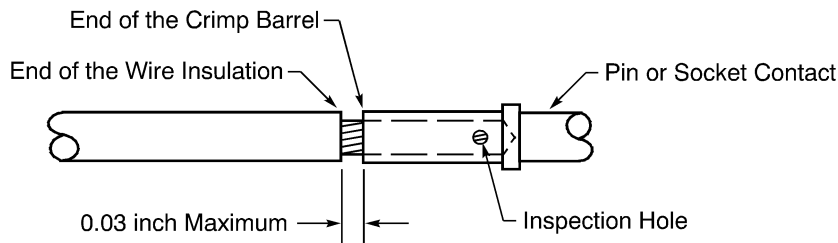
Table 11 (continued)

Wire Size (AWG)	Contact Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
12	12	M22520/1-01	8	M22520/1-02	Yellow
		MS3191-1	-	MS3191-12	Yellow

- (1) Make a selection of a contact crimp tool from Table 11.
- (2) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 19.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 19

- (3) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

D. Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be put on the wire harness before the insertion of the contacts into the connector.

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ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS

**Table 12
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
2020	294-88
	M81969/17-03
	MS24256A20
	ATA 1086
	RTM 20-5
	ZZL-R-9510-20
1616	294-96
	M81969/17-04
	MS24256A16
	RTM 16-2
	ZZL-R-9510-16
1212	294-72
	M81969/17-05
	MS24256A12
	RTM 12-5
	ZZL-R-9510-12

- (1) Make a selection of an insertion tool from Table 12.
- (2) Put the contact assembly in the insertion tool.
Make sure that the end of the tool is against the rear shoulder of the contact.
- (3) At the rear of the connector, axially align the insertion tool and the contact cavity.
- (4) Carefully push the insertion tool and the contact assembly into the contact cavity until it stops.
Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.

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ASSEMBLY OF MIL-C-26482 SERIES I FRONT RELEASE CONNECTORS

(b) Do Step (2) through Step (6) again.

E. Seal of an Empty Contact Cavity

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

F. Backshell and Strain Relief Assembly

Refer to Subject 20-60-09.

6. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 13
REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
294-73	Amphenol
294-89	Amphenol
294-97	Amphenol
AT 2012	Astro
AT 2016	Astro
AT 2020	Astro
ATML 1907	Astro
ATML 1908	Astro
ATML 1909	Astro
DRK12	Daniels
DRK16	Daniels
DRK20	Daniels
M81969/19-07	QPL
M81969/19-08	QPL
M81969/19-09	QPL
MS24256R12	QPL
MS24256R16	QPL
MS24256R20	QPL
RTX 12-7	Burndy
RX 16-7	Burndy
RX 20-24	Burndy
ZZL-R-9511-12	Pyle-National
ZZL-R-9511-16	Pyle-National
ZZL-R-9511-20	Pyle-National



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B. Contact Crimp Tools

Table 14
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
MS3191-1	QPL
MS3191-12	QPL
MS3191-16	QPL
MS3191-20	QPL

C. Contact Insertion Tools

Table 15
INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
294-88	Amphenol
294-96	Amphenol
294-72	Amphenol
ATA 1086	Astro
M81969/17-03	QPL
M81969/17-04	QPL
M81969/17-05	QPL
MS24256A12	QPL
MS24256A16	QPL
MS24256A20	QPL
RTM 20-5	Burndy
RTM 16-2	Burndy
RTM 12-5	Burndy
ZZL-R-9510-12	Pyle-National
ZZL-R-9510-16	Pyle-National
ZZL-R-9510-20	Pyle-National

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1. GENERAL DATA

A. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

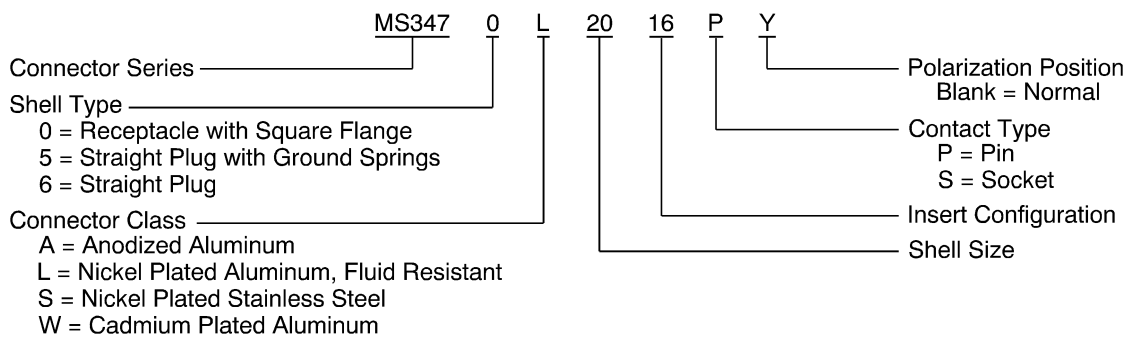
Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
MIL-C-26482	Series II; rear release, rear removal contacts	20	0.040
		16	0.053
		12	0.097

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

Part Number	Supplier	Reference
MS3470()	QPL	Figure 1
MS3475()	QPL	Figure 1
MS3476()	QPL	Figure 1



MIL-C-26482 SERIES II CONNECTOR PART NUMBER STRUCTURE

Figure 1



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B. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier	Color Code	
Engaging End	Crimp Barrel				Band	Color
20	20	Pin	M39029/4-110	QPL	1	Brown
					2	Brown
					3	Black
			M39029/4-20-20	QPL	1	Brown
					2	Brown
					3	Black
		Socket	M39029/5-115	QPL	1	Brown
					2	Brown
					3	Green
			M39029/5-20-20	QPL	1	Brown
					2	Brown
					3	Green
16	16	Pin	M39029/4-111	QPL	1	Brown
					2	Brown
					3	Brown
			M39029/4-16-16	QPL	1	Brown
					2	Brown
					3	Brown
		Socket	M39029/5-116	QPL	1	Brown
					2	Brown
					3	Blue
			M39029/5-16-16	QPL	1	Brown
					2	Brown
					3	Blue

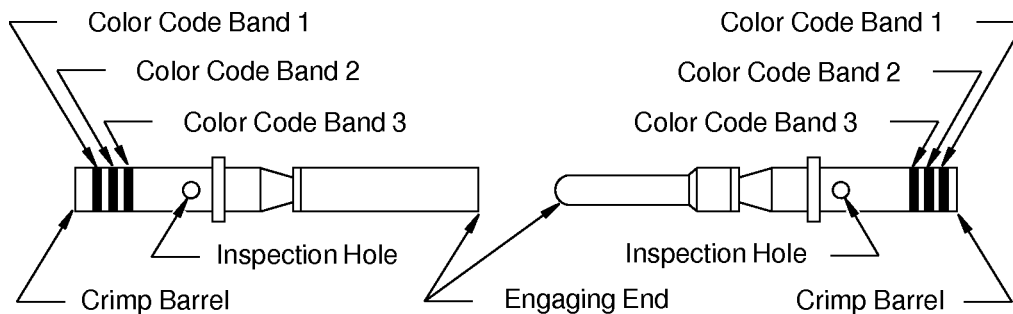
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Table 3 (continued)

Contact Size		Contact Type	Part Number	Supplier	Color Code	
Engaging End	Crimp Barrel				Band	Color
12	12	Pin	M39029/4-113	QPL	1	Brown
					2	Brown
					3	Orange
			M39029/4-12-12	QPL	1	Brown
					2	Brown
					3	Orange
		Socket	M39029/5-118	QPL	1	Brown
					2	Brown
					3	Gray
			M39029/5-12-12	QPL	1	Brown
					2	Brown
					3	Gray



SOCKET CONTACT

PIN CONTACT

CONTACT COLOR CODE BANDS

Figure 2

**Table 4
OBSOLETE CONTACT PART NUMBERS**

Obsolete Contact	Replacement Contact
M39029/4-12-12	M39029/4-113
M39029/4-16-16	M39029/4-111
M39029/4-20-20	M39029/4-110
M39029/5-12-12	M39029/5-118

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Table 4 (continued)

Obsolete Contact	Replacement Contact
M39029/5-16-16	M39029/5-116
M39029/5-20-20	M39029/5-115

3. INSERT CONFIGURATIONS

A. MIL-C-26482 Series II Connectors

NOTE: The insert configurations that are specified in Table 5 include the connector shell size as the first part of the configuration. Refer to Table 2 for the part number structure that is applicable for the connector.

NOTE: The contact cavity size that is specified in Table 5 is equivalent to the size of the engaging end of the contact.

**Table 5
CONNECTOR INSERT CONFIGURATIONS**

Insert	Contact Cavity		Reference
	Count	Size	
8-2	2	20	Figure 3
8-3	3	20	Figure 3
8-4	4	20	Figure 3
8-33	3	20	Figure 3
10-6	6	20	Figure 4
10-98	6	20	Figure 4
12-3	3	16	Figure 5
12-8	8	20	Figure 5
12-10	10	20	Figure 5
14-5	5	16	Figure 6
14-12	8	20	Figure 6
	4	16	
14-15	14	20	Figure 6
	1	16	
14-18	18	20	Figure 6
14-19	19	20	Figure 6
16-8	8	16	Figure 7
16-23	22	20	Figure 7
	1	16	
16-26	26	20	Figure 7

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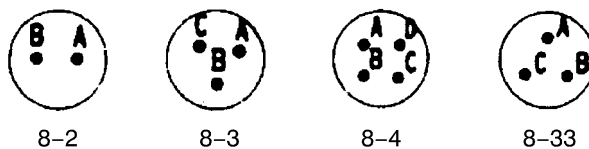
Table 5 (continued)

Insert	Contact Cavity		Reference
	Count	Size	
16A99	21	20	Figure 7
18-8	8	12	Figure 8
18-11	11	16	Figure 8
18A28	26	20	Figure 8
	2	16	
18-30	29	20	Figure 8
	1	16	
18-32	32	20	Figure 8
20-16	16	16	Figure 9
20-24	24	20	Figure 9
20-39	37	20	Figure 9
	2	16	
20-41	41	20	Figure 9
22-12	12	12	Figure 10
22-21	21	16	Figure 10
22-32	32	20	Figure 10
22-34	34	20	Figure 10
22-36	36	20	Figure 10
22-41	27	20	Figure 10
	14	16	
22-55	55	20	Figure 10
24A8	1	20	Figure 11
	7	Coax	
24A31	31	16	Figure 11
24A57	55	20	Figure 11
	2	12	
24-61	61	20	Figure 11

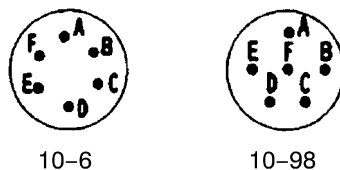
NOTE: Figure 3 through Figure 11 show the front face of an insert that has pins. The view of the front face of an insert that has sockets is the mirror image of this view.

STANDARD WIRING PRACTICES MANUAL

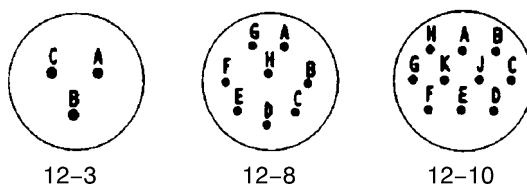
ASSEMBLY OF MIL-C-26482 SERIES II CONNECTORS



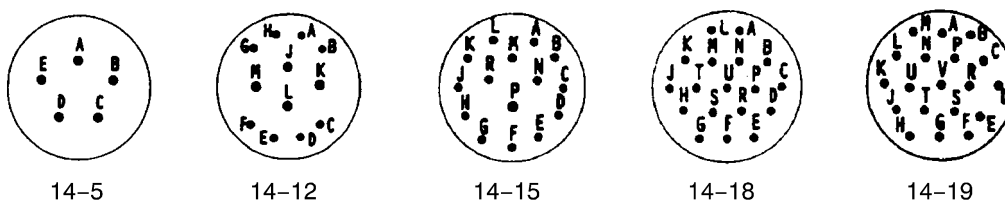
8-) INSERT CONFIGURATIONS
Figure 3



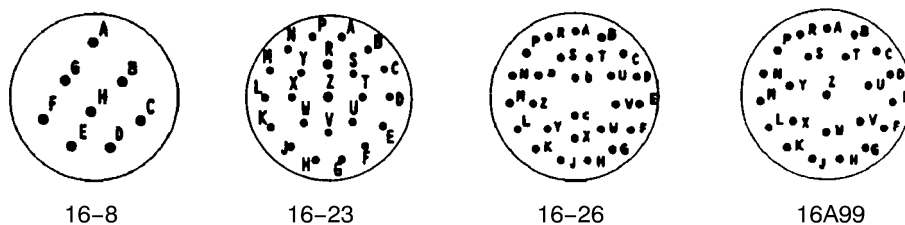
10-) INSERT CONFIGURATIONS
Figure 4



12-) INSERT CONFIGURATIONS
Figure 5



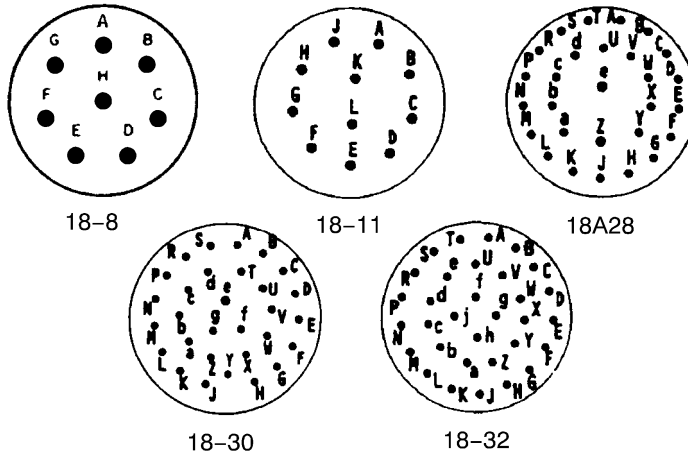
14-) INSERT CONFIGURATIONS
Figure 6



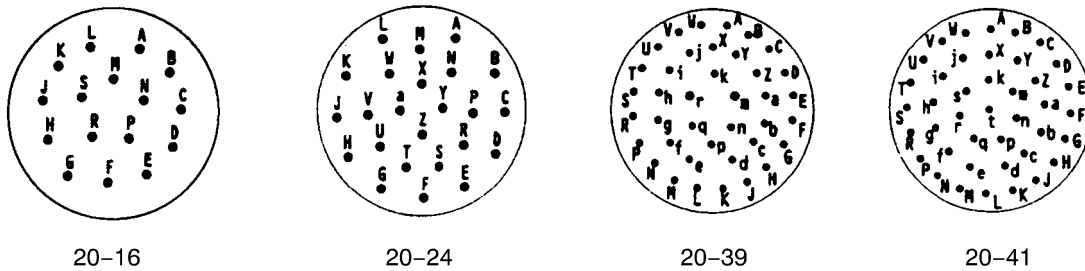
16-) INSERT CONFIGURATIONS
Figure 7

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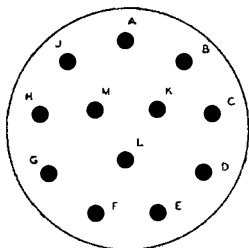
18-() INSERT CONFIGURATIONS
Figure 8



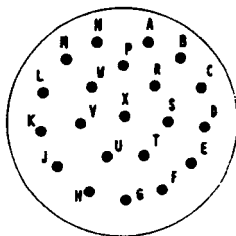
20-() INSERT CONFIGURATIONS
Figure 9

STANDARD WIRING PRACTICES MANUAL

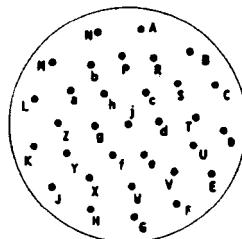
ASSEMBLY OF MIL-C-26482 SERIES II CONNECTORS



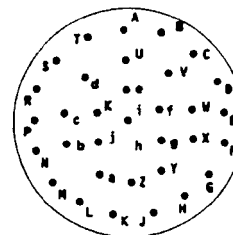
22-12



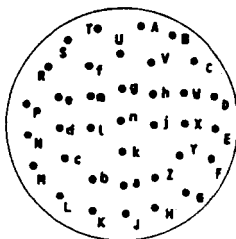
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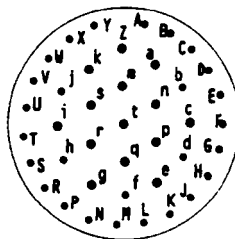
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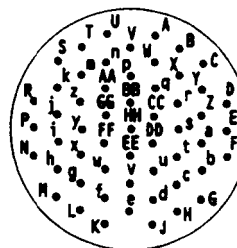
22-34



22-36

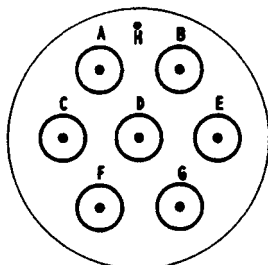


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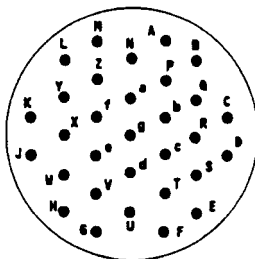


22-55

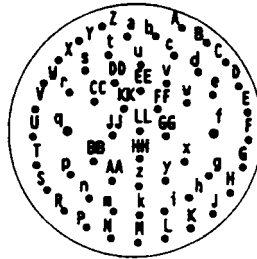
22-() INSERT CONFIGURATIONS
Figure 10



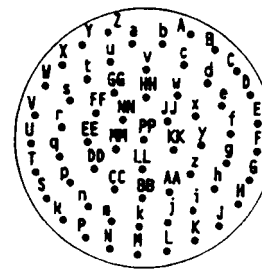
24A8



24A31



24A57



24-61

24-() INSERT CONFIGURATIONS
Figure 11

4. CONNECTOR DISASSEMBLY

A. Seal Plug and Seal Rod Removal

Table 6
NECESSARY TOOLS

Tool	Type
Pliers	Needle Nose

(1) Make a selection of a pliers from Table 6.

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CAUTION: MAKE SURE THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, remove a plastic tie strap or a wire harness tie that is less than 6 inches from the connector.
- (3) Hold the end of the seal plug or the seal rod tightly in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod from the contact cavity.

B. Contact Removal

This paragraph gives the procedure to remove a contact assembly from the connector.

For the procedure to remove an unwired contact, refer to Paragraph 4.C.

**Table 7
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	Color
20	CIET20-1	White
	M81969/14-02	White
	M83723/31-20	White
	MS27534-20	White
	NAS1664-20	White
16	CIET16-3	White
	M81969/14-03	White
	M83723/31-16	White
	MS27534-16	White
	NAS1664-16	White
12	M81969/14-04	White
	M83723/31-12	White
	MS27534-12	White
	NAS1664-12	White

- (1) Make a selection of a removal tool from Table 7.
- (2) Put the removal tool on the wire.
- (3) Axially align the tool and the contact cavity at the rear of the connector.
- (4) Carefully push the tool into the contact cavity until it stops.
Make sure that the tool stays aligned with the contact cavity.

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CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Hold the wire against the tool.
- (6) Pull the tool and the wire out of the contact cavity.
Make sure that the tool stays aligned with the contact cavity.

C. Unwired Contact Removal

This paragraph gives the procedure to remove an unwired contact from the connector.

For the procedure to remove a contact assembly, refer to Paragraph 4.B.

**Table 8
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool
20	CET20-24
	M81969/30-02
16	CET16-21
	M81969/30-03
12	CET12-16
	M81969/30-04

- (1) Make a selection of a contact removal tool from Table 8.
- (2) Remove the seal plug from the contact cavity.
- (3) Axially align the tool and the contact cavity at the rear of the connector.
- (4) Carefully push the tool into the contact cavity until it stops.

Make sure that:

- The end of the tool is between the contact cavity and the crimp barrel of the contact
- The tool stays aligned with the contact cavity
- Pressure is not applied on the plunger of the tool.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT APPLY PRESSURE ON THE PLUNGER OF THE TOOL WHEN THE TOOL IS IN THE CONTACT CAVITY. DAMAGE TO THE CONNECTOR CAN OCCUR.

- (5) Pull the tool and the contact out of the contact cavity.
Make sure that the tool stays aligned with the contact cavity.
- (6) Apply pressure on the plunger to eject the contact from the tool.

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ASSEMBLY OF MIL-C-26482 SERIES II CONNECTORS

5. CONNECTOR ASSEMBLY

A. Wire Preparation

For the assembly of a MIL-C-26482 Series II connector with triax cable, refer to Subject 20-53-05.

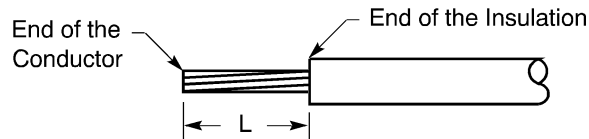
**Table 9
INSULATION REMOVAL LENGTH**

Crimp Barrel Size	Removal Length L (inch)		Special Instructions
	Target	Tolerance	
20	0.15	+0.03, -0	-
16	0.25	+0.03, -0	-
12	0.25	+0.03, -0	-

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 12
- Table 9 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.



**INSULATION REMOVAL LENGTH
Figure 12**

(2) Measure the O.D. of the wire.

(3) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.A.

B. Contact Assembly

**Table 10
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-02	-
22	20	M22520/1-01	3	M22520/1-02	Red
		M22520/2-01	6	M22520/2-02	-

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ASSEMBLY OF MIL-C-26482 SERIES II CONNECTORS

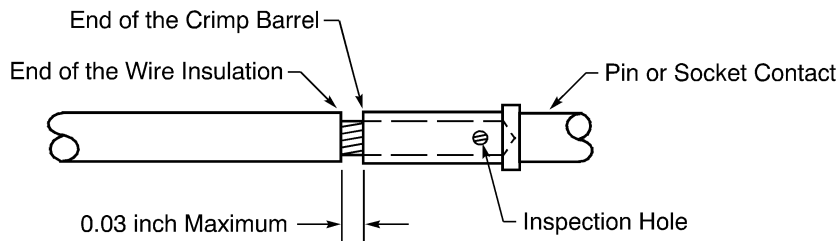
Table 10 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-02	-
	16	M22520/1-01	4	M22520/1-02	Blue
18	16	M22520/1-01	5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
14	12	M22520/1-01	7	M22520/1-02	Yellow
12	12	M22520/1-01	8	M22520/1-02	Yellow

- (1) Make a selection of a crimp tool from Table 10.
- (2) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 13.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more that 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 13

- (3) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more that 0.03 inch.

C. Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector. Refer to Paragraph 5.E.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-26482 SERIES II CONNECTORS

Table 11
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
20	CIET20-1	Red
	M81969/14-02	Red
	M83723/31-20	Red
	MS27534-20	Red
	NAS1664-20	Red
16	CIET16-3	Blue
	M81969/14-03	Blue
	M83723/31-16	Blue
	MS27534-16	Blue
	NAS1664-16	Blue
12	M81969/14-04	Yellow
	M83723/31-12	Yellow
	MS27534-12	Yellow
	NAS1664-12	Yellow

- (1) Make a selection of an insertion tool from Table 11.
- (2) Put the contact assembly in the insertion tool.
- (3) Axially align the tool and the contact cavity.
- (4) Carefully push the contact into the contact cavity until it stops.
Make sure that the tool and the contact cavity stay axially aligned.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out of the contact cavity.
Make sure that the tool and the contact cavity stay axially aligned.
- (6) Lightly pull the wire to make sure the contact is locked in the connector.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-26482 SERIES II CONNECTORS

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (2) through Step (6) again.

D. Seal of an Empty Contact Cavity

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

E. Backshell and Strain Relief Assembly

Refer to Subject 20-60-09.

6. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 12
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
CET12-16	ITT Cannon
CET16-21	ITT Cannon
CET20-24	ITT Cannon
CIET16-3	ITT Cannon
CIET20-1	ITT Cannon
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M81969/30-02	QPL
M81969/30-03	QPL
M81969/30-04	QPL
M83723/31-12	QPL
M83723/31-16	QPL
M83723/31-20	QPL
MS27534-12	QPL
MS27534-16	QPL
MS27534-20	QPL
NAS1664-12	QPL

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ASSEMBLY OF MIL-C-26482 SERIES II CONNECTORS

Table 12 (continued)

Removal Tool	Supplier
NAS1664-16	QPL
NAS1664-20	QPL

B. Contact Crimp Tools

**Table 13
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL

C. Contact Insertion Tools

**Table 14
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
CIET16-3	ITT Cannon
CIET20-1	ITT Cannon
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M83723/31-12	QPL
M83723/31-16	QPL
M83723/31-20	QPL
MS27534-12	QPL
MS27534-16	QPL
MS27534-20	QPL
NAS1664-12	QPL
NAS1664-16	QPL
NAS1664-20	QPL



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ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS**

This Subject gives the procedures to assemble Amphenol/Bendix 10-244() connectors and:

- Cerro H22-4000 fire resistant wire
- Vibro-Meter 60-116-00 cable
- Vibro-Meter 80-116-00 cable.

1. PART NUMBERS AND DESCRIPTION**A. Connector Part Numbers**

Table 1
CONNECTOR PART NUMBERS

Part Number	Supplier
10-244011-3P	Amphenol/Bendix
10-244014-7H	Amphenol/Bendix
10-244014-7P	Amphenol/Bendix
10-244014-7S	Amphenol/Bendix
10-244016-1P	Amphenol/Bendix
10-244016-1S	Amphenol/Bendix
10-244016-8S	Amphenol/Bendix
10-244020-27S	Amphenol/Bendix
10-244022-14S	Amphenol/Bendix
10-244211-3P	Amphenol/Bendix
10-244611-3S	Amphenol/Bendix
10-244611-4S	Amphenol/Bendix
10-244612-3S	Amphenol/Bendix
10-244614-5S	Amphenol/Bendix
10-244614-7G	Amphenol/Bendix
10-244614-7P	Amphenol/Bendix
10-244614-7S	Amphenol/Bendix
10-244616-1S	Amphenol/Bendix
10-244618-12S	Amphenol/Bendix
10-244618-4S	Amphenol/Bendix
10-244620-27S	Amphenol/Bendix
10-244622-14P	Amphenol/Bendix
10-244811-3S	Amphenol/Bendix
10-244811-4S	Amphenol/Bendix
10-244812-3S	Amphenol/Bendix
10-244814-5S	Amphenol/Bendix

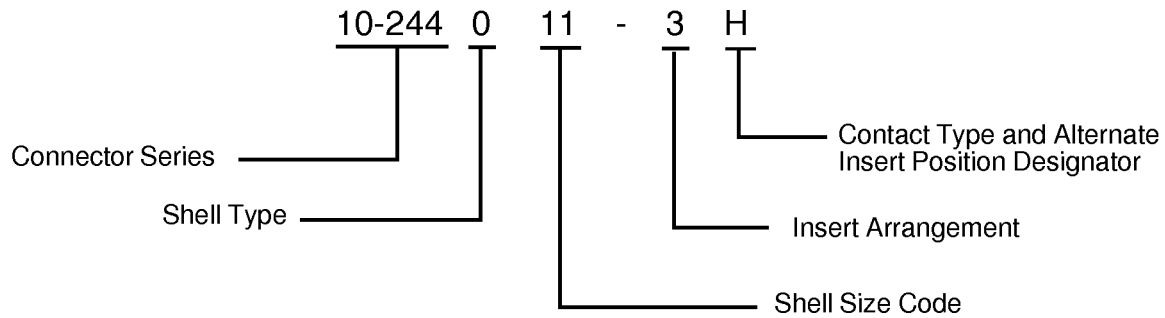
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

Table 1 (continued)

Part Number	Supplier
10-244814-7S	Amphenol/Bendix
10-244814-9S	Amphenol/Bendix
10-244816-1S	Amphenol/Bendix
10-244816-8S	Amphenol/Bendix
10-244818-12S	Amphenol/Bendix



AMPHENOL-BENDIX 10-244() SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1

Table 2
SHELL TYPES

Shell Type	Description
0	Wall Mount Receptacle
2	Box Mount Receptacle
6	Straight Plug
8	90 Degree Plug

Table 3
SHELL SIZE CODES

Shell Size Code	Shell Size
11	10SL
12	12S
14	14S
16	16S
18	18
20	20
22	22

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

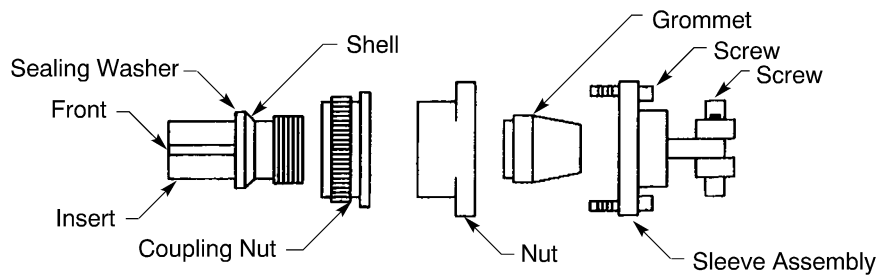
Table 4
CONTACT TYPES AND ALTERNATE POSITION DESIGNATORS

Contact Type and Alternate Insert Position Designator	Contact Type	Alternate Insert Position
G	Pins	W
H	Sockets	
I	Pins	X
J	Sockets	
K	Pins	Y
L	Sockets	
M	Pins	Z
N	Sockets	
P	Pins	Normal
S	Sockets	

Table 5
ALTERNATIVE CONNECTOR PART NUMBERS

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
10-244614-7P	Amphenol/Bendix	BACC63CE14S7P	Boeing
10-244814-7S	Amphenol/Bendix	BACC63CE14S7P	Boeing

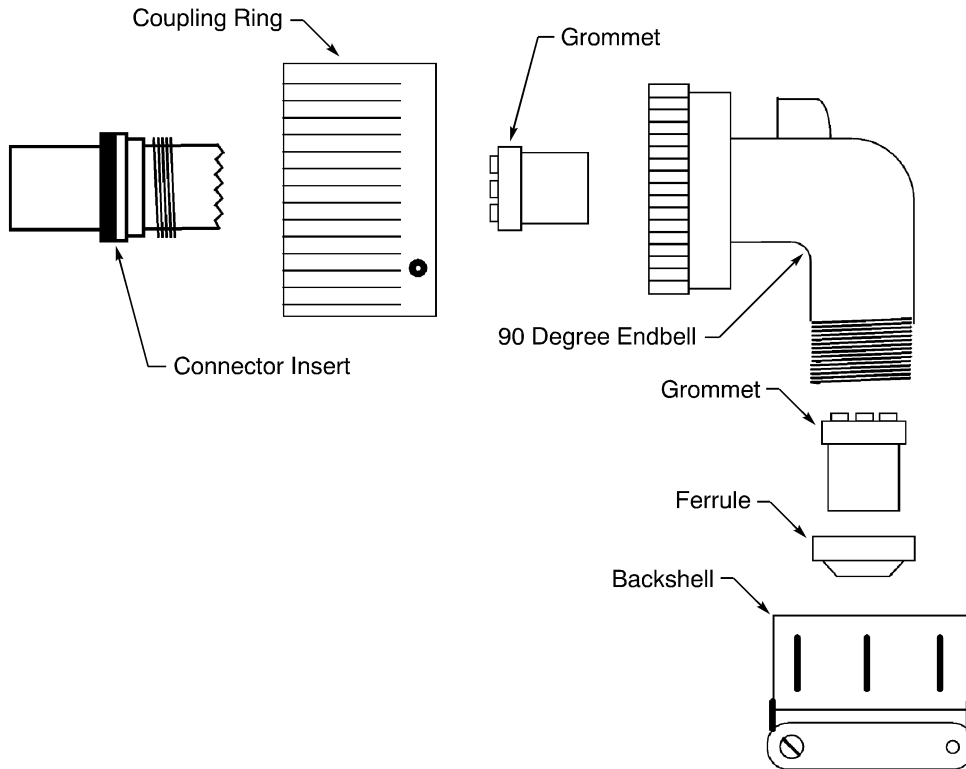
B. Connector Description



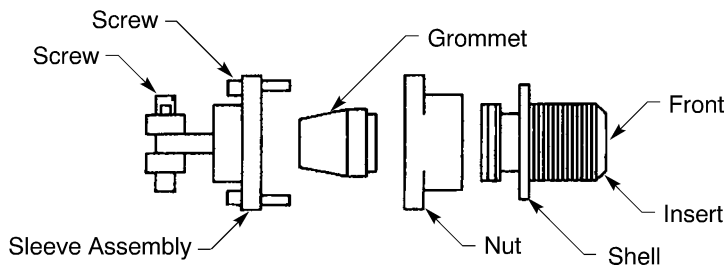
BENDIX 10-244() PLUG CONNECTOR
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS



90 DEGREE CONFIGURATION OF THE BENDIX 10-244() PLUG CONNECTOR
Figure 3



BENDIX 10-244() RECEPTACLE CONNECTOR
Figure 4

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ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

C. Contact Part Numbers

NOTE: If the connector insert arrangement has one or more size 16 contact cavities:

- Contact size 16L is used in connector shell size 8, 10, 12, 16, 18, 20, 22, 24, 28, 32, 36, 40, 44 or 48
- Contact size 16S is used in connector shell size 8S, 10S, 10SL, 12S, 14S, or 16S.

**Table 6
CONTACT PART NUMBERS**

Contact					
Size	Engaging End Size	Crimp Barrel Size	Type	Part Number	Supplier
16L	16	16	Pin	10-229192-166	Amphenol/Bendix
			Socket	10-229193-166	Amphenol/Bendix
16S	16	16	Pin	10-229192-156	Amphenol/Bendix
			Socket	10-229193-156	Amphenol/Bendix
12	12	12	Pin	10-229192-126	Amphenol/Bendix
			Socket	10-229193-126	Amphenol/Bendix
8	8	8	Pin	10-229192-86	Amphenol/Bendix
			Socket	10-229193-86	Amphenol/Bendix

2. INSERT CONFIGURATIONS

A. Insert Configurations for Amphenol/Bendix 10-244 Connectors

NOTE: The insert configurations that are specified in Table 7 and Table 8 include the connector shell size as the first part of the configuration. Refer to Figure 1 for the connector part number structure.

**Table 7
CONNECTORS THAT HAVE 10-244 INSERT CONFIGURATIONS**

Connector Part Number	Shell Size	Insert Configuration
10-244011-3P	10SL	10SL-3
10-244014-7H	14S	14S-7
10-244014-7P	14S	14S-7
10-244014-7S	14S	14S-7
10-244016-1P	16S	16S-1
10-244016-1S	16S	16S-1
10-244016-8S	16S	16S-8
10-244020-27S	20	20-27
10-244022-14S	22	22-14
10-244211-3P	10SL	10SL-3
10-244611-3S	10SL	10SL-3

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ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

Table 7 (continued)

Connector Part Number	Shell Size	Insert Configuration
10-244611-4S	10SL	10SL-4
10-244612-3S	12S	12S-3
10-244614-5S	14S	14S-5
10-244614-7G	14S	14S-7
10-244614-7P	14S	14S-7
10-244614-7S	14S	14S-7
10-244616-1S	16S	16S-1
10-244618-12S	18	18-12
10-244618-4S	18	18-4
10-244620-27S	20	20-27
10-244622-14P	22	22-14
10-244811-3S	10SL	10SL-3
10-244811-4S	10SL	10SL-4
10-244812-3S	12S	12S-3
10-244814-5S	14S	14S-5
10-244814-7S	14S	14S-7
10-244814-9S	14S	14S-9
10-244816-1S	16S	16S-1
10-244816-8S	16S	16S-8
10-244818-12S	18	18-12

NOTE: The contact cavity size that is specified in Table 7 is equivalent to the size of the engaging end of the contact.

**Table 8
10-244 CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
10SL-3	3	16	Figure 5
10SL-4	2	16	
12S-3	2	16	Figure 6
14S-5	5	16	Figure 7
14S-7	3	16	
14S-9	2	16	

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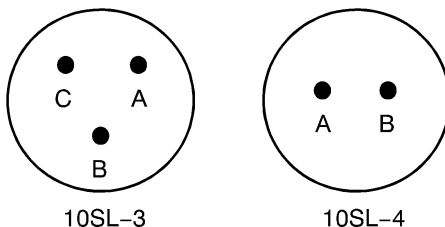
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

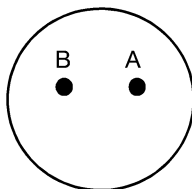
Table 8 (continued)

Insert Configuration	Contact Cavity		Reference
	Count	Size	
16S-1	7	16	Figure 8
16S-8	5	16	
18-4	4	16	Figure 9
18-12	6	16	
20-27	14	16	Figure 9
22-14	19	16	Figure 9

NOTE: Figure 5 through Figure 11 show the front face of an insert that has pins. The view of the front face of an insert that has sockets is the mirror image of this view.



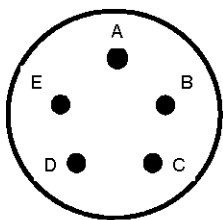
10SL-() INSERT CONFIGURATIONS
Figure 5



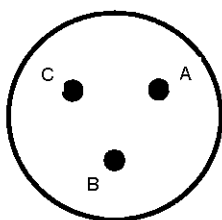
12S-() INSERT CONFIGURATIONS
Figure 6

STANDARD WIRING PRACTICES MANUAL

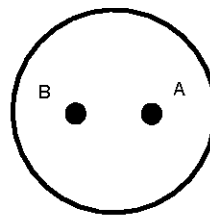
ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS



14S-5

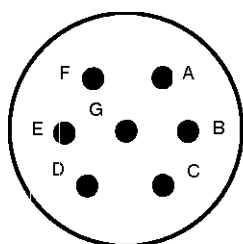


14S-7

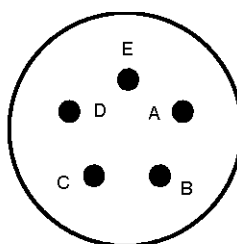


14S-9

14S-() INSERT CONFIGURATIONS
Figure 7

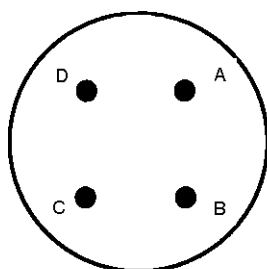


16S-1

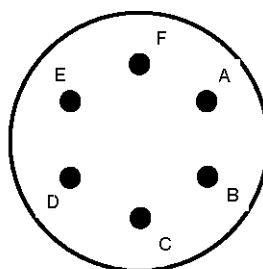


16S-8

16S-() INSERT CONFIGURATIONS
Figure 8



18-4

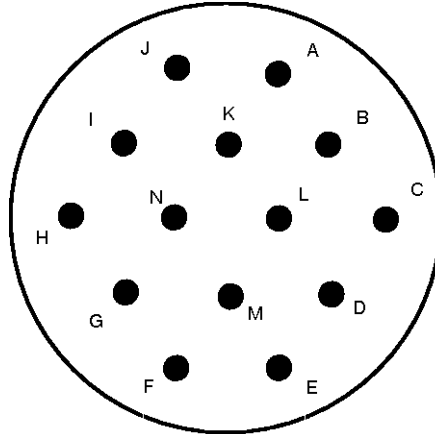


18-12

18-() INSERT CONFIGURATIONS
Figure 9

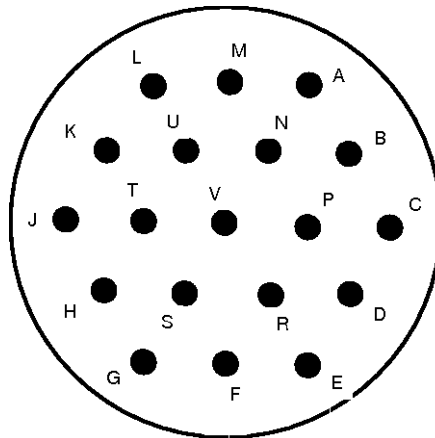
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS



20-27

20-() INSERT CONFIGURATIONSS
Figure 10



22-14

22-() INSERT CONFIGURATIONS
Figure 11

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ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

3. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 9
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Contact Type	Removal Tool	
		Handle	Tip
16	Pin	11-6911	11-3697
		ST2220-2	ST2220-3-2
	Socket	11-6911	11-3698
		ST2220-2	ST2220-3-2
12	Pin	11-6911	11-3696
	Socket	11-6911	11-3698

- (1) If it is necessary, remove:
 - The conduit assembly
 - Any rear accessories.
- (2) If it is necessary, move these components away from the end of connector.
 - The ferrule
 - The nut
 - The grommet
 - The sleeve assembly.
- (3) Make a selection of a removal tool from Table 9.
- (4) Remove the contact. Refer to Subject 20-61-00.
- (5) If it is necessary, remove any seal rods or any seal plugs. Refer to Subject 20-61-00.

4. CONNECTOR ASSEMBLY

A. Wire Preparation

Refer to:

- Figure 2 for a plug connector
 - Figure 3 for a 90 degrees plug connector
 - Figure 4 for a receptacle connector.
- (1) Cut the end of each wire so that the end of the wire is perpendicular with longitudinal axis of the wire.

NOTE: To make the insertion of the wire through the grommet holes easier, the end of the wire can be cut at a 45 degree angle.

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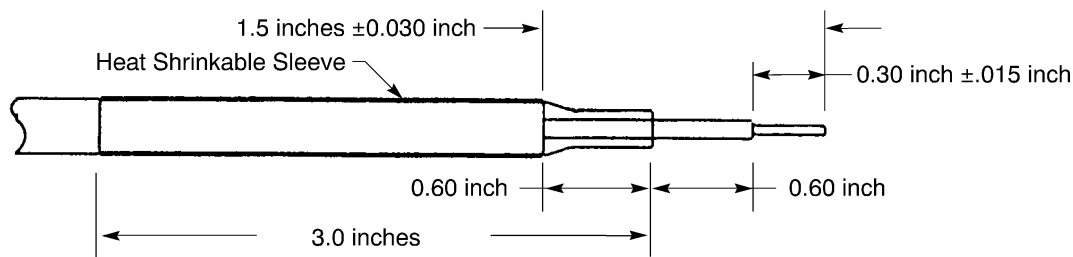
ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

- (2) For a connector with a 90 degree endbell to conduit, put these components on the cable in this sequence:
- A grommet
 - The 90 degree endbell
 - A grommet
 - The coupling ring.

NOTE: The ferrule and the backshell are not used and can be discarded.

- (3) For the plug connector, put these components on the cable in this sequence:
- The sleeve assembly
 - The grommet
 - The nut
 - The coupling nut.
- (4) For the receptacle connector, put these components on the cable in this sequence:
- The sleeve assembly
 - The grommet
 - The nut.
- (5) If a wire was cut at a 45 degree angle, cut the wire so that the end of the wire is perpendicular to the longitudinal axis of the wire.
- (6) To assemble a contact with a Cerro H22-4000 fire resistant wire, refer to Paragraph 4.B.
- (7) To assemble a contact with a Vibro-Meter 60-116-00 or a Vibro-Meter 80-116-00 cable, refer to Paragraph 4.C.
- (8) To assemble a contact with any other wire refer to Paragraph 4.D.

B. Contact Assembly with Cerro H22-4000 Fire Resistant Wire



PREPARATION OF CERRO FIRE RESISTANT WIRE

Figure 12

Refer to Figure 12.

- (1) Prepare the wire:
- (a) Remove 1.5 inches \pm 0.030 inch of the outer braid from the end of the wire.
 - (b) Remove 1.5 inches \pm 0.030 inch of the inner layer of clear Teflon from the wire.
- CAUTION:** DO NOT CUT THE DIELECTRIC MATERIAL.
- (c) Remove 0.30 inch \pm 0.015 inch of the inner insulation from the conductor.
 - (d) Put a 3.0 inch length of 1/4 inch diameter thinwall TFE 4X heat shrinkable sleeve on the wire.

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- (2) Make a selection of a crimp tool from Table 10.
- (3) Insert the wire into the contact.
- (4) Crimp the contact.
- (5) Move the heat shrinkable sleeve so that the forward end of sleeve makes a 0.60 inch overlap with the end of the outer braid. Refer to Figure 12.
- (6) Shrink the sleeve into position. Refer to Subject 20-10-14.

C. Contact Assembly with Vibro-Meter 60-116-00 or Vibro-Meter 80-116-00 Cable

- (1) Remove 3 inches of:
 - The white outer jacket
 - The yellow layer of polyimide
 - The braided shield
 - The black outer graphite layer of tape
 - The fiberglass binder and filler
 - The black individual conductor graphite layer of tape.
- (2) To remove any remaining carbon from the primary insulation of conductors, either sandblast the cable or brush it with a fiberglass eraser.
- (3) Clean the wire with acetone or an equivalent solvent.
- (4) Remove 5/8 inch \pm 1/32 inch of the wire insulation.
- (5) Put a 2.0 inch \pm 0.1 inch length of 1/8 inch thinwall TFE 4X sleeve on each wire so that the end of the sleeve is aligned with the end of the outer jacket.
- (6) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (7) Assemble a shield dead end on the cable. Refer to Subject 20-10-15.
 Make sure that the sleeve of the shield dead end makes an overlap with the sleeves of the individual conductors.
- (8) Put the sleeve assembly on the cable.
- (9) Push the grommet over the conductors with the sleeves.
- (10) Make a selection of a crimp tool from Table 10.
- (11) Fold the conductor back.
- (12) Put the wire into the crimp barrel of the contact.
- (13) Crimp the contact.

D. Contact Assembly

**Table 10
CONTACT CRIMP TOOLS**

Contact Size	Contact Type	Crimp Tool	
		Basic Unit	Locator
16S	Pin	11-7295	11-7771-1
		ST2220-1-Y	ST2220-1-24
	Socket	11-7295	11-7771-1
		ST2220-1-Y	ST2220-1-24

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS

Table 10 (continued)

Contact Size	Contact Type	Crimp Tool	
		Basic Unit	Locator
16L	Pin	11-7295	11-7771-3
		ST2220-1-Y	ST2220-1-40
	Socket	11-7295	11-7771-2
		ST2220-1-Y	ST2220-1-41
12	Pin	11-7295	11-7771-4
	Socket	11-7295	11-7771-4

- (1) Remove 5/16 inch ± 1/32 inch of wire insulation.
- (2) Make a selection of a crimp tool from Table 10.
- (3) Crimp the contact.

E. Contact Insertion

**Table 11
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Contact Type	Insertion Tool
16	Pin	11-7345
	Socket	
12	Pin	11-7082
	Socket	

- (1) Make a selection of an insertion tool from Table 11.

F. Seal of Empty Contact Cavities

- (1) It is necessary to install seal rods in contact cavities that are not used. Refer to Subject 20-61-00.

G. Assembly of an Endbell with a Conduit

- (1) Engage the threads of the endbell with the threads of the coupling ring of the conduit.
- (2) Tighten the coupling ring to the specified torque.

5. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 12
REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
11-3696	Bendix
11-3697	Bendix
11-3698	Bendix

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMPHENOL/BENDIX 10-244() SERIES CONNECTORS****Table 12 (continued)**

Removal Tool	Supplier
11-6911	Bendix
ST2220-2	Boeing
ST2220-3-2	Boeing

B. Contact Crimp Tools**Table 13
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11-7295	Bendix
11-7771-1	Bendix
11-7771-2	Bendix
11-7771-3	Bendix
11-7771-4	Bendix
ST2220-1-24	Boeing
ST2220-1-40	Boeing
ST2220-1-41	Boeing
ST2220-1-Y	Boeing

C. Contact Insertion Tools**Table 14
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
11-7082	Bendix
11-7345	Bendix



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1. GENERAL DATA

A. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Paragraph 5.D. for the procedure to increase the O.D. of AWG 2 or AWG 4 wire to seal in a size 1/0 contact cavity
- Subject 20-60-08 for the procedure to increase the O.D. of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
BACC63BD	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
BACC63BE	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
BACC63BW	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
BACC63BY	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390

STANDARD WIRING PRACTICES MANUAL

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Table 1 (continued)

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
BACC63CD	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
BACC63CE	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
CA66	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
CA80	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
FRA	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
FRF	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390

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Table 1 (continued)

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
FVA	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
FVF	MIL-C-5015 type; front release, rear removal contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390
MIL-C-5015	Front release, rear removal crimp contacts	16	0.070
		12	0.100
		8	0.140
		4	0.230
		0	0.390

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

Boeing Standard	Boeing Specification	Part Number	Supplier	Reference
-	-	017832-3000	Sabritec	Paragraph 2.G.
-	-	CA66278-101	ITT Cannon	Paragraph 2.E.
-	-	CA66278-105	ITT Cannon	Paragraph 2.E.
-	-	CA66278-93	ITT Cannon	Paragraph 2.E.
-	-	CA66279-102	ITT Cannon	Paragraph 2.E.
-	-	CA66279-106	ITT Cannon	Paragraph 2.E.
-	-	CA66279-94	ITT Cannon	Paragraph 2.E.
-	-	CA66286-45	ITT Cannon	Paragraph 2.E.
-	-	CA66287-50	ITT Cannon	Paragraph 2.E.
-	-	CA66420-1	ITT Cannon	Paragraph 2.E.
-	-	CA66422-9	ITT Cannon	Paragraph 2.E.

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Table 2 (continued)

Boeing Standard	Boeing Specification	Part Number	Supplier	Reference
-	-	CA66432-2	ITT Cannon	Paragraph 2.E.
-	-	CA66434-6	ITT Cannon	Paragraph 2.E.
-	-	CA80503-14	ITT Cannon	Paragraph 2.E.
-	-	FRA()-()	ITT Cannon	Paragraph 2.F.
-	-	FRA()36-5()-747	ITT Cannon	Paragraph 2.F.
-	-	FRF()-()	ITT Cannon	Paragraph 2.F.
-	-	FRF()36-5()-747	ITT Cannon	Paragraph 2.F.
-	-	FVA()-()	ITT Cannon	Paragraph 2.F.
-	-	FVA()36-5()-747	ITT Cannon	Paragraph 2.F.
-	-	FVF()-()	ITT Cannon	Paragraph 2.F.
-	-	FVF()36-5()-747	ITT Cannon	Paragraph 2.F.
-	280W0002-2	BACC63CE24()22S	-	Paragraph 2.H.
BACC63BD	-	246-3006R()-()	Amphenol	Paragraph 2.B.
		FC-3406D()-()	Flight	Paragraph 2.B.
BACC63BE	-	246-3000R()-()	Amphenol	Paragraph 2.B.
		FC-3400D()-()	Flight	Paragraph 2.B.
BACC63BW	-	FC3406D()-()	Flight	Paragraph 2.C.
		WFB6()-()	ITT Cannon	Paragraph 2.C.
BACC63BY	-	FC3400D()-()	Flight	Paragraph 2.C.
		WFB0()-()	ITT Cannon	Paragraph 2.C.
BACC63CD	-	CSF3440C()-()CD	Cinch	Paragraph 2.D.
		FC3400D()-()-140	Flight	Paragraph 2.D.
		SF3440C()-()	IPI	Paragraph 2.D.
		WFB0()-()CD	ITT Cannon	Paragraph 2.D.
BACC63CE	-	CSF3446C()-()CE	Cinch	Paragraph 2.D.
		FC3406D()-()-144	Flight	Paragraph 2.D.
		SF3446C()-()	IPI	Paragraph 2.D.
		WFB6()-()CE	ITT Cannon	Paragraph 2.D.

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**Table 3
OBSOLETE CONNECTOR PART NUMBERS**

Obsolete Connector		Replacement Connector
Part Number	Supplier	
246-3000R()-()	Amphenol	BACC63CD
246-3006R()-()	Amphenol	BACC63CE
BACC63BD	Boeing	BACC63CE
BACC63BE	Boeing	BACC63CD
BACC63BW	Boeing	BACC63CE
BACC63BY	Boeing	BACC63CD
CSF3440C()-()CD	Cinch	BACC63CD
CSF3446C()-()CE	Cinch	BACC63CE
FC-3400D()-()	Flight	BACC63CD
FC3400D()-()-140	Flight	BACC63CD
FC-3406D()-()	Flight	BACC63CE
FC3406D()-()-144	Flight	BACC63CE
SF3440C()-()	IPI	BACC63CD
SF3446C()-()	IPI	BACC63CE
WFB0()-()	ITT Cannon	BACC63CD
WFB6()-()	ITT Cannon	BACC63CE

**Table 4
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTORS**

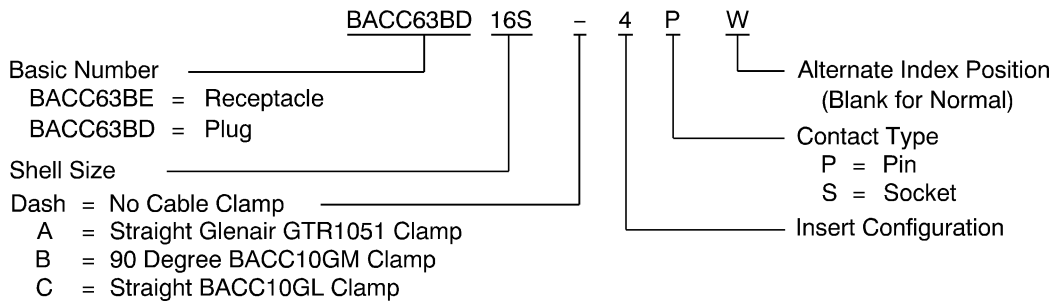
Boeing Standard	Supplier
BACC63BD	-
BACC63BE	-
BACC63BW	-
BACC63BY	-
BACC63CD	ITT Cannon
BACC63CE	ITT Cannon

B. BACC63BD and BACC63BE Connectors

If the replacement of a BACC63BD or BACC63BE connector is necessary, and a new BACC63BD or BACC63BE connector is not available, refer to Table 5 for the replacement connector and backshell.

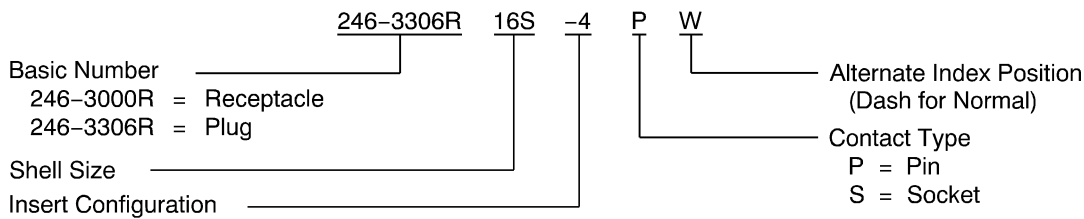
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS



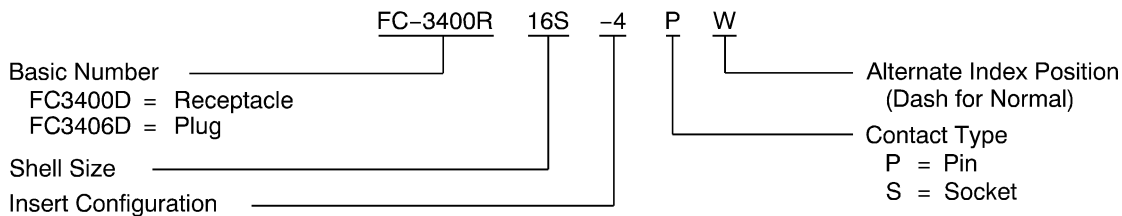
BOEING BACC63BD AND BACC63BE CONNECTOR PART NUMBER STRUCTURE

Figure 1



AMPHENOL BACC63BD AND BACC63BE CONNECTOR PART NUMBER STRUCTURE

Figure 2



FLIGHT BACC63BD AND BACC63BE CONNECTOR PART NUMBER STRUCTURE

Figure 3

Table 5

REPLACEMENT CONNECTOR AND BACKSHELL ASSEMBLIES

Obsolete		Replacement	
Connector	Backshell	Connector	Backshell
BACC63BD()-()	-	BACC63CE()-()	-
BACC63BD()A()	GTR1051()	BACC63CE()A()	BACC10HV()
BACC63BD()B()	BACC10GM()	BACC63CE()B()	BACC10HW()
BACC63BD()C()	BACC10GL()	BACC63CE()A()	BACC10HV()
BACC63BE()-()	-	BACC63CD()-()	-
BACC63BE()A()	GTR1051()	BACC63CD()A()	BACC10HV()
BACC63BE()B()	BACC10GM()	BACC63CD()B()	BACC10HW()

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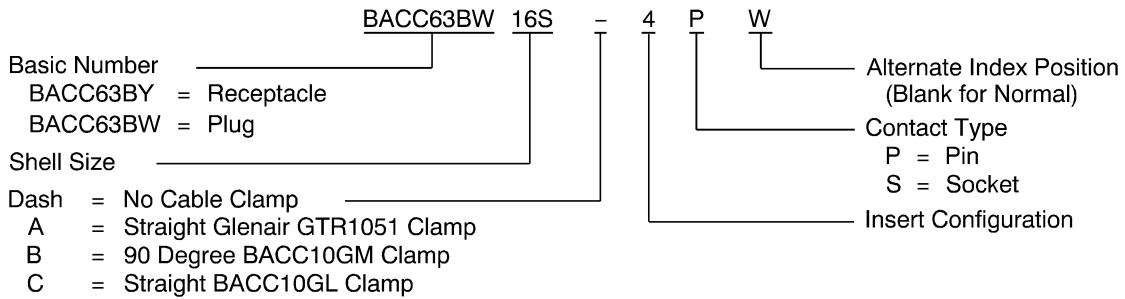
ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

Table 5 (continued)

Obsolete		Replacement	
Connector	Backshell	Connector	Backshell
BACC63BE()C()	BACC10GL()	BACC63CD()A()	BACC10HV()

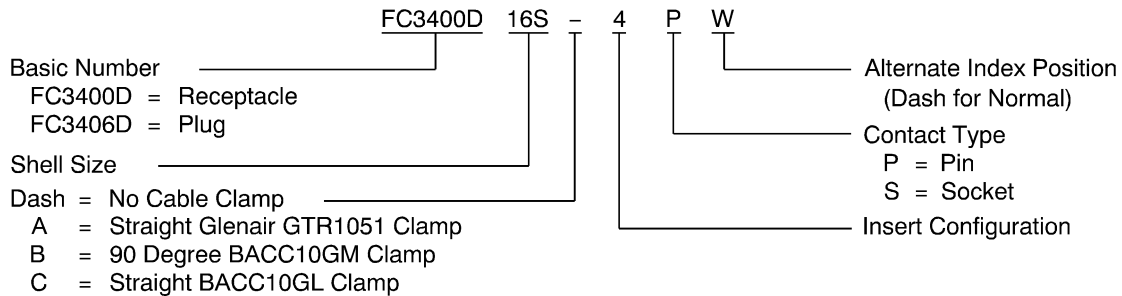
C. BACC63BW and BACC63BY Connectors

If the replacement of a BACC63BW or BACC63BY connector is necessary, and a new BACC63BW or BACC63BY connector is not available, refer to Table 6 for the replacement connector and backshell.



BOEING BACC63BW AND BACC63BY CONNECTOR PART NUMBER STRUCTURE

Figure 4

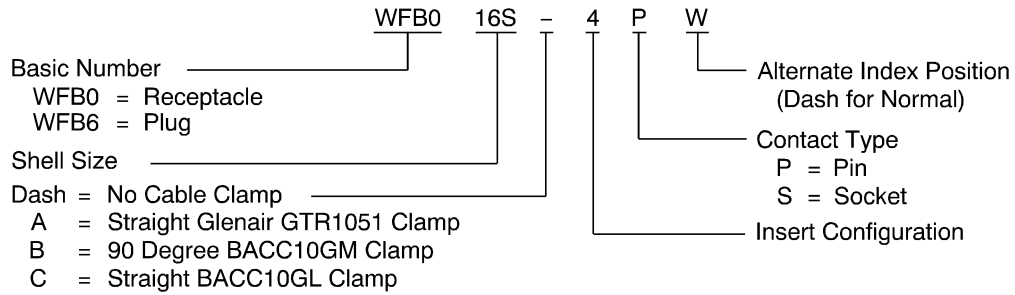


FLIGHT BACC63BW AND BACC63BY CONNECTOR PART NUMBER STRUCTURE

Figure 5

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS



ITT CANNON BACC63BW AND BACC63BY CONNECTOR PART NUMBER STRUCTURE

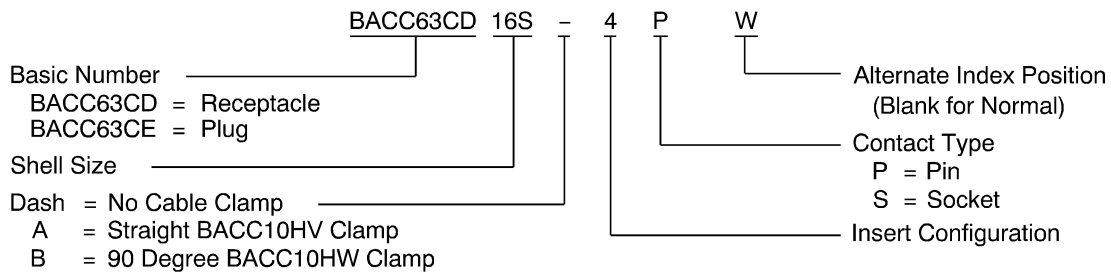
Figure 6

**Table 6
REPLACEMENT CONNECTOR AND BACKSHELL ASSEMBLIES**

Obsolete		Replacement	
Connector	Backshell	Connector	Backshell
BACC63BW()-()	-	BACC63CE()-()	-
BACC63BW()A()	GTR1051()	BACC63CE()A()	BACC10HV()
BACC63BW()B()	BACC10GM()	BACC63CE()B()	BACC10HW()
BACC63BW()C()	BACC10GL()	BACC63CE()A()	BACC10HV()
BACC63BY()-()	-	BACC63CD()-()	-
BACC63BY()A()	GTR1051()	BACC63CD()A()	BACC10HV()
BACC63BY()B()	BACC10GM()	BACC63CD()B()	BACC10HW()
BACC63BY()C()	BACC10GL()	BACC63CD()A()	BACC10HV()

D. BACC63CD and BACC63CE Connectors

BACC63CD and BACC63CE connectors have anti-rotation backshell teeth.



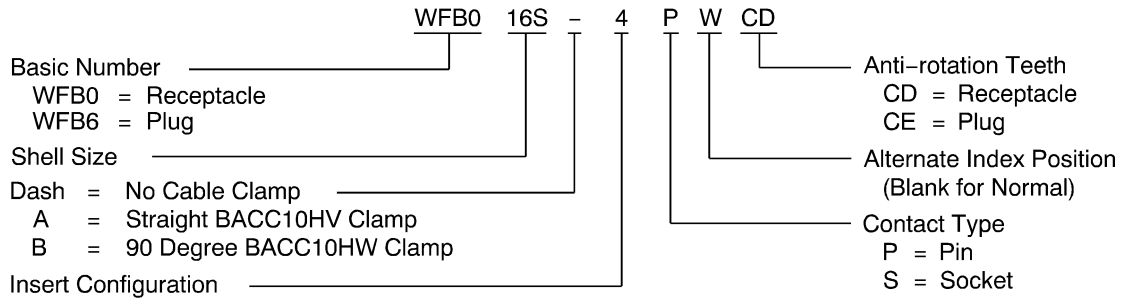
BOEING BACC63CD AND BACC63CE CONNECTOR PART NUMBER STRUCTURE

Figure 7

NOTE: Cinch, Flight, and IPI are no longer qualified suppliers of BACC63CD and BACC63CE connectors.

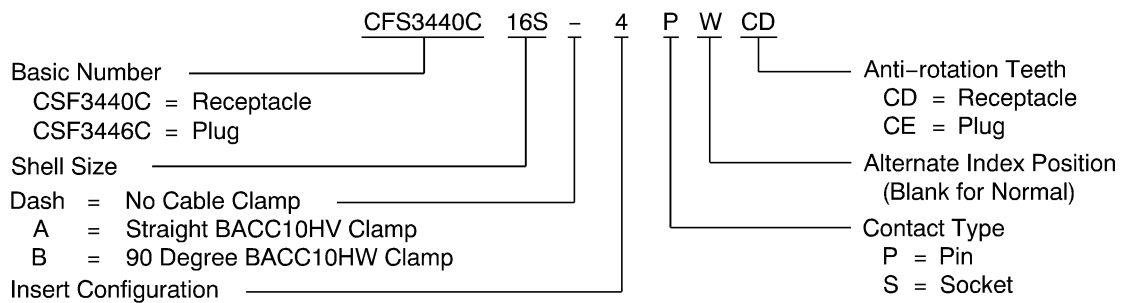
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ITT CANNON BACC63CD AND BACC63CE CONNECTOR PART NUMBER STRUCTURE

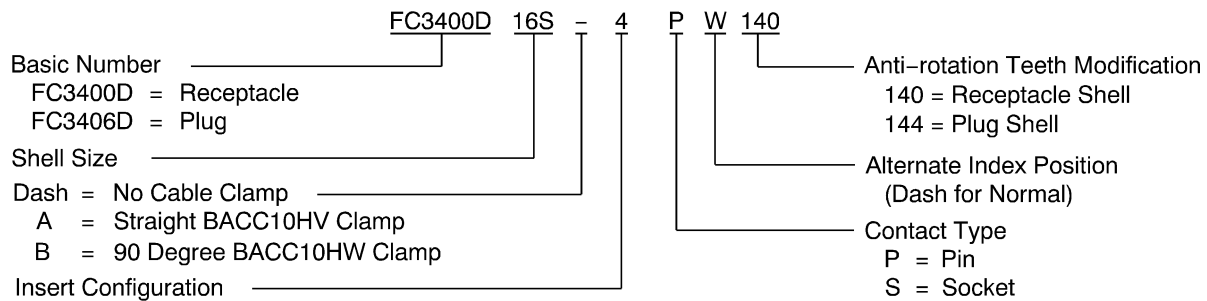
Figure 8



CINCH BACC63CD AND BACC63CE CONNECTOR PART NUMBER STRUCTURE

Figure 9

NOTE: Cinch is no longer a qualified supplier of BACC63CD and BACC63CE connectors.



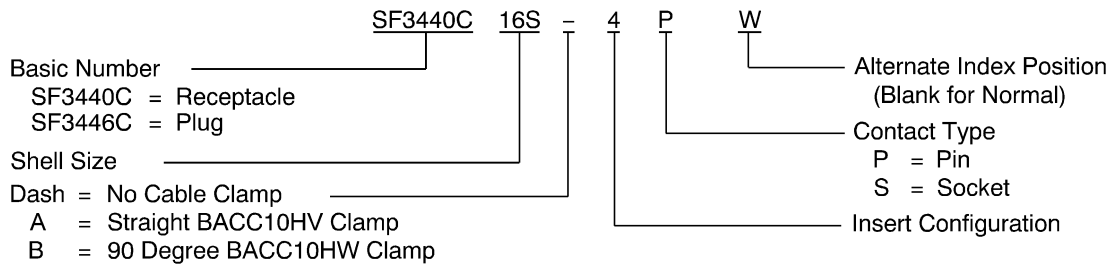
FLIGHT BACC63CD AND BACC63CE CONNECTOR PART NUMBER STRUCTURE

Figure 10

NOTE: Flight is no longer a qualified supplier of BACC63CD and BACC63CE connectors.

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IPI BACC63CD AND BACC63CE CONNECTOR PART NUMBER STRUCTURE
Figure 11

NOTE: IPI is no longer a qualified supplier of BACC63CD and BACC63CE connectors.

E. ITT Cannon CA66()-() and CA80()-() Connectors

Table 7
ITT CANNON CA66()-() AND CA80()-() CONNECTOR PART NUMBERS

Part Number	Description	Insert Configuration	Contact Type
CA66278-93	Receptacle	28-22	Pin
CA66278-101	Receptacle	28-22	Pin
CA66278-105	Receptacle	28-22	Pin
CA66279-94	Plug with castellated self-locking coupling ring	28-22	Socket
CA66279-102	Plug with castellated self-locking coupling ring	28-22	Socket
CA66279-106	Plug with castellated self-locking coupling ring	28-22	Socket
CA66286-45	Receptacle	36-5	Pin
CA66287-50	Plug with hex self-locking coupling nut	36-5	Socket
CA66420-1	Receptacle	28-22	Pin
CA66422-9	Receptacle	36-5	Pin
CA66432-2	Plug with knurled self-locking coupling ring	28-22	Socket
CA66434-6	Plug with hex self-locking coupling nut	36-5	Socket
CA80503-14	Receptacle	22-2	Socket

Table 8
ITT CANNON CA66()-() AND CA80()-() BACKSHELL COMPONENT PART NUMBERS

Connector	Backshell Component		
	Type	Part Number	Supplier
CA66278-101	Ferrule	304-0395-000	ITT Cannon
	Straight Backshell	057-0872-000	ITT Cannon

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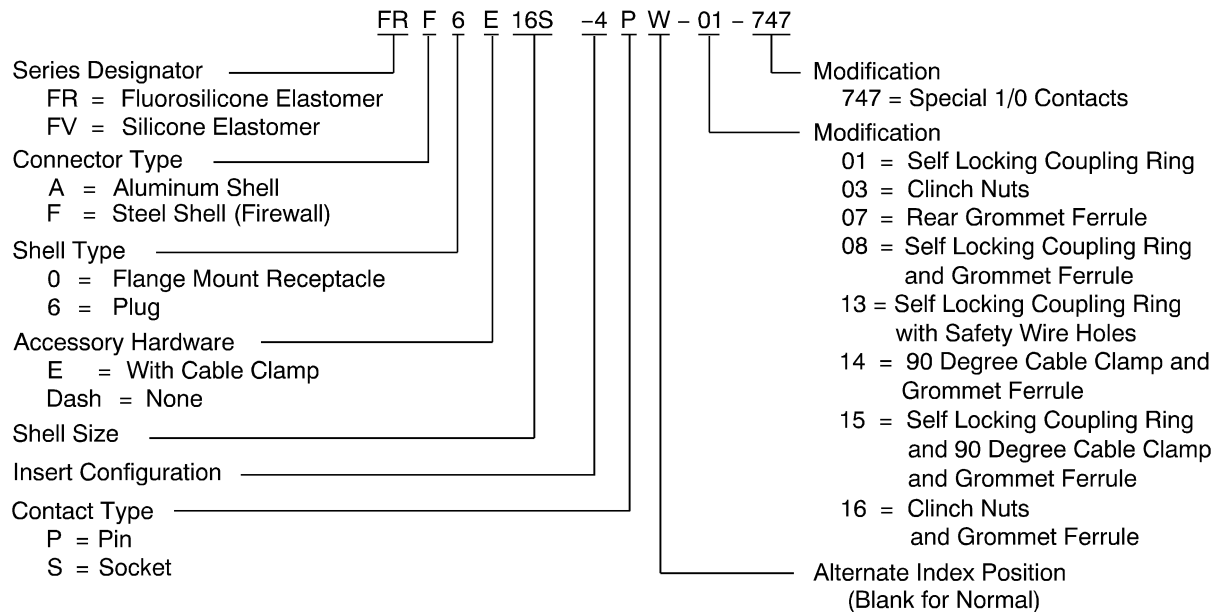
Table 8 (continued)

Connector	Backshell Component		
	Type	Part Number	Supplier
CA66278-105	Ferrule	304-0395-000	ITT Cannon
	Straight Backshell	057-0872-000	ITT Cannon
CA66278-93	Ferrule	304-0395-000	ITT Cannon
	Straight Backshell	057-0872-000	ITT Cannon
CA66279-102	Straight Backshell	057-0872-000	ITT Cannon
CA66279-106	Straight Backshell	057-0872-000	ITT Cannon
CA66279-94	Ferrule	304-0395-000	ITT Cannon
	Straight Backshell	057-0872-000	ITT Cannon
CA66286-45	Ferrule	304-0415-001	ITT Cannon
	Straight Backshell	627-048	Glenair
CA66287-50	Ferrule	304-0415-001	ITT Cannon
	Straight Backshell	627-048	Glenair
CA66420-1	Straight Backshell	057-0872-000	ITT Cannon
CA66422-9	Ferrule	304-0415-000	ITT Cannon
	Straight Backshell	627-048	Glenair
CA66432-2	Ferrule	304-0395-000	ITT Cannon
	Straight Backshell	057-0872-000	ITT Cannon
CA66434-6	Ferrule	304-0415-001	ITT Cannon
	Straight Backshell	627-048	Glenair
CA80503-14	Straight Backshell	057-0870-000	ITT Cannon

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F. ITT Cannon FR()-() and FV()-() Connectors



ITT CANNON FR()-() AND FV()-() CONNECTOR PART NUMBER STRUCTURE

Figure 12

NOTE: Table 21 gives the backshell part numbers that are supplied with the ITT Cannon FR()E() and FV()E() connectors:

- A 90 Degree backshell and a grommet ferrule are supplied with the ITT Cannon FR()E() and FV()E() when the connector part number specifies modification codes 14 or 15. Refer to Figure 12.
- A straight backshell is supplied with the ITT Cannon FR()E() and FV()E() when the connector part number does not specify modification code 14 or 15. Refer to Figure 12.
- FVF()E() and FVA()E connectors supplied with a straight backshell are supplied with a grommet ferrule.
- FRF()E() and FRA()E connectors supplied with a straight backshell are not supplied with a grommet ferrule.

G. Sabritec 017832-3000 Connector

The Sabritec 017832-3000 connector:

- Is a plug with a threaded coupling
- Has an aluminum alloy shell with black chromate over a cadmium finish
- Has a 12S-3 insert configuration; refer to Table 28 and Figure 19
- Has 2 size 16, MIL-C-26500 connector type, standard socket contacts; refer to Subject 20-61-11.

The connector is the same as a BACC63CE12S-3S connector with these differences:

- It has a decreased length
- It has different contacts
- It does not have anti-rotational backshell teeth.

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H. Boeing 280W0002-2 Connector

The Boeing S280W0002-2 connector:

- Is a BACC63CE plug; refer to Table 9
- Has insert configuration 24-22; refer to Table 28 and Figure 25
- Has four special size 0808 contacts; refer to Table 15.

**Table 9
BOEING 280W0002-2 CONNECTOR PART NUMBER**

Boeing Specification	Connector Specification Components					
	Connector	Contact				
		Part Number	Size	Type	Quantity	Reference
280W0002-2	BACC63CE24()22S	BACC47FW3	0808	Socket	4	Table 15

I. Contact Part Numbers

**Table 10
CONTACT SELECTION**

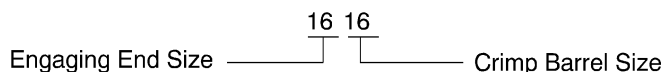
Connector	Contact Type	Reference
017832-3000	MIL-C-26500	Subject 20-61-11
BACC63BD	Standard	Table 11
	Thermocouple	Table 13
BACC63BE	Standard	Table 11
	Thermocouple	Table 13
BACC63BW	Standard	Table 11
	Thermocouple	Table 13
BACC63BY	Standard	Table 11
	Thermocouple	Table 13
BACC63CD	Standard	Table 11
	Thermocouple	Table 13
BACC63CE	Standard	Table 11
	Thermocouple	Table 13
CA66()-()	Special	Table 14
CA80()-()	Special	Table 14
FRA()36-5()-747	Standard	Table 11
FRA()-()	Standard	Table 11
	Thermocouple	Table 13
FRF()36-5()-747	Standard	Table 11

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Table 10 (continued)

Connector	Contact Type	Reference
FRF()-()	Standard	Table 11
	Thermocouple	Table 13
FVA()36-5-()-747	Standard	Table 11
FVA()-()	Standard	Table 11
	Thermocouple	Table 13
FVF()36-5-()-747	Standard	Table 11
FVF()-()	Standard	Table 11
	Thermocouple	Table 13



EXAMPLE OF CONTACT SIZE
Figure 13

Table 11
BOEING STANDARD CONTACT PART NUMBERS

Contact Size	Engaging End	Crimp Barrel	Contact Type	Boeing Standard
1616	16	16	Pin	BACC47DP1
			Socket	BACC47DR1
1212	12	12	Pin	BACC47DP2
			Socket	BACC47DR2
0808	8	8	Pin	BACC47DP3
			Socket	BACC47DR3
0404	4	4	Pin	BACC47DP4
			Socket	BACC47DR4
1/0-1/0	1/0	1/0	Pin	BACC47DP5
			Socket	BACC47DR5

Table 12
APPROVED SUPPLIERS OF BOEING STANDARD CONTACTS

Boeing Standard	Supplier
BACC47DP()	ITT Cannon
	Tri-Star

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Table 12 (continued)

Boeing Standard	Supplier
BACC47DR()	ITT Cannon
	Tri-Star

**Table 13
THERMOCOUPLE CONTACTS**

Contact Size		Type	Material	Color Code		Part Number	Supplier		
Engaging End	Crimp Barrel			Band	Color				
16	16	Pin	Alumel	1	Blue	016-0007-106	Flight		
				2	Blue				
				3	Green				
				1	Blue			030-1878-007	ITT Cannon
				2	Blue				
				3	Green				
			Chromel	1	Blue	016-0007-107	Flight		
				2	Blue				
				3	White				
				1	Blue			030-1878-006	ITT Cannon
				2	Blue				
				3	White				
		Socket	Alumel	1	Blue	016-1007-206	Flight		
				2	Blue				
				3	Green				
				1	Blue			031-1040-003	ITT Cannon
				2	Blue				
				3	Green				
			Chromel	1	Blue	016-1007-207	Flight		
				2	Blue				
				3	White				
				1	Blue			031-1040-004	ITT Cannon
				2	Blue				
				3	White				

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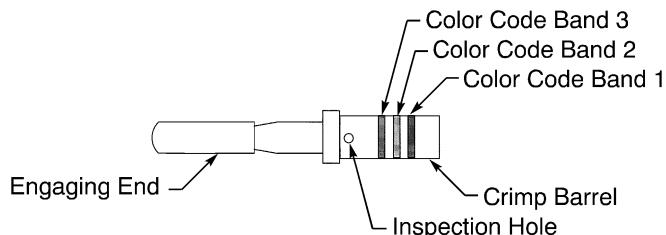
ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

Table 13 (continued)

Contact Size		Type	Material	Color Code		Part Number	Supplier		
Engaging End	Crimp Barrel			Band	Color				
12	12	Pin	Alumel	1	Yellow	012-0008-106	Flight		
				2	Yellow				
				3	Green				
				1	Yellow			030-1879-009	ITT Cannon
				2	Yellow				
				3	Green				
			Chromel	1	Yellow	012-0008-107	Flight		
				2	Yellow				
				3	White				
				1	Yellow			030-1879-010	ITT Cannon
				2	Yellow				
				3	White				
		Socket	Alumel	1	Yellow	012-1008-206	Flight		
				2	Yellow				
				3	Green				
				1	Yellow			031-1041-009	ITT Cannon
				2	Yellow				
				3	Green				
			Chromel	1	Yellow	012-1008-207	Flight		
				2	Yellow				
				3	White				
				1	Yellow			031-1041-010	ITT Cannon
				2	Yellow				
				3	White				

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COLOR CODE BANDS OF THE THERMOCOUPLE CONTACT
Figure 14

Table 14
CONTACTS FOR ITT CANNON CA66()-() AND CA80()-() CONNECTORS

Connector	Contact				
	Type	Size		Part Number	Supplier
		Engaging End	Crimp Barrel		
CA66278-93	Pin	4	4	030-1881-737	ITT Cannon
		16	16	BACC47DP1	Boeing
CA66278-101	Pin	4	8	030-1881-777	ITT Cannon
		16	16	BACC47DP1	Boeing
CA66278-105	Pin	4	8	030-1881-777	ITT Cannon
		16	16	BACC47DP1	Boeing
CA66279-94	Socket	4	4	031-1043-737	ITT Cannon
		16	16	BACC47DR1	Boeing
CA66279-102	Socket	4	8	031-1043-777	ITT Cannon
		16	16	BACC47DR1	Boeing
CA66279-106	Socket	4	8	031-1043-777	ITT Cannon
		16	16	BACC47DR1	Boeing
CA66286-45	Pin	1/0	1/0	030-8400-500	ITT Cannon
CA66287-50	Socket	1/0	2	031-8010-500	ITT Cannon
CA66420-1	Pin	4	8	030-1881-777	ITT Cannon
		16	16	BACC47DP1	Boeing
CA66422-9	Pin	1/0	2	030-8225-100	ITT Cannon
CA66432-2	Socket	4	8	031-1043-777	ITT Cannon
		16	16	BACC47DR1	Boeing
CA66434-6	Socket	1/0	1/0	031-8014-800	ITT Cannon
CA80503-14	Socket	8	8	031-1042-001	ITT Cannon



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Table 15
SPECIAL CONTACTS FOR 280W0002-2 CONNECTORS

Boeing Standard	Type	Contact Size	
		Engaging End	Crimp Barrel
BACC47FW3	Socket	8	8

Table 16
APPROVED SUPPLIERS OF BACC47FW CONTACTS

Boeing Standard	Supplier
BACC47FW3	Radiall
	Jerrik

Table 17
CONTACT ADAPTER SLEEVE PART NUMBERS

Part Number	Plating Material	Supplier
252-0127-000	Silver	ITT Cannon
252-0127-001	Silver	ITT Cannon
252-0128-000	Silver	ITT Cannon
252-0128-001	Gold	ITT Cannon
252-0130-000	Silver	ITT Cannon
252-0130-001	Gold	ITT Cannon
252-0146-000	Silver	ITT Cannon
252-0146-001	Gold	ITT Cannon
252-0318-000	Silver	ITT Cannon
252-0318-001	Gold	ITT Cannon
252-1230-000	Silver	ITT Cannon
252-1230-001	Gold	ITT Cannon
252-1231-000	Silver	ITT Cannon
252-1231-001	Gold	ITT Cannon
252-8006-500	Gold	ITT Cannon

NOTE: A gold plated adapter sleeve and a silver plated adapter sleeve give equivalent performance.

CAUTION: KEEP THE SILVER PLATED ADAPTER SLEEVES IN THEIR INITIAL CONTAINER UNTIL CONTACT ASSEMBLY IS DONE. THIS HELPS TO PREVENT TARNISH.

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J. Backshell Component Part Numbers

**Table 18
BACKSHELL PART NUMBERS**

Part Number	Description	Configuration	Supplier
057-08()-000	Strain Relief Backshell with Saddle Clamp	Straight	ITT Cannon
627-048	Strain Relief Backshell with Saddle Clamp and Wire Separator	Straight	Glenair
BACC10GL()	Strain Relief Backshell with Saddle Clamp	Straight	Boeing
BACC10GM()	Strain Relief Backshell with Saddle Clamp	90 Degree	Boeing
BACC10HV()	Strain Relief Backshell with Saddle Clamp	Straight	Boeing
BACC10HW()	Strain Relief Backshell with Saddle Clamp	90 Degree	Boeing
BACC10KA()	Strain Relief Backshell with Saddle Clamp	Straight	Boeing
BACC10KB()	Strain Relief Backshell with Saddle Clamp	90 Degree	Boeing
BACC10KC()	Strain Relief Backshell with Saddle Clamp	45 Degree	Boeing
G63292	Aluminum Strain Relief Backshell with Saddle Clamp and Aluminum Wire Separator	Straight	Glenair
G63292-1	Aluminum Strain Relief Backshell with Saddle Clamp and Composite Wire Separator	Straight	Glenair
G6652()-	Aluminum Strain Relief Backshell with Saddle Clamp and Aluminum Wire Separator	Straight	Glenair
G6652()-1	Aluminum Strain Relief Backshell with Saddle Clamp and Composite Wire Separator	Straight	Glenair
S1347()-	Strain Relief Backshell with 3 setscrews on coupling ring and Saddle Clamp	90 Degree	Sunbank
S3972()-	Extension Adapter	Straight	Sunbank



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**Table 19
ALTERNATIVE BACKSHELL PART NUMBERS**

Specified Backshell		Alternative Backshell	
Part Number	Supplier	Part Number	Supplier
G6652-36	Glenair	G63292	Glenair
		G63292-1	Glenair
G6652-36-1	Glenair	G63292	Glenair
		G63292-1	Glenair

**Table 20
APPROVED SUPPLIERS OF BOEING STANDARD BACKSHELLS**

Part Number	Supplier
BACC10GL()	Glenair
BACC10GM()	Glenair
BACC10HV()	Glenair
	Sunbank
BACC10HW()	Glenair
	Sunbank
BACC10KA()	Glenair
	Sunbank
BACC10KB()	Glenair
	Sunbank
BACC10KC()	Glenair
	Sunbank

**Table 21
BACKSHELL PART NUMBERS FOR ITT CANNON FR() AND FV() CONNECTORS**

Part Number	Shell Size	Configuration	Supplier
057-0866-000	10SL	Straight	ITT Cannon
	12S	Straight	ITT Cannon
	12	Straight	ITT Cannon
057-0867-000	14S	Straight	ITT Cannon
	14	Straight	ITT Cannon
057-0868-000	16S	Straight	ITT Cannon
	16	Straight	ITT Cannon
057-0869-000	20	Straight	ITT Cannon

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Table 21 (continued)

Part Number	Shell Size	Configuration	Supplier
057-0870-000	22	Straight	ITT Cannon
057-0871-000	24	Straight	ITT Cannon
057-0872-000	28	Straight	ITT Cannon
057-0865-000	32	Straight	ITT Cannon
057-0873-000	36	Straight	ITT Cannon
S1347-12-2	10SL	90 Degree	Sunbank
	12S	90 Degree	Sunbank
	12	90 Degree	Sunbank
S1347-14-2	14S	90 Degree	Sunbank
	14	90 Degree	Sunbank
S1347-16-2	16S	90 Degree	Sunbank
	16	90 Degree	Sunbank
S1347-20-2	20	90 Degree	Sunbank
S1347-22-2	22	90 Degree	Sunbank
S1347-24-2	24	90 Degree	Sunbank
S1347-28-2	28	90 Degree	Sunbank
S1347-32-2	32	90 Degree	Sunbank
S1347-36-2	36	90 Degree	Sunbank

**Table 22
FERRULE PART NUMBERS**

Connector		Ferrule		
Shell Size	Contact Type	Part Number	Length (inch)	Supplier
10SL	Pin	304-0399-000	0.332	ITT Cannon
	Socket	304-0400-000	0.496	ITT Cannon
12S	Pin	304-0399-000	0.332	ITT Cannon
	Socket	304-0400-000	0.496	ITT Cannon
14S	Pin	304-0397-000	0.332	ITT Cannon
	Socket	304-0398-000	0.496	ITT Cannon
16S	Pin	304-0392-000	0.332	ITT Cannon
	Socket	304-0393-000	0.496	ITT Cannon
28	Pin	304-0395-000	0.377	ITT Cannon
	Socket	304-0395-000	0.377	ITT Cannon

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Table 22 (continued)

Connector		Ferrule		
Shell Size	Contact Type	Part Number	Length (inch)	Supplier
36	Pin	304-0415-000	0.377	ITT Cannon
		304-0415-001	0.877	ITT Cannon
	Socket	304-0415-000	0.377	ITT Cannon
		304-0415-001	0.877	ITT Cannon

**Table 23
WIRE SEPARATOR PART NUMBERS**

Part Number	Number of Wires	Material	Supplier
BACS18AX2	3	Nylon	Boeing
BACS45A115	3	Nylon	Boeing
6000-052-0000	4	Teflon	Amphenol
687-522	4	-	Glenair

**Table 24
OBSOLETE WIRE SEPARATORS**

Obsolete Wire Separator	Replacement Wire Separator
BACS45A115	BACS18AX2

**Table 25
APPROVED SUPPLIERS OF BOEING STANDARD WIRE SEPARATORS**

Boeing Standard	Supplier
BACS18AX()	Component Products
	Nylon Molding
	WSI Technologies
	Zites

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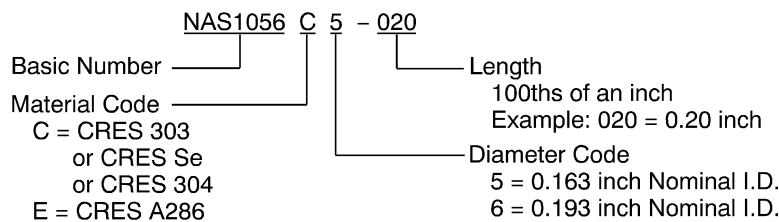
ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

**Table 26
SPACER PART NUMBERS**

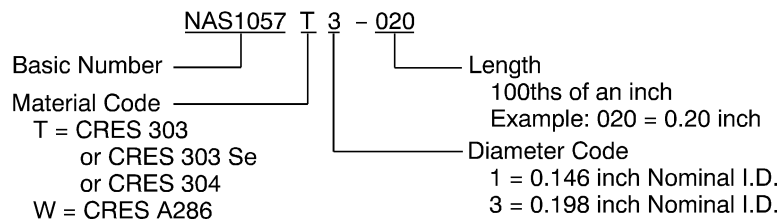
Connector Shell Size		Spacer		Reference
Minimum	Maximum	Part Number	Supplier	
8	16	NAS1056C5-()	QPL	Figure 15
		NAS1056C6-()	QPL	Figure 15
		NAS1057T1-()	QPL	Figure 16
		NAS1057W1-()	QPL	Figure 16
		NAS43DD1-()	QPL	Figure 17
18	28	NAS1056E5-()	QPL	Figure 15
		NAS1056E6-()	QPL	Figure 15
		NAS1057T3-()	QPL	Figure 16
		NAS1057W3-()	QPL	Figure 16
		NAS43DD3-()	QPL	Figure 17
36	36	BACS13S-297B	Boeing	-

**Table 27
APPROVED SUPPLIERS OF BOEING STANDARD SPACERS**

Boeing Standard	Supplier
BACS13S	Thomas & Betts



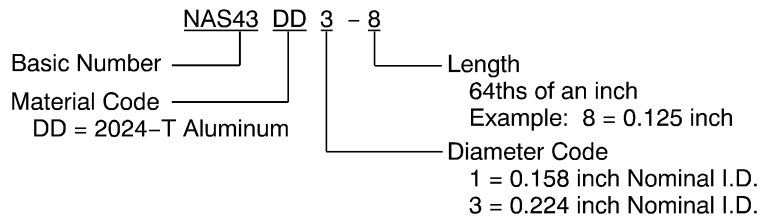
**NAS1056 SPACER PART NUMBER STRUCTURE
Figure 15**



**NAS1057 SPACER PART NUMBER STRUCTURE
Figure 16**

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS



NAS43 SPACER PART NUMBER STRUCTURE

Figure 17

3. INSERT CONFIGURATIONS

A. MIL-C-5015 Type Connectors

NOTE: The insert configurations that are specified in Table 28 include the connector shell size as the first part of the configuration. Refer to Table 2 for the the part number structure that is applicable for the connector.

NOTE: The contact cavity size that is specified in Table 28 is equivalent to the size of the engaging end of the contact.

**Table 28
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
10SL-3	3	16	Figure 18
10SL-4	2	16	Figure 18
12S-3	2	16	Figure 19
14S-2	4	16	Figure 20
14S-5	5	16	Figure 20
14S-6	6	16	Figure 20
14S-7	3	16	Figure 20
16S-1	7	16	Figure 21
18-4	4	16	Figure 22
20-4	4	12	Figure 23
22-2	3	8	Figure 24
24-10	7	8	Figure 25
24-11	6	12	Figure 25
	3	8	
24-22	4	8	Figure 25

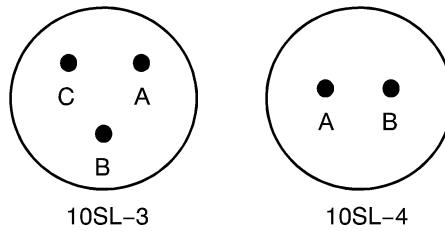
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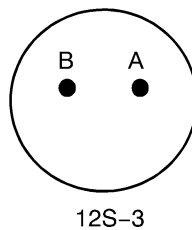
Table 28 (continued)

Insert Configuration	Contact Cavity		Reference
	Count	Size	
28-11	18	16	Figure 26
	4	12	
28-12	26	16	Figure 26
28-22	3	16	Figure 26
	3	4	
32-7	28	16	Figure 27
	7	12	
32-17	4	4	Figure 27
36-5	4	1/0	Figure 28

NOTE: Figure 18 through Figure 28 show the front face of an insert that has pins. The view of the front face of an insert that has sockets is the mirror image of this view.



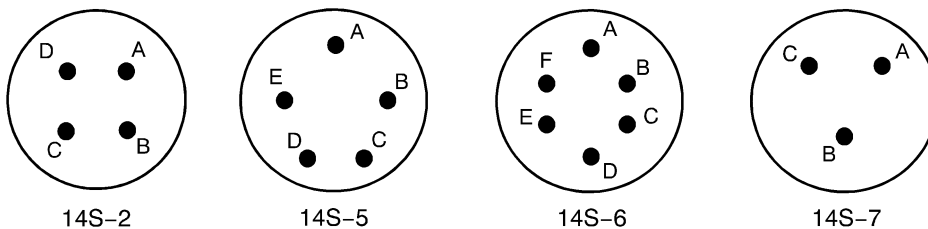
10SL-() INSERT CONFIGURATIONS
Figure 18



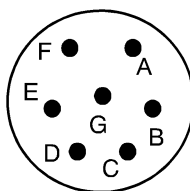
12S-() INSERT CONFIGURATIONS
Figure 19

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

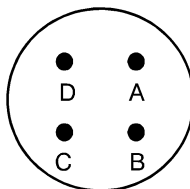


14S-() INSERT CONFIGURATIONS
Figure 20



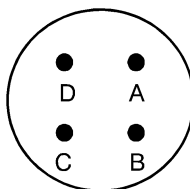
16S-1

16S-() INSERT CONFIGURATIONS
Figure 21



18-4

18-() INSERT CONFIGURATIONS
Figure 22

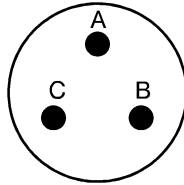


20-4

20-() INSERT CONFIGURATIONS
Figure 23

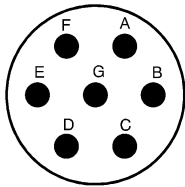
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

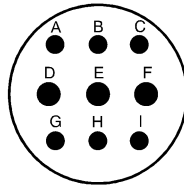


22-2

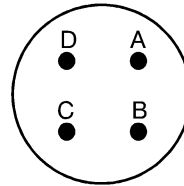
22-() INSERT CONFIGURATIONS
Figure 24



24-10

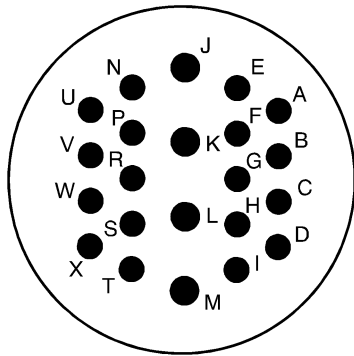


24-11

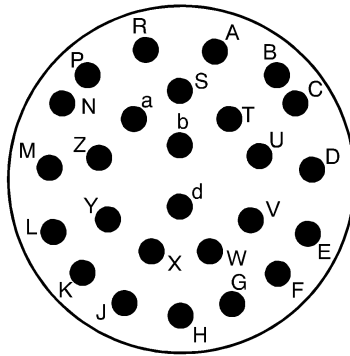


24-22

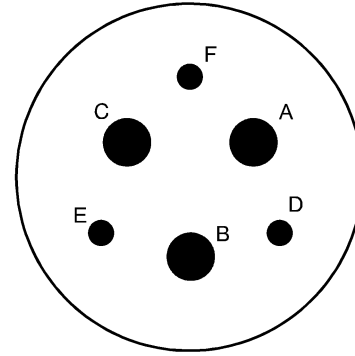
24-() INSERT CONFIGURATIONS
Figure 25



28-11



28-12

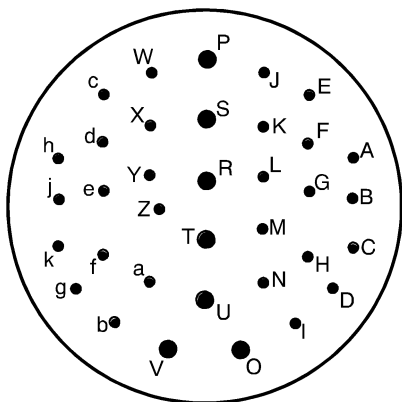


28-22

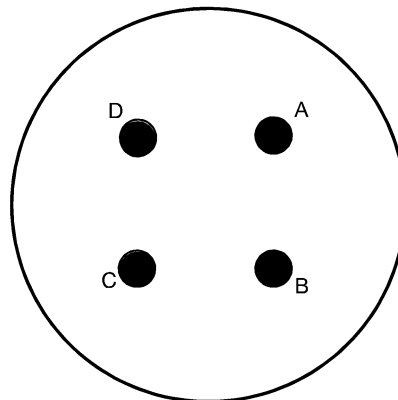
28-() INSERT CONFIGURATIONS
Figure 26

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS



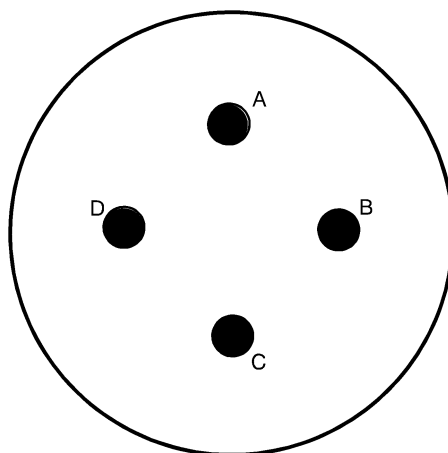
32-7



32-17

32-() INSERT CONFIGURATIONS

Figure 27



36-5

36-() INSERT CONFIGURATIONS

Figure 28

4. CONNECTOR DISASSEMBLY

A. Seal Plug and Seal Rod Removal

**Table 29
NECESSARY TOOLS**

Tool	Type
Pliers	Needle Nose

(1) Make a selection of a pliers from Table 29.

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CAUTION: MAKE SURE THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, remove a plastic tie strap or a wire harness tie that is less than 6 inches from the connector.
- (3) Hold the end of the seal plug or the seal rod tightly in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod from the contact cavity.

B. Contact Removal

**Table 30
CONTACT REMOVAL TOOLS**

Contact Engaging End Size	Removal Tool
16	294-219
	CET-FRF-16-22A
	M81969/19-01
	MS90456-1
12	294-230
	CET-FRF-12
	M81969/19-02
	MS90456-2
8	294-240
	DRK559
	CET-FRF-8
	M81969/19-03
	MS90456-3
4	294-239
	CET-FRF-4
	M81969/19-04
	MS90456-4
1/0	294-241
	CET-FRF-0
	M81969/19-05
	MS90456-5

- (1) Make a selection of a contact removal tool from Table 30.
- (2) If it is necessary, remove the backshell components from the connector.
- (3) Push the backshell components rearward away from the connector.
- (4) At the front face of the connector, axially align the tool and the contact cavity.

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Make sure that the plunger of the removal tool is fully retracted.

- (5) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT USE MORE FORCE THAN THE FORCE THAT IS NECESSARY TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Push the plunger of the tool until the contact starts to come out of the contact cavity.
- (7) Carefully pull the tool out from the contact cavity.

Make sure that the removal tool stays axially aligned with the contact cavity.

- (8) Pull the contact out of the contact cavity from the rear of the connector.

5. CONNECTOR ASSEMBLY

A. Wire Preparation

For the preparation of:

- Champlain 24-00033 and Champlain 24-00034 wire, refer to Paragraph 5.B.
- Rockbestos or Cerro H22-4000 wire, refer to Paragraph 5.C.

**Table 31
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	16	0.50	±0.03	Fold the conductor back on itself
22	16	0.50	±0.03	Fold the conductor back on itself
20	16	0.25	±0.03	-
	12	0.50	±0.03	Fold the conductor back on itself
	8	0.50	±0.03	Increase the size of the conductor
18	16	0.25	±0.03	-
	12	0.50	±0.03	Fold the conductor back on itself
	8	0.50	±0.03	Increase the size of the conductor
16	16	0.25	±0.03	-
	12	0.25	±0.03	-
	8	0.50	±0.03	Increase the size of the conductor
15	12	0.25	±0.03	-
14	12	0.25	±0.03	-
	8	0.50	±0.03	Increase the size of the conductor
13	12	0.25	±0.03	-
12	12	0.25	±0.03	-
	8	0.50	±0.03	Increase the size of the conductor

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

Table 31 (continued)

Wire Size (AWG)	Contact Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
10	8	0.50	±0.03	Increase the size of the conductor
	4	0.50	±0.03	Increase the size of the conductor
8	8	0.50	±0.03	-
	4	0.50	±0.03	Increase the size of the conductor
6	4	0.50	±0.03	Increase the size of the conductor
4	4	0.50	±0.03	-
	2	0.62	±0.03	Increase the size of the conductor
	1/0	0.62	±0.03	Increase the size of the conductor
2	2	0.62	±0.03	-
	1/0	0.62	±0.03	Increase the size of the conductor
1/0	1/0	0.62	±0.03	-

Table 32

CONTACT ADAPTER SLEEVES AND FILLER WIRE

Wire Size (AWG)	Contact Crimp Barrel Size	Adapter Sleeve	Filler Wire	
			Size (AWG)	Quantity
20	8	252-1231-000	10	1
		252-1231-001	10	1
18	8	252-1231-000	10	1
		252-1231-001	10	1
16	8	252-1231-000	10	1
		252-1231-001	10	1
		-	12	2
14	8	252-1231-000	12	1
		252-1231-001	12	1
		-	12	2
12	8	252-0146-000	-	0
		252-0146-001	-	0
		252-1231-000	14	1
		252-1231-001	14	1
		-	10	1

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

Table 32 (continued)

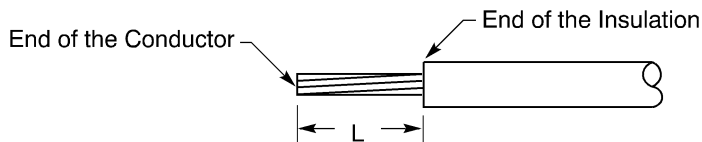
Wire Size (AWG)	Contact Crimp Barrel Size	Adapter Sleeve	Filler Wire	
			Size (AWG)	Quantity
10	8	252-1231-000	-	0
		252-1231-001	-	0
	4	252-0128-000	12	1
		252-0128-001	12	1
8	4	252-0128-000	-	0
		252-0128-001	-	0
6	4	252-0127-000	-	0
		252-0127-001	-	0
		252-0318-000	-	0
		252-0318-001	-	0
4	1/0	252-0130-000	-	0
		252-0130-001	-	0
	2	252-8006-500	-	0
2	1/0	252-1230-000	-	0
		252-1230-001	-	0

CAUTION: KEEP THE SILVER PLATED ADAPTER SLEEVES IN THEIR INITIAL CONTAINER UNTIL THEY ARE USED. THIS HELPS PREVENT TARNISH.

- (1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 29
- Table 31
- Subject 20-00-15 for the insulation removal procedure.

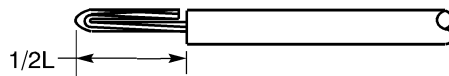


INSULATION REMOVAL
Figure 29

- (2) If it is specified, fold the conductor back on itself. Refer to Figure 30.

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS



FOLDED BACK CONDUCTOR

Figure 30

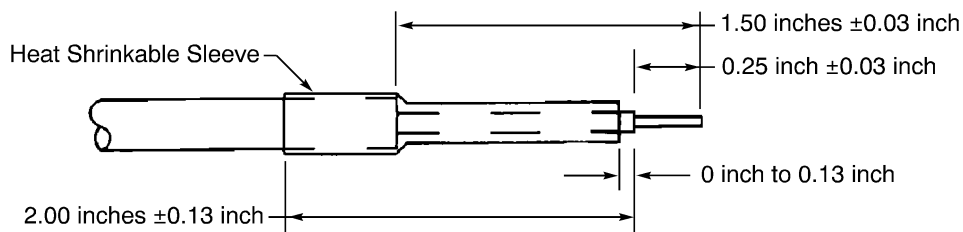
- (3) If it is specified to increase the size of the conductor, make a selection of:
 - An adapter sleeve, or a filler wire, or an adapter sleeve and a filler wire, from Table 32 if the contact is to be crimped with a hex type crimp tool
 - A filler wire from Table 32 if the contact part number is BACC47FW(), or if the contact is to be crimped with a pneumatic indenter crimp tool.
- (4) If a filler wire is specified, prepare the filler wire.
 - (a) Find the insulation removal length for the specified contact. Refer to the Table 31.
 - (b) Remove the necessary length of the insulation from the end of the filler wire.
 Refer to:
 - Figure 29
 - Subject 20-00-15 for the insulation removal procedure.
- (5) Measure the O.D. of the wire.
- (6) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.A.

B. Preparation of Champlain 24-00033 and Champlain 24-00034 Wire

**Table 33
NECESSARY MATERIALS**

Material	Part Number	Description	Supplier
Sleeve, Heat Shrinkable	TFE 4X	3/16 inch diameter	Chemplast
			Zeus Industrial Products

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.



CHAMPLAIN 24-00033 AND CHAMPLAIN 24-00034 WIRE PREPARATION

Figure 31

Refer to Figure 31.

- (1) Make a selection of a heat shrinkable sleeve from Table 33.
- (2) Remove 1.50 inch ±0.03 inch of the outer jacket from the end of the wire. Refer to Subject 20-00-15.
- (3) Remove 1.50 inch ±0.03 inch of the layer of braid from the end of the wire. Refer to Subject 20-00-15.

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

CAUTION: DO NOT CAUSE DAMAGE TO THE RUBBER INSULATION LAYER. DAMAGE TO THE RUBBER INSULATION LAYER CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (4) Remove 0.25 inch \pm 0.03 inch of the rubber insulation layer from the end of the wire. Refer to Subject 20-00-15.
- (5) Remove 0.25 inch \pm 0.03 inch of the inner tape wrap from the end of the wire. Refer to Subject 20-00-15.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (6) Put a 2.0 inch \pm 0.13 inch length of heat shrinkable sleeve on the wire.
- (7) Align the forward end of the sleeve and the end of the inner rubber layer.

Make sure that:

- The forward end of the sleeve does not extend farther than the end of the rubber insulation layer
- The distance from the forward end of the sleeve to the end of the rubber insulation layer is not more than 0.13 inch.

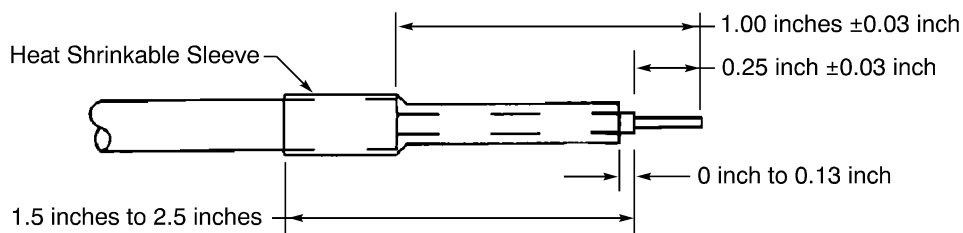
- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Preparation of Rockbestos or Cerro H22-4000 Wire

**Table 34
NECESSARY MATERIALS**

Material	Part Number	Description	Supplier
Sleeve, Heat Shrinkable	TFE 4X	1/4 inch diameter	Chemplast
			Zeus Industrial Products

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.



**ROCKBESTOS OR CERRO H22-4000 WIRE PREPARATION
Figure 32**

Refer to Figure 32.

- (1) Make a selection of a heat shrinkable sleeve from Table 34.
- (2) Remove 1.00 inch \pm 0.03 inch of the outer braid from the end of the wire. Refer to Subject 20-00-15.
- (3) Remove 1.00 inch \pm 0.03 inch of the clear inner wrap from the end of the wire. Refer to Subject 20-00-15.

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

CAUTION: DO NOT CAUSE DAMAGE TO THE INNER INSULATION LAYER. DAMAGE TO THE INNER LAYER CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (4) Remove 0.25 inch \pm 0.03 inch of the inner insulation from the end of the wire. Refer to Subject 20-00-15.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (5) Put a 1.5 inch to 2.5 inch length of heat shrinkable sleeve on the wire.
- (6) Align the forward end of the sleeve and the end of the inner insulation.

Make sure that:

- The forward end of the sleeve does not extend farther than the end of the inner insulation
- The distance from the forward end of the sleeve to the end of the inner insulation is not more than 0.13 inch.

- (7) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Preparation of AWG 2 and AWG 4 Wire for Assembly of a Size 1/0 Engaging End Contact

**Table 35
TYPES OF INSULATION MATERIAL FOR SPECIFIED WIRES**

Wire		Insulation Material			
Type	Size (AWG)	Type	Part Number	Description	Supplier
BMS 13-31	2	Sleeve	8443-2	Cold Shrinkable	3M
BMS 13-58	2	Sleeve	8443-2	Cold Shrinkable	3M
BMS 13-58	4	Sleeve	8443-6.5	Cold Shrinkable	3M
		Tape	Scotch 70	1.0 inch width	3M
BMS 13-60	4	Sleeve	8443-6.5	Cold Shrinkable	3M
		Tape	Scotch 70	1.0 inch width	3M

- (1) Make a selection of an insulation material from Table 35.
For a connector with a Glenair 6652 backshell, make sure that the length of the build-up sleeve is 3.0 inches \pm 0.25 inch.
- (2) To increase the O.D. of the wire with cold shrinkable sleeve:
 - (a) Put the sleeve on the wire.
Make sure that the distance from the end of the sleeve to the end of the wire insulation is 0.06 inch maximum.
 - (b) Hold the sleeve in its position with one hand.
 - (c) Pull the core out of the sleeve with the other hand.
- (3) To increase the O.D. of the wire with tape, wind 3.5 to 4 layers of tape around the wire.

Make sure that:

- The distance from the forward edge of the tape to the end of the contact crimp barrel is 0.75 inch \pm 0.10 inch
- Each layer of tape has a 100 percent overlap.

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E. Contact Assembly

**Table 36
INDENTER TYPE CRIMP TOOLS FOR SIZE 16 AND SIZE 12 CONTACTS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
24	16	294-126	-	-	-	
		M22520/1-01	4	M22520/1-02	Blue	
		MS3191-1		MS3191-16A	Blue	
		ST2220-1-Y		ST2220-1-2	-	
		WA27F		M22520/1-02	Blue	
22	16	294-126	-	-	-	
		M22520/1-01	5	M22520/1-02	Blue	
		MS3191-1		MS3191-16A	Blue	
		ST2220-1-Y		ST2220-1-2	-	
		WA27F		M22520/1-02	Blue	
20	16	294-126	-	-	-	
		M22520/1-01	4	M22520/1-02	Blue	
		MS3191-1		MS3191-16A	Blue	
		ST2220-1-Y		ST2220-1-2	-	
	WA27F	M22520/1-02		Blue		
	12	12	294-126	-	-	-
			M22520/1-01	6	M22520/1-02	Yellow
			MS3191-1		MS3191-12A	Yellow
			ST2220-1-Y		ST2220-1-3	-
18	16	294-126	-	-	-	
		M22520/1-01	5	M22520/1-02	Blue	
		MS3191-1		MS3191-16A	Blue	
		ST2220-1-Y		ST2220-1-2	-	
	WA27F	M22520/1-02		Blue		
	12	12	294-126	-	-	-
			M22520/1-01	7	M22520/1-02	Yellow
			MS3191-1		MS3191-12A	Yellow
			ST2220-1-Y		ST2220-1-3	-

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

Table 36 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
16	16	294-126	-	-	-	
		M22520/1-01	6	M22520/1-02	Blue	
		MS3191-1		MS3191-16A	Blue	
		ST2220-1-Y		ST2220-1-2	-	
		WA27F		M22520/1-02	Blue	
	12	12	294-126	-	-	-
			M22520/1-01	6	M22520/1-02	Yellow
			MS3191-1		MS3191-12A	Yellow
ST2220-1-Y			ST2220-1-3		-	
14	12	294-126	-	-	-	
		M22520/1-01	7	M22520/1-02	Yellow	
		MS3191-1		MS3191-12A	Yellow	
		ST2220-1-Y		ST2220-1-3	-	
12	12	294-126	-	-	-	
		M22520/1-01	8	M22520/1-02	Yellow	
		MS3191-1		MS3191-12A	Yellow	
		ST2220-1-Y		ST2220-1-3	-	

Table 37

HEX TYPE CRIMP TOOLS FOR SIZE 0808, 0404, AND 1/0-1/0 CONTACTS

Wire Size (AWG)	Contact Size		Contact Size	Crimp Tool		
	Engaging End	Crimp Barrel		Basic Unit	Die Set	
					Primary	Secondary
16	8	8	0808	13642	ST2354-5	11732
14	8	8	0808	13642	ST2354-5	11732
12	8	8	0808	13642	ST2354-5	11732
				Y29BH	ST2354B-5	-

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Table 37 (continued)

Wire Size (AWG)	Contact Size		Contact Size	Crimp Tool				
	Engaging End	Crimp Barrel		Basic Unit	Die Set			
					Primary	Secondary		
10	8	8	0808	13642	ST2354-5	11732		
				Y29BH	ST2354B-5	-		
	4	8	0408	13642	ST2354-5	11732		
				4	0404	13642	ST2354-5	11732
8	8	8	0808	13642	ST2354-5	11732		
				TBHD1	ST2354-5	11732		
				Y29BH	ST2354B-5	-		
	4	8	0408	13642	ST2354-5	11732		
				4	0404	13642	ST2354-2	11734
				TBHD1	ST2354-2	11734		
Y29BH	ST2354B-2	-						
6	4	4	0404	13642	ST2354-2	11734		
				TBHD1	ST2354-2	11734		
				Y29BH	ST2354B-2	-		
4	4	4	0404	13642	ST2354-2	11734		
				TBHD1	ST2354-2	11734		
				Y29BH	ST2354B-2	-		
	1/0	2	1/0-02	13642	ST2354-1	-		
				1/0	1/0-1/0	13642	11738	11737
				TBHD1	11738	11737		
2	1/0	2	1/0-02	13642	ST2354-1	-		
				1/0	1/0-1/0	13642	11738	11737
				TBHD1	11738	11737		
1/0	1/0	1/0	1/0-1/0	13642	11738	11737		
				13642	ST2354AB-1	ST2354AB-1		

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**Table 38
PNEUMATIC INDENTER CRIMP TOOLS FOR BACC47FW3 CONTACTS**

Wire Size (AWG)	Contact Size	Crimp Tool			
		Type	Basic Unit	Die	Locator
12	0808	Pneumatic Indenter	400B	414DA-8N	4046A
			400BHD	414DA-8N	4046A
8	0808	Pneumatic Indenter	400B	414DA-8N	4046A
			400BHD	414DA-8N	4046A

NOTE: A pneumatic indenter crimp tool cannot be used to assemble a size 0808 or larger contact that has an adapter sleeve in the crimp barrel.

**Table 39
PNEUMATIC INDENTER CRIMP TOOLS FOR SIZE 0808, SIZE 0404, AND SIZE 1/0-1/0 CONTACTS**

Wire Size (AWG)	Contact Size		Contact Size	Crimp Tool		
	Engaging End	Crimp Barrel		Basic Unit	Die	Locator
16	8	8	0808	400B	414DA-8N	4046A
				400-B-1	414DA-8N	4046A
14	8	8	0808	400B	414DA-8N	4046A
				400-B-1	414DA-8N	4046A
12	8	8	0808	400B	414DA-8N	4046A
				400-B-1	414DA-8N	4046A
10	8	8	0808	400B	414DA-8N	4046A
				400-B-1	414DA-8N	4046A
				M22520/23-01	WA23-09	WA23-02
				WA23	WA23-09	WA23-02
	4	8	0408	400B	414DA-8N	4112
				M22520/23-01	WA23-09	WA23-02
				WA23	WA23-09	WA23-02
	4	0404	400B	414DA-4N	4112	

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Table 39 (continued)

Wire Size (AWG)	Contact Size		Contact Size	Crimp Tool		
	Engaging End	Crimp Barrel		Basic Unit	Die	Locator
8	8	8	0808	400B	414DA-8N	4046A
				400-B-1	414DA-8N	4046A
				M22520/23-01	WA23-02	WA23-09
				M22520/23-01	M22520/23-02	M22520/23-09
				WA23	WA23-02	WA23-09
	4	8	0408	400B	414DA-8N	4112
				M22520/23-01	WA23-02	WA23-09
				WA23	WA23-02	WA23-09
		4	0404	400B	414DA-4N	4112
				400-B-1	414DA-4N	4112
6	4	4	0404	400B	414DA-4N	4112
				400-B-1	414DA-4N	4112
4	4	4	0404	400B	414DA-4N	4112
				400-B-1	414DA-4N	4112
				M22520/23-01	M22520/23-04	M22520/23-11
	1/0	1/0	1/0-1/0	400B	414DA-ON	4066
				400-B-1	414DA-ON	4066
2	1/0	1/0	1/0-1/0	400-B-1	414DA-ON	4066
1/0	1/0	1/0	1/0-1/0	400B	414DA-ON	4066
				400-B-1	414DA-ON	4066
				M22520/23-01	M22520/23-05	M22520/23-13

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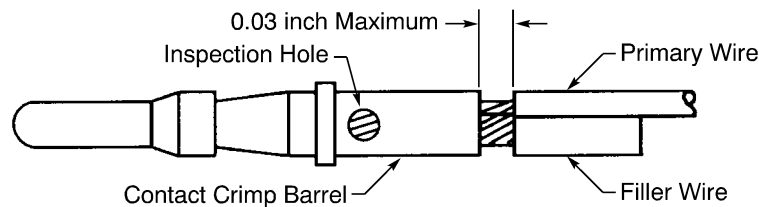
- (1) Select one 10 AWG filler wire to increase the size of the conductor for these contact assemblies:
 - A BACC47FW3 contact and a 12 AWG wire
 - A size 0808 contact and a 12 AWG wire.
- (2) Make a selection of a crimp tool from:
 - Table 36 for size 16 and 12 contacts
 - Table 37 for size 0404, 0808, and 1/0-1/0 contacts that have an adapter sleeve, or, do not have an adapter sleeve
 - Table 38 for BACC47FW3 and size 0808 contacts that do not have an adapter sleeve
 - Table 39 for size 0404, 0808, and 1/0-1/0 contacts that do not have an adapter sleeve.
- (3) For the assembly of a contact with an adapter sleeve only, put the adapter sleeve in the crimp barrel of the contact.

NOTE: A pneumatic indenter crimp tool cannot be used to assemble a size 8 or larger contact that has an adapter sleeve in the crimp barrel.

- (4) For the assembly of a contact with a filler wire only, put the filler wire in the crimp barrel of the contact.
- (5) For the assembly of a contact with an adapter sleeve and filler wire:
 - (a) Put the adapter sleeve in the crimp barrel of the contact.
 - (b) Put the filler wire in the adapter sleeve.
- (6) Put the conductor in the crimp barrel or in the adapter sleeve in the crimp barrel. Refer to Figure 33.

Make sure that:

- All of the strands of the conductor are in the crimp barrel or in the adapter sleeve
- If a filler wire is specified, all of the strands of the filler wire are in the crimp barrel or in the adapter sleeve
- If an adapter sleeve is not in the crimp barrel, the conductor can be seen in the inspection hole
- If an adapter sleeve is in the crimp barrel, the flange of the adapter sleeve stays against the rear end of the crimp barrel
- The distance from the end of the insulation to the end of the crimp barrel or to the end of the adapter sleeve is not more than 0.03 inch.



CONTACT ASSEMBLY WITH FILLER WIRE

Figure 33

- (7) If the crimp tool is an indenter type crimp tool, crimp the contact.

NOTE: A pneumatic indenter crimp tool cannot be used to assemble a size 8 or larger contact that has an adapter sleeve in the crimp barrel.

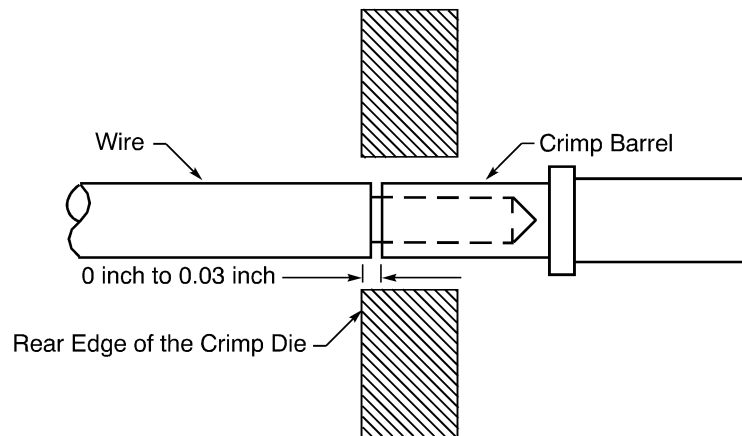
- (8) If the crimp tool is a hex type crimp tool:

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS**

- (a) Put the contact in the primary crimp die. Refer to Figure 34.

Make sure that:

- The distance from the rear end of the crimp barrel to the rear edge of the die is between 0 inch and 0.03 inch
- If the crimp tool is the 13642 basic unit and the ST2354AB-1 die, the contact is put in Cavity 1.



POSITION OF THE CONTACT AND WIRE IN THE CRIMP TOOL DIE
Figure 34

- (b) Crimp the contact with the primary crimp die.
(c) Turn the contact 60 degrees on the longitudinal axis of the contact.
(d) Put the crimp barrel end of the contact in the secondary crimp die. Refer to Figure 34.

Make sure that:

- The distance from the rear end of the crimp barrel to the rear edge of the die is between 0 inch and 0.03 inch
- If the crimp tool is the 13642 basic unit and the ST2354AB-1 die, the contact is put in Cavity 2.

- (e) Crimp the contact with the secondary crimp die.
(f) If the contact crimp barrel has flash, do Step (c) through Step (e) again.

NOTE: Copper that can be seen on the edges of the crimp barrel is permitted.

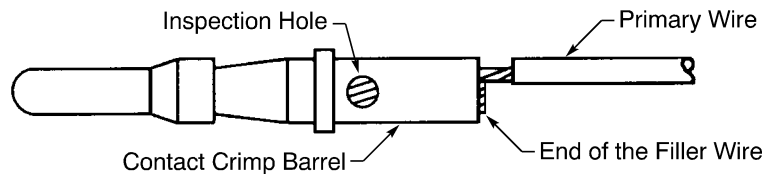
- (9) Examine the contact.

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Make sure that:

- All of the strands of the conductor are in the crimp barrel or in the adapter sleeve
 - If a filler wire is specified, all of the strands of the filler wire are in the crimp barrel or in the adapter sleeve
 - If an adapter sleeve is not in the crimp barrel, the conductor can be seen in the inspection hole
 - If an adapter sleeve is in the crimp barrel, the flange of the adapter sleeve stays against the rear end of the crimp barrel
 - The distance from the end of the insulation to the end of the crimp barrel or to the end of the adapter sleeve is not more than 0.03 inch.
- (10) If the contact has a filler wire, remove the unwanted length of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 35.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE

Figure 35

CAUTION: DO NOT CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

F. Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector. Refer to Paragraph 5.H.

**Table 40
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
1616	ATF 1101
	CIT-16-2
	M81969/17-01
	M81969/17-04
	294-192
1212	ATF 1144
	CIT-12
	M81969/17-02
	M81969/17-05
	294-229

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Table 40 (continued)

Contact Size	Insertion Tool
0808	ATF 1260
	M81969/17-06
	294-237
0408	ATF 1260
	M81969/17-06
	294-237
0404	ATF 1378
	M81969/17-07
	294-236
1/0-1/0	ATF 1558
	M81969/17-08
	294-235

- (1) Make a selection of an insertion tool from Table 40.
- (2) Put the contact assembly in the insertion tool.
Make sure that the end of the tool is against the rear shoulder of the contact.
- (3) Axially align the insertion tool and the contact cavity at the rear of the connector.
- (4) Carefully push the insertion tool and the contact assembly in the contact cavity until it stops.
Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (2) through Step (6) again.

G. Seal of an Empty Contact Cavity

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

If a stub wire is specified, the minimum length of the stub wire is 12.0 inches.

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H. Backshell and Strain Relief Assembly

If the connector and the applicable conditions are not specified in Table 41, refer to Paragraph 6.C. for the standard backshell assembly configuration.

**Table 41
SELECTION OF A SPECIAL BACKSHELL OR STRAIN RELIEF ASSEMBLY PROCEDURE**

Connector	Applicable Conditions			Assembly Procedure
	Insert Configuration	Backshell	Contact Assemblies	
280W0002-2	24-22	BACC10HV24 and Glenair 687-522 Wire Separator	Four AWG 8 or 12 Wires	Paragraph 6.K.
CA66()	28-22	Supplied with the connector	Three AWG 4 Wires	Paragraph 6.D.
		Glenair G6652	AWG 1/0 Wire	Paragraph 6.H.
	36-5	Glenair G63292	All	Paragraph 6.G.
		Supplied with the connector	AWG 2 Wire	Paragraph 6.E.
		None	AWG 2 Wire	Paragraph 7.C.
CA66279-102	28-22	Supplied with the connector	AWG 4 Wire	Paragraph 6.F.
		BACC10KA28 with Sunbank S3972-4 Extension Adapter	All	Paragraph 6.I.
		BACC10KB28 with Sunbank S3972-4 Extension Adapter	All	Paragraph 6.I.
CA66279-102	28-22	BACC10KC28 with Sunbank S3972-4 Extension Adapter	All	Paragraph 6.I.
		ITT Cannon 057-0870-000 supplied with the connector	Three AWG 4 Wires	Paragraph 6.D.
		Glenair G63292	All	Paragraph 6.G.
CA80503-14	22-2	ITT Cannon 057-0870-000 supplied with the connector	Three AWG 4 Wires	Paragraph 6.D.
FCA80()	36-5	Glenair G63292	All	Paragraph 6.G.
FR()	All	Sunbank S1347()	All	Paragraph 6.J.
FV()	All	Sunbank S1347()	All	Paragraph 6.J.
F()340()KE36-5()	36-5	Supplied with the connector	AWG 4 Wire	Paragraph 6.F.
FRF()28-22()	28-22	Supplied with the connector	Three AWG 4 Wires	Paragraph 6.D.

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Table 41 (continued)

Connector	Applicable Conditions			Assembly Procedure
	Insert Configuration	Backshell	Contact Assemblies	
FRF()36-5()	36-5	Glenair G6652	AWG 1/0 Wire	Paragraph 6.H.
		Glenair G63292	All	Paragraph 6.G.
		Supplied with the connector	AWG 2 Wire	Paragraph 6.E.
FRF()E36-5()	36-5	ITT Cannon 057-0873-000 supplied with the connector	AWG 4 Wire	Paragraph 6.F.

(1) Make a selection of a backshell assembly procedure from Table 41.

Use these to make the selection:

- The connector
- The insert configuration
- The backshell
- The contact assemblies.

NOTE: Refer to Table 19 for alternative backshell part numbers.

(2) Assemble the connector and backshell. Refer to the appropriate procedure from Table 41.

6. BACKSHELL ASSEMBLY CONFIGURATIONS

A. Applicable Conditions for Backshell Assembly

Thread lock compound on the threads at the rear of the connector is necessary if all of these conditions occur:

- The backshell does not have a coupling ring
- No shield ground wire terminal lugs must be attached to the cable clamp.

The installation of safety wire on the backshell coupling ring is necessary if one or more of these conditions occur:

- The initial backshell assembly configuration had safety wire on the backshell coupling ring
- The connector is in the engine or APU area and the backshell has a coupling ring that is not self-locking
- The connector is in the engine or APU area and one or more shield ground wire terminal lugs must be attached to the cable clamp.

For the conditions that are applicable for the assembly of the backshell strain relief, refer to Paragraph 7.A.

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B. Backshell Installation Torque

**Table 42
BACKSHELL INSTALLATION TORQUE VALUES**

Connector Shell Size	Torque (inch-pounds)	
	Target	Tolerance
10SL	32.5	± 2.5
12S	37.5	± 2.5
14S	37.5	± 2.5
16	37.5	± 2.5
16S	37.5	± 2.5
18	37.5	± 2.5
20	77.5	± 2.5
22	77.5	± 2.5
24	77.5	± 2.5
28	117.5	± 2.5
32	117.5	± 2.5
36	117.5	± 2.5

C. Standard Backshell Assembly Configuration

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

**Table 43
NECESSARY MATERIALS**

Material	Part Number	Description	Supplier
Thread Lock Compound	222	-	Loctite
	242	-	Loctite

**Table 44
NECESSARY TOOLS**

Tool	Description
Torque	Torque tool with strap wrench

- (1) Put the necessary backshell components on the wire harness.
Make sure that the strain relief end of the backshell is pointed away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to Paragraph 5.F.
- (3) If thread lock compound is necessary, put one or two drops of thread lock compound on the threads at the rear of the connector.

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Refer to:

- Paragraph 6.A. for the applicable conditions that make thread lock compound necessary
- Table 43 for the selection of a thread lock compound.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (4) Engage the threads of the backshell and the connector.
- (5) Torque the backshell. Refer Table 42.
- (6) If safety wire is necessary, install the safety wire on the backshell coupling ring.

Refer to:

- Paragraph 6.A. for the applicable conditions that make the installation of safety wire on the backshell coupling ring necessary
- Subject 20-60-07 for the procedure to install the safety wire.

- (7) Assemble the strain relief. Refer to Paragraph 7.B.

D. Backshell Assembly Configuration for a 28-22 Insert Configuration and Three AWG 4 Wires

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

**Table 45
NECESSARY MATERIALS**

Material	Part Number	Description	Supplier
Tape	P-212HD	1.0 inch width	Permacel
	P-421	1.0 inch width	Permacel
	P-440	1.0 inch width	Permacel
Thread Lock Compound	222	-	Loctite
	242	-	Loctite

**Table 46
NECESSARY LAYERS OF TAPE**

Tape	Number of Layers
P-212HD	8
P-421	8
P-440	14

**Table 47
NECESSARY TOOLS**

Tool	Description
Torque	Torque tool with strap wrench

- (1) Make a selection of a tape from Table 45.

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- (2) Make a selection of a Nylon wire separator for 3 wires from Table 23.

NOTE: Two separators are necessary.

- (3) If a ferrule is necessary and is not supplied with the connector, make a selection of a ferrule from Table 22.

NOTE: A ferrule is necessary for the assembly of these connectors with a Sunbank S1347 backshell:

- A CA66() connector
- A CA80() connector
- An FR() connector
- An FV() connector.

- (4) Put the necessary backshell components on the wire harness.

Make sure that:

- The backshell is put on the wire harness before the ferrule is put on
- The strain relief end of the backshell is pointed away from the end of the wire harness
- The larger end of the ferrule is pointed forward to the end of the wire harness.

- (5) Install the contacts in the connector. Refer to Paragraph 5.F.

- (6) If a ferrule is on the harness, put the ferrule on the rear grommet of the connector.

NOTE: If it is necessary, a small amount of isopropyl alcohol can be put on the grommet to make it easier to put the ferrule on the grommet.

- (7) If thread lock compound is necessary, put one or two drops of thread lock compound on the threads at the rear of the connector.

Refer to:

- Paragraph 6.A. for the applicable conditions that make thread lock compound necessary
- Table 45 for the selection of a thread lock compound.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (8) Engage the threads of the backshell and the connector.

- (9) Torque the backshell. Refer to Table 42.

- (10) If safety wire is necessary, install the safety wire on the backshell coupling ring.

Refer to:

- Paragraph 6.A. for the applicable conditions that make the installation of safety wire on the backshell coupling ring necessary
- Subject 20-60-07 for the procedure to install the safety wire.

- (11) Carefully put tape around the wire separator.

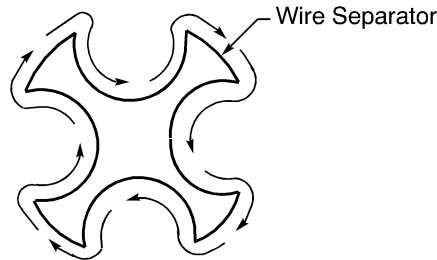
Make sure that the layers of tape follow the shape of the wire separator.

Refer to:

- Table 46 for the necessary layers of tape
- Figure 36.

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CONFIGURATION OF THE TAPE ON THE WIRE SEPARATOR
Figure 36

- (12) Put the wire separator between the wires and against the connector grommet.
- (13) Put the other wire separator between the wires at the location where the saddle bars of the cable clamp must be installed.
- (14) Wrap 2 to 3 layers of the tape around the wire harness and the wire separator at the location where the saddle bars of the cable clamp must be installed.
- (15) Assemble the strain relief. Refer to Paragraph 7.B.

E. Backshell Assembly Configuration for a 36-5 Insert Configuration and AWG 2 Wire

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

Table 48
NECESSARY MATERIALS

Material	Specification or Part Number	Description	Supplier
Rod, Seal	AMS 3656	PTFE, 0.5 inch diameter	A Qualified Source

Table 49
NECESSARY TOOLS

Tool	Description
Torque	Torque tool with strap wrench

- (1) Make a selection of a Teflon wire separator for 4 wires from Table 23.
- (2) Make a selection of a seal rod from Table 48.
- (3) If a ferrule is necessary and is not supplied with the connector, make a selection of a ferrule from Table 22.

NOTE: A ferrule is necessary for the assembly of these connectors with a Sunbank S1347 backshell:

- A CA66() connector
- A CA80() connector
- An FR() connector
- An FV() connector.

- (4) Put the necessary backshell components on the wire harness.

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Make sure that:

- The backshell is put on the wire harness before the ferrule is put on
 - The strain relief end of the backshell is pointed away from the end of the wire harness
 - The larger end of the ferrule is pointed forward to the end of the wire harness.
- (5) Install the contacts in the connector. Refer to Paragraph 5.F.
- (6) Install an unwired contact into each empty contact cavity.
- (7) Install a 2.25 inch \pm 0.10 inch length of seal rod in each contact cavity that has an unwired contact.

Make sure that:

- The forward end of the seal rod is against the rear end of the crimp barrel in the contact cavity
 - The ends of the rod do not have sharp edges.
- (8) If a ferrule is on the harness, put the ferrule on the rear grommet of the connector.
- NOTE:** If it is necessary, a small amount of isopropyl alcohol can be put on the grommet to make it easier to put the ferrule on the grommet.
- (9) If thread lock compound is necessary, put one or two drops of thread lock compound on the threads at the rear of the connector.

Refer to:

- Paragraph 6.A. for the applicable conditions that make thread lock compound necessary
- Table 43 for the selection of a thread lock compound.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (10) Engage the threads of the backshell and the connector.
- (11) Torque the backshell. Refer to Table 42.
- (12) If safety wire is necessary, install the safety wire on the backshell coupling ring.

Refer to:

- Paragraph 6.A. for the applicable conditions that make the installation of safety wire on the backshell coupling ring necessary
 - Subject 20-60-07 for the procedure to install the safety wire.
- (13) Put the wire separator between the wires and the seal rod.

Make sure that:

- The larger end of the wire separator is pointed forward to the connector grommet
 - The smaller end of the wire separator is 0.25 inch maximum farther than the rear end of the cable clamp.
- (14) Assemble the strain relief. Refer to Paragraph 7.B.

F. Backshell Assembly Configuration for a 36-5 Insert Configuration and AWG 4 Wire

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

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ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS

**Table 50
NECESSARY MATERIALS**

Material	Specification or Part Number	Description	Supplier
Rod, Seal	AMS 3656	PTFE, 3/8 inch diameter	A Qualified Source
		PTFE, 1/2 inch diameter	A Qualified Source
Tape	P-421	PTFE, 1.0 inch width	Permacel
	P-440	PTFE, 1.0 inch width	Permacel
Thread Lock Compound	222	-	Loctite
	242	-	Loctite

**Table 51
NECESSARY TOOLS**

Tool	Description
Torque	Torque tool with strap wrench

- (1) Make a selection of:
 - A Teflon wire separator for 4 wires from Table 23
 - A 3/8 inch diameter seal rod from Table 50
 - A 1/2 inch diameter seal rod from Table 50
 - A tape from Table 50
 - Two spacers from Table 26.
- (2) If a ferrule is necessary and is not supplied with the connector, make a selection of a ferrule from Table 22.

NOTE: A ferrule is necessary for the assembly of these connectors with a Sunbank S1347 backshell:

 - A CA66() connector
 - A CA80() connector
 - An FR() connector
 - An FV() connector.
- (3) Put the necessary backshell components on the wire harness.

Make sure that:

 - The backshell is put on the wire harness before the ferrule is put on
 - The strain relief end of the backshell is pointed away from the end of the wire harness
 - The larger end of the ferrule is pointed forward to the end of the wire harness.
- (4) Install the contacts in the connector. Refer to Paragraph 5.F.
- (5) Install an unwired contact into each empty contact cavity.
- (6) Install a 1.0 inch \pm 0.1 inch length of 1/2 inch diameter seal rod in each contact cavity that has an unwired contact.

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Make sure that:

- The forward end of the seal rod is against the rear end of the crimp barrel in the contact cavity
- The ends of the rod do not have sharp edges.

(7) If a ferrule is on the harness, put the ferrule on the rear grommet of the connector.

NOTE: A small amount of isopropyl alcohol can be put on the grommet to make it easier to put the ferrule on the grommet.

(8) Put the wire separator between the wires and seal rod against the connector grommet.

Make sure that the larger end of the wire separator is pointed forward to the connector grommet

(9) Put a 1.0 inch \pm 0.1 inch length of 3/8 inch diameter seal rod in the empty wire position in the wire separator.

Make sure that the ends of the rod do not have sharp edges.

(10) Put the saddle bars on the backshell.

- Make sure that the smaller end of the wire separator is 0.25 inch maximum farther than the rear edge of the saddle bars.

(11) Align the center of the seal rod with the center of the saddle bars.

(12) Remove the saddle bars.

Make sure that the wire separator and the seal rod stay in position.

(13) Wrap the tape around the wires, the seal rod, and the wire separator to increase the diameter of the wire harness.

Make sure that:

- The center of the layers of tape is where the saddle bars must be
- The layers of tape make a 100 percent overlap.

(14) If thread lock compound is necessary, put one or two drops of thread lock compound on the threads at the rear of the connector.

Refer to:

- Paragraph 6.A. for the applicable conditions that make thread lock compound necessary
- Table 50 for the selection of a thread lock compound.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

(15) Engage the threads of the backshell and the connector.

(16) Torque the backshell. Refer to Table 42.

(17) If safety wire is necessary, install the safety wire on the backshell coupling ring.

Refer to:

- Paragraph 6.A. for the applicable conditions that make the installation of safety wire on the backshell coupling ring necessary
- Subject 20-60-07 for the procedure to install the safety wire.

(18) Discard the two lockwashers that are supplied with the backshell.

(19) Put a spacer on each cable clamp screw.

(20) Put the saddle bars in position.

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- (21) Engage the threads of each cable clamp screw and the applicable screw hole.
- (22) Tighten the screws until the ends of the saddle bars are against the legs of the backshell.
- Make sure that:
- The saddle bars do not crush or pinch the wire harness
 - The wire harness is tight in the cable clamp
 - The cable clamp screws are tight.
- (23) If the clamp does not hold the wire harness tightly, increase the diameter of the wire harness with filler material. Refer to Subject 20-60-09.
- If the filler material is a Teflon rod, make sure that the ends of the rod do not have sharp edges.
- (a) Remove the saddle bars.
- (b) Wind 2 or 3 layers tape around the wire harness where the saddle bars must be.
- Make sure that:
- The center of the layers of tape is where the saddle bars must be
 - The layers of tape make a 100 percent overlap.
- (24) Engage the threads of the screws and the holes in the saddle bars again.
- (25) Tighten the screws again.
- Make sure that:
- The saddle bars do not crush or pinch the wire harness
 - The wire harness is tight in the cable clamp
 - The cable clamp screws are tight.
- (26) If the ends of the saddle bars are not against the legs of the backshell or the wire harness is too tight in the clamp:
- (a) Make a selection of a spacer from Table 26.
- NOTE:** Two spacers are necessary.
- Make sure that the spacer is the smallest that can make a tight fit of the wire harness in the cable clamp.
- (b) Remove the cable clamp screws.
- (c) Put one spacer on each screw between the saddle bar and the leg of the backshell.
- (d) Engage the threads of the screws and the holes in the saddle bars again.
- (e) Tighten the screws again.
- Make sure that:
- The saddle bars do not crush or pinch the wire harness
 - The wire harness is tight in the cable clamp
 - The cable clamp screws are tight.
- (27) Do Step (23) or Step (26) again until the fit of the wire harness in the cable clamp is correct and the cable clamp screws are tight.
- (28) If safety wire is necessary, install the safety wire on each cable clamp screw.

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Refer to:

- Paragraph 7.A. for the applicable conditions that make the installation of safety wire on the cable clamp screws necessary
- Subject 20-60-07 for the procedure to install the safety wire.

Make sure that each safety wire goes through the hole in:

- The screw head
- The adjacent leg of the backshell.

G. Backshell Assembly Configuration for a 36-5 Insert Configuration and a Glenair G63292 Backshell

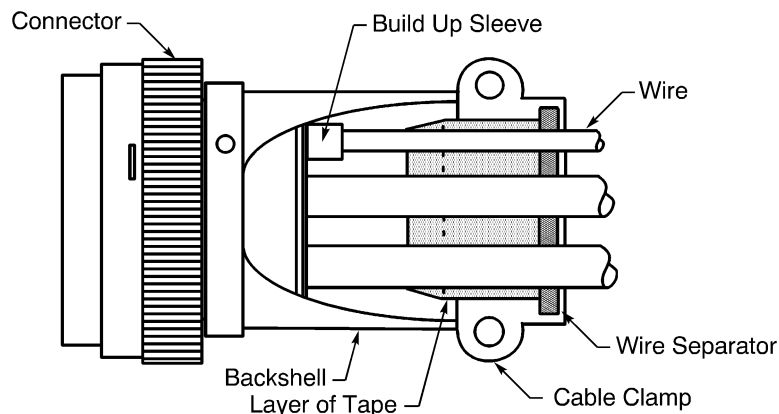
For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

**Table 52
NECESSARY MATERIALS**

Material	Specification or Part Number	Description	Supplier
Tape	Scotch 70	1.25 inches width	3M
Thread Lock Compound	222	-	Locktite
	242	-	Locktite

**Table 53
NECESSARY TOOLS**

Tool	Description
Torque	Torque tool with strap wrench



**BACKSHELL ASSEMBLY
Figure 37**

- (1) Make a selection of:
 - A tape from Table 52
 - A thread lock compound from Table 52.
- (2) Put the necessary backshell components on the wire harness.

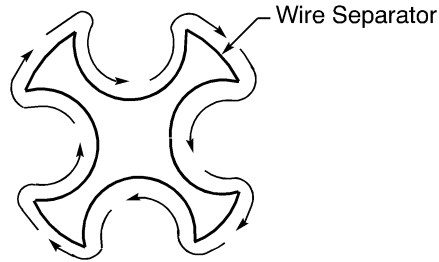
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF MIL-C-5015 FRONT RELEASE CONTACT TYPE CONNECTORS**

Make sure that the strain relief end of the backshell is pointed away from the end of the wire harness.

- (3) Install the contacts in the connector. Refer to Paragraph 5.F.
- (4) Carefully put tape around the wire separator that is supplied with the backshell. Refer to Figure 38.

Make sure that:

- The layer of tape is located on the smaller diameter end of the wire separator
- The layer of tape follows the shape of the wire separator.

**CONFIGURATION OF THE TAPE ON THE WIRE SEPARATOR****Figure 38**

- (5) Put the wire separator between the wires.
Make sure that the larger diameter end of the wire separator is pointed away from the connector.
- (6) Put one or two drops of thread lock compound on the rear threads of the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

- (7) Engage the threads of the backshell and the connector.
- (8) Torque the backshell. Refer to Table 42.
- (9) Put a lockwasher on each cable clamp screw.
- (10) Put the saddle bars in position.
Make sure that the larger end of the wire separator is in the groove inside the end of the cable clamp. Refer to Figure 37.
- (11) Engage the threads of each cable clamp screw and the applicable screw hole.
- (12) Tighten the cable clamp screws.
- (13) If safety wire is necessary, install the safety wire on each cable clamp screw.

Refer to:

- Paragraph 7.A. for the applicable conditions that make the installation of safety wire on the cable clamp screws necessary
- Subject 20-60-07 for the procedure to install the safety wire.

Make sure that each safety wire goes through the hole in:

- The screw head
- The adjacent leg of the backshell.

H. Backshell Assembly Configuration for AWG 1/0 Wire and a Glenair G6652 Backshell

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

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**Table 54
NECESSARY MATERIALS**

Material	Specification or Part Number	Description	Supplier
Rod, Seal	AMS 3656	PTFE, 3/8 inch diameter	A Qualified Source
Tape	P-421	PTFE, 1.0 inch width	Permacel
	P-440	PTFE, 1.0 inch width	Permacel
Thread Lock Compound	222	-	Locktite
	242	-	Locktite

**Table 55
NECESSARY TOOLS**

Tool	Description
Torque	Torque tool with strap wrench

- (1) Make a selection of:
 - A thread lock compound from Table 54
 - A 3/8 inch diameter seal rod from Table 54
 - A tape from Table 54.
 - (2) Put the necessary backshell components on the wire harness.
Make sure that the strain relief end of the backshell is pointed away from the end of the wire harness.
 - (3) Install the contacts in the connector. Refer to Paragraph 5.F.
 - (4) Put the wire separator between the wires.
Make sure that the larger end of the wire separator is pointed forward to the connector.
 - (5) Push the wire separator forward until it is against the grommet.
 - (6) Put a 1.0 inch ± 0.10 inch length of seal rod between all the wires at the center of the rear end of the wire separator.
Make sure that the ends of the rod do not have sharp edges.
 - (7) Push the rod forward until the end is against the center of the rear end of the wire separator.
 - (8) Wrap 8 layers of tape around the wire harness, the wire separator, and the rod.
Make sure that:
 - The center of the layers of tape is aligned with the rear edge of the wire separator
 - The layers of tape make a 100 percent overlap.
 - (9) Put one or two drops of thread lock compound on the threads at the rear of the connector.
- CAUTION:** THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.
- (10) Engage the threads of the backshell and the connector.
 - (11) Torque the backshell. Refer to Table 42.
 - (12) Assemble the strain relief. Refer to Paragraph 7.B.

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I. Backshell Assembly Configuration for a Sunbank S3972-4 Extension Adapter and a BACC10K() Backshell

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

**Table 56
NECESSARY MATERIALS**

Material	Part Number	Description	Supplier
Thread Lock Compound	222	-	Locktite
	242	-	Locktite

**Table 57
NECESSARY TOOLS**

Tool	Description
Torque	Torque tool with strap wrench

- (1) Make a selection of a thread lock compound from Table 56.
- (2) Put the necessary backshell components on the wire harness.
Make sure that:
 - The backshell is put on the wire harness before the extension adapter is put on
 - The strain relief end of the backshell is pointed away from the end of the wire harness
 - The end of the extension adapter with external threads is pointed away from the end of the wire harness.
- (3) Install the contacts in the connector. Refer to Paragraph 5.F.
- (4) Put one drop of thread lock compound on the threads at the rear of the connector on one side of the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.
- (5) Put one drop of thread lock compound on the threads at the rear of the connector on the other side of the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.
- (6) Engage the threads of the adapter and the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.
- (7) Torque the adapter 190 inch-pounds ± 10 inch-pounds.
Make sure that the forward end of the adapter is not against the coupling ring of the connector.
- (8) Engage the threads of the backshell coupling ring and the adapter.
- (9) Torque the backshell coupling ring. Refer to Table 42.
- (10) If safety wire is necessary, install the safety wire on the backshell coupling ring.

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Refer to:

- Paragraph 6.A. for the applicable conditions that make the installation of safety wire on the backshell coupling ring necessary
- Subject 20-60-07 for the procedure to install the safety wire.

(11) Assemble the strain relief. Refer to Paragraph 7.B.

J. Backshell Assembly Configuration for a Sunbank S1347 90 Degree Backshell

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

**Table 58
NECESSARY TOOLS**

Tool	Description
Torque	Torque tool with strap wrench

- (1) If a ferrule is not supplied with the connector, make a selection of a ferrule from Table 22.
- (2) Put the necessary backshell components on the wire harness.

Make sure that:

- The backshell is put on the wire harness before the ferrule is put on
- The strain relief end of the backshell is pointed away from the end of the wire harness
- The larger end of the ferrule is pointed forward to the end of the wire harness.

- (3) Install the contacts in the connector. Refer to Paragraph 5.F.
- (4) Put the ferrule on the rear grommet of the connector.

NOTE: A small amount of isopropyl alcohol can be put on the grommet to make it easier to put the ferrule on the grommet.

- (5) Engage the threads of the backshell coupling ring and the connector.
- (6) Put the backshell in the correct clock position.
- (7) Torque the backshell coupling ring. Refer to Table 42.
- (8) Tighten the three backshell coupling ring set screws.
- (9) If safety wire is necessary, install the safety wire on the backshell coupling ring.

Refer to:

- Paragraph 6.A. for the applicable conditions that make the installation of safety wire on the backshell coupling ring necessary
- Subject 20-60-07 for the procedure to install the safety wire.

(10) Assemble the strain relief. Refer to Paragraph 7.B.

K. Backshell Assembly Configuration for the 280W0002-2 Connector

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

**Table 59
BACKSHELL COMPONENTS**

Part Number	Description	Supplier
687-522	Wire Separator	Glenair
BACC10HV24	Backshell	QPL

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**Table 60
NECESSARY MATERIALS**

Material	Description	Specification or Part Number	Supplier
Tape	0.45 inch ± 0.05 inch wide	A-A-59163	QPL
		Scotch 70	Scotch
	1.0 inch wide	P-421	Permacel
Thread Lock Compound	-	081	Loctite
		242	Loctite
		83	Loctite

**Table 61
NECESSARY TOOLS**

Tool	Supplier
1/4 inch drive torque tool	An available source
3/8 inch drive torque tool	An available source
Strap Wrench	An available source

(1) Make a selection of these components from Table 59:

- A backshell
- A wire separator.

(2) Make a selection of these materials from Table 60:

- A thread lock compound
- A 1.0 inch wide tape
- A 0.45 inch wide tape.

NOTE: An equivalent tape is a satisfactory alternative. Refer to Subject 20-00-11.

(3) Make a selection of these tools from Table 61:

- A strap wrench
- A torque tool from Table 61.

(4) Put the backshell on the wire harness.

Make sure that the strain relief end of the backshell is pointed away from the end of the wire harness.

(5) Install the contacts in the connector. Refer to Paragraph 5.F.

(6) Engage the threads of the backshell coupling ring and the connector.

(7) Wrap 2 to 4 layers of the 1.0 inch wide tape on each AWG 8 wire at the location where the saddle bars of the backshell will be on the wires.

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Make sure that:

- The center of the tape and the center of the saddle bars is aligned
- The layers of tape make a 100 percent overlap.

- (8) Wrap 6 to 8 layers of the 1.0 inch wide tape on each AWG 12 wire at the location where the saddle bars of the backshell will be on the wires.

Make sure that:

- The center of the tape and the center of the saddle bars is aligned
- The layers of tape make a 100 percent overlap.

- (9) Put the wire separator between the wires at the rear of the backshell.

Make sure that:

- Each wire is located in one of the four slots of the wire separator
- The four wires are parallel with each other
- The wires are aligned with the contact cavities in the connector.

- (10) Wind 2 layers of the 0.45 inch wide tape around the outside of the wire separator.

Make sure that:

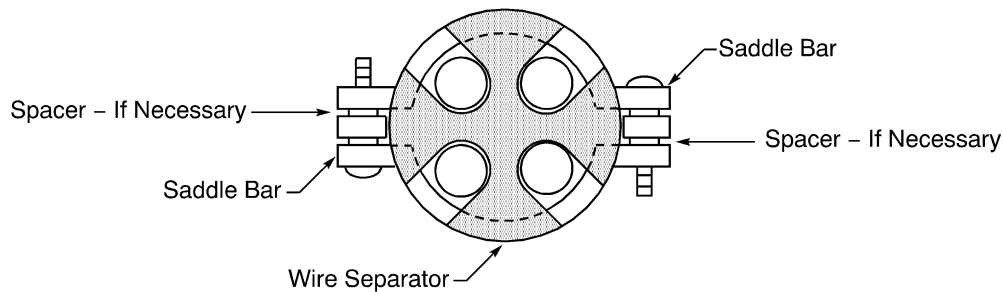
- The layers of tape make a 100 percent overlap.

- (11) Move the wire separator to its position between the saddle bars of the backshell.

Make sure that:

- Each wire is located in one of the four slots of the wire separator
- The wires are aligned with the contact cavities of the connector.

- (12) Align the wire separator and the backshell. Refer to Figure 39.



POSITION OF THE WIRE SEPARATOR

Figure 39

- (13) Tighten the backshell coupling ring to the connector with the hand.

Make sure that the wire separator and the connector stay aligned. Refer to Figure 39.

- (14) Torque the backshell coupling ring to 105 inch-pounds + 5.0 inch pounds, -0.0 inch-pounds.

Make sure that the wire separator and the connector stay aligned. Refer to Figure 39.

- (15) Temporarily tighten the saddle bar screws.

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Make sure that:

- The saddle bars hold the wire separator
- The saddle bars are against the legs of the backshell
- The saddle bar screws are tight.

(16) If the saddle bars are not against the legs of the backshell:

(a) Make a selection of spacers. Refer to Paragraph 2.J.

Make sure that the spacer is the smallest that can make a tight fit of the wire separator in the cable clamp.

(b) Remove the saddle bar screws.

(c) Put one spacer on each screw between the saddle bar and the leg of the backshell. Refer to Figure 39.

(d) Engage the threads of the screws and the holes in the saddle bars again.

(e) Tighten the screws again.

Make sure that:

- The saddle bars hold the wire separator
- The saddle bar screws are tight.

(17) Loosen the cable clamp screws.

(18) Apply one drop of thread lock compound on the screw threads and nut threads of the saddle bar screws.

(19) Tighten the screws again.

7. STRAIN RELIEF ASSEMBLY CONFIGURATIONS

A. Applicable Conditions for Strain Relief Assembly

Safety wire must be installed on each cable clamp screw if one or more of these conditions occur:

- The initial backshell assembly configuration had safety wire on the cable clamp screws
- The connector is in the engine or APU area and one or more shield ground wire terminal lugs must be attached to the cable clamp.

B. Standard Strain Relief Assembly

**Table 62
NECESSARY MATERIALS**

Material	Part Number	Description	Supplier
Tape	P-440	PTFE, 1.0 inch width	Permacel

- (1) Make a selection of a tape from Table 62.
- (2) Align the screw holes of a saddle bar of the cable clamp and the screw holes in the legs of the backshell.
- (3) Make a mark on the wire harness at the center of the saddle bar.
- (4) Put the other saddle bar on the wire harness and the backshell.
- (5) Push the saddle bars of the cable clamp together.
- (6) If the clamp does not hold the wire harness tightly, increase the diameter of the wire harness with filler material. Refer to Subject 20-60-09.

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If the filler material is a Teflon rod, make sure that the ends of the rod do not have sharp edges.

- (a) Remove the saddle bars.
- (b) Wrap 2 or 3 layers tape around the wire harness at the mark on the wire harness.

Make sure that:

- The center of the layers of tape is aligned with the mark on the wire harness
- The layers of tape make a 100 percent overlap.

- (7) Put a lockwasher on each cable clamp screw.
- (8) If the wire harness has shield ground wire terminal lugs that must be attached to the cable clamp screws:
 - (a) Put approximately half of the terminal lugs on one cable clamp screw.
 - (b) Put the remaining terminal lugs on the other cable clamp screw.
- (9) Put the saddle bars in position.
- (10) Engage the threads of each cable clamp screw and the applicable screw hole.
- (11) Tighten the screws until the ends of the saddle bars are against the legs of the backshell.

Make sure that:

- The saddle bars do not crush or pinch the wire harness
- The wire harness is tight in the cable clamp
- The cable clamp screws are tight.

- (12) If the ends of the saddle bars are not against the legs of the backshell or the wire harness is too tight in the clamp:
 - (a) Make a selection of a spacer from Table 26.

NOTE: Two spacers are necessary.

Make sure that the spacer is the smallest that can make a tight fit of the wire harness in the cable clamp.

- (b) Remove the cable clamp screws.
- (c) Put one spacer on each screw between the saddle bar and the leg of the backshell.
- (d) Engage the threads of the screws and the holes in the saddle bars again.
- (e) Tighten the screws again.

Make sure that:

- The saddle bars do not crush or pinch the wire harness
- The wire harness is tight in the cable clamp
- The cable clamp screws are tight.

- (13) If the fit of the wire harness in the cable clamp is not correct, do Step (6) or Step (12) again.
- (14) If safety wire is necessary, install safety wire on each cable clamp screw.

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Refer to:

- Paragraph 7.A. for the applicable conditions that make the installation of safety wire on the cable clamp screws necessary
- Subject 20-60-07 for the procedure to install the safety wire.

Make sure that each safety wire goes through the hole in:

- The screw head
- The adjacent leg of the backshell.

C. Strain Relief Assembly Configuration for a 36-5 Insert Configuration and AWG 2 Wire

For the conditions that are applicable for this procedure, refer to Paragraph 5.H.

**Table 63
NECESSARY MATERIALS**

Material	Specification or Part Number	Description	Supplier
Rod, Seal	AMS 3656	PTFE, 0.5 inch diameter	A Qualified Source

- (1) Make a selection of:
 - A Teflon wire separator for 4 wires from Table 23
 - A seal rod from Table 63.
- (2) Install the contacts in the connector. Refer to Paragraph 5.F.
- (3) Install an unwired contact into each empty contact cavity.
- (4) Install a 2.25 inch \pm 0.10 inch length of seal rod in each contact cavity that has an unwired contact.

Make sure that:

- The forward end of the seal rod is against the rear end of the crimp barrel in the contact cavity
 - The ends of the rod do not have sharp edges.
- (5) Put the wire separator between the wires and the seal rod.
Make sure that the larger end of the wire separator is pointed forward to the connector grommet.
 - (6) Assemble a lacing tape wire harness tie around the wires and seal rod in the groove of the wire separator. Refer to Subject 20-10-11.

Make sure that the tie material is a Temperature Grade D material.

8. CONNECTOR INSTALLATION

A. Selection of a Connector Installation

If the connector is not specified in Table 64, refer to Subject 20-60-06 for the standard connector installation procedure.

**Table 64
SELECTION OF A SPECIAL CONNECTOR INSTALLATION**

Connector	Installation Procedure
CA66279-94	Paragraph 8.B.
CA66279-102	Paragraph 8.B.
CA66279-106	Paragraph 8.B.

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Table 64 (continued)

Connector	Installation Procedure
CA66287-50	Paragraph 8.C.
CA66434-6	Paragraph 8.C.

B. Installation of the ITT Cannon CA66279-() Plug

For the conditions that are applicable for this procedure, refer to Paragraph 8.A.

**Table 65
NECESSARY TOOLS**

Tool	Type	Part Number
Adapter, Coupling Ring	Castellated	MT0011
Drive Extension	-	-
Wrench	Torque	-

- (1) Make a selection of these tools from Table 65:
 - A coupling ring adapter
 - A torque wrench
 - A drive extension.
- (2) Put the coupling ring adapter on the drive extension.
- (3) Align the keyway of the plug and the key of the receptacle.
 Make sure that the wire harness has sufficient slack for the plug:
 - To move forward
 - To make a satisfactory connection with the receptacle
 - To prevent tension on the contact assemblies in the plug.
- (4) Engage the threads of the plug and the receptacle.
- (5) Fully engage the coupling ring adapter with the coupling ring of the plug.
- (6) Torque the coupling ring 200 inch-pounds to 240 inch-pounds.

C. Installation of the ITT Cannon CA66287-50 and the ITT Cannon CA66434-6 Plug

For the conditions that are applicable for this procedure, refer to Paragraph 8.A.

**Table 66
NECESSARY TOOLS**

Tool	Type	Part Number
Drive Extension	-	-
Wrench	Torque	-
Wrench	2-9/16 inch Crowfoot Adapter	47482

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- (1) Make a selection of these tools from Table 66:
 - A crowfoot wrench
 - A torque wrench
 - A drive extension.
- (2) Put the crowfoot wrench on the drive extension.
- (3) Align the keyway of the plug and the key of the receptacle.
 Make sure that the wire harness has sufficient slack for the plug:
 - To move forward
 - To make a satisfactory connection with the receptacle
 - To prevent tension on the contact assemblies in the plug.
- (4) Engage the threads of the plug and the receptacle.
- (5) Engage the flats of the crowfoot wrench with the flats of the coupling nut of the plug.
- (6) Torque the coupling nut 450 inch-pounds to 520 inch-pounds.

9. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 67
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
294-219	Amphenol
294-230	Amphenol
294-239	Amphenol
294-240	Amphenol
294-241	Amphenol
CET-FRF-0	ITT Cannon
CET-FRF-12	ITT Cannon
CET-FRF-16-22A	ITT Cannon
CET-FRF-4	ITT Cannon
CET-FRF-8	ITT Cannon
DRK559	Daniels
M81969/19-01	QPL
M81969/19-02	QPL
M81969/19-03	QPL
M81969/19-04	QPL
M81969/19-05	QPL
MS90456-1	QPL
MS90456-2	QPL

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Table 67 (continued)

Removal Tool	Supplier
MS90456-3	QPL
MS90456-4	QPL
MS90456-5	QPL

B. Crimp Tools

**Table 68
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11732	Thomas & Betts
11734	Thomas & Betts
11737	Thomas & Betts
11738	Thomas & Betts
13642	Thomas & Betts
294-126	Amphenol
400B	Pico
400-B-1	Pico
4046A	Pico
4066	Pico
4112	Pico
414DA-4N	Pico
414DA-8N	Pico
414DA-ON	Pico
M22520/1-01	QPL
M22520/1-02	QPL
M22520/23-01	QPL
M22520/23-02	QPL
M22520/23-04	QPL
M22520/23-05	QPL
M22520/23-09	QPL
M22520/23-11	QPL
M22520/23-13	QPL
MS3191-1	QPL

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Table 68 (continued)

Crimp Tool	Supplier
MS3191-12A	QPL
MS3191-16A	QPL
ST2220-1-2	Boeing
ST2220-1-3	Boeing
ST2220-1-Y	Boeing
ST2354-1	Boeing
ST2354-2	Boeing
ST2354-5	Boeing
ST2354AB-1	Boeing
ST2354B-2	Boeing
TBHD1	Daniels
ST2354B-5	Boeing
WA23	Daniels
WA23-02	Daniels
WA23-09	Daniels
WA27F	Daniels
Y29BH	Burndy

C. Contact Insertion Tools

**Table 69
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
ATF 1101	Astro
ATF 1144	Astro
ATF 1260	Astro
ATF 1378	Astro
ATF 1558	Astro
294-192	Amphenol
294-229	Amphenol
294-235	Amphenol
294-236	Amphenol
294-237	Amphenol



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Table 69 (continued)

Insertion Tool	Supplier
CIT-16-2	ITT Cannon
CIT-12	ITT Cannon
M81969/17-01	QPL
M81969/17-02	QPL
M81969/17-04	QPL
M81969/17-05	QPL
M81969/17-06	QPL
M81969/17-07	QPL
M81969/17-08	QPL

D. Special Tools

Table 70
SPECIAL TOOL SUPPLIERS

Tool	Supplier
MT0011	Daniels
47482	Utica

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ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS

1. PART NUMBERS AND DESCRIPTION

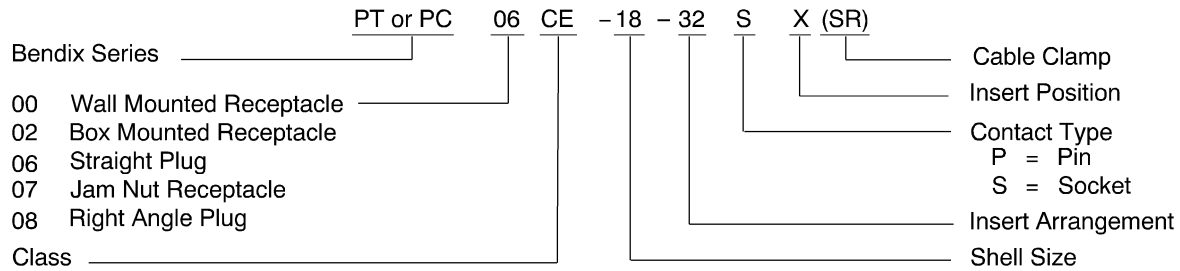
A. Connector Part Numbers

NOTE: The Bendix PT()CE and PC()CE connectors:

- Have front release contacts
- Are similar to MIL-C-26482 Series I connectors.

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
PT()CE	Bendix
PC()CE	Bendix



BENDIX PT()CE AND PC()CE SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 1

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	10-189000-20F	Bendix
		Socket	10-189002-20F	Bendix
20	16	Pin	10-195962-20F	Bendix
		Socket	10-195963-20F	Bendix
16	16	Pin	10-189004-16F	Bendix
		Socket	10-189006-16F	Bendix



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS

2. INSERT CONFIGURATIONS

A. Bendix PC()CE and PT()CE Series Connectors

**Table 3
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact			Service Rating
	Count	Size	Type	
8-2	2	20	Pin	I
8-3	3	20	Pin	I
8-4	4	20	Pin	I
8-33	3	20	Pin	I
10-6	6	20	Pin	I
10-98	6	20	Pin	I
12-3	3	16	Pin	II
12-8	8	20	Pin	I
12-10	10	20	Pin	I
14-5	5	16	Pin	II
14-12	8	20	Pin	I
	4	16	Pin	
14-15	14	20	Pin	I
	1	16	Pin	
14-18	18	20	Pin	I
14-19	19	20	Pin	I
16-8	8	16	Pin	II
16-23	22	20	Pin	I
	1	16	Pin	
16-26	26	20	Pin	I
16A99	21	20	Pin	I
	2	16	Pin	
18-11	11	16	Pin	II
18A28	26	20	Pin	I
	2	16	Pin	
18-30	29	20	Pin	I
	1	16	Pin	
18-32	32	20	Pin	I
20-16	16	16	Pin	II

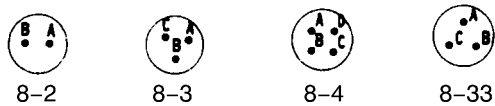
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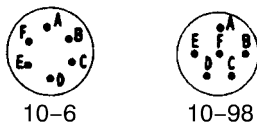
ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS

Table 3 (continued)

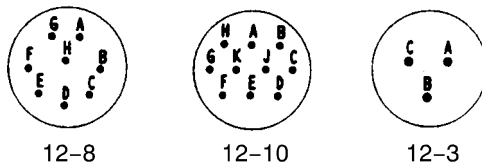
Insert Configuration	Contact			Service Rating
	Count	Size	Type	
20-24	24	20	Pin	I
20-39	37	20	Pin	I
	2	16	Pin	
20-41	41	20	Pin	I
22-21	21	16	Pin	I
22-32	32	30	Pin	I
22-34	34	20	Pin	I
22-36	36	20	Pin	I
22-41	27	20	Pin	I
	14	16	Pin	
22-55	55	20	Pin	I
24A31	31	16	Pin	I
24-61	61	20	Pin	I



SIZE 8 INSERT CONFIGURATIONS
Figure 2



SIZE 10 INSERT CONFIGURATIONS
Figure 3

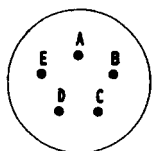


SIZE 12 INSERT CONFIGURATIONS
Figure 4

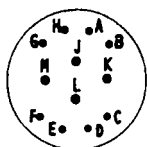
20-61-20

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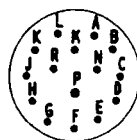
ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS



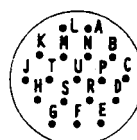
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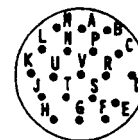
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14-15

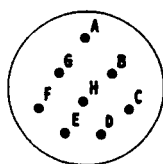


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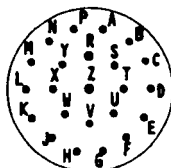


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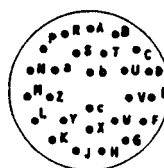
SIZE 14 INSERT CONFIGURATIONS
Figure 5



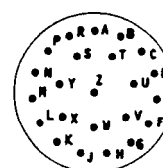
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16-23

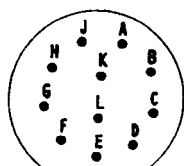


16-26



16A99

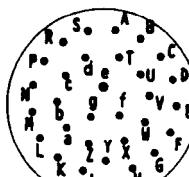
SIZE 16 INSERT CONFIGURATIONS
Figure 6



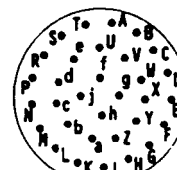
18-11



18A28

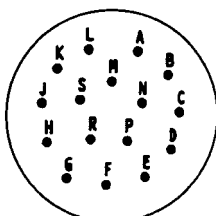


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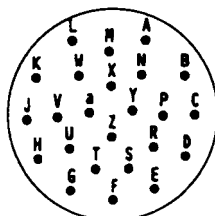


18-32

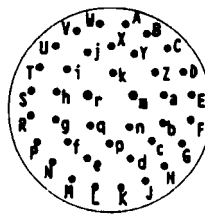
SIZE 18 INSERT CONFIGURATIONS
Figure 7



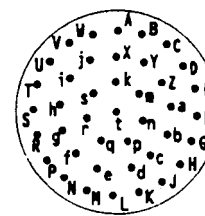
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20-24



20-39

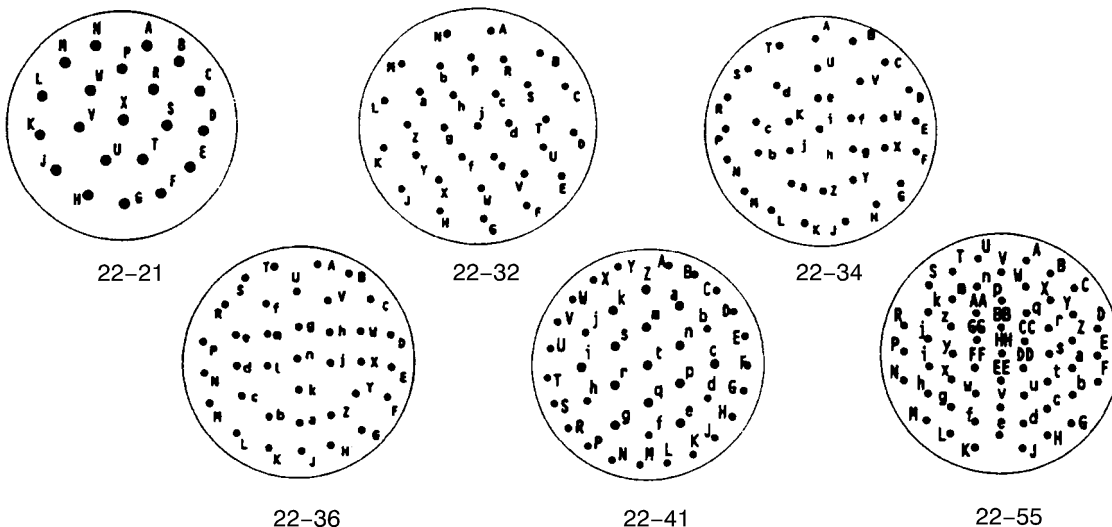


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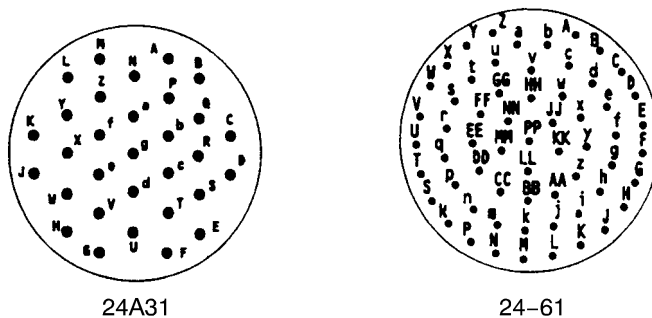
SIZE 20 INSERT CONFIGURATIONS
Figure 8

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS



SIZE 22 INSERT CONFIGURATIONS
Figure 9



SIZE 24 INSERT CONFIGURATIONS
Figure 10

3. CONNECTOR DISASSEMBLY

A. Contact Removal

NOTE: The contact removal tools given in Table 4 are available in the Bendix 11-6900 kit.

Table 4
CONTACT REMOVAL TOOLS

Contact		Removal Tool	
Engaging End Size	Type	Handle	Tip
20	Pin	11-6911	11-6783
	Socket		11-6784

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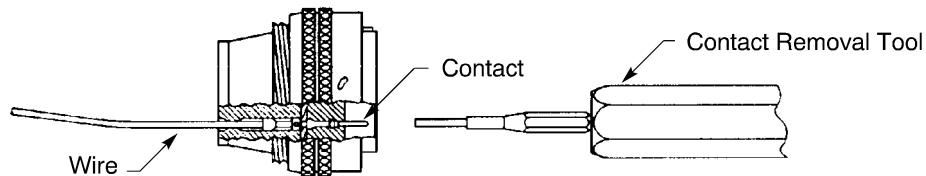
ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS

Table 4 (continued)

Contact		Removal Tool	
Engaging End Size	Type	Handle	Tip
16	Pin	11-6911	11-3697
	Socket		11-3698

- (1) Make a selection of a contact removal tool from Table 4.
- (2) From the front of the connector, axially align the tool with the contact. Refer to Figure 11.

CAUTION: Damage to the connector can occur if The removal tool is not **ALIGNED WITH THE CONTACT** cavity.



ALIGNMENT OF THE REMOVAL TOOL
Figure 11

- (3) Carefully push the tip of the tool straight into the contact cavity until the contact:
 - Is released from the connector
 - Starts to come out of the contact cavity from the rear of the connector.

CAUTION: DO NOT PUSH THE TOOL INTO THE CONTACT CAVITY FROM THE REAR OF THE CONNECTOR. DAMAGE TO THE CONNECTOR OR THE TOOL, OR BOTH CAN OCCUR.

- (4) Carefully pull the removal tool from the contact cavity.
- (5) From the rear of the connector, carefully pull the wired contact out of the contact cavity.

4. CONNECTOR ASSEMBLY

A. Contact Assembly

Table 5
CONTACT CRIMP TOOLS

Wire Size (AWG)	Contact Size		Crimp Tool			
	Engaging End	Crimp Barrel	Basic Unit		Locator	
			Part Number	Setting	Part Number	Color
24	20	20	M22520/1-01	2	TH254	Red
			ST2220-1-Y	-	11-7771-5	-
22	20	20	M22520/1-01	3	TH254	Red
			ST2220-1-Y	-	11-7771-5	-

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ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS

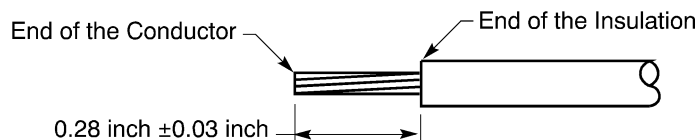
Table 5 (continued)

Wire Size (AWG)	Contact Size		Crimp Tool			
	Engaging End	Crimp Barrel	Basic Unit		Locator	
			Part Number	Setting	Part Number	Color
20	20	20	M22520/1-01	4	TH254	Red
			ST2220-1-Y	-	11-7771-5	-
	16	16	M22520/1-01	4	TH254	Blue
			ST2220-1-Y	-	11-7771-6	-
18	20	16	M22520/1-01	5	TH254	Red
			ST2220-1-Y	-	ST2220-1-1	-
	16	16	M22520/1-01	5	TH254	Blue
			ST2220-1-Y	-	11-7771-6	-
16	20	16	M22520/1-01	6	TH254	Red
			ST2220-1-Y	-	ST2220-1-1	-
	16	16	M22520/1-01	6	TH254	Blue
			ST2220-1-Y	-	11-7771-6	-

NOTE: If the size of the wire is smaller than the size of the crimp barrel of the contact, it is necessary to increase the diameter of the conductor. Refer to Subject 20-60-00.

- (1) Remove the necessary length of insulation from the end of the wire so that the distance from the end of the insulation to the end of the conductor is 0.28 inch ± 0.03 inch.

Refer to Figure 12 and Subject 20-00-15.



WIRE PREPARATION
Figure 12

- (2) Make a selection of a crimp tool from Table 5.
- (3) Put the conductor in the crimp barrel of the contact so that the end of the conductor is against the bottom of the crimp barrel.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole.

- (4) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS

- (5) Examine the wired contact for these types of damage:
 - Any broken strands of the conductor
 - Any strands of the conductor on which the base metal can be seen
 - Any cracks in the crimp barrel of the contact.

B. Contact Insertion

**Table 6
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool
20	11-6782
16	11-6781

- (1) Make a selection of a contact insertion tool from Table 6.
- (2) Put the wired contact in the end of the insertion tool.
- (3) Axially align the contact and the tool with the contact cavity.
- (4) Push the tool straight into the contact cavity until the tool stops.

CAUTION: THE TOOL AND CONTACT MUST BE PUSHED STRAIGHT INTO THE CONTACT CAVITY SO THAT DAMAGE TO THE CONNECTOR DOES NOT OCCUR.

- (5) Carefully remove the tool from the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the wired contact out of the cavity.
 - (b) Do Step (2) through Step (6) again.

C. Installation of Spare Contacts

Refer to Subject 20-60-08.

If it is necessary to install a spare contact in the contact cavities that are not used:

- (1) Make a selection of a contact insertion tool from Table 6.
- (2) Put the contact in the contact cavity.
- (3) Axially align the tool and the contact.
- (4) Push the tool straight into the contact cavity until the tool stops.
- (5) Carefully remove the tool from the contact cavity.

D. Installation of Seal Plugs or Seal Rods

Refer to Subject 20-60-08.

If it is necessary to install a seal plug or a seal rod in the contact cavities that are not used:

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BENDIX PT()CE AND PC()CE SERIES CONNECTORS**

- (1) Make a selection of a seal plug or a seal rod.
- (2) Push the plug or the rod into the contact cavity.

Make sure that the distance from the end of the plug or the rod to the grommet is less than 0.1 inch.

5. APPROVED TOOL SUPPLIERS**A. Contact Removal Tools**

**Table 7
REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
11-3697	Bendix
11-3698	Bendix
11-6783	Bendix
11-6784	Bendix
11-6911	Bendix

B. Contact Crimp Tools

**Table 8
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11-7771-5	Buchanan
11-7771-6	Buchanan
M22520/1-01	QPL
ST2220-1-1	Boeing
ST2220-1-Y	Boeing
TH254	Daniels

C. Contact Insertion Tools

**Table 9
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
11-6781	Bendix
11-6782	Bendix



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY MBG28 SERIES CONNECTORS

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ASSEMBLY OF BURNDY MBG28 SERIES CONNECTORS

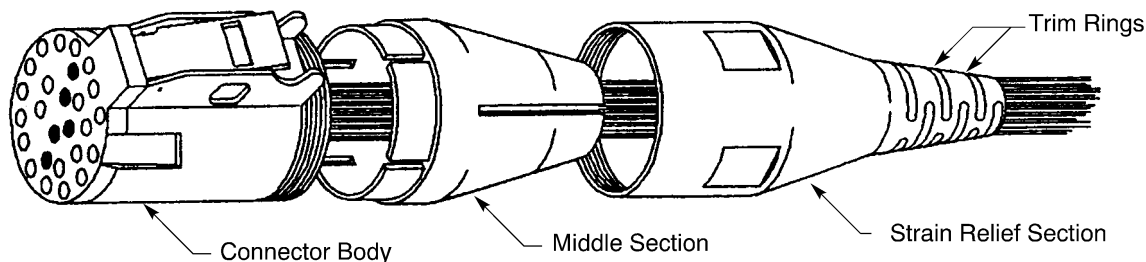
1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
MBG28P	Plug	Burndy
MBG28R	Receptacle	Burndy

B. Connector Description



**BURNDY MBG28R CONNECTOR RECEPTACLE
Figure 1**

C. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Wire Size (AWG)	Contact Type	Contact	
		Part Number	Supplier
20	Socket	RC20M-12F29	Burndy
	Pin	RM20M-12F29	Burndy

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Engaging End Size	Removal Tool
20	RX16-D11
	RX16-D11-D1

(1) Make a selection of a removal tool from Table 3.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY MBG28 SERIES CONNECTORS

- (2) Remove the contacts from the engaging face of the connector.

3. CONNECTOR ASSEMBLY

A. Cable Preparation

Refer to Figure 1.

- (1) Put a 2 inch length of the smallest practical size of heat shrinkable sleeve on the cable.
- (2) Put the strain relief section of the connector on the cable so that the wide aperture of the section is toward the end of the cable.

If the cable diameter is larger than the aperture at the strain relief end of the section, remove the necessary trim rings so that the cable fits through the aperture.

- (3) Put the middle section of the connector on the cable so that the wide aperture of the section is toward the end of the cable.

If the cable diameter is larger than the small aperture at the end of the section, ream the aperture so that the cable fits through the aperture.

CAUTION: DO NOT CUT THE SMALL APERTURE. THE CONNECTOR SECTION WILL BE DAMAGED.

B. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Tool		
	Basic Unit	Die Set	Stop Bushing
20	M10S-1	S-10	SL-40

- (1) Remove 3/16 inch ± 1/32 inch of insulation.
- (2) Make a selection of a crimp tool from Table 4.
- (3) Put the contact and the conductor in the crimp tool.
- (4) Crimp the contact.

C. Contact Insertion

- (1) Push the contact into the contact cavity manually.

NOTE: The use of an insertion tool is not necessary.

- (2) Push the heat shrinkable sleeve over the contact until it touches the connector body.
Make sure that the end of the sleeve is no more that 1/16 inch from the connector body.
- (3) Shrink the sleeve in position. Refer to Subject 20-10-14.

D. Connector Assembly

Refer to Figure 1.

- (1) Push the middle section of the connector into the connector body.
Make sure to align the slots on the section with the slots on the connector.
- (2) Engage the threads of the middle section and the strain relief section.
- (3) Manually tighten the sections.



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ASSEMBLY OF BURNDY MBG28 SERIES CONNECTORS

4. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 5
REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
RX16-D11	Burndy
RX16-D11-D1	Burndy

B. Contact Crimp Tools

**Table 6
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M10S-1	Burndy
S-10	Burndy
SL-40	Burndy

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ASSEMBLY OF DEUTSCH DD SERIES CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

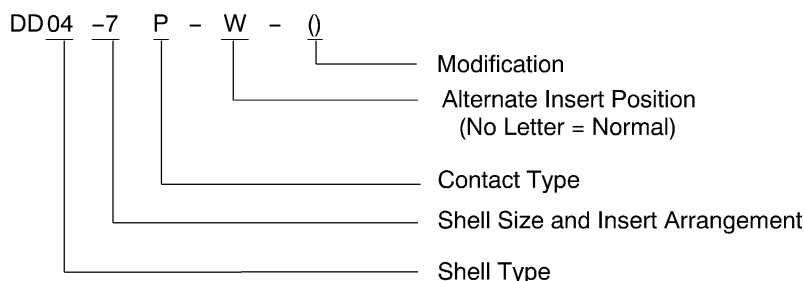
ASSEMBLY OF DEUTSCH DD SERIES CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
DD()-()	Connector	Deutsch



**DEUTSCH DD SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1**

B. Contact Part Numbers

**Table 2
DEUTSCH DD SERIES CONNECTOR CONTACTS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	0004-058-000	Deutsch
		Socket	0007-008-000	Deutsch
16	16	Pin	0004-065-000	Deutsch
		Socket	0007-013-000	Deutsch

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool
20	294-89
	MS24256-R20
	RX 20-24
	ZZL-R-9511-20

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ASSEMBLY OF DEUTSCH DD SERIES CONNECTORS

Table 3 (continued)

Crimp Barrel Size	Removal Tool
16	294-97
	MS24256-R16
	RX 16-7
	ZZL-R-9511-16

- (1) Make a selection of a removal tool from Table 3.
- (2) Remove the contact.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 4
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Target	Tolerance	
24	20	7/16	1/32	Fold the conductor back
	16	1/2	1/32	Fold the conductor back
22	20	3/16	1/32	If the wire insulation is too large to enter the insulation support barrel, remove 1/4 inch minimum to 5/16 inch maximum of insulation
	16	1/2	1/32	Fold the conductor back
20	20	3/16	1/32	If the wire insulation is too large to enter the insulation support barrel, remove 1/4 inch minimum to 5/16 inch maximum of insulation
	16	9/32	1/32	-
18	16	9/32	1/32	-
16	16	9/32	1/32	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH DD SERIES CONNECTORS

**Table 5
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-02	-
		MS3191-1	-	MS3191-20A	Red
	16	M22520/1-01	4	M22520/1-02	Blue
		MS3191-1	-	MS3191-16A	Blue
22	20	M22520/1-01	3	M22520/1-02	Red
		M22520/2-01	6	M22520/2-02	-
		MS3191-1	-	MS3191-20A	Red
	16	M22520/1-01	5	M22520/1-02	Blue
		MS3191-1	-	MS3191-16A	Blue
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-02	-
		MS3191-1	-	MS3191-20A	Red
	16	M22520/1-01	4	M22520/1-02	Blue
		MS3191-1	-	MS3191-16A	Blue
18	16	M22520/1-01	5	M22520/1-02	Blue
		MS3191-1	-	MS3191-16A	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
		MS3191-1	-	MS3191-16A	Blue

- (1) Make a selection of a contact from Table 2.
- (2) Remove the wire insulation.
Refer to Table 4.
- (3) Make a selection of a crimp tool from Table 5.
- (4) Crimp the contact onto the wire.

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ASSEMBLY OF DEUTSCH DD SERIES CONNECTORS

B. Contact Insertion

**Table 6
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
20	294-88
	MS24256-A20
	RTM 20-5
	ZZL-R-9510-20
16	294-97
	MS24256-A16
	RTM 16-2
	ZZL-R-9510-16

NOTE: MS24256 kit includes the MS24256-A20 and MS24256-A16 removal tools.

- (1) Make a selection of an insertion tool from Table 6.
- (2) Insert the contact.

C. Spare Contact or Seal Plug Installation

- (1) Seal all unused contact cavities. Refer to Subject 20-60-08.

4. APPROVED TOOL SUPPLIERS

A. Crimp Tool Suppliers

**Table 7
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
MS3191-1	QPL
MS3191-16A	QPL
MS3191-20A	QPL

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF DEUTSCH DD SERIES CONNECTORS****B. Insertion Tool Suppliers**

Table 8
INSERTION TOOL SUPPLIERS

Tool	Supplier
294-88	Amphenol
294-97	Amphenol
MS24256-A16	QPL
MS24256-A20	QPL
RTM 16-2	Burndy
RTM 20-5	Burndy
ZZL-R-9510-16	Pyle-National
ZZL-R-9510-20	Pyle-National

C. Removal Tool Suppliers

Table 9
REMOVAL TOOL SUPPLIERS

Tool	Supplier
294-89	Amphenol
294-97	Amphenol
MS24256-R16	QPL
MS24256-R20	QPL
RX 16-7	Burndy
RX 20-24	Burndy
ZZL-R-9511-20	Pyle-National
ZZL-R-9511-16	Pyle-National



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ASSEMBLY OF WIRE-PRO 84-() SERIES CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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	A. Connector Part Numbers	1
	B. Contact Part Numbers	1
2.	<u>CONNECTOR DISASSEMBLY</u>	2
	A. Contact Removal - Connector Deviation 115	2
3.	<u>CONNECTOR ASSEMBLY</u>	2
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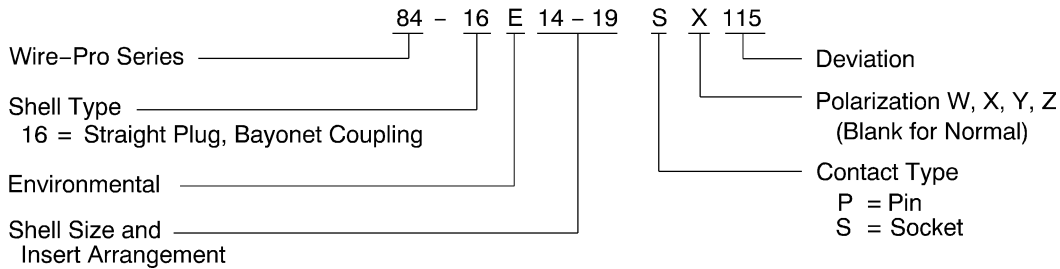
ASSEMBLY OF WIRE-PRO 84-() SERIES CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
84-()	Plug	Wire-Pro



**WIRE-PRO 84-() SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1**

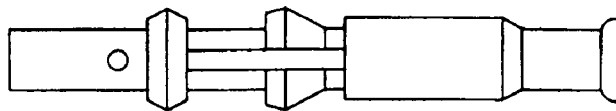
NOTE: Connector deviations 110, 111, 115, and 116 have non-removable grommets.

NOTE: Deviation 109 does not require the removal of the grommet to remove the contacts.

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	84-1477	Wire-Pro
		Socket	84-1478	Wire-Pro
16	16	Pin	84-1674	Wire-Pro
		Socket	84-1675	Wire-Pro



**SIZE 20 84-1478 SCREW MACHINE COLLET TYPE SOCKET CONTACT
Figure 2**

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ASSEMBLY OF WIRE-PRO 84-() SERIES CONNECTORS

2. CONNECTOR DISASSEMBLY

A. Contact Removal - Connector Deviation 115

NOTE: Deviation 109 does not require the removal of the grommet to remove the contacts.

NOTE: Connector deviations 110, 111, 115, and 116 have non-removable grommets.

**Table 3
CONTACT REMOVAL TOOLS**

Contact Engaging End Size	Removal Tool	Special Instructions
20	294-58	0.089 inch maximum Wire O.D.
	ST2220-3-8	-
16	294-48	0.089 inch maximum Wire O.D.
	ST2220-3-9	-

- (1) Remove the cable clamp and the tape (if tape is used) from the wire bundle.
- (2) Loosen the grommet clamp nut.
- (3) Make a selection of a removal tool from Table 3.
- (4) Put the tip of the removal tool on the engaging end of the contact.
- (5) Push the removal into the contact cavity until its stops.
- (6) Push on the removal tool, and at the same time, push on the extraction knob to remove the contact.

NOTE: This operation will also remove seal plugs or seal rods when spare contacts are removed.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 4
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Target	Tolerance	
24	20	7/16	1/32	Fold the conductor back on itself
	16	9/16	1/32	Fold the conductor back on itself
22	20	3/16	1/32	-
	16	9/16	1/32	Fold the conductor back on itself
20	20	3/16	1/32	-
	16	3/16	1/32	-
18	16	17/64	1/32	-

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ASSEMBLY OF WIRE-PRO 84-() SERIES CONNECTORS

**Table 5
CONNECTOR GROMMET WIRE OUTSIDE DIAMETER RANGE**

Contact Cavity	Wire O.D. (inch)	
	Minimum	Maximum
20	0.060	0.090
16	0.064	0.120

**Table 6
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			Special Instructions
		Basic Unit	Locator		
			Part Number	Color	
24	20	11148	71-17019	Red	Remove 7/16 inch ± 1/32 inch of insulation and fold back
		MS3191-1	3360-2	-	
	16	11148	71-17148	Blue	Remove 9/16 inch ± 1/32 inch of insulation and fold back
		MS3191-1	2520-3	-	
22	20	11148	71-17019	Red	-
		MS3191-1	3360-2	-	-
	16	11148	71-17148	Blue	Remove 9/16 inch ± 1/32 inch of insulation and fold back
		MS3191-1	2520-3	-	
20	20	11148	71-17019	Red	-
		MS3191-1	3360-2	-	-
	16	11148	71-17148	Blue	-
		MS3191-1	2520-3	-	-
18	16	11148	71-17148	Blue	-
18	16	MS3191-1	2520-3	-	-

NOTE: The MS3191-1 is a hand tool; the 11148 is a power tool.

- (1) Remove the applicable length of wire insulation. Refer to Table 4.
- (2) Install a heat shrinkable sleeve to all undersized wire to build up the wire O.D.
Refer to Table 5 and Subject 20-10-14.
- (3) For connector Deviation 101, solder the wire in the contact.
Refer to Subject 20-40-00.
- (4) For all connector deviations expect Deviation 101:
 - (a) Select a crimp tool from Table 6.
 - (b) Crimp the contact onto the wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WIRE-PRO 84-() SERIES CONNECTORS

B. Contact Insertion

**Table 7
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool		Special Instructions
	Handle	Bit	
20	294-473-05	294-953	-
	ST2220-2	ST2220-2-6	0.089 inch maximum Wire O.D.
		ST2220-2-8	
16	294-473-05	294-952	-
	ST2220-2	ST2220-2-4	0.089 inch maximum Wire O.D.
		ST2220-2-4A	

**Table 8
AMPHENOL INSERTION TOOL KIT CONTENTS**

Tool Kit	Tool Kit Contents	
	Description	Part Number
294-66	Handle	294-473-05
	Cap	294-472-05
	Nut	294-471-05
	Insertion Bit	294-953
		294-952

- (1) Loosen the grommet nut before contact insertion.
- (2) If the wires are not required in all contacts of the connector, install spare contacts in the unused contact cavities before the wired contacts are inserted.
Refer to Paragraph 3.C.
- (3) Make a selection of an insertion tool from Table 7.
- (4) Place the contact or wired contact in the insertion tool.
- (5) Align the contact and insertion tool perpendicular to the back face of the grommet.

CAUTION: TO PREVENT GROMMET DAMAGE, THE OPEN FACE OF THE INSERTION TOOL TIP MUST FACE OUTWARD WHEN THE CONTACTS ARE INSERTED INTO THE OUTER ROW OF GROMMET HOLES.

- (6) Carefully guide the contact through the grommet hole.
- (7) Push the tool straight in, perpendicular to the grommet surface, until the contact is fully seated.
The insertion is complete when the contact is seated firmly against the stop.
- (8) Keep the tool perpendicular to the grommet surface and carefully withdraw the tool.



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ASSEMBLY OF WIRE-PRO 84-() SERIES CONNECTORS

C. Spare Contact or Seal Plug Installation

Refer to Subject 20-61-00.

4. APPROVED TOOL SUPPLIERS

A. Contact Crimp Tools

Table 9
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
11148	Buchanan
2520-3	Astro
3360-2	Astro
71-17019	Astro
71-17148	Astro
MS3191-1	QPL

B. Contact Removal Tools

Table 10
REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
294-48	Amphenol
294-58	Amphenol
ST2220-3-8	Boeing
ST2220-3-9	Boeing

C. Contact Insertion Tools

Table 11
INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
294-66	Amphenol
294-952	Amphenol
294-953	Amphenol
294-473-05	Amphenol
ST2220-2	Boeing
ST2220-2-4	Boeing
ST2220-2-4A	Boeing

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ASSEMBLY OF WIRE-PRO 84-() SERIES CONNECTORS

Table 11 (continued)

Insertion Tool	Supplier
ST2220-2-6	Boeing
ST2220-2-8	Boeing

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STANDARD WIRING PRACTICES MANUAL

VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS

This subject gives these procedures for the Viking Electronics AMC() series circular connectors:

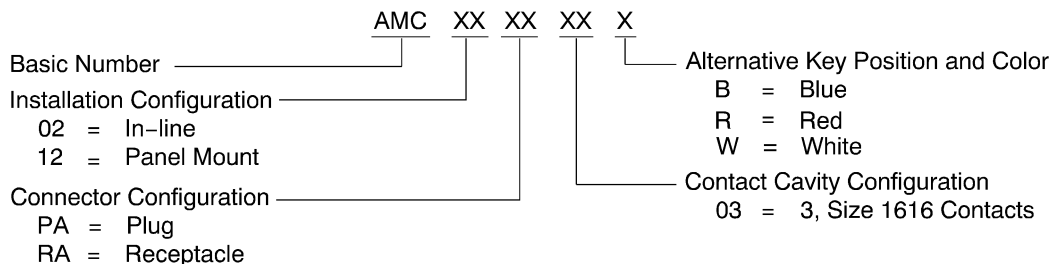
- Disassembly
- Assembly
- Installation.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
AMC02PA03B	Plug	Viking Electronics
AMC02PA03R	Plug	Viking Electronics
AMC02PA03W	Plug	Viking Electronics
AMC02RA03B	Receptacle	Viking Electronics
AMC02RA03R	Receptacle	Viking Electronics
AMC02RA03W	Receptacle	Viking Electronics
AMC12RA03B	Receptacle	Viking Electronics
AMC12RA03R	Receptacle	Viking Electronics
AMC12RA03W	Receptacle	Viking Electronics



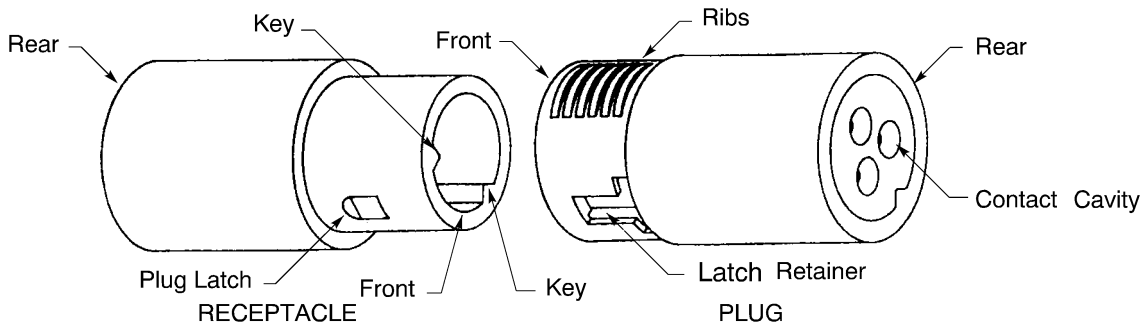
**VIKING ELECTRONICS AMC() SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1**

The Viking Electronics AMC() circular connector has these technical features:

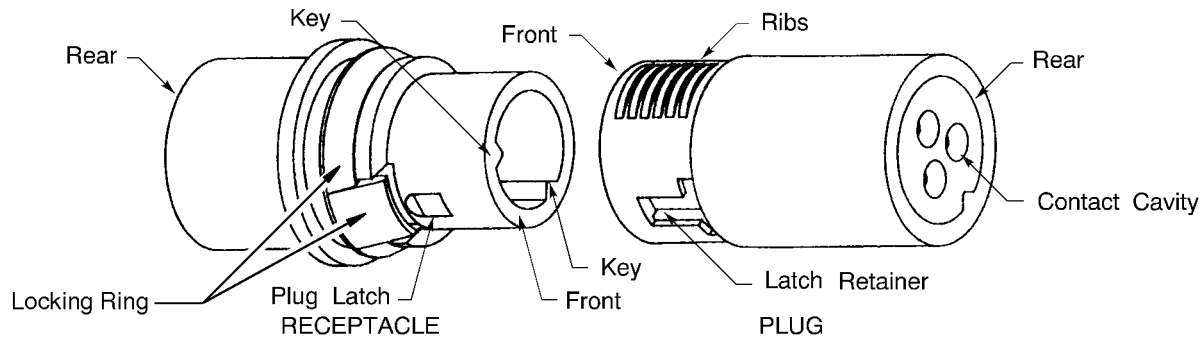
- It has a circular configuration
- The connector shell is plastic
- It is an in-line receptacle or a single hole panel mount receptacle
- It is a quick disconnect latch configuration
- It has one contact size
- The contacts are front release, rear removable
- The connector has a color code that shows the alternate key position.

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IN-LINE CONFIGURATION OF THE AMC() SERIES CONNECTOR
Figure 2



PANEL MOUNT CONFIGURATION OF THE AMC() SERIES CONNECTOR
Figure 3

B. Contact Part Numbers

Table 2
CONTACT PART NUMBERS

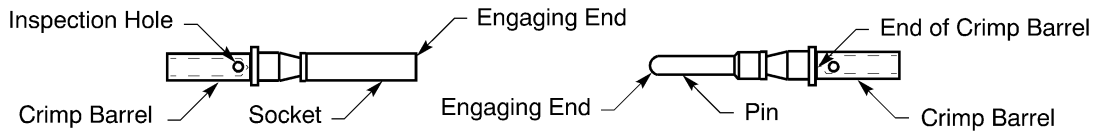
Contact Size		Contact Type	Boeing Standard	Color Band	Finish
Engaging End	Crimp Barrel				
16	16	Pin	BACC47CN2	Blue	Rhodium
			BACC47CN2A	Blue	Gold
			BACC47CN2S	Blue	Localized Gold
		Socket	BACC47CP2A	Blue	Gold
			BACC47CP2S	Blue	Localized Gold
			BACC47CP2T	Blue	Rhodium

The contacts have these technical features:

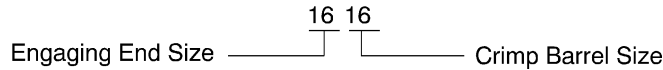
- Crimp type
- Front release.

STANDARD WIRING PRACTICES MANUAL

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STANDARD SIZE 1616 PIN AND SOCKET CONTACTS
Figure 4



CONTACT SIZE STRUCTURE
Figure 5

C. Necessary Parts

Table 3
NECESSARY PARTS AND MATERIALS FOR CONNECTOR ASSEMBLY

Material	Specification	Part Number	Supplier	Note
Filler	Y6051C	-	ITT Cannon	-
Seal Plug	-	MS27488-16	QPL	Blue
Seal Rod	AMS3656	-	QPL	-

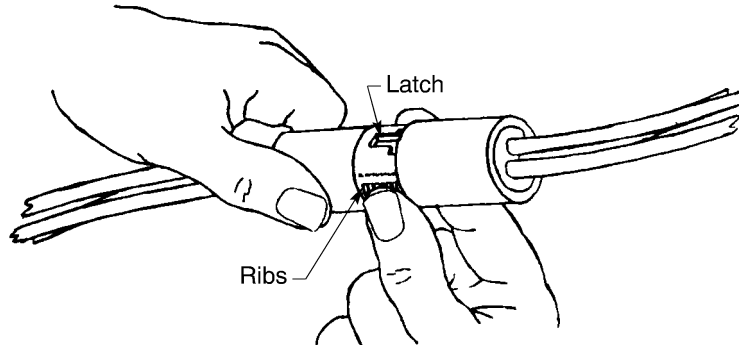
D. Recommended Tools

NOTE: The satisfactory alternatives for:

- Contact removal tools are given in Table 5
- Contact crimp tools are given in Table 8
- Contact insertion tools are given in Table 10.

Table 4
RECOMMENDED TOOLS FOR CONNECTOR ASSEMBLY

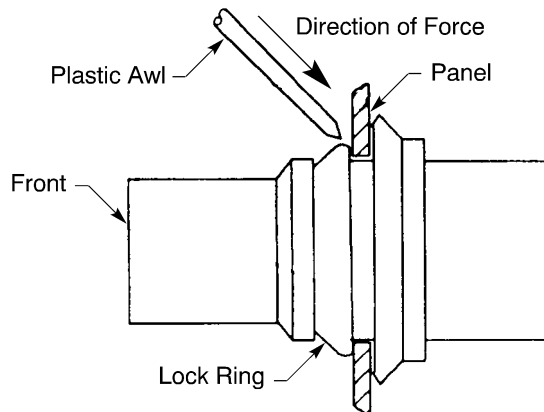
Procedure	Contact Size		Tool	
	Engaging End	Crimp Barrel	Type	Part Number
Contact Removal	16	16	Removal	MS24256R16
Contact Assembly	16	16	Crimp	M22520/1-01
			Locator	M22520/1-02
Contact Insertion	16	16	Insertion	M81969/17-04

STANDARD WIRING PRACTICES MANUAL**VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS****2. CONNECTOR DISASSEMBLY****A. Separation of a Plug from a Receptacle****SEPARATION OF THE PLUG AND THE RECEPTACLE****Figure 6**

- (1) Hold the plug in one hand and the receptacle in the other hand. Refer to Figure 6.
- (2) To release the latches, apply pressure on the ribs of both connectors at the same time.
- (3) Pull the plug and receptacle apart.

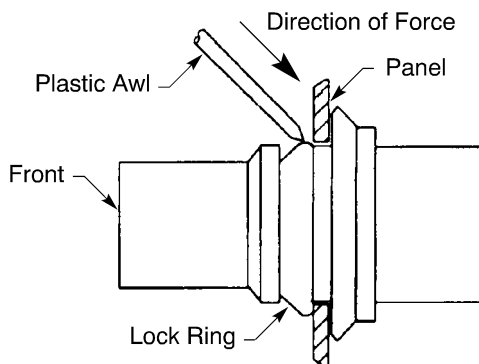
B. Removal of a Receptacle from a Panel

- (1) Push on the lock ring at the front of the panel with a plastic awl or an equivalent tool. Refer to Figure 7 and Figure 8.

**POSITION OF PLASTIC AWL ON THE LOCK RING****Figure 7**

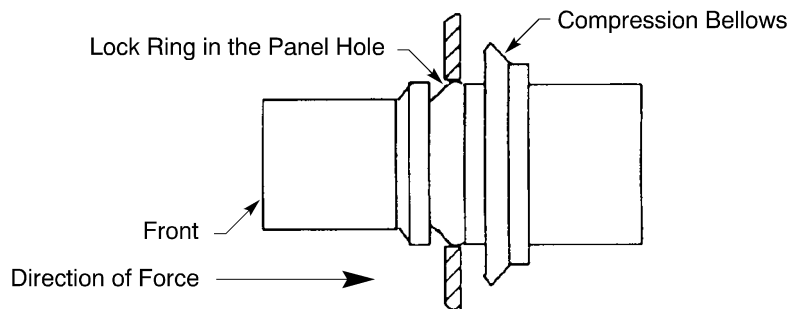
STANDARD WIRING PRACTICES MANUAL

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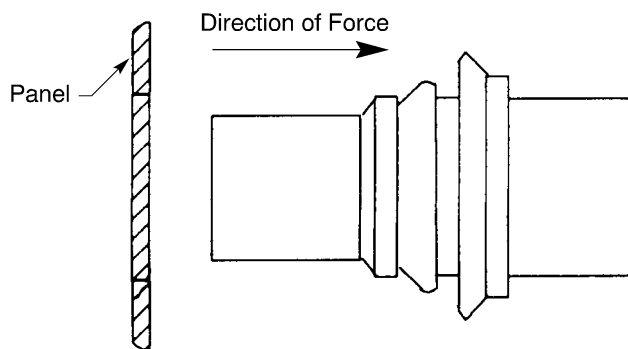
COMPRESSED POSITION OF THE LOCK RING
Figure 8

- (2) As the lock ring is compressed, push it into the hole in the panel.
- (3) Do Step (1) and Step (2) again until the outer surface of the lock ring is in the hole in the panel. Refer to Figure 9.



POSITION OF THE LOCK RING IN THE PANEL HOLE
Figure 9

- (4) Push the front of the receptacle into the panel until it is free from the panel. Refer to Figure 10.



RECEPTACLE REMOVED FROM THE PANEL
Figure 10

STANDARD WIRING PRACTICES MANUAL

VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS

C. Contact Removal

**Table 5
CONTACT REMOVAL TOOLS**

Contact Size		Removal Tool
Engaging End	Crimp Barrel	
16	16	MS24256R16
		RRBX-16S

- (1) Make a selection of a contact removal tool from Table 5.
- (2) Put the tool plunger in the retracted position.
- (3) From the front of the connector, carefully push the tool axially straight into the contact cavity until it stops.

CAUTION: DO NOT PUSH THE TOOL INTO THE CONTACT CAVITY FROM THE REAR OF THE CONNECTOR. DAMAGE TO THE CONNECTOR AND THE TOOL CAN OCCUR.

- (4) Push the plunger into the tool.
- (5) If the plunger does not push the contact towards the rear of the connector:
 - (a) Carefully remove the tool from the contact cavity.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (3) and Step (4) again.
- (6) Pull the wire to remove the contact from the connector.
- (7) Examine the front of the connector for a crack or a chip that extends from:
 - One contact cavity to another contact cavity
 - A contact cavity to the shell of the connector.

D. Seal Plug Removal

- (1) Remove the backshell from the rear of the connector with a pair of needle nose pliers that have smooth surfaces and no sharp edges.

CAUTION: NEEDLE NOSE PLIERS WITH ROUGH SURFACES OR SHARP EDGES CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) Hold the end of the seal plug or seal rod tightly in the jaws of the pliers.
- (3) Pull the seal plug or seal rod out of the rear grommet in the direction that is perpendicular to the face of the grommet.

STANDARD WIRING PRACTICES MANUAL

VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS

- (4) Examine the rear grommet for these types of damage:
- Gouges between two contact cavities
 - Cuts between two contact cavities
 - Cracks between two contact cavities
 - Cracks between cavities and the shell in the rear grommet.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 6
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	16	1/2	± 1/32	Fold the conductor back so that the length L of the bare conductor is 1/4 inch
		1/4	± 1/32	Put a contact filler into the crimp barrel
22	16	1/2	± 1/32	Fold the conductor back so that the length L of the bare conductor is 1/4 inch
		1/4	± 1/32	Put a contact filler into the crimp barrel
20	16	1/4	± 1/32	-
18	16			
16	16			

**Table 7
BELT OR REEL MOUNTED CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Block
		Part Number	Setting	
24	16	11148	Red	Blue
22	16	11148	Red	Blue
20	16	11148	Red	Blue
18	16	11148	Red	Blue
16	16	11148	Red	Blue

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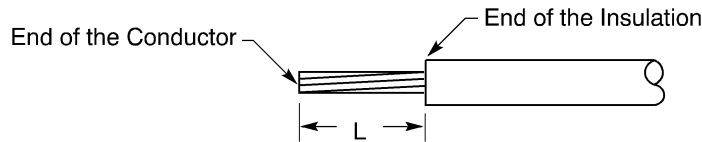
**Table 8
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	16	M22520/1-01	4	M22520/1-02	Blue
		85-550			
		WA27F			
		ST2220-1-Y	-	ST2220-1-2	-
22	16	M22520/1-01	5	M22520/1-02	Blue
		85-550			
		WA27F			
		ST2220-1-Y	-	ST2220-1-2	-
20	16	M22520/1-01	4	M22520/1-02	Blue
		85-550			
		WA27F			
		M10S S-7	-	SL-2	-
		ST2220-1-Y	-	ST2220-1-2	-
18	16	M22520/1-01	5	M22520/1-02	Blue
		85-550			
		WA27F			
		M10S S-7	-	SL-2	-
		ST2220-1-Y	-	ST2220-1-2	-
16	16	M22520/1-01	6	M22520/1-02	Blue
		85-550			
		WA27F			
		M10S S-7	-	SL-3	-
		ST2220-1-Y	-	ST2220-1-2	-

- (1) Remove the necessary length L of the insulation from the end of the wire.
Refer to Table 6 and Figure 11.

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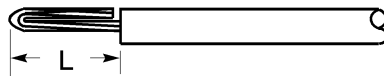
VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS



INSULATION REMOVAL

Figure 11

- (2) If it is necessary, fold the conductor back on itself so that the length of the bare conductor is 1/4 inch. Refer to Table 6 and Figure 12.



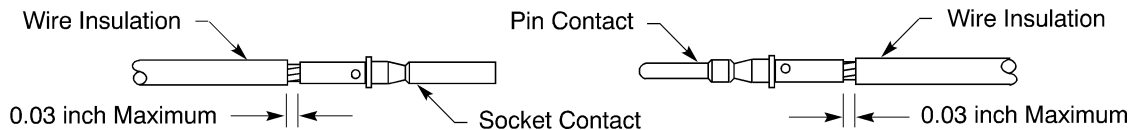
A CONDUCTOR FOLDED BACK ON ITSELF

Figure 12

- (3) Make a selection of the crimp tool from Table 7 or Table 8.
 (4) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the bottom of the crimp barrel. Refer to Figure 13.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of crimp barrel is less than or equal to 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL

Figure 13

- (5) Crimp the contact.
 (6) Examine the wired contact for these types of damage:
- Any broken conductor strands
 - Any conductor strands on which the base metal can be seen
 - Any cracks in the crimp barrel of the contact.

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B. Contact Insertion

**Table 9
AWG 16 WIRES WITH A LARGER OUTSIDE DIAMETER**

Wire Size (AWG)	Boeing Specification	Class
16	BMS 13-31	1
	BMS 13-55	1
	BMS 13-58	1

**Table 10
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool		
	O.D. of the Cable	Handle	Bit
16	Less than 0.088 inch	294-96	-
		AT 1016	-
		ATBO1108	-
		ATBO1108-16	-
		ATBO1108-90	-
		M81969/17-04	-
		ZZL-R-9510-16	-
		ST2220-2	ST2220-2-4
16	Greater than 0.088 inch and less than 0.130 inch	ST2220-2	ST2220-2-4A

- (1) Find the O.D. of the wire.
Refer to Table 9 for the AWG 16 wires with an O.D. that is greater than 0.088 inch but less than 0.130 inch.
- (2) Make a selection of a contact insertion tool from Table 10.

CAUTION: DO NOT USE A TOOL WITH:

- A TIP THAT IS BENT
- A TIP THAT IS FLARED
- A TIP THAT IS BROKEN
- A TIP THAT IS CRACKED
- A BIT THAT IS BENT.

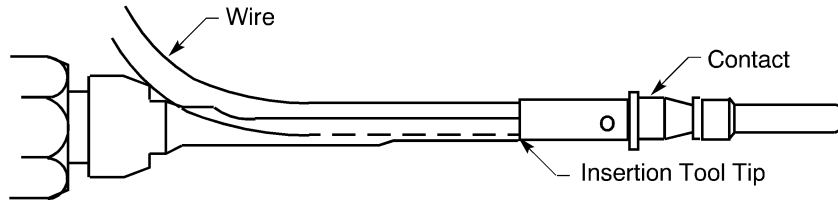
WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE REAR GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS, OR BOTH.

- (3) Put the wired contact into the tool so that the tip of the tool is against the end of the wire barrel of the contact. Refer to Figure 14.

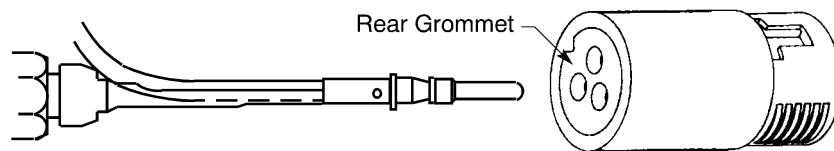
STANDARD WIRING PRACTICES MANUAL

VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS



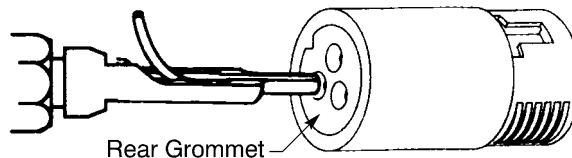
POSITION OF THE WIRED CONTACT IN THE INSERTION TOOL
Figure 14

- (4) Axially align the tool and the contact with the contact cavity. Refer to Figure 15.



POSITION OF THE WIRED CONTACT IN RELATION TO THE CONTACT CAVITY
Figure 15

- (5) Push the tool straight into the contact cavity until the tool stops. Refer to Figure 16.



INSERTION OF THE CONTACT
Figure 16

- (6) Carefully remove the tool from the contact cavity.
 (7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT, OR BOTH.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (8) If the contact does is not locked in the contact cavity:
 (a) Pull the wired contact out of the contact cavity.
 (b) Do Step (3) through Step (7) again.

C. Spare Contact Installation

Refer to Subject 20-60-08.

- (1) If it is necessary to install a spare contact in the contact cavities that are not used:

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VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS

- (a) Make a selection of the contact from Table 2.
- (b) Make a selection of a contact insertion tool from Table 10.
- (c) Put the contact in the contact cavity.
- (d) Axially align the tool and the contact.
- (e) Push the tool straight into the contact cavity until the tool stops.
- (f) Carefully remove the tool from the contact cavity.

D. Seal Plug or Seal Rod Installation

Refer to Subject 20-60-08.

- (1) If it is necessary to install a seal plug or a seal rod in the contact cavities that are not used:

- (a) Make a selection of a seal plug or seal rod from Table 3.
- (b) Push the plug or the rod into the contact cavity.

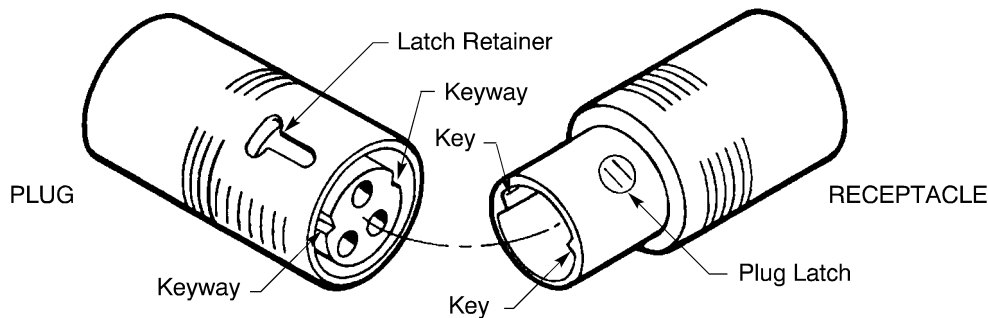
Make sure that the distance from the end of the plug or the rod to the connector grommet is less than 0.1 inch.

4. CONNECTOR INSTALLATION

A. Installation of a Plug in the In-line Receptacle

- (1) Align the keys of the receptacle with the keyways of the plug.

Refer to Figure 17.



POSITION OF THE KEYS AND THE KEYWAYS

Figure 17

- (2) Push the plug into the receptacle until it stops.

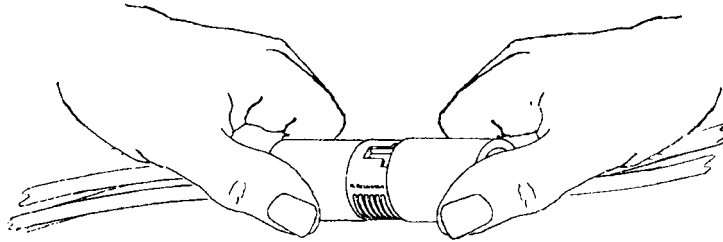
When the plug stops:

- A click can be heard
- The plug latches lock in the latch retainers.

- (3) Lightly pull the plug and the receptacle apart to make sure that the plug latches are locked. Refer to Figure 18.

STANDARD WIRING PRACTICES MANUAL

VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS



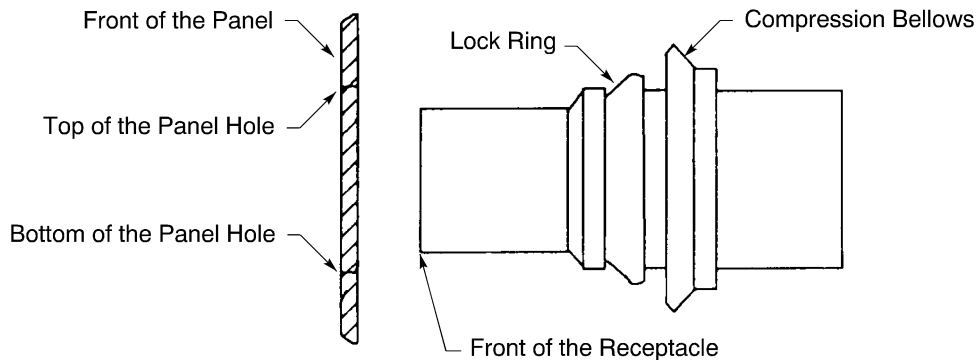
POSITION OF THE HANDS TO PULL AGAINST THE PLUG LATCHES
Figure 18

- (4) If the plug moves away from the receptacle, do Step (2) and Step (3) again.
- (5) Examine the connector for these types of damage:
 - Cracks in the connector shell
 - Cracks or chips in the plug latches.

CAUTION: DO NOT INSTALL A WIRE HARNESS TIE OR A WIRE HARNESS CLAMP ON THE MATED CONNECTORS. THIS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE LATCH RETAINER AND CAUSE THE CONNECTORS TO BECOME DISCONNECTED IN SERVICE.

B. Installation of a Receptacle in a Panel

- (1) From the back of the panel, align the receptacle with the hole. Refer to Figure 19.

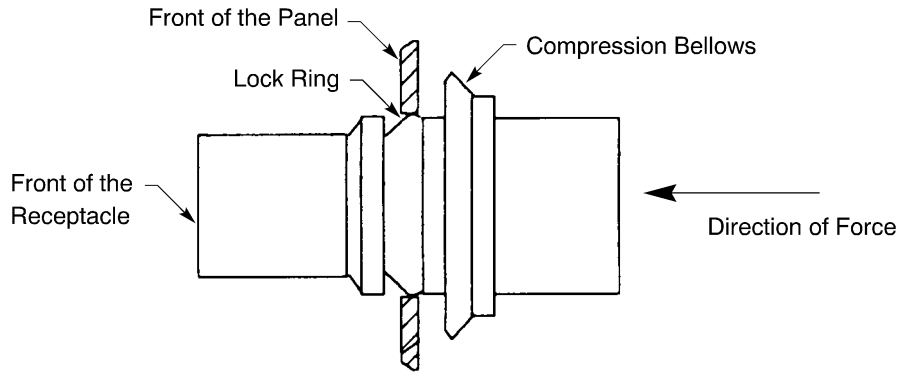


POSITION OF THE RECEPTACLE IN RELATION TO THE HOLE IN THE PANEL
Figure 19

- (2) Push the receptacle into the hole so that the lock ring becomes compressed. Refer to Figure 20.

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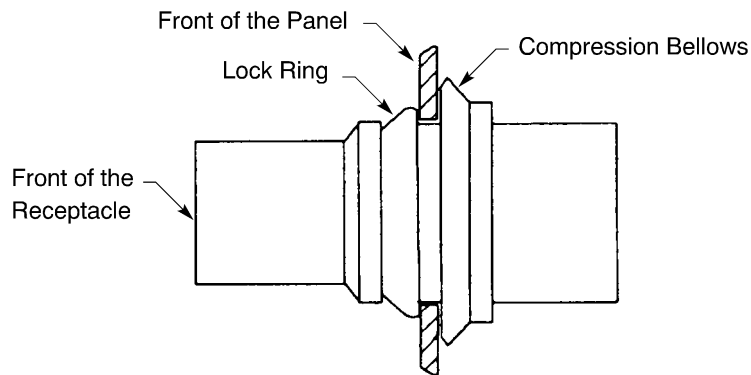
VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS



LOCK RING COMPRESSED IN THE PANEL HOLE
Figure 20

- (3) Push the receptacle through the hole until:
- The lock ring extends and holds the receptacle in position on the panel
 - The rear surface of the lock ring is against the front of the panel
 - The forward end of the compression bellows is against the panel.

Refer to Figure 21.



POSITION OF THE RECEPTACLE IN THE PANEL
Figure 21

- (4) Push the receptacle from the front to make sure that it is locked in the panel.
 (5) If the receptacle moves, do Step (3) and Step (4) again.

5. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

Table 11
REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
MS24256R16	QPL
RRBX-16S	Russtech

STANDARD WIRING PRACTICES MANUAL**VIKING ELECTRONICS AMC() SERIES CIRCULAR CONNECTORS****B. Contact Insertion Tools**

Table 12
INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
294-96	Amphenol
AT 1016	Astro
ATBO1108	Astro
ATBO1108-16	Astro
ATBO1108-90	Astro
M81969/17-04	QPL
ST2220-2	Boeing
ST2220-2-4	Boeing
ST2220-2-4A	Boeing
ZZL-R-9510-16	Pyle-National

C. Contact Crimp Tools

Table 13
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
11148	Buchanan
85-550	Balmar
M10S S-7	Burndy
M22520/1-01	QPL
M22520/1-02	QPL
SL-2	Burndy
SL-3	Burndy
ST2220-1-2	Boeing
ST2220-1-Y	Boeing
WA27F	Daniels



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STANDARD WIRING PRACTICES MANUAL

CORY AND TRI-STAR CSLT2-21P() CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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STANDARD WIRING PRACTICES MANUAL

CORY AND TRI-STAR CSLT2-21P() CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
CSLT2-21P()	Plug	Cory Components
CSLT2-21P()	Plug	Tri-Star

**Table 2
OBSOLETE CONNECTOR PART NUMBERS**

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
CSLT2-21P()	Cory Components	CSLT2-21P()	Tri-Star

B. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

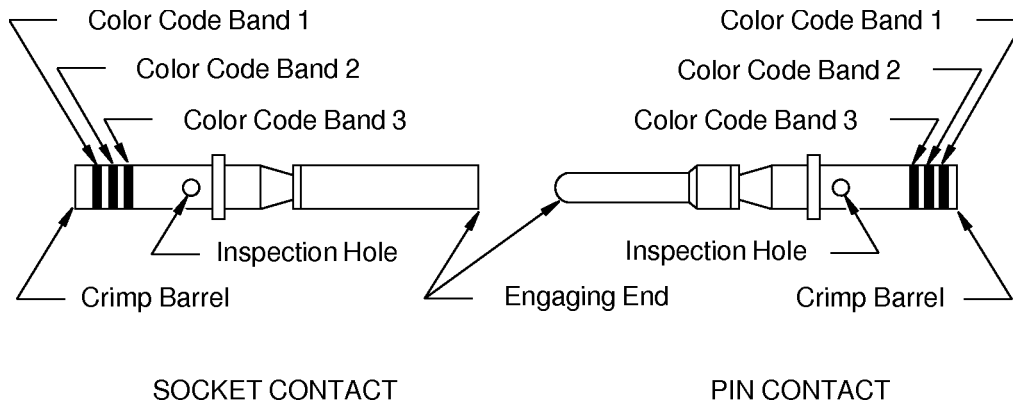
Contact Size		Contact Type	Color Code		Part Number	Supplier
Engaging End	Crimp Barrel		Band	Color		
20	18	Socket	1	-	CB005-5P	Cory Components
			2	-		
			3	-		
	20	Socket	1	-	CB005-5P	Tri-Star
			2	-		
			3	-		
20	Socket	1	Orange	M39029/63-368	QPL	
		2	Blue	M39029/63-368	QPL	
		3	Gray	M39029/63-368	QPL	

**Table 4
OBSOLETE CONTACT PART NUMBERS**

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
CB005-5P	Cory Components	CB005-5P	Tri-Star

STANDARD WIRING PRACTICES MANUAL

CORY AND TRI-STAR CSLT2-21P() CONNECTORS

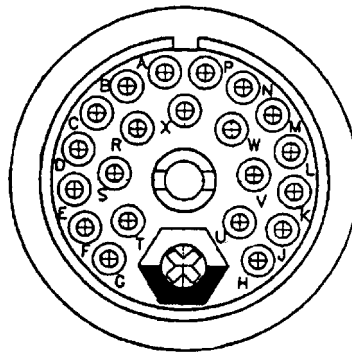


LOCATION OF CONTACT COLOR CODES
Figure 1

C. Insert Configurations

Table 5
INSERT CONFIGURATIONS

Insert Configuration	Contact Cavity		Reference
	Count	Size	
21	21	20	Figure 2



21
21 INSERT CONFIGURATION
Figure 2

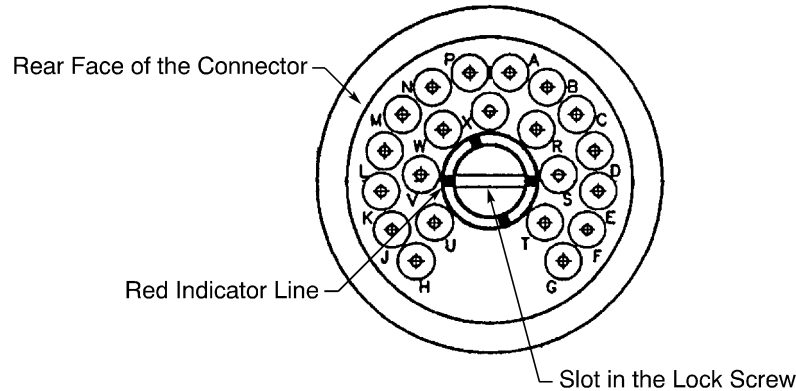
2. CONNECTOR DISASSEMBLY

A. Connector Separation

- (1) Make a selection of a screwdriver.
- (2) Turn the screw counterclockwise to align the slots on the screw head with the red indicator lines. Refer to Figure 3.

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CORY AND TRI-STAR CSLT2-21P() CONNECTORS



POSITION OF THE LOCK SCREW
Figure 3

(3) Pull the plug from the receptacle.

B. Contact Removal

Table 6
CONTACT REMOVAL TOOLS

Removal Tool	Color
DRK145	-
M81969/1-02	White

- (1) Make a selection of a contact removal tool from Table 6.
- (2) Put the tip of the tool on the wire.
- (3) At the rear of the connector, axially align the tool and the contact cavity.
- (4) Carefully push the tool into the contact cavity until it stops.
Make sure that the tool stays aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Hold the wire against the tool.
- (6) Pull the tool and the wire out from the contact cavity at the same time.
Make sure that the tool stays aligned with the contact cavity.
- (7) If the contact is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (2) through Step (6) again.

STANDARD WIRING PRACTICES MANUAL

CORY AND TRI-STAR CSLT2-21P() CONNECTORS

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 7
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
26	20	0.40	± 0.03	Fold back conductor
24	20	0.20	± 0.03	-
22	20	0.20	± 0.03	-
20	20	0.20	± 0.03	-

**Table 8
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
26	20	AFM 8	6	K41
			6	M22520/2-06
		M22520/2-01	6	K41
			6	M22520/2-06
		WA22	6	K41
			6	M22520/2-06
		WA22LC	6	K41
			6	M22520/2-06

STANDARD WIRING PRACTICES MANUAL

CORY AND TRI-STAR CSLT2-21P() CONNECTORS

Table 8 (continued)

Wire Size (AWG)	Contact Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
24	20	AFM 8	5	K13-1
			5	M22520/2-06
		M22520/2-01	5	K13-1
			5	M22520/2-06
		MS3191-1	-	P20-3191-1
		ST2220-1-Y	-	11697-1
			-	ST2220-1-43
		WA22	5	K13-1
			5	M22520/2-06
		WA22AP	5	KAP13-1
		WA22LC	5	K13-1
			5	M22520/2-06
22	20	AFM 8	6	K13-1
			6	M22520/2-06
		M22520/2-01	6	K13-1
			6	M22520/2-06
		MS3191-1	-	P20-3191-1
		ST2220-1-Y	-	11697-1
			-	ST2220-1-43
		WA22	6	K13-1
			6	M22520/2-06
		WA22AP	6	KAP13-1
		WA22LC	6	K13-1
			6	M22520/2-06

STANDARD WIRING PRACTICES MANUAL

CORY AND TRI-STAR CSLT2-21P() CONNECTORS

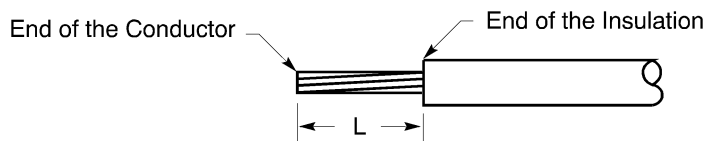
Table 8 (continued)

Wire Size (AWG)	Contact Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
20	20	AFM 8	7	K13-1
			7	M22520/2-06
		M22520/2-01	7	K13-1
			7	M22520/2-06
		MS3191-1	-	P20-3191-1
		ST2220-1-Y	-	11697-1
			-	ST2220-1-43
		WA22	7	K13-1
			7	M22520/2-06
		WA22AP	7	KAP13-1
WA22LC	7	K13-1		
	7	M22520/2-06		
18	18	M22520/2-01	8	K250

- (1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 4
- Table 7 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 4

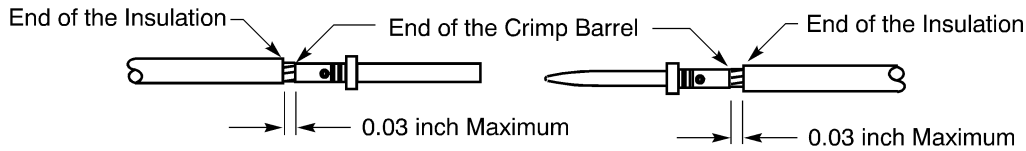
- (2) Make a selection of a crimp tool from Table 8.
- (3) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the end of the crimp barrel. Refer to Figure 5.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

STANDARD WIRING PRACTICES MANUAL

CORY AND TRI-STAR CSLT2-21P() CONNECTORS



POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT

Figure 5

(4) Crimp the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

B. Contact Insertion

**Table 9
CONTACT INSERTION TOOLS**

Insertion Tool	Color
DAK145	-
M81969/1-02	Red

- (1) Make a selection of a contact removal tool from Table 9.
- (2) Put the contact assembly in the tool.
- (3) Axially align the insertion tool and the contact cavity at the rear of the connector.
- (4) Carefully push the contact assembly into the contact cavity until it stops.
- (5) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (6) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (2) through Step (5) again.

4. CONNECTOR INSTALLATION

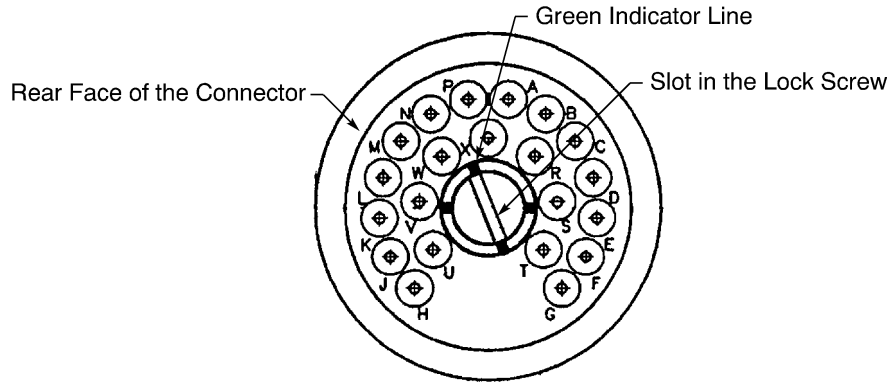
A. Plug and Receptacle Connection

- (1) Make a selection of a screwdriver.
- (2) Align the plug and the receptacle.
- (3) Push the plug into the receptacle until it stops.

STANDARD WIRING PRACTICES MANUAL

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- (4) From the rear of the plug, turn the locking screw clockwise until the slot in the screw are aligned with the green indicator lines. Refer to Figure 6.



POSITION OF THE LOCK SCREW

Figure 6

5. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 10
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11697-1	Buchanan
AFM 8	Daniels
K13-1	Daniels
K250	Daniels
K41	Daniels
KAP13-1	Daniels
M22520/2-01	QPL
M22520/2-06	QPL
MS3191-1	QPL
P20-3191-1	ITT Cannon
ST2220-1-43	Boeing
ST2220-1-Y	Boeing
WA22	Daniels
WA22AP	Daniels
WA22LC	Daniels



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CORY AND TRI-STAR CSLT2-21P() CONNECTORS

B. Insertion and Removal Tools

**Table 11
INSERTION AND REMOVAL TOOL SUPPLIERS**

Tool	Supplier
DAK145	Daniels
DRK145	Daniels
M81969/1-02	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VEAM 115 SERIES CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VEAM 115 SERIES CONNECTORS

This subject gives the procedures to assemble Veam 115 Series connectors with:

- MIL-W-16878 Type EE or Class 2 cable
- ENDEVCO 16833 cable
- BMS 13-10 or BMS 13-16 cable.

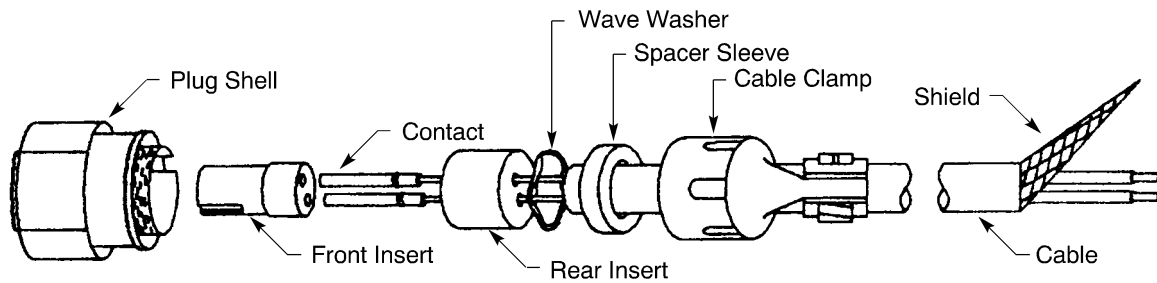
1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

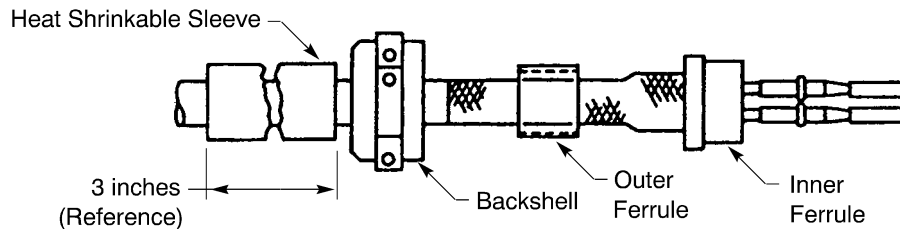
Amphenol no longer makes the 115 Series connectors. The connectors are made by Veam in Apese, Milano, Italy.

**Table 1
VEAM 115 SERIES CONNECTOR PART NUMBERS**

Part Number	Supplier
115-5051	Veam
115-5051-1	Veam
115-5066	Veam
115-5074	Veam



**VEAM 115-5066 AND 115-5074 CONNECTORS
Figure 1**



**VEAM 115-5051 AND 115-5051-1 CONNECTORS
Figure 2**



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VEAM 115 SERIES CONNECTORS

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact		Connector
Part Number	Supplier	
175-270-02	Veam	115-5051
		115-5051-1
115-2454	Veam	115-5066
115-2522-02	Veam	115-5074

C. Accessory Part Numbers

**Table 3
VEAM 115 SERIES CONNECTOR ACCESSORIES**

Accessory	Part Number	Supplier
Cable Clamp	10-536997-85	Bendix
	115-2458	Veam
Ferrule, Inner	GSB-134	Thomas & Betts
Ferrule, Outer	GSC-187	Thomas & Betts
	BACS13S232C	Boeing
Insert, Front	115-2320	Veam
Insert, Rear	115-2456	Veam
Kit	20279	ENDEVCO
Shell	115-2445	Veam
Spacer Sleeve	115-2457	Veam
	20215	ENDEVCO
Wave Washer	115-2383	Veam

NOTE: The ENDEVCO 20279 Kit includes the Bendix 10-536997-85 cable clamp and the ENDEVCO 20215 spacer sleeve.

D. Contact Crimp Tools

**Table 4
CONTACT CRIMP TOOLS**

Basic Unit		Locator		
Part Number	Supplier	Part Number	Color	Supplier
MS3191-1	QPL	MS3191-20	Red	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VEAM 115 SERIES CONNECTORS

Table 4 (continued)

Basic Unit		Locator		
Part Number	Supplier	Part Number	Color	Supplier
ST2220-1-Y	Boeing	ST2220-1-1	-	Boeing

2. CONNECTOR DISASSEMBLY

A. Veam 115-5051 and 115-5051-1 Connectors with BMS 13-10 or BMS 13-16 Cable

This procedure applies to BMS 13-10 or BMS 13-16 Type III Class 2 AWG 20 cable.

- (1) Remove the lockwire and heat shrinkable sleeve.
- (2) Remove the backshell from the connector body.
- (3) Slide the ferrule assembly away from the connector body.
- (4) Cut the wire at the back of the connector.

Refer to Subject 20-61-00.

3. ASSEMBLY OF THE VEAM 115-5066 CONNECTOR WITH MIL-W-16878 CABLE

The MIL-W-16878 cable in this procedure is Type EE or Class 2 cable with AWG 20 wire.

A. Contact Assembly

Table 5

GSC-187 OUTER FERRULE CRIMP TOOLS

Basic Unit		Die		
Part Number	Supplier	Part Number	Position	Supplier
44-000	Balmar	44-141	B	Balmar
620175	Buchanan	620309	B	Buchanan
HX4	Daniels	Y141	B	Daniels
M22520/5-01	QPL	M22520/5-43	B	QPL
ST2966M	Boeing	-	5	Boeing
ST965-1	Boeing	-	M	Boeing
ST965A-6	Boeing	-	-	-
ST965B	Boeing	ST965B-6	-	Boeing
WT202-06-08	Thomas & Betts	-	M	-
WT206	Thomas & Betts	-	-	-
WT406	Thomas & Betts	-	-	-
WT440	Thomas & Betts	WT-4406	-	Thomas & Betts

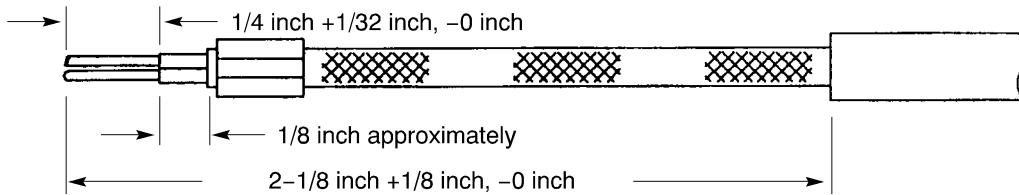
Refer to Figure 1 and Table 3.

- (1) Slide the cable clamp down the cable.
- (2) Slide a 2-1/2 inch \pm 1/16 inch length of 1/4 inch diameter TFE sleeving down the cable.
- (3) Slide an additional 1-3/8 inch \pm 1/16 inch length of 3/16 inch diameter TFE sleeving down the cable.

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ASSEMBLY OF VEAM 115 SERIES CONNECTORS

- (4) Remove 2-1/8 inches + 1/8 inch, -0 inch of the cable jacket. Refer to Figure 3.
Make sure to avoid any nicks on the shield.
- (5) Remove approximately 3/8 inch of the shield from end of the cable.
- (6) Remove 1/4 inch + 1/32 inch, -0 inch of wire insulation.

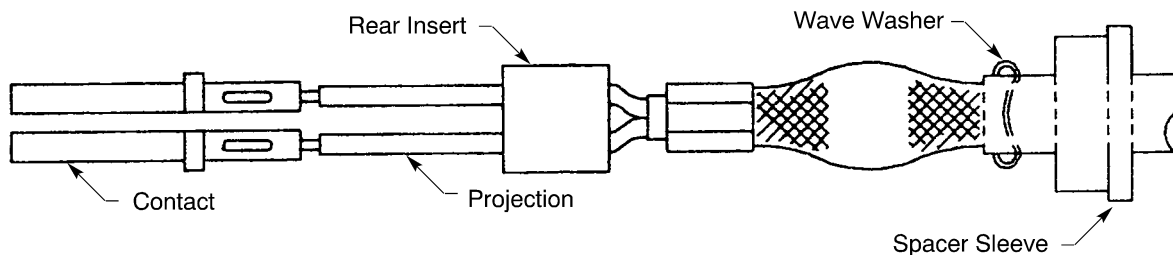


PREPARATION OF THE MIL-W-16878 CABLE
Figure 3

- (7) Slide an outer ferrule over the shield.
- (8) Flare the end of the shield.
- (9) Slide an inner ferrule under the shield until the outer edge of the ferrule is flush with the end of the shield.
- (10) Position the outer ferrule over the shield.
- (11) Make a selection of a crimp tool from Table 5.
- (12) Crimp the outer ferrule.
- (13) Remove the excess end of the shield so that it is flush with the forward edge of outer ferrule.
- (14) Slide the spacer sleeve and wave washer over the end of the cable.
- (15) Push the shield back approximately 1 inch (as far as necessary to do the next step). Refer to Figure 4.
- (16) Slide the rear insert over the wires.

Make sure that:

- The lay of the conductor strands is not disturbed
- The shoulder of the spacer sleeve faces away from the end of the cable
- The face of the rear insert with the two small projections faces toward the end of the cable.



VEAM 115-5066 CONNECTOR ASSEMBLED WITH MIL-W-16878 CABLE
Figure 4

- (17) Make a selection of a crimp tool from Table 4.
- (18) Put each conductor completely into the crimp barrel of each contact.

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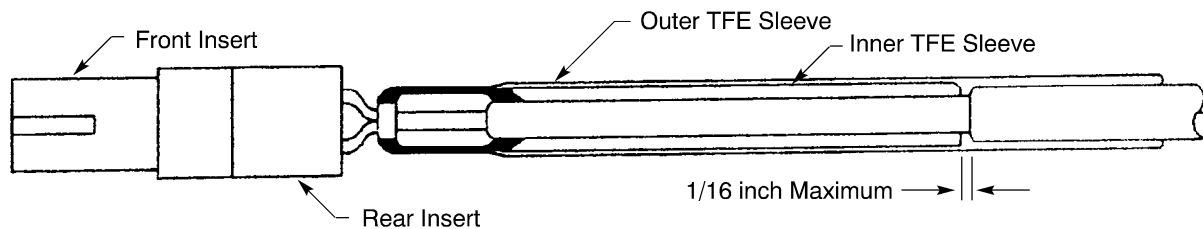
ASSEMBLY OF VEAM 115 SERIES CONNECTORS

- (19) Crimp the contacts onto the wires.
- (20) Slide the rear insert forward and carefully seat the contacts in the cavities. Refer to Figure 5.
Make sure that the flats of the contact shoulders face each other.
- (21) Reform the shield over the wires so that end of the inner ferrule is as close as possible, approximately 1/8 inch, to the back face of the rear insert. Refer to Figure 5.
- (22) Put the short TFE sleeve over the cable so that the end away from the contacts is aligned with the end of the cable jacket.
- (23) Shrink the sleeve into place.
The maximum gap between the end of the sleeve and cable jacket is 1/16 inch.
- (24) Place the long TFE sleeve so that the forward end is flush with the exposed end of the inner ferrule. Refer to Figure 5.
- (25) Shrink the sleeve into place.

B. Contact Insertion

- (1) Insert the front end of the contacts into the cavities of the front insert.
- (2) Rotate the contacts so the flats on the contact shoulder enter the recess of the front insert. Refer to Figure 5.

CAUTION: DO NOT FORCE THE FRONT AND REAR INSERTS TOGETHER.



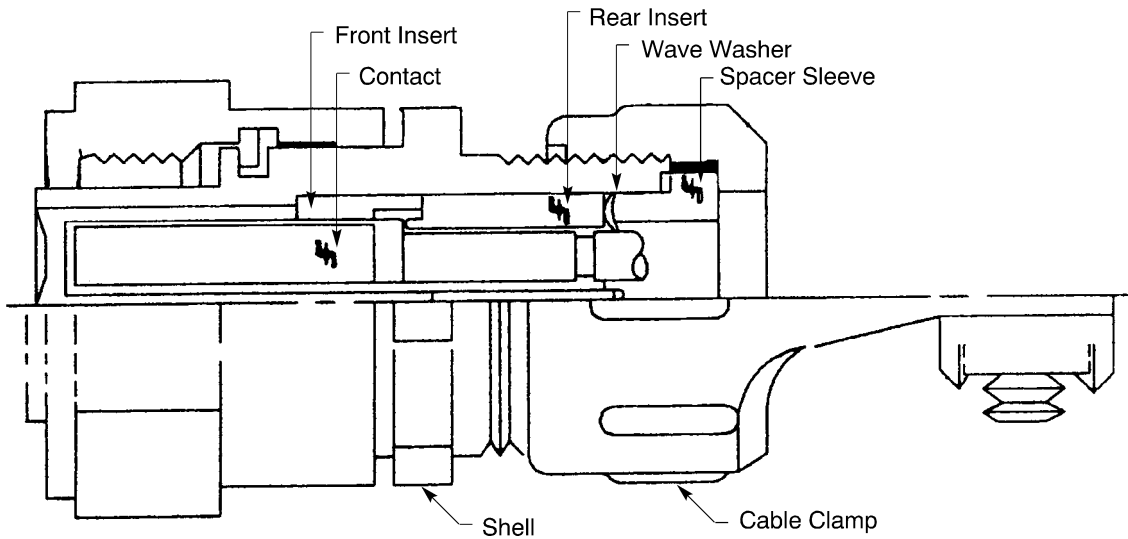
POSITION OF THE CONTACT AND THE TFE SLEEVE
Figure 5

C. Connector Assembly

- (1) Slide the insert assembly into the shell.
If necessary, rotate the assembly to engage the keyway and shell key.
- (2) Slide the wave washer and push it against the back face of the rear insert.
- (3) Slide the spacer sleeve into the shell so that the shoulder rests against the end of the shell.
- (4) Slide the cable clamp down and engage the threads of the clamp with the shell. Refer to Figure 6.

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ASSEMBLY OF VEAM 115 SERIES CONNECTORS



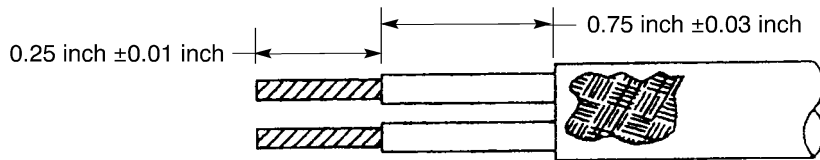
POSITION OF THE CONNECTOR CABLE CLAMP
Figure 6

- (5) Tighten the clamp.
- (6) Remove the clamp bars or saddles.
- (7) Build up the cable diameter with filler tape.
- (8) Replace the clamp bars and tighten the screw.

4. ASSEMBLY OF THE VEAM 115-5066 CONNECTOR WITH ENDEVCO 16833 CABLE

A. Contact Assembly

- (1) Prepare the cable. Refer to Figure 7.
Make sure that all cuts are square.
 - (a) Remove 1.0 inch ± 0.03 inch of the cable jacket.
 - (b) Remove 1.0 inch ± 0.03 inch of the shield.
 - (c) Remove 0.25 inch ± 0.01 inch of wire insulation from each wire.

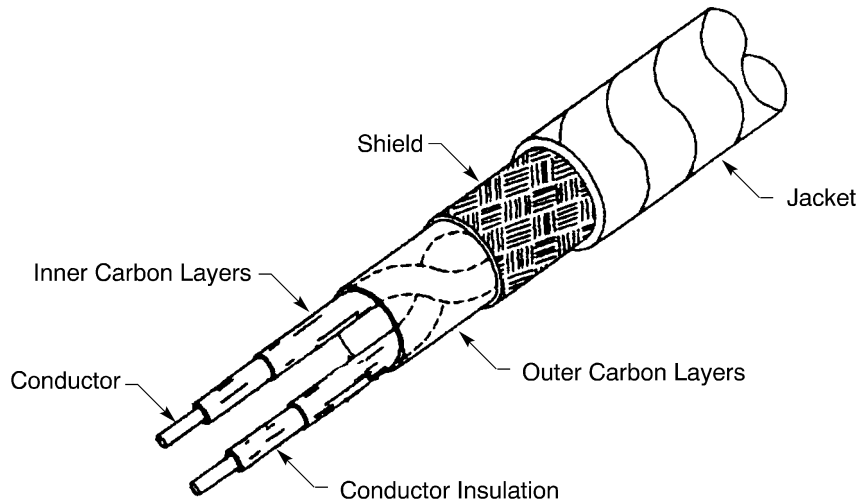


PREPARATION OF THE ENDEVCO 16833 CABLE
Figure 7

- (2) Untwist the two conductors in the outer carbon layer so that they are parallel. Refer to Figure 8.

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ASSEMBLY OF VEAM 115 SERIES CONNECTORS



CONFIGURATION OF THE ENDEVCO 16833 CABLE

Figure 8

- (3) Cut the outer carbon layer along the groove between the two conductors and peel off the outer carbon layer.
- (4) Remove any excess carbon.
- (5) Remove the inner carbon layer.
- (6) To remove all residue of carbon from the primary insulation of the conductors:
 - (a) Sandblast the conductors or brush them with a fiberglass eraser
 - (b) Clean the conductors with acetone or another suitable solvent.
- (7) Remove 0.25 inch \pm 0.01 inch of insulation from each conductor. Refer to Figure 7.
- (8) To make sure there are no carbon tracks, check the insulation resistance at 500Vdc between:
 - The conductors
 - The shield and each conductor.
- (9) To make a 6917M19A cable:
 - (a) Discard the spacer sleeve and cable clamp supplied with the Veam 115-5066 connector
 - (b) Use the ENDEVCO spacer sleeve and the Bendix cable clamp that is supplied in the ENDEVCO 20279 Kit.
Refer to Table 3.
- (10) Push these components over the cable:
 - Two 2 inch lengths of 1/4 inch diameter Teflon 4X sleeve
 - The cable clamp
 - The spacer sleeve
 - The wave washer.Refer to Figure 1.
- (11) Push the rear insert over the conductors so that it is against the shield.
- (12) Make a selection of a crimp tool from Table 4.

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF VEAM 115 SERIES CONNECTORS**

- (13) Insert the bare conductors into the crimp barrel of each contact.

Make sure that:

- The insulation is against the contact
- The conductor strands are visible in the inspection hole.

- (14) Crimp the contacts onto each conductor.

- (15) Push the first Teflon sleeve against the rear insert and shrink it into place.

- (16) Push the second Teflon sleeve over the first and against the rear insert and shrink it into place.

B. Contact Insertion

- (1) Insert the socket contacts into the front insert.

- (2) Insert the wired contacts into the connector.

C. Connector Assembly

- (1) Engage the cable clamp threads on the connector body and tighten.

5. ASSEMBLY OF THE VEAM 115-5074 CONNECTOR WITH ENDEVCO 16833 CABLE (AVM)**A. Contact Assembly**

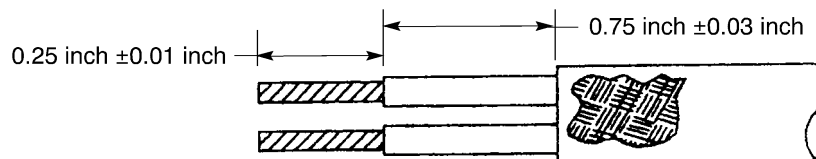
- (1) Prepare the cable. Refer to Figure 9.

Make sure that all cuts are square.

- (a) Remove 1.0 inch ± 0.03 inch of the cable jacket.

- (b) Remove 1.0 inch ± 0.03 inch of the shield.

- (c) Remove 0.25 inch ± 0.01 inch of wire insulation from each wire.

**PREPARATION OF THE ENDEVCO 16833 CABLE****Figure 9**

- (2) Untwist the two conductors within the outer carbon layer so that they are parallel. Refer to Figure 10.
- (3) Cut the outer carbon layer along the groove between the two conductors and peel off the outer carbon layer.
- (4) Remove any excess carbon.
- (5) Remove the inner carbon layer.
- (6) To remove all residue of carbon from the primary insulation of the conductors:
- (a) Sandblast the conductors or brush them with a fiberglass eraser
 - (b) Clean the conductors with acetone or another suitable solvent.
- (7) Remove 0.25 inch ± 0.01 inch of insulation from each conductor. Refer to Figure 9.

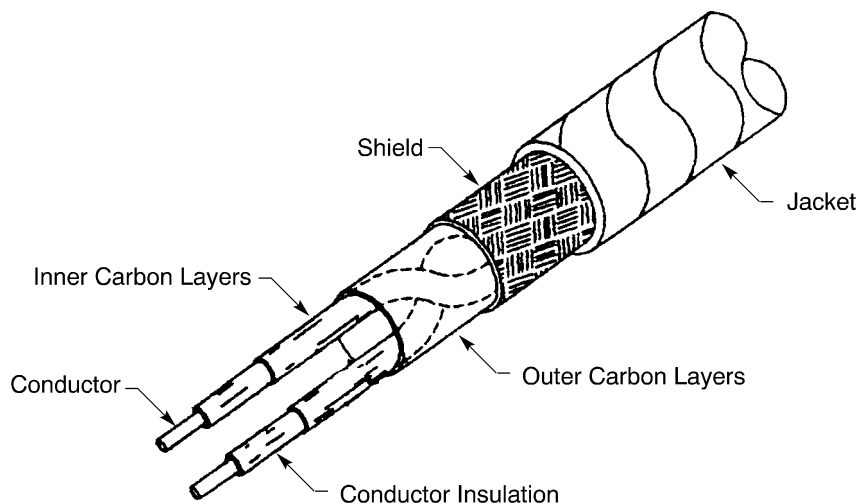
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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF VEAM 115 SERIES CONNECTORS**

- (8) To make sure there are no carbon tracks, check the insulation resistance at 500Vdc between:
- The conductors
 - The shield and each conductor.
- (9) Put these components on the cable:
- Two 2 inch lengths of 1/4 inch diameter Teflon 4X sleeve
 - The cable clamp
 - The spacer sleeve
 - The wave washer.

Refer to Figure 1.

- (10) Push the rear insert over the conductors so that it is against the shield.



CONFIGURATION OF THE ENDEVCO 16833 CABLE

Figure 10

- (11) Make a selection of a crimp tool from Table 4.
- (12) Insert each of the bare conductors into the crimp barrel of each contact.
- Make sure that:
- The insulation is against the contact
 - The conductor strands are visible in the inspection hole.
- (13) Crimp the contacts onto each conductor.
- (14) Push the first Teflon sleeve against the rear insert and shrink it into place.
- (15) Push the second Teflon sleeve over the first and against the rear insert and shrink it into place.

B. Contact Insertion

- (1) Insert the socket contacts into front insert.
- (2) Insert the wired contacts into the connector.

C. Connector Assembly

- (1) Engage the cable clamp threads on the connector body and tighten.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VEAM 115 SERIES CONNECTORS

6. ASSEMBLY OF THE VEAM 115-5051 AND 115-5051-1 CONNECTORS WITH BMS 13-10 OR BMS 13-16 CABLE

This procedure applies to BMS 13-10 or BMS 13-16 Type III Class 2 AWG 20 cable.

A. Contact Assembly

**Table 6
CONTACT CRIMP TOOLS**

Basic Unit		Locator		
Part Number	Supplier	Part Number	Color	Supplier
ST2220-1-Y	Boeing	ST2220-1-43	-	Boeing

**Table 7
BACS13S232C OUTER FERRULE CRIMP TOOLS**

Basic Unit		Die		
Part Number	Supplier	Part Number	Position	Supplier
44-000	Balmar	44-143	A	Balmar
612648	Buchanan	612748	-	Buchanan
613214	Buchanan	613846	-	Buchanan
620175	Buchanan	620310	A	Buchanan
HX4	Daniels	Y143	A	Daniels
M22520/5-01	QPL	M22520/5-45	A	QPL
ST2966M	Boeing	-	7	-
ST965-4	Boeing	-	L	-
ST965A-10	Boeing	-	-	-
ST965B	Boeing	ST965B-10	-	Boeing
WT201-03-10	Thomas & Betts	-	L	-
WT210	Thomas & Betts	-	-	-
WT440	Thomas & Betts	WT-4410	-	Thomas & Betts
WT4410	Thomas & Betts	-	-	-

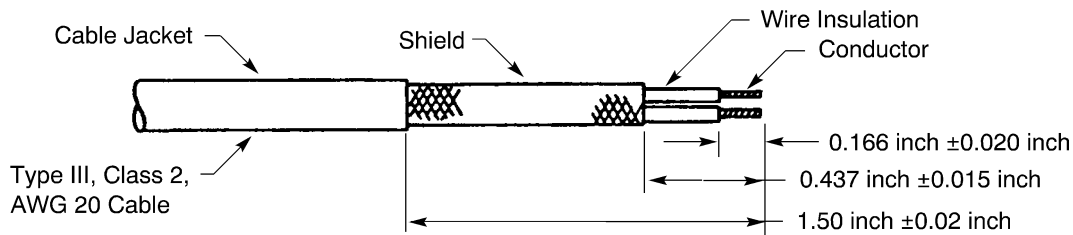
(1) Prepare the cable. Refer to Figure 11.

Make sure to:

- Make all cuts square
 - Avoid nicks on the shield or wire.
- (a) Remove 1.50 inches \pm 0.02 inch of cable jacket.
 - (b) Remove 0.437 inch \pm 0.015 inch of shield.
 - (c) Remove 0.166 inch \pm 0.020 inch of insulation from each wire.

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ASSEMBLY OF VEAM 115 SERIES CONNECTORS



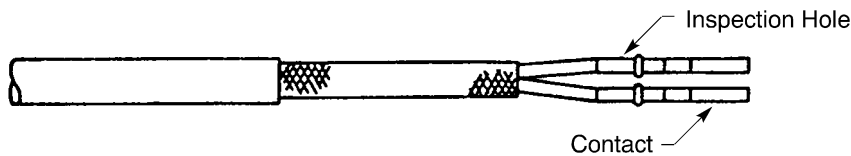
PREPARATION OF BMS 13-10 OR BMS 13-16 CABLE

Figure 11

(2) Insert the bare conductors into the crimp barrel of each contact. Refer to Figure 12.

Make sure that:

- The insulation is against the contact
- The conductor strands can be seen in the inspection hole.



POSITION OF THE CONTACTS ON THE WIRE

Figure 12

(3) Make a selection of a crimp tool from Table 6.

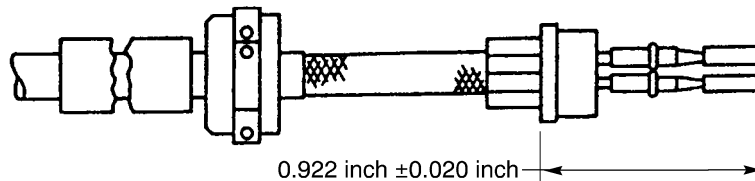
(4) Crimp the contacts onto each conductor.

(5) Push these components over the cable:

- A 3 inch length of heat shrinkable sleeve
- The backshell
- The outer ferrule.

(6) Slide the inner ferrule under the braid. Refer to Figure 2.

(7) Slide the outer ferrule over the shield against the inner ferrule. Refer to Figure 13.



POSITION OF THE OUTER FERRULE CRIMP

Figure 13

(8) Make a selection of a crimp tool from Table 7.

(9) Crimp the outer ferrule.

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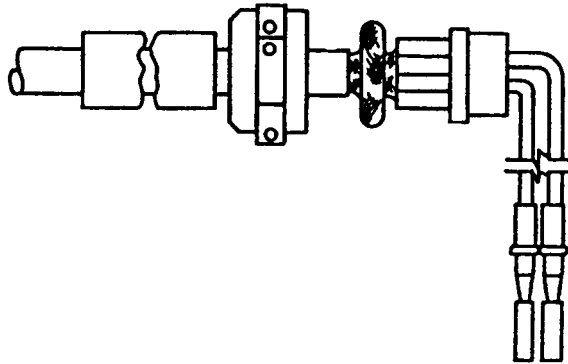
ASSEMBLY OF VEAM 115 SERIES CONNECTORS

B. Contact Insertion

**Table 8
CONTACT INSERTION TOOLS**

Insertion Tool	Supplier
294-245	Amphenol
ST2220-2-23	Boeing

- (1) Push the crimped ferrule away from the contacts.
- (2) Push the shield so it collapses and bend the wires approximately 90 degrees to provide clearance for the contact insertion tool. Refer to Figure 14.

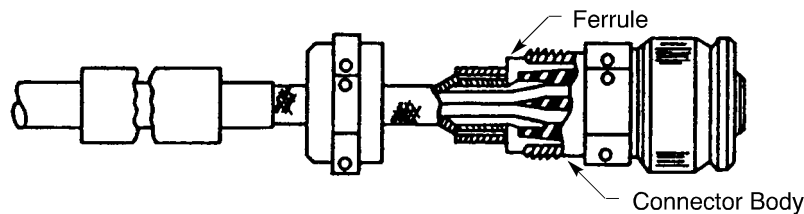


**PREPARATION FOR CONTACT INSERTION
Figure 14**

- (3) Make a selection of an insertion tool from Table 8.
- (4) Insert the contact into each contact cavity.
To make sure that each contact is fully seated, lightly pull on each wire.

C. Connector Assembly

- (1) Insert the ferrule assembly into the connector body. Refer to Figure 15.



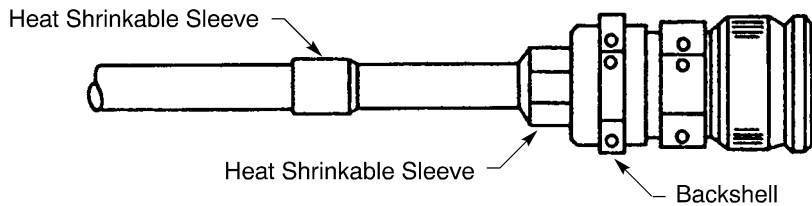
**INSERTION OF THE FERRULE
Figure 15**

- (2) Thread backshell onto plug shell and tighten into place.
- (3) Lockwire the assembly.

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ASSEMBLY OF VEAM 115 SERIES CONNECTORS

- (4) Slide heat shrinkable sleeve over the outer ferrule and up against the backshell.
- (5) Shrink the sleeve into place. Refer to Figure 16.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 16



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ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Supplier
60B40052-3	Plug	Boeing
60B40052-4	Receptacle	Boeing
MB10P-1	Plug	Burndy
MB10R-6	Receptacle	Burndy
MB12P-1	Plug	Burndy
MB12R-20	Receptacle	Burndy
MB12R-6	Receptacle	Burndy
MB13P-3	Plug	Burndy
MB13R-4	Receptacle	Burndy
MB24P	Plug	Burndy
MB6P-3	Plug	Burndy
MB6R-3	Receptacle	Burndy

**Table 2
SUPPLIER PART NUMBERS FOR BOEING STANDARD CONNECTORS**

Boeing Standard	Part Number	Supplier
60B40052-3	MB6P-3	Burndy
60B40052-4	MB6R-3	Burndy

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ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

B. Standard Contact Part Numbers

**Table 3
STANDARD CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	BACC47CN1	Boeing
			BACC47CN1A	Boeing
			BACC47CN1S	Boeing
			LRM20W-5F63	Burndy
		Socket	BACC47CP1A	Boeing
			BACC47CP1S	Boeing
			BACC47CP1T	Boeing
			LRC20W-5F63	Burndy
	18	Pin	48-100-5008P-02	Amphenol
			48-100-5014P-02	Amphenol
		Socket	248-136-2018S-02	Amphenol
16	Pin	48-100-5007P-02	Amphenol	
		48-100-5012P-02	Amphenol	
	Socket	248-136-2016S-02	Amphenol	

C. Coax Contact Part Numbers

**Table 4
COAX CONTACT PART NUMBERS**

Size	Part Number	Type	Supplier
12	60B40052-5	Pin	Boeing
	60B40052-6	Socket	Boeing
	CRC280-4	Socket	Cory Components
	CRC280-4	Socket	Tri-Star
	KIT700-42	Pin	Burndy
	KIT700-43	Socket	Burndy

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

**Table 5
SUPPLIER PART NUMBERS FOR BOEING STANDARD COAX CONTACTS**

Boeing Standard	Part Number	Supplier
60B40052-5	KIT700-42	Burndy
60B40052-6	KIT700-43	Burndy

D. Heat Shrinkable Boot Part Numbers

**Table 6
HEAT SHRINKABLE BOOT PART NUMBERS**

Boot	Supplier
204A121-3-01	Raychem

E. Necessary Materials

**Table 7
NECESSARY MATERIALS**

Material	Specification or Part Number	Supplier
Adhesive	S-1006	Raychem
	S-1009	Raychem
Emery Cloth	No. 240	Available Source
	No. 320	Available Source
Lacquer Thinner	TT-T-266	Available Source
Sleeve, Heat Shrinkable	MIL-LT	Raychem
	AMS-DTL-23053/5 Class 1	Available Source
Solvent	TT-N-95	Available Source

2. CONNECTOR DISASSEMBLY

A. Removal of Standard Contacts

NOTE: After a standard contact is installed in an MB6P-3 connector, it cannot be removed.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

**Table 8
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool
20	294-89
	AT 2020
	DRK20
	M81969/19-06
	MS24256R20
	RX20-24V5
	ST2220-3-13

- (1) Make a selection of a removal tool from Table 8.
- (2) If the connector has a strain relief leg, remove the wire harness tie that holds the wire harness.
- (3) Axially align the tool with the contact cavity at the front face of the connector.
Make sure that the plunger of the removal tool is fully retracted.

CAUTION: DO NOT INSERT THE TOOL INTO THE REAR OF THE CONNECTOR. DAMAGE TO THE CONNECTOR WILL OCCUR.

- (4) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Push the plunger of the tool forward until it stops.
- (6) Carefully pull the tool out from the contact cavity.
Make sure that the tool stays axially aligned with the contact cavity.
- (7) Pull the contact out of the contact cavity from the rear of the connector.

B. Removal of Coax Contacts

NOTE: After a coax contact is installed in an MB6P-3 connector, it cannot be removed.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

**Table 9
COAX CONTACT REMOVAL TOOLS**

Contact Size	Removal Tool
12	294-73
	AT 2012
	DRK56-12
	M81969/19-02
	MS24256R12
	MS90456-12
	RX12-7
	ST2220-3-15

- (1) Make a selection of a coax contact removal tool from Table 9.
- (2) If the connector has a strain relief leg, remove the wire harness tie that holds the wire harness.
- (3) Remove the coax contact from the connector.

Make sure that the center contact is not removed from the coax contact.

CAUTION: DAMAGE TO THE COAX CONTACT AND THE CONNECTOR CAN OCCUR IF THE CENTER CONTACT IS REMOVED.

- (a) At the front face of the connector, axially align the tool with the contact cavity.
Make sure that the plunger of the removal tool is fully retracted.

CAUTION: DO NOT INSERT THE TOOL INTO THE REAR OF THE CONNECTOR. DAMAGE TO THE CONNECTOR WILL OCCUR.

- (b) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (c) Push the plunger of the tool forward until it stops.
- (d) Carefully pull the tool out from the contact cavity.
Make sure that the tool stays axially aligned with contact cavity.
- (e) Pull the contact out of the contact cavity from the rear of the connector.

3. ASSEMBLY OF BURNDY MB10, MB12, MB13, AND MB24 SERIES CONNECTORS

A. Assembly of Standard Contacts

For the procedures to assemble a standard contact, refer to Paragraph 6.A.

B. Assembly of Coax Contacts

For the procedure to assemble a coax contact, refer to Paragraph 6.C.

C. Standard Contact Insertion

For the procedure to install a standard contact, refer to Paragraph 7.A.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

D. Coax Contact Insertion

For the procedure to install a coax contact, refer to Paragraph 7.B.

E. Seal of an Empty Contact Cavity

The seal of an empty contact cavity is not necessary.

F. Strain Relief Assembly

- (1) Attach the wire harness to the strain relief leg with a plastic tie strap or a wire harness tie material. Refer to Subject 20-10-11 for the procedure to assemble the wire harness tie.

Make sure that the knot or the head of the plastic tie strap is opposite the strain relief leg.

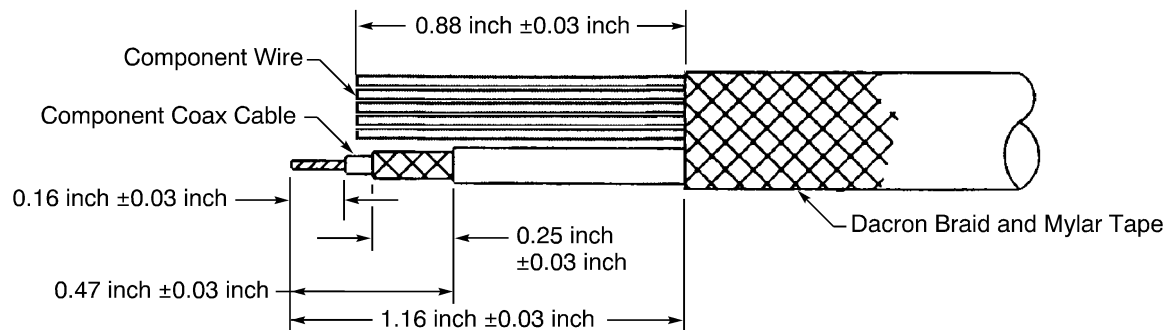
4. ASSEMBLY OF THE BURNDY MB6R-3 CONNECTORS

This paragraph gives the procedure to assemble the MB6R-3 connectors with these wires and cables:

- A BMS13-42 wire
- A BMS13-48 wire
- A Raychem 44A7418 multiconductor cable
- A Raychem 5026A1018 coax cable
- A Raychem 5026A1318 coax cable.

A. Cable Preparation for a Raychem 44A7418 Cable

- (1) Make a selection of a heat shrinkable boot from Table 6.
- (2) Put the heat shrinkable boot on the cable or the wire harness.
Make sure that the small end of the boot is pointed rearward, away from the connector.
- (3) Prepare the cable. Refer to Figure 1.



RAYCHEM 44A7418 CABLE PREPARATION
Figure 1

- (a) Remove 1.16 inches ± 0.03 inch of the outer layer of Dacron braid and Mylar tape.
 - (b) Remove necessary length of each component wire to make the distance from the end of the braid to the end of the wire equal to 0.88 inch ± 0.03 inch.
- (4) Prepare the component coax cable. Refer to Figure 1.
- (a) Remove the necessary length of jacket to make the distance from the end of the cable to the end of the jacket equal to 0.47 inch ± 0.03 inch.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

- (b) Remove the necessary length of shield to make the distance from the end of the cable to the end of the shield equal to 0.25 inch ±0.03 inch.
- (c) Remove the necessary length of the dielectric to make the distance from the end of the conductor to the end of the dielectric equal to 0.16 inch ±0.03 inch.

B. Assembly of Standard Contacts

For the procedures to assemble a standard contact, refer to Paragraph 6.A.

C. Assembly of Coax Contacts

For the procedure to assemble a coax contact, refer to Paragraph 6.C.

D. Standard Contact Insertion

For the procedure to install a standard contact, refer to Paragraph 7.A.

E. Coax Contact Insertion

For the procedure to install a coax contact, refer to Paragraph 7.B.

F. Insertion of CRC280-4 Coax Contacts

**Table 10
COAX CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
12	294-72
	M81969/17-05
	MS24256A12

- (1) Make a selection of a coax contact insertion tool from Table 10.

CAUTION: DO NOT USE A TOOL WITH:

- A TIP THAT IS BENT
- A TIP THAT IS FLARED
- A TIP THAT IS BROKEN
- A TIP THAT HAS A CRACK.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE THE CONTACT RETENTION CLIPS.

- (2) Put the necessary connector assembly components on the wire harness.
- (3) Examine the contact.

Make sure that the contact:

- Is straight
- Does not have damage.

NOTE: A contact that has a bend or damage must be replaced.

- (4) Put the contact assembly in the insertion tool.
- (5) Axially align the insertion tool with the contact cavity at the rear of the connector.
- (6) Carefully push the tool straight into the correct contact cavity until it stops.

Make sure that the tool stays axially aligned with the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

CAUTION: DO NOT TURN THE INSERTION TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (7) Carefully pull the tool out from the contact cavity.
Make sure that the tool stays axially aligned with the contact cavity.

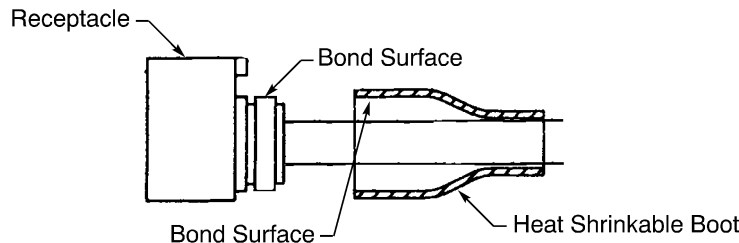
- (8) Lightly pull the wire to make sure that the contact is locked.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE CABLE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE CABLE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (9) If the contact is not locked in the contact cavity, do Step (5) through Step (8) again.

G. Bond Surface Preparation



BOND SURFACES
Figure 2

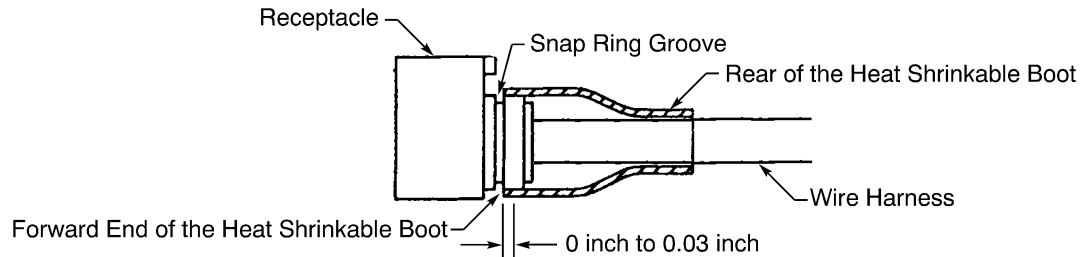
Refer to Figure 2.

- (1) Make a selection of a solvent from Table 7.
- (2) Prepare the surfaces of the boot that must make a bond with the connector.
 - (a) Wind a piece of emery cloth around an applicable rod or tool.
 - (b) Make the bond surfaces rough.
 - (c) Shake the loose particles out of the boot.
 - (d) Clean the bond surfaces with a clean wiper and solvent.
 - (e) Dry the boot with a wiper immediately.

CAUTION: DO NOT LET NAPHTHA DRY ON THE BOOT. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

- (3) Clean the receptacle connector surfaces that must make a bond with the adhesive.
 - (a) Clean the bond surfaces of the connector with a clean wiper and solvent.
 - (b) Dry the connector with a wiper immediately.

CAUTION: DO NOT LET NAPHTHA DRY ON THE CONNECTOR. WHEN NAPHTHA DRIES, AN UNWANTED FILM STAYS ON THE CLEAN SURFACES.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS****H. Boot Installation**

POSITION OF THE HEAT SHRINKABLE BOOT
Figure 3

- (1) Prepare the bond surfaces of the boot and the connector. Refer to Paragraph 4.G.
Make sure that the rear end of the boot that touches the wire harness is not prepared for a bond.
- (2) Apply the adhesive to the surfaces of receptacle flange and boot that make a bond.
Make sure that the rear end of the boot that touches the wire harness does not have adhesive.
- (3) Push the boot on the receptacle flange until the forward end of the boot is 0 inch to 0.03 inch from the snap ring groove.
- (4) Hold the boot until the adhesive cures.
Make sure that the forward edge of the boot is 0 inch to 0.03 inch from the rear edge of the snap ring groove.
- (5) Shrink only the rear end of the boot on the wire harness.

I. Seal of an Empty Contact Cavity

The seal of an empty contact cavity is not necessary.

J. Connector Installation

- (1) From the front of the panel, put the connector in hole in the panel.
- (2) Install the snap ring in the snap ring groove.

STANDARD WIRING PRACTICES MANUAL

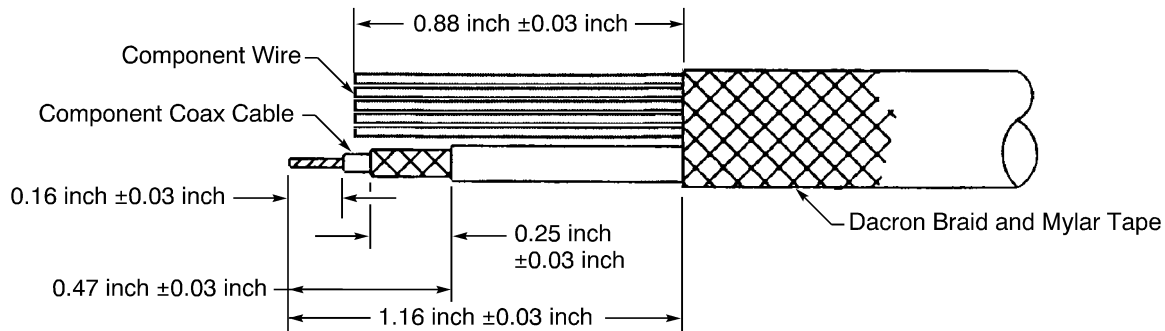
ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

5. ASSEMBLY OF THE BURNDY MB6P-3 CONNECTORS

This paragraph gives the procedure to assemble the MB6P-3 connector with these wires and cables:

- A BMS13-42 wire
- A BMS13-48 wire
- A Raychem 44A7418 multiconductor cable
- A Raychem 5026A1018 coax cable
- A Raychem 5026A1318 coax cable.

A. Cable Preparation for a Raychem 44A7418 Cable



RAYCHEM 44A7418 CABLE PREPARATION
Figure 4

Refer to Figure 4.

- (1) Make a selection of a heat shrinkable boot from Table 6.
- (2) Put the heat shrinkable boot on the cable or the wire harness.
 Make sure that the small end of the boot is pointed rearward, away from the connector.
- (3) Prepare the cable.
 - (a) Remove 1.16 inches ± 0.03 inch of the outer layer of Dacron braid and Mylar tape.
 - (b) Remove necessary length of each component wire to make the distance from the end of the braid to the end of the wire equal to 0.88 inch ± 0.03 inch.
- (4) Prepare the component coax cable. Refer to Figure 4.
 - (a) Remove the necessary length of jacket to make the distance from the end of the cable to the end of the jacket equal to 0.47 inch ± 0.03 inch.
 - (b) Remove the necessary length of shield to make the distance from the end of the cable to the end of the shield equal to 0.25 inch ± 0.03 inch.
 - (c) Remove the necessary length of the dielectric to make the distance from the end of the conductor to the end of the dielectric equal to 0.16 inch ± 0.03 inch.

B. Assembly of Standard Contacts

For the procedures to assemble a standard contact, refer to Paragraph 6.A.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

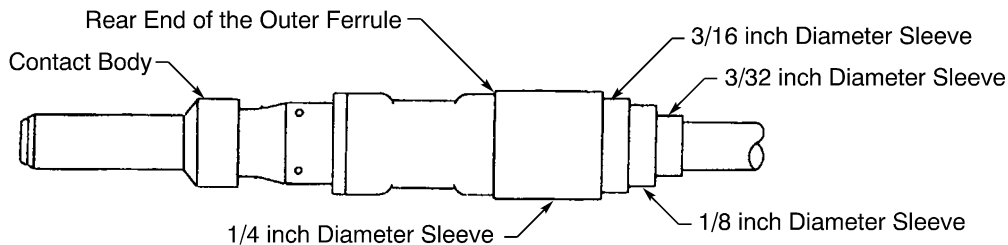
C. Assembly of Coax Contacts

**Table 11
CENTER CONTACT CRIMP TOOLS**

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Locator	Die Set
26	ST2220-1-Y	ST2220-1-47	-
	M10S-1	SL-72	S-35

**Table 12
OUTER FERRULE CRIMP TOOL**

Coax Contact	Crimp Tool		
	Basic Unit	Die Set	Locator
KIT700-42	WT 202-06-08	WT 202	-
	M10S-1	S-39	SL-58



**POSITION OF THE HEAT SHRINKABLE SLEEVES
Figure 5**

Refer to Figure 5.

- (1) Make a selection of a center contact crimp tool from Table 11.
- (2) Make a selection of a ferrule crimp tool from Table 12.
- (3) Make a selection of a heat shrinkable sleeve from Table 7.
- (4) Put a 0.75 inch \pm 0.03 inch length of 3/32 inch diameter heat shrinkable sleeve on the cable.
Make sure that the end of the sleeve is 0 inch to 0.03 inch from the edge of the jacket.
- (5) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (6) Put a 0.68 inch \pm 0.03 inch length of 1/8 inch diameter heat shrinkable sleeve on the first sleeve.
Make sure that the end of the sleeve is 0 inch to 0.03 inch from the edge of the jacket.
- (7) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (8) Put the outer ferrule on the cable.
Make sure that the ferrule is not near the contact and the sleeves.
- (9) Crimp the inner contact.
- (10) Push the inner contact into the outer contact until it locks in position.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

Make sure that the crimp barrel of the outer contact is between the insulation and the shield.

- (11) Push the outer ferrule forward on the shield until it is fully against the shoulder of the outer contact.
- (12) Crimp the ferrule.
- (13) Put a 0.5 inch ± 0.03 inch length of 3/16 inch diameter heat shrinkable sleeve on the outer sleeve.
Make sure that the forward end of the sleeve is against the ferrule.
- (14) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (15) Put a 0.38 inch ± 0.03 inch length of 1/4 inch diameter heat shrinkable sleeve on the outer sleeve.
Make sure that the forward end of the sleeve is against the ferrule.
- (16) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Standard Contact Insertion

NOTE: After a standard contact is installed in an MB6P-3 connector, it cannot be removed.

- (1) Put the snap ring on the wire harness.
- (2) If the wire harness has less than five individual BMS 13-42 or BMS 13-48 wires, the put the necessary number of 1.5 inch lengths of heat shrinkable sleeves on the wire harness to make the outer diameter of the wire harness 0.19 inch to 0.21 inch.
- (3) Insert each standard contact, refer to Paragraph 7.A.

E. Coax Contact Insertion

For the procedure to install a coax contact, refer to Paragraph 7.B.

NOTE: After a coax contact is installed in an MB6P-3 connector, it cannot be removed.

F. Connector Assembly

**Table 13
HEAT SHRINKABLE SLEEVES**

Description	Part Number	Supplier
Inner Sleeve	CRN	Raychem
Outer Sleeve	DWP-125	Raychem

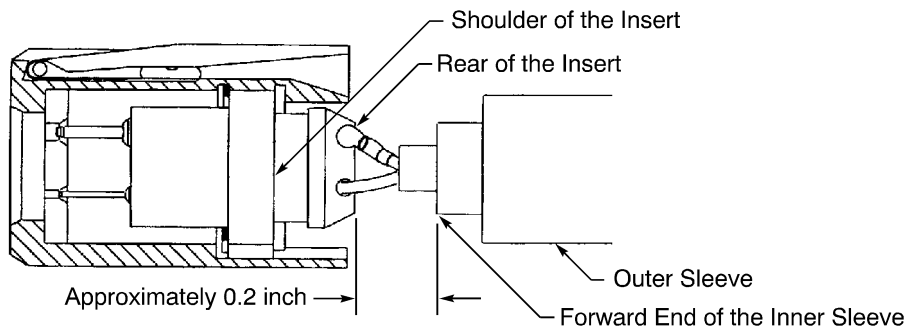
- (1) If the heat shrinkable sleeves are not supplied with the connector, make a selection of each of these sleeves from Table 13:
 - A 2.5 inch length of 3/8 inch diameter inner sleeve
 - A 1 inch length of 3/4 inch diameter outer sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

- (2) If sleeves are supplied with the connector, remove the identification marks from the sleeves:
 - (a) Make a selection of a lacquer thinner from Table 7.
 - (b) Apply a small quantity of lacquer thinner to the identification marks with a soft nylon bristle brush or an equivalent tool.
 - (c) Dry the sleeves with a wiper.
- (3) Push the longer inner sleeve forward on the cable until it is approximately 0.2 inch from the rear of the insert. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS



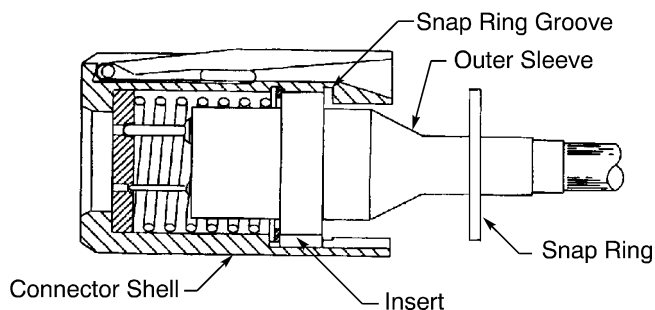
POSITION OF THE INNER AND OUTER SLEEVES

Figure 6

- (4) Shrink the sleeve into its position. Subject 20-10-14.
- (5) Push the shorter outer sleeve forward until it is 0 inch to 0.06 inch from the shoulder of the insert.
- (6) Shrink the sleeve into its position. Subject 20-10-14.
- (7) Install the assembled insert into the plug body. Refer to Figure 7 and Figure 8.

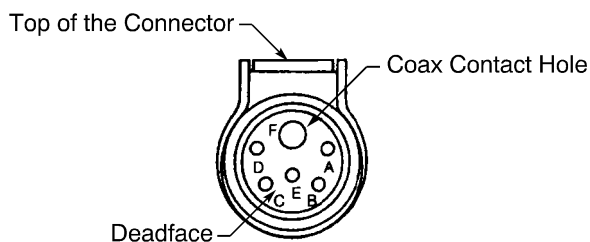
Make sure that:

- The coax contact hole in the deadface is aligned with the top of the connector
- The contacts in the insert are aligned with the applicable contact holes in the deadface.



ASSEMBLED MB6P-3 PLUG

Figure 7



ALIGNMENT OF THE INSERT WITH THE DEADFACE

Figure 8

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

(8) Install the snap ring. Refer to Figure 7.

NOTE: After the snap ring is installed, it cannot be removed.

- (a) Put the connector on a hard surface with the face of the connector against the surface.
 - (b) Put the snap ring in the rear of the connector at an approximate 45 degree angle.
Make sure that one edge of the ring is in the keyway.
 - (c) Move the ring into the rear of the connector with the hand.
Make sure to move the side of the ring that is opposite the keyway first.
 - (d) When the ring is below the edge of the connector, press down on the insert until it hits the bottom.
 - (e) Push on the snap ring with a small screwdriver or an equivalent tool to move it into its position in the snap ring groove.
- (9) To make sure that the snap ring is fully installed, hold the plug tightly and at the same time, lightly pull on the cable.

G. Seal of an Empty Contact Cavity

Empty contact cavities must be sealed with an unwired contact. Refer to Subject 20-60-08.

6. CONTACT ASSEMBLY

A. Assembly of Standard Contacts

**Table 14
INSULATION REMOVAL LENGTH**

Crimp Barrel Size	Removal Length L (inch)	
	Target	Tolerance
24	0.19	± 0.03
22	0.19	± 0.03
20	0.19	± 0.03
18	0.25	± 0.03
16	0.25	± 0.03

**Table 15
WIRE SIZES FOR RAYCHEM 44A7418 MULTICONDUCTOR CABLE**

Insulation Color	Wire Size (AWG)
Blue	22
Green	22
Red	20
White	20
Yellow	22

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

**Table 16
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
24	20	M22520/1-01	2	M22520/1-02	Red	-
22	20	11148	-	-	Red Decal	Locator is Red Block
		614019	-	-	Red Decal	Locator is Red Block
		M22520/1-01	3	M22520/1-02	Red	-
		M22520/2-01	6	M22520/2-02	-	-
		MS3191-1	-	MS3191-20	-	-
		ST2220-1-Y	-	ST2220-1-1	-	-
		WA22	6	M22520/2-02	-	-
		WA27F	3	M22520/1-02	Red	-
20	20	M22520/1-01	4	M22520/1-02	Red	-
		M22520/2-01	7	M22520/2-02	-	-
		WA22	7	M22520/2-02	-	-
		WA27F	4	M22520/1-02	Red	-
18	18	M22520/1-01	5	M22520/1-02	Red	-
		M22520/2-01	8	M22520/2-02	-	-
		ST2220-1-Y	-	ST2220-1-1	-	-
16	16	11148	-	-	Red Decal	Locator is Blue Block
		614019	-	-	Red Decal	Locator is Blue Block
		M22520/1-01	6	M22520/1-02	Red	-
		M22520/2-01	8	M22520/2-02	-	-
		ST2220-1-Y	-	ST2220-1-1	-	-

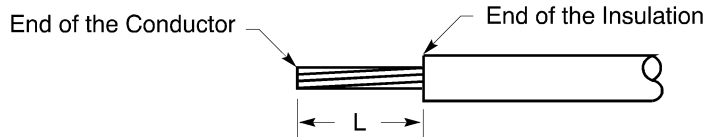
- (1) Make a selection of a crimp tool from Table 16.
- (2) Remove the necessary length of insulation from the wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

Refer to:

- Figure 9
- Table 15 for wire sizes of Raychem 44A7418 cable
- Table 14
- Subject 20-00-15 for the insulation removal procedures.

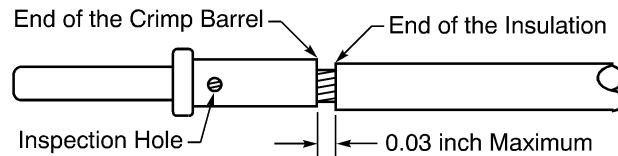


WIRE PREPARATION
Figure 9

(3) Push the conductor into the crimp barrel of the contact. Refer to Figure 10.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is a maximum of 0.03 inch.



THE POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 10

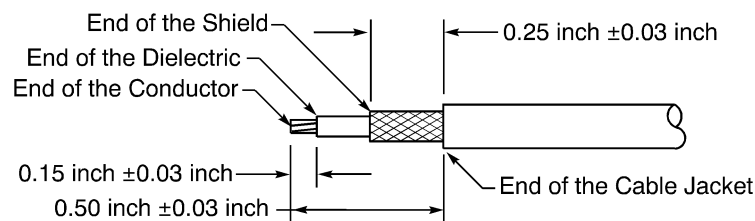
(4) Crimp the contact.

(5) Examine the wired contact for these types of damage:

- A strand of the conductor is broken
- The base metal of a strand of the conductor can be seen
- The crimp barrel of the contact has a crack.

(6) If the contact or the wire has damage, replace the contact.

B. Coax Cable Preparation



CABLE PREPARATION
Figure 11

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

Refer to Figure 11.

- (1) Remove the necessary length of the cable jacket to make the distance from the end of the jacket to the end of the shield equal to 0.50 inch \pm 0.03 inch.
- (2) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.25 inch \pm 0.03 inch.
- (3) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the center conductor equal to 0.15 inch \pm 0.03 inch.

C. Assembly of Coax Contacts

This Paragraph gives the procedure to assemble KIT700-() and 60B40052-() coax contacts.

For the procedure to assemble a CRC280-4 coax contact, refer to Paragraph 6.D.

**Table 17
CENTER CONTACT CRIMP TOOLS**

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Locator	Die Set
26	ST2220-1-Y	ST2220-1-47	-
	M10S-1	SL-72	S-35

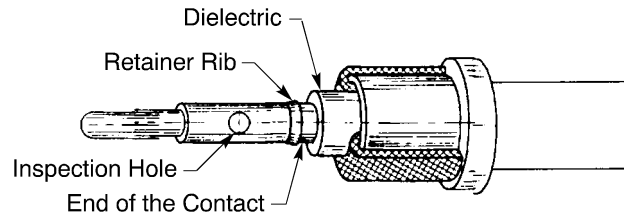
**Table 18
FERRULE CRIMP TOOLS**

Basic Unit	Die Set	Locator
WT 202-06-08	WT 202	-
M10S-1	S-30	SL-58

- (1) Make a selection of a center contact crimp tool from Table 17.
- (2) Make a selection of a ferrule crimp tool from Table 18.
- (3) Put the ferrule on the coax cable.
Make sure that the small end of the ferrule is pointed rearward, away from the end of the cable.
- (4) Prepare the coax cable. Refer to Paragraph 6.B.
- (5) Push the center conductor into the crimp barrel of the center contact until the end of the dielectric is against the end of the center contact. Refer to Figure 12.
Make sure that the strands of the conductor can be seen in the inspection hole.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS



POSITION OF THE CENTER CONTACT ON THE CENTER CONDUCTOR
Figure 12

- (6) Crimp the center contact.
- (7) Put the body of the contact on the cable.
 Make sure that:
 - The crimp barrel of the contact body is between the insulation of the center conductor and the shield
 - The center contact is fully inserted in the body.
- (8) Push the outer ferrule forward on the shield until it is fully against the shoulder of the contact body.
- (9) Crimp the ferrule.

D. Assembly of CRC280-4 Coax Contacts with BMS13-65 Coax Cable

Table 19
CENTER CONTACT CRIMP TOOLS

Coax Contact	Basic Unit		Locator
	Part Number	Setting	
CRC280-4	M22520/2-01	5	640001
			K709

Table 20
COAX CONTACT BODY CRIMP TOOL

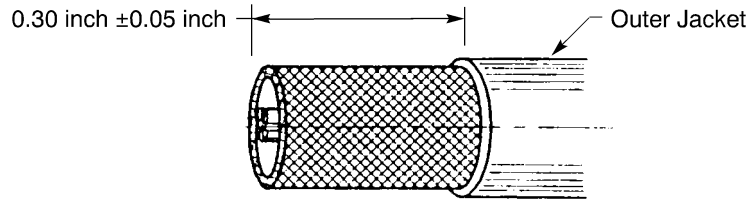
Coax Contact	Basic Unit	Die	
		Part Number	Cavity
CRC280-4	612648	612642	B
	KTH-1000	KTH-2007	A
	M22520/5-01	M22520/5-05	B
		M22520/5-41	B
		Y197	B

- (1) Make a selection of a center contact crimp tool from Table 19.
- (2) Make a selection of a contact body crimp tool from Table 20.
- (3) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
- (4) Remove 0.30 inch ±0.05 inch of the outer jacket from the end of the cable. Refer to Figure 13.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

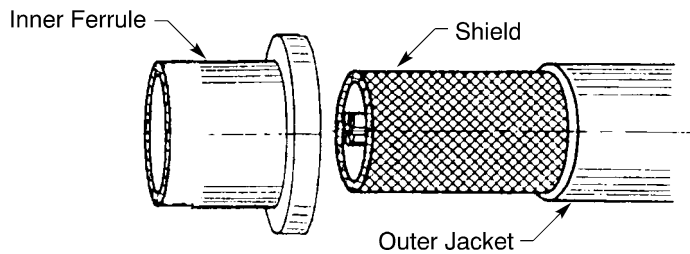
CAUTION: DAMAGE TO THE SHIELD, THE DIELECTRIC, OR THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.



OUTER JACKET REMOVAL LENGTH

Figure 13

(5) Align the inner ferrule and the end of the cable. Refer to Figure 14.



ALIGNMENT OF THE INNER FERRULE AND THE END OF THE CABLE

Figure 14

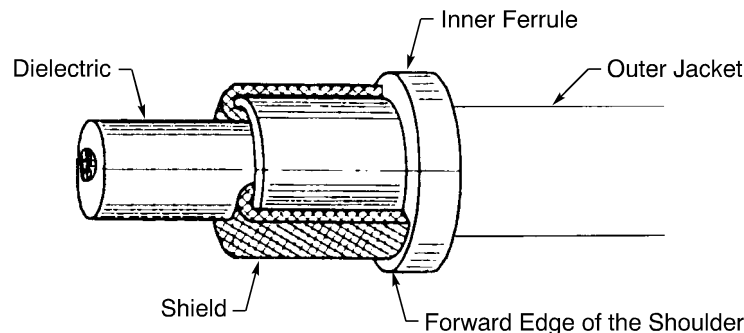
(6) Push the inner ferrule rearward until the shoulder of the ferrule is against the end of the outer jacket.

(7) Cut the flat conductor shield at the forward edge of the inner ferrule.

(8) Fold the shield back on the outer surface of the inner ferrule.

Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.

(9) Cut the strands of the shield at the forward edge of the shoulder of the inner ferrule. Refer to Figure 15.



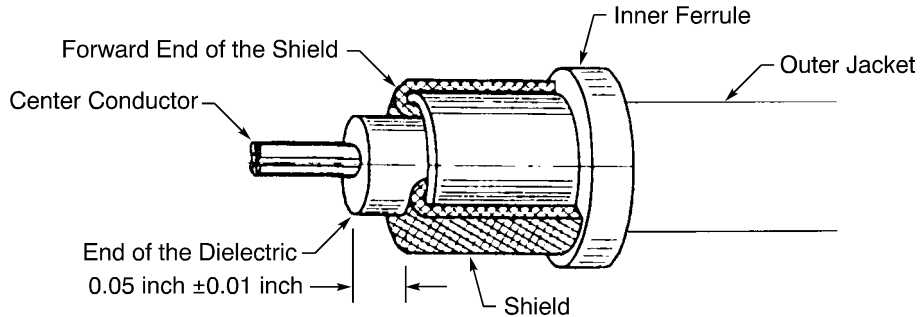
POSITION OF THE SHIELD ON THE INNER FERRULE

Figure 15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

- (10) Remove the necessary length of the dielectric to make the distance between the end of the forward end of the shield and the end of the dielectric equal to 0.05 inch \pm 0.01 inch. Refer to Figure 16.

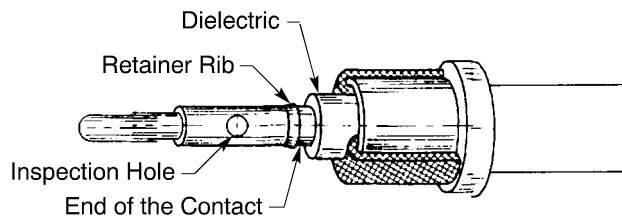


DIELECTRIC REMOVAL

Figure 16

- (11) If all of the strands of the center conductor are not together, twist the strands together in their initial direction.
- (12) Push the center conductor into the crimp barrel of the center contact until the end of the dielectric is against the end of the center contact. Refer to Figure 17.

Make sure that the strands of the conductor can be seen in the inspection hole.



POSITION OF THE CENTER CONTACT ON THE CENTER CONDUCTOR

Figure 17

- (13) Crimp the center contact.
- (14) Put the contact body on the center contact.
- (15) Push the center contact into the contact body until it is locked in position.
- (16) Lightly pull the cable to make sure that the center contact is locked in the contact body.
- (17) If the center contact is not locked in the contact body, do Step (15) and Step (16) again.
- (18) Put the contact in the crimp die.

Make sure that the rear end of the contact body is aligned with the edge of the crimp die.

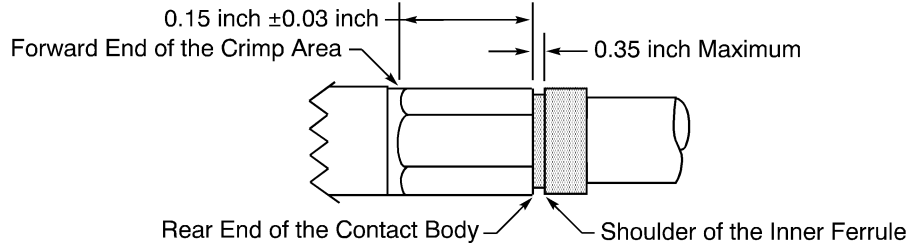
- (19) Crimp the contact body. Refer to Figure 18.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

Make sure that the distance from:

- The rear end of the contact body to the forward end of the crimp area is equal to 0.15 inch \pm 0.03 inch
- The rear end of the contact body to the shoulder of the inner ferrule is not more than 0.035 inch.



POSITION OF THE CONTACT BODY
Figure 18

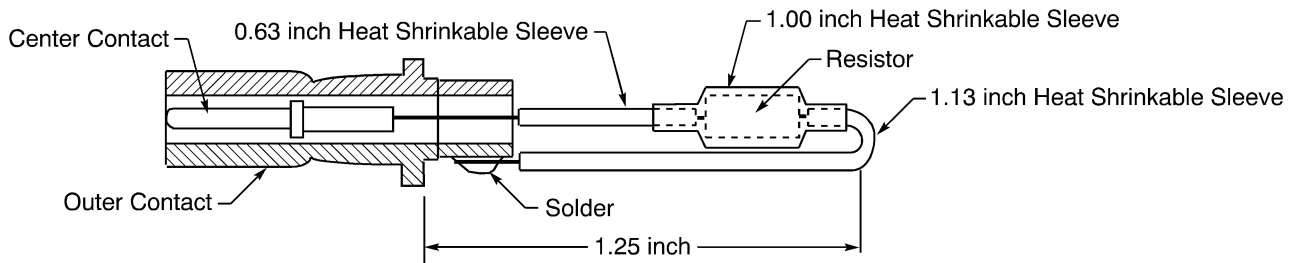
(20) Remove the unwanted length of the strands of the shield.

Make sure that the end of the shield is aligned with the rear end of the contact body.

E. Assembly of the Burndy KIT700-() Coax Contacts with an In-Line Resistor

Table 21
IN-LINE RESISTORS

Part Number	Supplier
RLR07C51R1FR	Available Source



ASSEMBLY OF THE COAX CONTACT WITH AN IN-LINE RESISTOR
Figure 19

Refer to Figure 19.

- (1) Make a selection of a resistor from Table 21.
- (2) Remove 0.50 inch \pm 0.06 inch from one lead of the resistor.
Make sure that each lead is the same length before the 0.50 inch is removed.
- (3) Put a 0.63 inch \pm 0.06 inch length of 1/16 inch diameter heat shrinkable sleeve on the shortest lead.
- (4) Put the end of the shortest lead into the crimp barrel of the center contact.
- (5) Apply a small quantity of solder to the of the shortest lead and the crimp barrel of the center contact.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

- (6) Put a 1.13 inch \pm 0.06 inch length of 1/16 inch diameter heat shrinkable sleeve on the longest lead of the resistor.
- (7) Put a 1.00 \pm 0.06 inch length of 3/16 inch diameter heat shrinkable sleeve on the resistor.
- (8) Install the assembled center contact in the outer contact.
- (9) Bend the resistor lead until it touches the side of the outer contact.
- (10) Apply a small quantity of solder to the lead and the side of the outer contact.
- (11) Align the center of the 1.00 inch heat shrinkable sleeve with the center of the resistor.
- (12) Shrink the sleeve into its position. Subject 20-10-14.

7. CONTACT INSERTION

A. Standard Contact Insertion

**Table 22
CONTACT INSERTION TOOLS**

Engaging End	Crimp Barrel	Wire O.D. (inch)	Basic Unit	Bit
20	20	Less than 0.06	ATB 1067	-
			DAK351	-
			RTPIT-085B	DAK602-2
			RTPIT-120B	DAK602-2
			ST2220-2	DAK602-2
		More than 0.06	294-88	-
			294-279	-
			AT 1020	-
			DAK20	-
			MS24256A20	-
	M81969/17-03		-	
	RTM20-16		-	
	RTPIT-085B		ST2220-2-1	
	RTPIT-120B		ST2220-2-1	
	ST2220-2		ST2220-2-1	
	ST2220-2	ST2220-2-30		
	18	-	RTPIT-085B	ST2220-2-1
			RTPIT-120B	ST2220-2-1
			ST2220-2	ST2220-2-1
			16	RTPIT-085B
RTPIT-120B				ST2220-2-1
ST2220-2				ST2220-2-1

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS**

- (1) Make a selection of a contact insertion tool from Table 22.
Refer to Subject 20-00-16 to find the O.D. of the wire.
- (2) Examine the tool.

CAUTION: DO NOT USE A TOOL WITH:

- A TIP THAT IS BENT
- A TIP THAT IS FLARED
- A TIP THAT IS BROKEN
- A TIP THAT HAS A CRACK.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE INSERT OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (3) Put the necessary connector assembly components on the wire harness.
- (4) Examine the contact.

Make sure that the contact:

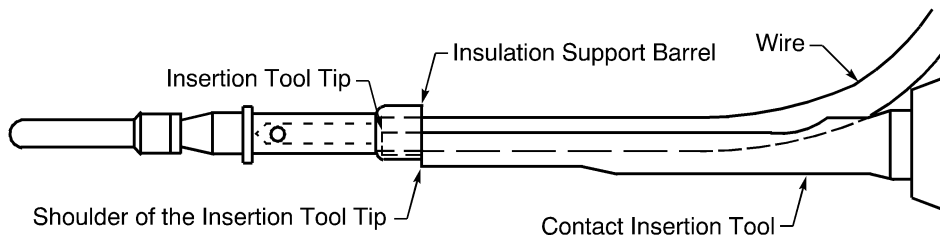
- Is straight
- Does not have damage.

NOTE: A contact with a bend or damage must be replaced.

- (5) Put the contact assembly in the insertion tool.

Refer to:

- Figure 20 for the correct position of the insertion tool tip on the contact assembly with a wire O.D. less than 0.06 inch
- Figure 21 for the correct position of the insertion tool tip on the contact assembly with a wire O.D. more than 0.06 inch.

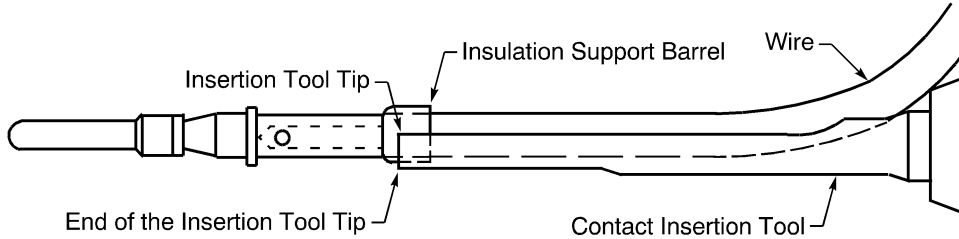


POSITION OF THE INSERTION TOOL TIP INSIDE THE WIRE INSULATION BARREL FOR SIZE 20 CONTACTS AND A WIRE O.D. LESS THAN 0.06 INCH

Figure 20

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS



POSITION OF THE INSERTION TOOL TIP OUTSIDE THE WIRE INSULATION BARREL FOR SIZE 20 CONTACTS AND A WIRE O.D. MORE THAN 0.06 INCH

Figure 21

- (6) Axially align the insertion tool and the contact cavity at the rear of the connector.
- (7) Carefully push the insertion tool and the contact assembly into the contact cavity until it stops. Make sure that the tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL WHEN THE TOOL IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (8) Carefully pull the tool out from the contact cavity. Make sure that the tool stays axially aligned with the contact cavity.
- (9) Lightly pull on the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (10) If the contact is not locked in the contact cavity:
 - (a) Pull the contact out of the contact cavity.
 - (b) Do Step (4) through Step (9) again.

B. Coax Contact Insertion

This Paragraph gives the procedure to install KIT700-() and 60B40052-() coax contacts. For the procedure to install a CRC280-4 coax contact, refer to Paragraph 4.F.

**Table 23
COAX CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
12	RTM12-5
	RX12-5
	ST2220-2-29

- (1) Make a selection of a coax contact insertion tool from Table 10.

NOTE: As an alternative, the contact can be inserted with the hand.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

- CAUTION:** DO NOT USE A TOOL WITH:
- A TIP THAT IS BENT
 - A TIP THAT IS FLARED
 - A TIP THAT IS BROKEN
 - A TIP THAT HAS A CRACK.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE INSERT OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (2) Put the necessary connector assembly components on the wire harness.
- (3) Examine the contact.

Make sure that the contact:

- Is straight
- Does not have damage.

NOTE: A contact that has a bend or damage must be replaced.

- (4) Put the contact assembly in the insertion tool.
- (5) Axially align the insertion tool and the contact cavity at the rear of the connector.
- (6) Carefully push the tool and the contact assembly into the contact cavity until it stops.

Make sure that the tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL WHEN THE TOOL IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (7) Carefully pull the tool out from the contact cavity.
Make sure that the tool stays axially aligned with the contact cavity.
- (8) Lightly pull the wire to make sure that the contact is locked.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE CABLE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE CABLE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (9) If the contact is not locked in the contact cavity, do Step (5) through Step (8) again.

8. APPROVED TOOL SUPPLIERS

A. Contact Crimp Tools

**Table 24
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11148	Buchanan
612642	Buchanan
612648	Buchanan
614019	Buchanan
640001	Astro

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

Table 24 (continued)

Crimp Tool	Supplier
K709	Daniels
KTH-1000	Kings
KTH-2007	Kings
M10S-1	Burndy
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
M22520/5-01	QPL
M22520/5-05	QPL
M22520/5-41	QPL
MS3191-1	QPL
MS3191-20	QPL
S-30	Burndy
S-35	Burndy
SL-58	Burndy
SL-72	Burndy
ST2220-1-1	Boeing
ST2220-1-Y	Boeing
ST2220-1-47	Boeing
WA22	Daniels
WA27F	Daniels
WT 202-06-08	Thomas & Betts
WT 202	Thomas & Betts
Y197	Daniels

B. Contact Insertion Tools

**Table 25
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
294-279	Amphenol
294-72	Amphenol



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

Table 25 (continued)

Insertion Tool	Supplier
294-88	Amphenol
AT 1020	Astro
ATB 1067	Astro
DAK20	Daniels
DAK351	Daniels
DAK602-2	Daniels
M81969/17-03	QPL
M81969/17-05	QPL
MS24256A12	QPL
MS24256A20	QPL
RTPIT-085B	Russtech
RTPIT-120B	Russtech
RTM12-5	Burndy
RTM20-16	Burndy
RX12-5	Burndy
ST2220-2	Boeing
ST2220-2-1	Boeing
ST2220-2-29	Boeing
ST2220-2-30	Boeing

C. Contact Removal Tools

Table 26
REMOVAL TOOL SUPPLIERS

Removal Tools	Supplier
294-73	Amphenol
294-89	Amphenol
AT 2012	Astro
AT 2020	Astro
DRK20	Daniels
DRK56-12	Daniels
M81969/19-02	QPL
M81969/19-06	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 60B40052-() AND BURNDY MB6, MB10, MB12, MB13, AND MB24 CONNECTORS

Table 26 (continued)

Removal Tools	Supplier
MS24256R12	QPL
MS24256R20	QPL
MS90456-12	QPL
RTM20-16	Burndy
RX12-7	Burndy
RX20-24V5	Burndy
ST2220-3-13	Boeing
ST2220-3-15	Boeing

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ASSEMBLY OF FENWAL CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Connector Type	Contact Type	Supplier
04-035303-087	Plug	Socket	Fenwal
35303-8	Receptacle	Pin	Fenwal
35303-9	Plug	Socket	Fenwal
35303-10	Receptacle	Pin	Fenwal
35303-100	Plug	Socket	Fenwal
35303-11	Plug	Socket	Fenwal
35303-12	Receptacle	Pin	Fenwal
35303-64	Receptacle	Pin	Fenwal
35303-66	Receptacle	Pin	Fenwal
35303-67	Plug	Socket	Fenwal
35303-68	Receptacle	Pin	Fenwal
35303-73	Receptacle	Pin	Fenwal
35303-75	Receptacle	Pin	Fenwal
35303-77	Plug	Socket	Fenwal
35303-87	Plug	Socket	Fenwal
35303-90	Receptacle	Pin	Fenwal
35303-91	Plug	Socket	Fenwal
35303-94	Receptacle	Pin	Fenwal
35303-95	Plug	Socket	Fenwal
35303-97	Receptacle	Pin	Fenwal
35303-98	Plug	Socket	Fenwal
35303-99	Receptacle	Pin	Fenwal

Table 2
ALTERNATIVE CONNECTOR PART NUMBERS

Specified Connector	Alternative Connector
35303-90	35303-97
35303-91	35303-98
35303-94	35303-99
35303-95	35303-100

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

2. NECESSARY TOOLS AND MATERIALS

A. Necessary Materials

**Table 3
CEMENTS**

Part Number	Minimum Cure Time at 70degrees F (hours)	Supplier
No. 1	18	Sauereisen
No. 31	18	Sauereisen
Resbond 940	8	Cotronics

**Table 4
HEAT SHRINKABLE SLEEVES**

Size (inch)		Part Number or Specification	Supplier
Outer Diameter	Wall Thickness		
0.060 through 0.191	0.016	MIL-DTL-23053/12 Class 2	QPL
		MIL-I-23053/12 Class 2	QPL
		SAE-AMS-DTL-23053/12 Class 2	QPL
		TFE-2X	Chemplast Zeus
0.078	0.009	MIL-DTL-23053/12 Class 5	QPL
		MIL-I-23053/12 Class 5	QPL
		SAE-AMS-DTL-23053/12 Class 5	QPL
		TFE-4X	Chemplast Zeus
0.125 through 0.250	0.012	MIL-DTL-23053/12 Class 5	QPL
		MIL-I-23053/12 Class 5	QPL
		SAE-AMS-DTL-23053/12 Class 5	QPL
		TFE-4X	Chemplast Zeus

**Table 5
TAPES**

Description	Part Number	Supplier
Polyimide, 0.75 inch width minimum	2345-2	Fluorglas
		Saint Gobain Performance Plastics
PTFE, 0.75 inch width minimum	P-421	Permacel

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

Table 5 (continued)

Description	Part Number	Supplier
PTFE, 0.75 inch width minimum	Scotch 61	3M
Polyimide, 0.75 inch width minimum	Scotch 92	3M

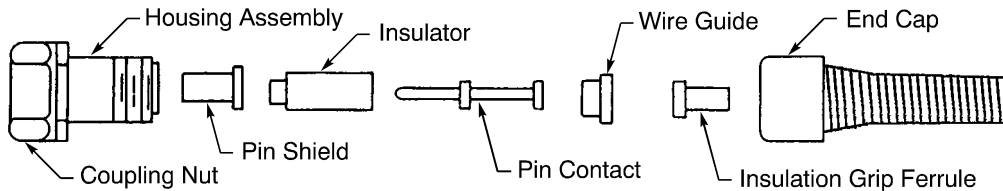
B. Necessary Tools

Table 6
NECESSARY TOOLS

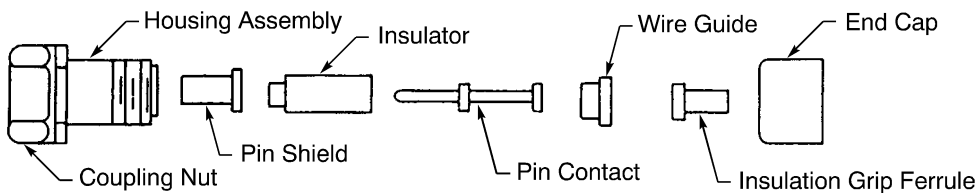
Tool	Size (inch)	Special Instructions
Crow Foot Adapter	3/8	-
	1/2	-
Socket	3/8	-
	1/2	-
Torque Tool	-	Tool must measure 65 inch-pounds minimum
Wrench	1/2	-

3. ASSEMBLY OF FENWAL 35303-8, 35303-10, 35303-12, AND 35303-73 CONNECTORS

A. Connector Description



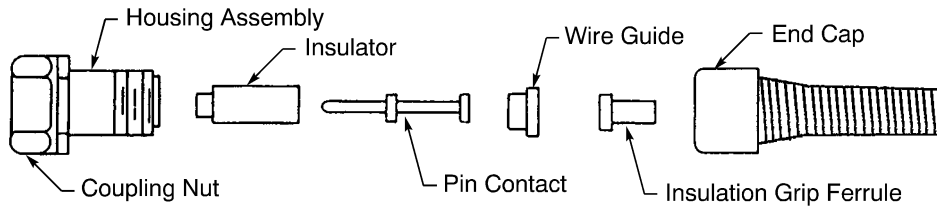
FENWAL 35303-8 AND 35303-10 CONNECTORS
Figure 1



FENWAL 35303-73 CONNECTORS
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



FENWAL 335303-12 CONNECTOR
Figure 3

B. Contact Assembly

Table 7
CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Tools			
	Basic Unit		Locator	
	Part Number	Setting	Part Number	Color
20	11921	-	3795-1	-
	85-550	5	TH338	Red
			TP673	-
	M22520/1-01	-	TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
WA27F	5	TH338	Red	
		TP673	-	
18	11921	-	3795-1	-
	85-550	6	TH338	Red
			TP673	-
	M22520/1-01	-	TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
WA27F	6	TH338	Red	
		TP673	-	

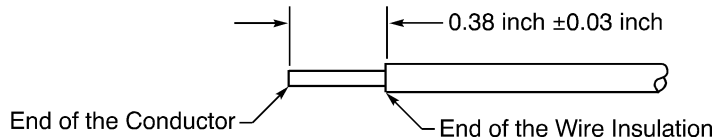
- (1) Make a selection of a crimp tool from Table 7.
- (2) Remove the 0.38 inch ±0.03 inch of insulation from the end of the wire.

Refer to:

- Figure 4
- Subject 20-00-15 for the insulation removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



WIRE PREPARATION
Figure 4

- (3) Put the end cap on the wire.
Make sure that the end of the end cap that has threads is pointed to the end of the wire.
- (4) Put the insulation grip ferrule on the wire.
Make sure that the larger end is pointed to the end of the wire.
- (5) Increase the O.D. of the wire until the O.D. of the wire is approximately 0.120 inch.

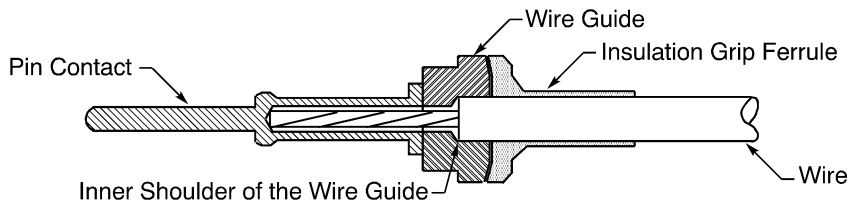
Refer to:

- Paragraph 10.A. for the procedure to increase the O.D. of the wire with one or more heat shrinkable sleeves
- Paragraph 10.B. for the procedure to increase the O.D. of the wire with layers of tape.

- (6) Put the wire guide on the wire. Refer to Figure 5.

Make sure that:

- The inner shoulder of the wire guide is against the end of the wire insulation
- If a heat shrinkable sleeve or layer of tape is used to increase the wire O.D, the wire guide does not push the heat shrinkable sleeve or the layer of tape out of its shape.



POSITION OF THE CONTACT AND THE WIRE GUIDE ON THE WIRE
Figure 5

- (7) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the forward end of the crimp barrel. Refer to Figure 5.
Make sure that all of the conductors are in the crimp barrel.
- (8) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

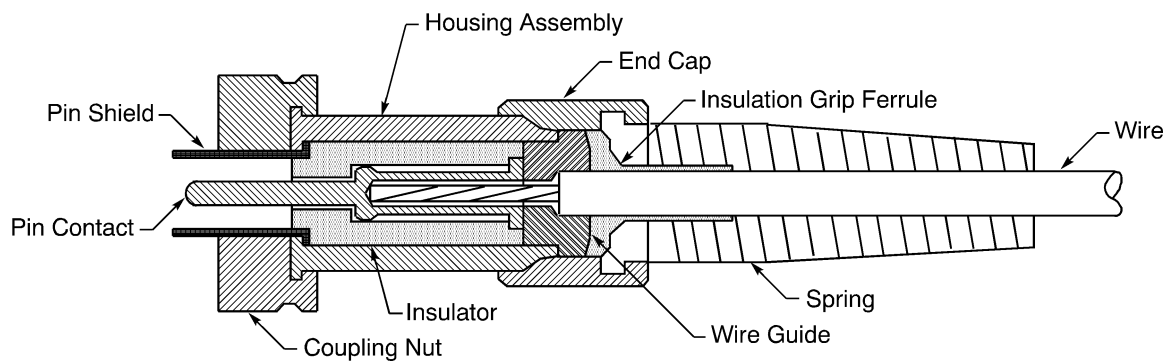
C. Connector Assembly

**Table 8
FERRULE CRIMP TOOLS**

Connector	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
35303-8	M22520/5-01	M22520/5-45	B
	WT-409	-	-
35303-10	M22520/5-01	M22520/5-37	B
	WT-401	-	-
35303-12	M22520/5-01	M22520/5-37	B
	WT-401	-	-
35303-73	M22520/5-01	M22520/5-37	B
	WT-401	-	-

**Table 9
CONNECTOR ASSEMBLY TOOLS**

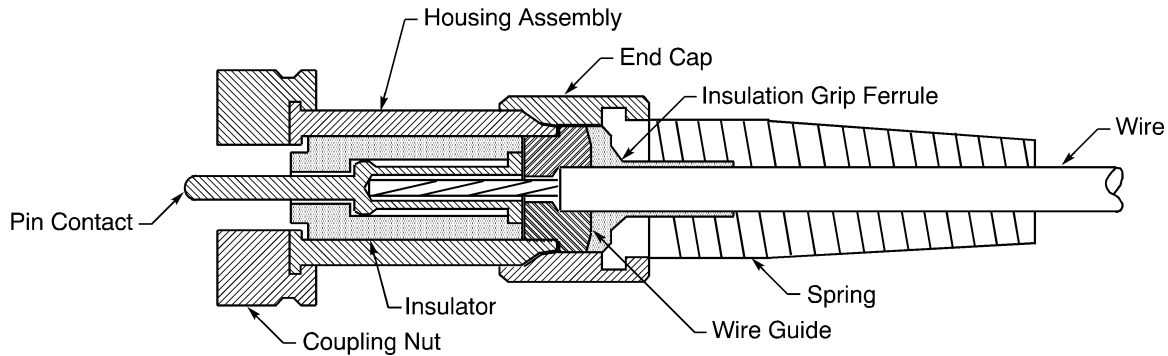
Tool	Part Number
Pliers	ST2598C
Torque Adapter	ST2575A
	ST2575B
Vice	ST2598C-201



**FENWAL 35303-8 AND 35303-10 CONNECTOR ASSEMBLY
Figure 6**

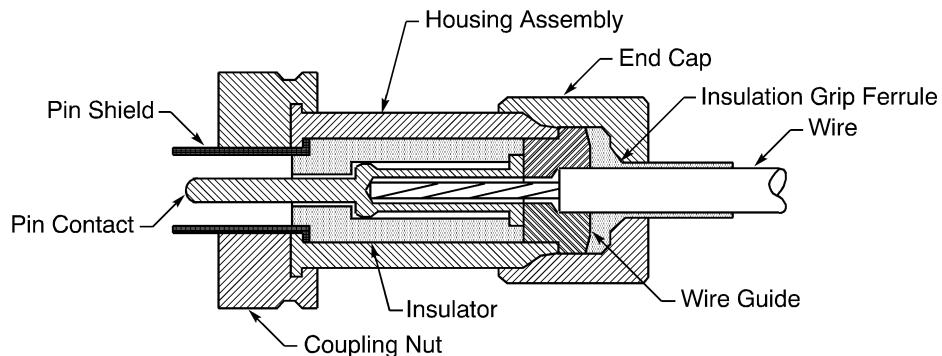
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



FENWAL 35303-12 CONNECTOR ASSEMBLY

Figure 7



FENWAL 35303-73 CONNECTOR ASSEMBLY

Figure 8

Refer to Figure 6, Figure 7, or Figure 8.

- (1) Make a selection of these tools from Table 6:
 - A torque wrench
 - A 1/2 inch wrench
 - A 1/2 inch socket or a 1/2 inch crow foot adapter.

- (2) Make a selection of a cement from Table 3.
- (3) Make a selection of a ferrule crimp tool from Table 8.
- (4) Make a selection of a torque adapter from Table 9.

NOTE: The housing assembly of a plug connector is a satisfactory alternative for a torque adapter.

- (5) Make a selection of pliers or a vice from Table 9.
- (6) Put the insulator on the contact.

Make sure the rear end of the insulator is against the wire guide.

- (7) Put the pin shield on the contact.

NOTE: The 35303-12 connector does not have a pin shield.

Make sure that the rear end of the pin shield is against the insulator

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

- (8) Put the housing assembly on the contact assembly.
- (9) Push the insulation grip ferrule forward until the ferrule is fully against the wire guide.
- (10) Crimp the ferrule.
- (11) Apply a layer of cement on the first three threads of the housing assembly.
- (12) Push the end cap forward on the ferrule until the end cap is against the housing assembly.
- (13) Fully engage the threads of the end cap and the threads of the housing assembly.
- (14) Torque the torque adapter and the housing assembly:
 - (a) Fully engage the threads of the torque adapter and the threads of the coupling nut.
 - (b) Put the torque wrench with the crow foot adapter or the socket on the torque adapter.
 - (c) Put the 1/2 inch wrench on the coupling nut.
 - (d) Torque the adapter 65 inch-pounds to 75 inch-pounds.
- (15) Torque the end cap:
 - (a) Hold the end cap tightly in the pliers or the vice.
 - (b) Put the torque wrench and the crow foot adapter or the socket on the torque adapter.
 - (c) Torque the end cap 50 inch-pounds to 60 inch-pounds.
- (16) Remove the unwanted cement from the surface of the housing assembly.
- (17) Hold the coupling nut with the 1/2 inch wrench.
- (18) Remove the torque adapter from the connector.
- (19) If the connector is not connected to a sensing element immediately, put a dust cap on the connector.

CAUTION: DO NOT LET FLUID OR CONTAMINATION GO INTO THE CONNECTOR. IF FLUID OR CONTAMINATION GOES INTO THE CONNECTOR, UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

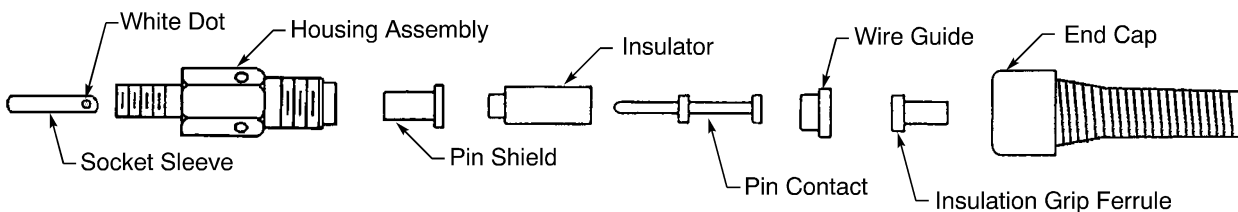
- (20) Cure the cement for the minimum cure time at 70 degrees F. Refer to Table 3.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The receptacle can be connected to the plug before the cement is fully cured.

4. ASSEMBLY OF FENWAL 35303-9 AND 35303-11 CONNECTORS

A. Connector Description



FENWAL 35303-9 AND 35303-11 CONNECTORS
Figure 9

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

B. Contact Assembly

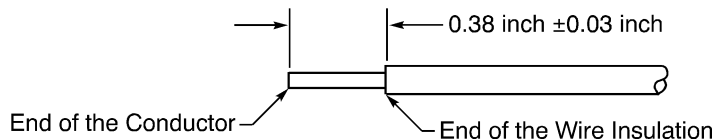
**Table 10
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Tools			
	Basic Unit		Locator	
	Part Number	Setting	Part Number	Color
20	11921	-	3795-1	-
	85-550	5	TH338	Red
			TP673	-
	M22520/1-01	5	M22520/1-02	Red
			TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
	WA27F	5	TH338	Red
TP673			-	
18	11921	-	3795-1	-
	85-550	6	TH338	Red
			TP673	-
	M22520/1-01	6	M22520/1-02	Red
			TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
	WA27F	6	TH338	Red
TP673			-	

- (1) Make a selection of a crimp tool from Table 10.
- (2) Remove the 0.38 inch ±0.03 inch of insulation from the end of the wire.

Refer to:

- Figure 10
- Subject 20-00-15 for the insulation removal procedures.



**WIRE PREPARATION
Figure 10**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

(3) Put the end cap on the wire.

Make sure that the end of the end cap that has threads is pointed to the end of the wire.

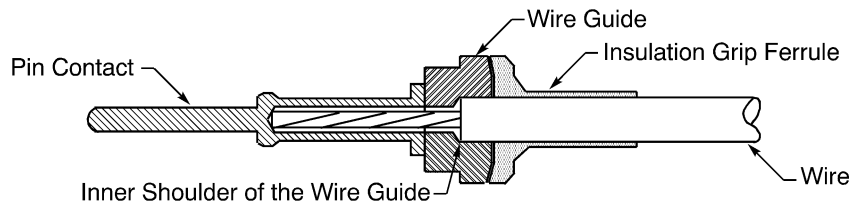
(4) Put the insulation grip ferrule on the wire.

Make sure that the larger end is pointed to the end of the wire.

(5) Put the wire guide on the wire. Refer to Figure 11.

Make sure that:

- The inner shoulder of the wire guide is against the end of the wire insulation
- If a heat shrinkable sleeve or layer of tape is used to increase the wire O.D, the wire guide does not push the heat shrinkable sleeve or the layer of tape out of its shape.



POSITION OF THE CONTACT, THE WIRE GUIDE, AND THE FERRULE ON THE WIRE
Figure 11

(6) Increase the O.D. of the wire until the O.D. of the wire is approximately 0.120 inch.

Refer to:

- Paragraph 10.A. for the procedure to increase the O.D. of the wire with one or more heat shrinkable sleeves
- Paragraph 10.B. for the procedure to increase the O.D. of the wire with layers of tape.

(7) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the forward end of the crimp barrel. Refer to Figure 11.

Make sure that all of the conductors are in the crimp barrel.

(8) Crimp the contact.

C. Connector Assembly

Table 11
FERRULE CRIMP TOOLS

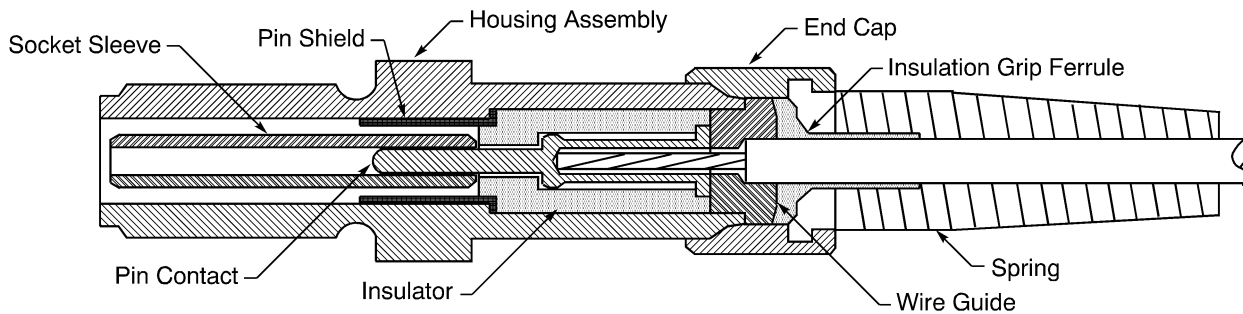
Basic Unit	Die	
	Part Number	Cavity
M22520/5-01	M22520/5-37	B
WT-401	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

**Table 12
CONNECTOR ASSEMBLY TOOLS**

Tool	Part Number
Pliers	ST2598C
Screw Press	ST2575C
Vice	ST2598C-201



FENWAL 35303-9 AND 35303-11 CONNECTOR ASSEMBLY

Figure 12

Refer to Figure 12.

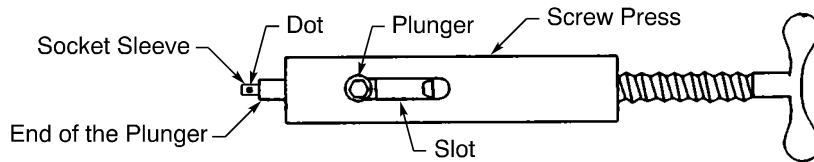
- (1) Make a selection of these tools from Table 6:
 - A torque wrench
 - A 3/8 inch socket or a 3/8 inch crow foot adapter.
- (2) Make a selection of a cement from Table 3.
- (3) Make a selection of a ferrule crimp tool from Table 11.
- (4) Make a selection of pliers or a vice from Table 12.
- (5) Make a selection of a screw press from Table 12.
- (6) Put the insulator on the contact.
Make sure the rear end of the insulator is against the wire guide.
- (7) Put the pin shield on the contact.
Make sure that the rear end of the pin shield is against the insulator
- (8) Put the housing assembly on the contact assembly.
- (9) Push the insulation grip ferrule forward until it is fully against the wire guide.
- (10) Crimp the ferrule.
- (11) Apply a layer of cement on the first three threads of the housing assembly.
- (12) Push the end cap forward on the ferrule until the end cap is against the housing assembly.
- (13) Tighten the end cap on the housing assembly:
 - (a) Fully engage the threads of the end cap and the threads of the housing assembly.
 - (b) Hold the end cap tightly in the pliers or the vice.
 - (c) Put the torque wrench with the crow foot adapter or the socket on the housing assembly.

20-62-14

STANDARD WIRING PRACTICES MANUAL

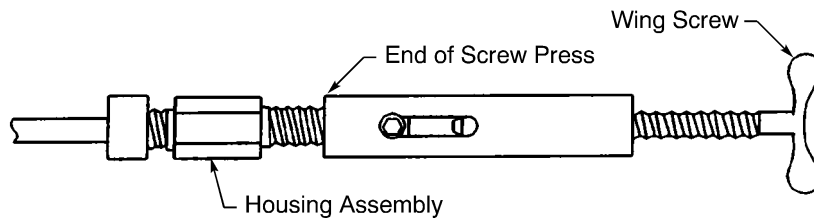
ASSEMBLY OF FENWAL CONNECTORS

- (d) Torque the end cap 50 inch-pounds to 60 inch-pounds.
- (14) Remove the unwanted cement from the surface of the housing assembly.
- (15) Install the socket sleeve with the screw press:
 - (a) Move the plunger of the screw press to the end of the slot.
 - (b) Put the end of the socket sleeve without a white dot in the end of the plunger. Refer to Figure 13.



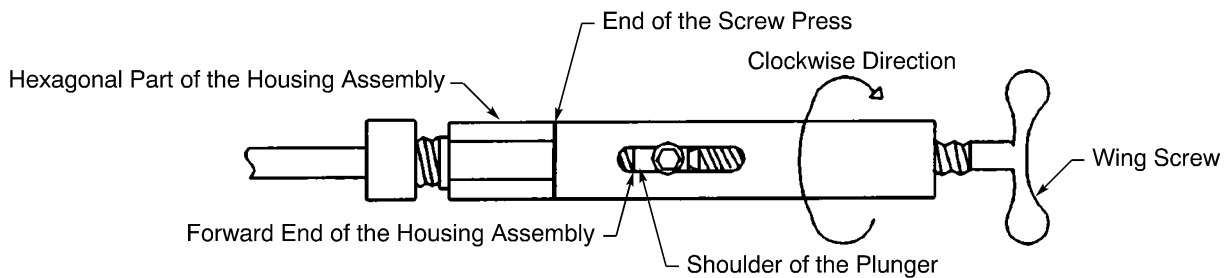
POSITION OF THE SOCKET SLEEVE IN THE SCREW PRESS
Figure 13

- (c) Align the end of the screw press and the threads on the housing assembly.



ALIGNMENT OF THE SCREW PRESS AND THE CONNECTOR
Figure 14

- (d) Turn the screw press clockwise until the end of the screw press is against the hexagonal part of the housing assembly. Refer to Figure 15.



POSITION OF THE SCREW PRESS AGAINST THE HOUSING ASSEMBLY
Figure 15

- (e) Turn the wing screw clockwise until it stops. Refer to Figure 15.
- NOTE:** When the wing screw stops, the shoulder of the plunger is against the housing assembly.
- (f) Turn the screw press counter-clockwise to remove it from the housing assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

(16) If the connector is not connected to a sensing element immediately, put a dust cap on the connector.

CAUTION: DO NOT LET FLUID OR CONTAMINATION GO INTO THE CONNECTOR. IF FLUID OR CONTAMINATION GOES INTO THE CONNECTOR, UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

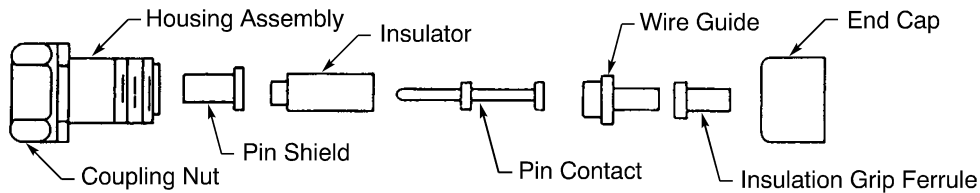
(17) Cure the cement a minimum of 18 hours at 70 degrees F before the connector is put in service.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The plug can be connected to the receptacle before the cement is fully cured.

5. ASSEMBLY OF FENWAL 35303-64, 35303-66 AND 35303-68 CONNECTORS

A. Connector Description



FENWAL 35303-64, 35303-66 AND 35303-68 CONNECTORS

Figure 16

B. Contact Assembly

**Table 13
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Setting	Part Number	Color
20	11921	-	3795-1	-
	85-550	5	TH338	Red
			TP673	-
	M22520/1-01	-	TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
	WA27F	5	TH338	Red
			TP673	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

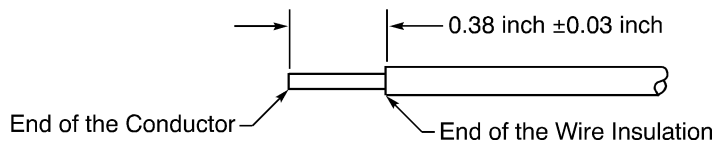
Table 13 (continued)

Wire Size (AWG)	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Setting	Part Number	Color
18	11921	-	3795-1	-
	85-550	6	TH338	Red
			TP673	-
	M22520/1-01	-	TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
	WA27F	6	TH338	Red
			TP673	-

- (1) Make a selection of a crimp tool from Table 13.
- (2) Remove the 0.38 inch \pm 0.03 inch of insulation from the end of the wire.

Refer to:

- Figure 17
- Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 17

- (3) Put the end cap on the wire.
Make sure that the end of the end cap that has threads is pointed to the end of the wire.
- (4) Put the insulation grip ferrule on the wire.
- (5) Increase the O.D. of the wire until the O.D. of the wire is approximately 0.120 inch.

Refer to:

- Paragraph 10.A. for the procedure to increase the O.D. of the wire with one or more heat shrinkable sleeves
- Paragraph 10.B. for the procedure to increase the O.D. of the wire with layers of tape.

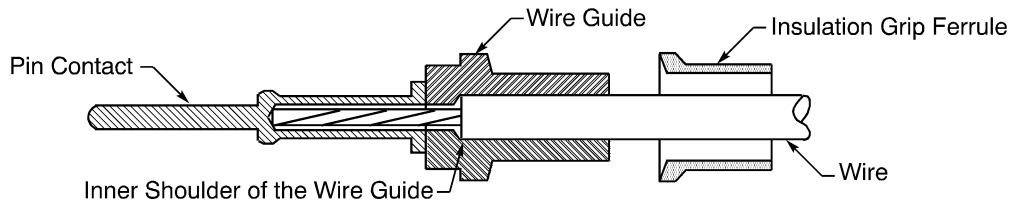
- (6) Put the wire guide on the wire. Refer to Figure 18.

Make sure that:

- The inner shoulder of the wire guide is against the end of the wire insulation
- If a heat shrinkable sleeve or layer of tape is used to increase the wire O.D, the wire guide does not push the heat shrinkable sleeve or the layer of tape out of its shape.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



POSITION OF THE CONTACT AND THE WIRE GUIDE ON THE WIRE
Figure 18

- (7) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the forward end of the crimp barrel. Refer to Figure 18.
 Make sure that all of the conductors are in the crimp barrel.
- (8) Crimp the contact.

C. Connector Assembly

Table 14
FERRULE CRIMP TOOLS

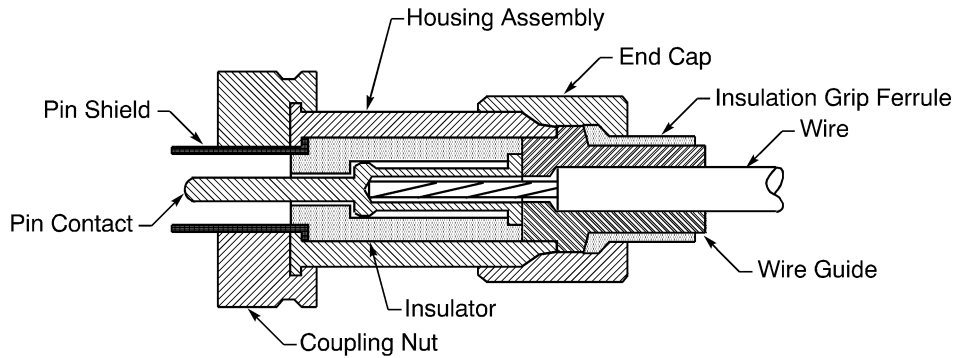
Basic Unit	Die	
	Part Number	Cavity
M22520/5-01	M22520/5-45	B
WT-409	-	-

Table 15
CONNECTOR ASSEMBLY TOOLS

Tool	Part Number
Pliers	ST2598C
Screw Press	ST2575C
Torque Adapter	ST2575A
	ST2575B
Vice	ST2598C-201

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



FENWAL 35303-64, 35303-66 AND 35303-68 CONNECTOR ASSEMBLY

Figure 19

Refer to Figure 19.

- (1) Make a selection of these tools from Table 6:
 - A torque wrench
 - A 1/2 inch wrench
 - A 1/2 inch socket or a 1/2 inch crow foot adapter.
- (2) Make a selection of a cement from Table 3.
- (3) Make a selection of a ferrule crimp tool from Table 14.
- (4) Make a selection of a torque adapter from Table 15.

NOTE: The housing assembly of a plug connector is a satisfactory alternative for a torque adapter.
- (5) Make a selection of pliers or a vice from Table 15.
- (6) Put the insulator on the pin contact.

Make sure the rear end of the insulator is against the wire guide.
- (7) Put the pin shield on the contact.

Make sure that the rear end of the pin shield is against the insulator
- (8) Put the housing assembly on the contact assembly.
- (9) Apply a layer of cement to the first three threads of the housing assembly.
- (10) Push the insulation grip ferrule forward until it is fully on the wire guide.
- (11) Push the end cap forward on the ferrule until the end cap is against the housing assembly.
- (12) Fully engage the threads of the end cap and the threads of the housing assembly.
- (13) Torque the torque adapter and the housing assembly:
 - (a) Fully engage the threads of the torque adapter and the threads of the coupling nut.
 - (b) Put the torque wrench and the crow foot adapter or the socket on the torque adapter.
 - (c) Put the 1/2 inch wrench on the coupling nut.
 - (d) Torque the adapter 65 inch-pounds to 75 inch-pounds.
- (14) Torque the end cap:
 - (a) Hold the end cap tightly in the pliers or the vice.
 - (b) Put the torque wrench and the crow foot adapter or the socket on the torque adapter.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF FENWAL CONNECTORS**

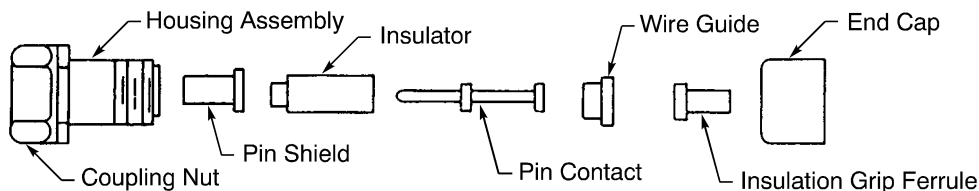
- (c) Torque the end cap 50 inch-pounds to 60 inch-pounds.
- (15) Remove the unwanted cement from the surface of the housing assembly.
- (16) Hold the coupling nut with the 1/2 inch.
- (17) Remove the torque adapter from the connector.
- (18) Crimp the ferrule.
- (19) If the connector is not connected to a sensing element immediately, put a dust cap on the connector.

CAUTION: DO NOT LET FLUID OR CONTAMINATION GO INTO THE CONNECTOR. IF FLUID OR CONTAMINATION GOES INTO THE CONNECTOR, UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

- (20) Cure the cement a minimum of 18 hours at 70 degrees F before the connector is put in service.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The receptacle can be connected to the plug before the cement is fully cured.

6. ASSEMBLY OF FENWAL 35303-75 CONNECTORS**A. Connector Description****FENWAL 35303-75 CONNECTOR****Figure 20**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

B. Contact Assembly

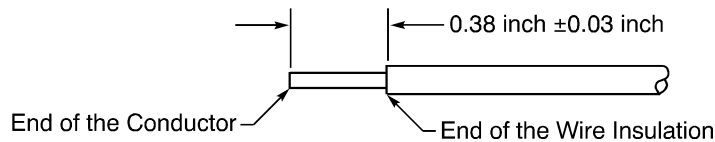
**Table 16
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Tools				
	Basic Unit		Locator		
	Part Number	Setting	Part Number	Color	
20	11921	-	3795-1	-	
	85-550	5	TH338	Red	
			TP673	-	
	M22520/1-01	-	TH338	Red	
			TP673	-	
	ST2220-1-Y	-	ST2220-1-7	-	
	WA27F	5	TH338	Red	
			TP673	-	
	18	11921	-	3795-1	-
		85-550	6	TH338	Red
TP673				-	
M22520/1-01		-	TH338	Red	
			TP673	-	
ST2220-1-Y		-	ST2220-1-7	-	
WA27F		6	TH338	Red	
			TP673	-	

- (1) Make a selection of a crimp tool from Table 16.
- (2) Remove the 0.38 inch ±0.03 inch of insulation from the end of the wire.

Refer to:

- Figure 21
- Subject 20-00-15 for the insulation removal procedures.



**WIRE PREPARATION
Figure 21**

- (3) Put the end cap on the wire.
Make sure that the end of the end cap that has threads is pointed to the end of the wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

- (4) Put the insulation grip ferrule on the wire. Refer to Figure 20.
- (5) Increase the O.D. of the wire until the O.D. of the wire is approximately 0.120 inch.

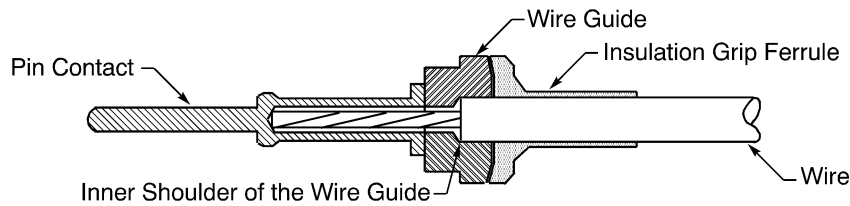
Refer to:

- Paragraph 10.A. for the procedure to increase the O.D. of the wire with one or more heat shrinkable sleeves
- Paragraph 10.B. for the procedure to increase the O.D. of the wire with layers of tape.

- (6) Put the wire guide on the wire. Refer to Figure 22.

Make sure that:

- The inner shoulder of the wire guide is against the end of the wire insulation
- If a heat shrinkable sleeve or layer of tape is used to increase the wire O.D, the wire guide does not push the heat shrinkable sleeve or the layer of tape out of its shape.



POSITION OF THE CONTACT AND THE WIRE GUIDE ON THE WIRE
Figure 22

- (7) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the forward end of the crimp barrel. Refer to Figure 22.

Make sure that all of the conductors are in the crimp barrel.

- (8) Crimp the contact.

C. Connector Assembly

Table 17
FERRULE CRIMP TOOLS

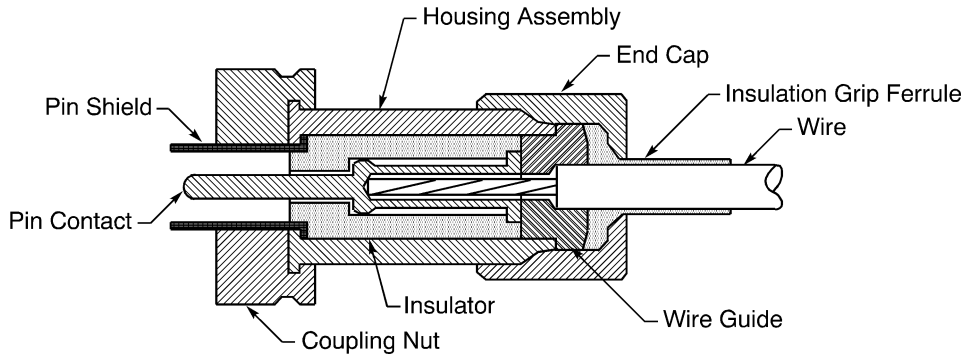
Basic Unit	Die	
	Part Number	Cavity
M22520/5-01	M22520/5-45	B
WT-409	-	-

Table 18
CONNECTOR ASSEMBLY TOOLS

Tool	Part Number
Pliers	ST2598C
Torque Adapter	ST2575A
	ST2575B
Vice	ST2598C-201

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



FENWAL 35303-75 CONNECTOR ASSEMBLY
Figure 23

Refer to Figure 23.

- (1) Make a selection of these tools from Table 6:
 - A torque wrench
 - A 1/2 inch wrench
 - A 1/2 inch socket or a 1/2 inch crow foot adapter.

- (2) Make a selection of a cement from Table 3.
- (3) Make a selection of a torque adapter from Table 18.

NOTE: The housing of a plug connector is a satisfactory alternative for a torque adapter.

- (4) Make a selection of pliers or a vice from Table 18.
- (5) Make a selection of a ferrule crimp tool from Table 17.
- (6) Put the insulator on the pin contact.
 Make sure the rear end of the insulator is against the wire guide.
- (7) Put the pin shield on the contact.
 Make sure that the rear end of the pin shield is against the insulator
- (8) Put the housing assembly on the contact assembly.
- (9) Apply a layer of cement to the first three threads of the housing assembly.
- (10) Push the insulation grip ferrule forward until the is fully on the wire guide.
- (11) Push the end cap forward on the ferrule until the end cap is against the housing assembly.
- (12) Fully engage the threads of the end cap and the threads of the housing assembly.
- (13) Torque the torque adapter and the coupling nut.
 - (a) Fully engage the threads of the torque adapter and the threads of the coupling nut.
 - (b) Put the torque wrench and the crow foot adapter or the socket on the torque adapter.
 - (c) Put the 1/2 inch wrench on the coupling nut.
 - (d) Torque the adapter 65 inch-pounds to 75 inch-pounds.
- (14) Torque the end cap.
 - (a) Hold the end cap tightly in the pliers or the vice.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

- (b) Put the torque wrench and the crow foot adapter or the socket on the torque adapter.
- (c) Torque the end cap 50 inch-pounds to 60 inch-pounds.
- (15) Remove the unwanted cement from the surface of the housing assembly.
- (16) Hold the coupling nut with the 1/2 inch wrench.
- (17) Remove the torque adapter from the connector.
- (18) Crimp the ferrule.
- (19) If the connector is not connected to a sensing element immediately, put a dust cap on the connector.

CAUTION: DO NOT LET FLUID OR CONTAMINATION GET INTO THE CONNECTOR. IF FLUID OR CONTAMINATION GOES INTO THE CONNECTOR, UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

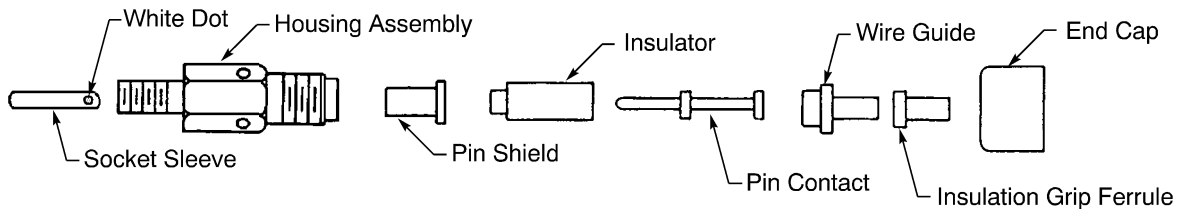
- (20) Cure the cement a minimum of 18 hours at 70 degrees F before the connector is put in service.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The receptacle can be connected to the plug before the cement is fully cured.

7. ASSEMBLY OF FENWAL 35303-67, 35303-77, 35303-87, AND 04-035303-087 CONNECTORS

A. Connector Description



FENWAL 35303-67, 35303-77, 35303-87, AND 04-035303-087 CONNECTORS
Figure 24

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

B. Contact Assembly

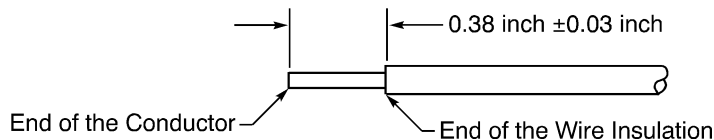
**Table 19
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Setting	Part Number	Color
20	11921	-	3795-1	-
	85-550	5	TH338	Red
			TP673	-
	M22520/1-01	5	M22520/1-02	Red
			TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
	WA27F	5	TH338	Red
TP673			-	
18	11921	-	3795-1	-
	85-550	6	TH338	Red
			TP673	-
	M22520/1-01	6	M22520/1-02	Red
			TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
	WA27F	6	TH338	Red
TP673			-	

- (1) Make a selection of a crimp tool from Table 19.
- (2) Remove the 0.38 inch ±0.03 inch of insulation from the end of the wire.

Refer to:

- Figure 25
- Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 25

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

- (3) Put the end cap on the wire.
Make sure that the end of the end cap that has threads is pointed to the end of the wire.
- (4) Put the insulation grip ferrule on the wire. Refer to Figure 24.
- (5) Increase the O.D. of the wire until the O.D. of the wire is approximately 0.120 inch.

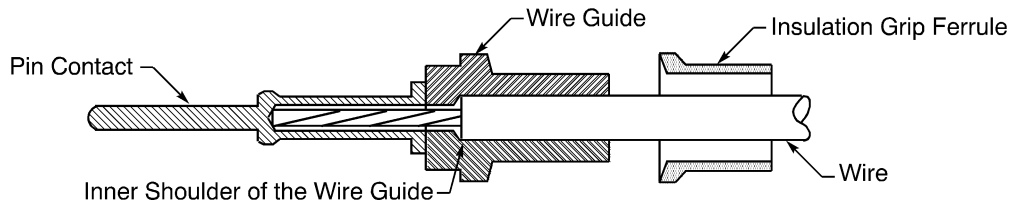
Refer to:

- Paragraph 10.A. for the procedure to increase the O.D. of the wire with one or more heat shrinkable sleeves
- Paragraph 10.B. for the procedure to increase the O.D. of the wire with layers of tape.

- (6) Put the wire guide on the wire. Refer to Figure 26.

Make sure that:

- The inner shoulder of the wire guide is against the end of the wire insulation
- If a heat shrinkable sleeve or layer of tape is used to increase the wire O.D, the wire guide does not push the heat shrinkable sleeve or the layer of tape out of its shape.



POSITION OF THE CONTACT, THE WIRE GUIDE, AND THE FERRULE ON THE WIRE
Figure 26

- (7) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the forward end of the crimp barrel. Refer to Figure 26.
Make sure that all of the conductors are in the crimp barrel.
- (8) Crimp the contact.

C. Connector Assembly

Table 20
FERRULE CRIMP TOOLS

Basic Unit	Die	
	Part Number	Cavity
M22520/5-01	M22520/5-45	B
WT-409	-	-

Table 21
CONNECTOR ASSEMBLY TOOLS

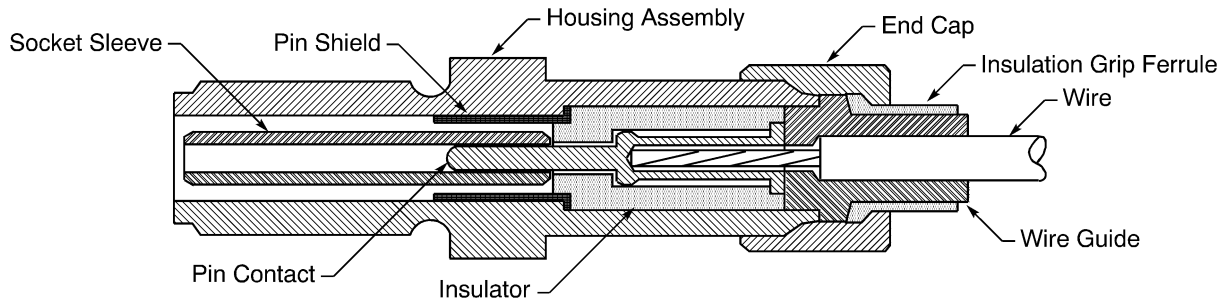
Tool	Part Number
Pliers	ST2598C
Screw Press	ST2575C

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

Table 21 (continued)

Tool	Part Number
Vice	ST2598C-201



FENWAL 35303-67, 35303-77, 35303-87, AND 04-035303-087 CONNECTOR ASSEMBLY
Figure 27

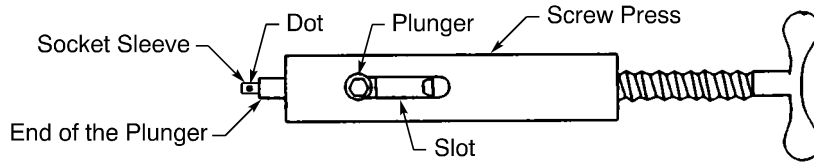
Refer to Figure 27.

- (1) Make a selection of these tools from Table 6:
 - A torque wrench
 - A 3/8 inch socket or a 3/8 inch crow foot adapter.
- (2) Make a selection of a cement from Table 3.
- (3) Make a selection of a ferrule crimp tool from Table 20.
- (4) Make a selection of pliers or a vice to hold the end cap from Table 21.
- (5) Make a selection of a screw press from Table 21.
- (6) Put the insulator on the pin contact.
 Make sure the rear end of the insulator is against the wire guide.
- (7) Put the pin shield on the contact.
 Make sure that the rear end of the pin shield is against the insulator
- (8) Put the housing assembly on the contact assembly.
- (9) Apply a layer of cement to the first three threads of the housing assembly.
- (10) Push the ferrule forward until it is fully on the wire guide.
- (11) Push the end cap forward on the ferrule until the end cap is against the housing assembly.
- (12) Tighten the end cap on the housing assembly:
 - (a) Fully engage the threads of the end cap and the threads of the housing assembly.
 - (b) Hold the end cap tightly in the pliers or the vice.
 - (c) Put the torque wrench with the crow foot adapter or the socket on the housing assembly.
 - (d) Torque the end cap 50 inch-pounds to 60 inch-pounds.
- (13) Remove the unwanted cement from the surface of the housing assembly.
- (14) Crimp the insulation grip ferrule.
- (15) Install the socket sleeve with the screw press:

STANDARD WIRING PRACTICES MANUAL

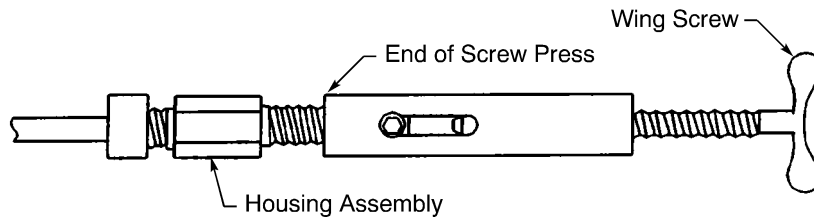
ASSEMBLY OF FENWAL CONNECTORS

- (a) Move the plunger of the screw press to the end of the slot.
- (b) Put the end of the socket sleeve without a white dot in the plunger. Refer to Figure 28.



POSITION OF THE SOCKET SLEEVE IN THE SCREW PRESS
Figure 28

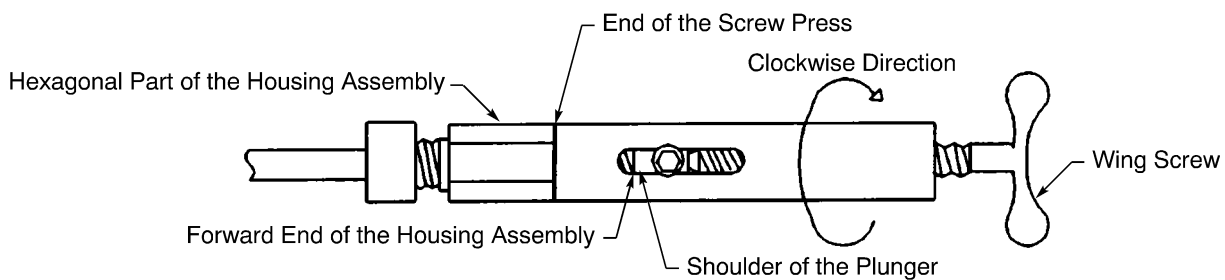
- (c) Align the end of the screw press with the threads on the housing assembly.



ALIGNMENT OF THE SCREW PRESS AND THE CONNECTOR
Figure 29

- (d) Turn the screw press clockwise until the end of the screw press is against the hexagonal part of the housing assembly.
- (e) Turn the wing screw clockwise until it stops. Refer to Figure 30.

NOTE: When the wing screw stops, the shoulder of the plunger is against the housing assembly.



POSITION OF THE SCREW PRESS AGAINST THE HOUSING ASSEMBLY
Figure 30

- (f) Turn the screw press counter-clockwise to remove it from the housing assembly.
- (16) If the connector is not connected to a sensing element immediately, put a dust cap on the connector.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

CAUTION: DO NOT LET FLUID OR CONTAMINATION GET INTO THE CONNECTOR. IF FLUID OR CONTAMINATION GOES INTO THE CONNECTOR, UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

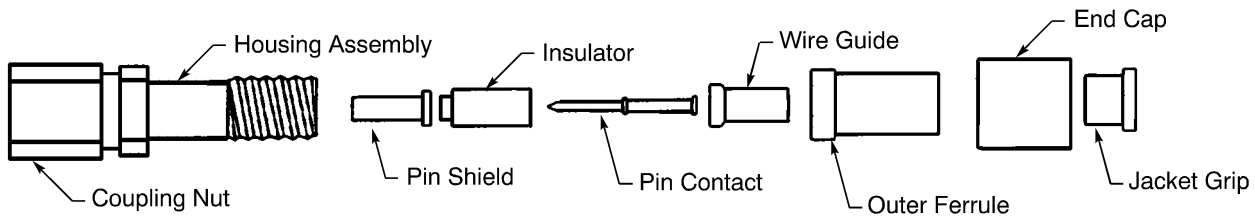
(17) Cure the cement a minimum of 18 hours at 70 degrees F before the connector is put in service.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The plug can be connected to the receptacle before the cement is fully cured.

8. ASSEMBLY OF FENWAL 35303-90, 35303-94, 35303-97, AND 35303-99 CONNECTORS

A. Connector Description



FENWAL 35303-90, 35303-94, 35303-97, AND 35303-99 CONNECTORS
Figure 31

B. Contact Assembly

Table 22
CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Setting	Part Number	Color
18	11921	-	3795-1	-
	M22520/1-01	6	TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
	WA27F	6	TH338	Red
			TP673	-

- (1) Make a selection of the crimp tool from Table 22.
- (2) Remove 1.07 inches ±0.03 inch of the outer jacket from the end of the wire.

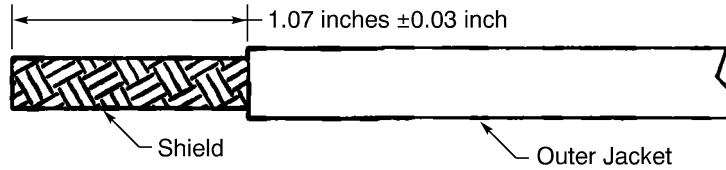
Refer to:

- Figure 32
- Subject 20-00-15 for the insulation removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

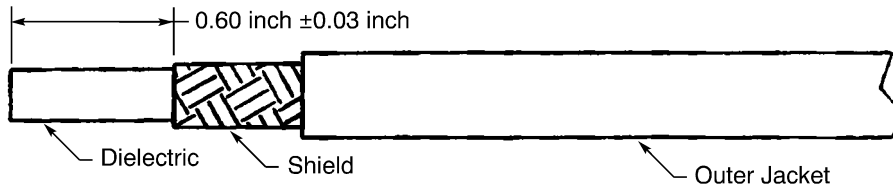
CAUTION: DO NOT CAUSE DAMAGE TO THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.



OUTER JACKET REMOVAL LENGTH
Figure 32

(3) Remove 0.60 inch ± 0.03 inch of the shield from the end of the wire. Refer to Figure 33.

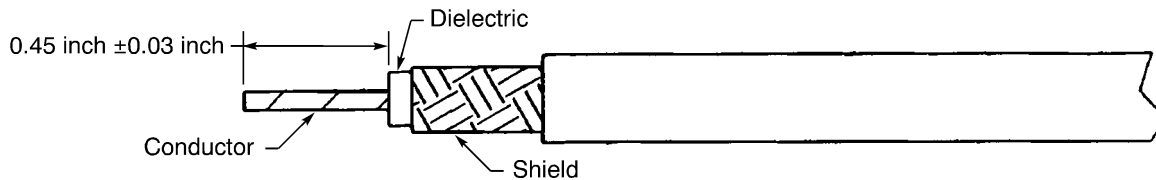
CAUTION: DO NOT CAUSE DAMAGE TO THE DIELECTRIC. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.



SHIELD REMOVAL LENGTH
Figure 33

(4) Remove 0.45 inch ± 0.03 inch of the dielectric from the end of the wire. Refer to Figure 34.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.

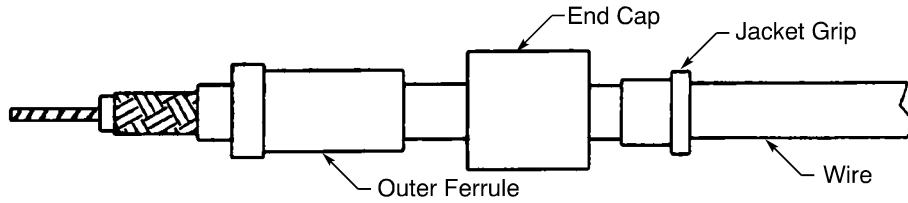


DIELECTRIC REMOVAL LENGTH
Figure 34

(5) Put the jacket grip on the wire. Refer to Figure 35.

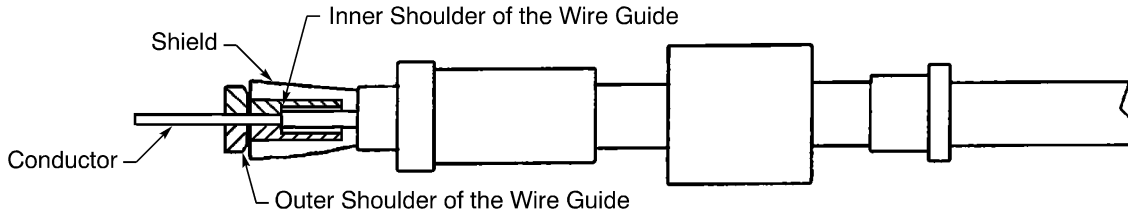
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



POSITION OF THE JACKET GRIP, THE END CAP, AND THE OUTER FERRULE ON THE WIRE
Figure 35

- (6) Put the end cap on the wire. Refer to Figure 35.
 Make sure that the end of the end cap that has threads is pointed to the end of the wire.
- (7) Put the outer ferrule on the wire. Refer to Figure 35.
- (8) Put the wire guide on the wire between the dielectric and the shield. Refer to Figure 36.
 Make sure that the inner shoulder of the wire guide is against the end of the dielectric.

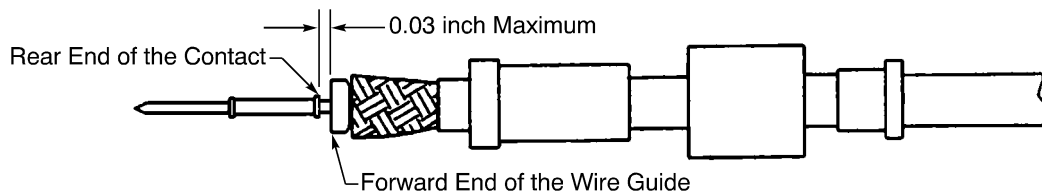


POSITION OF THE WIRE GUIDE BETWEEN THE DIELECTRIC AND THE SHIELD
Figure 36

- (9) If the shield makes an overlap with the outer shoulder of the wire guide, remove the necessary length of shield to make the shield go against the wire guide. Refer to Figure 36.
- (10) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the forward end of the crimp barrel. Refer to Figure 37.

Make sure that:

- All of the conductor strands are in the crimp barrel
- The distance from the forward end of the wire guide to the rear end of the contact is 0.03 inch maximum.



POSITION OF THE CONTACT ON THE WIRE
Figure 37

- (11) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

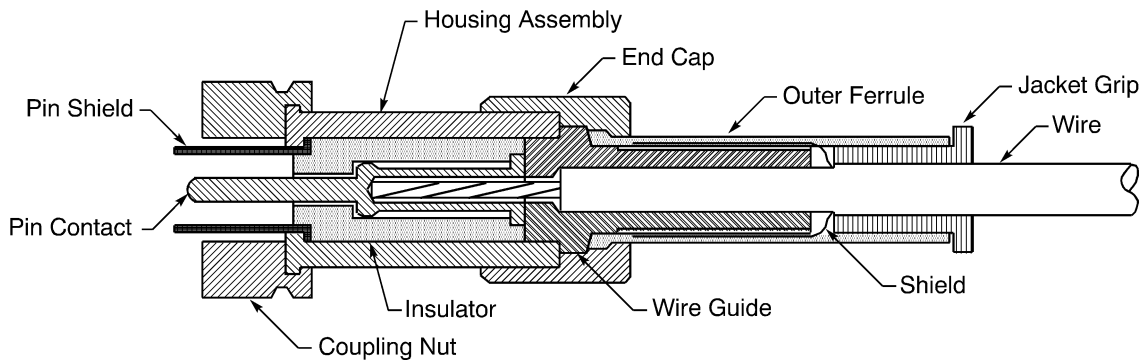
C. Connector Assembly

**Table 23
FERRULE CRIMP TOOLS**

Crimp Tool	
Basic Unit	Die
HD37	Y870H

**Table 24
CONNECTOR ASSEMBLY TOOLS**

Tool	Part Number
Pliers	ST2598C
Torque Adapter	ST2575A
	ST2575B
Vice	ST2598C-201



**FENWAL 35303-90, 35303-94, 35303-97, AND 35303-99 CONNECTOR ASSEMBLY
Figure 38**

Refer to Figure 38.

- (1) Make a selection of these tools from Table 6:
 - A torque wrench
 - A 1/2 inch wrench
 - A 1/2 inch socket or a 1/2 inch crow foot adapter.

- (2) Make a selection of a ferrule crimp tool from Table 23.
- (3) Make a selection of a torque adapter from Table 24.

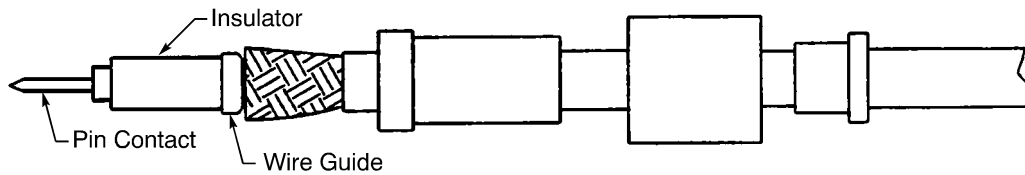
NOTE: The housing assembly of a plug connector is a satisfactory alternative for a torque adapter.

- (4) Make a selection of pliers or a vice from Table 24.
- (5) Make a selection of a cement from Table 3.
- (6) Put the insulator on the pin contact. Refer to Figure 39.

STANDARD WIRING PRACTICES MANUAL

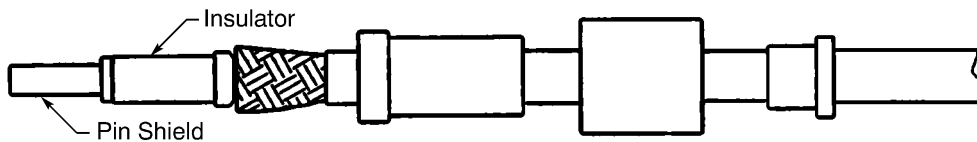
ASSEMBLY OF FENWAL CONNECTORS

Make sure that the rear end of the insulator is against the wire guide.



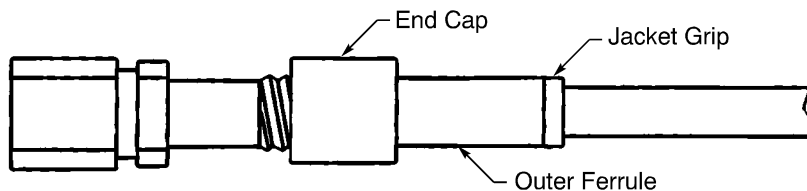
POSITION OF THE INSULATOR
Figure 39

- (7) Put the pin shield on the contact. Refer to Figure 40.
Make sure the end of the pin shield is against the insulator.



POSITION OF THE PIN SHIELD
Figure 40

- (8) Put the housing assembly on the contact assembly.
Make sure that the housing assembly is against the pin shield.
- (9) Apply a layer of cement to the first three threads of the housing assembly.
- (10) Push the outer ferrule forward until it is fully on the wire guide.
- (11) Push the end cap forward on the ferrule until the end cap is against the housing assembly.
- (12) Fully engage the threads of the end cap and the housing assembly. Refer to Figure 41.



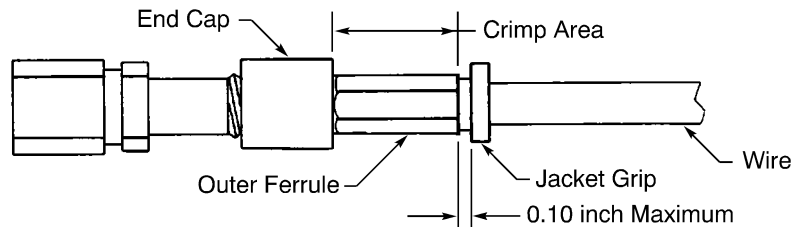
POSITION OF THE END CAP AND THE HOUSING ASSEMBLY
Figure 41

- (13) Torque the torque adapter and the coupling nut.
 - (a) Fully engage the threads of the torque adapter and the threads of the coupling nut.
 - (b) Put the torque wrench with the crow foot adapter or the socket on the torque adapter and hold it in its position.
 - (c) Put the 1/2 inch wrench on the coupling nut.
 - (d) Torque the adapter 65 inch-pounds to 75 inch-pounds.
- (14) Torque the end cap.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

- (a) Hold the end cap tightly in the pliers or the vice.
- (b) Hold the torque wrench in its position on the torque adapter.
- (c) Torque the end cap 50 inch-pounds to 60 inch-pounds.
- (15) Hold the coupling nut with the 1/2 inch wrench.
- (16) Remove the torque adapter from the connector.
- (17) Remove the unwanted cement from the surface of the housing assembly.
- (18) Push the jacket grip forward until it is fully against the ferrule.
- (19) Crimp the ferrule. Refer to Figure 42.



CRIMP AREA ON THE FERRULE

Figure 42

- (20) Examine the ferrule for these types of damage:
 - The base metal of the ferrule can be seen
 - The ferrule has a crack.

NOTE: These items are permitted:

 - Flash on the crimp area of the ferrule
 - A dimple on all sides of the crimp area
 - Deformation of the jacket grip.
- (21) If the ferrule has damage, replace the ferrule.
- (22) If the connector is not connected to a sensing element immediately, put a dust cap on the connector.

CAUTION: DO NOT LET FLUID OR CONTAMINATION GO INTO THE CONNECTOR. IF FLUID OR CONTAMINATION GOES INTO THE CONNECTOR, UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

- (23) Cure the cement a minimum of 18 hours at 70 degrees F before the connector is put in service.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

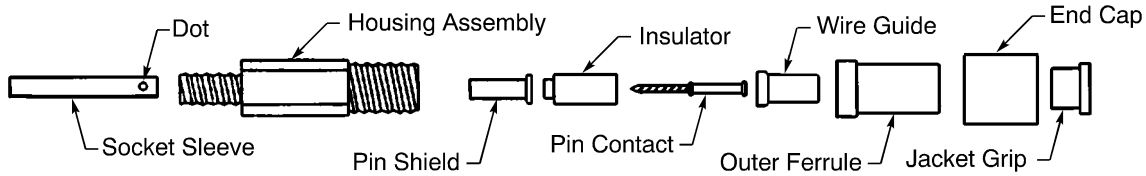
NOTE: The receptacle can be connected to the plug before the cement is fully cured.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

9. ASSEMBLY OF FENWAL 35303-91, 35303-95, 35303-98, AND 35303-100 CONNECTORS

A. Connector Description



FENWAL 35303-91, 35303-95, 35303-98, AND 35303-100 CONNECTORS

Figure 43

B. Contact Assembly

Table 25
CONTACT CRIMP TOOLS

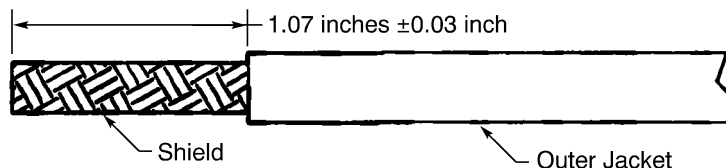
Wire Size (AWG)	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Setting	Part Number	Color
18	11921	-	3795-1	-
	M22520/1-01	6	TH338	Red
			TP673	-
	ST2220-1-Y	-	ST2220-1-7	-
	WA27F	6	TH338	Red
			TP673	-

- (1) Make a selection of the crimp tool from Table 25.
- (2) Remove 1.07 inches \pm 0.03 inch of the outer jacket from the end of the wire.

Refer to:

- Figure 44
- Subject 20-00-15 for the insulation removal procedures.

CAUTION: DO NOT DAMAGE THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.



OUTER JACKET REMOVAL LENGTH

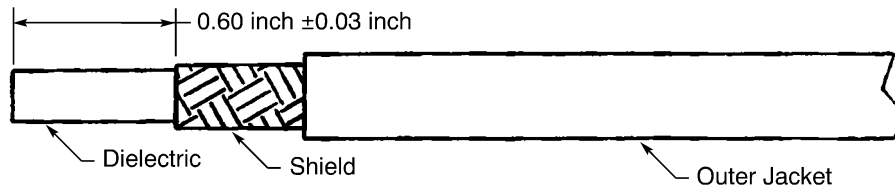
Figure 44

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

- (3) Remove 0.60 inch \pm 0.03 inch of the shield from the end of the wire. Refer to Figure 45.

CAUTION: DO NOT DAMAGE THE DIELECTRIC. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.

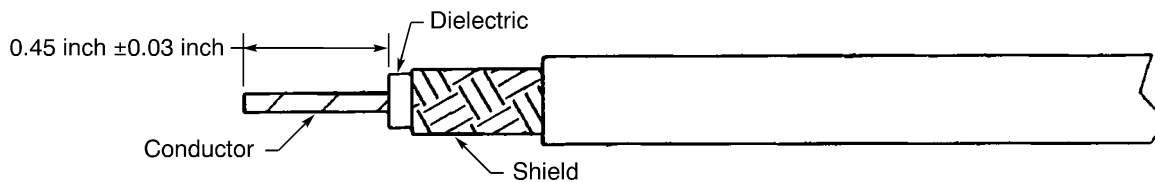


SHIELD REMOVAL LENGTH

Figure 45

- (4) Remove 0.45 inch \pm 0.03 inch of the dielectric from the end of the wire. Refer to Figure 46.

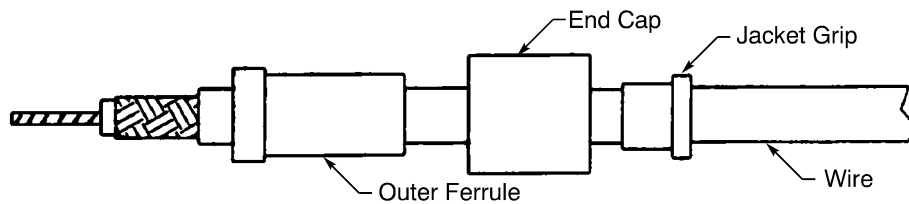
CAUTION: DO NOT DAMAGE THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.



DIELECTRIC REMOVAL LENGTH

Figure 46

- (5) Put the jacket grip on the wire. Refer to Figure 47.



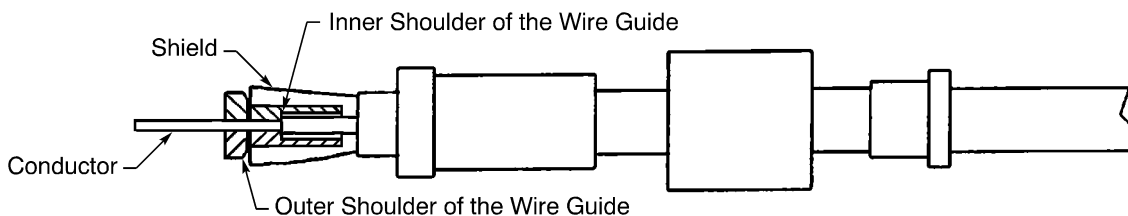
POSITION OF THE JACKET GRIP, THE END CAP, AND THE OUTER FERULE

Figure 47

- (6) Put the end cap on the wire. Refer to Figure 47.
Make sure that the end of the end cap that has threads is pointed to the end of the wire.
- (7) Put the outer ferrule on the wire. Refer to Figure 47.
- (8) Put the wire guide on the wire between the dielectric and the shield. Refer to Figure 48.
Make sure that the inner shoulder of the wire guide is against the end of the dielectric.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



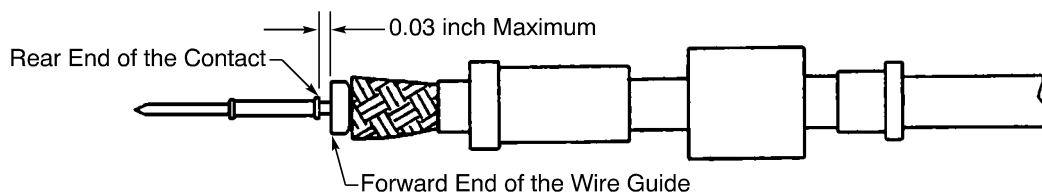
POSITION OF THE WIRE GUIDE BETWEEN THE DIELECTRIC AND THE SHIELD

Figure 48

- (9) If the shield makes an overlap with the outer shoulder of the wire guide, remove the necessary length of shield to make the shield go against the wire guide. Refer to Figure 48.
- (10) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the forward end of the crimp barrel. Refer to Figure 49.

Make sure that:

- All of the conductor strands are in the crimp barrel
- The distance from the forward end of the wire guide to the rear end of the contact is 0.03 inch maximum.



POSITION OF THE CONTACT ON THE WIRE

Figure 49

- (11) Crimp the contact.

C. Connector Assembly

**Table 26
FERRULE CRIMP TOOLS**

Crimp Tool	
Basic Unit	Die
HD37	Y870H

**Table 27
CONNECTOR ASSEMBLY TOOLS**

Tool	Part Number
Pliers	ST2598C
Screw Press	ST2575C
Torque Adapter	ST2575A
	ST2575B

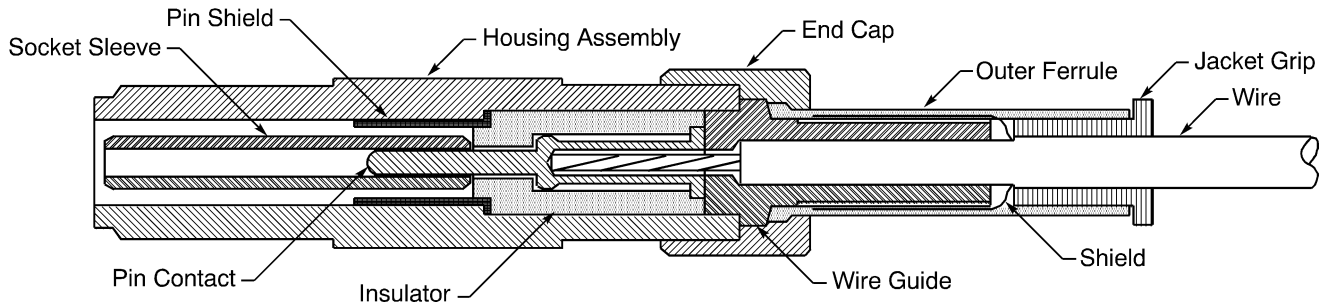
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

Table 27 (continued)

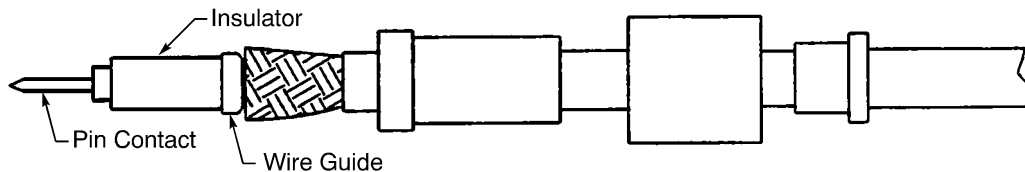
Tool	Part Number
Vice	ST2598C-201



FENWAL 35303-91, 35303-95, 35303-98, AND 35303-100 CONNECTOR ASSEMBLY
Figure 50

Refer to Figure 50.

- (1) Make a selection of these tools from Table 6:
 - A torque wrench
 - A 3/8 inch socket or a 3/8 inch crow foot adapter.
- (2) Make a selection of a cement from Table 3.
- (3) Make a selection of a ferrule crimp tool from Table 26.
- (4) Make a selection of a screw press from Table 27.
- (5) Make a selection of pliers or a vice from Table 27.
- (6) Put the insulator on the pin contact. Refer to Figure 51.
 Make sure that the rear end of the insulator is against the wire guide.

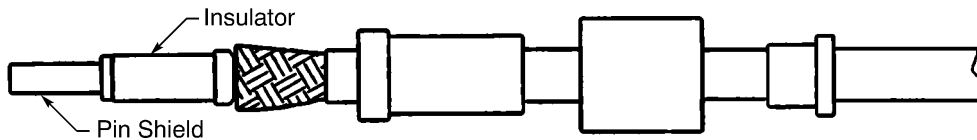


POSITION OF THE INSULATOR
Figure 51

- (7) Put the pin shield on the contact. Refer to Figure 52.
 Make sure the end of the pin shield is against the insulator.

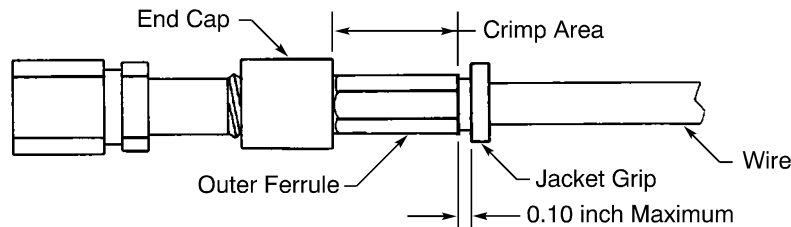
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS



POSITION OF THE PIN SHIELD
Figure 52

- (8) Put the housing assembly on the contact assembly.
Make sure that the housing assembly is against the pin shield.
- (9) Apply a layer of cement to the first three threads of the housing assembly.
- (10) Push the outer ferrule forward until it is fully on the wire guide.
- (11) Push the end cap forward on the ferrule until the end cap is against the housing assembly.
- (12) Tighten the end cap on the housing assembly.
 - (a) Fully engage the threads of the end cap and the housing assembly.
 - (b) Hold the end cap tightly in the pliers or the vice.
 - (c) Put the torque wrench with the crow foot adapter or the socket on the housing assembly.
 - (d) Torque the end cap 50 inch-pounds to 60 inch-pounds.
- (13) Remove the unwanted cement from the surface of the housing assembly.
- (14) Push the jacket grip forward until it is fully against the ferrule.
- (15) Crimp the ferrule. Refer to Figure 53.



CRIMP AREA ON THE OUTER FERRULE
Figure 53

- (16) Examine the ferrule for these types of damage:
 - The base metal of the ferrule can be seen
 - The ferrule has a crack.

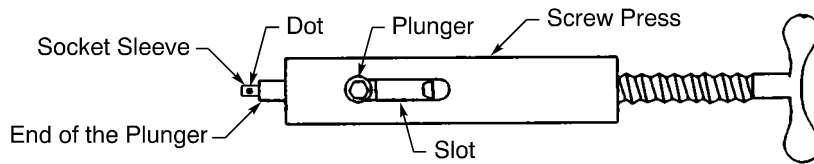
NOTE: These items are permitted:

- Flash on the crimp area of the ferrule
 - A dimple on all sides of the crimp area
 - Deformation of the jacket grip.
- (17) If the ferrule has damage, replace the ferrule.
 - (18) Install the socket sleeve with the screw press:
 - (a) Move the plunger of the screw press to the end of the slot.

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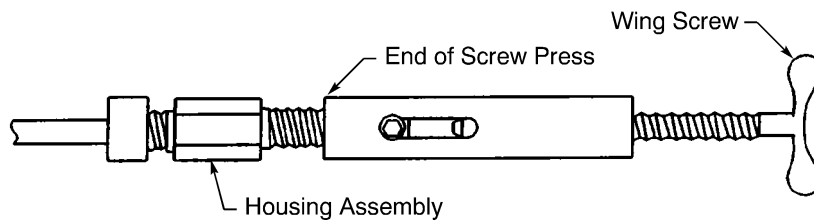
ASSEMBLY OF FENWAL CONNECTORS

- (b) Put the end of the socket sleeve without a black dot in the plunger. Refer to Figure 54.



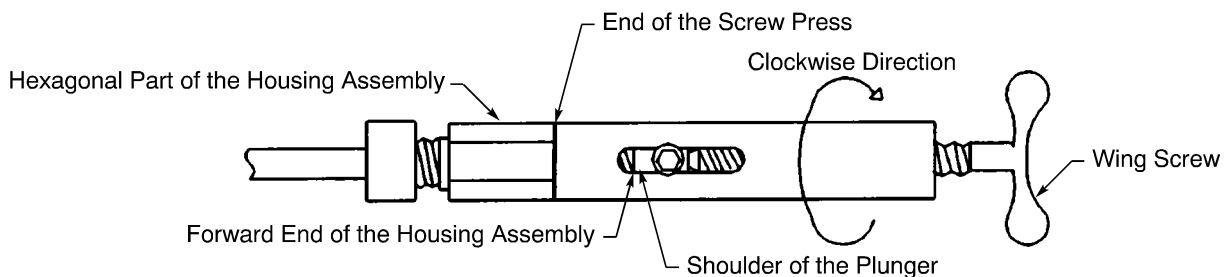
POSITION OF THE SOCKET SLEEVE IN THE SCREW PRESS
Figure 54

- (c) Align the end of the screw press with the threads on the housing assembly. Refer to Figure 55.



ALIGNMENT OF THE SCREW PRESS AND THE CONNECTOR
Figure 55

- (d) Turn the screw press clockwise until the end of the screw press is against the hexagonal part of the housing assembly. Refer to Figure 56.



POSITION OF THE SCREW PRESS AGAINST THE HOUSING ASSEMBLY
Figure 56

- (e) Turn the wing screw clockwise until it stops. Refer to Figure 56.

NOTE: When the wing screw stops, the shoulder of the plunger is against the housing assembly.

- (f) Turn the screw press counter-clockwise to remove it from the housing assembly.

- (19) If the connector is not connected to a sensing element immediately, put a dust cap on the connector.

CAUTION: DO NOT LET FLUID OR CONTAMINATION GO INTO THE CONNECTOR. IF FLUID OR CONTAMINATION GOES INTO THE CONNECTOR, UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

- (20) Cure the cement a minimum of 18 hours at 70 degrees F before the connector is put in service.

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ASSEMBLY OF FENWAL CONNECTORS

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The plug can connected to the receptacle before the cement is fully cured.

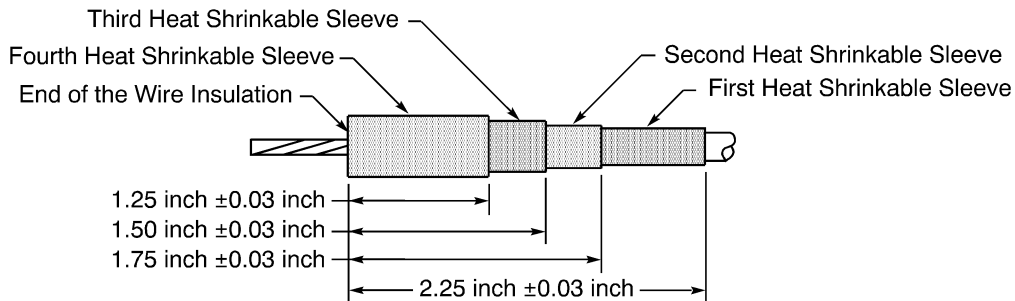
10. ADJUSTMENT OF THE WIRE O.D.

A. Installation of a Heat Shrinkable Sleeve

This paragraph gives the procedure to increase the O.D. of a wire.

**Table 28
SLEEVE LENGTHS**

Layer	Length (inch)
First	2.25
Second	1.75
Third	1.50
Fourth	1.25



**POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE WIRE
Figure 57**

Refer to Figure 57.

- (1) Make a selection of a heat shrinkable sleeve from Table 4.
Make sure that the sleeve has an O.D. that can move easily on the wire.

- (2) Cut the necessary length of sleeve. Refer to Table 28.

NOTE: If more than four sleeves are installed, each subsequent sleeve should be approximately 0.25 inch shorter than the last sleeve that is installed.

- (3) Put the sleeve on the wire.
Make sure that the end of the sleeve is aligned with the end of the wire insulation.

- (4) Shrink the sleeve into its position. Refer to Subject 20-10-14.

- (5) Measure the O.D. of the wire.

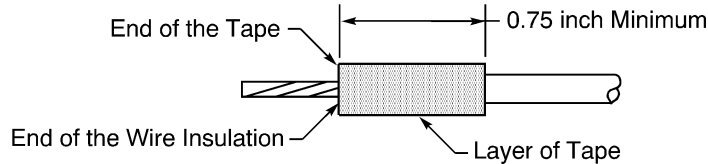
- (6) If the O.D. of the wire is not approximately 0.120 inch, do Step (1) through Step (5) again.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF FENWAL CONNECTORS

B. Installation of a Layer of Tape

This paragraph gives the procedure to increase the O.D. of a wire.



POSITION OF THE LAYER OF TAPE ON THE WIRE
Figure 58

Refer to Figure 58.

- (1) Make a selection of a tape from Table 5.
- (2) Wind one layer of tape around the end of the wire insulation.

Make sure that:

- The forward end of the tape is aligned with the end of the insulation
- Each subsequent layer of tape make a 100 percent overlap with the last layer of tape that is installed.

- (3) Measure the O.D. of the wire.
- (4) If the O.D. of the wire is not approximately 0.120 inch, do Step (2) through Step (3) again.

11. APPROVED TOOL SUPPLIERS

A. Crimp Tools

Table 29
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
11921	Buchanan
3795-1	Buchanan
85-550	Balmer
HD37	Daniels
M22520/1-01	QPL
M22520/1-02	QPL
M22520/5-01	QPL
M22520/5-37	QPL
M22520/5-45	QPL
ST2220-1-7	Boeing
ST2220-1-Y	Boeing
TH338	Daniels
TP673	Daniels

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF FENWAL CONNECTORS****Table 29 (continued)**

Crimp Tool	Supplier
WA27F	Daniels
WT-401	Thomas&Betts
WT-409	Thomas&Betts
Y870H	Daniels

B. Connector Assembly Tools**Table 30****CONNECTOR ASSEMBLY TOOL SUPPLIERS**

Tool	Supplier
ST2575A	Boeing
ST2575B	Boeing
ST2575C	Boeing
ST2598C	Boeing
ST2598C-201	Boeing



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ASSEMBLY OF GRAVINER CONNECTORS

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF GRAVINER CONNECTORS**

This subject gives the procedures to assemble Graviner connectors with these wires:

- BMS 13-8
- BMS 13-31
- BMS 13-55
- Cerro H22-4000
- Champlain 24-00034.

1. PART NUMBER AND DESCRIPTION**A. Connector Part Numbers**

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
51444-103	Graviner
51444-106	Graviner
51444-118	Graviner
51444-123-1D	Graviner
51444-124-1D	Graviner
51444-129	Graviner
51444-129-1D	Graviner
51444-130	Graviner
51444-130-1D	Graviner
51444-137	Graviner
51444-138	Graviner
51444-144	Graviner
51444-145	Graviner
D5653	Graviner
D5653-1	Graviner
D5653-2	Graviner
D5922	Graviner
D5922-1	Graviner
D5922-2	Graviner



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ASSEMBLY OF GRAVINER CONNECTORS

B. Wire Part Numbers

**Table 2
WIRE PART NUMBERS**

Part Number	Supplier
24-00034	Champlain
BMS 13-8	Boeing
BMS 13-31	Boeing
BMS 13-55	Boeing
H22-4000	Cerro

C. Connector Assembly Procedures

**Table 3
CONNECTOR ASSEMBLY PROCEDURES**

Wire	Connector	Location
BMS 13-8 Type 1 Class A AWG 18	D5653	Paragraph 2.A.
	D5922	
BMS 13-31 AWG 18	51444-129	Paragraph 3.A.
	51444-130	
BMS 13-55 Type 1 and Type 2 AWG 18	51444-137	Paragraph 4.A.
	51444-138	
	D5653	Paragraph 4.B.
	D5653-1	
	D5653-2	
	D5922	
	D5922-1	
	D5922-2	
Cerro H22-4000 AWG 18	D5653	Paragraph 5.A.
	D5922	Paragraph 5.B.
	51444-103	
	51444-106	
	D5653-1	Paragraph 5.C.
	D5922-1	
	51444-118	
	D5653-2	
	D5922-2	

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ASSEMBLY OF GRAVINER CONNECTORS

Table 3 (continued)

Wire	Connector	Location
Champlain 24-00034	51444-123-1D	Paragraph 6.A.
	51444-124-1D	
	51444-129-1D	
	51444-130-1D	Paragraph 6.B.
	51444-144	
	51444-145	

2. CONNECTOR ASSEMBLY WITH BMS 13-8 TYPE 1 CLASS A AWG 18 WIRE

A. Assembly of Graviner D5653 and D5922 Connectors

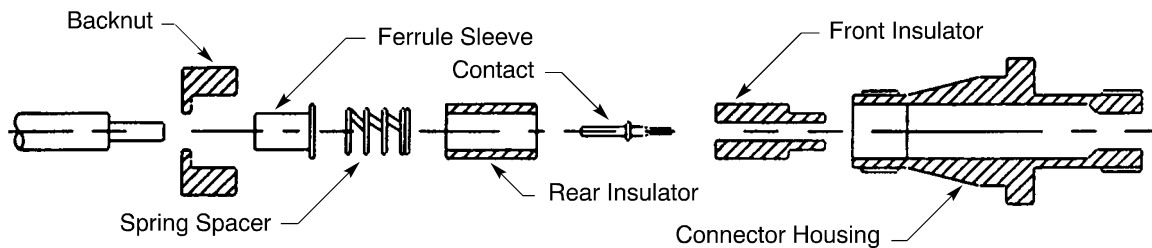
Refer to Figure 1.

**Table 4
CONTACT CRIMP TOOLS**

Basic Unit		Locator		
Part Number	Supplier	Part Number	Color	Supplier
M22520/1-01	QPL	M22520/1-02	Blue	QPL

**Table 5
FERRULE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22520/5-01	QPL	M22520/5-37	QPL



**GRAVINER D5653 AND D5922 CONNECTORS
Figure 1**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS

- (1) In this order, put these components on the wire:
 - The backnut
 - The ferrule sleeve
 - The spring spacer
 - The rear insulator.
- (2) Remove 9/32 inch ± 1/32 inch of insulation from the end of the wire.
- (3) Make a selection of a crimp tool from Table 4.
- (4) Put the contact in the crimp tool.
- (5) Put the conductor in crimp barrel of the contact.
- (6) Crimp the contact.
- (7) Put the wired contact in the large end of the front insulator.
- (8) Put the connector housing over front insulator and wired contact.
- (9) Push the rear insulator, the spring, and the ferrule into the connector housing.
- (10) Apply a light coat of Sauereisen 32 or Sauereisen 1 adhesive to the first two or three threads of the connector housing.
- (11) Push the nut against the connector housing.
- (12) Turn the nut so that the threads engage the threads of the housing.
- (13) Torque the nut 100 inch-pounds to 120 inch-pounds.
- (14) Make a selection of a ferrule crimp tool from Table 5.
- (15) Crimp the ferrule.

Make sure to use the small die opening on the locator.

3. CONNECTOR ASSEMBLY WITH BMS 13-31 AWG 18 WIRE

A. Assembly of Graviner 51444-129 and 51444-130 Connectors

**Table 6
CONTACT CRIMP TOOLS**

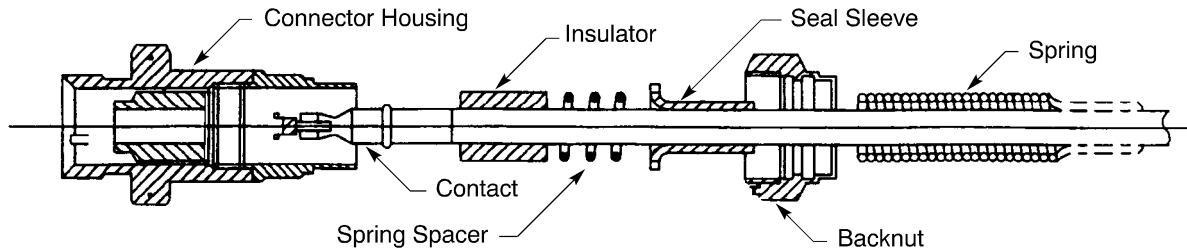
Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
ST2220-1-Y	Boeing	ST2220-1-2	Boeing
M22520/1-01	QPL	TP875	Daniels

**Table 7
SEAL SLEEVE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22520/5-01	QPL	M22520/5-37	QPL

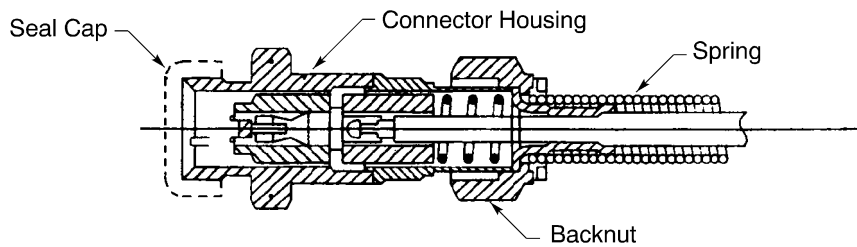
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS



GRAVINER 51444-129 AND 51444-130 CONNECTORS

Figure 2



ASSEMBLED CONNECTOR

Figure 3

- (1) Remove 0.30 inch \pm 0.03 inch of wire insulation.
- (2) In this order, put these components on the wire:
 - The spring (if supplied)
 - The backnut
 - The seal sleeve
 - The spring spacer
 - The insulator.

Refer to Figure 2.

- (3) Make a selection of a crimp tool from Table 6.
- (4) Push the wire into the crimp barrel of the contact until it touches the bottom.
- (5) Crimp the contact.
- (6) Remove these components from the end of the connector:
 - The seal cap
 - The seal cup
 - The washer.
- (7) Apply a light coat of a thread locking compound to the length of wire that the crimp seal sleeve covers when the sleeve is in position.

Refer to:

- Subject 20-00-11
 - Figure 3.
- (8) Apply a light coat of the thread locking compound to the first three external threads on the connector housing.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS

- (9) Move the insulator over the contact.
- (10) Push the spring spacer and the sleeve against the insulator.
- (11) Push the backnut against the connector housing.
- (12) Turn the backnut so that the threads engage the threads of the housing.
- (13) Torque the backnut 110 inch-pounds \pm 10 inch-pounds.
- (14) Make a selection of a crimp tool from Table 7.
- (15) Crimp the seal sleeve.
Make sure that the locator is in position B.
- (16) If the spring is supplied with the connector:
 - (a) Push the spring forward until it is against the backnut.
 - (b) Turn the spring clockwise a minimum of one turn so that the end of the spring is attached to the backnut.
- (17) Cure the thread locking compound under either of these conditions:
 - 68 degrees F for 5 hours
 - 250 degrees F for 10 minutes.
- (18) Install these components:
 - The washer
 - The seal cup
 - The seal cap.

4. CONNECTOR ASSEMBLY WITH BMS 13-55 TYPE 1 AND TYPE 2 AWG 18 WIRE

A. Assembly of Gravier 51444-137 and 51444-138 Connectors

**Table 8
CONTACT CRIMP TOOLS**

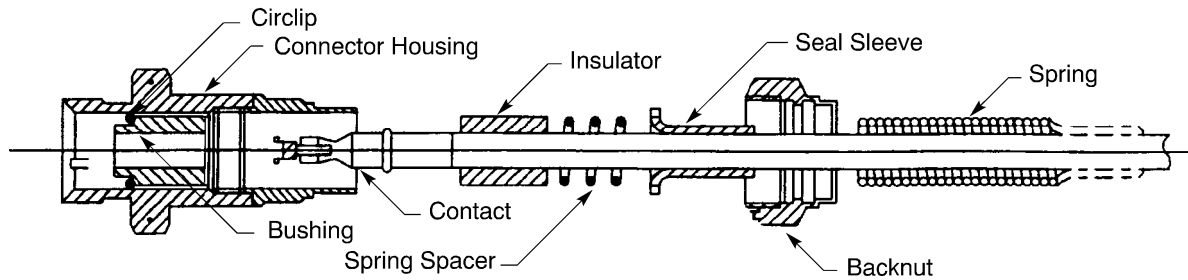
Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
ST2220-1-Y	Boeing	ST2220-1-2	Boeing
M22520/1-01	QPL	TP875	Daniels

**Table 9
SEAL SLEEVE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22520/5-01	QPL	M22520/5-37	QPL

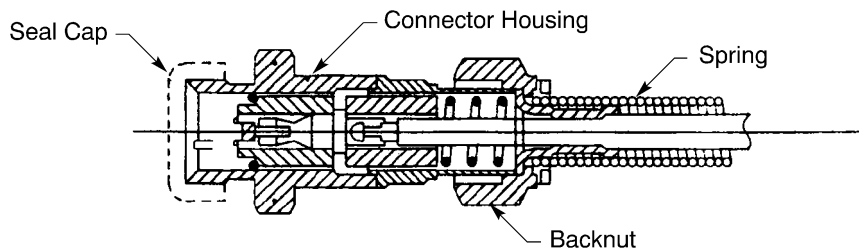
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS



GRAVINER 51444-137 AND 51444-138 CONNECTORS

Figure 4



ASSEMBLED CONNECTOR

Figure 5

- (1) Remove 0.30 inch \pm 0.03 inch of wire insulation.
- (2) In this order, put these components on the wire:
 - The spring (if supplied)
 - The backnut
 - The seal sleeve
 - The spring spacer
 - The insulator.
- Refer to Figure 4.
- (3) Make a selection of a crimp tool from Table 8.
- (4) Put the conductor in the crimp barrel of the contact.
- (5) Crimp the contact.
- (6) Remove these components from the end of the connector:
 - The seal cap
 - The seal cup
 - The washer.
- (7) Examine the connector housing.
Make sure that the shoulder of the bushing is against the circlip.
- (8) Apply a light coat of a thread locking compound to the length of wire that the crimp seal sleeve covers when the sleeve is in position.

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ASSEMBLY OF GRAVINER CONNECTORS

Refer to:

- Subject 20-00-11
- Figure 5.

- (9) Apply a light coat of the thread locking compound to the first three external threads on the connector housing.
- (10) Move the insulator over the contact.
- (11) Push the spring spacer and the sleeve against the insulator.
- (12) Push the backnut against the connector housing.
- (13) Turn the backnut so that the threads engage the threads of the housing.
- (14) Torque the backnut 110 inch-pounds \pm 10 inch-pounds.
- (15) Make a selection of a crimp tool from Table 9.
- (16) Crimp the seal sleeve.
Make sure that the locator is in position B.
- (17) If the spring is supplied with the connector:
 - (a) Push the spring forward until it is against the backnut.
 - (b) Turn the spring clockwise a minimum of one turn so that the end of the spring is attached to the backnut.
- (18) Cure the thread locking compound under either of these conditions:
 - 68 degrees F for 5 hours
 - 250 degrees F for 10 minutes.
- (19) Install these components:
 - The washer
 - The seal cup
 - The seal cap.

B. Assembly of Gravier D5653, D5653(-), D5922, and D5922(-) Connectors

**Table 10
CONTACT CRIMP TOOLS**

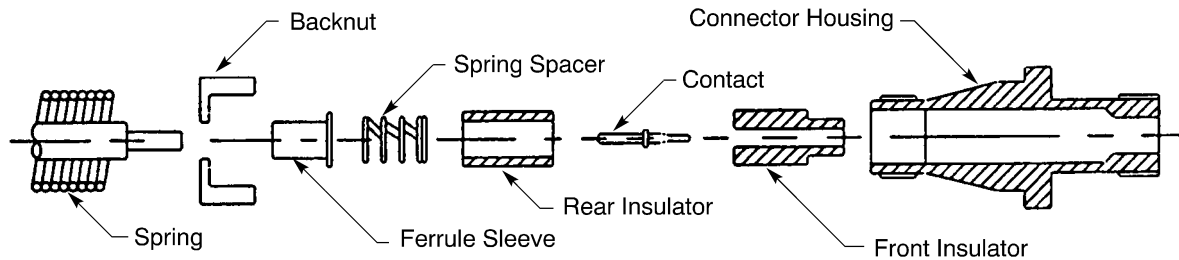
Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
ST2220-1-Y	Boeing	ST2220-1-2	Boeing
M22520/1-01	QPL	TP875	Daniels

**Table 11
FERRULE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22520/5-01	QPL	M22520/5-43	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS



GRAVINER D5653-1 AND D5922-1 CONNECTORS
Figure 6

(1) In this order, put these components on the wire:

- The spring (if supplied)
- The backnut
- A 2-1/4 inch \pm 1/16 inch length of 1/4 inch diameter TFE 2X heat shrinkable sleeve
- A 6.0 inch \pm 1/16 inch length of 1/4 inch diameter TFE 4X heat shrinkable sleeve
- Two 1-1/2 inch lengths of 1/8 inch diameter TFE 4X heat shrinkable sleeve
- The ferrule sleeve
- The spring spacer
- The rear insulator.

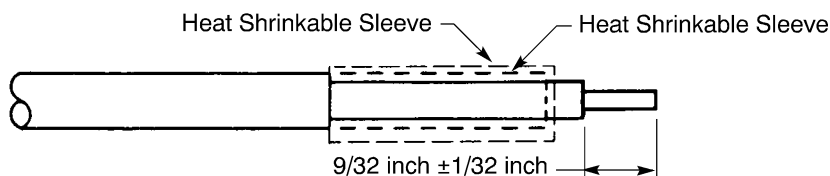
Refer to Figure 6.

NOTE: The Scotch 1205 anti-friction tape that is supplied with connector is not used.

- (2) Remove 9/32 inch \pm 1/32 inch of insulation from the end of the wire.
- (3) Make a selection of a crimp tool from Table 10.
- (4) Put the conductor in the crimp barrel of the contact until it touches the bottom.
- (5) Crimp the contact.
- (6) Put the wired contact in the large end of the front insulator.
- (7) Push the connector housing over the front insulator until it is against the back of the wired contact.
- (8) Push the rear insulator and the spring spacer against the housing.
- (9) Increase the diameter of the wire.

Refer to:

- Subject 20-10-14
- Figure 7.



WIRE DIAMETER BUILDUP
Figure 7

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS

- (a) Move the first 1-1/2 inch length of 1/8 inch diameter heat shrinkable sleeve so that the end of the sleeve is against the end of the crimp barrel of the contact.
- (b) Shrink the sleeve in position.
- (c) Move the second 1-1/2 inch length of 1/8 inch diameter heat shrinkable sleeve so that the end of the sleeve is against the end of the crimp barrel of the contact.
- (d) Shrink the sleeve in position.
- (10) Make a selection of a ferrule crimp tool from Table 11.
- (11) Push the ferrule over the sleeves against the spring spacer and the rear insulator.
- (12) Crimp the ferrule.
Make sure to use the small die opening on the locator.
- (13) Push the 6.0 inch length of heat shrinkable sleeve until the end of the sleeve is against the end of the crimp barrel of the ferrule.
- (14) Shrink the sleeve in position.
- (15) Push the 2-1/4 inch length of heat shrinkable sleeve until the end of the sleeve is against the flange end of the ferrule.
- (16) Shrink the sleeve in position.
- (17) Apply a light coat of Sauereisen 32 or Sauereisen 1 adhesive to the first two or three threads of the wire end of the connector housing.
- (18) Push the backnut against the connector housing.
- (19) Turn the backnut so that the threads engage the threads of the housing.
- (20) Torque the backnut 100 inch-pounds to 120 inch-pounds.
- (21) If the spring is supplied with the connector:
 - (a) Push the spring forward until it is against the backnut.
 - (b) Turn the spring clockwise a minimum of one turn so that the end of the spring is attached to the backnut.

5. CONNECTOR ASSEMBLY WITH CERRO H22-4000 AWG 18 WIRE

A. Assembly of Gravier D5653 and D5922 Connectors

**Table 12
CONTACT CRIMP TOOLS**

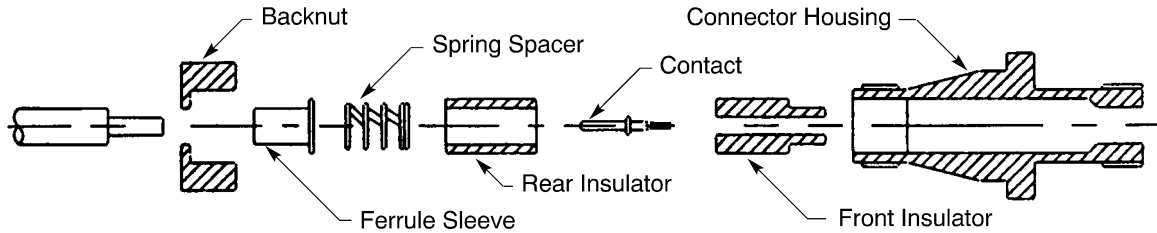
Basic Unit		Locator		
Part Number	Supplier	Part Number	Color	Supplier
M22520/1-01	QPL	M22520/1-02	Blue	QPL

**Table 13
FERRULE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22520/5-01	QPL	M22520/5-37	QPL

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ASSEMBLY OF GRAVINER CONNECTORS

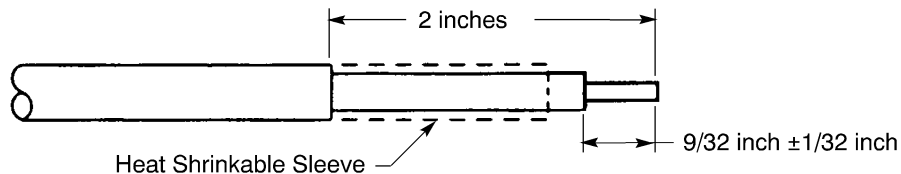


GRAVINER D5653 AND D5922 CONNECTORS
Figure 8

- (1) In this order, put these components on the wire:
 - A 1-1/2 inch length of 1/4 inch diameter TFE 4X heat shrinkable sleeve
 - The backnut
 - The ferrule sleeve
 - The spring spacer
 - The rear insulator.

Refer to Figure 8.

- (2) Prepare the wire. Refer to Figure 9.



CERRO H22-4000 WIRE TRIM DIMENSIONS
Figure 9

- (a) Remove 2 inches of the shield from the wire.
 - (b) Remove 2 inches of the clear teflon inner wrap from wire.
- CAUTION:** DO NOT CUT OR DAMAGE THE DIELECTRIC MATERIAL.
- (c) Remove 9/32 inch \pm 1/32 inch of insulation from the end of the wire.
- (3) Put a 1-1/2 inch length of 1/8 inch diameter TFE 4X heat shrinkable sleeve over the dielectric and against the shield.
 - (4) Shrink in the sleeve in position. Refer to Subject 20-10-14.
 - (5) Make a selection of a crimp tool from Table 12.
 - (6) Put the contact in the crimp tool.
 - (7) Put the conductor in crimp barrel of the contact.
 - (8) Crimp the contact.
 - (9) Put the wired contact in the large end of the front insulator.
 - (10) Put the connector housing over front insulator and wired contact.
 - (11) Push the rear insulator, the spring, and the ferrule into the connector housing.

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ASSEMBLY OF GRAVINER CONNECTORS

- (12) Apply a light coat of Sauereisen 32 or Sauereisen 1 adhesive to the first two or three threads of the connector housing.
- (13) Push the nut against the connector housing.
- (14) Turn the nut so that the threads engage the threads of the housing.
- (15) Torque the nut 100 inch-pounds to 120 inch-pounds.
- (16) Make a selection of a ferrule crimp tool from Table 13.
- (17) Crimp the ferrule.
Make sure to use the small die opening on the locator.
- (18) Move the 1-1/2 inch length of 1/4 inch diameter TFE 4X heat shrinkable sleeve so that the end of the sleeve is against the ferrule.
- (19) Shrink the sleeve in position.

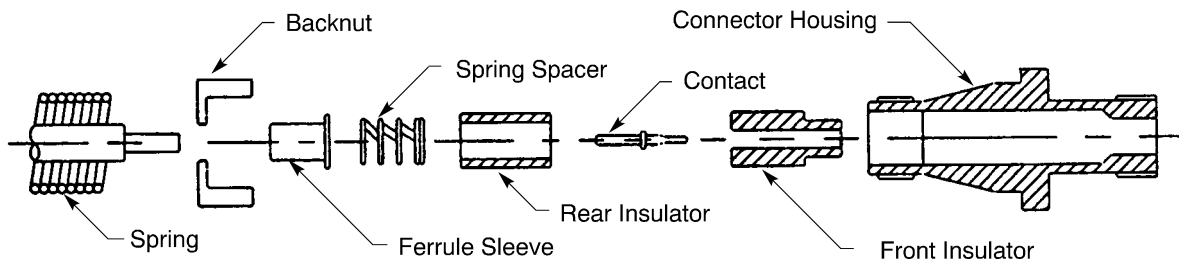
B. Assembly of Graviner 51444-103, 51444-106, D5653-1, and D5922-1 Connectors

**Table 14
CONTACT CRIMP TOOLS**

Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
ST2220-1-Y	Boeing	ST2220-1-2	Boeing
M22520/1-01	QPL	TP875	Daniels

**Table 15
FERRULE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22520/5-01	QPL	M22520/5-43	QPL



**GRAVINER D5653-1, D5922-1, 51444-103, AND 51444-106 CONNECTORS
Figure 10**

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF GRAVINER CONNECTORS**

- (1) In this order, put these components on the wire:
 - The spring
 - The backnut
 - A 2-1/4 inch \pm 1/16 inch length of 1/4 inch diameter TFE 2X heat shrinkable sleeve
 - A 6.0 inch \pm 1/16 inch length of 1/4 inch diameter TFE 4X heat shrinkable sleeve
 - The ferrule sleeve
 - The spring spacer
 - The rear insulator.

Refer to Figure 10.

NOTE: The Scotch 1205 anti-friction tape that is supplied with connector is not used.

- (2) Remove 9/32 inch \pm 1/32 inch of insulation from the end of the wire.
- (3) Make a selection of a crimp tool from Table 14.
- (4) Put the conductor in the crimp barrel of the contact until it touches the bottom.
- (5) Crimp the contact.
- (6) Put the wired contact in the large end of the front insulator.
- (7) Push the connector housing over the front insulator until it is against the back of the wired contact.
- (8) Push the rear insulator and the spring spacer against the housing.
- (9) Make a selection of a ferrule crimp tool from Table 15.
- (10) Push the ferrule over the sleeves against the spring spacer and the rear insulator.
- (11) Crimp the ferrule.

Make sure to use the small die opening on the locator.
- (12) Push the 6.0 inch length of heat shrinkable sleeve until the end of the sleeve is against the end of the crimp barrel of the ferrule.
- (13) Shrink the sleeve in position.
- (14) Push the 2-1/4 inch length of heat shrinkable sleeve until the end of the sleeve is against the flange end of the ferrule.
- (15) Shrink the sleeve in position.
- (16) Apply a light coat of Sauereisen 32 or Sauereisen 1 adhesive to the first two or three threads of the wire end of the connector housing.
- (17) Push the backnut against the connector housing.
- (18) Turn the backnut so that the threads engage the threads of the housing.
- (19) Torque the backnut 100 inch-pounds to 120 inch-pounds.
- (20) Push the spring forward until it is against the backnut.
- (21) Turn the spring clockwise a minimum of one turn so that the end of the spring is attached to the backnut.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS

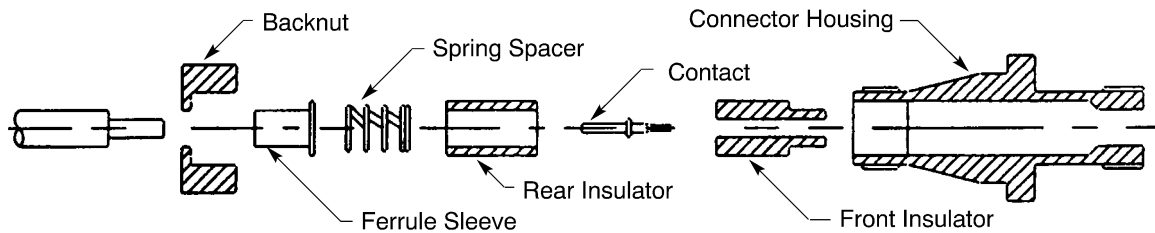
C. Assembly of Graviner D5653-2, D5922-2, and 51444-118 Connectors

**Table 16
CONTACT CRIMP TOOLS**

Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
ST2220-1-Y	Boeing	ST2220-1-2	Boeing
M22520/1-01	QPL	TP875	Daniels

**Table 17
FERRULE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22520/5-01	QPL	M22520/5-43	QPL



**GRAVINER D5653-2, D5922-2, AND 51444-118 CONNECTORS
Figure 11**

- (1) In this order, put these components on the wire:
 - The backnut
 - The ferrule sleeve
 - The spring spacer
 - The rear insulator.

Refer to Figure 11.

- (2) Remove 9/32 inch ± 1/32 inch of insulation from the end of the wire.
- (3) Make a selection of a crimp tool from Table 12.
- (4) Put the contact in the crimp tool.
- (5) Put the conductor in crimp barrel of the contact.
- (6) Crimp the contact.
- (7) Put the wired contact in the large end of the front insulator.
- (8) Put the connector housing over front insulator and wired contact.
- (9) Push the rear insulator, the spring, and the ferrule into the connector housing.
- (10) Apply a light coat of Sauereisen 32 or Sauereisen 1 adhesive to the first two or three threads of the connector housing.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS

- (11) Push the nut against the connector housing.
- (12) Turn the nut so that the threads engage the threads of the housing.
- (13) Torque the nut 100 inch-pounds to 120 inch-pounds.
- (14) Make a selection of a ferrule crimp tool from Table 13.
- (15) Crimp the ferrule.

Make sure to use the small die opening on the locator.

6. CONNECTOR ASSEMBLY WITH CHAMPLAIN 24-00034 WIRE

A. Assembly of Graviner 51444-123-1D, 51444-124-1D, 51444-129-1D, and 51444-130-1D Connectors

NOTE: The data in this paragraph:

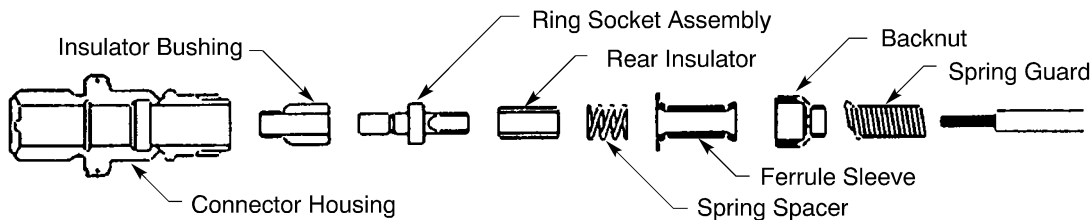
- Is applicable to the wire harnesses for the Rolls-Royce engines
- Is supplied to Boeing by Rolls-Royce.

**Table 18
CONTACT CRIMP TOOLS**

Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
M22520/1-01	QPL	M22520/1-02	QPL
MS27828/1-01	QPL	MS27828-1	QPL

**Table 19
FERRULE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
HX4	Daniels	Y295	Daniels



**GRAVINER 51444-12()-1D CONNECTORS
Figure 12**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS

(1) In this order, put these components on the wire:

- The spring guard
- The backnut
- The ferrule sleeve
- The spring spacer
- The rear insulator.

Refer to Figure 12.

- (2) Remove 0.30 inch \pm 0.03 inch of insulation from the end of the wire.
- (3) Make a selection of a crimp tool from Table 12.
- (4) Put the ring socket assembly in the crimp tool.
- (5) Put the conductor in crimp barrel of the socket.
- (6) Crimp the contact.
- (7) Put the ring socket assembly in the insulator bushing of the connector housing.
- (8) Push the rear insulator, the spring, and the ferrule sleeve into the connector housing.
- (9) Push the nut against the connector housing.
- (10) Turn the nut so that the threads engage the threads of the housing.
- (11) Torque the nut 100 inch-pounds to 120 inch-pounds.
- (12) Make a selection of a ferrule crimp tool from Table 19.
- (13) Crimp the ferrule.
- (14) Push the spring guard forward until it is against the backnut.
- (15) Turn the spring clockwise a minimum of one turn so that the end of the spring is attached to the backnut.

B. Assembly of Gravier 51444-144 and 51444-145 Connectors

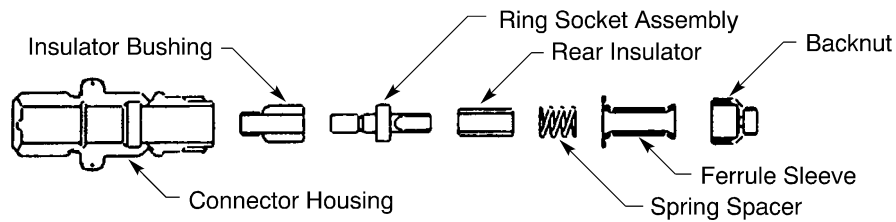
This paragraph gives the procedure to assemble the connectors with AWG 16 wire.

**Table 20
CONTACT CRIMP TOOLS**

Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
ST2220-1-Y	Boeing	ST2220-1-2	Boeing
M22520/1-01	QPL	TP875	Daniels

**Table 21
FERRULE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
WT 401	Thomas & Betts	-	-

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF GRAVINER CONNECTORS****GRAVINER 51444-144 AND 51444-145 CONNECTORS****Figure 13**

- (1) Put these TFE 4X heat shrinkable sleeves on the wire:
 - A 2 inch length
 - A 3-1/2 inch length.

Make sure that the diameter of the sleeve is large enough so that the sleeve can be installed over the ferrule sleeve.

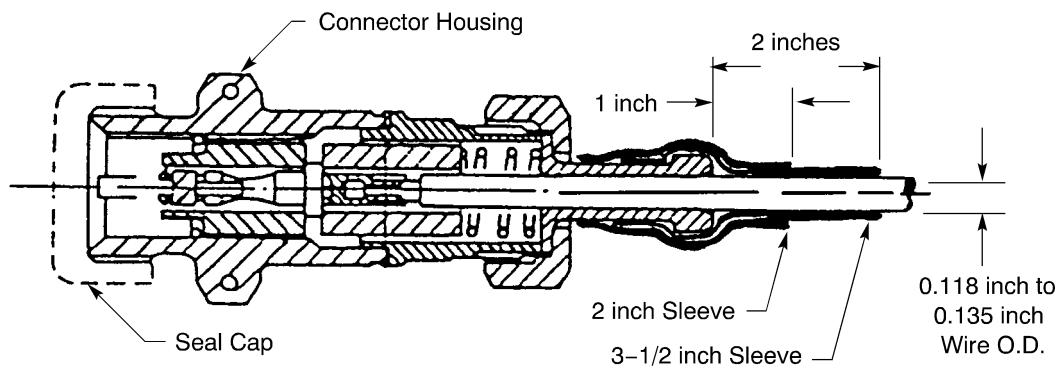
- (2) In this order, put these components on the wire:
 - The backnut
 - The ferrule sleeve
 - The spring spacer
 - The rear insulator.

Refer to Figure 13.

- (3) Remove 5/16 inch +0 inch, -1/16 inch of insulation from the end of the wire.
- (4) Make a selection of a crimp tool from Table 20.
- (5) Put the ring socket assembly in the crimp tool.
- (6) Put the conductor in crimp barrel of the socket.
- (7) Crimp the contact.
- (8) Put the ring socket assembly in the insulator bushing of the connector housing.
- (9) Push the rear insulator, the spring, and the ferrule sleeve into the connector housing.
- (10) Push the nut against the connector housing.
- (11) Turn the nut so that the threads engage the threads of the housing.
- (12) Torque the nut 100 inch-pounds to 120 inch-pounds.
- (13) Make a selection of a ferrule crimp tool from Table 21.
- (14) Crimp the ferrule.
- (15) Install the wire support sleeves. Refer to Figure 14.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRAVINER CONNECTORS



SUPPORT SLEEVE INSTALLATION

Figure 14

- (a) Push the 3-1/2 inch TFE 4X sleeve over the ferrule sleeve until the end of the sleeve is approximately 2 inches from the end of the ferrule.
- (b) Shrink the sleeve in position.
- (c) Push the 2 inch TFE 4X sleeve over the first sleeve until the end of the sleeve is approximately 2 inches from the end of the ferrule.
- (d) Shrink the sleeve in position.



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ASSEMBLY OF WALTER KIDDE CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

This subject gives the procedures to assemble Walter Kidde connectors with fire resistant wires.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Contact Configuration	Supplier
875564	Pin	Walter Kidde
876288	Socket	Walter Kidde
876633	Pin	Walter Kidde
876635	Socket	Walter Kidde
877535	Socket	Walter Kidde
877536	Pin	Walter Kidde
878238-01	Socket	Walter Kidde
878238-02	Pin	Walter Kidde
878239-01	Pin	Walter Kidde
878239-02	Socket	Walter Kidde
878550-01	Pin	Walter Kidde
878551-01	Socket	Walter Kidde
878581-01	Pin	Walter Kidde
878582-01	Socket	Walter Kidde

Table 2
ALTERNATIVE CONNECTOR PART NUMBERS

Specified Connector	Alternative Connector
878238-01	878238-02
878239-01	878239-02

Table 3
OBSOLETE CONNECTOR PART NUMBERS

Obsolete Connector	Replacement Connector
875564	878238-02
876288	878239-02
876633	878581-01
876635	878582-01
877535	878551-01
877536	878550-01

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ASSEMBLY OF WALTER KIDDE CONNECTORS

B. Necessary Materials

**Table 4
NECESSARY MATERIALS**

Description	Part Number or Specification	Supplier
Cement	No. 1	Sauereisen
	No. 31	Sauereisen
Grease, Silicone	DC-4	Dow Corning
Washer, Brass	209592	Walter Kidde
Sleeve, Heat Shrinkable	MIL-DTL-23053/12 Class 5	Any Source
	SAE-AMS-23053/12 Class 5	Any Source
	TFE 4X	Chemplast Zeus
Tube, Heat Shrinkable with Meltable Inner Liner	MWSF Polyolefin	Remtek
	WTF Teflon	Penntube Plastics
		Saint-Gobain Performance Plastics

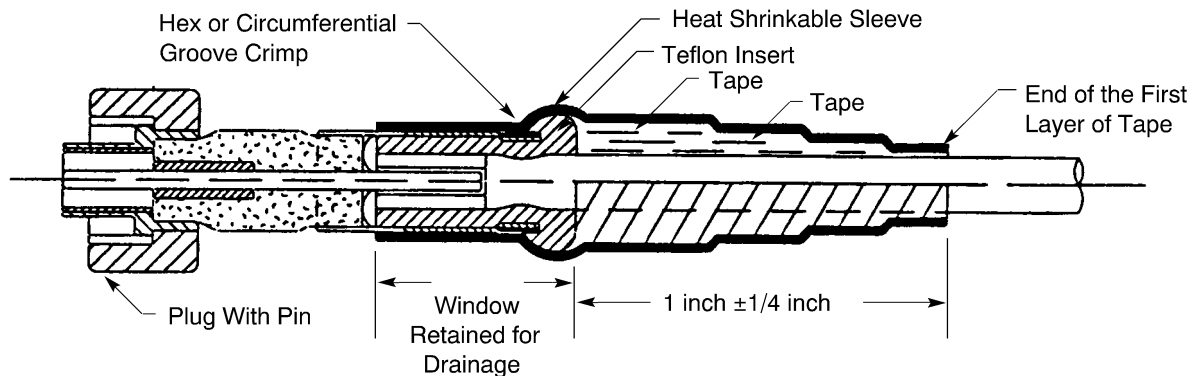
2. GENERAL DATA

A. Connector Cleaning

For the procedures to clean Walter Kidde connectors, refer to Subject 20-60-01.

B. Installation of Strain Relief

This paragraph gives the procedure to assemble more strain relief if the strain relief given by the grommet insert is not sufficient.



**INSTALLATION OF MORE STRAIN RELIEF
Figure 1**

Refer to Figure 1.

- (1) Put tape on the cable or wire at the rear of the connector.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

CAUTION: TAPE BY ITSELF DOES NOT GIVE THE NECESSARY STRAIN RELIEF. THE INSTALLATION OF A HEAT SHRINKABLE SLEEVE ON THE TAPE IS NECESSARY TO GIVE THE NECESSARY STRAIN RELIEF. IF THE STRAIN RELIEF IS NOT SUFFICIENT, DAMAGE TO THE WIRE HARNESS CAN OCCUR.

- (a) Make a selection of Temperature Grade D tape. Refer to Subject 20-00-11.
- (b) Put rear end of the first layer of tape on the cable or wire approximately 1-1/4 inches from the collar of the Teflon insert.
- (c) Put more layers of tape on the cable or wire to increase the diameter slowly and continuously from the end of the first layer of tape.

Make sure that:

- The tape is smooth and symmetrical around the wire or cable
- The diameter of the wire or cable at the end of the connector is almost as large as the collar of the Teflon insert.

- (2) Install the necessary quantity of sleeves.

NOTE: If the sleeve is TFE 4X, installation of 2 or 3 sleeves is necessary.

- (a) Make a selection of an approximately 0.5 inch diameter Teflon heat shrinkable sleeve. Refer to Subject 20-00-11.

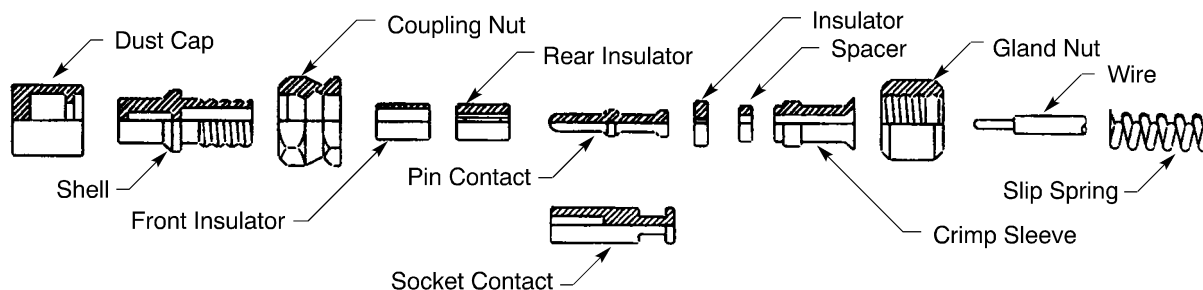
Make sure that:

- The sleeve can move on the Teflon insert easily
- The length of the sleeve is sufficient to extend from the forward end of the Teflon insert to the rear end of the layers of tape.

- (b) Put the sleeve on the layers of tape and the Teflon insert.
- (c) Align the rear end of the sleeve with the rear end of the tape.
- (d) To prevent damage to the cable or wire caused by the application of heat, put sufficient layers of protection on 4 to 6 inches of the cable or wire that does not have tape on it.
- (e) Shrink the sleeve in its position. Refer to Subject 20-10-14.
- (f) Do Step (b) through Step (e) again for each sleeve.

3. ASSEMBLY OF WALTER KIDDE 875564 AND 876288 CONNECTORS WITH BMS 13-8A TYPE I CLASS A AWG 18 WIRE

A. Connector Description



WALTER KIDDE 875564 AND 876288 CONNECTORS
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

B. Contact Assembly

**Table 5
CONTACT CRIMP TOOLS**

Contact	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Supplier	Part Number	Supplier
Pin	MS3191A	QPL	3630-2	Astro
			3630-2	Buchanan
	ST2220-1-Y	Boeing	ST2220-1-7	Boeing
Socket	MS3191A	QPL	3630-4	Astro
			3630-4	Buchanan
	ST2220-1-Y	Boeing	ST2220-1-58	Boeing

Refer to Figure 2.

- (1) Make a selection of a crimp tool from Table 5.
- (2) Remove 0.35 inch ±0.03 inch of insulation from the end of the wire.
- (3) In this sequence, put these components on the wire:
 - The slip spring
 - The gland nut
 - The crimp sleeve
 - The spacer.
- (4) Put the insulator on the wire.
Make sure that it is against the wire insulation.
- (5) Put the contact in the tool.
- (6) Hold the tool with the crimp barrel of the contact pointed up.
- (7) Push the wire into the crimp barrel of the contact until the end of the wire is against the bottom of the crimp barrel.
- (8) Crimp the contact.

C. Connector Assembly

**Table 6
NECESSARY TOOLS**

Tool	Part Number
Pliers	ST2598C
Torque Adapter	ST2575

Refer to Figure 2.

- (1) Make a selection of a torque adapter from Table 6.
- (2) Make a selection of a pair of pliers from Table 6.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF WALTER KIDDE CONNECTORS**

- (3) Make a selection of a cement from Table 4.
- (4) For protection for the pin to shell seal surface when the gland nut is torqued, make a selection of a washer from Table 4.

NOTE: An equivalent washer is a satisfactory alternative.

- (5) Put the coupling nut on the end of the shell that has threads.
- (6) Put a small quantity of cement on the first three threads of the shell.
- (7) Put the front insulator and the rear insulator into the shell.
Make sure that the flange of the contact is aligned correctly in the counterbore of the rear insulator.
- (8) Push the wired contact into the rear insulator.
- (9) Fill the space at the end of the insulator in the shell with the cement.
- (10) Move the spacer forward.
- (11) Push the gland nut on the sleeve.
Make sure it is against the shell.
- (12) Tighten the gland nut:
 - (a) Fully engage the threads of the gland nut with the threads of the shell.
 - (b) Put the washer on the shell.
 - (c) Fully engage the threads of the torque adapter with the threads of the shell.
 - (d) Torque the adapter to the shell 32 inch-pounds to 38 inch-pounds.
 - (e) Put the pliers on the gland nut.
 - (f) Torque the gland nut 12 inch-pounds to 18 inch-pounds.
- (13) Remove the washer and the unwanted cement.
- (14) Turn the spring on the crimp sleeve until it is against the gland nut.
- (15) Put a dust cap on the end of the shell.
- (16) Cure the Sauereisen cement a minimum of 18 hours at 70 degrees F.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The connector can be installed before the cement fully cures.

4. ASSEMBLY OF WALTER KIDDE 875564 AND 876288 CONNECTORS WITH ROCKBESTOS H22-4000 AWG 18 WIRE

NOTE: These alternatives are permitted:

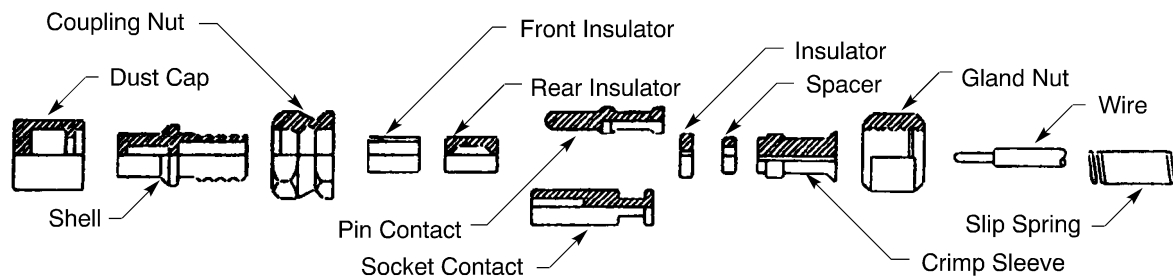
- The 877535 connector for the 876288 connector
- The 877536 connector for the 875564 connector.

Refer to Paragraph 7. for the procedure to assemble the Walter Kidde 877535 and 877536 connectors with Rockbestos H22-4000 AWG 18 wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

A. Connector Description



WALTER KIDDE 875564 AND 876288 CONNECTORS

Figure 3

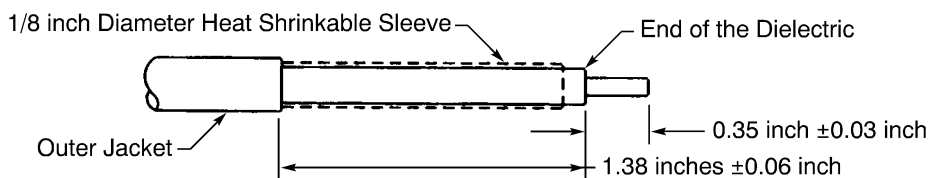
B. Contact Assembly

**Table 7
CONTACT CRIMP TOOLS**

Contact	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Supplier	Part Number	Supplier
Pin	MS3191A	QPL	3630-2	Astro
	ST2220-1-Y	Boeing	3630-2	Buchanan
Socket	MS3191A	QPL	ST2220-1-7	Boeing
	MS3191A	QPL	3630-4	Astro
	ST2220-1-Y	Boeing	3630-4	Buchanan
			ST2220-1-58	Boeing

Refer to Figure 3.

- (1) Make a selection of a 1/8 inch diameter heat shrinkable sleeve from Table 4.
- (2) Make a selection of a 1/4 inch diameter heat shrinkable sleeve from Table 4.
- (3) Make a selection of a crimp tool from Table 7.
- (4) Prepare the wire. Refer to Figure 4.



WIRE TRIM DIMENSIONS

Figure 4

- (a) Remove 1.38 inches ± 0.06 inch of the outer braid from the wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

- (b) Remove 1.38 inches ± 0.06 inch of the Teflon tape from the wire.
 - CAUTION:** DO NOT CUT THE DIELECTRIC MATERIAL.
- (c) Remove 0.35 inch ± 0.03 inch of the dielectric from the end of the wire.
- (d) Put a 1 inch ± 0.06 inch length of 1/8 inch diameter heat shrinkable sleeve on the dielectric. Make sure that the end of the sleeve is against the end of the braid.
- (e) Shrink the sleeve in its position. Refer to Subject 20-10-14.
- (5) In this sequence, put these components on the wire:
 - A 1 inch ± 0.06 inch length of 1/4 inch diameter heat shrinkable sleeve
 - The slip spring
 - The gland nut
 - The crimp sleeve
 - The spacer.
- (6) Put the insulator on the wire. Make sure that it is against the wire insulation.
- (7) Put the contact in the tool.
- (8) Hold the tool with the crimp barrel of the contact pointed up.
- (9) Push the wire into the crimp barrel of the contact until the end of the wire is against the bottom of the crimp barrel.
- (10) Crimp the contact.

C. Connector Assembly

**Table 8
NECESSARY TOOLS**

Tool	Part Number
Pliers	ST2598C
Torque Adapter	ST2575

Refer to Figure 3.

- (1) Make a selection of a torque adapter from Table 8.
- (2) Make a selection of a pair of pliers from Table 6.
- (3) Make a selection of a cement from Table 4.
- (4) For protection for the pin to shell seal surface when the gland nut is torqued, make a selection of a washer from Table 4.

NOTE: An equivalent washer is a satisfactory alternative.

- (5) Put the coupling nut on the end of the shell that has threads.
- (6) Put a small quantity of cement on the first three threads of the shell.
- (7) Put the front insulator and the rear insulator into the shell. Make sure that the flange of the contact is aligned correctly in the counterbore of the rear insulator.
- (8) Push the wired contact into the rear insulator.
- (9) Fill the space at the end of the insulator in the shell with the cement.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

- (10) Move the spacer forward.
- (11) Push the gland nut on the sleeve.
Make sure that it is against the shell.
- (12) Tighten the gland nut:
 - (a) Fully engage the threads of the gland nut with the threads of the shell.
 - (b) Put the washer on the shell.
 - (c) Fully engage the threads of the torque adapter with the threads of the shell.
 - (d) Torque the adapter to the shell 32 inch-pounds to 38 inch-pounds.
 - (e) Put the pliers on the gland nut.
 - (f) Torque the gland nut 12 inch-pounds to 18 inch-pounds.
- (13) Remove the washer and unwanted cement.
- (14) Push the 1 inch length of 1/4 inch diameter heat shrinkable sleeve to the connector until the end of the sleeve is against the end of crimp sleeve.
- (15) Shrink the sleeve in its position. Refer to Subject 20-10-14.
- (16) Turn the spring on the crimp sleeve until it is against the gland nut.
- (17) Put a dust cap on the end of the shell.
- (18) Cure the Sauereisen cement a minimum of 18 hours at 70 degrees F.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

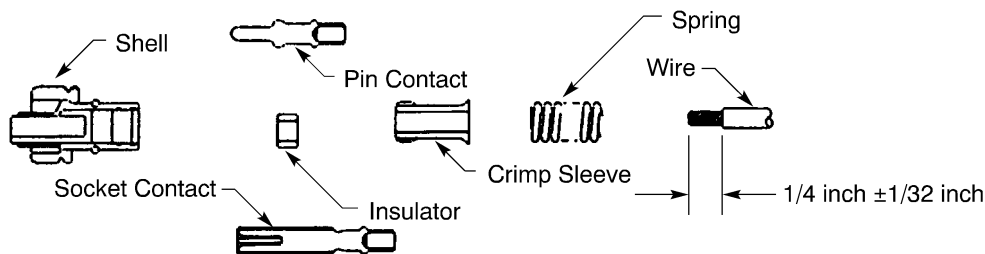
NOTE: The connector can be installed before the cement fully cures.

5. ASSEMBLY OF WALTER KIDDE 876633 AND 876635 CONNECTORS

This paragraph gives the procedures to assemble the connectors with these wires:

- Boeing 10-60816-17
- Filotex TMF
- Haveg 24-00033.

A. Connector Description



WALTER KIDDE 876633 AND 876635 CONNECTORS

Figure 5

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

B. Contact Assembly

**Table 9
CONTACT CRIMP TOOLS**

Contact	Crimp Tool					
	Basic Unit			Locator		
	Part Number	Setting	Supplier	Part Number	Color	Supplier
Pin	M22520-1-01	6	QPL	56-302	Red	Balmar
				TH302	Red	Daniels
	ST2220-1-Y	-	Boeing	3630-2	-	Astro
				3630-2	-	Buchanan
Socket	M22520-1-01	6	QPL	56-302	Red	Balmar
				TH302	Red	Daniels
	ST2220-1-Y	-	Boeing	3630-4	-	Astro
				3630-4	-	Buchanan

Refer to Figure 5.

- (1) Make a selection of heat shrinkable tube from Table 4.
- (2) Make a selection of a crimp tool from Table 9.
- (3) Prepare the wire.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO:

- THE RUBBER TAPE
- THE GLASS WRAPPED LAYER.

- (a) Remove 1.50 inches \pm 0.06 inch of the jacket from the wire.
 - (b) Remove 1.50 inches \pm 0.06 inch of the Teflon tapes from the wire.
 - (c) Remove 1.50 inches \pm 0.06 inch of the braid from the wire.
 - (d) Put a 1.13 inch \pm 0.06 inch length of 0.13 inch diameter heat shrinkable tube on the wire.
 - (e) Move the inner and the outer layers of the sleeve until the ends of the sleeve are against the end of outer jacket.
 - (f) Shrink the sleeve in its position. Refer to Subject 20-10-14.
Make sure to use a heat source of 750 degrees F to shrink the tube.
- (4) Remove 0.35 inch \pm 0.03 inch of insulation from the end of the wire.
 - (5) In this sequence, put these components on the wire:
 - A 0.75 inch \pm 0.10 inch length of 0.35 inch diameter heat shrinkable tube
 - A 0.75 inch \pm 0.10 inch length of 0.19 inch diameter heat shrinkable tube
 - A 1.25 inch \pm 0.10 inch length of 0.13 inch diameter heat shrinkable tube.
 - The sleeve
 - The insulator.

The spring can be discarded; it is not used.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF WALTER KIDDE CONNECTORS**

- (6) Push the wire into the crimp barrel of the contact until the end of the wire is against the bottom of the crimp barrel.
- (7) Crimp the contact.

C. Connector Assembly

Refer to Figure 5.

- (1) Make a selection of a cement from Table 4.
- (2) Apply a small quantity of cement around the bare wire where the wire goes in the crimp barrel of the contact.

CAUTION: DO NOT APPLY THE CEMENT TO THE CONTACT FARTHER THAN THE FLANGE OF THE CONTACT.

- (3) Hold the sleeve and the insulator away from the shell.
- (4) Push the contact into the shell until the contact is fully inserted.
- (5) Hold the contact in position.
- (6) Use a syringe to fill the rear of the shell with the cement.
- (7) Push the insulator into the shell.
- (8) Push the sleeve against the shell.
- (9) Turn the sleeve counterclockwise until the threads of the sleeve engage the threads of the shell.

Make sure that:

- The contact does not move backward
- The shell and the wire do not turn.

- (10) Tighten the sleeve with the hand.
Make sure that the center contact is centered in the connector shell.
- (11) Remove the unwanted cement.
- (12) Push the 0.13 inch diameter tube forward until the end of the tube is against the flare on connector sleeve.
- (13) Shrink the tube in its position. Refer to Subject 20-10-14.
- (14) Push the 0.19 inch diameter tube on the flare on the connector sleeve until the end of the tube is against the connector shell.
- (15) Shrink the tube in its position. Refer to Subject 20-10-14.
- (16) Push the 0.35 inch diameter tube on the connector shell until the end of the tube is against retainer ring of the coupling nut.
- (17) Shrink the tube in its position. Refer to Subject 20-10-14.
- (18) Put a dust cap on the end of the shell.
- (19) Attach the Walter Kidde 241833 envelope that contains the Walter Kidde 209592 seal gaskets to the connector with the tie material. Refer to Subject 20-10-11 for the procedure to assemble a wire harness tie.
- (20) Cure the Sauereisen cement a minimum of 18 hours at 70 degrees F.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The connector can be installed before the cement fully cures.

D. Connector Installation

- (1) Install one gasket when the plug is attached to the sensor element. Refer to the instructions on the Walter Kidde 241833 envelope.

NOTE: When the plug is disconnected from the receptacle, it is necessary to install a new gasket before the plug and the receptacle are attached again.

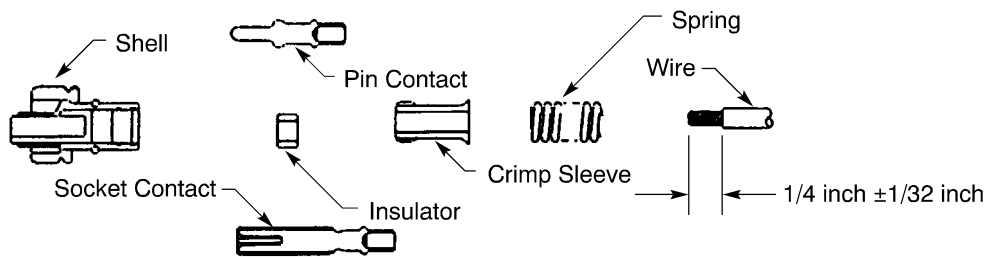
- (2) When it is necessary, attach more gaskets to the cable assembly with a Temperature Grade D tie material. Refer to Subject 20-10-11 for the procedure to assemble a wire harness tie.

Make sure that the tie material is Temperature Grade D material.

6. ASSEMBLY OF WALTER KIDDE 876633 AND 876635 CONNECTORS ON ROLLS-ROYCE WIRE HARNESSSES

NOTE: The data in this paragraph is supplied to Boeing by Rolls-Royce.

A. Connector Description



WALTER KIDDE 876633 AND 876635 CONNECTORS

Figure 6

B. Contact Assembly

**Table 10
CONTACT CRIMP TOOLS**

Contact	Basic Unit		Die		Locator	
	Part Number	Supplier	Part Number	Supplier	Part Number	Supplier
Pin	M22520/1-01	QPL	-	-	M22520/1-02	QPL
	MS27828	QPL	MS27828-1	QPL	-	-
	MS3191A	QPL	-	-	3630-2	Astro
			-	-	3630-2	Buchanan

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

Table 10 (continued)

Contact	Basic Unit		Die		Locator	
	Part Number	Supplier	Part Number	Supplier	Part Number	Supplier
Socket	M22520/1-01	QPL	-	-	M22520/1-02	QPL
	MS27828	QPL	MS27828-1	QPL	-	-
	MS3191A	QPL	-	-	3630-4	Astro
			-	-	3630-4	Buchanan

Refer to Figure 6.

- (1) Make a selection of a crimp tool from Table 10.
- (2) Remove 0.25 inch \pm 0.03 inch of the insulation from the end of the wire.
- (3) In this sequence, put these components on the wire:
 - The spring
 - The crimp sleeve
 - The insulator.
- (4) Push the wire into the crimp barrel of the contact until the end of the wire is against the bottom of the crimp barrel.
- (5) Crimp the contact.

C. Connector Assembly

Table 11
CRIMP SLEEVE CRIMP TOOLS

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
612648	Astro	614499	Astro
612648	Buchanan	614499	Buchanan
M22520/5-01	QPL	M22520/5-37	QPL
HX4	Daniels	Y715	Daniels

Refer to Figure 6.

- (1) Make a selection of a cement from Table 4.
- (2) Make a selection of a crimp tool from Table 11.
- (3) Put a small quantity of cement on the first three threads of the crimp sleeve.
- (4) Push the contact into the shell.
Make sure that the flange of the contact is aligned correctly in the counterbore of the insulator.
- (5) Push the crimp sleeve forward into the shell.
- (6) Turn the sleeve counterclockwise until it is tight.

CAUTION: DO NOT USE A PAIR OF PLIERS TO TURN THE CRIMP SLEEVE.

- (7) Crimp the sleeve.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

- (8) Push the spring to the connector until it is against the flared end of the crimp sleeve.
- (9) Turn the spring counterclockwise on the end of the sleeve until the end of the spring is against the shell.

NOTE: Some force can be necessary to start the first coil of the spring on the flared end of the crimp sleeve.

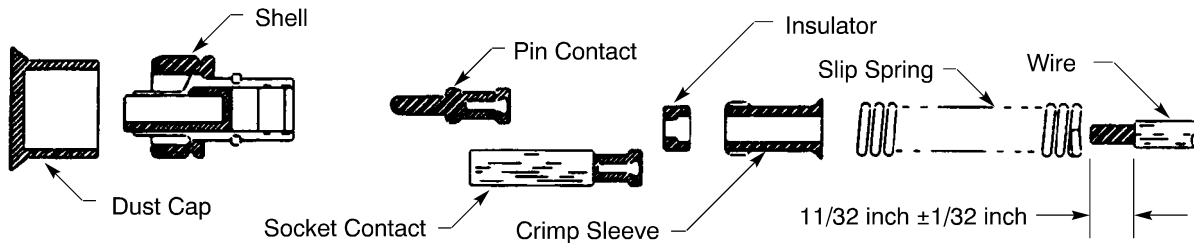
- (10) Put a dust cap on the end of the shell.
- (11) Cure the Sauereisen cement a minimum of 18 hours at 70 degrees F.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

NOTE: The connector can be installed before the cement fully cures.

7. ASSEMBLY OF WALTER KIDDE 877535 AND 877536 CONNECTORS WITH ROCKBESTOS H22-4000 AND BMS 13-55 AWG 18 WIRE

A. Connector Description



WALTER KIDDE 877535 AND 877536 CONNECTORS
Figure 7

B. Contact Assembly

Table 12
CONTACT CRIMP TOOLS

Contact	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Supplier	Part Number	Supplier
Pin	ST2220-1-Y	Boeing	ST2220-1-33	Boeing
Socket	ST2220-1-Y	Boeing	ST2220-1-58	Boeing
			ST2220-1-30	Boeing

NOTE: The ST2220-1-58 locator is a modified ST2220-1-30 locator. A metal stop is used in the bottom of the contact cavity. The metal stop has these dimensions:

- A diameter of 0.125 inch to 0.140 inch
- A thickness of 0.035 inch to 0.045 inch.

Refer to Figure 7.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

- (1) Make a selection of a 1/4 inch diameter heat shrinkable sleeve from Table 4.
- (2) Make a selection of a crimp tool from Table 7.
- (3) In this sequence, put these components on the wire:
 - The slip spring
 - The crimp sleeve.
- (4) Remove 0.35 inch ±0.03 inch of the insulation from the end of the wire.
- (5) For Rockbestos H22-4000 wire, put a 1.50 inch ±0.06 inch length of 1/4 inch diameter heat shrinkable sleeve on the wire.
- (6) For BMS 13-55 wire, put four 1.50 inch ±0.06 inch lengths of 1/4 inch diameter heat shrinkable sleeve on the wire.
- (7) Put the insulator on the wire.
Make sure that the end of the insulator is against the wire insulation.
- (8) Put the contact in the tool.
- (9) Hold the tool with the crimp barrel of the contact pointed up.
- (10) Push the wire into the crimp barrel of the contact until the end of the wire is against the bottom.
- (11) Crimp the contact.

C. Connector Assembly

**Table 13
CRIMP SLEEVE CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
612648	Astro	616229	Astro
612648	Buchanan	616229	Buchanan
612648	Buchanan	ST965-4	Boeing

Refer to Figure 7.

- (1) Make a selection of a cement from Table 4.
- (2) Make a selection of a hex crimp tool from Table 13.
- (3) Put a small quantity of the cement around the wire where the wire goes into the insulator.
- (4) Push the contact into the shell.
Make sure that the flange of the contact is aligned correctly in the counterbore of the insulator.
- (5) Put a small quantity of the cement on the first three threads of the crimp sleeve.
- (6) Push the crimp sleeve forward into the shell.
- (7) Turn the sleeve counterclockwise until it is tight.

CAUTION: DO NOT USE A PAIR OF PLIERS TO TURN THE CRIMP SLEEVE.

Make sure that the end of the sleeve that has threads aligns correctly with the rear face of the shell.

- (8) Crimp the sleeve on the wire.

Make sure that the distance across the hex crimp flats is approximately 0.175 inch to 0.181 inch.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

- (9) For Rockbestos H22-4000 wire:
 - (a) Move the 1.50 inch length of heat shrinkable sleeve until the end of the sleeve is against the edge of the crimp sleeve.
 - (b) Shrink the sleeve in its position. Refer to Subject 20-10-14.
 - (10) For BMS 13-55 wire:
 - (a) Move one of the 1.50 inch length of heat shrinkable sleeves until the end of the sleeve is against the edge of the crimp sleeve.
 - (b) Shrink the sleeve in its position. Refer to Subject 20-10-14.
 - (c) Do Step (a) and Step (b) for the remaining sleeves.
 - (11) Push the spring to the connector until it is against the flared end of the crimp sleeve.
 - (12) Turn the spring counterclockwise on the end of the sleeve until the end of the spring is against the shell.
- NOTE:** Some force can be necessary to start the first coil of the spring on the flared end of the crimp sleeve.
- (13) Put a dust cap on the end of the shell.
 - (14) Cure the Sauereisen cement a minimum of 18 hours at 70 degrees F.

CAUTION: THE CONNECTOR IS NOT SERVICEABLE UNTIL THE CEMENT FULLY CURES. IN FLIGHT, TEMPERATURES HIGHER THAN 180 DEGREES F AND HIGH VIBRATIONS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

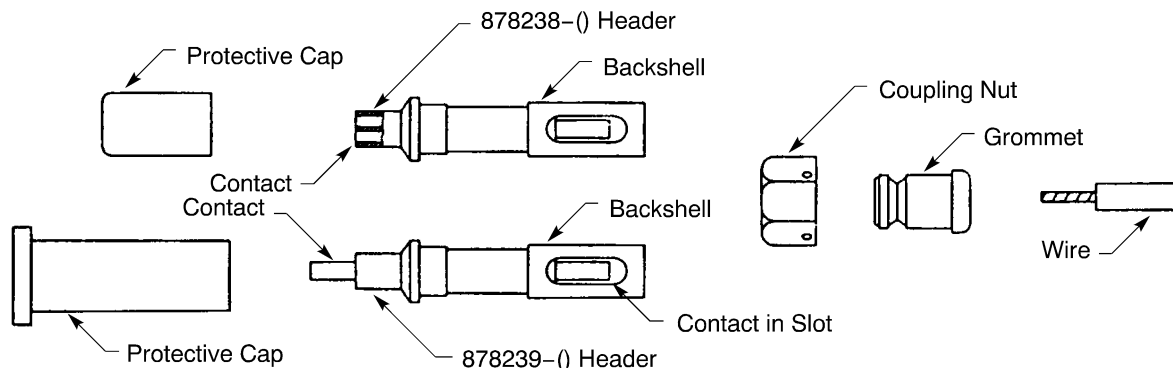
NOTE: The connector can be installed before the cement fully cures.

8. ASSEMBLY OF WALTER KIDDE 878238-() AND 878239-() CONNECTORS

This paragraph give the procedures to assemble the connectors with AWG 18 and AWG 16 wire with an O.D. of:

- 0.096 inch minimum
- 0.160 inch maximum.

A. Connector Description



WALTER KIDDE 878238-() AND 878239-() CONNECTORS
Figure 8

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

B. Wire Preparation

- (1) Make a selection of a 1/8 inch diameter heat shrinkable sleeve from Table 4.
- (2) Remove 0.31 inch \pm 0.02 inch of insulation from the end of the wire.
- (3) For wire with an O.D. between 0.096 inch and 0.126 inch, increase the O.D. of the wire:
 - (a) Put a 1 inch length of 1/8 inch diameter heat shrinkable sleeve on the wire.
 - (b) Align the end of the sleeve with the end of the wire insulation.
 - (c) Shrink the sleeve in its position. Refer to Subject 20-10-14.

C. Contact Assembly

**Table 14
CONTACT CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
612648	Astro	620770	Astro
612648	Buchanan	620770	Buchanan
HX4	Daniels	Y715	Daniels
M22520/5-01	QPL	Y715	Daniels

Refer to Figure 8.

- (1) Make a selection of a contact crimp tool from Table 14.
- (2) Put the grommet on the wire.
- (3) Put the nut on the header.
- (4) Push the wire into the contact until the wire insulation is against the crimp barrel.
- (5) Crimp the contact.

Make sure that the tool is against the ceramic face of the backshell.

NOTE: The contact is crimped through the slots in the backshell of the header.

D. Connector Assembly

**Table 15
BACKSHELL CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
612648	Astro	620963	Astro
612648	Buchanan	620963	Buchanan
HX4	Daniels	Y715	Daniels
M22520/5-01	QPL	Y715	Daniels

Refer to Figure 8.

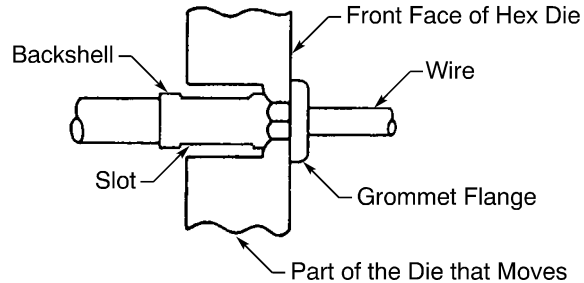
- (1) Make a selection of a crimp tool from Table 15.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF WALTER KIDDE CONNECTORS**

- (2) Push the grommet forward into the backshell of the header until the face of the grommet flange is against the end of the backshell.
- (3) Crimp the backshell down into the V groove of the grommet. Refer to Figure 9.

Make sure that:

- The flange of the grommet is fully against the end of the backshell
- The flange of the grommet is against the front face of the hex die
- A side of the backshell with a slot is pointed to the part of the die that moves.



POSITION THE BACKSHELL IN THE CRIMP TOOL
Figure 9

- (4) Put a dust cap on the end of the shell.

E. Connector Installation

- (1) Make a selection of a silicone grease from Table 4.
- (2) Put a light, smooth layer of the grease on the copper seal gasket that is in the coupling nut.

CAUTION: DO NOT APPLY GREASE ON THE CONTACT. THE GREASE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (3) Connect the plug with the receptacle.
- (4) Torque the coupling nut of the plug 50 inch-pounds to 60 inch-pounds.

STANDARD WIRING PRACTICES MANUAL

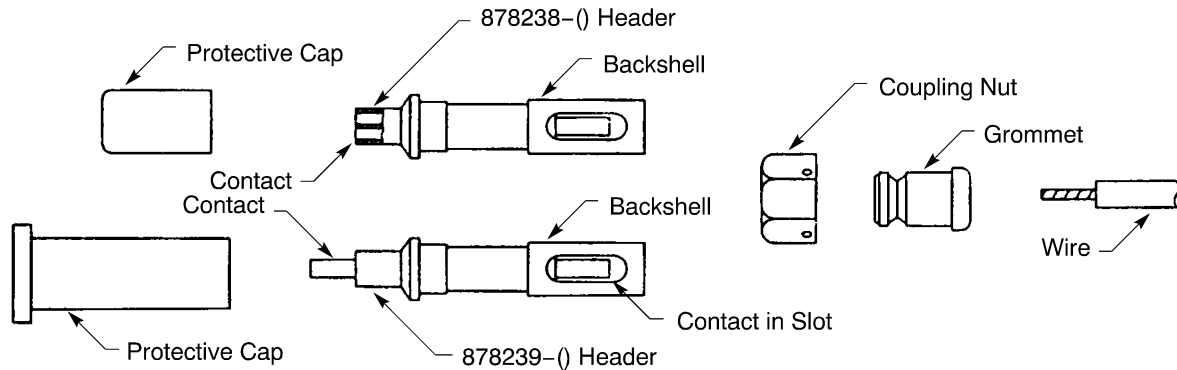
ASSEMBLY OF WALTER KIDDE CONNECTORS

9. ASSEMBLY OF WALTER KIDDE 878550-() AND 878551-() CONNECTORS

This paragraph give the procedures to assemble the connectors with AWG 18 and AWG 16 wire with an O.D. of:

- 0.15 inch minimum
- 0.17 inch maximum.

A. Connector Description



WALTER KIDDE 878550-() AND 878551-() CONNECTORS
Figure 10

B. Contact Assembly

Table 16
CONTACT CRIMP TOOLS

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
612648	Astro	620770	Astro
612648	Buchanan	620770	Buchanan
HX4	Daniels	Y715	Daniels
M22520/5-01	QPL	Y715	Daniels

Refer to Figure 10.

- (1) Make a selection of a contact crimp tool from Table 16.
- (2) Remove 0.31 inch \pm 0.02 inch of insulation from the end of the wire.
- (3) Put the grommet on the wire.
- (4) Slide the nut forward on the connector assembly.
- (5) Push the wire into the contact until the wire insulation is against the contact crimp barrel.
- (6) Crimp the contact.

Make sure that the tool is against the ceramic face of the backshell.

NOTE: The contact is crimped through the slots in the backshell of the header.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

C. Connector Assembly

**Table 17
BACKSHELL CRIMP TOOLS**

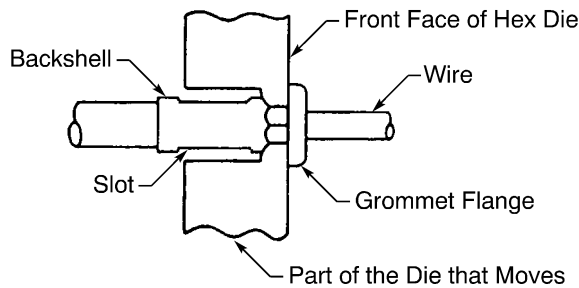
Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
612648	Astro	620784	Astro
612648	Buchanan	620784	Buchanan
HX4	Daniels	Y715	Daniels
M22520/5-01	QPL	Y715	Daniels

Refer to Figure 10.

- (1) Make a selection of a crimp tool from Table 17.
- (2) Push the grommet forward into the backshell of the header until the face of the grommet flange is against the end of the backshell.
- (3) Crimp the backshell down into the V groove of the grommet. Refer to Figure 11.

Make sure that:

- The flange of the grommet is fully against the end of the backshell
- The flange of the grommet is against the front face of the hex die
- A side of the backshell with a slot is pointed to the part of the die that moves.



POSITION THE BACKSHELL IN THE CRIMP TOOL

Figure 11

- (4) Put a dust cap on the end of the shell.

D. Connector Installation

- (1) Make a selection of a silicone grease from Table 4.
- (2) Put a light, smooth layer of the grease on the copper seal gasket that is in the coupling nut.

CAUTION: DO NOT APPLY GREASE ON THE CONTACT. THE GREASE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (3) Connect the plug with the receptacle.
- (4) Torque the coupling nut of the plug 50 inch-pounds to 60 inch-pounds.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS

10. ASSEMBLY OF WALTER KIDDE 878581-01, 878582-01, AND 878598-01 CONNECTORS

This paragraph gives the procedures to assemble the connectors with these wires:

- BMS 13-8 Type 1 Class A AWG 18
- Champlain 24-00033
- Filotex TMF.

A. Contact Assembly

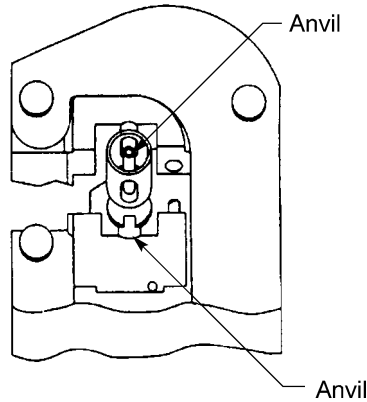
**Table 18
CONTACT CRIMP TOOLS**

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22910/7-1	QPL	620770	Astro
		620770	Buchanan
M22520/5-01	QPL	620770	Astro
		620770	Buchanan

- (1) Make a selection of a crimp tool from Table 18.
- (2) If the wire has a braided jacket, cut the end of the wire at an angle to make the installation of the Teflon grommet easier.
- (3) Put the Teflon grommet on the wire.
Make sure to put the large end of the grommet on the wire first.
- (4) If the wire was cut at an angle, cut the wire to make the end of the wire perpendicular to its longitudinal axis.
- (5) Remove 0.31 inch \pm 0.02 inch of the insulation from the end of the wire.
- (6) Put the coupling nut on the wire.
Make sure that the end of the nut that has threads points to the bare end of the wire.
- (7) Put the body of the connector in the die of the crimp tool. Refer to Figure 12.
Make sure that:
 - The point of each anvil goes into the slots in the backshell
 - The top of each anvil is against the ceramic body.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS



POSITION OF THE CONNECTOR BODY IN THE CRIMP TOOL
Figure 12

- (8) Lightly close the handles of the tool to the distance that is sufficient to hold the connector in position. Make sure that the anvils start to close around the crimp barrel of the contact.
- (9) Push the bare end of the wire into the crimp barrel of the contact.
- (10) Crimp the contact.
 Make sure that all of the strands of the conductor are in the crimp barrel.

B. Connector Assembly

Table 19
BACKSHELL CRIMP TOOLS

Basic Unit		Die	
Part Number	Supplier	Part Number	Supplier
M22910/7-1	QPL	620963	Astro
		620963	Buchanan

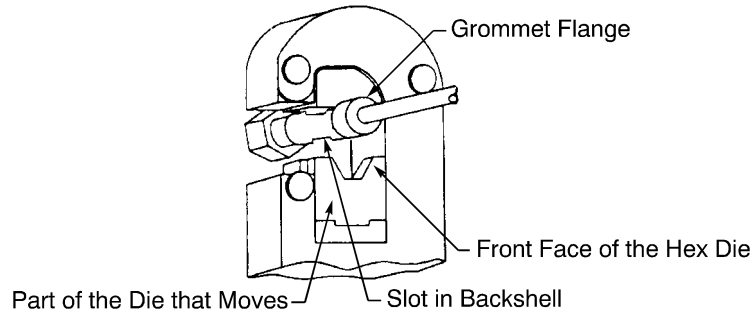
- (1) Make a selection of a crimp tool from Table 19.
- (2) Push the coupling nut on the connector body.
- (3) Push the Teflon grommet into the connector shell.
- (4) Put the body of the connector in the die of the crimp tool. Refer to Figure 13.

Make sure that:

- The flange of the grommet is fully against the end of the backshell
- The flange of the grommet is against the front face of the hex die
- A side of the backshell with a slot is pointed to the part of the die that moves.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WALTER KIDDE CONNECTORS



CONNECTOR SHELL CRIMP
Figure 13

- (5) Crimp the backshell.
- (6) Put a dust cap on the end of the shell.

11. APPROVED TOOL SUPPLIERS

A. Connector Assembly Tools

Table 20
CONNECTOR ASSEMBLY TOOL SUPPLIERS

Tool	Supplier
ST2575	Boeing
ST2598C	Boeing



707, 727-787

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LINDBERG 1039, 2564-3, AND 2564-4 CONNECTORS

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20-62-17 CONTENTS

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LINDBERG 1039, 2564-3, AND 2564-4 CONNECTORS

This Subject gives the procedure to assemble the connectors with BMS 13-8 wire.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

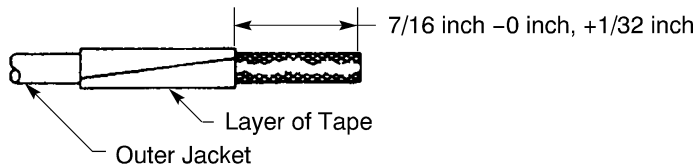
Part Number	Supplier
1039	Lindberg
2564-3	Lindberg
2564-4	Lindberg

2. ASSEMBLY OF THE LINDBERG 1039 CONNECTOR

This paragraph gives the procedure to assemble the connector with BMS 13-8 Type 3 Class A AWG 18 wire.

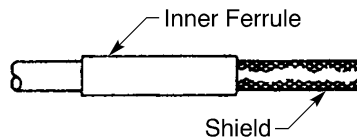
A. Wire Preparation

- (1) Remove 7/16 inch -0 inch, + 1/32 inch of the outer jacket. Refer to Figure 1.



**OUTER JACKET REMOVAL LENGTH
Figure 1**

- (2) If the outer diameter of the wire is less than 0.165 inch:
 - (a) Make a selection of a 3/4 inch Grade D Class 2 tape. Refer to Subject 20-00-11.
 - (b) Put a layer of tape on the end of the outer jacket so that the diameter of the wire is increased to 0.175 inch.
- (3) Put the inner ferrule on the wire. Refer to Figure 2.
If the inner ferrule cannot be put on the wire, remove the length of the outer jacket that is equal to length of the inner ferrule.



**POSITION OF THE INNER FERRULE
Figure 2**

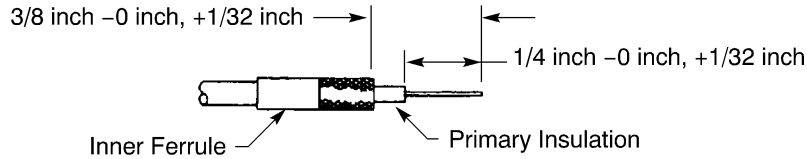
- (4) Move the ferrule on the wire so that the end of the ferrule is aligned with the end of the outer jacket or the end of the tape.

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ASSEMBLY OF LINDBERG 1039, 2564-3, AND 2564-4 CONNECTORS

- (5) Fold the shield back so that the folded end of the shield is 3/8 inch -0 inch, + 1/32 inch from the end of the wire. Refer to Figure 3.

Make sure that the strands of the shield are not fully moved apart.



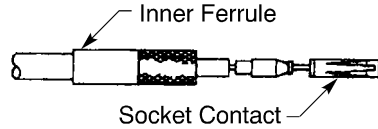
SHIELD AND INSULATION REMOVAL LENGTH
Figure 3

- (6) Remove 1/4 inch -0 inch, + 1/32 inch of the primary insulation. Refer to Figure 3.

B. Contact Assembly

Table 2
CONTACT CRIMP TOOLS

Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
MS3191-1	QPL	3242	Buchanan



CONTACT ASSEMBLY
Figure 4

- (1) Make a selection of a contact crimp tool from Table 2.
- (2) Put the contact in the crimp tool.
- (3) Put the wire in the crimp barrel of the contact so that the wire touches the bottom. Refer to Figure 4.
- (4) Crimp the contact.

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ASSEMBLY OF LINDBERG 1039, 2564-3, AND 2564-4 CONNECTORS

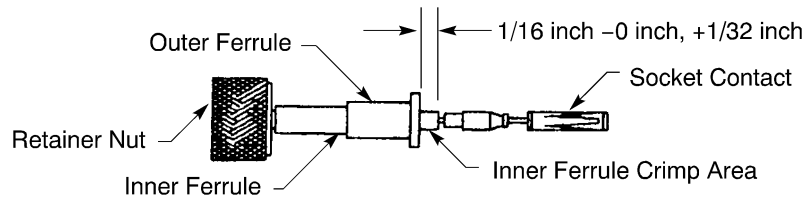
C. Connector Assembly

**Table 3
FERRULE CRIMP TOOLS**

Ferrule	Crimp Tool			
	Basic Unit		Die	
	Part Number	Supplier	Part Number	Supplier
Outer	WT201-03-10	Thomas & Betts	WT209	Thomas & Betts
			WT210	Thomas & Betts
	ST965-4	Boeing	WT209	Thomas & Betts
			WT210	Thomas & Betts
Inner	WT201-03-10	Thomas & Betts	WT203	Thomas & Betts
	ST965-4	Boeing		

- (1) Make a selection of an outer ferrule crimp tool from Table 3.
- (2) Make a selection of an inner ferrule crimp tool from Table 3.
- (3) Put the retainer nut on the wire so that:
 - The the large thread end of the retainer nut is pointed toward the end of the wire
 - The retainer nut is over the inner ferrule.

Refer to Figure 5.

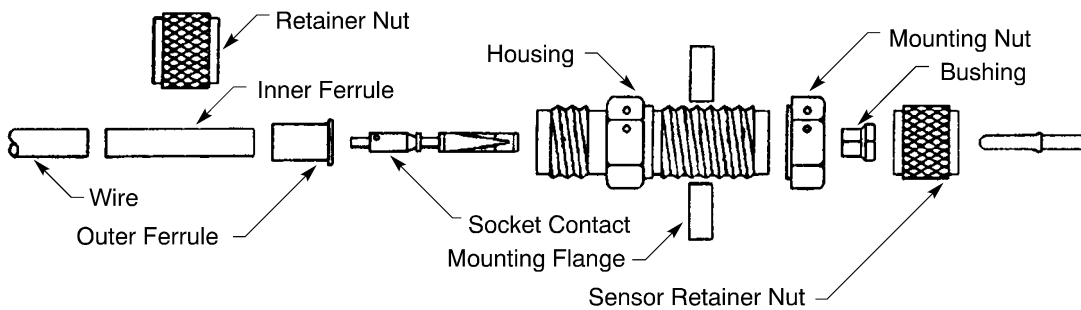


**POSITION OF THE OUTER FERRULE
Figure 5**

- (4) Put the outer ferrule on the wire so that the end of the inner ferrule is 1/16 inch -0 inch, + 1/32 inch beyond the end of the outer ferrule.
- (5) Crimp the outer ferrule.
- (6) Crimp the inner ferrule on the end that points toward the end of the wire.
- (7) Assembly the remaining components of the connector. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LINDBERG 1039, 2564-3, AND 2564-4 CONNECTORS



LINDBERG 1039 CONNECTOR
Figure 6

- (a) Put the socket contact in the end of the housing with the porcelain insulator and the shorter threads.
- (b) Put the wire retainer nut on the housing and tighten the nut.
- (c) Put the bushing in the housing.
- (d) Put the sensor retainer nut on the housing and tighten the nut.

D. Installation of the Lindberg Sensor

- (1) Remove these components from the connector assembly:
 - The sensor retainer nut
 - The bushing
 - The mounting nut.

Refer to Figure 6.

- (2) Put the connector housing in the mounting flange hole.
- (3) Put the mounting nut on the housing and tighten.
- (4) Install the sensor.
- (5) Put the sensor retainer nut on the sensor.
- (6) Open the slot in the bushing and push it over the Teflon insulated area of the sensor until the bushing is:
 - In the housing
 - Against the shoulder of the sensor.
- (7) Engage the threads of the sensor retainer nut and the housing and tighten.
- (8) Install lockwire on the connector.

3. ASSEMBLY OF THE LINDBERG 2564-3 AND 2564-4 CONNECTORS

This paragraph gives the procedure to assemble the connector with BMS 13-8 Type 1 Class A AWG 18 wire.

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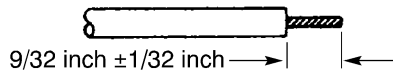
ASSEMBLY OF LINDBERG 1039, 2564-3, AND 2564-4 CONNECTORS

A. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
MS3191-1	QPL	5004-1	Buchanan
		11-7771-23	Bendix

- (1) Put the wire through the connector housing assembly.
- (2) Remove 9/32 inch \pm 1/32 inch of the wire insulation. Refer to Figure 7.



**INSULATION REMOVAL LENGTH
Figure 7**

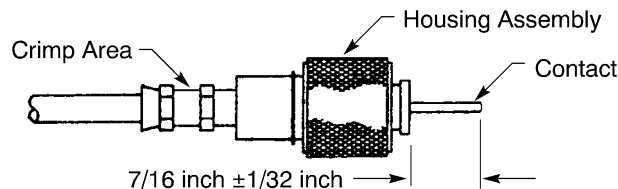
- (3) Make a selection of a contact crimp tool from Table 4.
- (4) Put the contact in the crimp tool.
- (5) Put the wire in the crimp barrel of the contact so that the wire touches the bottom.
- (6) Crimp the contact.

B. Connector Assembly

Refer to Figure 8.

**Table 5
FERRULE CRIMP TOOLS**

Basic Unit		Locator	
Part Number	Supplier	Part Number	Supplier
WT201-03-10	Thomas & Betts	CTR	Thomas & Betts



**POSITION OF THE CONTACT AND LOCATION OF THE CRIMP
Figure 8**

- (1) Make a selection of a ferrule crimp tool from Table 5.
- (2) Pull the housing assembly toward the end of the wire until the end of the contact is 7/16 inch \pm 1/32 inch from the housing.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LINDBERG 1039, 2564-3, AND 2564-4 CONNECTORS

- (3) Crimp the rear part of the housing assembly. Refer to Figure 8.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WAVE LAB 169493 AND 400015 CONNECTORS

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	A. Connector Part Numbers	1
2.	<u>ASSEMBLY OF THE WAVE LAB 169493 CONNECTOR</u>	1
	A. Contact Assembly	1
	B. Connector Assembly	2
3.	<u>ASSEMBLY OF THE WAVE LAB 400015 CONNECTOR</u>	3
	A. Cable Preparation	3
	B. Contact Assembly	4
	C. Connector Assembly	4

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WAVE LAB 169493 AND 400015 CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
169493	Wave Lab
400015	Wave Lab

2. ASSEMBLY OF THE WAVE LAB 169493 CONNECTOR

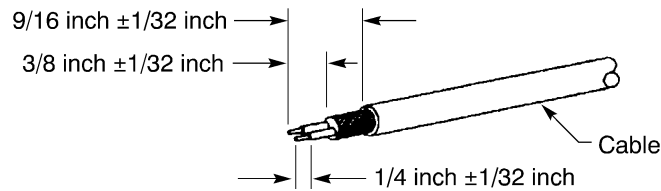
This paragraph gives the procedures to assemble the connector with BMS 13-18 Type 3 Class 2 AWG 20 wire.

A. Contact Assembly

**Table 2
CONTACT CRIMP TOOLS**

Basic Unit		Locator		
Part Number	Supplier	Part Number	Color	Supplier
MS3191-1	QPL	MS3191-20	Red	QPL

(1) Prepare the cable. Refer to Figure 1.



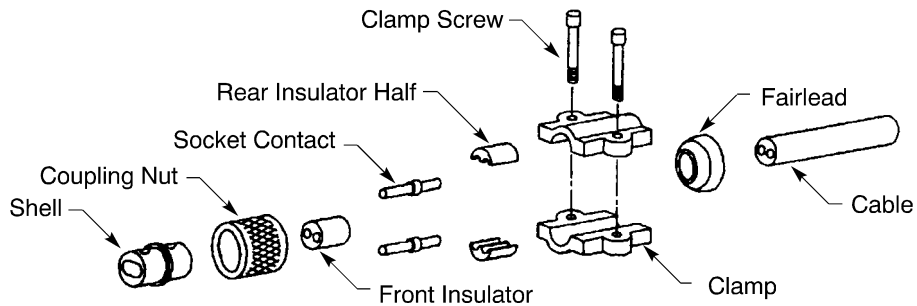
**CABLE PREPARATION
Figure 1**

- (a) Remove 9/16 inch ± 1/32 inch of the outer jacket from the end of the cable.
 - (b) Remove 3/8 inch ± 1/32 inch of the shield.
 - (c) Remove 1/4 inch ± 1/32 inch of the primary insulation from each wire.
- (2) Make a selection of a crimp tool from Table 2.
- (3) For each contact:
- (a) Put the wire in the crimp barrel of the contact.
 - (b) Crimp the contact.

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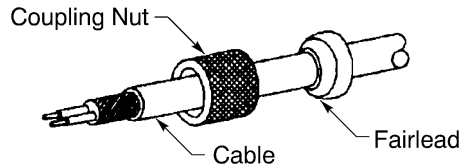
ASSEMBLY OF WAVE LAB 169493 AND 400015 CONNECTORS

B. Connector Assembly



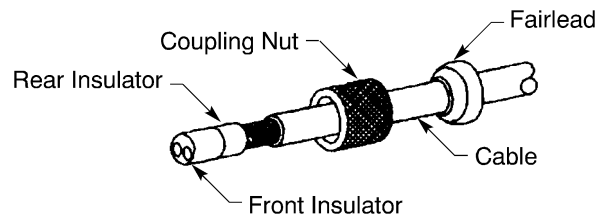
WAVE LAB 169493 CONNECTOR
Figure 2

- (1) Put the fairlead on the cable so that the smaller end points toward the contacts. Refer to Figure 3.



POSITION OF THE FAIRLEAD AND THE COUPLING NUT
Figure 3

- (2) Put the coupling nut on the cable so that the threaded end points toward the contacts. Refer to Figure 3.
- (3) Put the front insulator on the contacts so that the flange of each contact is against the insulator. Refer to Figure 4.

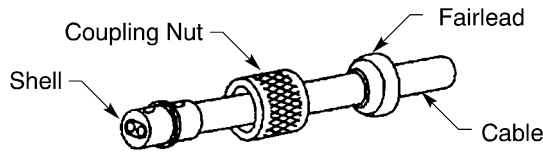


POSITION OF THE INSULATORS
Figure 4

- (4) Put each half of the rear insulator on the crimp barrels of the contacts. Refer to Figure 2.
- (5) Push the shell onto the insulator so that the keyway of the shell is aligned with the key of the insulator. See Figure 5.

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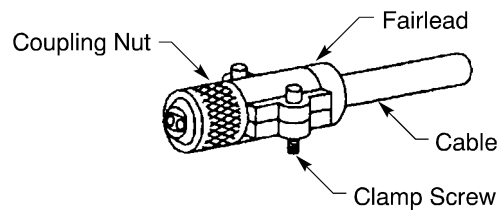
ASSEMBLY OF WAVE LAB 169493 AND 400015 CONNECTORS



POSITION OF THE SHELL
Figure 5

- (6) Move the coupling nut toward the end of the wire so that the nut is against the shoulder of the shell.
- (7) Put the clamp on the shell so that:
 - The smaller end of the fairlead is held in the groove of the clamp
 - Each clamp pin is aligned with a hole of the shell.

Refer to Figure 6.



POSITION OF THE CLAMP
Figure 6

- (8) Engage the threads of the screws and the clamp.
- (9) Tighten the screws.
- (10) Install a lockwire on each screw.

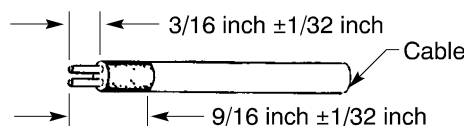
3. ASSEMBLY OF THE WAVE LAB 400015 CONNECTOR

This paragraph gives the procedures to assemble the connector with a cable that has these properties:

- Shielded wire
- Twisted pair
- High temperature wire
- AWG 18 or AWG 20 wire.

A. Cable Preparation

- (1) Prepare the cable. Refer to Figure 7.



CABLE PREPARATION
Figure 7

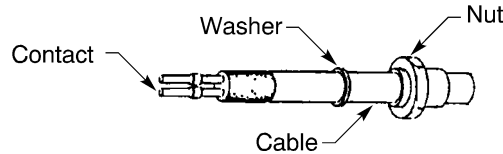
- (a) Remove 9/16 inch \pm 1/32 inch of the outer jacket from the end of the cable.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF WAVE LAB 169493 AND 400015 CONNECTORS

- (b) Remove 3/16 inch \pm 1/32 inch of the shield.
- (c) Remove 3/16 inch \pm 1/32 inch of the primary insulation from each wire.
- (2) In this order, put these components on the cable:
 - The nut
 - The washer.

Make sure that the end of the nut with the threads points toward the contacts. Refer to Figure 8.



POSITION OF THE NUT AND THE WASHER
Figure 8

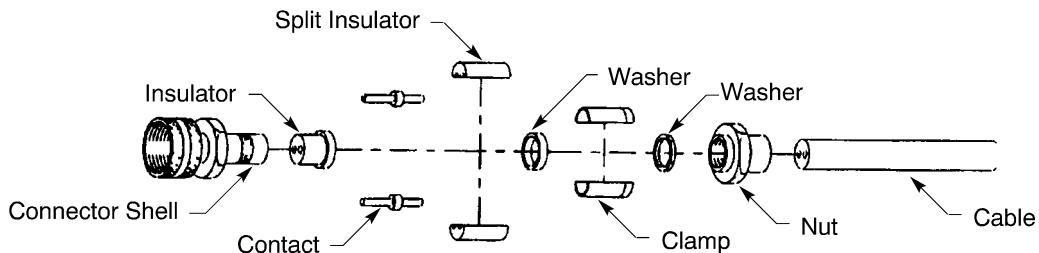
B. Contact Assembly

Table 3
CONTACT CRIMP TOOLS

Basic Unit		Locator		
Part Number	Supplier	Part Number	Color	Supplier
MS3191-1	QPL	MS3191-20	Red	QPL

- (1) Make a selection of a crimp tool from Table 3.
- (2) For each contact:
 - (a) Put the wire in the crimp barrel of the contact.
 - (b) Crimp the contact.

C. Connector Assembly

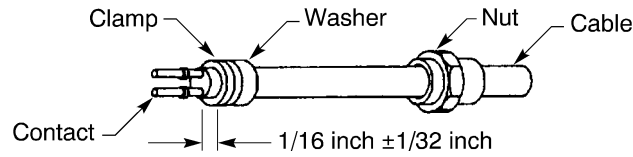


WAVE LAB 400015 CONNECTOR
Figure 9

- (1) Put the clamp on the cable so that the forward edge of the clamp is 1/16 inch \pm 1/32 inch from the end of the shield. Refer to Figure 10.

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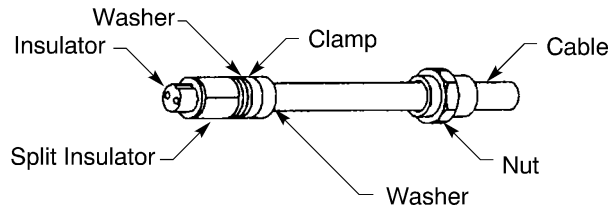
ASSEMBLY OF WAVE LAB 169493 AND 400015 CONNECTORS



POSITION OF THE SPLIT CLAMP

Figure 10

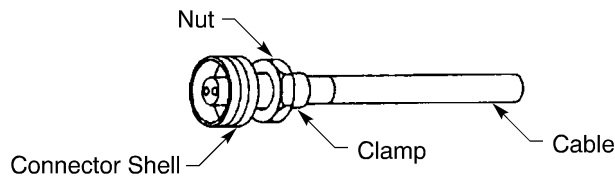
- (2) Hold the clamp in position with the washer.
- (3) At the end of the shield, move the strands of the shield apart.
- (4) Fold the strands of the shield back over the clamp so that they are even and symmetrical.
- (5) Put the second washer on the cable. Refer to Figure 9.
- (6) Put the insulator on the contact so that the flange of each contact is against the insulator.
- (7) Put each half of the split insulator on the crimp barrels of the contacts. Refer to Figure 11.



POSITION OF THE INSULATORS

Figure 11

- (8) Push the shell onto the insulator so that the keyway of the shell is aligned with the key of the insulator. Refer to Figure 12.



POSITION OF THE CONNECTOR SHELL

Figure 12

- (9) Engage the threads of the nut and the shell.
Make sure that the end of the shield is under the clamp.
- (10) Tighten the nut.
- (11) Install a lockwire on the nut and the shell.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AN3115 TYPE CONNECTORS

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	A. Connector Assembly	1

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AN3115 TYPE CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Connector Type	Supplier
AN3115-1	Receptacle	QPL

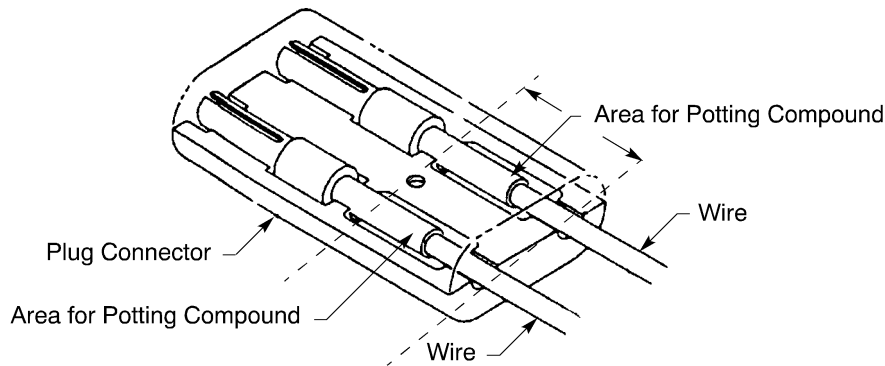
B. Necessary Materials

**Table 2
NECESSARY MATERIALS**

Description	Part Number	Supplier
Potting Compound	3110 RTV	Dow Corning

2. CONNECTOR ASSEMBLY

A. Connector Assembly



**AN3115-1 PLUG CONNECTOR
Figure 1**

- (1) Assemble the contacts.
- (2) Put the wired contacts in one half of the connector body.
- (3) If a potting compound is specified:
 - (a) Make a selection of a potting compound from Table 2.
 - (b) Apply the necessary amount of potting compound to fill the cavity around the solder pot and wire insulation of each contact. Refer to Figure 1.

CAUTION: DO NOT PUT ANY POTTING COMPOUND BEYOND THE KNURLED AREA OF EACH CONTACT.

- (4) Install the other half of the connector body.
- (5) If necessary, add more potting compound fill the area around the wires at the body of the connector.

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ASSEMBLY OF AN3115 TYPE CONNECTORS

- (6) Let the potting compound cure.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AVIBANK AV667 AND AV697 CONNECTORS

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	B. Connector Adapter Part Numbers	1
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	A. Wire Harness Preparation	1
	B. Contact Assembly	1
	C. Spare Contact and Seal Plug Installation	1
	D. Connector Assembly	1

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AVIBANK AV667 AND AV697 CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
AV667	Avibank
AV697	Avibank

B. Connector Adapter Part Numbers

**Table 2
ADAPTER PART NUMBERS**

Part Number	Supplier
3651-1604-0603	Avibank
3651-1804-0603	Avibank

2. CONNECTOR ASSEMBLY

A. Wire Harness Preparation

- (1) Make a selection of a 0.75 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (2) Put a 30 inch \pm 1/4 inch length of the sleeve on the wire harness.
- (3) Put a 2 inch \pm 1/8 inch length of 1 inch diameter PD 70 heat shrinkable sleeve on the wire harness.
- (4) Put a 2 inch \pm 1/8 inch length of 1/2 inch diameter PD 70 heat shrinkable sleeve on the wire harness.
- (5) Put the specified adapter on the wire harness. Refer to Table 2.

B. Contact Assembly

Refer to Subject 20-61-11.

C. Spare Contact and Seal Plug Installation

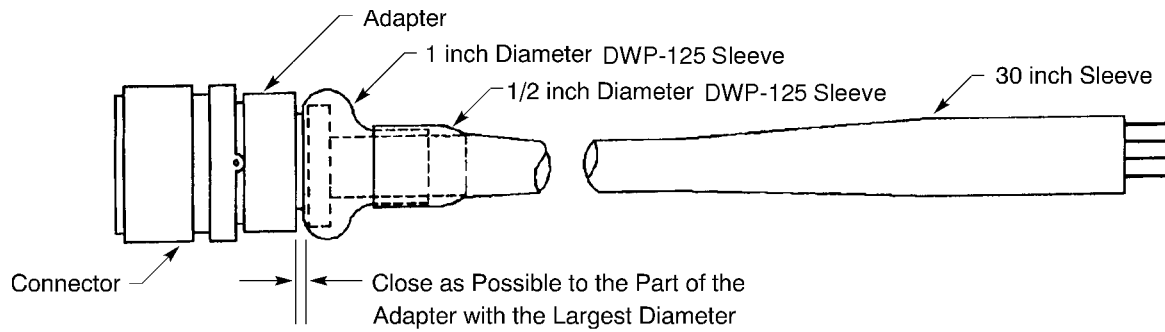
Refer to Subject 20-61-11.

D. Connector Assembly

- (1) Engage the threads of the adapter and the connector.
- (2) Tighten the adapter.
- (3) Install the heat shrinkable sleeves. Refer to Figure 1.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AVIBANK AV667 AND AV697 CONNECTORS



POSITION OF THE HEAT SHRINKABLE SLEEVES

Figure 1

- (a) Push the length of the 1/2 inch diameter PD 70 sleeve forward until the end of the sleeve is against the rear of the adapter.
- (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (c) Push the length of the 1 inch diameter PD 70 sleeve forward until the end of the sleeve is aligned with the part of the adapter that has the largest diameter.
- (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (e) Push the 30 inch sleeve on the PD 70 sleeves until the end of the sleeve is aligned with the end of the 1/2 inch diameter PD 70 sleeve.
- (f) Shrink only the end of the sleeve into position. Refer to Subject 20-10-14.
- (g) Assemble the necessary number of wire harness ties on the remaining length of the 30 inch sleeve to which no heat was applied.

NOTE: Drain holes in the 30 inch sleeve are not necessary.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE CINCH S345T002-156 CONNECTOR

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	B. Backshell Part Numbers	1
	C. Necessary Materials	1
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	A. Cable Preparation	1
	B. Shield Ground Wire Assembly	2
	C. Contact Assembly	3
	D. Connector Assembly	3

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE CINCH S345T002-156 CONNECTOR

This Subject gives the procedure to assemble the connector with Boeing 10-60875-8 cables with AWG 18 or AWG 20 wire.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
S345T002-156	Cinch

B. Backshell Part Numbers

**Table 2
BACKSHELL PART NUMBERS**

Part Number	Supplier
50031004-001	Cinch

C. Necessary Materials

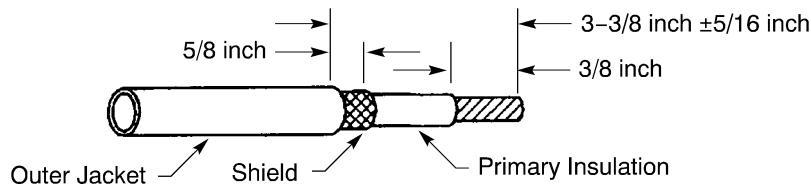
**Table 3
NECESSARY MATERIALS**

Material	Specification	Description	Supplier
Fuel Tank Sealant	BMS 5-26	Class B-2	Courtaulds Aerospace
Heat Shrinkable Sleeve	-	Grade B, Class 1	Refer to Subject 20-00-11.

2. CONNECTOR ASSEMBLY

A. Cable Preparation

- (1) Put the strain relief clamp on both cables.
- (2) Prepare each cable. Refer to Figure 1.



**CABLE PREPARATION
Figure 1**

- (a) Remove 3-3/8 inches ± 5/16 inch of the outer jacket from the end of the cable.

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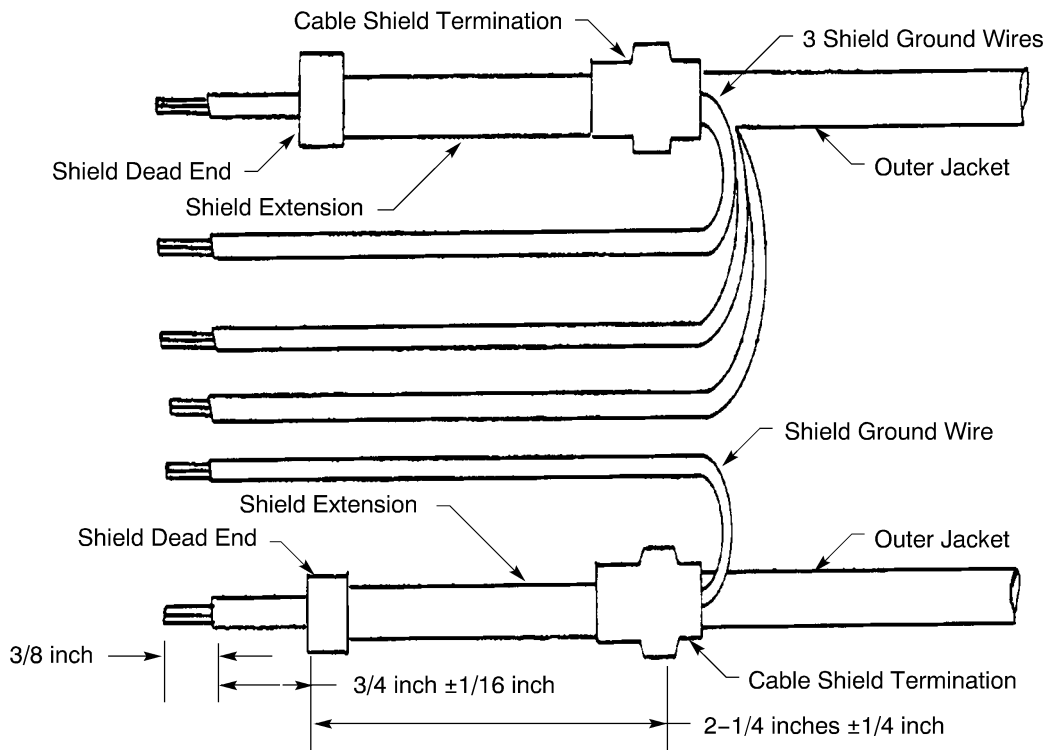
ASSEMBLY OF THE CINCH S345T002-156 CONNECTOR

- (b) Remove the necessary length of the shield so that the end of the shield is 5/8 inch or less from the end of the outer jacket.

CAUTION: MAKE SURE THAT DAMAGE TO THE PRIMARY INSULATION DOES NOT OCCUR.

- (c) Remove 3/8 inch of the primary insulation from the end of the cable.

B. Shield Ground Wire Assembly



CONFIGURATION OF THE SHIELD GROUND WIRES
Figure 2

- (1) Assemble a shield extension on each cable with:
- 1 shield ground wire on one shield extension
 - 3 shield ground wires on the other shield extension.

Refer to Subject 20-10-15 and Figure 2.

Make sure that:

- The wires for the 4 ground wires are 8 inches in length
- The extension shields are 2-1/2 inches ± 1/4 inch in length
- The shield terminations are correctly insulated.

- (2) Assemble a shield dead end on the end of each cable.

Refer to Subject 20-10-15 and Figure 2.

Make sure that the shield dead end is correctly insulated.

STANDARD WIRING PRACTICES MANUAL

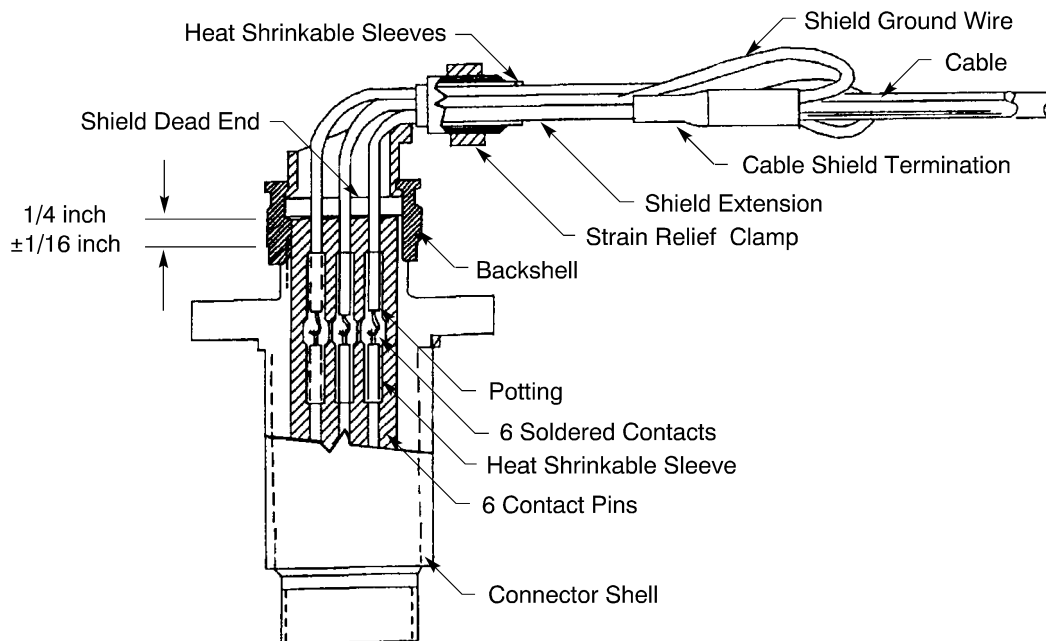
ASSEMBLY OF THE CINCH S345T002-156 CONNECTOR

C. Contact Assembly

- (1) Tin each conductor.
- (2) Solder each conductor in a connector pin. Refer to Subject 20-40-00.
- (3) Make a selection of a heat shrinkable sleeve from Table 3.
Make sure that the sleeve has the smallest diameter that can be moved over each cable.
- (4) Put a 1 inch \pm 1/8 inch length of the sleeve on each cable so that the center of the sleeve is aligned with the center of the soldered area.
- (5) Shrink each sleeve in position. Refer to Subject 20-10-14.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY TIME TO SHRINK THE SLEEVE.

D. Connector Assembly



CINCH S345T002-156 CONNECTOR ASSEMBLY
Figure 3

- (1) Make a selection of a heat shrinkable sleeve from Table 3.
Make sure that the sleeve has the smallest diameter that can be moved over each cable.
- (2) In this order, put these lengths of the sleeve on the two cables and all of the shielded ground wires:
 - Two 3/4 inch lengths
 - Two 1/2 inch lengths.
- (3) Put each contact into the applicable contact cavity of the connector.
- (4) Install the heat shrinkable sleeves at the installation location of the strain relief clamp:



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE CINCH S345T002-156 CONNECTOR

- (a) Move one 3/4 inch length of sleeve so that the center of the sleeve is aligned with the center of the clamp area on the bundle.
 - (b) Shrink the sleeve in position. Refer to Subject 20-00-14.
 - (c) Move the other 3/4 inch length of sleeve so that the center of the sleeve is aligned with the center of the clamp area on the bundle.
 - (d) Shrink the sleeve in position. Refer to Subject 20-00-14.
 - (e) Do Step (a) through Step (d) again for each 1/2 inch length of sleeve.
- (5) Make a selection of a fuel tank sealant from Table 3.
- (6) Fill the connector shell cavity with the sealant.
Make sure that the surface of the sealant is at or within 1/16 inch of the edge of the connector shell.
Refer to Figure 3.
- (7) Install the strain relief clamp.

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ASSEMBLY OF AN3116 TYPE CONNECTORS

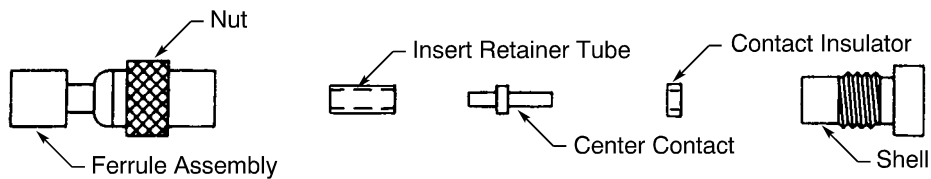
1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

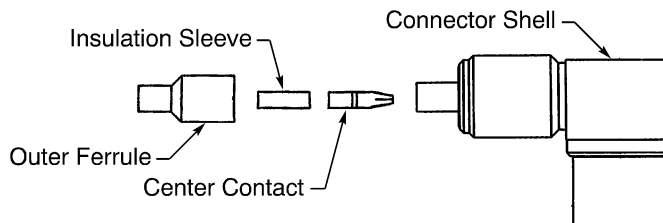
Specification	Part Number	Type	Supplier	Reference
AN3116-2	CA270-8	Plug, Straight	ITT Cannon	Figure 1
-	K-4932	Plug, 90 Degree	Kings Electronics	Figure 2
-	K-4941	Plug, 45 Degree	Kings Electronics	Figure 3
-	K-4942	Plug, 90 Degree	Kings Electronics	Figure 4
-	K-4943	Plug, Straight	Kings Electronics	Figure 5

B. AN3116-2 Connectors



**AN3116-2 AND ITT CANNON CA270-8 CONNECTOR
Figure 1**

C. Kings K-4932 Connector

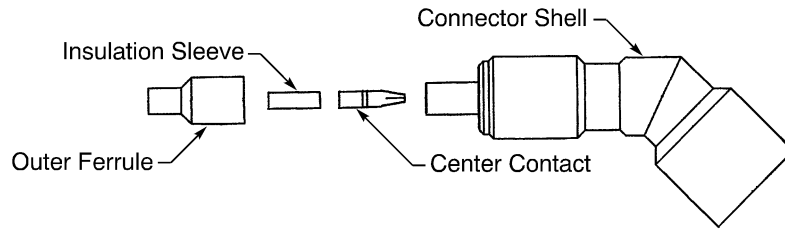


**KINGS K-4932 CONNECTOR
Figure 2**

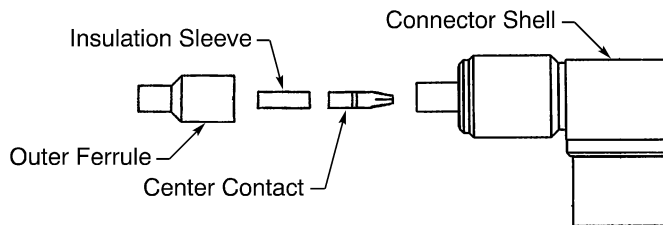
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AN3116 TYPE CONNECTORS

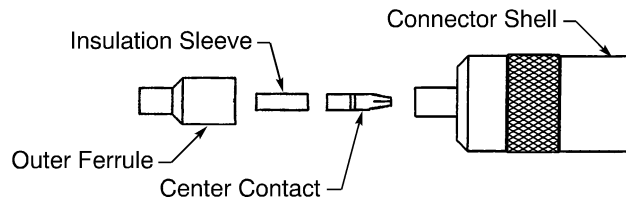
D. Kings K-494() Connectors



KINGS K-4941 CONNECTOR
Figure 3



KINGS K-4942 CONNECTOR
Figure 4



KINGS K-4943 CONNECTOR
Figure 5

E. Necessary Parts and Materials

Table 2
NECESSARY MATERIALS

Material	Description	Part Number or Specification	Supplier
Sleeve, Heat Shrinkable	3/16 inch diameter	MIL-DTL-23053/12 Class 2	QPL
		TFE-2X	Zeus
Sleeve	Meltable Inner Liner	D415-00	Raychem
		D415-02	Raychem
		D-436-48	Raychem
Solvent	Aliphatic Naptha	TT-N-95	Any Source

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AN3116 TYPE CONNECTORS

**Table 3
MECHANICAL FERRULE PART NUMBERS**

Type	Boeing Standard	Color
Inner Ferrule	BACS13S194B	Blue
Outer Ferrule	BACS13S261C	Yellow

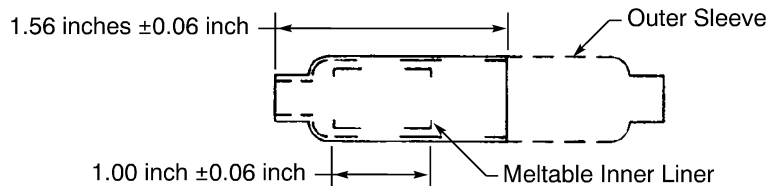
**Table 4
APPROVED SUPPLIERS OF BOEING STANDARD MECHANICAL FERRULES**

Boeing Standard	Supplier
BACS13S	Thomas & Betts

2. ASSEMBLY OF AN3116-2 AND ITT CANNON CA270-8 CONNECTORS

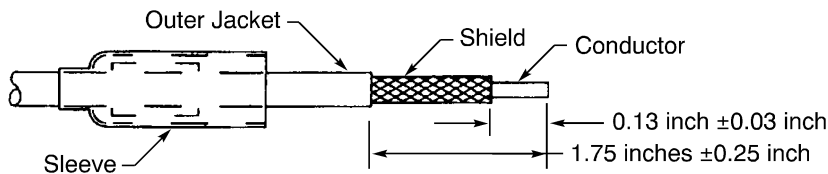
A. Wire Preparation

- (1) Make a selection of a sleeve with a meltable inner liner from Table 2.
- (2) If the selection is the Raychem D415-00 sleeve, prepare the sleeve. Refer to Figure 6.



**PREPARATION OF A SLEEVE WITH A MELTABLE INNER LINER
Figure 6**

- (a) Remove the necessary length from one end of the outer sleeve to make the length of the sleeve equal to 1.56 inches \pm 0.06 inch.
- (b) Remove the necessary length from the end of the inner sleeve to make the length of the inner sleeve equal to 1.00 inch \pm 0.06 inch.
- (3) Put the sleeve on the wire.
Make sure that smaller end of the sleeve is pointed away from the end of the wire.
- (4) Prepare the wire. Refer to Figure 7.



**PREPARATION OF THE WIRE
Figure 7**

- (a) Remove 1.75 inches \pm 0.25 inch of the outer jacket from the end of the wire.

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ASSEMBLY OF AN3116 TYPE CONNECTORS

(b) Remove 0.13 inch \pm 0.03 inch of shield from the end of the wire.

B. Center Contact Assembly

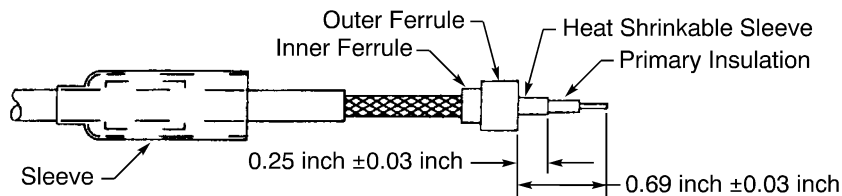
**Table 5
OUTER FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
44-000	44-142	A
612648	612675	L
612648	612766	-
613214	613850	-
620175	620299	A
HX4	Y142	A
M22520/5-01	M22520/5-19	A
ST2966M	-	8
ST965-2	-	S
ST965A-11	-	-
ST965B	ST965B-11	-
WT211	-	-
WT211-14	-	S
WT411	-	-
WT440	4411	-

- (1) Make a selection of an inner ferrule and an outer ferrule from Table 3.
- (2) Make a selection of a heat shrinkable sleeve from Table 2.
- (3) Make a selection of a solvent from Table 2.

NOTE: A satisfactory alternative is an equivalent solvent.

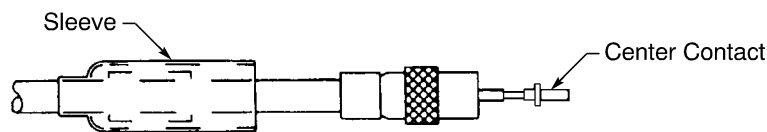
- (4) Remove the color band from each ferrule with solvent.
- (5) Install the ferrules. Refer to Figure 8.



**POSITION OF THE FERRULES AND HEAT SHRINKABLE SLEEVES
Figure 8**

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AN3116 TYPE CONNECTORS**

- (a) Make a selection of a ferrule crimp tool from Table 5.
 - (b) Put the inner ferrule on the wire.
Make sure that:
 - The ferrule is on the shield
 - The forward end of the ferrule is 0.69 inch \pm 0.03 inch from the end of the wire.
 - (c) Move the strands of the shield apart on the length of the shield that extends farther than the forward end of the inner ferrule.
 - (d) Fold the strands back on the inner ferrule.
Make sure that the strands are even and symmetrical around the surface of the ferrule.
 - (e) Put the outer ferrule on the inner ferrule.
Make sure that:
 - The strands of the shield are between the inner ferrule and the outer ferrule
 - The forward edge of the outer ferrule is aligned with the forward edge of the inner ferrule.
 - (f) Crimp the outer ferrule.
 - (g) Remove the unwanted strands of the shield at the rear end of the outer ferrule.
- (6) Install two 0.25 inch \pm 0.03 inch heat shrinkable sleeves on the wire. Refer to Figure 8.
- (a) Put a heat shrinkable sleeve on the wire.
Make sure that:
 - The sleeve is on the wire insulation
 - The rear end of the sleeve is against the forward edge of the ferrules.
 - (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
 - (c) Do Step (a) and Step (b) again for the other sleeve.
- (7) Put the insert retainer tube on the wire.
Make sure that:
 - The tube is on the primary insulation and the heat shrinkable sleeves
 - The rear end of the tube is against the ferrules.
- (8) Apply a small amount of solder on the end of the conductor.
 - (9) Apply a small amount of solder in the wire barrel of the contact.
- (10) Put the center contact on the conductor. Refer to Figure 9.

**POSITION OF THE CENTER CONTACT ON THE CONDUCTOR****Figure 9**

- (11) Solder the contact.

C. Connector Shell Installation

- (1) Push the contact insulator into the plug shell.
- (2) Engage the threads of the plug shell and the ferrule assembly nut.

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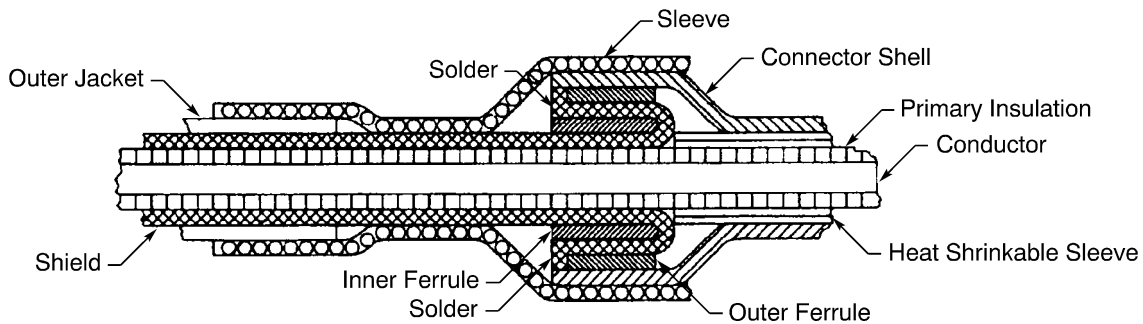
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AN3116 TYPE CONNECTORS

- (3) Push the ferrule assembly forward until the rear end of the ferrule assembly is aligned with the rear end of the inner ferrule.
- (4) Solder the ends of:
 - The ferrule assembly
 - The inner ferrule
 - The shield.

Refer to Figure 10.

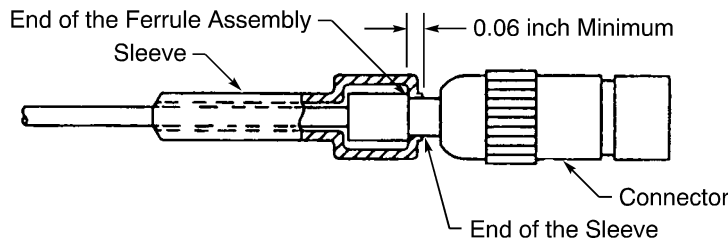
CAUTION: DO NOT APPLY SOLDER BETWEEN THE OUTER JACKET OF THE WIRE AND THE FERRULES.



LOCATION OF THE SOLDER ON THE FERRULE ASSEMBLY

Figure 10

- (5) Push the sleeve forward until the forward end of the sleeve extends 0.06 inch minimum farther than the end of the ferrule assembly. Refer to Figure 11.



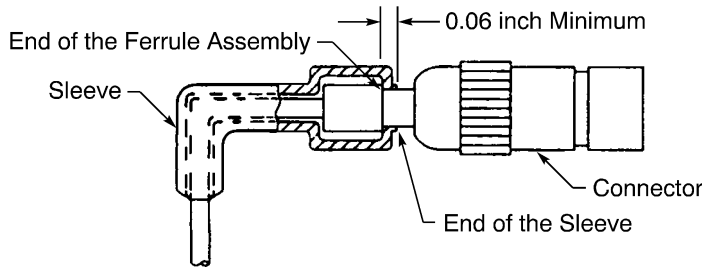
POSITION OF THE SLEEVE ON THE FERRULE ASSEMBLY

Figure 11

- (6) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (7) While the sleeve is hot, bend the wire near the rear end of the sleeve to make a 90 degree angle. Refer to Figure 12.

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ASSEMBLY OF AN3116 TYPE CONNECTORS



LOCATION OF THE BEND OF THE WIRE
Figure 12

3. ASSEMBLY OF THE KINGS K-4932 CONNECTOR

A. Center Contact Assembly

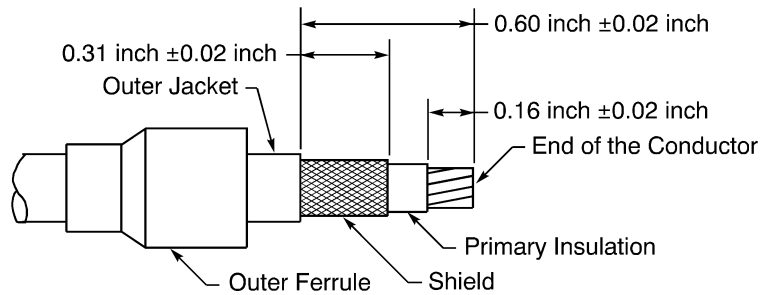
Table 6
CENTER CONTACT CRIMP TOOLS

Basic Unit	Die	
	Part Number	Cavity
KTH-1000	KTH-2208	Small
KTM-3000	KTH-2208	Small

- (1) Make a selection of a contact crimp tool from Table 6.
- (2) Put the outer ferrule on the wire.
Make sure that the larger end of the outer ferrule is pointed forward to the end of the wire.
- (3) Prepare the wire.

Refer to:

- Figure 13
- Subject 20-00-15.



WIRE PREPARATION
Figure 13

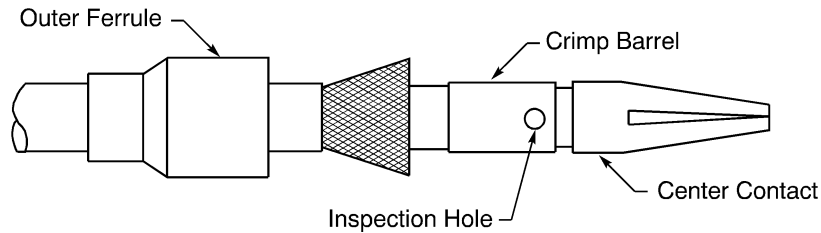
- (a) Remove 0.60 inch \pm 0.02 inch of the outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield to make the distance from the end of the outer jacket to the end of the shield equal to 0.31 inch \pm 0.02 inch.

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ASSEMBLY OF AN3116 TYPE CONNECTORS

- (c) Remove 0.16 inch \pm 0.02 inch of the primary insulation from the end of the wire.
- (4) Move the strands of the shield apart.
- (5) Put the plastic insulation sleeve on the primary insulation.
Make sure that the rear end of the insulation sleeve is against the end of the outer jacket.
- (6) Put the end of the wire in the crimp barrel of the center contact. Refer to Figure 14.
Make sure that:
 - All the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole.



POSITION OF THE CENTER CONTACT ON THE WIRE
Figure 14

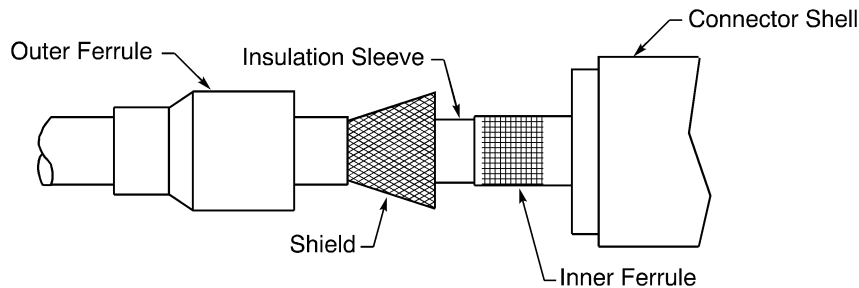
- (7) Crimp the contact.

B. Connector Shell Installation

Table 7
OUTER FERRULE CRIMP TOOLS

Basic Unit	Die	
	Part Number	Cavity
KTH-1000	KTH-2208	Large
KTM-3000	KTH-2208	Large

- (1) Make a selection of a ferrule crimp tool from Table 7.
- (2) Put the connector shell on the contact assembly. Refer to Figure 15.
Make sure that the inner ferrule is between the insulation sleeve and the shield.

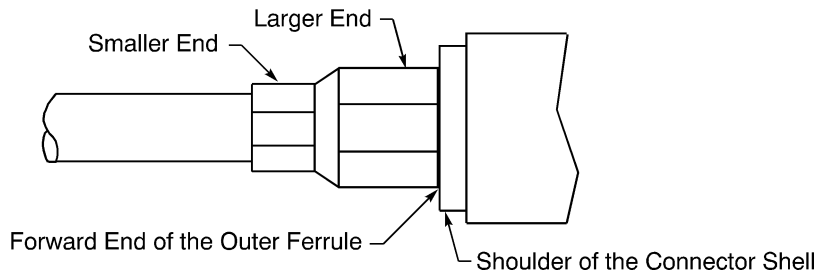


ALIGNMENT OF THE INNER FERRULE AND THE SHIELD
Figure 15

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ASSEMBLY OF AN3116 TYPE CONNECTORS

- (3) Push the connector shell rearward until the contact is locked in the shell.
- (4) Make the strands of the shield flat against the inner ferrule.
- (5) Push the outer ferrule forward until the forward end of the ferrule is against the shoulder of the connector shell. Refer to Figure 16.



POSITION OF THE OUTER FERRULE AGAINST THE CONNECTOR SHELL

Figure 16

- (6) Crimp the outer ferrule. Refer to Figure 16.

Make sure that:

- The larger part of the die cavity is on the larger end of the outer ferrule
- The smaller part of the die cavity is on the smaller end of the outer ferrule.

4. ASSEMBLY OF KINGS K-494() CONNECTORS

A. Center Contact Assembly

**Table 8
CENTER CONTACT CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
KTH-1000	KTH-2223	Small
KTM-3000	KTH-2223	Small

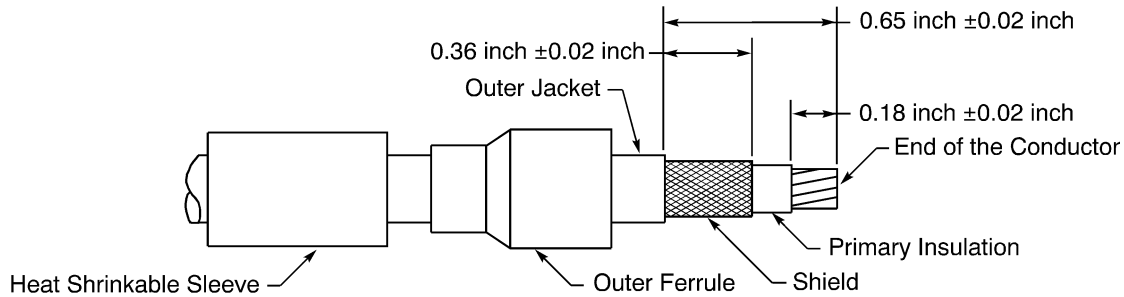
- (1) Make a selection of a contact crimp tool from Table 8.
- (2) Make a selection of a heat shrinkable sleeve from Table 2.
- (3) Put a 1.50 inch \pm 0.30 inch length of heat shrinkable sleeve on the wire.
- (4) Put the outer ferrule on the wire.
Make sure that the larger end of the outer ferrule is pointed forward to the end of the wire.
- (5) Prepare the wire.

Refer to:

- Figure 17
- Subject 20-00-15.

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ASSEMBLY OF AN3116 TYPE CONNECTORS



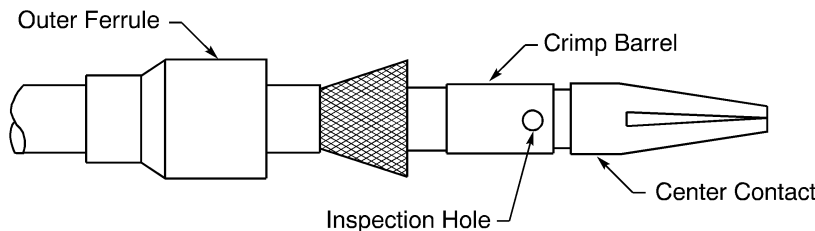
WIRE PREPARATION

Figure 17

- (a) Remove 0.65 inch \pm 0.02 inch of the outer jacket from the end of the wire.
- (b) Remove the necessary length of the shield to make the distance from the end of the outer jacket to the end of the shield equal to 0.36 inch \pm 0.02 inch.
- (c) Remove 0.18 inch \pm 0.02 inch of the primary insulation from the end of the wire.
- (6) Move the strands of the shield apart.
- (7) Put the plastic insulation sleeve on the primary insulation.
Make sure that the rear end of the insulation sleeve is against the end of the outer jacket.
- (8) Put the end of the wire in the crimp barrel of the center contact. Refer to Figure 18.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole.



POSITION OF THE CENTER CONTACT ON THE WIRE

Figure 18

- (9) Crimp the contact.

B. Connector Shell Installation

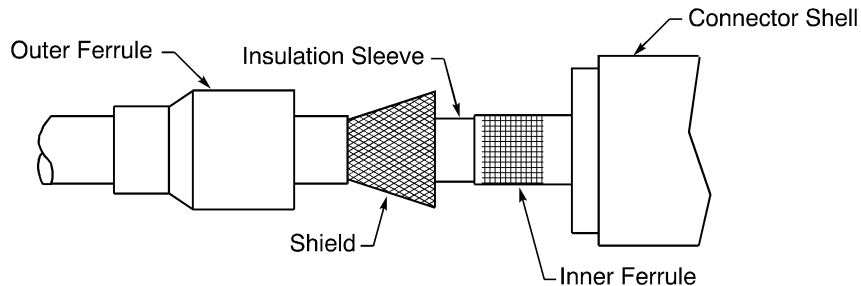
**Table 9
OUTER FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
KTH-1000	KTH-2208	Large
KTM-3000	KTH-2208	Large

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ASSEMBLY OF AN3116 TYPE CONNECTORS

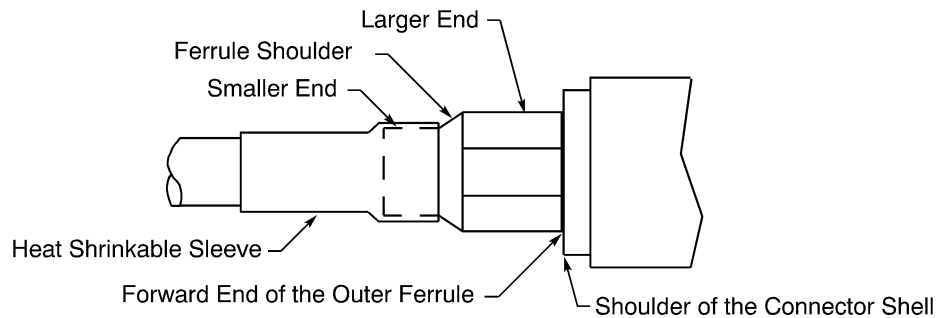
- (1) Make a selection of a ferrule crimp tool from Table 9.
- (2) Put the connector shell on the contact assembly. Refer to Figure 19.
Make sure that the inner ferrule is between the insulation sleeve and the shield.



ALIGNMENT OF THE INNER FERRULE AND THE SHIELD

Figure 19

- (3) Push the connector shell rearward until the contact is locked in the shell.
- (4) Make the strands of the shield flat against the inner ferrule.
- (5) Push the outer ferrule forward until the forward end of the ferrule is against the shoulder of the connector shell. Refer to Figure 20.



POSITION OF THE OUTER FERRULE AGAINST THE CONNECTOR SHELL

Figure 20

- (6) Crimp the outer ferrule. Refer to Figure 20.
Make sure that:
 - The larger part of the die cavity is on the larger end of the outer ferrule
 - The smaller part of the die cavity is on the smaller end of the outer ferrule.
- (7) Push the heat shrinkable sleeve forward until the forward end of the sleeve is against the ferrule shoulder. Refer to Figure 20.
- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.



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ASSEMBLY OF AN3116 TYPE CONNECTORS

5. APPROVED TOOL SUPPLIERS

A. Crimp Tools

Table 10
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
44-000	Balmar
44-142	Balmar
4411	Thomas&Betts
612648	Astro
612675	Astro
612766	Astro
613214	Astro
613850	Astro
620175	Astro
620299	Astro
HX4	Daniels
KTH-1000	Kings Electronics
KTH-2208	Kings Electronics
KTH-2223	Kings Electronics
KTM-3000	Kings Electronics
M22520/5-01	QPL
M22520/5-19	QPL
ST2966M	Boeing
ST965-2	Boeing
ST965A-11	Boeing
ST965B	Boeing
ST965B-11	Boeing
WT211	Thomas&Betts
WT211-14	Thomas&Betts
WT411	Thomas&Betts
WT440	Thomas&Betts
Y142	Daniels

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STANDARD WIRING PRACTICES MANUAL

ITT CANNON CA()KR FIREWALL CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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	A. Connector Part Numbers	1
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	A. Contact Removal	2
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	B. Connector Assembly	4
	C. Connector Installation	4

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STANDARD WIRING PRACTICES MANUAL

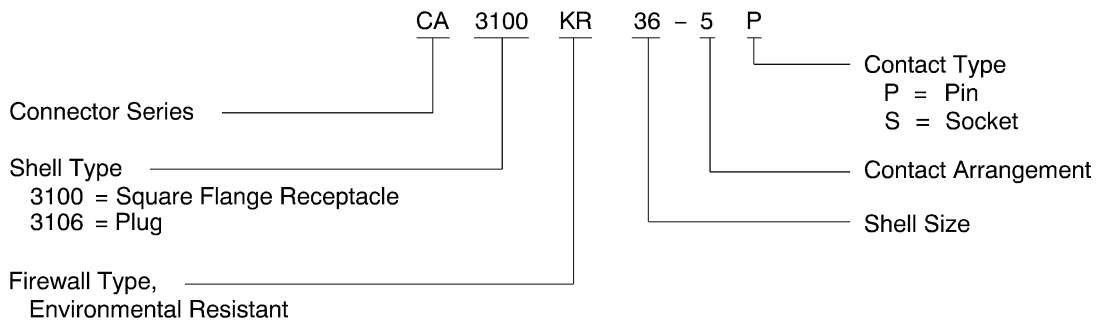
ITT CANNON CA()KR FIREWALL CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
FIREWALL CONNECTOR PART NUMBERS**

Firewall Connector		Supplier
Part Number	Type	
CA3100KR()	Receptacle	ITT Cannon
CA3106KR()	Plug	ITT Cannon



**ITT CANNON FIREWALL CONNECTOR PART NUMBER STRUCTURE
Figure 1**

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact	Type	Size	Supplier
030-1734-000	Pin	1/0	ITT Cannon
031-0975-000	Socket	1/0	ITT Cannon

C. Crimp Barrel Adapter Part Numbers

**Table 3
CRIMP BARREL ADAPTER PART NUMBERS**

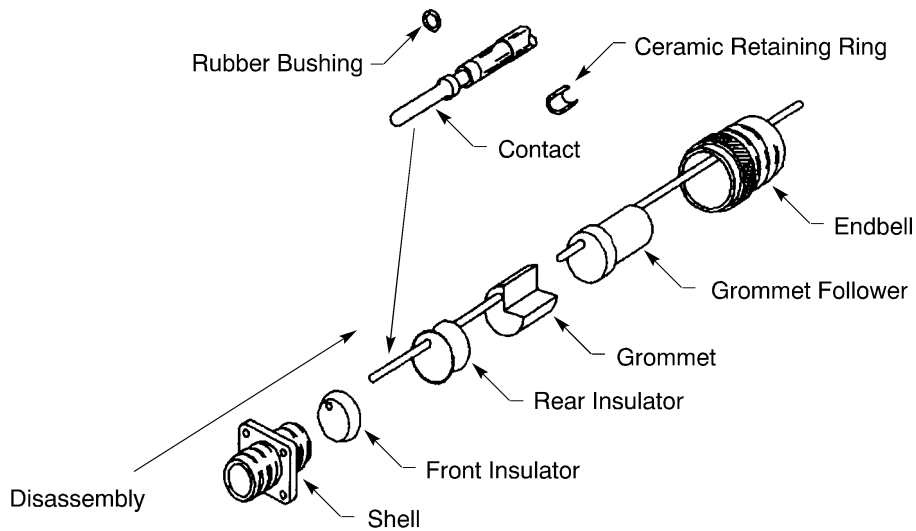
Wire Size (AWG)	Contact Size	Adapter	
		Part Number	Supplier
2	1/0	252-1230-000	ITT Cannon

STANDARD WIRING PRACTICES MANUAL

ITT CANNON CA()KR FIREWALL CONNECTORS

2. CONNECTOR DISASSEMBLY

A. Contact Removal



**CA-KR FIREWALL CONNECTOR DISASSEMBLY
Figure 2**

- (1) Loosen the cable clamp.
- (2) Unscrew the endbell.
- (3) Move the endbell and grommet follower back over the wires and, at the same time, push the insert assembly out of the shell. Refer to Figure 2.

NOTE: The endbell holds these parts in the connector shell:

- Grommet Follower
- Grommet
- Rear Insulator
- Front Insulator.

- (4) Remove the front insulator from the rear insulator.

NOTE: The front and the rear insulators hold the contacts.

- (5) Pull the contacts forward from the rear insulator.
- (6) Remove the ceramic retaining ring from the contact:
 - (a) Move the ring back against the silicone bushing.
 - (b) Pull the ring free when it is over the small diameter of the contact.

STANDARD WIRING PRACTICES MANUAL

ITT CANNON CA()KR FIREWALL CONNECTORS

(7) Pull the wired contact through these components:

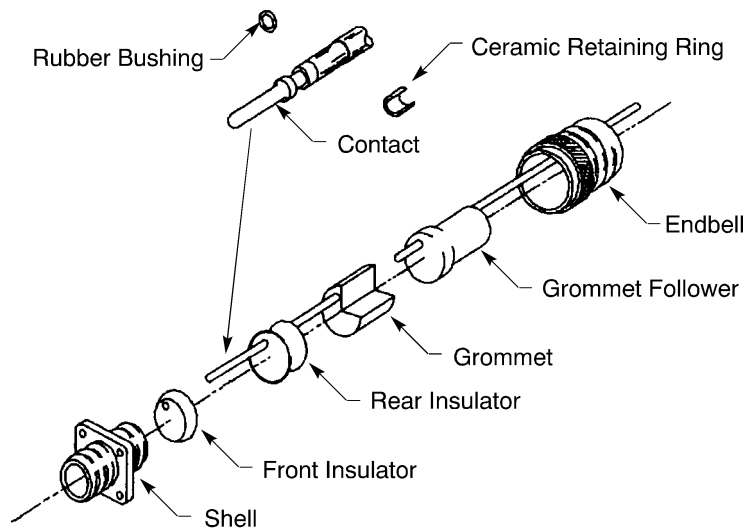
- The rear insulator
- The grommet
- The grommet follower.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Contact Size	Crimp Tool			
	Basic Unit	Die	Locator	Supplier
1/0	13642	11738	-	Thomas & Betts
	CBT600B	CCH-0-1	CCHP-8-6	ITT Cannon



CANNON CA-KR FIREWALL1 CONNECTOR ASSEMBLY

Figure 3

- (1) Put the cable clamp, the wire separator, the endbell, and the grommet follower on the wires.
- (2) Put the wires through the grommet and rear insulator.
Make sure the length is sufficient to allow the insulation removal and the crimp operations.
- (3) Remove a sufficient length of the wire insulation.
Make sure that:
 - The edge of the insulation is against the contact
 - The conductor is visible in the inspection hole.
- (4) Make a selection of the crimp tool from Table 4.
- (5) For AWG 2 wire:

STANDARD WIRING PRACTICES MANUAL

ITT CANNON CA()KR FIREWALL CONNECTORS

- (a) Put a 2-1/2 inch length of heat shrinkable sleeve over each wire.
- (b) Put the conductor into a crimp barrel adapter. Refer to Table 3.
- (c) Put the adapter and the conductor into the crimp barrel of the contact.
- (6) Crimp the contact.
- (7) For AWG 2 wire:
 - (a) Move the sleeve against the back of the contact.
 - (b) Shrink the sleeve in position.

B. Connector Assembly

- (1) Put the ceramic retaining ring on the small diameter of the contact.
- (2) Push the retaining ring forward until the ring is fully installed on the larger diameter of the contact.
- (3) Carefully pull each wire through the grommet so that:
 - The rear insulator is against the grommet
 - The retaining ring on the contact is fully inserted into the rear insulator.
- (4) Install the front insulator over the contacts:
 - (a) Align the keyways in the two insulators.
 - (b) Move the front insulator evenly over the contacts until it meets the rear insulator.
The front and the rear insulators hold the ceramic retaining rings on the contacts.
Align the slot in the grommet follower with the keyways of the front and the rear insulators.
- (5) Move the grommet follower over the grommet.
NOTE: The outer surface of the grommet follower can be lubricated with denatured alcohol to help move the grommet follower over the grommet.
- (6) Install the insulators in the shell:
 - (a) Align the keyways of the insulators with the key of the shell.
 - (b) Carefully push the assembly into the shell.
- (7) Connect the endbell to the shell.
- (8) Torque the endbell 90 inch-pounds ± 10 inch-pounds.
- (9) Move the cable clamp and wire separator forward.
- (10) Attach the cable clamp to the endbell.
- (11) Put approximately 12 layers of Scotch 61 tape under the clamp saddles.
- (12) Tighten the clamp screws.

C. Connector Installation

**Table 5
COUPLING RING TORQUE WRENCHES**

Part Number	Supplier
ST2580-148B	Boeing

- (1) Engage the plug connector threads with the receptacle connector threads.
- (2) Tighten the coupling ring with the hand.



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ITT CANNON CA()KR FIREWALL CONNECTORS

- (3) Make a selection of a torque wrench from Table 5.
- (4) For the shell size 36 connector, torque the coupling ring 190 inch-pounds \pm 10 inch-pounds.
- (5) Put a lockwire on the coupling ring. Refer to Subject 20-60-07.

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ASSEMBLY OF CONNECTORS WITH REAR RELEASE CONTACTS

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A. Contact Removal	1
B. Contact Replacement	2

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF CONNECTORS WITH REAR RELEASE CONTACTS**

This Subject gives the general maintenance data for the disassembly and assembly of connectors that have rear release contacts.

1. GENERAL DATA**A. Connector Assembly**

Most of the maintenance data for the assembly of connectors with front release contacts is satisfactory for the assembly of connectors with rear release contacts.

Refer to Subject 20-61-00.

2. CONNECTOR DISASSEMBLY**A. Contact Removal**

- (1) Make a selection of a contact removal tool. Refer to the applicable Subject for the connector.

WARNING: DO NOT USE A TOOL WITH A TIP THAT IS BENT OR BROKEN, OR THAT HAS A CRACK. A TOOL WITH DAMAGE CAN CAUSE INJURY TO PERSONNEL.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT OR BROKEN, OR THAT HAS A CRACK. A TOOL WITH DAMAGE CAN CAUSE DAMAGE TO THE GROMMET OR THE CONTACT RETENTION CLIPS OF THE CONNECTOR.

- (2) If it is necessary to make space for the removal of the contact:
 - (a) Loosen or remove the connector components.
 - (b) Remove wire harness ties or plastic straps near the rear end of the connector.
- (3) Put the wire into the slot of the tool.
- (4) Axially align the tool and the contact cavity.
- (5) Carefully push the tool into the contact cavity until it stops.

NOTE: If the O.D. of the wire is too large for the removal tool to go into the contact cavity, the contact must be replaced. Refer to Paragraph 2.B.

- (6) Carefully pull the wire and the tool out of the contact cavity at the same time.

CAUTION: THE WIRE AND THE REMOVAL TOOL MUST NOT BE PULLED WITH TOO MUCH FORCE. DAMAGE TO THE CONTACT RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (7) If the removal tool does not release the contact from the contact cavity:
 - (a) Carefully pull the tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.

CAUTION: THE REMOVAL TOOL MUST BE REMOVED FROM THE CONTACT CAVITY WHEN THE TOOL IS TURNED. IF THE TOOL IS NOT REMOVED, DAMAGE TO THE RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (c) Do Step (3) through Step (6) again.
- (d) If the removal tool does not release the contact from the contact cavity a second time, do Step (a) through Step (c) again.
- (e) If the removal tool does not release the contact from the contact cavity the third time, do Step (a) through Step (c) again.

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ASSEMBLY OF CONNECTORS WITH REAR RELEASE CONTACTS

- (f) If the removal tool does not release the contact from the contact cavity the fourth time, replace the contact. Refer to Paragraph 2.B.

B. Contact Replacement

This Paragraph gives the procedure to replace a contact that cannot be removed from a contact cavity.

- (1) Cut the wire approximately 0.25 inch from the rear face of the connector.
- (2) Remove the remaining insulation from the wire in the contact cavity with a pair of needle nose pliers.
- (3) Align the removal tool with the longitudinal axis of the contact cavity.
- (4) Carefully push the tool forward into the contact cavity until it stops.
- (5) Hold the end of the remaining wire with the needle nose pliers.
- (6) At the same time, pull the wire and the removal tool from the contact cavity.
- (7) If the removal tool does not release the contact from the contact cavity:
 - (a) Carefully pull the tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.

CAUTION: THE REMOVAL TOOL MUST BE REMOVED FROM THE CONTACT CAVITY WHEN THE TOOL IS TURNED. IF THE TOOL IS NOT REMOVED, DAMAGE TO THE RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (c) Do Step (3) through Step (6) again.
- (8) Assemble a new contact on the end of the wire. Refer to the applicable Subject for the connector.

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ASSEMBLY OF DEUTSCH DL TYPE CONNECTORS

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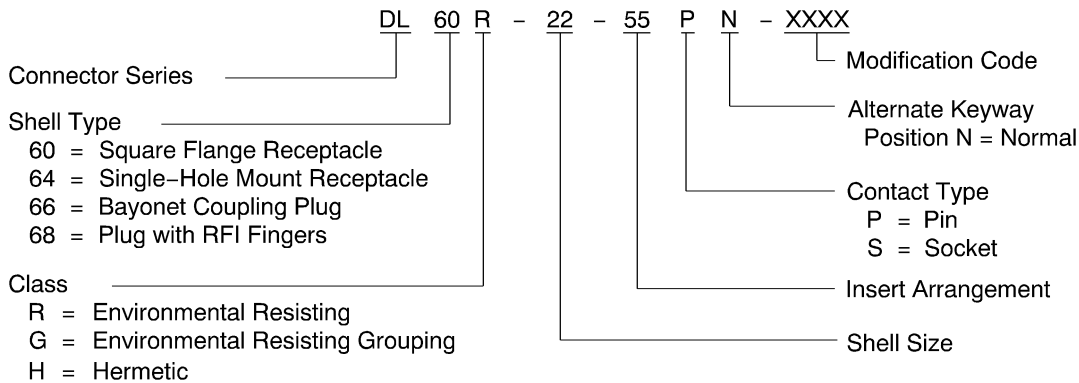
ASSEMBLY OF DEUTSCH DL TYPE CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
DL60()	Deutsch
DL64()	Deutsch
DL66()	Deutsch
DL68()	Deutsch



**DEUTSCH DL CONNECTOR PART NUMBER STRUCTURE
Figure 1**

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	0641-1-2031	Deutsch
			M39029/4-110	QPL
		Socket	100503	Deutsch
			M39029/5-115	QPL
16	16	Pin	0641-2-1631	Deutsch
			M39029/4-111	QPL
		Socket	100504	Deutsch
			M39029/5-116	QPL

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ASSEMBLY OF DEUTSCH DL TYPE CONNECTORS

Table 2 (continued)

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
12	12	Pin	0641-3-1231	Deutsch
			M39029/4-113	QPL
		Socket	100505	Deutsch
			M39029/5-118	QPL

2. CONNECTOR DISASSEMBLY

A. Connector Disconnect

- (1) Loosen and remove the rear end components.

B. Contact Removal

Table 3
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool
20	M15570-20
	M81969/14-02
	NAS1664-20
16	M15570-16
	M81969/14-03
	NAS1664-16
12	M15570-12
	M81969/14-04
	NAS1664-12

- (1) Make a selection of a removal tool from Table 3.
- (2) Snap the tool onto the wire and slide the tool straight into the rear of the contact cavity over the rear of contact until the tool bottoms.

CAUTION: DO NOT ROTATE THE TOOL WHILE IT IS IN THE CONNECTOR GROMMET.

- (3) Hold the wire against the tool and pull both tool and wired contact straight out of the rear of the contact cavity.
- (4) If contact is not released:
 - (a) Remove the tool.
 - (b) Turn the tool a small amount.
 - (c) Do Step (2) and Step (3) again.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH DL TYPE CONNECTORS

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-02	-
22	20	M22520/1-01	3	M22520/1-02	Red
		M22520/2-01	6	M22520/2-02	-
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-02	-
	16	M22520/1-01	4	M22520/1-02	Blue
18	16	M22520/1-01	5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
14	12	M22520/1-01	7	M22520/1-02	Yellow
12	12	M22520/1-01	8	M22520/1-02	Yellow

- (1) Remove the necessary length of insulation from the end of the wire:
 - (a) For size 20 contacts, remove $5/32 \pm 1/32$ inch of insulation.
 - (b) For size 16 and 12 contacts, remove $1/4 \pm 1/32$ inch of insulation.
- (2) Make a selection of a crimp tool from Table 4.
- (3) Insert the wire into the crimp barrel of the contact.
 Make sure that all of the conductor strands enter the barrel and that all of the strands are visible through the inspection hole.
- (4) With the contact shoulder seated in the locator and the wire bottomed in the contact, close the handles of the crimp tool until the ratchet releases.
- (5) Remove the wired contact from the crimp tool.

B. Contact Insertion

**Table 5
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool
20	M15570-20
	M81969/14-02
	NAS1664-20

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ASSEMBLY OF DEUTSCH DL TYPE CONNECTORS

Table 5 (continued)

Crimp Barrel Size	Insertion Tool
16	M15570-16
	M81969/14-03
	NAS1664-16
12	M15570-12
	M81969/14-04
	NAS1664-12

- (1) Before any contacts are inserted, thread the wire bundle through the rear end components of the connector.
- (2) Make a selection of an insertion tool from Table 5.
- (3) Place the insertion tool on the wire and slide the tool against the contact shoulder.
- (4) Insert the contact straight into the proper cavity until a slight click and resistance to further motion occur.

CAUTION: DO NOT ROTATE THE TOOL WHILE IT IS IN THE CONNECTOR GROMMET.

- (5) Carefully withdraw the tool straight out of the contact cavity.

4. APPROVED TOOL SUPPLIERS

A. Contact Crimp Tools

Table 6
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL

B. Contact Insertion Tools

Table 7
INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
M15570-12	Deutsch
M15570-16	Deutsch
M15570-20	Deutsch
M81969/14-02	QPL
M81969/14-03	QPL

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF DEUTSCH DL TYPE CONNECTORS****Table 7 (continued)**

Insertion Tool	Supplier
M81969/14-04	QPL
NAS1664-12	QPL
NAS1664-16	QPL
NAS1664-20	QPL

C. Contact Removal Tools**Table 8
REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
M15570-12	Deutsch
M15570-16	Deutsch
M15570-20	Deutsch
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL
NAS1664-12	QPL
NAS1664-16	QPL
NAS1664-20	QPL



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ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

1. GENERAL DATA

A. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
52752-()	MIL-C-83723 Series III type	20	0.040
		16	0.053
		12	0.096
52753-()	MIL-C-83723 Series III type	20	0.040
		16	0.053
		12	0.096
52761-()	MIL-C-83723 Series III type	20	0.040
		16	0.053
		12	0.096
BACC63BR	MIL-C-83723 Series III type	20	0.040
		16	0.053
		12	0.096
BACC63BT	MIL-C-83723 Series III type	20	0.040
		16	0.053
		12	0.096
BACC63CM	ESC 10 Class SE	20	0.040
		16	0.053
		12	0.096
BACC63CN	ESC 10 Class SE	20	0.040
		16	0.053
		12	0.096
M83723/()	MIL-C-83723 Series III	20	0.040
		16	0.053

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

Boeing Standard	Part Number	Supplier	Reference
-	10-584762	Amphenol	Paragraph 2.F.
-	10-584796	Amphenol	Paragraph 2.F.
-	52752-()	Matrix	Paragraph 2.D.
-	52753-()	Matrix	Paragraph 2.D.
-	52761-()	Matrix	Paragraph 2.D.
BACC63BR()	BSK-12()	Pyle-National	Paragraph 2.B.
BACC63BR()	HTBMF()	ITT Cannon UK	Paragraph 2.B.
BACC63BR()	MT37K()	Matrix	Paragraph 2.B.
BACC63BT()	BSK-17()	Pyle-National	Paragraph 2.B.
BACC63BT()	HTBMF00()	ITT Cannon UK	Paragraph 2.B.
BACC63BT()	MT30K()	Matrix	Paragraph 2.B.
BACC63CM()	-	QPL	Paragraph 2.C.
BACC63CN()	-	QPL	Paragraph 2.C.

**Table 3
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTORS**

Boeing Standard	Supplier
BACC63BR()	ITT Cannon UK
	Matrix
	Pyle-National
BACC63BT()	ITT Cannon UK
	Matrix
	Pyle-National
BACC63CM()	Deutsch
	Matrix
	Pyle-National
	Souriau

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ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

Table 3 (continued)

Boeing Standard	Supplier
BACC63CN()	Deutsch
	Matrix
	Pyle-National
	Souriau

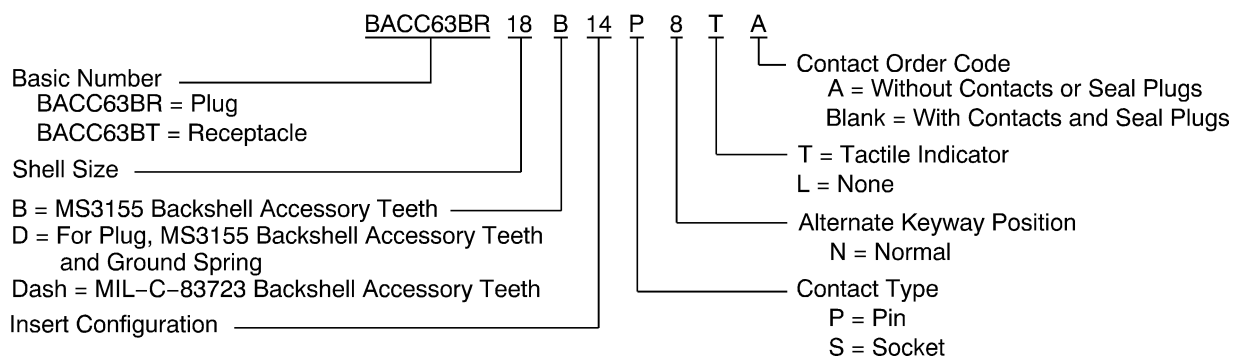
Table 4

ALTERNATIVE CONNECTOR PART NUMBERS

Specified Connector	Alternative Connector
52761-()	BACC63CM()
BACC63BR()	BACC63CM()
BACC63BT()	BACC63CN()

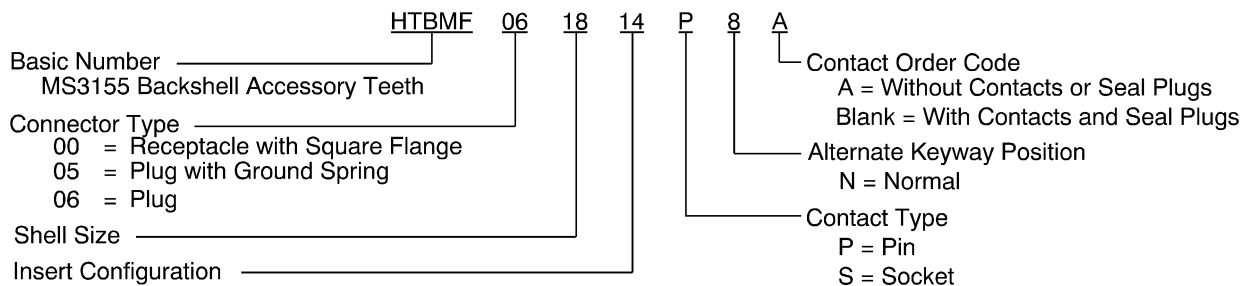
B. BACC63BR and BACC63BT Thread Coupled Firewall Connectors

The BACC63BR and BACC63BT connectors have a self-locking coupling mechanism.



BOEING BACC63BR AND BACC63BT CONNECTOR PART NUMBER STRUCTURE

Figure 1

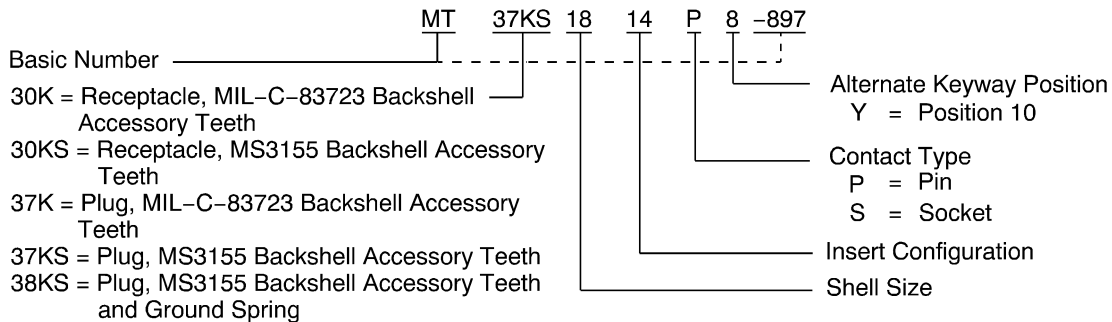


ITT CANNON BACC63BR AND BACC63BT CONNECTOR PART NUMBER STRUCTURE

Figure 2

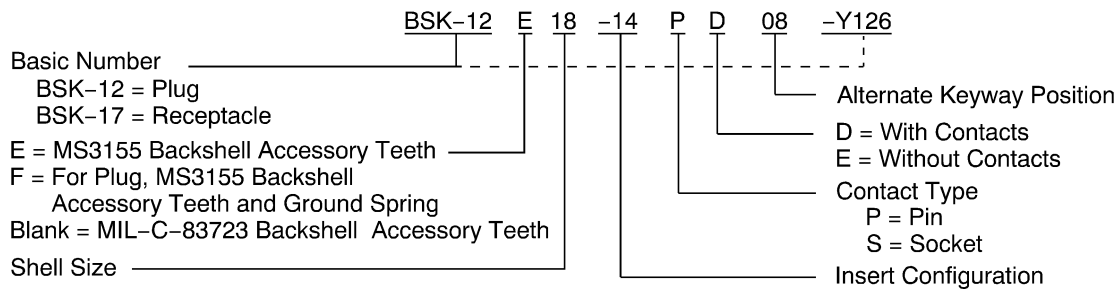
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS



MATRIX BACC63BR AND BACC63BT CONNECTOR PART NUMBER STRUCTURE

Figure 3



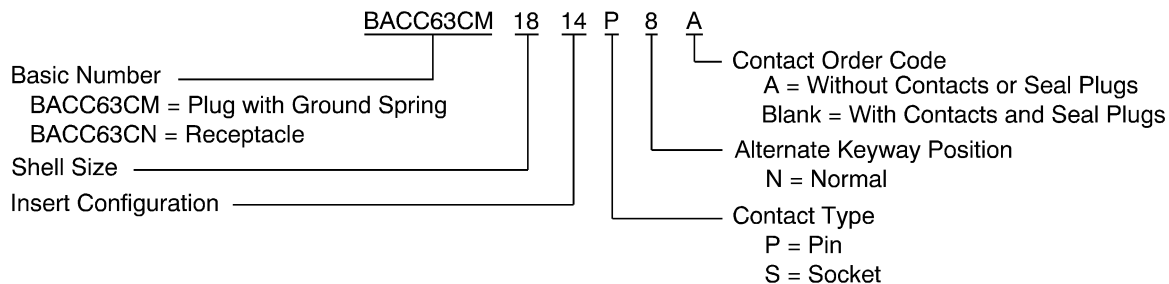
PYLE-NATIONAL BACC63BR AND BACC63BT CONNECTOR PART NUMBER STRUCTURE

Figure 4

C. BACC63CM and BACC63CN Thread Coupled Firewall Connectors

The BACC63CM and BACC63CN connectors have:

- A self-locking coupling mechanism
- Have the performance of the British Aerospace Companies Standard ESC 10 Class SE plug and Class KE receptacle.



BOEING BACC63CM AND BACC63CN CONNECTOR PART NUMBER STRUCTURE

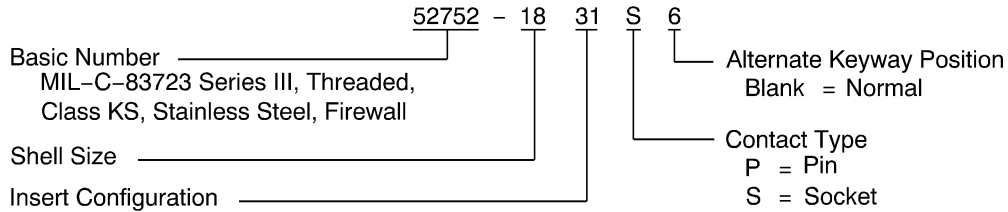
Figure 5

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

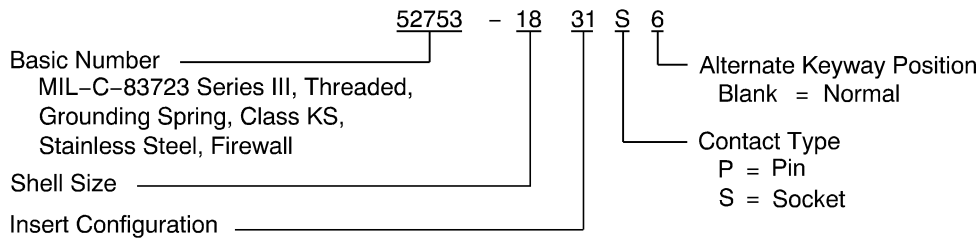
D. Matrix 527() Connectors

The Matrix 527() connectors are the same as the Matrix MT37() plug connectors, but the coupling ring is set back to prevent interference with the threads of the receptacle jam nut.



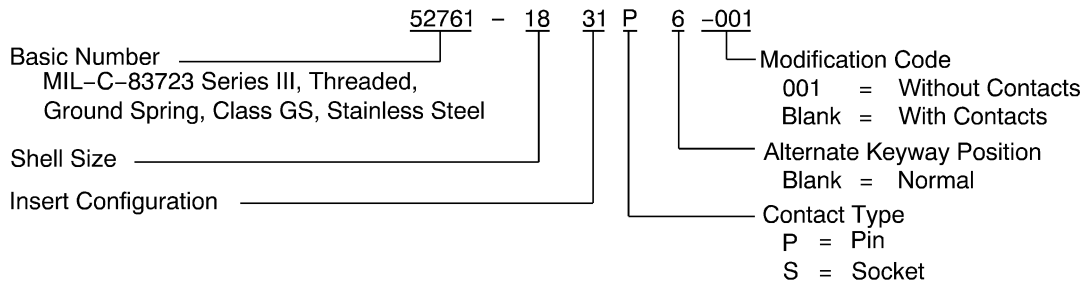
MATRIX 52752-() CONNECTOR PART NUMBER STRUCTURE

Figure 6



MATRIX 52753-() CONNECTOR PART NUMBER STRUCTURE

Figure 7



MATRIX 52761-() CONNECTOR PART NUMBER STRUCTURE

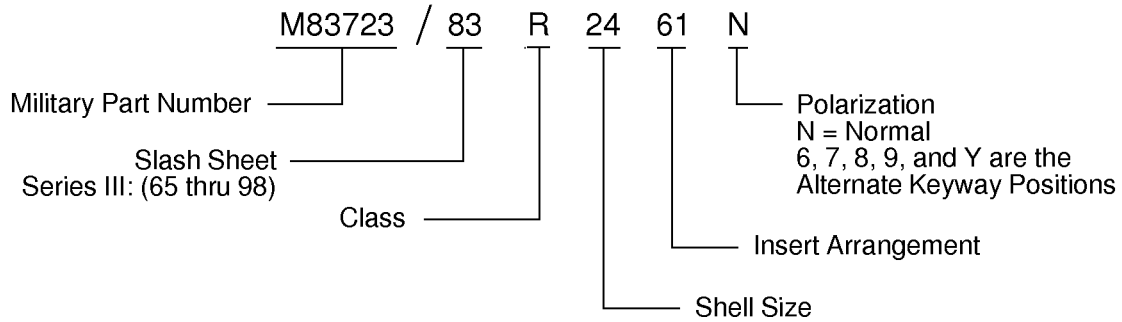
Figure 8

E. MIL-C-83723 Series III Connectors

MIL-C-83723 Series III connectors can be Type T Threaded, or Type B Bayonet coupling.

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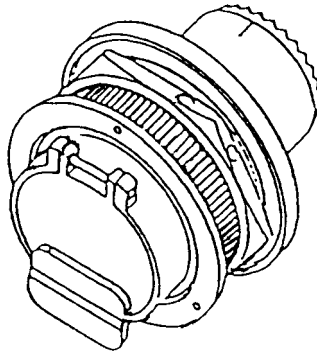
ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS



MIL-C-83723 CONNECTOR PART NUMBER STRUCTURE
Figure 9

F. Amphenol Special Audio Connector

The Amphenol special audio receptacle connector has 10 size 16 standard socket contacts.



AMPHENOL 10-584762 RECEPTACLE CONNECTOR
Figure 10

G. Contact Part Numbers

Table 5
BOEING STANDARD CONTACT PART NUMBERS

Contact Size		Contact Type	Boeing Standard
Engaging End	Crimp Barrel		
20	20	Pin	BACC47ES1
		Socket	BACC47ET1
16	16	Pin	BACC47ES2
		Socket	BACC47ET2
12	12	Pin	BACC47ES3
		Socket	BACC47ET3

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

**Table 6
APPROVED SUPPLIERS OF BOEING STANDARD CONTACTS**

Boeing Standard	Supplier
BACC47ES()	Amphenol
	Pyle-National
	Tri-Star
BACC47ET()	Amphenol
	Pyle-National
	Tri-Star

**Table 7
ALTERNATIVE EQUIVALENT MILITARY STANDARD CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	M39029/4-110	QPL
		Socket	M39029/5-115	QPL
16	16	Pin	M39029/4-111	QPL
		Socket	M39029/5-116	QPL
12	12	Pin	M39029/4-113	QPL
		Socket	M39029/5-118	QPL

**Table 8
THERMOCOUPLE CONTACT PART NUMBERS**

Contact Size		Contact Type	Contact	Part Number	Supplier
Engaging End	Crimp Barrel				
20	20	Pin	Alumel	5000-070-120	Matrix
			Chromel	5000-070-220	Matrix
		Socket	Alumel	5100-108-120	Matrix
			Chromel	5100-108-220	Matrix
16	16	Pin	Alumel	5000-070-116	Matrix
			Chromel	5000-070-216	Matrix
		Socket	Alumel	5100-108-116	Matrix
			Chromel	5100-108-216	Matrix

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

Table 8 (continued)

Contact Size		Contact Type	Contact	Part Number	Supplier
Engaging End	Crimp Barrel				
12	12	Pin	Alumel	5000-070-112	Matrix
			Chromel	5000-070-212	Matrix
		Socket	Alumel	5100-108-112	Matrix
			Chromel	5100-108-212	Matrix

3. INSERT CONFIGURATIONS

A. MIL-C-83723 Series III Type Connectors

NOTE: The insert configurations that are specified in Table 9 include the connector shell size as the first part of the configuration. Refer to Table 5 for the part number structure that is applicable for the connector.

NOTE: The contact cavity size that is specified in Table 9 is equivalent to the size of the engaging end of the contact.

**Table 9
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
8-2	2	20	Figure 11
8-3	3	20	Figure 11
10-2	2	20	Figure 12
10-20	2	16	Figure 12
10-5	5	20	Figure 12
12-12	12	20	Figure 13
12-3	3	16	Figure 13
14-12	3	16	Figure 14
	9	20	
14-15	15	20	Figure 14
14-4	4	12	Figure 14
14-7	7	16	Figure 14
16-10	10	16	Figure 15
16-24	24	20	Figure 15
18-14	14	16	Figure 16
18-31	31	20	Figure 16
18-8	8	12	Figure 16

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

Table 9 (continued)

Insert Configuration	Contact Cavity		Reference
	Count	Size	
20-16	16	16	Figure 17
20-25	19	20	Figure 17
	6	12	
20-28	24	20	Figure 17
	4	12	
20-39	2	16	Figure 17
	37	20	
20-41	41	20	Figure 17
22-12	12	12	Figure 18
22-19	19	16	Figure 18
22-32	26	20	Figure 18
	6	12	
22-55	55	20	Figure 18
24-30	30	16	Figure 19
24-43	20	16	Figure 19
	23	20	
24-57	2	12	Figure 19
	55	20	
24-61	61	20	Figure 19
28-40	36	16	Figure 20
	4	12	
28-42	42	16	Figure 20

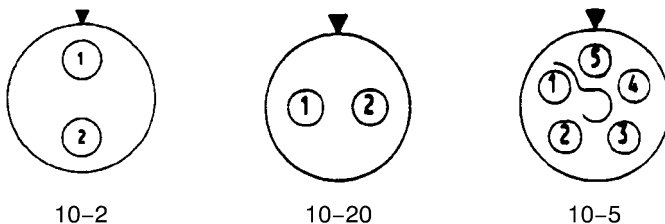
NOTE: Figure 11 through Figure 20 show the front face of an insert that has sockets. The view of the front face of an insert that has pins is the mirror image of this view.



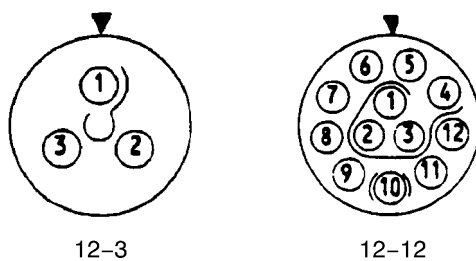
8-() INSERT CONFIGURATIONS
Figure 11

STANDARD WIRING PRACTICES MANUAL

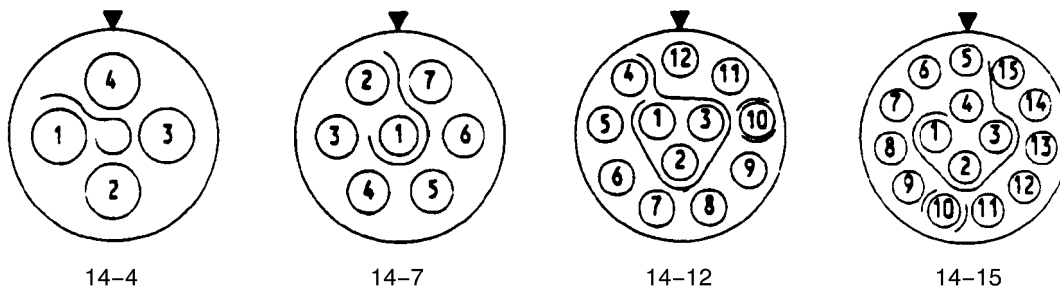
ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS



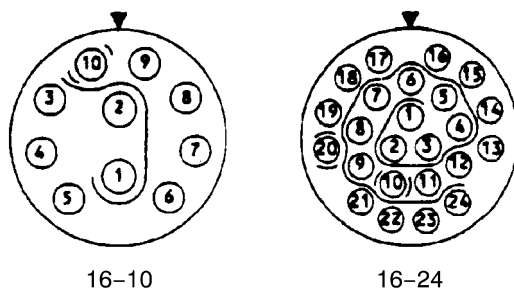
10-() INSERT CONFIGURATIONS
Figure 12



12-() INSERT CONFIGURATIONS
Figure 13



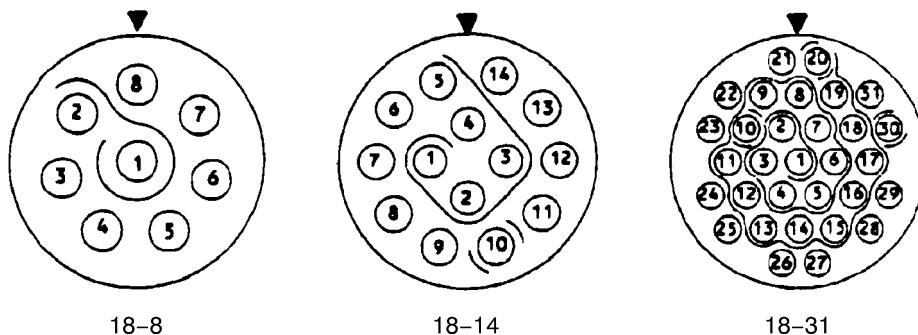
14-() INSERT CONFIGURATIONS
Figure 14



16-() INSERT CONFIGURATIONS
Figure 15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

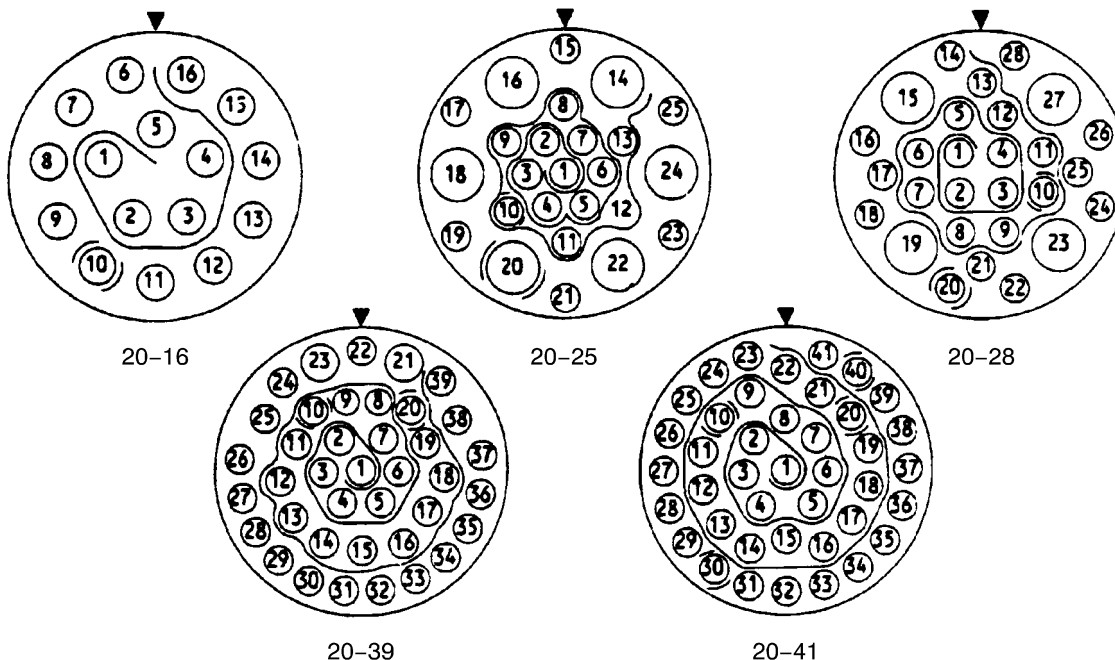


18-8

18-14

18-31

18-() INSERT CONFIGURATIONS
Figure 16



20-16

20-25

20-28

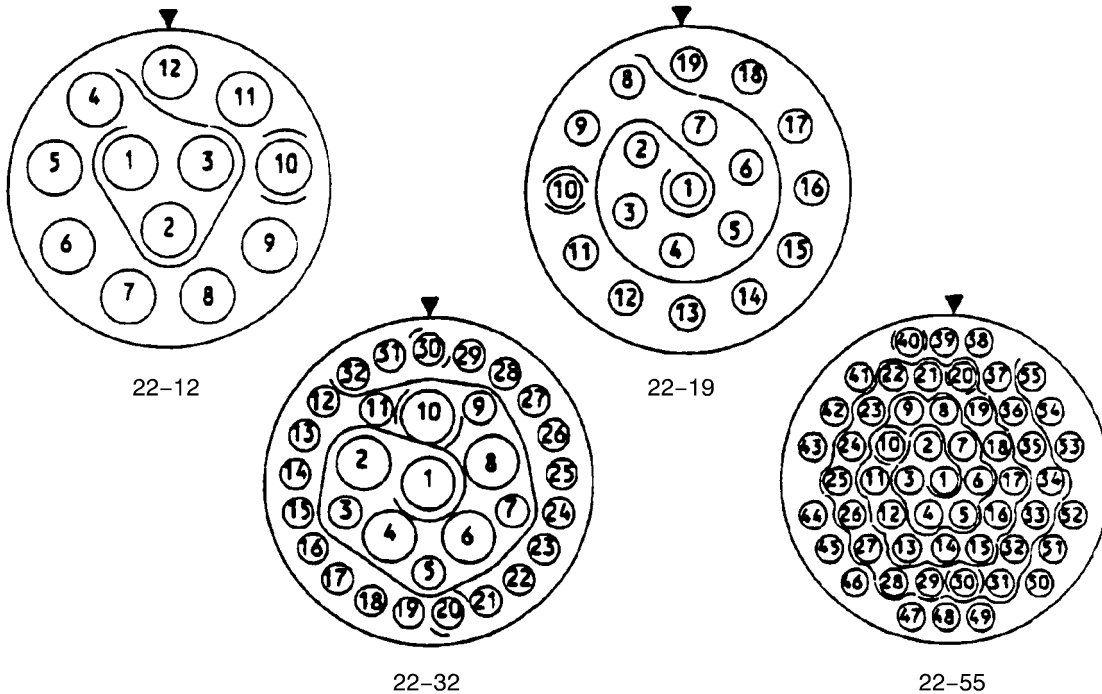
20-39

20-41

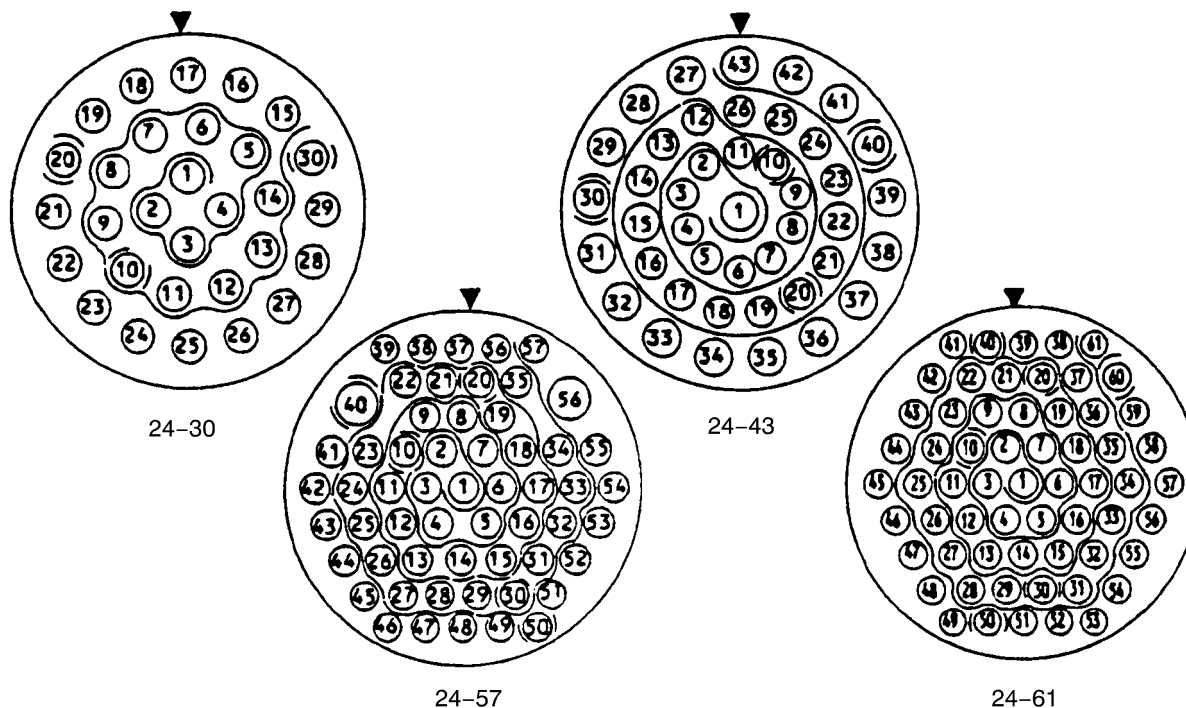
20-() INSERT CONFIGURATIONS
Figure 17

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS



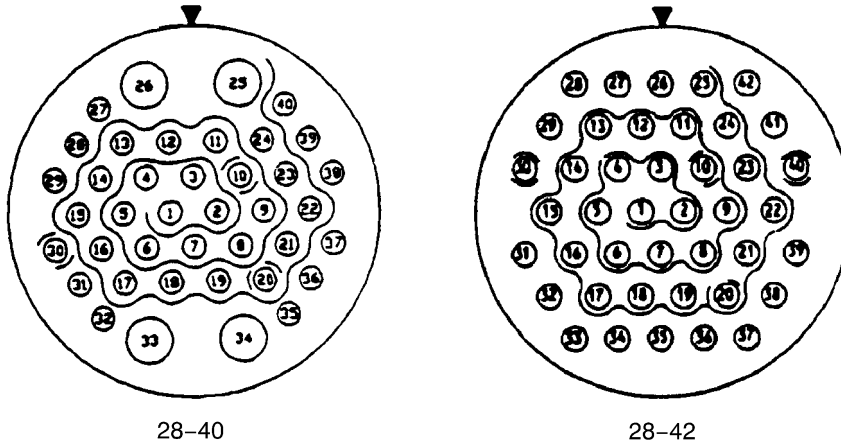
22-() INSERT CONFIGURATIONS
Figure 18



24-() INSERT CONFIGURATIONS
Figure 19

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS



28-() INSERT CONFIGURATIONS
Figure 20

4. CONNECTOR DISASSEMBLY

A. Seal Plug and Seal Rod Removal

Table 10
NECESSARY TOOLS

Tool	Type
Pliers	Needle Nose

(1) Make a selection of a pliers from Table 10.

CAUTION: MAKE SURE THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, remove a plastic tie strap or a wire harness tie that is less than 6 inches from the connector.
- (3) Hold the end of the seal plug or the seal rod tightly in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod from the contact cavity.

B. Contact Removal

This paragraph gives the procedure to remove a contact assembly from the connector. For the procedure to remove an unwired contact, refer to Paragraph 4.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

Table 11
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool	Special Instructions
20	6500-001-20	-
	CIET-20	-
	M81969/14-11	-
	M83723/31-20	-
	ATR 2112	For contacts assembled with Champlain 24-00034 wire
16	6500-001-16	-
	6500-037-016	-
	ATR 2112	For contacts assembled with Champlain 24-00034 wire
	CIET-16	Not applicable for contacts assembled with wire that has thick wall insulation
	M81969/14-03	-
	M83723/31-16	-
12	6500-001-12	-
	ATR 2112	For contacts assembled with Champlain 24-00034 wire
	CIET-12	-
	M81969/14-04	-
	M83723/31-12	-

- (1) Make a selection of the removal tool from Table 11.
- (2) Put the removal tool on the wire.
- (3) Axially align the tool and the contact cavity at the rear of the connector.
- (4) Carefully push the tool into the contact cavity until it stops.

Make sure that the tool stays aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Hold the wire against the tool.
 - (6) Pull the tool and the wire out from the contact cavity.
- Make sure that the tool stays aligned with the contact cavity.

C. Unwired Contact Removal

This paragraph gives the procedure to remove an unwired contact from the connector.

For the procedure to remove a contact assembly, refer to Paragraph 4.B.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS**

Table 12
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool
20	CET-20-24
16	CET-16-21
12	CET-12-16

- (1) Make a selection of a contact removal tool from Table 12.
- (2) Remove the seal plug from the contact cavity.
- (3) Axially align the tool and the contact cavity at the rear of the connector.
- (4) Carefully push the tool into the contact cavity until it stops.

Make sure that:

- The end of the tool is between the contact cavity and the crimp barrel of the contact
- The tool stays aligned with the contact cavity
- Pressure is not applied on the plunger of the tool.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT APPLY PRESSURE ON THE PLUNGER OF THE TOOL WHEN THE TOOL IS IN THE CONTACT CAVITY. DAMAGE TO THE CONNECTOR CAN OCCUR.

- (5) Pull the tool and the contact out of the contact cavity.
Make sure that the tool stays aligned with the contact cavity.
- (6) Apply pressure on the plunger to eject the contact from the tool.

5. CONNECTOR ASSEMBLY

A. Wire Preparation

For the preparation of:

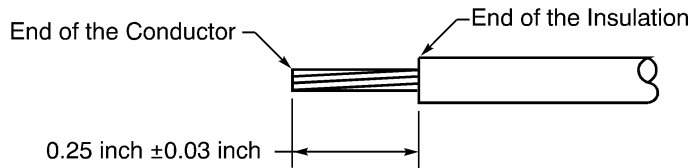
- Champlain 24-00033 and Champlain 24-00034 wire, refer to Paragraph 5.B.
 - Rockbestos or Cerro H22-4000 wire, refer to Paragraph 5.C.
 - Vibro-Meter 50-116-00 and Vibro-Meter 80-116-0() cable assembly wire, refer to Paragraph 5.D.
 - Specialty Cable 852-4985339 cable wire, refer to Paragraph 5.E.
- (1) Remove 0.25 inch \pm 0.03 inch of insulation from the end of the wire.

Refer to:

- Figure 21
- Subject 20-00-15 for the insulation removal procedure.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS



INSULATION REMOVAL LENGTH

Figure 21

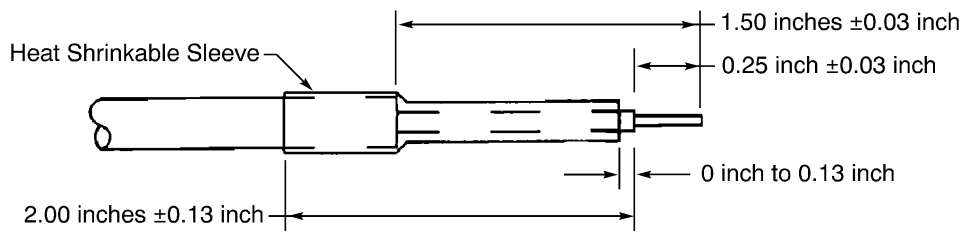
- (2) Measure the O.D. of the wire.
- (3) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.A.

B. Preparation of Champlain 24-00033 and Champlain 24-00034 Wire

Table 13

NECESSARY MATERIALS

Material	Part Number	Size (inch)	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12 Class 5	3/16	Available source
	TFE 4X	3/16	Chemplast
	TFE 4X	3/16	Zeus Industrial Products



CHAMPLAIN 24-00033 AND CHAMPLAIN 24-00034 WIRE PREPARATION

Figure 22

Refer to Figure 22.

- (1) Make a selection of a heat shrinkable sleeve from Table 13.
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (2) Remove 1.50 inch \pm 0.03 inch of the outer jacket from the end of the wire. Refer to Subject 20-00-15.
- (3) Remove 1.50 inch \pm 0.03 inch of the layer of braid from the end of the wire. Refer to Subject 20-00-15.

CAUTION: DO NOT CAUSE DAMAGE TO THE RUBBER INSULATION LAYER. DAMAGE TO THE RUBBER INSULATION LAYER CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (4) Remove 0.25 inch \pm 0.03 inch of the rubber insulation layer from the end of the wire. Refer to Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

- (5) Remove 0.25 inch \pm 0.03 inch of the inner tape wrap from the end of the wire. Refer to Subject 20-00-15.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (6) Put a 2.0 inch \pm 0.13 inch length of heat shrinkable sleeve on the wire.
- (7) Align the forward end of the sleeve and the end of the inner rubber layer.

Make sure that:

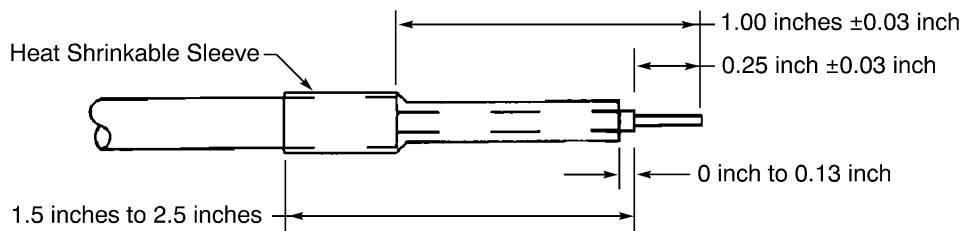
- The forward end of the sleeve does not extend farther than the end of the rubber insulation layer
- The distance from the forward end of the sleeve to the end of the rubber insulation layer is not more than 0.13 inch.

- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Preparation of Rockbestos or Cerro H22-4000 Wire

**Table 14
NECESSARY MATERIALS**

Material	Part Number	Size (inch)	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12 Class 5	1/4	Available source
	TFE 4X	1/4	Chemplast
	TFE 4X	1/4	Zeus Industrial Products



**ROCKBESTOS OR CERRO H22-4000 WIRE PREPARATION
Figure 23**

Refer to Figure 23.

- (1) Make a selection of a heat shrinkable sleeve from Table 14.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (2) Remove 1.00 inch \pm 0.03 inch of the outer braid from the end of the wire. Refer to Subject 20-00-15.
- (3) Remove 1.00 inch \pm 0.03 inch of the clear inner wrap from the end of the wire. Refer to Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

CAUTION: DO NOT CAUSE DAMAGE TO THE INNER INSULATION LAYER. DAMAGE TO THE INNER LAYER CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (4) Remove 0.25 inch \pm 0.03 inch of the inner insulation from the end of the wire. Refer to Subject 20-00-15.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (5) Put a 1.5 inch to 2.5 inch length of heat shrinkable sleeve on the wire.
- (6) Align the forward end of the sleeve and the end of the inner insulation.

Make sure that:

- The forward end of the sleeve does not extend farther than the end of the inner insulation
 - The distance from the forward end of the sleeve to the end of the inner insulation is not more than 0.13 inch.
- (7) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Preparation of Vibro-Meter 50-116-00 and Vibro-Meter 80-116-0() Cable Assembly Wire

**Table 15
NECESSARY MATERIALS**

Material	Part Number	Size (inch)	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12 Class 5	1/8	Available source
	TFE 4X	1/8	Chemplast
	TFE 4X	1/8	Zeus Industrial Products

- (1) Make a selection of a heat shrinkable sleeve from Table 15.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (2) Remove a 1.5 inch \pm 0.03 inch length of these layers from the end of the cable:
 - The white outer jacket
 - The yellow polyimide layer
 - The shield
 - The outer layer of black graphite tape
 - The fiberglass binder and filler.
- (3) Remove 1.0 inch \pm 0.06 inch of the inner layer of black graphite tape from each wire.
- (4) Remove all of the carbon residue from the primary insulation of each wire with one or more of these cleaners:
 - A brush with a fiberglass eraser
 - A sandblaster
 - Acetone or an equivalent solvent; refer to Subject 20-00-11.
- (5) Assemble a shield dead end. Refer to Subject 20-10-15.
- (6) For each wire:
 - (a) Remove 0.5 inch \pm 0.03 inch of insulation from the end of the wire.
 - (b) Put the necessary length of heat shrinkable sleeve on the wire.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

Make sure that:

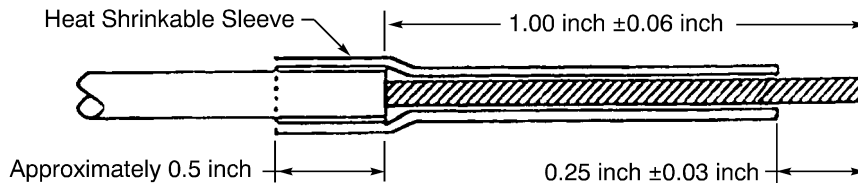
- The rear end of the sleeve is aligned with the forward end of the shield dead end
 - The forward end of the sleeve is aligned with the end of the insulation.
- (c) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (d) Fold the conductor back on itself.

NOTE: When the conductor is folded back on itself, the size of the conductor becomes AWG 18.

E. Preparation of Specialty Cable 852-4985339 Cable Wire

**Table 16
NECESSARY MATERIALS**

Material	Part Number	Size (inch)	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12 Class 2	1/8	Available source
	TFE 2X Standard Wall	1/8	Chemplast
	TFE 2X Standard Wall	1/8	Zeus Industrial Products



**SPECIALTY CABLE 852-4985339 WIRE PREPARATION
Figure 24**

Refer to Figure 24.

- (1) Make a selection of a heat shrinkable sleeve from Table 16.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (2) Remove 1.00 inch \pm 0.06 inch of the insulation from the end of the wire.
- (3) Put a 1.3 inch \pm 0.1 inch length of the heat shrinkable sleeve on the wire.

Make sure that:

- The distance from the forward end of the sleeve to the end of the conductor is 0.25 inch \pm 0.03 inch
 - The sleeve makes an overlap of approximately 0.5 inch with the insulation.
- (4) Shrink the sleeve into its position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

F. Contact Assembly

**Table 17
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-02	-
22	20	M22520/1-01	3	M22520/1-02	Red
		M22520/2-01	6	M22520/2-02	-
		MS3191-1	-	MS3191-20A	-
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-02	-
		MS3191-1	-	MS3191-20A	-
	16	M22520/1-01	4	M22520/1-02	Blue
18	16	M22520/1-01	5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
		MS3191-1	-	MS3191-16A	-
	12	M22520/1-01	6	M22520/1-02	Yellow
14	12	M22520/1-01	7	M22520/1-02	Yellow
12	12	M22520/1-01	8	M22520/1-02	Yellow
		MS3191-1	-	MS3191-12A	-

- (1) Make a selection a crimp tool from Table 17.
- (2) Put the end of the wire in the crimp barrel of the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- For a wire with thick wall insulation, the distance from the end of the insulation to the crimp barrel is approximately 0.13 inch
- For all other wire, the end of the insulation is against the end of the crimp barrel.

- (3) Crimp the contact.

G. Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector. Refer to Paragraph 5.I.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

**Table 18
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	Special Instructions
20	6500-001-20	-
	ATR 1105	Only applicable for Champlain 24-00034 wire
	CIET-20	-
	M81969/14-11	-
	M83723/31-20	-
16	6500-001-16	-
	6500-037-016	-
	ATR 1105	Only applicable for Champlain 24-00034 wire
	CIET-16	-
	M81969/14-03	-
	M83723/31-16	-
12	6500-001-12	-
	ATR 1105	Only applicable for Champlain 24-00034 wire
	CIET-12	-
	M81969/14-04	-
	M83723/31-12	-

- (1) Make a selection of an insertion tool from Table 18.
- (2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

- (3) Put the contact assembly in the insertion tool.
- (4) Axially align the tool and the contact cavity.
- (5) Carefully push the contact into the contact cavity until it stops.
Make sure that the tool and the contact cavity stay axially aligned.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the tool out of the contact cavity.
Make sure that the tool and the contact cavity stay axially aligned.
- (7) Lightly pull the wire to make sure the contact is locked in the connector.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (3) through Step (7) again.

H. Seal of an Empty Contact Cavity

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

If a stub wire is specified, the minimum length of the stub wire is 12.0 inches.

I. Backshell and Strain Relief Assembly

Refer to Subject 20-60-09.

6. CONNECTOR INSTALLATION

A. Connector Installation

Refer to Subject 20-60-06.

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 19
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
6500-001-12	Matrix
6500-001-16	Matrix
6500-001-20	Matrix
6500-037-016	Matrix
ATR 2112	Astro
CET-20-24	ITT Cannon
CET-16-21	ITT Cannon
CET-12-16	ITT Cannon
CIET-12	ITT Cannon
CIET-16	ITT Cannon
CIET-20	ITT Cannon
M81969/14-03	QPL
M81969/14-04	QPL
M81969/14-11	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

Table 19 (continued)

Removal Tool	Supplier
M83723/31-12	QPL
M83723/31-16	QPL
M83723/31-20	QPL

B. Contact Crimp Tools

**Table 20
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
MS3191-1	QPL
MS3191-12A	QPL
MS3191-16A	QPL
MS3191-20A	QPL

C. Contact Insertion Tools

**Table 21
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
6500-001-12	Matrix
6500-001-16	Matrix
6500-001-20	Matrix
6500-037-016	Matrix
ATR 1105	Astro
CIET-12	ITT Cannon
CIET-16	ITT Cannon
CIET-20	ITT Cannon
M81969/14-03	QPL
M81969/14-04	QPL
M81969/14-11	QPL



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-83723 SERIES III TYPE CONNECTORS

Table 21 (continued)

Insertion Tool	Supplier
M83723/31-12	QPL
M83723/31-16	QPL
M83723/31-20	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

1. GENERAL DATA

A. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
MIL-C-5015	Rear release, rear removal contacts	16	0.066
		12	0.097
		8	0.132
		4	0.237
		0	0.360

2. PART NUMBERS AND DESCRIPTION

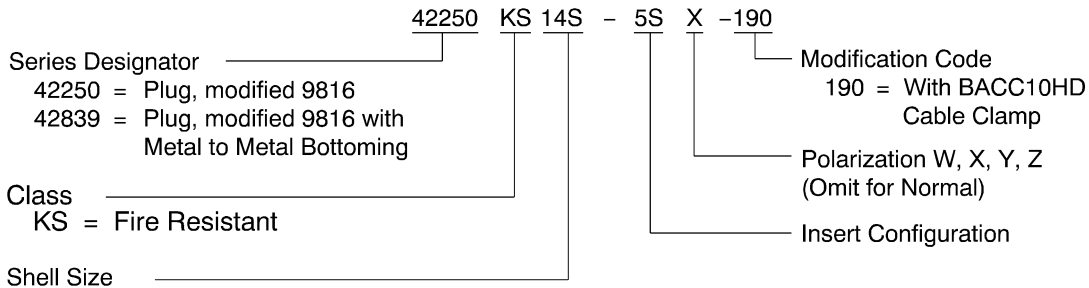
A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

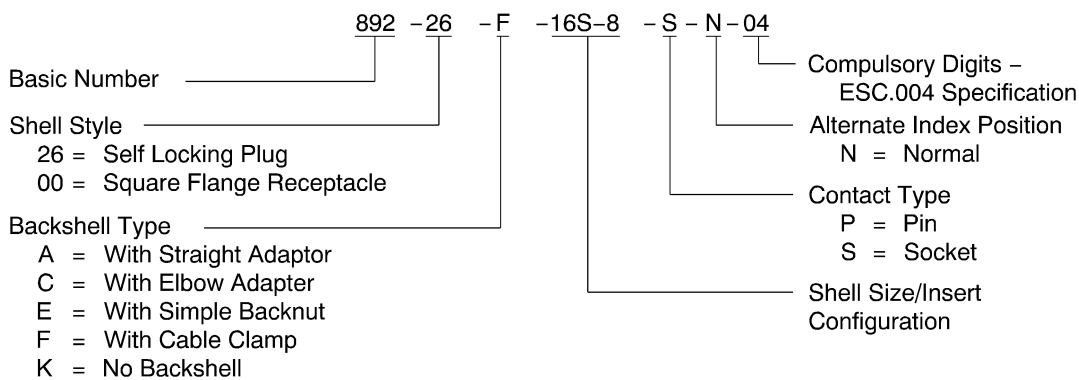
Part Number	Supplier
42839KS()	Matrix
42250KS()	Matrix
892()	Souriau
9440()	Matrix
9446()	Matrix
9816()	Matrix
MS3450()	QPL
MS3452()	QPL
MS3454()	QPL
MS3456()	QPL
MS3459()	QPL

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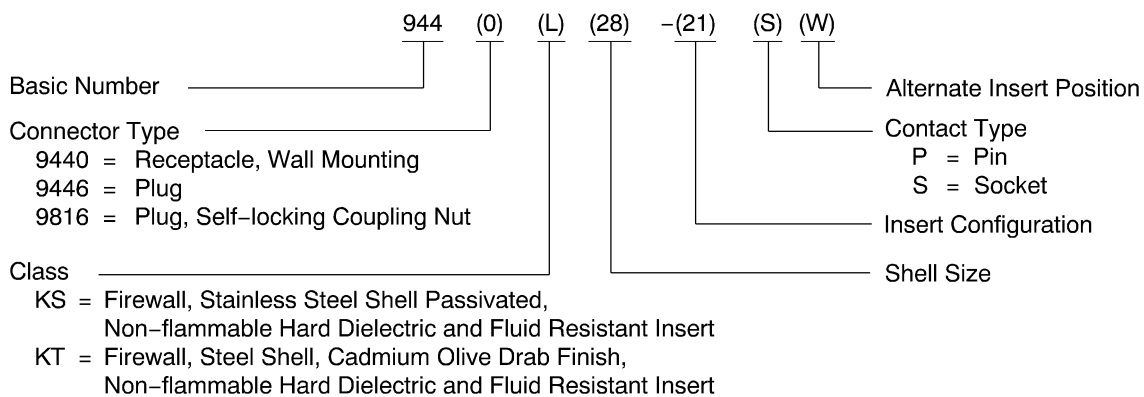
ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS



MATRIX 42250 AND 42839 SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1



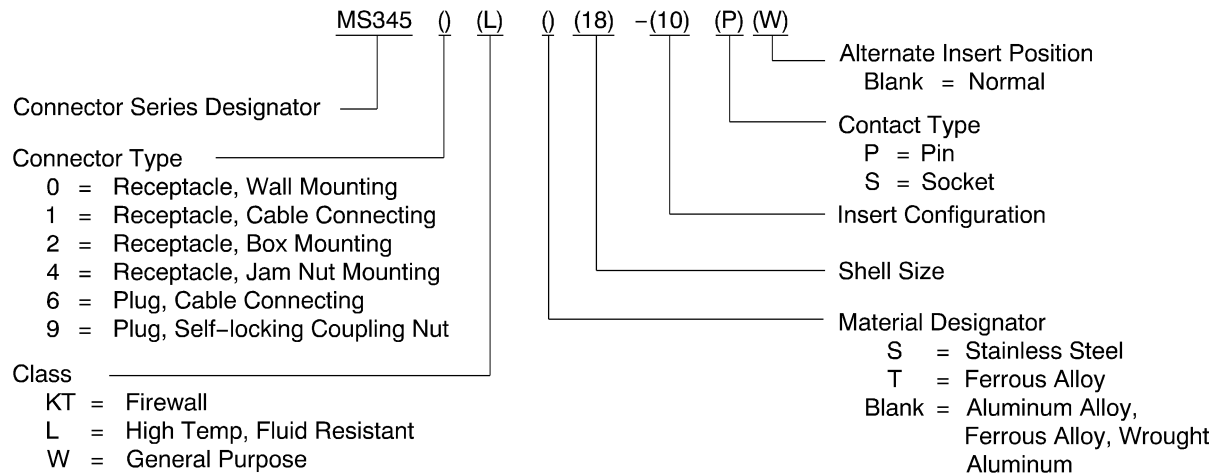
SOURIAU 892 SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 2



MATRIX 944 SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 3

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS



MS345 SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 4

B. Contact Part Numbers

NOTE: If the connector insert arrangement has one or more size 16 contact cavities:

- Contact size 16 is used in connector shell size 8, 10, 12, 16, 18, 20, 22, 24, 28, 32, 36, 40, 44 or 48.
- Contact size 16S is used in connector shell size 8S, 10S, 10SL, 12S, 14S, or 16S.

NOTE: The Matrix 5100-179-16-1 contact has a high engaging force.

NOTE: Souriau 8950-5052A and 8950-5053A contacts are used in the Souriau 892 type connector.

Table 3
CONTACT PART NUMBERS

Contact Size	Contact Engaging End Size	Contact Crimp Barrel Size	Contact Type	Part Number	Supplier
16S	16	16	Socket	5100-033-16-1	Matrix
				5100-179-16-1	
				8950-5052A	Souriau
				M39029/30-217	QPL
16	16	16	Pin	5000-029-16	Matrix
				M39029/29-212	QPL
			Socket	5100-033-16-2	Matrix
				8950-5053A	Souriau
				M39029/30-218	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

Table 3 (continued)

Contact Size	Contact Engaging End Size	Contact Crimp Barrel Size	Contact Type	Part Number	Supplier
12	12	12	Pin	5000-029-12	Matrix
				M39029/29-213	QPL
			Socket	5100-033-12	Matrix
				M39029/30-219	QPL
8	8	8	Pin	5000-029-08	Matrix
				M39029/29-214	QPL
			Socket	5100-033-08	Matrix
				M39029/30-220	QPL
4	4	4	Pin	5000-029-04	Matrix
				M39029/29-215	QPL
			Socket	5100-033-04	Matrix
				M39029/30-221	QPL
1/0	1/0	1/0	Pin	5000-029-0	Matrix
				M39029/29-216	QPL
			Socket	5100-033-0	Matrix
				M39029/30-222	QPL

3. INSERT CONFIGURATIONS

A. MIL-C-5015 Series Connectors

Refer to Subject 20-61-19.

4. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 4
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	Supplier
16	6500-001-16	Matrix
	MS3447-16	QPL
	M81969/14-03	QPL
12	6500-001-12	Matrix
	MS3447-12	QPL
8	6500-018-08	Matrix
	MS3165-8	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

Table 4 (continued)

Crimp Barrel Size	Removal Tool	Supplier
4	6500-018-04	Matrix
	MS3165-4	QPL
1/0	6500-018-0	Matrix
	MS3165-0	QPL

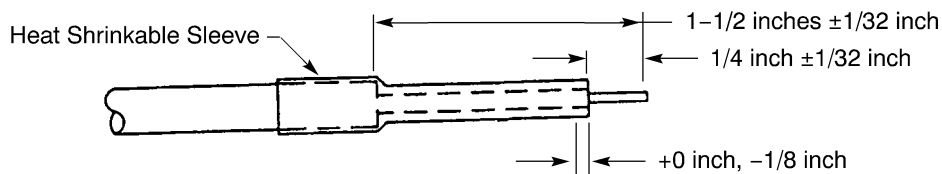
5. CONNECTOR ASSEMBLY

A. Wire Preparation

**Table 5
INSULATION REMOVAL LENGTH**

Crimp Barrel Size	Removal Length (inch)		Special Instructions
	Target	Tolerance	
16	0.28	±0.03	-
12	0.28	±0.03	-
8	0.50	±0.06	-
4	0.50	±0.06	-
1/0	0.62	±0.06	-

- (1) To prepare BMS 13-8, BMS 13-55, Champlain 24-00033, or Champlain 24-00034 wire, the wire diameter must be decreased. Refer to Figure 5.



**REDUCTION OF THE DIAMETER OF THE WIRE
Figure 5**

- (a) Put a 2.0 inch ±0.1 inch length of 3/16 inch diameter TFE 4X heat shrinkable sleeve on the wire.
 - (b) Remove 1.50 inches ±0.03 inch of the outer Teflon jacket from the end of the wire.
 - (c) Remove 1.50 inches ±0.03 inch of the insulation yarn from the end of the wire.
- CAUTION:** DO NOT CUT THE EXTRUDED SILICONE RUBBER DIELECTRIC MATERIAL.
- (d) Remove 0.25 inch ±0.03 inch of extruded silicone rubber and Kapton tape insulation materials from the conductor.
- (2) To prepare the wire for the assembly of the Souriau 8950-5052A and 8950-5053A contacts, remove 0.40 inch ±0.03 inch of insulation from the end of the wire.
- (3) Measure the O.D. of the wire.

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ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

- (4) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.A.
- (5) To prepare all other wire, remove the necessary length of insulation from the end of the wire. Refer to Table 5.
- (6) Measure the O.D. of the wire.
- (7) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet holes, increase the O.D. of the wire. Refer to Paragraph 1.A.

B. Contact Assembly

**Table 6
CONTACT CRIMP TOOLS**

Crimp Barrel Size	Wire Size (AWG)	Filler Wire Size (AWG)	Crimp Tool				
			Basic Unit		Die Set	Locator	
			Part Number	Setting		Part Number	Color
16	20	-	294-126	-	-	-	-
			M22520/1-01	4	-	M22520/1-02	Blue
			MS3191-1	-	-	MS3191-16A	Blue
			ST2220-1-Y	-	-	ST2220-1-2	-
			WA27F	4	-	M22520/1-02	Blue
	18	-	294-126	-	-	-	-
			M22520/1-01	5	-	M22520/1-02	Blue
			MS3191-1	-	-	MS3191-16A	Blue
			ST2220-1-Y	-	-	ST2220-1-2	-
			WA27F	5	-	M22520/1-02	Blue
	16	-	294-126	-	-	-	-
			M22520/1-01	-	-	M22520/1-02	Blue
			M22520/1-01	6	-	M22520/1-02	Blue
			MS3191-1	-	-	MS3191-16A	Blue
			ST2220-1-Y	-	-	ST2220-1-2	-
			WA27F	6	-	M22520/1-02	Blue
	12	-	294-126	-	-	-	-
			M22520/1-01	-	-	M22520/1-02	Yellow
MS3191-1			-	-	MS3191-12A	Yellow	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

Table 6 (continued)

Crimp Barrel Size	Wire Size (AWG)	Filler Wire Size (AWG)	Crimp Tool				
			Basic Unit		Die Set	Locator	
			Part Number	Setting		Part Number	Color
8	12	10	13642	-	-	-	-
			400B	-	414DA-8N	4046A	-
			M22520/23-01	-	-	-	-
			Y29H	-	-	-	-
	10	12	13642	-	-	-	-
			400B	-	414DA-8N	4046A	-
			M22520/23-01	-	-	-	-
			Y29H	-	-	-	-
	8	-	13642	-	ST2354-5	-	-
			400B	-	414DA-8N	4046A	-
			M22520/23-01	-	M22520/23-02	M22520/23-09	-
			Y29H	-	ST2354B-5	-	-
4	4	-	13642	-	ST2354-2	-	-
			M22520/23-01	-	M22520/23-04	M22520/23-11	-
			Y29H	-	ST2354B-2	-	-
1/0	1/0	-	13642	-	11738	-	-
			M22520/23-01	-	M22520/23-05	M22520/23-13	-

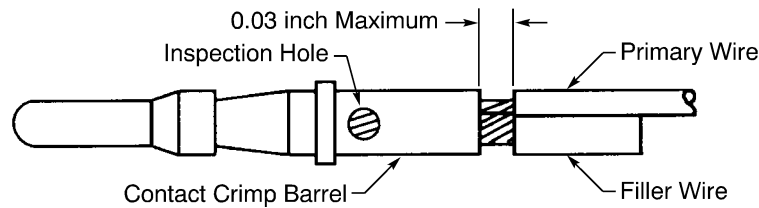
- (1) Make a selection of a crimp tool from Table 6.
- (2) Remove the necessary length of insulation from the end of the wire.
Refer to:
 - Table 5 for the insulation removal length
 - Subject 20-00-15 for the insulation removal procedures.
- (3) If a filler wire is specified:
 - (a) Remove 0.7 inch of insulation from the end of the filler wire.
Refer to Subject 20-00-15 for the insulation removal procedures.
 - (b) Put the filler wire in the crimp barrel of the contact.
- (4) Put the conductor in the crimp barrel. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

Make sure that:

- All of the strands of the conductor are in the crimp barrel or in the adapter sleeve
- If a filler wire is specified, all of the strands of the filler wire are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



CONTACT ASSEMBLY WITH FILLER WIRE
Figure 6

- (5) Crimp the contact.

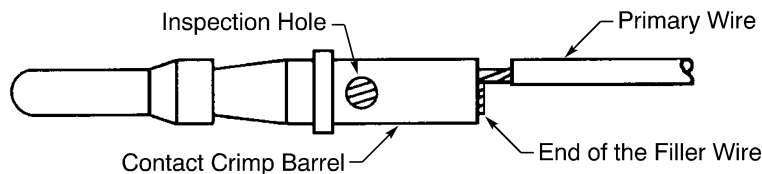
NOTE: A pneumatic indenter crimp tool cannot be used to assemble a size 8 or larger contact that has an adapter sleeve in the crimp barrel.

- (6) Examine the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- If a filler wire is specified, all of the strands of the filler wire are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

- (7) If the contact has a filler wire, remove the unwanted length of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 7.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE
Figure 7

CAUTION: DO NOT CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the wire has a heat shrinkable sleeve on it:

- (a) Push the heat shrinkable sleeve forward on the wire. Refer to Figure 5.

Make sure that the end of the sleeve is 0.25 inch \pm 0.03 inch from the end of the insulation.

- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

C. Contact Insertion

**Table 7
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	Supplier
16	6500-001-16	Matrix
	MS3447-16	QPL
	M81969/14-03	QPL
12	6500-001-12	Matrix
	MS3447-12	QPL
8	6500-018-08	Matrix
	MS3165-8	QPL
4	6500-018-04	Matrix
	MS3165-4	QPL
1/0	6500-018-0	Matrix
	MS3165-0	QPL

- (1) Make a selection of contact insertion tool from Table 7.
- (2) Put the wired contact into the applicable contact cavity.

D. Spare Contact and Seal Plug Installation

All contact cavities that are not used must be sealed. Refer to Subject 20-60-08.

6. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 8
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
6500-001-12	Matrix
6500-001-16	Matrix
6500-018-0	Matrix
6500-018-04	Matrix
6500-018-08	Matrix
MS3165-0	QPL
MS3165-4	QPL
MS3165-8	QPL
MS3447-12	QPL
MS3447-16	QPL



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

B. Contact Insertion Tools

Table 9
CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
6500-001-12	Matrix
6500-001-16	Matrix
6500-018-0	Matrix
6500-018-04	Matrix
6500-018-08	Matrix
MS3165-0	QPL
MS3165-4	QPL
MS3165-8	QPL
MS3447-16	QPL
MS3447-12	QPL

C. Contact Crimp Tools

Table 10
CONTACT CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
11738	Thomas & Betts
13642	Thomas & Betts
294-126	Amphenol
M22520/1-01	QPL
M22520/1-02	QPL
M22520/23-01	QPL
M22520/23-02	QPL
M22520/23-04	QPL
M22520/23-05	QPL
M22520/23-09	QPL
M22520/23-11	QPL
M22520/23-13	QPL
MS3191-1	QPL
MS3191-12A	QPL
MS3191-16A	QPL
ST2220-1-2	Boeing

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-5015 TYPE CONNECTORS WITH REAR RELEASE CONTACTS

Table 10 (continued)

Crimp Tool	Supplier
ST2220-1-Y	Boeing
ST2354-2	Boeing
ST2354-5	Boeing
ST2354B-2	Boeing
ST2354B-5	Boeing
WA27F	Daniels
Y29H	Burndy

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

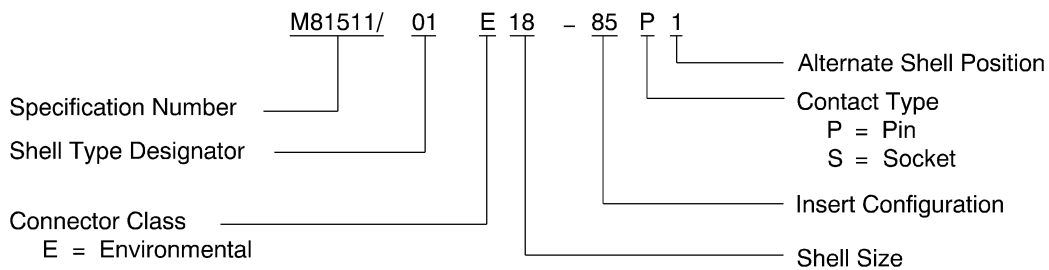
This Subject gives the procedure to assemble MIL-C-81511 Series 1 and Series 2 electrical connectors.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

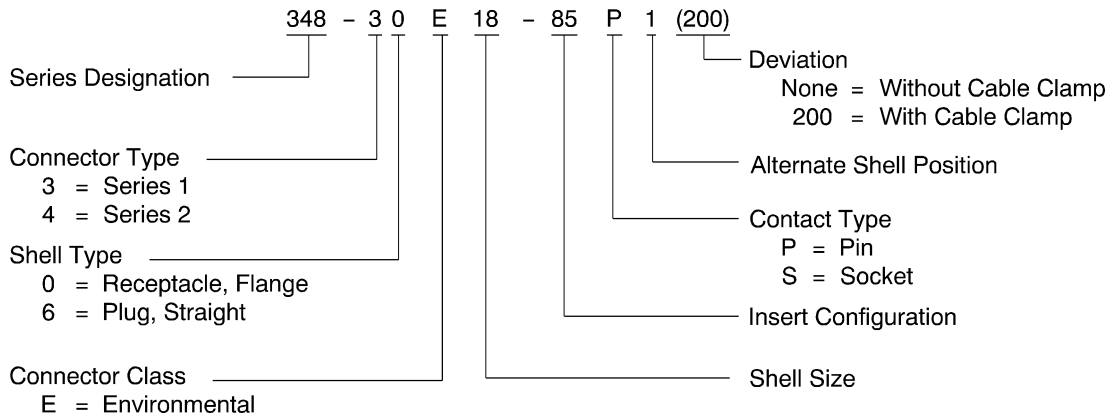
**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
348-()	Amphenol/Bendix
M81511/()	QPL



M81511() SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 1



AMPHENOL/BENDIX 348-() SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 2

STANDARD WIRING PRACTICES MANUAL

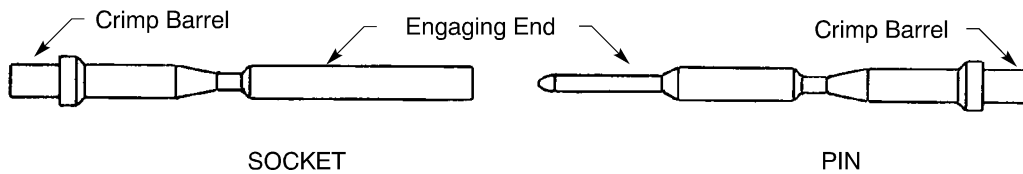
ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

B. Shell Type Designators

Table 2
SHELL TYPE DESIGNATORS FOR MIL-C-81511 SERIES 1 AND 2 CONNECTORS

Connector Series	Designator	Shell Type
1	21	Receptacle
	22	Receptacle
	23	Receptacle
	24	Receptacle
	25	Receptacle
	26	Plug
	27	Receptacle
	35	Receptacle
	36	Receptacle
	37	Receptacle
	38	Plug
2	01	Receptacle
	02	Receptacle
	03	Receptacle
	04	Receptacle
	05	Receptacle
	06	Plug
	28	Receptacle
	31	Receptacle
	32	Receptacle
	33	Receptacle
	34	Plug

C. Contact Part Numbers



M39029/() SOCKET AND PIN CONTACTS

Figure 3



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

**Table 3
CONTACT PART NUMBERS**

MIL-C-81511 Connector Series	Contact Size		Contact			
	Engaging End	Crimp Barrel	Type	Part Number	Supplier	
1	23	22	Pin	M39029/47-314	QPL	
			Socket	M39029/33-264	QPL	
	20	20	Pin	M39029/47-316	QPL	
			Socket	M39029/33-266	QPL	
	16	16	Pin	M39029/47-337	QPL	
			Socket	M39029/33-268	QPL	
	12	12	Pin	M39029/47-339	QPL	
			Socket	M39029/33-270	QPL	
	2	23	22	Pin	M39029/47-314	QPL
				Socket	M39029/46-304	QPL
20		20	Pin	M39029/47-316	QPL	
			Socket	M39029/46-306	QPL	
16		16	Pin	M39029/47-337	QPL	
			Socket	M39029/46-308	QPL	
12		12	Pin	M39029/47-339	QPL	
			Socket	M39029/46-310	QPL	

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 4
CONTACT REMOVAL TOOLS**

Contact		Removal Tool
Engaging End Size	Type	
23	Pin	294-386
		MS3342-23
	Socket	294-287
		MS3344-23
20	Pin	294-28
		MS3342-20
	Socket	294-29
		MS3344-20

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ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

Table 4 (continued)

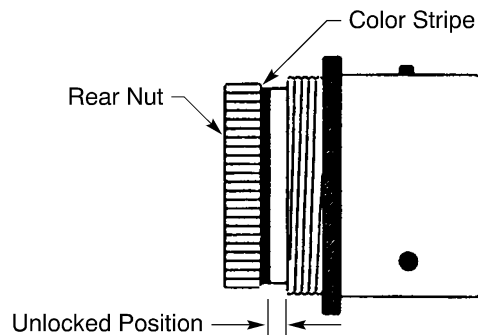
Contact		Removal Tool
Engaging End Size	Type	
16	Pin	294-31
		MS3342-16
	Socket	294-32
		MS3344-16
12	Pin	294-34
		MS3342-12
	Socket	294-35
		MS3344-12

- (1) If a cable clamp is installed, loosen the clamp screws.
- (2) Remove the cable clamp from the connector.
- (3) To unlock the rear nut, turn the nut counterclockwise approximately 2-1/2 turns. Refer to Figure 4.

NOTE: The rear nut assembly must be unlocked before any contacts can be inserted or removed.

After approximately 2-1/2 turns:

- Resistance to more turns can be felt
- The colored stripe can be seen fully.



REAR NUT OF THE CONNECTOR
Figure 4

- (4) To remove a pin contact:
 - (a) Make a selection of a contact removal tool from Table 4.
 - (b) From the front of the connector, put the removal tool over the pin.
 - (c) Push until the tool is fully against the face of the connector insert.
 - (d) Pull the contact out of the rear of the connector.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

CAUTION: REMOVE ONE CONTACT AT A TIME TO PREVENT DAMAGE TO THE CONNECTOR GROMMET.

- (5) To remove a socket contact:
 - (a) Make a selection of a contact removal tool from Table 4.
 - (b) Push the tip of the removal tool into the insert and the socket contact.
 - (c) Push until the tool is fully against the face of the connector insert.
 - (d) Pull the contact out of the rear of the connector.

CAUTION: REMOVE ONE CONTACT AT A TIME TO PREVENT DAMAGE TO THE CONNECTOR GROMMET.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 5
INSULATION REMOVAL LENGTH**

Contact Size		Removal Length (inch)		
Engaging End	Crimp Barrel	Minimum	Target	Maximum
23	22	0.219	0.219	0.250
20	20	0.268	0.268	0.299
16	16	0.268	0.268	0.299
12	12	0.281	0.281	0.313

**Table 6
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
26	22	ST2220-1-Y	5	ST2220-1-52
24	22	294-286	4	294-1551-01
		M22520/2-01	4	M22520/2-03
		MS3198	4	-
		ST2220-1-Y	5	ST2220-1-53
		ST2220-10	5	ST2220-10-3

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

Table 6 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
22	22	294-286	5	294-1551-01
		M22520/2-01	5	M22520/2-03
		MS3198	5	-
		ST2220-1-Y	5	ST2220-1-53
		ST2220-10	5	ST2220-10-3
	20	MS3198	3	-
20	20	MS3198	4	-
	16	MS3198	4	-
18	16	MS3198	5	-
16	16	294-1718	-	294-1722-01
		MS3198	5	-
14	12	294-1462	-	294-1722-01
		MS3191-4	-	-
12	12	294-1462	-	294-1722-01
		MS3191-4	-	-

- (1) Remove the necessary length of insulation from the end of the wire. Refer to Table 5.
- (2) Make a selection of a contact crimp tool from Table 6.
- (3) Put the contact in the crimp tool locator.
- (4) Put the end of the wire into the crimp barrel of the contact.
- (5) Close the handles of the crimp tool until the ratchet releases.
- (6) Remove the wired contact from the tool.
- (7) Examine the contact to make sure that the wire can be seen in the inspection hole.

B. Contact Insertion

**Table 7
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool
22	294-278
	MS3323-22
20	294-27
	MS3323-20

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

Table 7 (continued)

Crimp Barrel Size	Insertion Tool
16	294-30
	MS3323-16
12	294-33
	MS3323-12

- (1) If a cable clamp is used, put the clamp on the wire bundle.
- (2) To unlock the rear nut, turn the nut counterclockwise approximately 2-1/2 turns. Refer to Figure 4.

NOTE: The rear nut assembly must be unlocked before any contacts can be inserted or removed.

After approximately 2-1/2 turns:

- Resistance to more turns can be felt
 - The colored stripe can be seen fully.
- (3) Manually put the wired contact in the applicable contact cavity until only the crimped portion of the contact extends from the connector grommet.
 - (4) Make a selection of an insertion tool from Table 7.
 - (5) Put tool around the rear of the contact so that it is against the contact shoulder.
 - (6) Push the contact into the connector until it is fully inserted.
 - (7) Carefully pull the tool from the connector grommet.

C. Seal Plug Installation

- (1) Install a seal plug into each contact cavity that is not used.

NOTE: As an alternative, an unwired contact can be inserted before the seal plug is installed.

D. Connector Assembly

- (1) To lock the rear nut, turn the nut until it is tight and the color stripe cannot be seen.
- (2) If a cable clamp is used, push the clamp until it is against the rear of the connector.
- (3) Tighten the cable clamp manually.
- (4) Tighten the clamp 1/8 of a turn more.

4. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 8
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
294-28	Amphenol
294-287	Amphenol
294-29	Amphenol
294-31	Amphenol

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Table 8 (continued)

Removal Tool	Supplier
294-32	Amphenol
294-34	Amphenol
294-35	Amphenol
294-386	Amphenol
MS3342-12	QPL
MS3342-16	QPL
MS3342-20	QPL
MS3342-23	QPL
MS3344-12	QPL
MS3344-16	QPL
MS3344-20	QPL
MS3344-23	QPL

B. Contact Insertion Tools

**Table 9
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
294-278	Amphenol
294-27	Amphenol
294-30	Amphenol
294-33	Amphenol
MS3323-12	QPL
MS3323-16	QPL
MS3323-20	QPL
MS3323-22	QPL

C. Contact Crimp Tools

**Table 10
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
294-1462	Amphenol
294-1551-01	Amphenol

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ASSEMBLY OF MIL-C-81511 SERIES 1 AND SERIES 2 CONNECTORS

Table 10 (continued)

Crimp Tool	Supplier
294-1718	Amphenol
294-1722-01	Amphenol
294-286	Amphenol
M22520/2-01	QPL
M22520/2-03	QPL
MS3191-4	QPL
MS3198	QPL
ST2220-1-52	Boeing
ST2220-1-53	Boeing
ST2220-1-Y	Boeing
ST2220-10	Boeing
ST2220-10-3	Boeing

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1. GENERAL DATA

A. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
MIL-C-38999	Rear release, rear removal contacts	22M	0.030
		22D	0.030
		22	0.034
		20	0.040
		16	0.065
		12	0.097

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 2
CONNECTOR PART NUMBERS

MIL-C-38999 Series	Connector		
	Type	Part Number	Supplier
I	Plug	MS27467	QPL
		Receptacle	MS27466
	MS27468		QPL
	MS27496		QPL
	MS27505		QPL
	MS27656	QPL	
II	Plug	MS27473	QPL
		MS27484	QPL
	Receptacle	MS27472	QPL
		MS27474	QPL
		MS27497	QPL
		MS27499	QPL
		MS27508	QPL

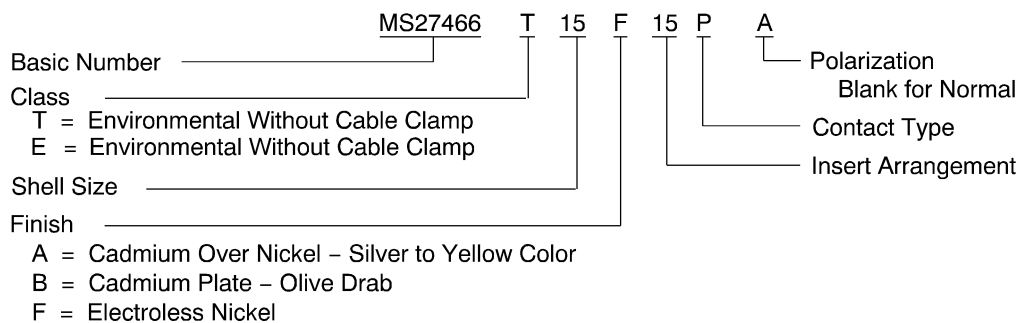
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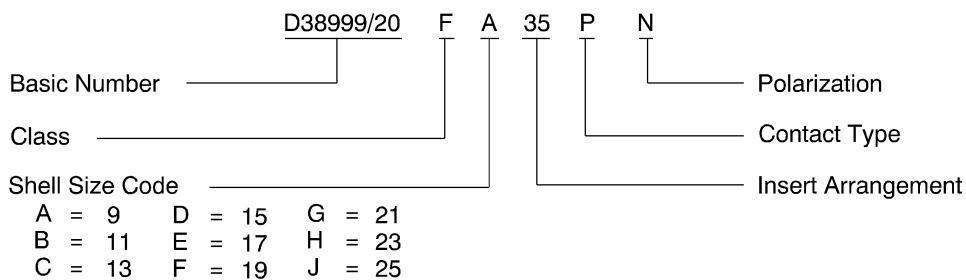
ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 2 (continued)

MIL-C-38999 Series	Connector		
	Type	Part Number	Supplier
III	Plug	D38999/26	QPL
		BACC63CT	Boeing
		BACC63DB	Boeing
		8D513M	Souriau
	Receptacle	D38999/20	QPL
		D38999/24	QPL
		BACC63CU	Boeing
		BACC63DC	Boeing
		8D513M	Souriau



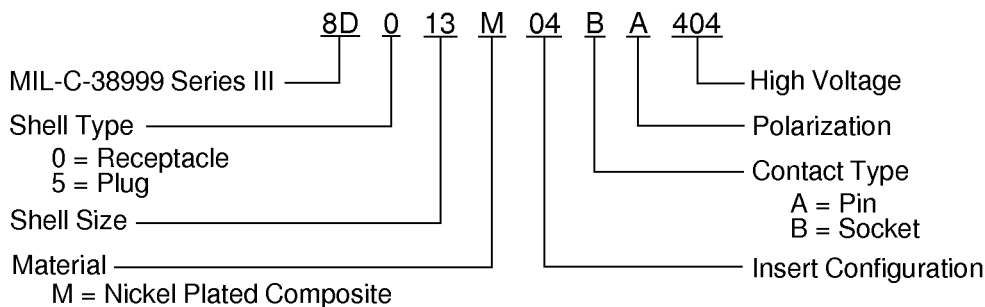
MIL-C-38999 SERIES I AND II CONNECTOR PART NUMBER STRUCTURE
Figure 1



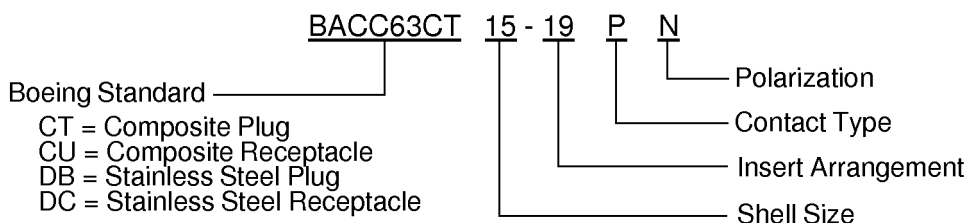
D38999 CONNECTOR PART NUMBER STRUCTURE
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS



Souriau 8D Connector Part Number Structure
Figure 3



BACC63CT, BACC63CU, BACC63DB, and BACC63DC Connector Part Number Structure
Figure 4

B. Contact Part Numbers

Table 3
SUPERSEDED CONTACT PART NUMBERS

Superseded Contact		New Part Number
Part Number	Supplier	
MS27490-22D	QPL	M39029/56-348
MS27490-22M	QPL	M39029/56-349
MS27490-22	QPL	M39029/56-350
MS27490-20	QPL	M39029/56-351
MS27490-16	QPL	M39029/56-352
MS27490-12	QPL	M39029/56-353
MS27491-22D	QPL	M39029/57-354
MS27491-22M	QPL	M39029/57-355
MS27491-22	QPL	M39029/57-356
MS27491-20	QPL	M39029/57-357
MS27491-16	QPL	M39029/57-358
MS27491-12	QPL	M39029/57-359
MS27493-22D	QPL	M39029/58-360

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Table 3 (continued)

Superseded Contact		New Part Number
Part Number	Supplier	
MS27493-22M	QPL	M39029/58-361
MS27493-22	QPL	M39029/58-362
MS27493-20	QPL	M39029/58-363
MS27493-16	QPL	M39029/58-364
MS27493-12	QPL	M39029/58-365
M39029/872020C2	QPL	M39029/87-475
M39029/872020C3	QPL	M39029/87-476
M39029/882020C2	QPL	M39029/88-487
M39029/882020C3	QPL	M39029/88-488
M39029/892020C2	QPL	M39029/89-499
M39029/892020C3	QPL	M39029/89-500

Table 4

CONTACT PART NUMBERS FOR MIL-C-38999 SERIES I AND SERIES III CONNECTORS

Contact Size		Type	Color Code		Part Number	Supplier
Engaging End	Crimp Barrel		Band	Color		
22M	22	Pin	1	Orange	M39029/58-361	QPL
			2	Blue		
			3	Brown		
		Socket, long	1	Orange	M39029/56-349	QPL
			2	Yellow		
			3	White		
22D	22	Pin	1	Orange	M39029/58-360	QPL
			2	Blue		
			3	Black		
		Socket, long	1	Orange	M39029/56-348	QPL
			2	Yellow		
			3	Gray		

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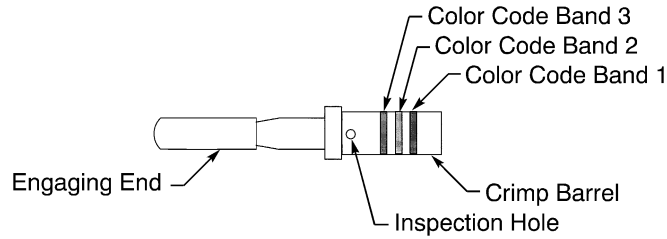
Table 4 (continued)

Contact Size		Type	Color Code		Part Number	Supplier
Engaging End	Crimp Barrel		Band	Color		
22	22	Pin	1	Orange	M39029/58-362	QPL
			2	Blue		
			3	Red		
		Socket, long	1	Orange	M39029/56-350	QPL
			2	Green		
			3	Black		
20	20	Pin	1	Orange	M39029/58-363	QPL
			2	Blue		
			3	Orange		
		Socket, long	1	Orange	M39029/56-351	QPL
			2	Green		
			3	Brown		
16	16	Pin	1	Orange	M39029/58-364	QPL
			2	Blue		
			3	Yellow		
		Socket, long	1	Orange	M39029/56-352	QPL
			2	Green		
			3	Red		
12	12	Pin	1	Orange	M39029/58-365	QPL
			2	Blue		
			3	Green		
		Socket, long	1	Orange	M39029/56-353	QPL
			2	Green		
			3	Orange		

NOTE: Color codes start at the crimp barrel end of the contact. Refer to Figure 5.

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ASSEMBLY OF MIL-C-38999 CONNECTORS



LOCATION OF CONTACT COLOR CODES
Figure 5

Table 5
Boeing Standard Contact Numbers

Contact Size		Contact Type	Boeing Standard	Color Band
Engaging End	Crimp Barrel			
22	22D	Pin	BACC47GC1A	Green
		Socket	BACC47GD1A	Green
20	20	Pin	BACC47GC2A	Red
		Socket	BACC47GD2A	Red
16	16	Pin	BACC47GC3A	Blue
		Socket	BACC47GD3A	Blue
12	12	Pin	BACC47GC4A	Yellow
		Socket	BACC47GD4A	Yellow

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Table 6
THERMOCOUPLE CONTACT PART NUMBERS FOR MIL-C-38999 SERIES I AND SERIES III CONNECTORS

Contact Size		Type	Material	Color Code		Part Number	Supplier		
Engaging End	Crimp Barrel			Band	Color				
20	20	Pin	Alumel	1	Yellow	M39029/87-475	QPL		
				2	Violet				
				3	Green				
			Chromel	1	Yellow			M39029/87-476	QPL
				2	Violet				
				3	Blue				
		Socket, long	Alumel	1	Yellow	M39029/88-487	QPL		
				2	Gray				
				3	Violet				
			Chromel	1	Yellow			M39029/88-488	QPL
				2	Gray				
				3	Gray				

NOTE: Color codes start at the crimp barrel end of the contact. Refer to Figure 5.

Table 7
CONTACT PART NUMBERS FOR MIL-C-38999 SERIES II CONNECTORS

Contact Size		Type	Color Code		Part Number	Supplier		
Engaging End	Crimp Barrel		Band	Color				
22M	22	Pin	1	Orange	M39029/58-361	QPL		
			2	Blue				
			3	Brown				
		Socket, short	1	Orange			M39029/57-355	QPL
			2	Green				
			3	Green				
22D	22	Pin	1	Orange	M39029/58-360	QPL		
			2	Blue				
			3	Black				
		Socket, short	1	Orange			M39029/57-354	QPL
			2	Green				
			3	Yellow				

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Table 7 (continued)

Contact Size		Type	Color Code		Part Number	Supplier
Engaging End	Crimp Barrel		Band	Color		
22	22	Pin	1	Orange	M39029/58-362	QPL
			2	Blue		
			3	Red		
		Socket, short	1	Orange	M39029/57-356	QPL
			2	Green		
			3	Blue		
20	20	Pin	1	Orange	M39029/58-363	QPL
			2	Blue		
			3	Orange		
		Socket, short	1	Orange	M39029/57-357	QPL
			2	Green		
			3	Violet		
16	16	Pin	1	Orange	M39029/58-364	QPL
			2	Blue		
			3	Yellow		
		Socket, short	1	Orange	M39029/57-358	QPL
			2	Green		
			3	Gray		
12	12	Pin	1	Orange	M39029/58-365	QPL
			2	Blue		
			3	Green		
		Socket, short	1	Orange	M39029/57-359	QPL
			2	Green		
			3	White		

NOTE: Color codes start at the crimp barrel end of the contact. Refer to Figure 5.

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Table 8
THERMOCOUPLE CONTACT PART NUMBERS FOR MIL-C-38999 SERIES II CONNECTORS

Contact Size		Type	Material	Color Code		Part Number	Supplier
Engaging End	Crimp Barrel			Band	Color		
20	20	Pin	Alumel	1	Yellow	M39029/87-475	QPL
				2	Violet		
				3	Green		
			Chromel	1	Yellow	M39029/87-476	QPL
				2	Violet		
				3	Blue		
		Socket, short	Alumel	1	Yellow	M39029/89-499	QPL
				2	White		
				3	White		
Chromel	1		Green	M39029/89-500	QPL		
	2		Black				
	3		Black				

NOTE: Color codes start at the crimp barrel end of the contact. Refer to Figure 5.

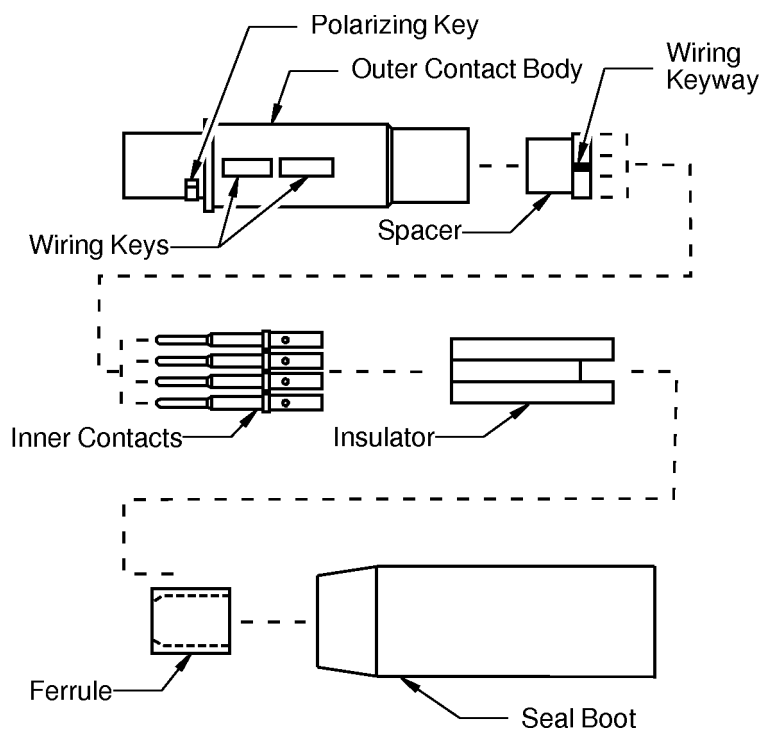
C. Quadrax Contact Part Numbers

Table 9
QUADRAX CONTACT PART NUMBERS FOR MIL-DTL-38999 SERIES III CONNECTORS

Contact Size	Type	Boeing Standard
8	Pin	BACC47GM1
8	Socket	BACC47GN1

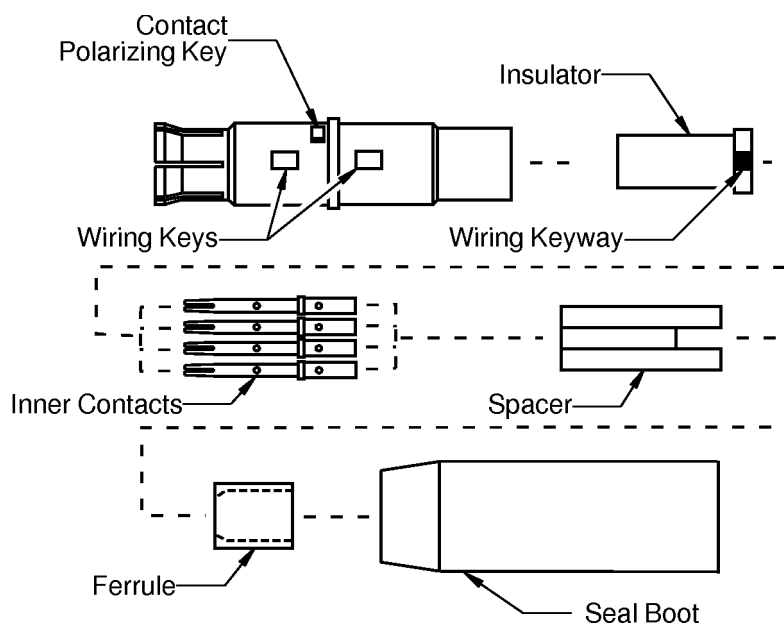
STANDARD WIRING PRACTICES MANUAL

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COMPONENTS OF THE QUADRAX PIN CONTACT

Figure 6



COMPONENTS OF THE QUADRAX SOCKET CONTACT

Figure 7



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ASSEMBLY OF MIL-C-38999 CONNECTORS

**Table 10
SUPPLIER PART NUMBERS FOR BOEING STANDARD SIZER 8 QUADRAX CONTACTS**

Boeing Standard	Alternative Contact	
	Part Number	Supplier
BACC47GM1	670175011	Radiall
BACC47GN1	670075011	Radiall

3. INSERT CONFIGURATIONS

A. Insert Configurations for MIL-C-38999 Series I and Series III Connectors

**Table 11
INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
9-35	6	22D	Figure 8
9-98	3	20	Figure 8
11-35	13	22D	Figure 9
11-98	6	20	Figure 9
13-8	8	20	Figure 10
13-35	22	22D	Figure 10
13-98	10	20	Figure 10
15-5	5	16	Figure 11
15-15	14	20	Figure 11
	1	16	
15-18	18	20	Figure 11
15-19	19	20	Figure 11
15-35	37	22D	Figure 11
15-97	8	20	Figure 11
	4	16	
17-6	6	12	Figure 12
17-8	8	16	Figure 12
17-26	26	20	Figure 12
17-35	55	22D	Figure 12
17-82	2	8	Figure 18
17-99	21	20	Figure 12
	2	16	
18-53	53	22	Figure 13

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Table 11 (continued)

Insert Configuration	Contact Cavity		Reference
	Count	Size	
19-11	11	16	Figure 14
19-32	32	20	Figure 14
19-35	66	22D	Figure 14
21-11	11	12	Figure 15
21-16	16	16	Figure 15
21-35	79	22D	Figure 15
21-39	37	20	Figure 15
	2	16	
21-41	41	20	Figure 15
21-75	4	8	Figure 15
21-76	17	22D	Figure 18
	2	8	
21-84	4	8	Figure 18
23-21	21	16	Figure 16
23-35	100	22D	Figure 16
23-53	53	20	Figure 16
25-4	48	20	Figure 17
	8	16	
25-19	19	12	Figure 17
25-24	12	16	Figure 17
	12	12	
25-29	29	16	Figure 17
25-35	128	22D	Figure 17
25-43	23	20	Figure 17
	20	16	
25-46	40	20	Figure 17
	4	16	
	2	8	
25-61	61	20	Figure 17

NOTE: Figure 8 through Figure 17 show the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.

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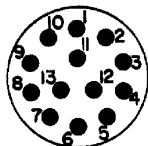
9-35



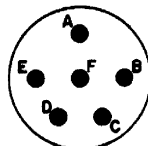
9-98

9-() INSERT CONFIGURATIONS

Figure 8



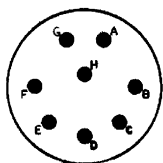
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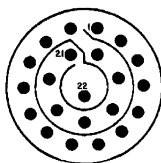
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11-() INSERT CONFIGURATIONS

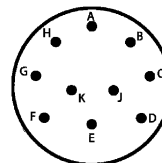
Figure 9



13-8



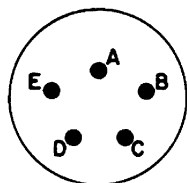
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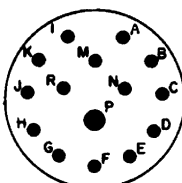
13-98

13-() INSERT CONFIGURATIONS

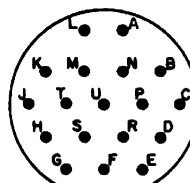
Figure 10



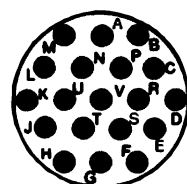
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15-15



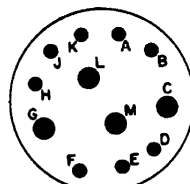
15-18



15-19



15-35



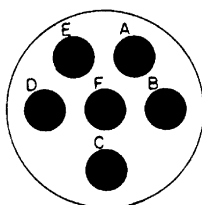
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15-() INSERT CONFIGURATIONS

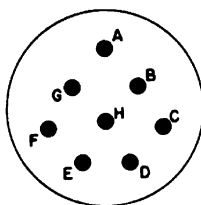
Figure 11

STANDARD WIRING PRACTICES MANUAL

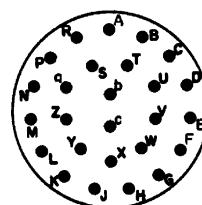
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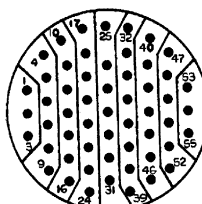
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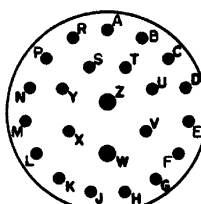
17-8



17-26



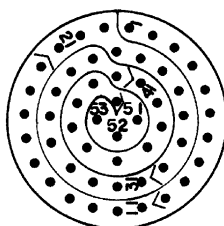
17-35



17-99

17-() INSERT CONFIGURATIONS

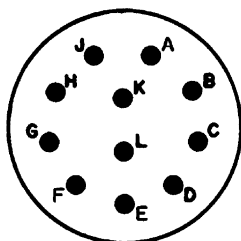
Figure 12



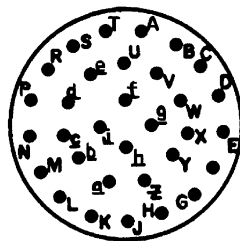
18-53

18-() INSERT CONFIGURATIONS

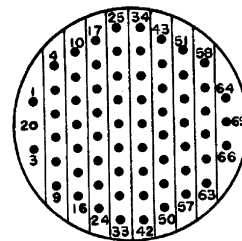
Figure 13



19-11



19-32



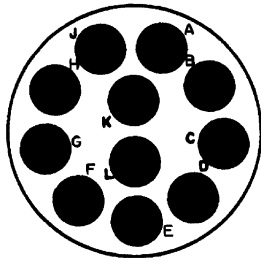
19-35

19-() INSERT CONFIGURATIONS

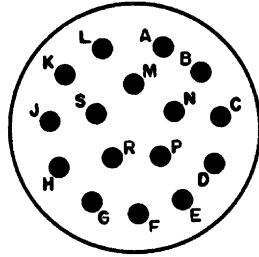
Figure 14

STANDARD WIRING PRACTICES MANUAL

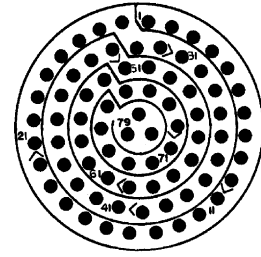
ASSEMBLY OF MIL-C-38999 CONNECTORS



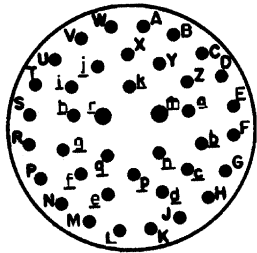
21-11



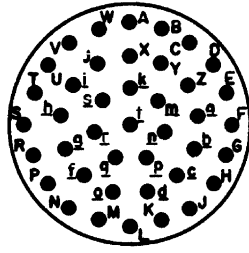
21-16



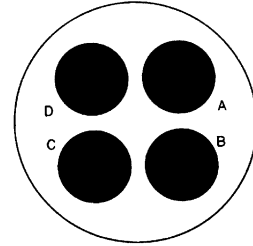
21-35



21-39

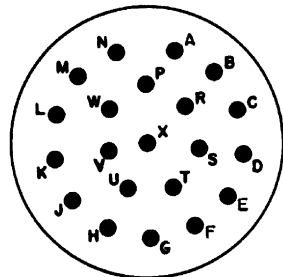


21-41

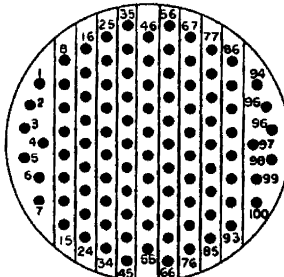


21-75

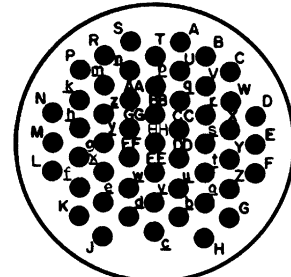
21-) INSERT CONFIGURATIONS
Figure 15



23-21



23-35

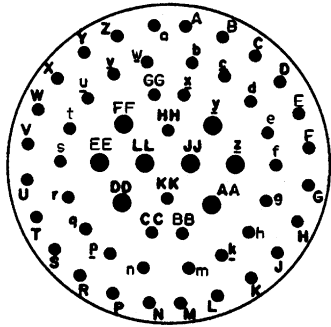


23-53

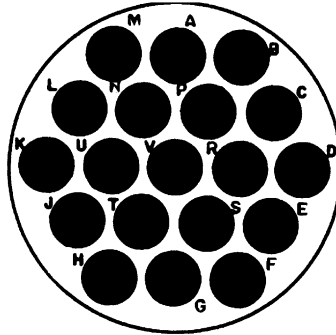
23-) INSERT CONFIGURATIONS
Figure 16

STANDARD WIRING PRACTICES MANUAL

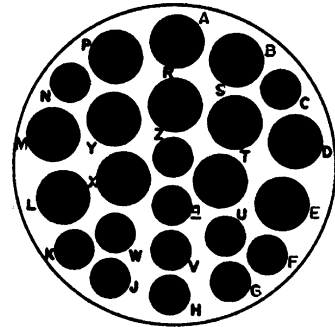
ASSEMBLY OF MIL-C-38999 CONNECTORS



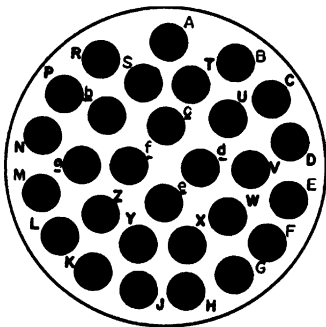
25-4



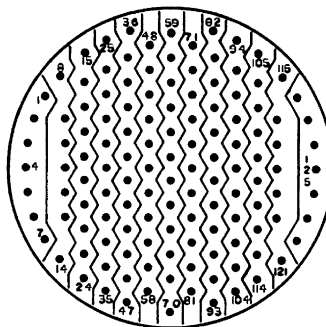
25-19



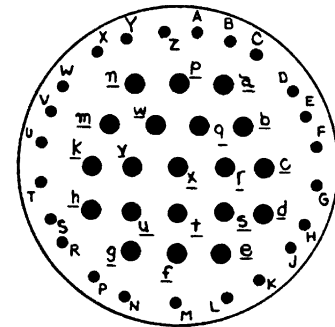
25-24



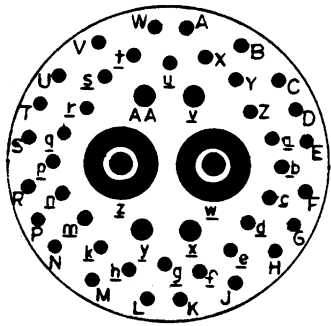
25-29



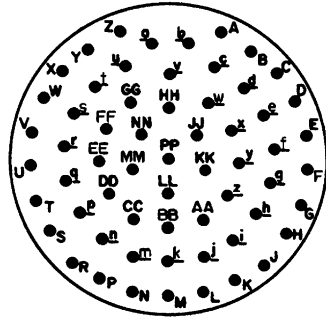
25-35



25-43



25-46



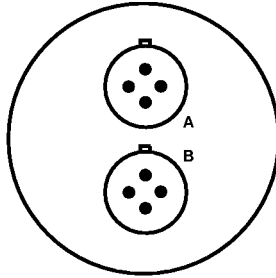
25-61

25-() INSERT CONFIGURATIONS

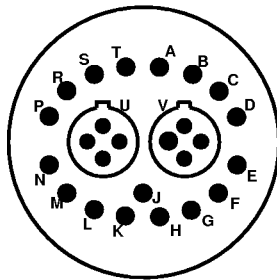
Figure 17

STANDARD WIRING PRACTICES MANUAL

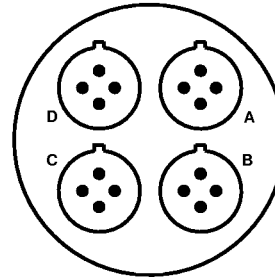
ASSEMBLY OF MIL-C-38999 CONNECTORS



17-82



21-76



21-84

QUADRAX INSERT CONFIGURATIONS
Figure 18

4. CONNECTOR DISASSEMBLY

A. Contact Removal

Table 12
CONTACT REMOVAL TOOLS

Contact Size	Material	Part Number	Color
22M	Metal	11-8675-24	-
		11-8795-24	
		ATBX2052	
		M81969/8-02	
		MS27495R22M	
		RX24-3	
	Plastic	10-296943-23	White
		M81969/14-01	
		MS27509R22M	
		MS27534-22D	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 12 (continued)

Contact Size	Material	Part Number	Color
22D	Metal	11-8675-24	-
		11-8795-24	
		ATBX2052	
		M81969/8-02	
		MS27495R22M	
		RX24-3	
	Plastic	10-296943-23	White
		M81969/14-01	
		MS27509R22M	
		MS27534-22D	
22	Metal	11-8675-22	-
		11-8795-22	
		M81969/8-04	
		MS27495R22	
		RX22-1	
	Plastic	10-296943-22	White
		MS27509R22	
	20	Metal	11-8675-20
11-8795-20			
M81969/8-06			
MS27495R20			
RX20-3			
Plastic		10-296943-20	White
		M81969/14-02	
		MS27509R20	
		MS27534-20	
16		Metal	11-8675-16
	11-8795-16		
	M81969/8-08		
	MS27495R16		
	RX16-9		
	Plastic	M81969/14-03	White
		MS27534-16	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 12 (continued)

Contact Size	Material	Part Number	Color
12	Metal	11-8675-12	-
		11-8795-12	
		M81969/8-10	
		MS27495R12	
		RX12-9	
	Plastic	M81969/14-04	White
		MS27534-12	
8	Metal	M81969/28-03	-

NOTE: For plastic tools, the color given in Table 12 is the color of the removal end of the combination tools that are both insertion and removal tools.

- (1) Make a selection of a contact removal tool from Table 12.

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

- (2) At the rear of the connector, put the removal tool on the wire.
- (3) Axially align the removal tool and the contact cavity.
- (4) Carefully push the removal tool into the rear of the contact cavity until it stops.

CAUTION: DO NOT ROTATE THE TOOL OR SPREAD THE TOOL TIPS WHILE THE TOOL IS STILL IN THE GROMMET.

- (5) Carefully pull the wire and the removal tool from the contact cavity at the same time. Make sure that the removal tool and the contact cavity stay axially aligned.
- (6) If the contact does not release:
 - (a) Pull the removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (2) through Step (5) again.

5. CONNECTOR ASSEMBLY

A. Standard Contact Crimp Tools

**Table 13
CRIMP TOOLS FOR LONG SOCKET CONTACTS**

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
28	22M	M22520/2-01	2	M22520/2-07	-	-
	22D	M22520/2-01	1	M22520/2-07	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 13 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
26	22M	M22520/2-01	3	M22520/2-07	-	-
	22D	M22520/2-01	2	M22520/2-07	-	-
		WA22	2	M22520/2-07	-	-
	22	M22520/2-01	2	M22520/2-07	-	-
24	22M	M22520/2-01	4	M22520/2-07	-	-
	22D	612118	-	613194	-	-
		612916	-	-	Blue	Locator block is Red
		M22520/2-01	3	M22520/2-07	-	-
		WA22	3	M22520/2-07	-	-
		ST2220-10	-	ST2220-10-2	-	-
	22	612118	-	613194	-	-
		612916	-	-	Blue	Locator block is Red
		M22520/2-01	3	M22520/2-07	-	-
		ST2220-10	-	ST2220-10-2	-	-
	20	612916	-	-	Blue	Locator block is Yellow
		M22520/1-01	1	M22520/1-04	-	-
		WA27F	1	M22520/1-04	-	-
		M22520/2-01	4	M22520/2-10	-	-
		WA22	4	M22520/2-10	-	-
		ST2220-1-Y	-	ST2220-1-12	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 13 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
22	22D	612118	-	613194	-	-
		M22520/2-01	4	M22520/2-07	-	-
		WA22	4	M22520/2-07	-	-
		ST2220-10	-	ST2220-10-2	-	-
	22	612118	-	613194	-	-
		612916	-	-	Blue	Locator block is Blue
		M22520/2-01	4	M22520/2-07	-	-
		ST2220-10	-	ST2220-10-2	-	-
	20	11148	-	-	Red	Locator block is Red
		612916	-	-	Yellow	Locator block is Red
		614019	-	-	Red	Locator block is Red
		M22520/1-01	2	M22520/1-04	-	-
		WA27F	2	M22520/1-04	Red	Locator block is Red
		M22520/2-01	5	M22520/2-10	-	-
		WA22	5	M22520/2-10	-	-
		MS3191-1	-	11-7771-31	-	-
		ST2220-1-Y	-	ST2220-1-12	-	-
	16	M22520/1-01	4	M22520/1-04	-	-
		WA27F	4	M22520/1-04	Blue	Locator block is Blue
		MS3191-1	-	11-7771-29	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 13 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions	
		Basic Unit		Locator			
		Part Number	Setting	Part Number	Color		
20	20	11148	-	-	Red	Locator block is Red	
		612916	-	-	Yellow	Locator block is Blue	
		614019	-	-	Red	Locator block is Red	
		M22520/1-01	3	M22520/1-04	-	-	
		WA27F	3	M22520/1-04	Red	Locator block is Red	
		M22520/2-01	6	M22520/2-10	-	-	
		WA22	6	M22520/2-10	-	-	
		MS3191-1	-	11-7771-31	-	-	
		ST2220-1-Y	-	ST2220-1-12	-	-	
	16	11148	-	-	Red	Locator block is Blue	
		614019	-	-	Red	Locator block is Blue	
		M22520/1-01	4	M22520/1-04	-	-	
		WA27F	4	M22520/1-04	Blue	Locator block is Blue	
		MS3191-1	-	11-7771-29	-	-	
		ST2220-1-Y	-	ST2220-1-2	-	-	
	18	16	11148	-	-	Red	Locator block is Blue
			614019	-	-	Red	Locator block is Blue
			M22520/1-01	5	M22520/1-04	-	-
WA27F			5	M22520/1-04	Blue	Locator block is Blue	
MS3191-1			-	11-7771-29	-	-	
ST2220-1-Y			-	ST2220-1-2	-	-	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 13 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
16	16	11148	-	-	Red	Locator block is Blue
		614019	-	-	Red	Locator block is Blue
		M22520/1-01	6	M22520/1-04	-	-
		WA27F	6	M22520/1-04	Blue	Locator block is Blue
		MS3191-1	-	11-7771-29	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-
	12	11148	-	-	Red	Locator block is Yellow
		614019	-	-	Red	Locator block is Yellow
		M22520/1-01	7	M22520/1-04	-	-
		WA27F	7	M22520/1-04	Yellow	Locator block is Yellow
MS3191-1		-	11-7771-43	-	-	
14	12	11148	-	-	Red	Locator block is Yellow
		614019	-	-	Red	Locator block is Yellow
		M22520/1-01	7	M22520/1-04	-	-
		WA27F	7	M22520/1-04	Yellow	Locator block is Yellow
		MS3191-1	-	11-7771-43	-	-
		ST2220-1-Y	-	ST2220-1-3	-	-
12	12	11148	-	-	Red	Locator block is Yellow
		614019	-	-	Red	Locator block is Yellow
		M22520/1-01	8	M22520/1-04	-	-
		WA27F	8	M22520/1-04	Yellow	Locator block is Yellow
		MS3191-1	-	11-7771-43	-	-
		ST2220-1-Y	-	ST2220-1-3	-	-

Table 14
CRIMP TOOLS FOR SHORT SOCKET CONTACTS

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
28	22M	M22520/2-01	2	M22520/2-06	-	-
	22D	M22520/2-01	1	M22520/2-06	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 14 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
26	22M	M22520/2-01	3	M22520/2-06	-	-
	22D	M22520/2-01	2	M22520/2-06	-	-
		WA22	2	M22520/2-06	-	-
	22	M22520/2-01	2	M22520/2-06	-	-
24	22M	M22520/2-01	4	M22520/2-06	-	-
	22D	612118	-	612521	-	-
		612916	-	-	Blue	Locator block is Red
		M22520/2-01	3	M22520/2-06	-	-
		WA22	3	M22520/2-06	-	-
		ST2220-10	-	ST2220-10-1	-	-
	22	612118	-	612521	-	-
		612916	-	-	Blue	Locator block is Red
		M22520/2-01	3	M22520/2-06	-	-
		ST2220-10	-	ST2220-10-1	-	-
	20	612916	-	-	Blue	Locator block is Yellow
		M22520/1-01	1	M22520/1-04	-	-
		WA27F	1	M22520/1-04	-	-
		M22520/2-01	4	M22520/2-10	-	-
		WA22	4	M22520/2-10	-	-
		ST2220-1-Y	-	ST2220-1-12	-	-

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ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 14 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
22	22D	612118	-	612521	-	-
		612916	-	-	Blue	Locator block is Blue
		M22520/2-01	4	M22520/2-06	-	-
		WA22	4	M22520/2-06	-	-
		ST2220-10	-	ST2220-10-1	-	-
	22	612118	-	612521	-	-
		612916	-	-	Blue	Locator block is Blue
		M22520/2-01	4	M22520/2-06	-	-
		ST2220-10	-	ST2220-10-1	-	-
	20	11148	-	-	Red	Locator block is Red
		612916	-	-	Yellow	Locator block is Red
		614019	-	-	Red	Locator block is Red
		M22520/1-01	2	M22520/1-04	-	-
		WA27F	2	M22520/1-04	-	-
		M22520/2-01	5	M22520/2-10	-	-
		WA22	5	M22520/2-10	-	-
		MS3191-1	-	11-7771-31	-	-
		ST2220-1-Y	-	ST2220-1-12	-	-
	16	M22520/1-01	4	M22520/1-04	-	-
		WA27F	4	M22520/1-04	-	-
		MS3191-1	-	11-7771-29	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 14 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
20	20	11148	-	-	Red	Locator block is Red
		612916	-	-	Yellow	Locator block is Blue
		614019	-	-	Red	Locator block is Red
		M22520/1-01	3	M22520/1-04	-	-
		WA27F	3	M22520/1-04	-	-
		M22520/2-01	6	M22520/2-10	-	-
		WA22	6	M22520/2-10	-	-
		MS3191-1	-	11-7771-31	-	-
		ST2220-1-Y	-	ST2220-1-12	-	-
	16	11148	-	-	Red	Locator block is Blue
		614019	-	-	Red	Locator block is Blue
		M22520/1-01	4	M22520/1-04	-	-
		WA27F	4	M22520/1-04	-	-
		MS3191-1	-	11-7771-29	-	-
ST2220-1-Y		-	ST2220-1-2	-	-	
18	16	11148	-	-	Red	Locator block is Blue
		614019	-	-	Red	Locator block is Blue
		M22520/1-01	5	M22520/1-04	-	-
		WA27F	5	M22520/1-04	-	-
		MS3191-1	-	11-7771-29	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-

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ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 14 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
16	16	11148	-	-	Red	Locator block is Blue
		614019	-	-	Red	Locator block is Blue
		M22520/1-01	6	M22520/1-04	-	-
		WA27F	6	M22520/1-04	-	-
		MS3191-1	-	11-7771-29	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-
	12	11148	-	-	Red	Locator block is Yellow
		614019	-	-	Red	Locator block is Yellow
		M22520/1-01	7	M22520/1-04	-	-
		WA27F	7	M22520/1-04	-	-
MS3191-1		-	11-7771-43	-	-	
14	12	11148	-	-	Red	Locator block is Yellow
		614019	-	-	Red	Locator block is Yellow
		M22520/1-01	7	M22520/1-04	-	-
		WA27F	7	M22520/1-04	-	-
		MS3191-1	-	11-7771-43	-	-
		ST2220-1-Y	-	ST2220-1-3	-	-
12	12	11148	-	-	Red	Locator block is Yellow
		614019	-	-	Red	Locator block is Yellow
		M22520/1-01	8	M22520/1-04	-	-
		WA27F	8	M22520/1-04	-	-
		MS3191-1	-	11-7771-43	-	-
		ST2220-1-Y	-	ST2220-1-3	-	-

**Table 15
CRIMP TOOLS FOR PIN CONTACTS**

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
28	22M	M22520/2-01	2	M22520/2-09	-	-
	22D	M22520/2-01	1	M22520/2-09	-	-



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ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 15 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
26	22M	M22520/2-01	3	M22520/2-09	-	-
	22D	M22520/2-01	2	M22520/2-09	-	-
		WA22	2	M22520/2-09	-	-
	22	M22520/2-01	2	M22520/2-09	-	-
24	22M	M22520/2-01	4	M22520/2-09	-	-
	22D	612118	-	613192	-	-
		612916	-	-	Blue	Locator Block is Red
		M22520/2-01	3	M22520/2-09	-	-
		WA22	3	M22520/2-09	-	-
		ST2220-10	-	ST2220-10-1	-	-
	22	612118	-	613192	-	-
		612916	-	-	Blue	Locator Block is Red
		M22520/2-01	3	M22520/2-09	-	-
		ST2220-10	-	ST2220-10-1	-	-
	20	612916	-	-	Blue	Locator Block is Yellow
		M22520/1-01	1	M22520/1-04	-	-
		WA27F	1	M22520/1-04	-	-
		M22520/2-01	4	M22520/2-10	-	-
		WA22	4	M22520/2-10	-	-
		MS3191-1	-	11-7771-30	-	-

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ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 15 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
22	22D	612118	-	613192	-	-
		612916	-	-	Blue	Locator Block is Blue
		M22520/2-01	4	M22520/2-09	-	-
		WA22	4	M22520/2-09	-	-
		ST2220-10	-	ST2220-10-1	-	-
	22	612118	-	613192	-	-
		612916	-	-	Blue	Locator Block is Blue
		M22520/2-01	4	M22520/2-09	-	-
		ST2220-10	-	ST2220-10-1	-	-
	20	11148	-	-	Red	Locator Block is Red
		612916	-	-	Yellow	Locator Block is Red
		614019	-	-	Red	Locator Block is Red
		M22520/1-01	2	M22520/1-04	-	-
		WA27F	2	M22520/1-04	Red	Locator Block is Red
		M22520/2-01	5	M22520/2-10	-	-
		WA22	5	M22520/2-10	-	-
		MS3191-1	-	11-7771-30	-	-
		ST2220-1-Y	-	ST2220-1-12	-	-
	16	M22520/1-01	4	M22520/1-04	-	-
		WA27F	4	M22520/1-04	-	-
		MS3191-1	-	11-7771-28	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-

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Table 15 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
20	20	11148	-	-	Red	Locator Block is Red
		612916	-	-	Yellow	Locator Block is Blue
		614019	-	-	Red	Locator Block is Red
		M22520/1-01	3	M22520/1-04	-	-
		WA27F	3	M22520/1-04	-	-
		M22520/2-01	6	M22520/2-10	-	-
		WA22	6	M22520/2-10	-	-
		MS3191-1	-	11-7771-30	-	-
		ST2220-1-Y	-	ST2220-1-12	-	-
	16	11148	-	-	Red	Locator Block is Blue
		614019	-	-	Red	Locator Block is Blue
		M22520/1-01	4	M22520/1-04	-	-
		WA27F	4	M22520/1-04	-	-
		MS3191-1	-	11-7771-28	-	-
ST2220-1-Y		-	ST2220-1-2	-	-	
18	16	11148	-	-	Red	Locator Block is Blue
		614019	-	-	Red	Locator Block is Blue
		M22520/1-01	5	M22520/1-04	-	-
		WA27F	5	M22520/1-04	-	-
		MS3191-1	-	11-7771-28	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-

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Table 15 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
16	16	11148	-	-	Red	Locator Block is Blue
		614019	-	-	Red	Locator Block is Blue
		M22520/1-01	6	M22520/1-04	-	-
		WA27F	6	M22520/1-04	-	-
		MS3191-1	-	11-7771-28	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-
	12	11148	-	-	Red	Locator Block is Yellow
		614019	-	-	Red	Locator Block is Yellow
		M22520/1-01	7	M22520/1-04	-	-
		WA27F	7	M22520/1-04	-	-
MS3191-1		-	11-7771-43	-	-	
14	12	11148	-	-	Red	Locator Block is Yellow
		614019	-	-	Red	Locator Block is Yellow
		M22520/1-01	7	M22520/1-04	-	-
		WA27F	7	M22520/1-04	-	-
		MS3191-1	-	11-7771-43	-	-
		ST2220-1-Y	-	ST2220-1-3	-	-
12	12	11148	-	-	Red	Locator Block is Yellow
		614019	-	-	Red	Locator Block is Yellow
		M22520/1-01	8	M22520/1-04	-	-
		WA27F	8	M22520/1-04	-	-
		MS3191-1	-	11-7771-43	-	-
		ST2220-1-Y	-	ST2220-1-3	-	-

B. Cable Preparation for Shield Termination in the Connector Insert

Table 16
Cable Jacket Removal Length

Solder Sleeve	Removal Length L (inch)	
	Target	Tolerance
BACS13CT	2.05	0.06

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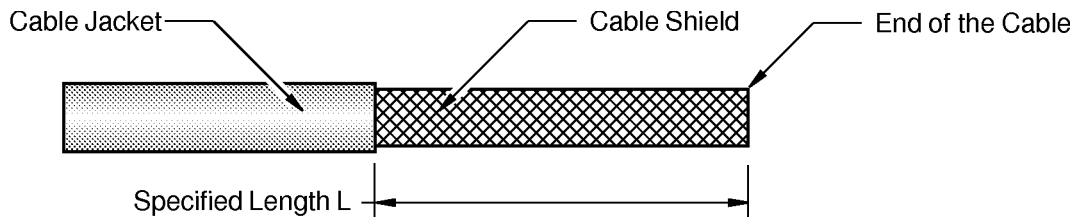
Table 16 (continued)

Solder Sleeve	Removal Length L (inch)	
	Target	Tolerance
BACS13DG	2.05	0.06
D-104	2.15	0.06
D-108	2.22	0.06

(1) Remove the necessary length of the cable jacket from the end of the cable.

Refer to:

- Table 16
- Figure 19
- Subject 20-00-15 for the procedure to remove the cable jacket.



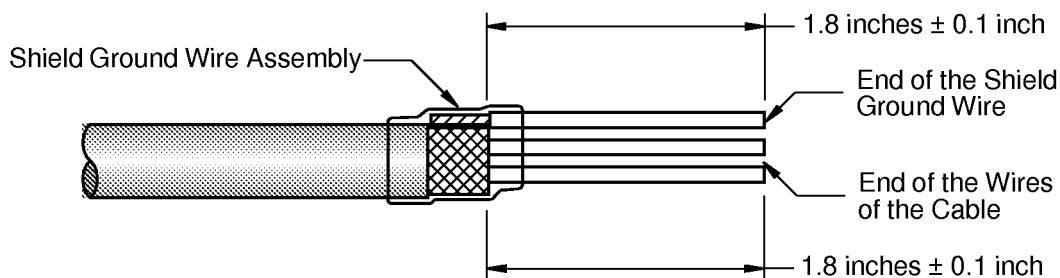
**Cable Jacket Removal
Figure 19**

(2) Assemble the insulated shield ground wire at the end of the cable jacket.

Refer to:

- Figure 20
- Subject 20-10-15 for the procedure to assemble a shield ground wire.

Make sure that the free end of the shield ground wire is pointed forward to the end of the cable.



**Length of the Shield Ground Wire and the Wires of the Cable
Figure 20**

(3) Remove the necessary length from the end of the shield ground wire to make the distance from the end of the shield to the end of the shield ground wire equal to 1.8 inches ± 0.1 inch. Refer to Figure 20.

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- (4) Remove the necessary length from the end of each wire of the cable to make the distance from the end of the shield to the end of the wire equal to 1.8 inches \pm 0.1 inch. Refer to Figure 20.

C. Cable Preparation for Shield Termination - Isolated Shields, Solder Sleeve and Dead End

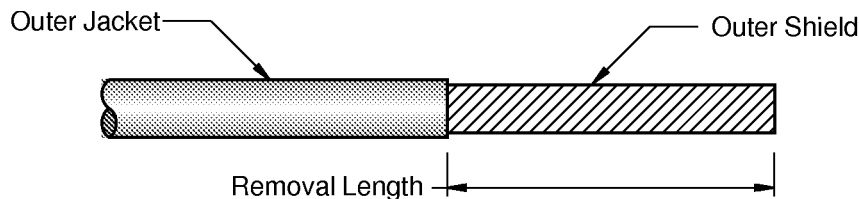
Table 17
Cable Jacket Removal Length

Solder Sleeve	Removal Length L (inch)		
	Target	Minimum	Maximum
BACS13CT	2.55	2.45	2.65
BACS13DG	2.55	2.45	2.65
D-104	2.65	2.55	2.75
D-108	2.72	2.62	2.82

- (1) Remove the necessary length of the cable jacket from the end of the cable.

Refer to:

- Table 17
- Figure 21
- Subject 20-00-15



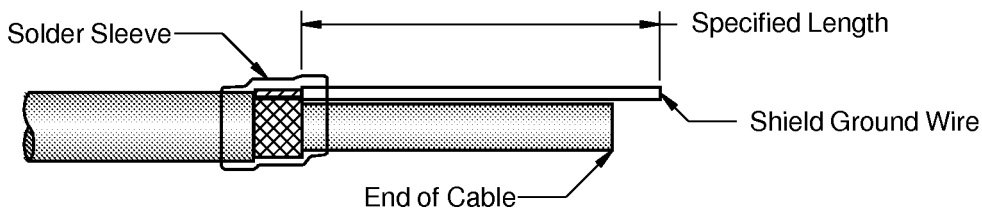
Outer Jacket Removal
Figure 21

- (2) Assemble the insulated shield ground wire at the end of the cable outer jacket.

Refer to:

- Figure 22
- Subject 20-10-15 for the shield ground wire assembly procedures.

Make sure that the free end of the shield ground wire is pointed in the direction that is specified for the shield ground wire connection.



Solder Sleeve Shield Ground Wire of the Outer Shield
Figure 22

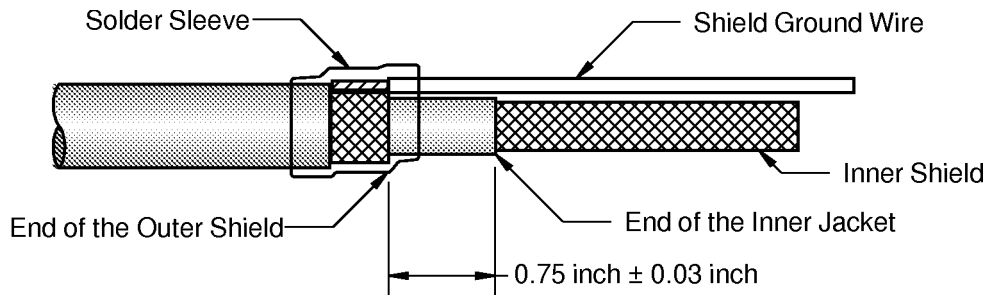
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

- (3) Remove the necessary length of the inner jacket from the end of the cable to make the distance from the end of the outer shield to the end of the inner jacket equal to 0.75 inch \pm 0.03 inch.

Refer to:

- Figure 23.
- Subject 20-00-15 for the cable jacket removal procedures.

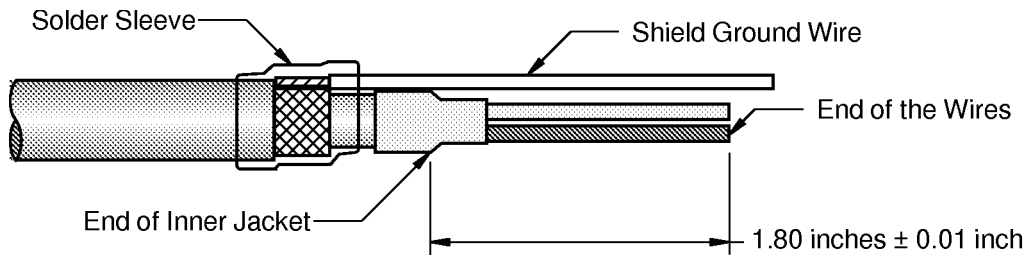


**Inner Jacket Removal
Figure 23**

- (4) Remove the length of the inner shield from the end of the cable to the end of the inner jacket.
 (5) Assemble the shield dead end of the inner shield.

Refer to:

- Figure 24
- Subject 20-10-15 for the procedure to assemble the shield dead end.



**Shield Dead End of the Inner Shield
Figure 24**

- (6) Remove the necessary length from the end of the wires of the cable to make the distance from the end of the inner jacket to the end of the wires equal to 1.8 inches \pm 0.1 inch. Refer to Figure 24.

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D. Standard Contact Assembly

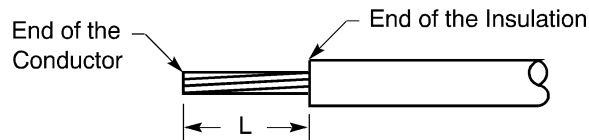
**Table 18
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact Size	Removal Length L (inch)			Special Instructions
		Maximum	Target	Minimum	
28	22	0.17	0.14	0.14	-
26	22	0.17	0.14	0.14	-
24	22	0.17	0.14	0.14	-
	20	0.39	0.36	0.36	Fold the conductor back on itself
22	22	0.17	0.14	0.14	-
	20	0.21	0.18	0.18	-
	16	0.39	0.36	0.36	Fold the conductor back on itself
20	20	0.21	0.18	0.18	-
	16	0.39	0.36	0.36	Fold the conductor back on itself
18	16	0.21	0.18	0.18	-
16	16	0.21	0.18	0.18	-
	12	0.39	0.36	0.36	Fold the conductor back on itself
14	12	0.21	0.18	0.18	-
12	12	0.21	0.18	0.18	-

- (1) Make a selection of a crimp tool from Table 13, Table 14, or Table 15.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 25
- Table 18 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH

Figure 25

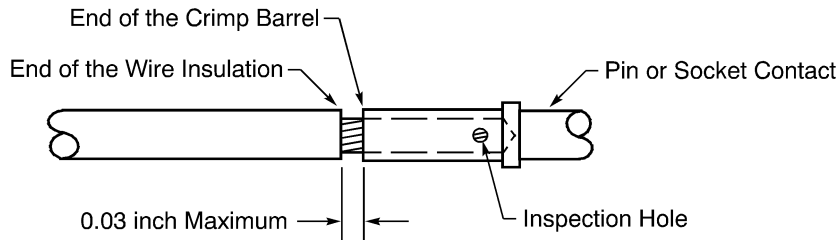
- (3) Measure the O.D. of the wire.
- (4) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.A.
- (5) Put the end of the conductor in the crimp barrel of the contact. Refer to Figure 26.

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Make sure that:

- All the conductor strands are in the crimp barrel
- The conductor strands are visible in the inspection hole of the contact
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE CONDUCTOR IN THE CRIMP BARREL OF THE CONTACT

Figure 26

(6) Crimp the contact.

Make sure that:

- All the conductor strands are in the crimp barrel
- The conductor strands are visible in the inspection hole of the contact
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

E. Assembly of a Contact with Oversize Wire

This procedure is applicable if the outside diameter of the wire insulation is larger than the maximum wire O.D. specified in Table 19.

**Table 19
MAXIMUM WIRE OUTSIDE DIAMETER**

Connector	Description	Contact Cavity Size	Maximum Wire O.D. (inch)
MIL-C-3899	Rear release, rear removal contacts	22M	0.050
		22D	0.054
		22	0.060
		20	0.083
		16	0.109
		12	0.142

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**Table 20
NECESSARY MATERIALS**

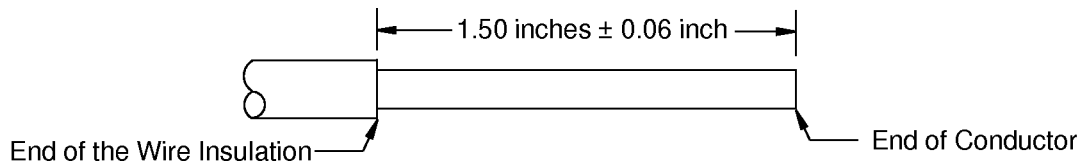
Material	Part Number	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12 Class 5	An available source
	RT850	Raychem
	RW175	
	TFE 4X	Chemplast
		Zeus

(1) Make a selection of a 1.75 inch \pm 0.06 inch length of heat shrinkable sleeve from Table 20.

NOTE: An equivalent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

Make sure that the sleeve has the smallest diameter that can move easily on the wire.

(2) Remove 1.50 inch \pm 0.06 inch length of insulation from the end of the wire. Refer to Figure 27.



**INSULATION REMOVAL LENGTH
Figure 27**

(3) Put the sleeve on the wire.

(4) Put the conductor into the crimp barrel of the contact.

Make sure that:

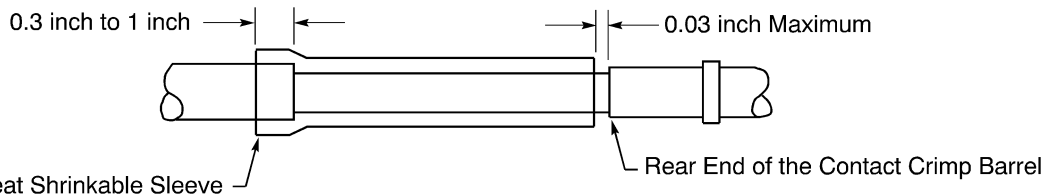
- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact.

(5) Crimp the contact.

(6) Align the sleeve. Refer to Figure 28.

Make sure that:

- The sleeve makes a 0.3 inch to 1 inch overlap with the wire insulation
- The distance from the forward end of the sleeve to the rear end of the contact crimp barrel is not more than 0.03 inch.

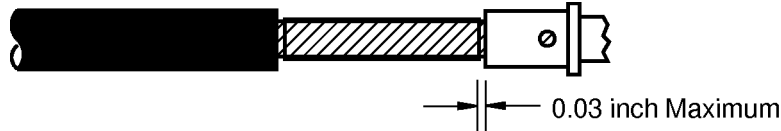


**POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 28**

STANDARD WIRING PRACTICES MANUAL

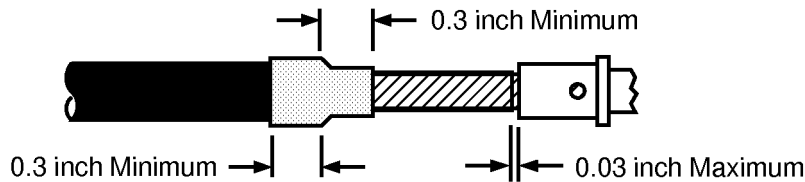
ASSEMBLY OF MIL-C-38999 CONNECTORS

- (7) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (8) Install two separate sleeves if a single sleeve will not shrink tightly against both the wire and the insulation of the wire.
 - (a) Push the inner sleeve forward until the forward end of the sleeve is 0.03 inch or less from the crimp barrel. Refer to Figure 29.



POSITION OF THE INNER HEAT SHRINKABLE SLEEVE
Figure 29

- (b) Shrink the sleeve into its position. Refer to .
Make sure that the distance between the forward end of the sleeve and the crimp barrel is not more than 0.03 inch.
- (c) Push the outer sleeve forward until the forward end of the sleeve extends 0.3 inch minimum from the end of the wire insulation. Refer to Figure 30 .



POSITION OF THE OUTER HEAT SHRINKABLE SLEEVE
Figure 30

- (9) Shrink the sleeve into its position. Refer to Subject 20-10-14
Make sure that:
 - The forward end of the outer sleeve extends 0.3 inch minimum from the end of the insulation of the wire.
 - The outer sleeve makes an overlap of 0.3 inch or more with the insulation of the wire.

F. Quadrax Contact Assembly

Table 21
QUADRAX CONTACT INNER CONTACT CRIMP TOOLS

Quadrax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	Part Number
BACC47GM1	M22520/2-01	5	K709
BACC47GN1	M22520/2-01	5	K709

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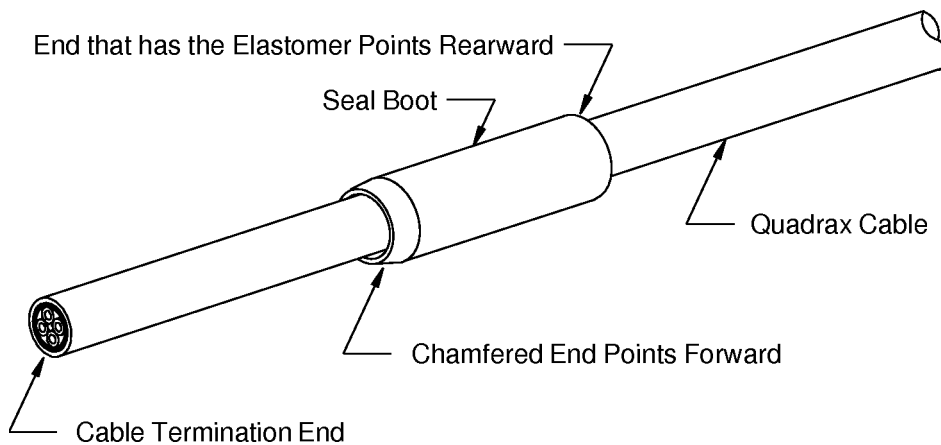
ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 22
QUADRAX CONTACT OUTER CONTACT CRIMP TOOLS

Quadrax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACC47GM1	M22520/5-01	M22520/5-45	B
BACC47GN1	M22520/5-01	M22520/5-45	B

- (1) Make a selection of an inner contact crimp tool from Table 21.
- (2) Make a selection of an outer contact crimp tool from Table 22.
- (3) Cut the cable perpendicular to its longitudinal axis.
- (4) Put the seal boot on the cable. Refer to Figure 31.

Make sure that the end of the seal boot that has the elastomer seal points rearward, away from the end of the cable.

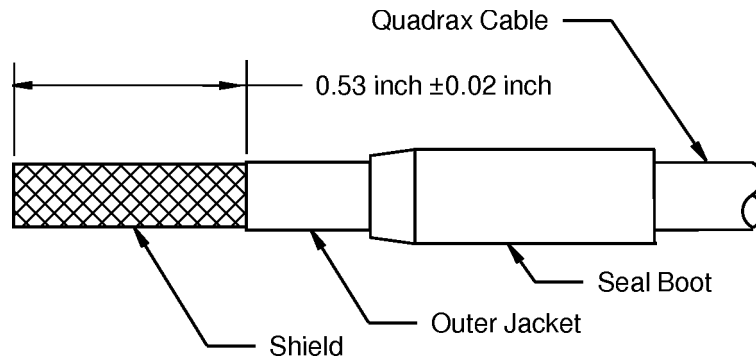


THE SEAL BOOT ON THE CABLE
Figure 31

- (5) Move the seal boot away from the end of the cable.
- (6) Remove 0.53 inch \pm 0.02 inch of the outer jacket from the end of the cable. Refer to Figure 32.

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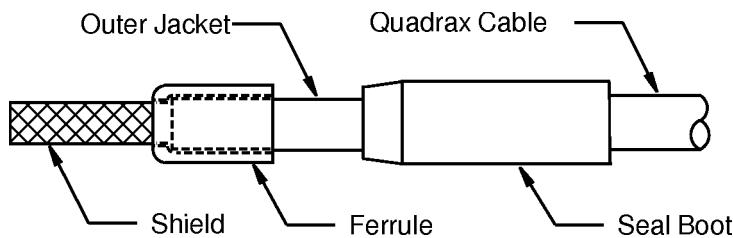


OUTER JACKET TRIM DIMENSIONS

Figure 32

- (7) Put the ferrule on the cable. Refer to Figure 33.

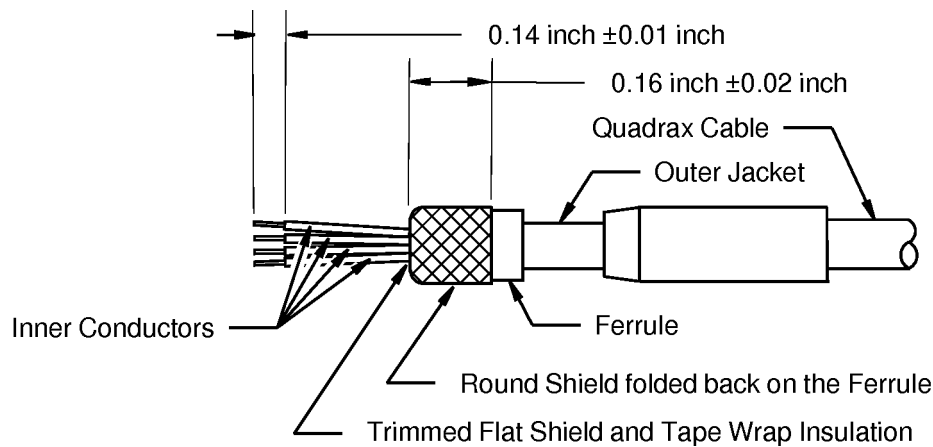
Make sure that the end of the ferrule that has the smaller diameter is pointed forward toward the end of the cable.



POSITION OF THE FERRULE ON THE CABLE

Figure 33

- (8) Push the ferrule rearward until it is against the end of the outer jacket. Refer to Figure 33.
- (9) Fold the outer round shield back on the ferrule. Refer to Figure 34.



INNER CONDUCTOR INSULATION REMOVAL DIMENSIONS AND SHIELD PREPARATION

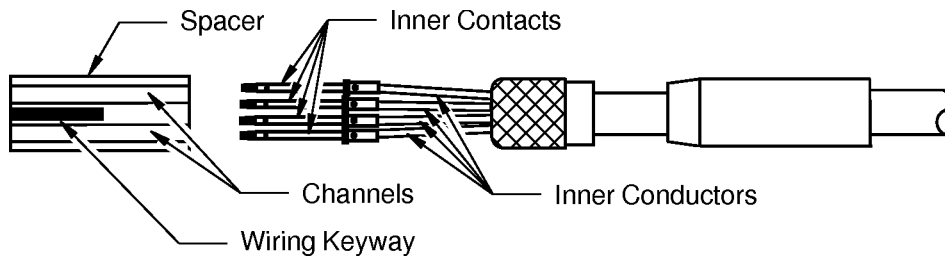
Figure 34

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF MIL-C-38999 CONNECTORS**

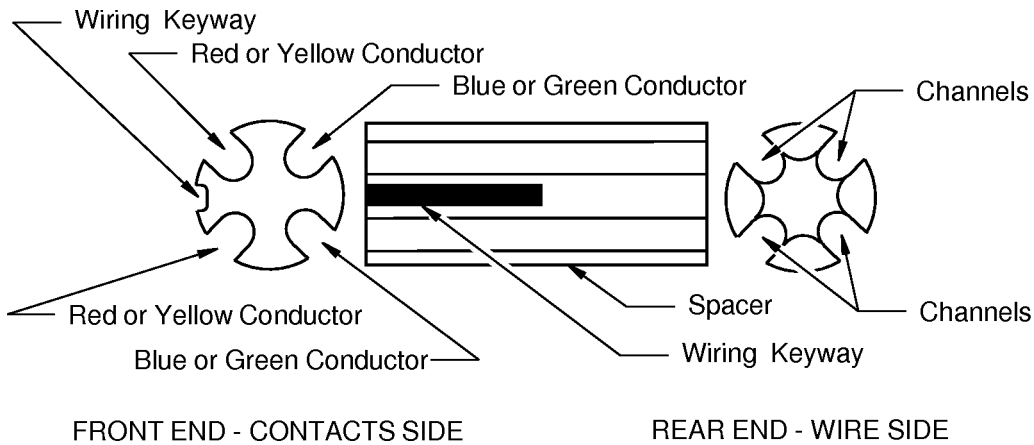
- (10) Remove the necessary length of the outer round shield.
Make sure that the length of the round shield folded back is 0.16 inch \pm 0.02 inch. Refer to Figure 34.
- (11) Remove the necessary length of:
- The inner flat shield
 - The cable fillers
 - The tape wrap insulation.
- Make sure that the ends of the flat shield, the fillers, and the tape wrap are all approximately aligned with the front end of the ferrule.
- (12) Move the four inner conductors apart.
Make sure that:
- The inner conductors do not cross each other
 - The initial positions of the inner conductors in the cable is not changed.
- (13) Remove the necessary length of the fillers of the cable.
Make sure that the ends of the filler rods are approximately aligned with the front end of the ferrule.
- (14) Remove 0.14 inch \pm 0.02 inch of insulation from each of the four inner conductors.
Refer to:
- Refer to Figure 34.
 - Subject 20-00-15 for the procedure to remove the wire insulation.
- (15) Crimp an inner contact on each of the four inner conductors.
Make sure that:
- The distance between the wire insulation and the end of each inner contact crimp barrel is 0.02 inch maximum
 - The wire insulation is not in the crimp barrel
 - The conductor strands can be seen in the inspection hole
 - All conductor strands are in the crimp barrel
 - The conductor strands do not go out of the inspection hole
 - The plating of each inner contact is not removed
 - The inner contacts have no cracks.
- (16) Put the inner conductors into the channels of the spacer. Refer to Figures 35, 36, and 37.
Make sure that:
- The red conductor and the yellow conductor are adjacent to the wiring keyway of the spacer. Refer to Figure 36
 - The shoulders of the contacts are against the front of the spacer. Refer to Figure 37
 - The position of the conductors in the spacer is the same as the position of the conductors in the cable
 - The conductors do not cross each other.

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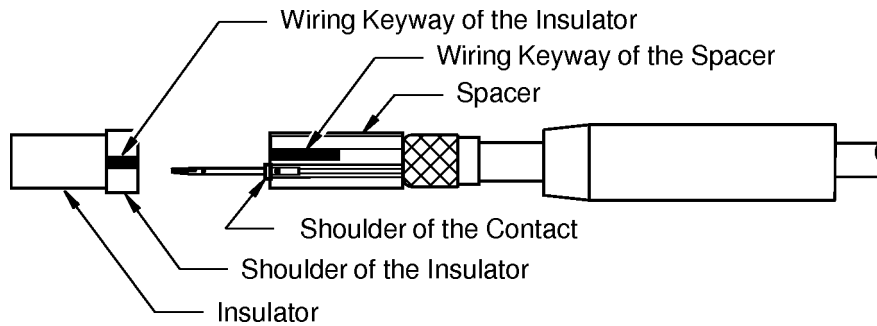
ASSEMBLY OF MIL-C-38999 CONNECTORS



INSTALLATION OF THE INNER CONDUCTORS IN THE SPACER CHANNELS
Figure 35



POSITION OF THE INNER CONDUCTORS IN THE SPACER
Figure 36



POSITION OF THE INNER CONTACTS ON THE SPACER
Figure 37

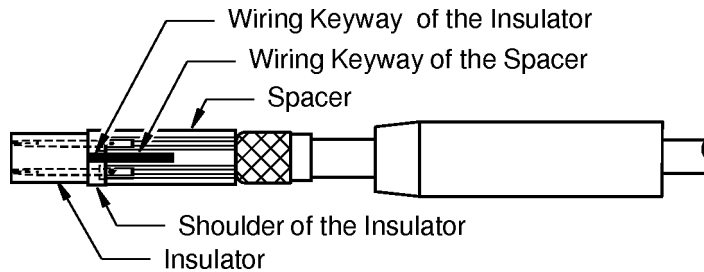
- (17) Align the insulator and the spacer. Refer to figure 38.
 Make sure that the keyway of the insulator and the keyway of the spacer are aligned.
- (18) Install the insulator on the inner contacts. Refer to Figure 38.

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Make sure that:

- The shoulders of the contacts are against the spacer
- The insulator is against the spacer
- The keyway of the insulator and the keyway of the spacer are aligned.



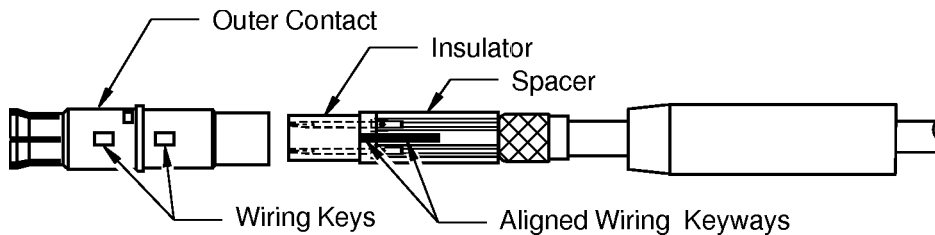
POSITION OF THE INSULATOR AND THE SPACER

Figure 38

- (19) Align the wiring key of the outer contact and the wiring keyways of the insulator and spacer. Refer to Figure 39.
- (20) Push the insulator assembly into the outer contact until it stops. Refer to Figure 39.

Make sure that:

- The wiring key of the outer contact and the wiring keyways of the insulator and spacer are aligned
- The rear of the insulator is against the shield that is folded back on the ferrule
- The distance from the rear edge of the outer contact to the shoulder of the ferrule is not more than 0.02 inch
- The distance from the rear end of the ferrule to the end of the cable jacket is not more than 0.02 inch.



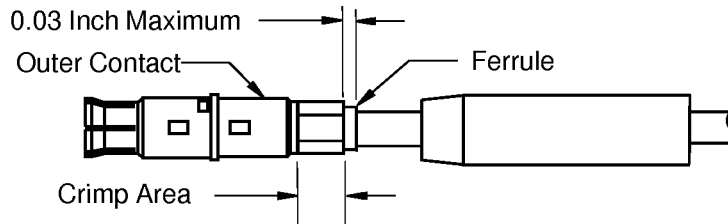
ALIGNMENT OF THE OUTER CONTACT AND THE INSULATOR AND SPACER

Figure 39

- (21) Crimp the outer contact. Refer to Figure 40.

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QUADRAX CONTACT ASSEMBLY

Figure 40

(22) Remove all of the strands of the shield that extend beyond the rear edge of the outer contact.

G. Contact Insertion

**Table 23
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool		
	Material	Part Number	Color
22M	Metal	11-8674-24	Black
		11-8794-24	
		M81969/8-01	
		MS27495A22M	
		RTM24-3	
	Plastic	10-296940-23	Black
		M81969/14-01	Green
		MS27509A22M	Black
MS27534-22D		Green	
22D	Metal	11-8674-24	Black
		11-8794-24	
		M81969/8-01	
		MS27495A22M	
		RTM24-3	
	Plastic	10-296940-23	Black
		M81969/14-01	Green
		MS27509A22M	Black
MS27534-22D		Green	

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Table 23 (continued)

Contact Size	Insertion Tool		
	Material	Part Number	Color
22	Metal	11-8674-22	Brown
		11-8794-22	
		M81969/8-03	
		MS27495A22	
		RTM22-1	
	Plastic	10-296940-22	Brown
MS27509A22			
20	Metal	11-8674-20	Red
		11-8794-20	
		M81969/8-05	
		MS27495A20	
		RTM20-17	
	Plastic	10-296940-20	Red
		M81969/14-02	
		MS27509A20	
		MS27534-20	
16	Metal	11-8674-16	Blue
		11-8794-16	
		M81969/8-07	
		MS27495A16	
		RX16-4	
	Plastic	M81969/14-03	Blue
		MS27534-16	
12	Metal	11-8674-12	Yellow
		11-8794-12	
		M81969/8-09	
		MS27495A12	
		RX12-8	
	Plastic	M81969/14-04	Yellow
		MS27534-12	

NOTE: For metal tools, the color given in Table 23 is the color code on the handle of the tool.

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ASSEMBLY OF MIL-C-38999 CONNECTORS

NOTE: For plastic tools, the color given in Table 23 is the color of the insertion end of the combination tools that are both insertion and removal tools.

- (1) Make a selection of an insertion tool from Table 23.

CAUTION: DO NOT USE DAMAGED TOOLS.

NOTE: Contacts with AWG 20 or larger wire can be inserted by hand.

- (2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

- (3) Put the contact assembly in the insertion tool.
- (4) Axially align the insertion tool and the contact cavity at the rear of the connector.
- (5) Carefully push the contact assembly into the contact cavity until it stops.
Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the tool out of the contact cavity.
Make sure that the tool and the contact cavity stay axially aligned.
- (7) Lightly pull the wire to make sure that the contact is locked in the connector.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (3) through Step (7) again.

H. Quadrax Contact Insertion

**Table 24
LUBRICANTS**

Lubricant	Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

- (1) At the rear of the connector, align the contact polarization key and the keyway of the quadrax contact cavity.

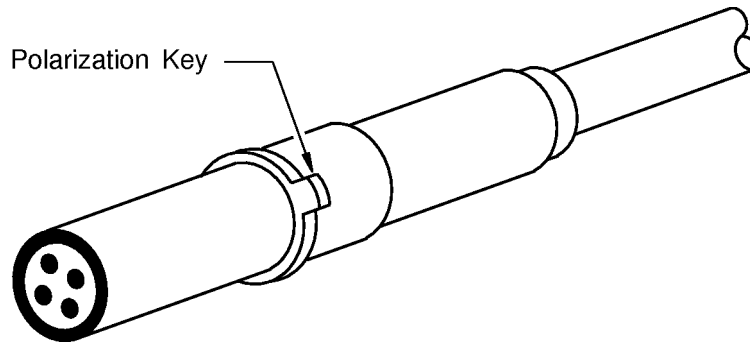
Make sure that the longitudinal axis of the contact assembly is perpendicular to the rear face of the connector.

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ASSEMBLY OF MIL-C-38999 CONNECTORS

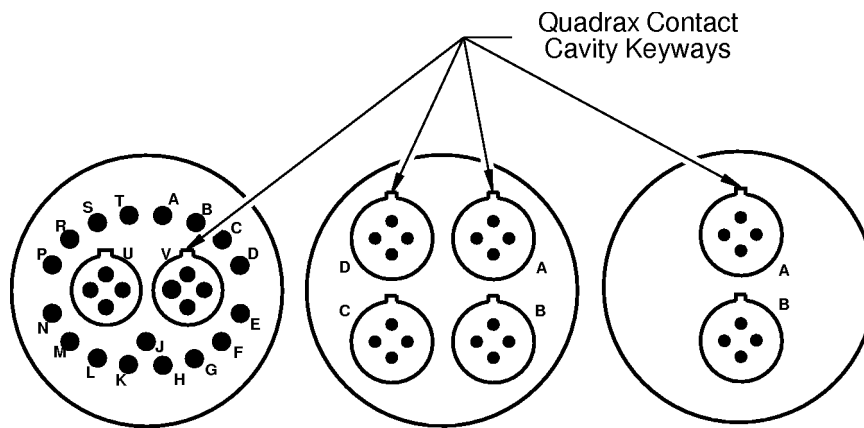
Refer to:

- Figure 41 for the polarization key of the quadrax contact
- Figure 42 for the keyway of the quadrax contact cavity.



POLARIZATION KEY OF THE QUADRAX CONTACT

Figure 41



QUADRAX CONTACT CAVITY KEYWAY

Figure 42

- (2) Push the contact into the contact cavity until the contact stops and is locked.

NOTE: A lubricant can be used to make it easier to push the contact into the contact cavity. Refer to Table 24

- (3) Align the seal boot key with the contact cavity keyway. Refer to Figure 42.
- (4) Push the seal boot into the contact cavity.

Make sure that the rear edge of the seal boot key is aligned with the rear face of the connector.

NOTE: A lubricant can be used to make it easier to push the seal boot into the contact cavity. Refer to Table 24.

- (5) Lightly pull on the cable.

Make sure that the contact is locked in the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (6) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (2) through Step (5) again.

I. Spare Contact and Seal Plug Installation

- (1) Install unwired contacts and seal plugs in all unused contact cavities. Refer to Subject 20-60-08.

6. APPROVED TOOL SUPPLIERS

A. Contact Crimp Tool Suppliers

**Table 25
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11-7771-28	Bendix
11-7771-29	Bendix
11-7771-30	Bendix
11-7771-31	Bendix
11-7771-43	Bendix
11148	Buchanan
612118	Buchanan
612521	Buchanan
612916	Buchanan
613192	Buchanan
613194	Buchanan
614019	Buchanan
K709	Daniels
M22520/1-01	QPL
M22520/1-04	QPL
M22520/2-01	QPL
M22520/2-06	QPL
M22520/2-07	QPL
M22520/2-09	QPL
M22520/2-10	QPL
M22520/5-01	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 25 (continued)

Crimp Tool	Supplier
M22520/5-45	QPL
MS3191-1	QPL
ST2220-1-12	Boeing
ST2220-1-2	Boeing
ST2220-1-3	Boeing
ST2220-1-Y	Boeing
ST2220-10	Boeing
ST2220-10-1	Boeing
ST2220-10-2	Boeing

B. Removal Tool Suppliers

**Table 26
REMOVAL TOOL SUPPLIERS**

Removal Tools	Suppliers
10-296943-20	Bendix
10-296943-22	Bendix
10-296943-23	Bendix
11-8675-12	Bendix
11-8675-16	Bendix
11-8675-20	Bendix
11-8675-22	Bendix
11-8675-24	Bendix
11-8795-12	Bendix
11-8795-16	Bendix
11-8795-20	Bendix
11-8795-22	Bendix
11-8795-24	Bendix
ATBX2052	Astro
M81969/14-01	QPL
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 26 (continued)

Removal Tools	Suppliers
M81969/8-02	QPL
M81969/8-04	QPL
M81969/8-06	QPL
M81969/8-08	QPL
M81969/8-10	QPL
M81969/28-03	QPL
MS27495R12	QPL
MS27495R16	QPL
MS27495R20	QPL
MS27495R22	QPL
MS27495R22M	QPL
MS27509R20	QPL
MS27509R22	QPL
MS27509R22M	QPL
MS27534-12	QPL
MS27534-16	QPL
MS27534-20	QPL
MS27534-22D	QPL
RX12-9	Burndy
RX16-9	Burndy
RX20-3	Burndy
RX22-1	Burndy
RX24-3	Burndy

C. Insertion Tool Suppliers

Table 27
INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
10-296940-20	Bendix
10-296940-22	Bendix
10-296940-23	Bendix
11-8674-12	Bendix

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ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 27 (continued)

Insertion Tool	Supplier
11-8674-16	Bendix
11-8674-20	Bendix
11-8674-22	Bendix
11-8674-24	Bendix
11-8794-12	Bendix
11-8794-16	Bendix
11-8794-20	Bendix
11-8794-22	Bendix
11-8794-24	Bendix
M81969/14-01	QPL
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M81969/8-01	QPL
M81969/8-03	QPL
M81969/8-05	QPL
M81969/8-07	QPL
M81969/8-09	QPL
MS27495A12	QPL
MS27495A16	QPL
MS27495A20	QPL
MS27495A22	QPL
MS27495A22M	QPL
MS27509A20	QPL
MS27509A22	QPL
MS27509A22M	QPL
MS27534-12	QPL
MS27534-16	QPL
MS27534-20	QPL
MS27534-22D	QPL
RTM20-17	Burndy
RTM22-1	Burndy
RTM24-3	Burndy

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ASSEMBLY OF MIL-C-38999 CONNECTORS

Table 27 (continued)

Insertion Tool	Supplier
RX12-8	Burndy
RX16-4	Burndy

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STANDARD WIRING PRACTICES MANUAL

CORY CTZ623-6CH MODULAR JACK ASSEMBLY

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1.	<u>PART NUMBERS AND DESCRIPTION</u>	1
	A. Connector Part Numbers	1
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2.	<u>CONNECTOR DISASSEMBLY</u>	1
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STANDARD WIRING PRACTICES MANUAL

CORY CTZ623-6CH MODULAR JACK ASSEMBLY

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Supplier
CTZ623-6CH	Cory

B. Contact Part Numbers

Table 2
CONTACT PART NUMBERS

Part Number	Supplier
M39029/22-191	QPL

C. Necessary Materials

Table 3
NECESSARY MATERIALS

Description	Part Number	Supplier
Grommet	8507	Component Products
Tape	70	Scotch
Tie Strap, Plastic	BACS38K-4	Boeing

2. CONNECTOR DISASSEMBLY

A. Strain Relief Removal

CAUTION: DO NOT CAUSE ANY DAMAGE TO THE WIRES. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (1) Disconnect the plug from the receptacle.
- (2) If necessary, remove the modular jack assembly from the structure or panel.
Make sure to keep the installation hardware.
- (3) Remove the two plastic tie straps. Refer to Figure 1.
- (4) Remove the grommet or layers of tape.

B. Contact Removal

Table 4
CONTACT REMOVAL TOOLS

Part Number	Color	Supplier
M81969/14-01	White	QPL

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STANDARD WIRING PRACTICES MANUAL

CORY CTZ623-6CH MODULAR JACK ASSEMBLY

- (1) Make a selection of a removal tool from Table 4.
- (2) Remove each contact from the modular jack.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 5
CONTACT CRIMP TOOLS**

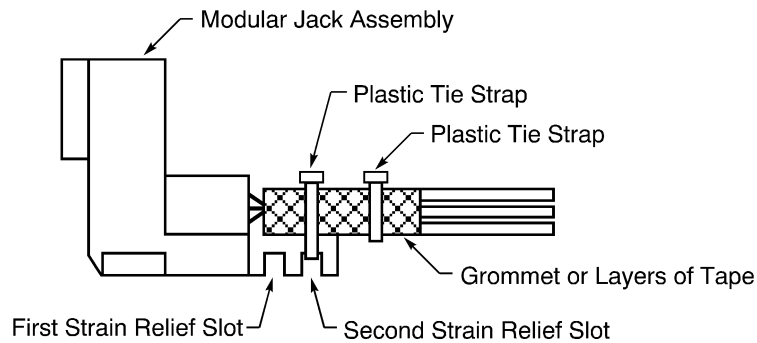
Wire Size (AWG)	Crimp Tool				
	Basic Unit			Locator	
	Part Number	Setting	Supplier	Part Number	Supplier
24	M22520/7-01	3	QPL	M22520/7-11	QPL
22	M22520/7-01	4	QPL	M22520/7-11	QPL

- (1) Make a selection of a crimp tool from Table 5.
- (2) Remove 0.17 inch \pm 0.03 inch of insulation from the end of the wire.
- (3) Crimp the contact.

B. Connector Assembly

**Table 6
CONTACT INSERTION TOOLS**

Part Number	Color	Supplier
M81969/14-01	Green	QPL



**MODULAR JACK ASSEMBLY
Figure 1**

Refer to Figure 1.

- (1) Make a selection of an insertion tool from Table 6.
- (2) Make a selection of a plastic strap from Table 3.

NOTE: Two straps are necessary for each modular jack assembly.



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CORY CTZ623-6CH MODULAR JACK ASSEMBLY

- (3) Make a selection of one of these wire protection materials from Table 3:
 - A grommet
 - A tape.
- (4) If the wire protection is a grommet:
 - (a) Put the grommet on the wires.
 - (b) Insert each contact into the correct contact cavity.
 - (c) Align the forward end of the grommet with the first slot.
 - (d) Install a tie strap around the grommet and in the second slot of the strain relief arm.
 - (e) Install the other tie strap around the grommet near the rear end of the grommet.
- (5) If the wire protection is tape:
 - (a) Insert each contact into the correct contact cavity.
 - (b) Put 2 layers of tape on the wires.

Make sure to align the forward end of the tape with the first slot of the strain relief arm.
 - (c) Install a tie strap around the tape and in the second slot of the strain relief arm.
 - (d) Install the other tie strap around the tape near the rear end of the tape.

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STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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	A. Connector Part Numbers	1
	B. Connector Configurations	2
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STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

This subject gives these procedures to:

- Assemble and disassemble the XLR-() and AXR-() connectors
- Connect and disconnect the XLR-() and AXR-() connectors
- Install the XLR-() and AXR-() connectors.

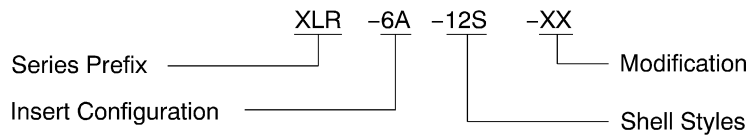
1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

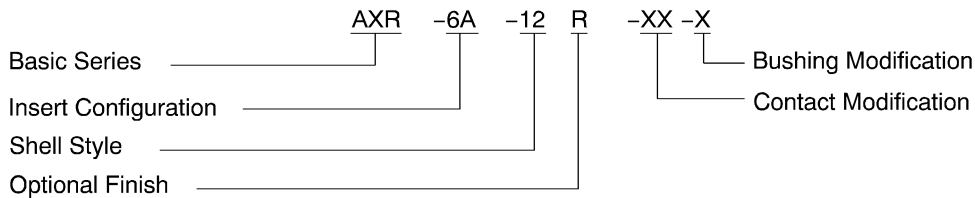
NOTE: The AXR-() and XLR-() connectors are interchangeable. The AXR-() is obsolete and was replaced by the XLR-() in 1992.

**Table 1
AUDIO CONNECTOR PART NUMBERS**

Part Number	Supplier
XLR-()	ITT Cannon
AXR-()	ITT Cannon



**XLR-() CONNECTOR PART NUMBER STRUCTURE
Figure 1**

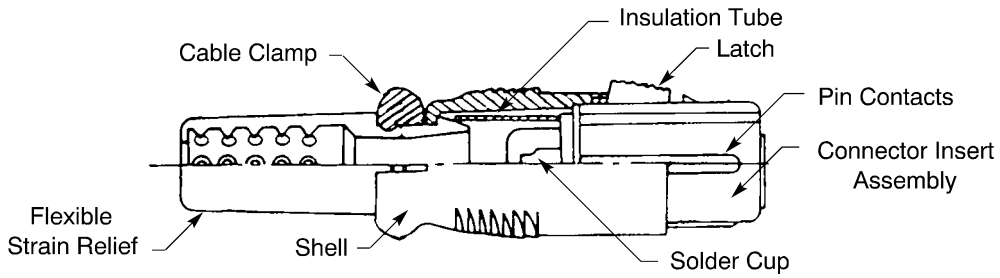


**ITT CANNON AXR-() CONNECTOR PART NUMBER STRUCTURE
Figure 2**

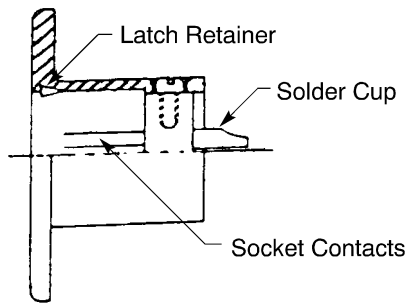
STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

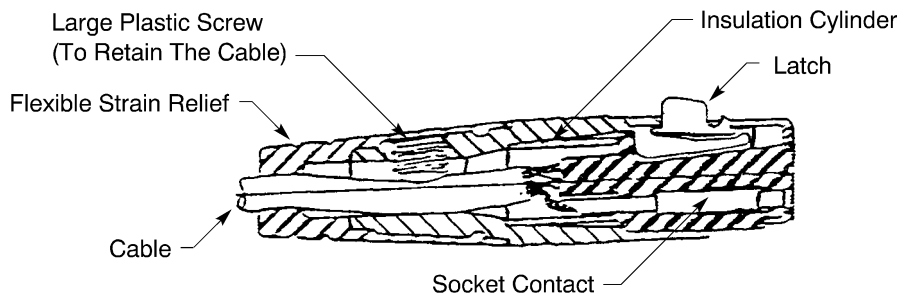
B. Connector Configurations



ITT CANNON XLR-() CONNECTOR PLUG
Figure 3



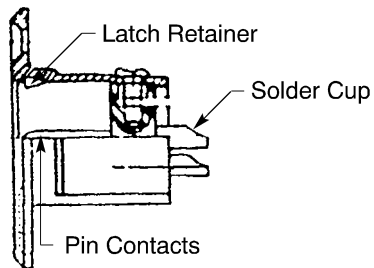
ITT CANNON XLR-() CONNECTOR RECEPTACLE
Figure 4



ITT CANNON AXR-() CONNECTOR PLUG
Figure 5

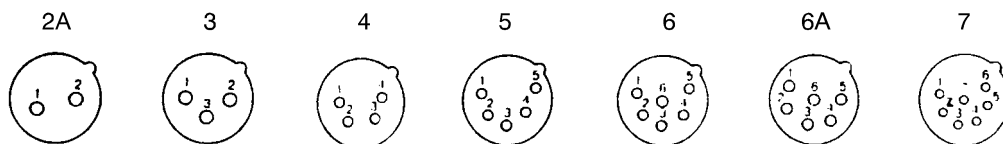
STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

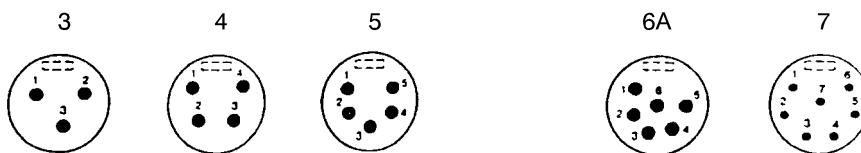


ITT CANNON AXR-() CONNECTOR RECEPTACLE
Figure 6

C. Connector Insert Configurations



XLR-() CONNECTOR INSERT CONFIGURATIONS
Figure 7



AXR-() CONNECTOR INSERT CONFIGURATIONS
Figure 8

STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

D. Connector Interchangeability

**Table 2
INTERCHANGEABLE CONNECTORS**

Insert Configuration	Interchangeable Connectors	
	Obsolete Part Number	Part Number
3	AXR-3-12R	XLR-3-12C
	AXR-3-13	XLR-3-13
	AXR-3-14	XLR-3-14
	AXR-3-31	XLR-3-31
	AXR-3-31-F77	XLR-3-31-F77
	AXR-3-32	XLR-3-32
	AXR-3-32-F77	XLR-3-32-F77
	AXR-3-32AU	XLR-3-32-A176
	AXR-II-3-11R	XLR-3-11C
	AXR-II-3-12R	XLR-3-12C
4	AXR-4-11	XLR-4-11C
	AXR-4-11R	XLR-4-11C
	AXR-4-12	XLR-4-12C
	AXR-4-12R	XLR-4-12C
	AXR-4-12R	XLR-4-12C
	AXR-4-13	XLR-4-13
	AXR-4-14	XLR-4-14
	AXR-4-31	XLR-4-31
	AXR-4-32	XLR-4-32
5	AXR-5-11	XLR-5-11C
	AXR-5-11R	XLR-5-11C
	AXR-5-12R	XLR-5-12C
	AXR-5-13	XLR-5-13
	AXR-5-14R	XLR-5-14
	AXR-5-31	XLR-5-31
	AXR-5-32	XLR-5-32
6A	AXR-6A-11	XLR-6A-11C
	AXR-6A-31	XLR-6A-31
	AXR-6A-31AU	XLR-6A-31-A176
	AXR-6A-32	XLR-6A-32

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STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

Table 2 (continued)

Insert Configuration	Interchangeable Connectors	
	Obsolete Part Number	Part Number
7	AXR-7-11	XLR-7-11C
	AXR-7-12R	XLR-7-12C
	AXR-7-14B	XLR-7-12C
	AXR-7-31	XLR-7-31
	AXR-7-32	XLR-7-32
	AXR-7-32B	XLR-7-32

2. CONNECTOR DISASSEMBLY

A. Connector Separation

(1) If the plug has a latch:

- (a) Push down on the latch until it disengages from the latch retainer of the receptacle.
- (b) Continue to push on the latch, hold the plug by the shell, and pull the plug away from the receptacle in a direction perpendicular to the receptacle.

CAUTION: DO NOT HOLD THE PLUG AT THE FLEXIBLE STRAIN RELIEF OR HOLD THE CABLE WHEN THE CONNECTOR IS PULLED AWAY FROM THE RECEPTACLE. THE CONNECTION BETWEEN THE CABLE AND THE CONTACTS IN THE PLUG WILL BE DAMAGED.

(2) If the receptacle has a latch:

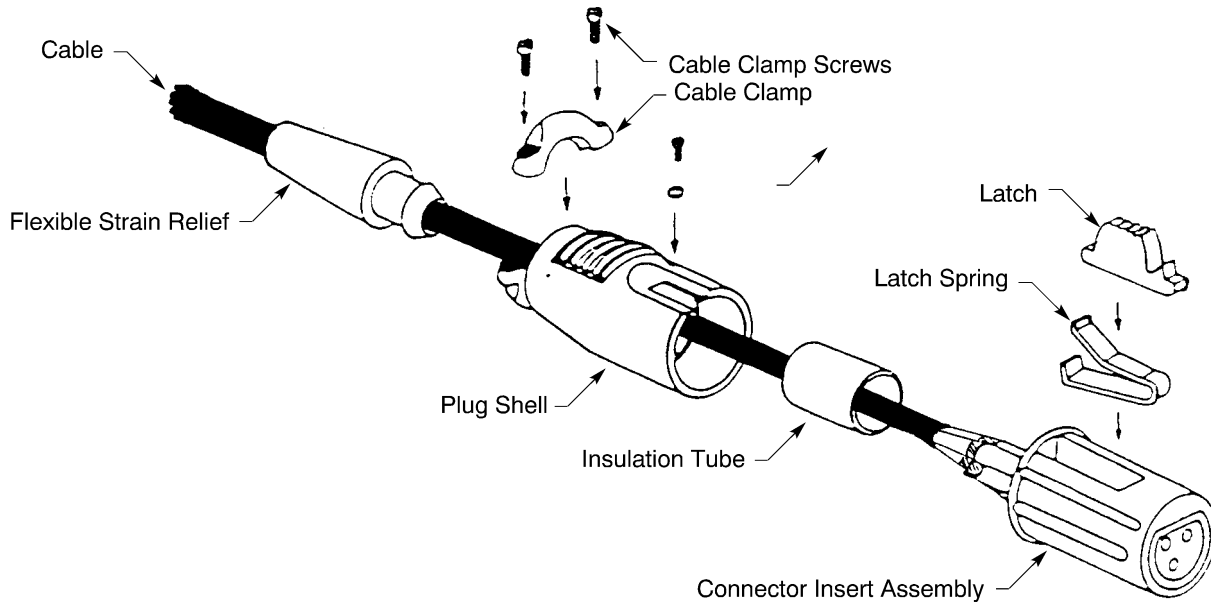
- (a) Push the latch in the direction of the receptacle.
Make sure to push the latch until it disengages from the latch retainer on the plug.
- (b) While you continue to push on the latch, hold the plug by the shell and pull the plug away from the receptacle, perpendicular to the receptacle.

CAUTION: DO NOT HOLD THE PLUG AT THE FLEXIBLE STRAIN RELIEF OR HOLD THE CABLE WHEN THE CONNECTOR IS PULLED AWAY FROM THE RECEPTACLE. THE CONNECTION BETWEEN THE CABLE AND THE CONTACTS IN THE PLUG WILL BE DAMAGED.

STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

B. XLR-() Connector Plug Disassembly



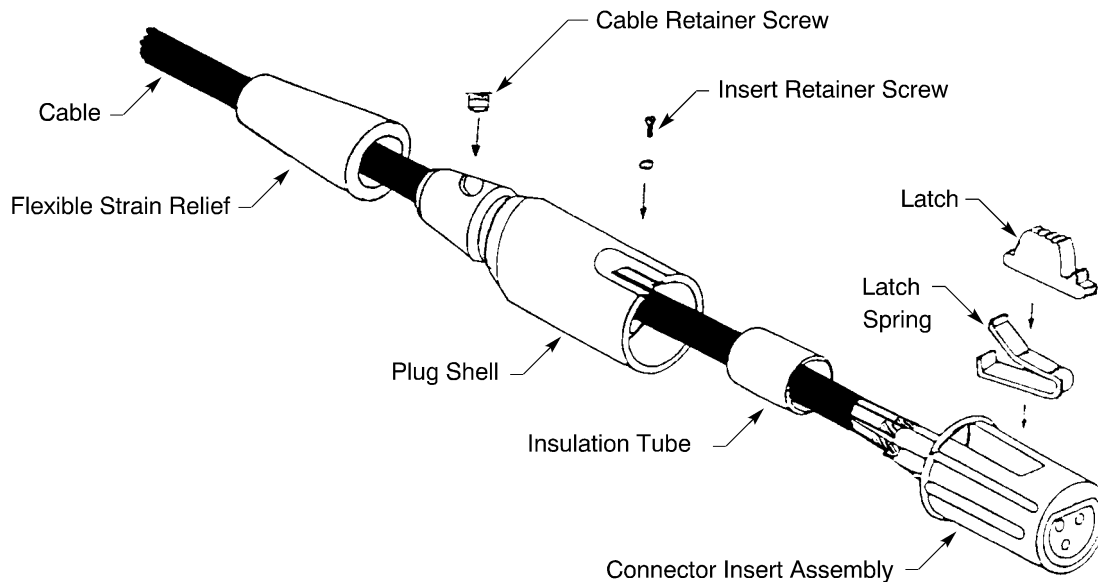
DISASSEMBLY OF THE XLR-() PLUG
Figure 9

- (1) Loosen the cable clamp screws.
- (2) Push the flexible strain relief along the cable away from the plug. Refer to Figure 9.
- (3) Loosen the insert retainer screw in the plug shell until the plug shell is free from the connector insert assembly.
- (4) Push the plug shell along the cable away from the connector insert assembly. Refer to Figure 9.
- (5) Push the insulation tube along the cable away from the connector insert assembly. Refer to Figure 9.
- (6) Use a soldering iron to remove the conductors from the contacts.
- (7) Pull the cable away from the connector insert assembly and through the insulation tube, the plug shell, and the flexible strain relief.

STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

C. AXR-() Connector Plug Disassembly



DISASSEMBLY OF THE ITT CANNON AXR-() PLUG
Figure 10

- (1) Push the flexible strain relief off the AXR-() plug shell along the cable away from the plug. Refer to Figure 10.
- (2) Loosen the large plastic cable retainer screw at the back of the plug.
- (3) Loosen the insert retainer screw in the plug shell until the plug shell is free from the connector insert assembly.
- (4) Push the AXR-() plug shell along the cable away from the connector insert assembly. Refer to Figure 10.
- (5) Push the insulation tube along the cable away from the connector insert assembly. Refer to Figure 10.
- (6) Use a soldering iron to remove the conductors from the contacts.
- (7) Pull the cable away from the connector insert assembly and through the insulation tube, the plug shell, and the flexible strain relief.

D. Receptacle Disassembly

- (1) Remove the receptacle from the panel:
 - (a) Loosen the two nuts that attach the receptacle to the panel.
 - (b) Continue to loosen the nuts until the nuts are free from the screws.
 - (c) Remove the two screws from the holes in the panel.
 - (d) From the back of the panel, push the receptacle through the hole in the panel.
- (2) Use a soldering iron to remove the conductors from the contacts in the receptacle.

STANDARD WIRING PRACTICES MANUAL

ITT CANNON XLR-() AND AXR-()CONNECTORS

3. CONNECTOR ASSEMBLY

A. Cable Preparation

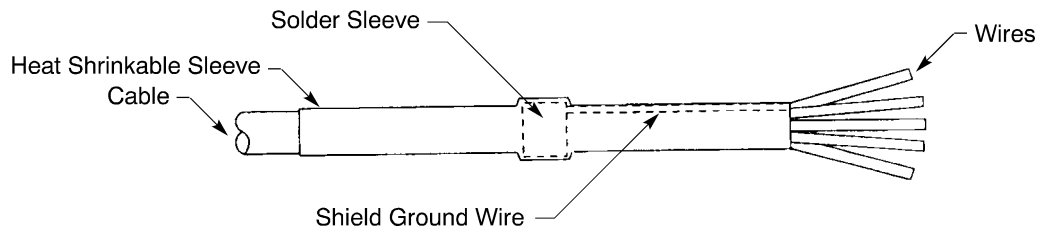
**Table 3
INSULATION REMOVAL LENGTH**

Insert Configuration	Removal Length (inch)	
	Target	Tolerance
2A	0.25	0.03
3	0.25	0.03
4	0.22	0.03
5	0.20	0.03
6	0.20	0.03
6A	0.20	0.03
7	0.13	0.03

- (1) Remove the flexible strain relief from the body of the connector.
- (2) Remove the connector shell from the connector insert assembly.
- (3) Put the flexible strain relief on the cable.
- (4) Push the flexible strain relief approximately 6 inches along the cable.
- (5) Put the connector shell on the cable.
- (6) Push the connector shell approximately 6 inches along the cable.
- (7) Put the insulation tube on the cable.
- (8) Push the insulation tube approximately 6 inches along the cable.
- (9) If the cable does not have a shield, remove 1.0 inch \pm 0.1 inch of the cable jacket. Refer to Subject 20-00-15.
- (10) If the cable has a shield:
 - (a) Put a 2.4 inch \pm 0.2 inch length of the heat shrinkable sleeve on the end of the cable.
 - (b) Push the sleeve along the cable in the direction of the connector shell.
 - (c) Remove 1.8 inches \pm 0.1 inch of the shield jacket. Refer to Subject 20-00-15.
 - (d) Install a solder sleeve and a shield ground wire on the shield. Refer to Subject 20-10-15.
 - (e) Move the sleeve so that the middle of the sleeve is directly over the middle of the solder sleeve. Refer to Figure 11.

STANDARD WIRING PRACTICES MANUAL

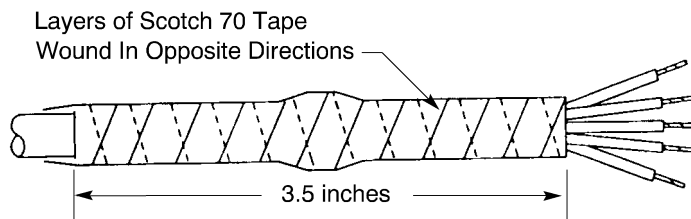
ITT CANNON XLR-() AND AXR-()CONNECTORS



POSITION OF THE SLEEVE ON THE CABLE

Figure 11

- (f) Shrink the sleeve in position. Refer to Subject 20-10-14.
- (g) Cut the shield ground wire so that it is the same length as the other wires in the cable.
- (11) Remove the insulation from the end of each wire.
Refer to Table 3 and Subject 20-00-15.
- (12) Put a thin layer of solder on the conductors. Refer to Subject 20-40-00.
- (13) If the outer diameter of the cable and the heat shrinkable sleeve is less than 0.22 inches, increase the outer diameter of the cable so that it is 0.25 inch to 0.30 inch.
Refer to Figure 12.
- (a) Wind one or more layers of Scotch 70 insulation tape around the end of the cable.
- (b) Wind each layer in the opposite direction.
- (c) Make the distance from one end of the insulation tape layer and the other end of the insulation tape layer approximately 3.5 inches.



CABLE DIAMETER BUILDUP

Figure 12

B. Contact Assembly

- (1) Solder the conductors to the contacts in the connector insert. Refer to Subject 20-40-00.

Make sure that:

- The conductors are attached to the correct contacts
- The solder joints are satisfactory.

C. Connector Plug Assembly

- (1) Push the insulation tube until the end of the tube touches the connector insert assembly.
- (2) Align the screw hole in the plug shell with the screw hole in the connector insert assembly.
- (3) Align the slot in the plug shell with the latch in the connector insert assembly.

STANDARD WIRING PRACTICES MANUAL**ITT CANNON XLR-() AND AXR-()CONNECTORS**

- (4) Push the plug shell along the cable until the end of the connector insert assembly touches the flange in the plug shell.
- (5) Align the screw hole in the plug shell with the screw hole in the connector insert assembly.
- (6) Put the insert lock screw in the hole and tighten the screw so that the connector insert assembly locks in the plug shell.
- (7) For the XLR-() plug:
 - (a) Push the flexible strain relief along the cable and under the cable clamp until it touches the flange in the plug shell.
 - (b) Tighten the cable screws so that the cable clamp satisfactorily holds the cable in position.
- (8) For the AXR-() plug:
 - (a) Put the cable retainer screw in position in the plug shell.
 - (b) Tighten the cable retainer screw until it holds the cable in position in the shell.
 - (c) Push the flexible strain relief along the cable so that it engages the back of the plug shell.

D. Connection of a Plug To a Receptacle

- (1) Align the plug with the receptacle so that these conditions occur:
 - The alternate position key in the plug aligns with the alternate position groove in the receptacle
 - The longitudinal axis of the plug aligns with the longitudinal axis of the receptacle.
- (2) Put the plug in the receptacle.
- (3) Push the plug into the receptacle until the latch engages the latch retainer and locks in position. Make sure that the plug locks in the receptacle.

E. Installation of a Receptacle in a Panel

- (1) If it is necessary, remove the two 4-40 screws and the 4-40 nuts from the flanges on the connector
- (2) From the front of the panel, align the connector with the hole in the panel.
Make sure that the position of the top of the connector is correct in relation to the top of the hole.
- (3) If the connector has wires and cables attached, put the wires and cables through the hole from the front of the panel.
- (4) Push the connector through the hole until the back surface of the flange touches the front surface of the panel.
- (5) Align the two holes on the flange of the with the connector holes in the panel.
- (6) Align the screws with the holes in the front of the connector flange.
- (7) From the front of the panel, push the screws through the holes until the shoulder on the screws touches the front of the connector flange.
- (8) At the back of the panel, put the nuts on the screws.
- (9) Tighten the nuts.
Make sure that the receptacle will not move on the panel.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF MIL-J-641/8 TELEPHONE JACK CONNECTORS

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20-64-13 CONTENTS

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF MIL-J-641/8 TELEPHONE JACK CONNECTORS****1. CONNECTOR PART NUMBERS AND DESCRIPTION****A. Connector Part Numbers**

Table 1
TELEPHONE JACK CONNECTOR PART NUMBERS

Military Specification	Telephone Jack Connector	
	Part Number	Supplier
MIL-J-641/8-1	JJ-055	Kings Electronics

2. CONNECTOR ASSEMBLY**A. Contact Assembly**

- (1) Remove 2-1/8 inches \pm 1/8 inch of the outer jacket from the cable.
- (2) Install a shield ground wire. Refer to Subject 20-10-15.
 - (a) Use a length of BMS 13-48 Type VIII Class 1 AWG 22 wire for the shield ground wire.
 - (b) Cut the shield ground wire so that it is the same length as the wires.
- (3) Put a 2 inch \pm 1/8 inch length of heat shrinkable sleeve over the cable.
Make sure to use a sleeve with the smallest diameter that will fit over the cable.
- (4) Remove 9/32 inch \pm 1/32 inch of insulation from each wire.
- (5) Solder a contact to each conductor. Refer to Subject 20-40-00.
Make sure the solder does not flow onto the upper surface of the contact.

B. Telephone Jack Assembly

- (1) Insert the two contacts into the jack recession.
Make sure the slots are exposed and face upwards.
- (2) Move the sleeve forward over wires.
- (3) Align the sleeve with the inner, leading edge of strain relief ribs on the body of the jack.
- (4) Shrink the sleeve into position.
- (5) If necessary, build the cable diameter up with filler tape in the strain relief area.



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STANDARD WIRING PRACTICES MANUAL

J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS

1. CONNECTOR PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
SMP-()-BC	J.S.T.
SMR-()-B	J.S.T.
XHP-()	J.S.T.

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Connector	Contact	
	Part Number	Supplier
SMP-()-BC	SHF-001T-0.8SS	J.S.T.
SMR-()-B	SYM-001T-P0.6	J.S.T.
XHP-()	SXH-001()-P0.6	J.S.T.

C. Backshell Part Numbers

**Table 3
BACKSHELL PART NUMBERS FOR XHP-() CONNECTORS**

Connector	Backshell	
	Part Number	Supplier
XHP-()	CBJ-14	Cory Components
	CBJ-14	Tri-Star

**Table 4
OBSOLETE BACKSHELL PART NUMBERS**

Obsolete Backshell		Replacement Backshell	
Part Number	Supplier	Part Number	Supplier
CBJ-14	Cory Components	CBJ-14	Tri-Star

STANDARD WIRING PRACTICES MANUAL

J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS

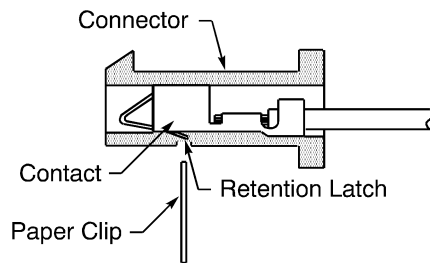
2. SMP-()-BC CONNECTORS

A. Removal of Contacts from SMP-()-BC Connectors

**Table 5
CONTACT REMOVAL TOOLS**

Tool	Supplier
Paper Clip	An available source

- (1) Make a selection of a contact removal tool from Table 5.
- (2) Push the contact retention latch with the paper clip, and at the same time, pull the contact out of the connector. Refer to Figure 1.



**CONTACT REMOVAL
Figure 1**

B. Contact Assembly for SMP-()-BC Connectors

**Table 6
CONTACT CRIMP TOOLS**

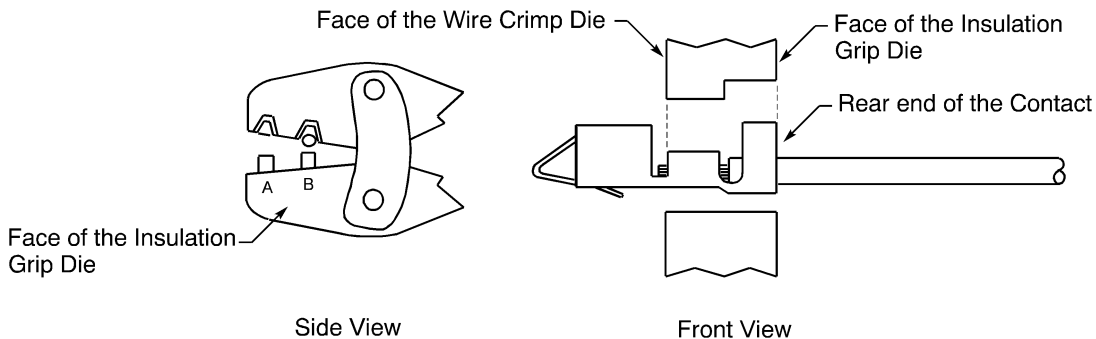
Contact	Crimp Tool		
	Part Number	Die Cavity	Supplier
SHF-001T-0.8SS	YC-122R	B	J.S.T.

- (1) Make a selection of a crimp tool from Table 6.
- (2) Remove 0.10 inch \pm 0.05 inch of the insulation from the end of the wire.
- (3) Put the end of the wire in the contact. Refer to Figure 2.
- (4) Put the contact and the end of the wire in the die cavity.

Make sure that the face of the insulation grip die is aligned with the rear end of the contact. Refer to Figure 2.

STANDARD WIRING PRACTICES MANUAL

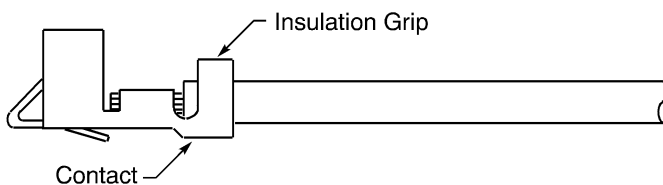
J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS



POSITION OF THE CONTACT IN THE CRIMP TOOL
Figure 2

- (5) Crimp the contact. Refer to Figure 3.

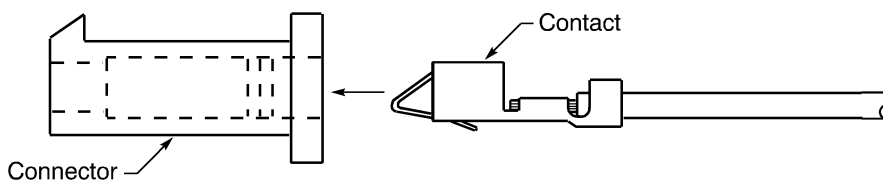
NOTE: It is not necessary for the insulation grip to touch the wire insulation around the full outer surface of the wire.



CONTACT ASSEMBLY
Figure 3

C. Insertion of Contacts in SMP-()-BC Connectors

- (1) Push the contact into the connector. Refer to Figure 4.



CONTACT INSERTION
Figure 4

- (2) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

STANDARD WIRING PRACTICES MANUAL

J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

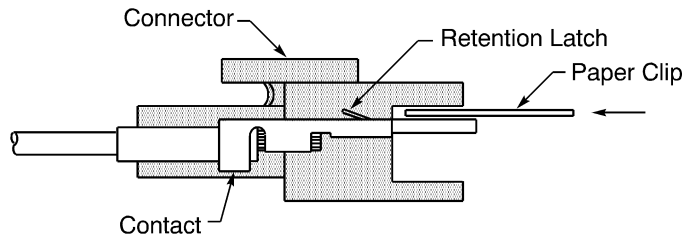
3. SMR-()-B CONNECTORS

A. Removal of Contacts from SMR-()-B Connectors

**Table 7
CONTACT REMOVAL TOOLS**

Tool	Supplier
Paper Clip	An available source

- (1) Make a selection of a contact removal tool from Table 7.
- (2) Push the contact retention latch with the paper clip, and at the same time, pull the contact out of the connector. Refer to Figure 5.



**CONTACT REMOVAL
Figure 5**

B. Contact Assembly for SMR-()-B Connectors

**Table 8
NECESSARY MATERIALS**

Material	Specification	Diameter (inch)	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/5 Class 1	1/16	An available source

**Table 9
CONTACT CRIMP TOOLS**

Contact	Crimp Tool		
	Part Number	Die Cavity	Supplier
SYM-001T-P0.6	YC-121R	B	J.S.T.

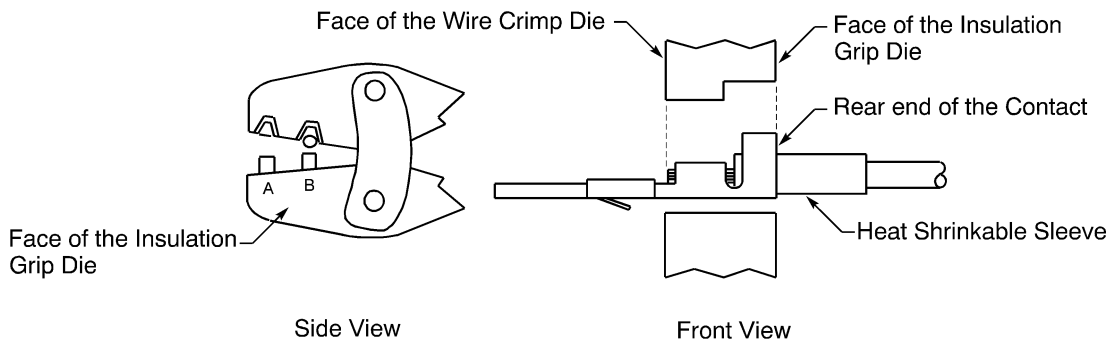
- (1) Make a selection of a crimp tool from Table 9.
- (2) Make a selection of a heat shrinkable sleeve from Table 8.

STANDARD WIRING PRACTICES MANUAL

J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS

An equivalent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

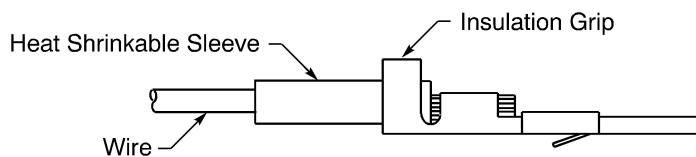
- (3) Remove 0.10 inch \pm 0.05 inch of the insulation from the end of the wire.
- (4) Put a 0.5 inch minimum length of the heat shrinkable sleeve on the wire.
Make sure that the end of the sleeve is aligned with the end of the wire insulation.
- (5) Shrink the heat shrinkable sleeve in its position on the wire. Refer to Subject 20-10-14.
- (6) Put the end of the wire in the contact. Refer to Figure 6.
- (7) Put the contact and the end of the wire in the die cavity. Refer to Figure 6.



POSITION OF THE CONTACT IN THE CRIMP TOOL
Figure 6

- (8) Crimp the contact. Refer to Figure 7.

NOTE: It is not necessary for the insulation grip to touch the heat shrinkable sleeve around the full outer surface of the wire.



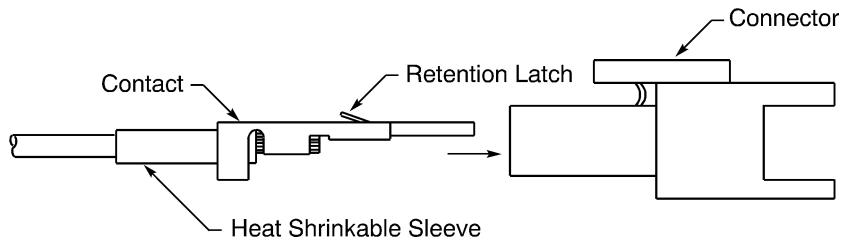
CONTACT ASSEMBLY
Figure 7

C. Insertion of Contacts in SMR-()-B Connectors

- (1) Put the contact into the connector. Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL

J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS



CONTACT INSTALLATION IN SMR-()-B CONNECTORS
Figure 8

(2) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

4. XHP-() CONNECTORS

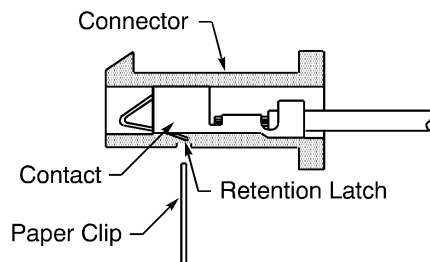
A. Removal of Contacts from XHP-() Connectors

Table 10
CONTACT REMOVAL TOOLS

Tool	Supplier
Paper Clip	An available source

(1) Make a selection of a contact removal tool from Table 10.

(2) Push the contact retention latch with the paper clip, and at the same time, pull the contact out of the connector. Refer to Figure 9.



CONTACT REMOVAL FROM XHP-() CONNECTORS
Figure 9

STANDARD WIRING PRACTICES MANUAL

J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS

B. Contact Assembly for XHP-() Connectors

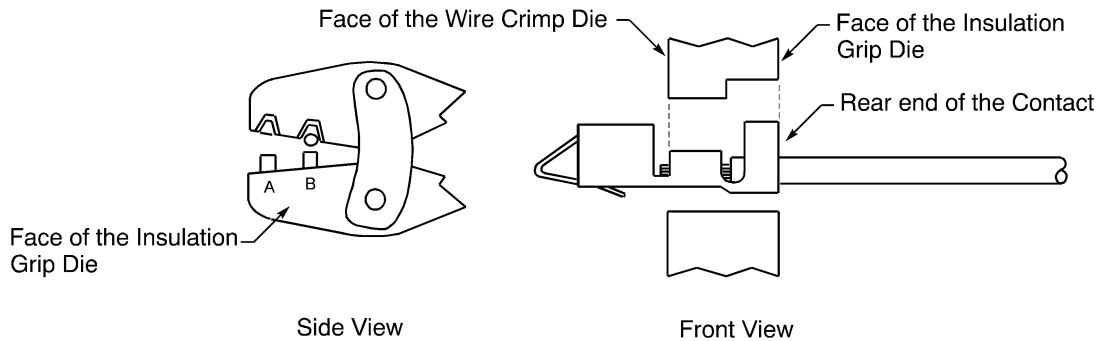
**Table 11
NECESSARY MATERIALS**

Material	Specification	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/5 Class 1	An available source

**Table 12
CONTACT CRIMP TOOLS**

Contact	Crimp Tool		
	Part Number	Die Cavity	Supplier
SHX-001()-P0.6	YC-119R	B	J.S.T.

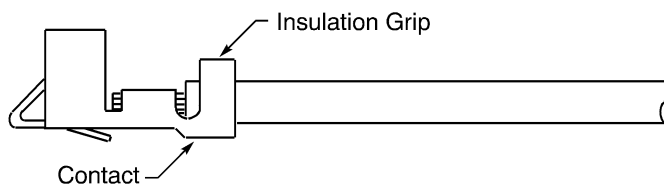
- (1) Make a selection of a crimp tool from Table 12.
- (2) Remove 0.10 inch \pm 0.05 inch of the insulation from the end of the wire.
- (3) Put the end of the wire in the contact. Refer to Figure 10.
- (4) Put the contact and the end of the wire in the die cavity. Refer to Figure 10.



**POSITION OF THE CONTACT IN THE CRIMP TOOL
Figure 10**

- (5) Crimp the contact. Refer to Figure 11.

NOTE: It is not necessary for the insulation grip to touch the wire insulation around the full outer surface of the wire.



**CONTACT ASSEMBLY
Figure 11**

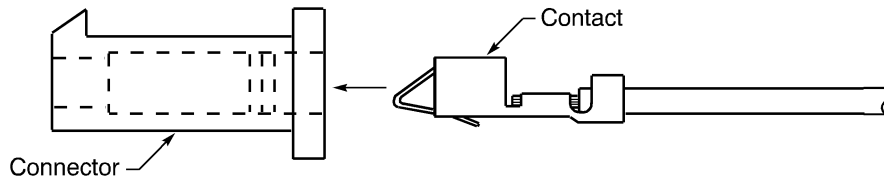
STANDARD WIRING PRACTICES MANUAL**J.S.T. SMP-()-BC, SMR-()-B, AND XHP-() CONNECTORS****C. Contact Insertion and Backshell Assembly for XHP-() Connectors**

- (1) Make a selection of a heat shrinkable sleeve from Table 11.

An equivalent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

Make sure that the sleeve has the smallest diameter that can be moved freely on the wire harness.

- (2) Put a 0.5 inch minimum length of the heat shrinkable sleeve on the wire harness.
(3) Put a contact into the connector. Refer to Figure 12.



CONTACT INSERTION
Figure 12

- (4) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

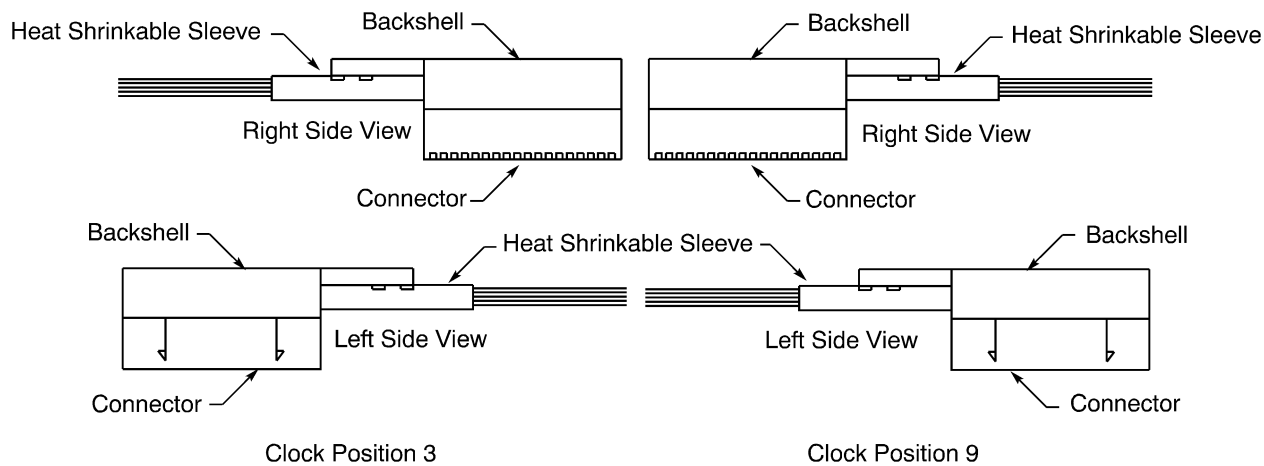
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE OF THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (5) Do Step (3) and Step (4) again for each contact in the connector.
(6) Push the heat shrinkable sleeve forward until the forward end of the sleeve is against the rear end of the connector.
(7) Shrink the sleeve in its position on the wire harness. Refer to Subject 20-10-14.
(8) Put the backshell on the connector.

Make sure that the backshell is in the correct clock position. Refer to Figure 13.

STANDARD WIRING PRACTICES MANUAL

J.S.T. SMP()-BC, SMR()-B, AND XHP()- CONNECTORS

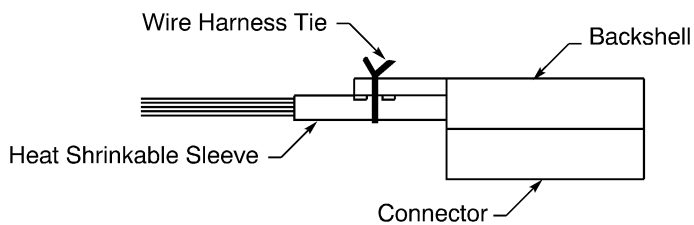


CLOCK POSITIONS OF THE BACKSHELL
Figure 13

(9) Assemble a wire harness tie on the strain relief leg of the backshell and the heat shrinkable sleeve.

Refer to:

- Figure 14
- Subject 20-10-11 for the procedure assemble a wire harness tie.



POSITION OF THE WIRE HARNESS TIE
Figure 14



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ROSEMOUNT CERAMIC CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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	B. Connector Description	1
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ROSEMOUNT CERAMIC CONNECTORS

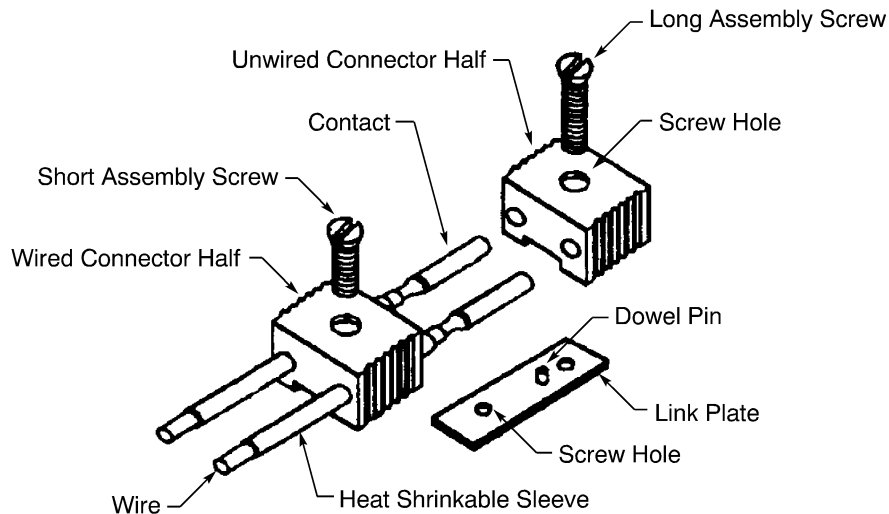
1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Contact Type	Supplier
00855-0488-0003	Crimp	Rosemount
00855-1727-0001	Crimp	Rosemount
850-27-4	Solder	Rosemount

B. Connector Description



**CONNECTOR
Figure 1**

2. CONNECTOR DISASSEMBLY

A. Connector Disassembly

Refer to Figure 1.

- (1) Loosen the long assembly screw on the unwired connector half.
- (2) Remove the connector from the probe.
- (3) Remove the small assembly screw on the wired connector half.
- (4) Move the connector halves apart.
- (5) Push the wired connector half back away from the contacts.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ROSEMOUNT CERAMIC CONNECTORS

3. CONNECTOR ASSEMBLY

A. Assembly of Crimp Type Contacts

**Table 2
INSULATION REMOVAL LENGTH**

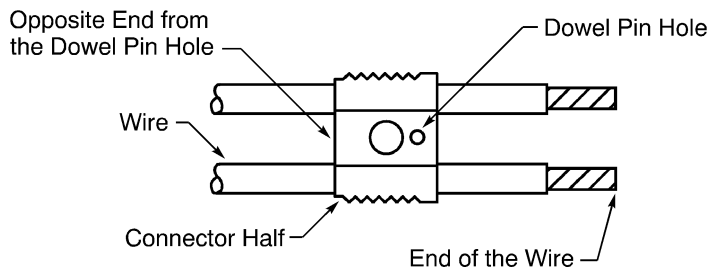
Wire Size (AWG)	Removal Length L (inch)	
	Target	Tolerance
22	0.25	± 0.03
20	0.25	± 0.03

**Table 3
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Tool				
	Basic Unit			Locator	
	Part Number	Setting	Supplier	Part Number	Supplier
22	M22520/1-01	4	QPL	M22520/1-05	QPL
				TP960	Daniels
20	M22520/1-01	5	QPL	M22520/1-05	QPL
				TP960	Daniels

Refer to Figure 1.

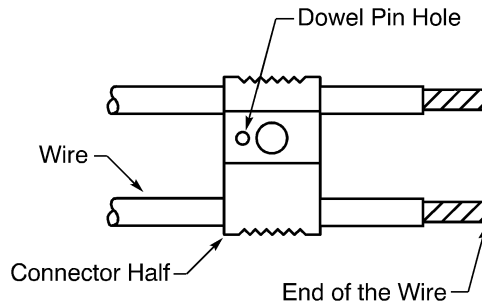
- (1) Disassemble the ceramic connector.
- (2) Put one connector half on the two wires:
 - For the 00855-0488-0003 connector, the end of the connector half opposite the dowel pin must be put on the wire first; refer to Figure 2
 - For the 00855-1727-0001 connector, the end of the connector half with the dowel pin must be put on the wire first; refer to Figure 3.



**POSITION OF THE 00855-0488-0003 CONNECTOR HALF
Figure 2**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ROSEMOUNT CERAMIC CONNECTORS

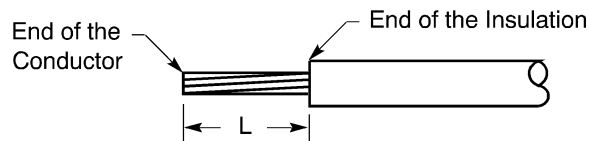


POSITION OF THE 00855-1727-0001 CONNECTOR HALF
Figure 3

- (3) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-00-11.
 The sleeve must have:
 - A maximum wall thickness of 0.006 inch
 - The smallest diameter that can be put on the wire
 - The applicable temperature grade for the wire harness.
- (4) Put a 0.9 inch \pm 0.1 inch length of the sleeve on each wire.
- (5) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 4
- Table 2 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH
Figure 4

- (6) Make a selection of a crimp tool from Table 3.
- (7) Put the end of the wire in the crimp barrel of the contact.
 Make sure that:
 - All of the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole
 - The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.
- (8) Crimp each contact.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ROSEMOUNT CERAMIC CONNECTORS

B. Assembly of Solder Type Contacts

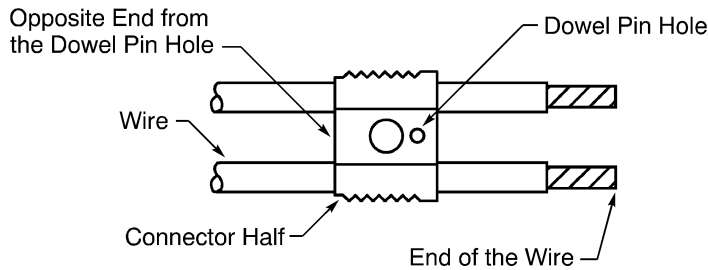
**Table 4
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Removal Length L (inch)	
	Target	Tolerance
22	0.19	± 0.03
20	0.19	± 0.03

Refer to Figure 1.

- (1) Disassemble the ceramic connector.
- (2) Put one connector half on the two wires. Refer to Figure 5.

Make sure that the end of the connector half with the dowel pin goes on the wires first.



**POSITION OF THE CONNECTOR HALF
Figure 5**

- (3) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-00-11.

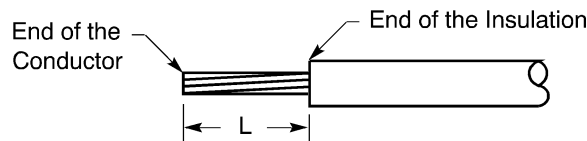
The sleeve must have:

- A maximum wall thickness of 0.006 inch
- The smallest diameter that can be put on the wire
- The applicable temperature grade for the wire harness.

- (4) Put a 0.9 inch ± 0.1 inch length of the sleeve on each wire.
- (5) Remove the necessary length of insulation from the end of each wire.

Refer to:

- Figure 6
- Table 4 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



**INSULATION REMOVAL LENGTH
Figure 6**

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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF ROSEMOUNT CERAMIC CONNECTORS**

- (6) Clean the solder cup of each contact.
- (7) Tin each solder cup.
- (8) Tin each wire.
- (9) Solder each wire in the applicable contact.

C. Connector Body Assembly

Refer to Figure 1.

- (1) Align the forward end of each sleeve with the rear edge of the inspection hole on each contact crimp barrel.
- (2) Shrink each sleeve in position. Refer to Subject 20-10-14.
- (3) Push the wired connector half forward until it stops.
Make sure that the shoulder of each contact is against the body of the connector.
- (4) Put the link plate on the unwired connector half.
Make sure that the dowel pin on the link plate is in the dowel pin hole of the unwired connector half.
- (5) Put the long assembly screw in the screw hole in the unwired connector half.
- (6) Engage the threads of the long assembly screw with the threads of the screw hole in the link plate.
- (7) Tighten the screw with a screwdriver.

CAUTION: DO NOT TIGHTEN THE SCREW TOO MUCH. THE SCREW MUST BE REMOVED AND INSTALLED AGAIN WHEN THE PITOT PROBE IS ATTACHED TO THE CONNECTOR.

- (8) Put the connector halves together.
Make sure that the screw hole in the link plate is aligned with the screw hole in the wired connector.
- (9) Put the short assembly screw in the screw hole in the wired connector half.
- (10) Engage the threads of the short assembly screw with the threads of the screw hole in the link plate.
- (11) Tighten the screw with a screwdriver.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CWC(), CORY CWC(), AND WALLACE-BLACK WB() CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Configuration	Supplier
CWC01-1206	Single	Cory Components
		Tri-Star
CWC01-1210	Single	Cory Components
		Tri-Star
CWC01-2006	Single	Cory Components
		Tri-Star
CWC01-2010	Single	Cory Components
		Tri-Star
CWC02-1206	Dual	Cory Components
		Tri-Star
CWC02-2006	Dual	Cory Components
		Tri-Star
CWC02-2010	Dual	Cory Components
		Tri-Star
WB0710	Single	Wallace-Black
WB0720	Single	Wallace-Black
WB0730	Single	Wallace-Black
WB1220	Dual	Wallace-Black
WB1230	Dual	Wallace-Black
WB1240	Single	Wallace-Black

**Table 2
ALTERNATIVE CONNECTOR PART NUMBERS**

Specified Connector	Alternative Connector	
	Part Number	Supplier
WB0710	CWC01-1210	Cory Components
		Tri-Star
WB0720	CWC01-1210	Cory Components
		Tri-Star

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ASSEMBLY OF TRI-STAR CWC(), CORY CWC(), AND WALLACE-BLACK WB() CONNECTORS

Table 2 (continued)

Specified Connector	Alternative Connector	
	Part Number	Supplier
WB0730	CWC01-2006	Cory Components
		Tri-Star
WB1220	CWC02-2010	Cory Components
		Tri-Star
WB1230	CWC02-2006	Cory Components
		Tri-Star
WB1240	CWC01-2010	Cory Components
		Tri-Star

Table 3

OBSOLETE CONNECTOR PART NUMBERS

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
CWC01-1206	Cory Components	CWC01-1206	Tri-Star
CWC01-1210	Cory Components	CWC01-1210	Tri-Star
CWC01-2006	Cory Components	CWC01-2006	Tri-Star
CWC01-2010	Cory Components	CWC01-2010	Tri-Star
CWC02-1206	Cory Components	CWC02-1206	Tri-Star
CWC02-2006	Cory Components	CWC02-2006	Tri-Star
CWC02-2010	Cory Components	CWC02-2010	Tri-Star
WB0710	Wallace-Black	CWC01-1210	Cory Components
			Tri-Star
WB0720	Wallace-Black	CWC01-1210	Cory Components
			Tri-Star
WB0730	Wallace-Black	CWC01-2006	Cory Components
			Tri-Star
WB1220	Wallace-Black	CWC02-2010	Cory Components
			Tri-Star
WB1230	Wallace-Black	CWC02-2006	Cory Components
			Tri-Star
WB1240	Wallace-Black	CWC01-2010	Cory Components
			Tri-Star

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B. Connector Hardware Part Numbers

**Table 4
WB() CONNECTOR HARDWARE PART NUMBERS**

Connector	Hardware	Quantity	Part Number	Supplier
WB0710	Cover	1	0711	Wallace-Black
			0712	Wallace-Black
	Lockwasher	1	MS35338-43	An available source
	Screw	1	NAS1802-3-9	An available source
WB0720	Cover	1	0711	Wallace-Black
			0712	Wallace-Black
	Lockwasher	1	MS35338-138	An available source
	Screw	1	NAS1802-3-10	An available source
WB0730	Cover	1	0711	Wallace-Black
			0712	Wallace-Black
	Lockwasher	1	MS35338-136	An available source
	Screw	1	NAS1802-06-9	An available source
WB1220	Cover	1	1225	Wallace-Black
	Lockwasher	2	MS35338-138	An available source
	Screw	2	NAS1802-3-10	An available source
WB1230	Cover	1	1235	Wallace-Black
	Lockwasher	2	MS35338-136	An available source
	Screw	2	NAS1802-06-10	An available source
WB1240	Cover	1	0711	Wallace-Black
			0712	Wallace-Black
	Lockwasher	1	MS35338-43	An available source
	Screw	1	NAS1802-3-9	An available source

**Table 5
ALTERNATIVE HARDWARE PART NUMBERS**

Specified Hardware	Alternative Hardware	
	Part Number	Supplier
0711	0712	Wallace-Black
0712	0711	Wallace-Black



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ASSEMBLY OF TRI-STAR CWC(), CORY CWC(), AND WALLACE-BLACK WB() CONNECTORS

**Table 6
CWC() CONNECTOR HARDWARE KIT PART NUMBERS**

Connector	Hardware Kit	
	Part Number	Supplier
CWC01-1206	KIT01-1206	Cory Components
		Tri-Star
CWC01-1210	KIT01-1210	Cory Components
		Tri-Star
CWC01-2006	KIT01-2006	Cory Components
		Tri-Star
CWC01-2010	KIT01-2010	Cory Components
		Tri-Star
CWC02-1206	KIT02-1206	Cory Components
		Tri-Star
CWC02-2006	KIT02-2006	Cory Components
		Tri-Star
CWC02-2010	KIT02-2010	Cory Components
		Tri-Star

**Table 7
CWC() CONNECTOR HARDWARE KIT CONTENTS**

Kit	Hardware	Quantity	Part Number	Supplier
KIT01-1206	Cover	1	CWCC-06	Cory Components
				Tri-Star
	Lockwasher	1	AN936A6C-316	An available source
	O-Ring	1	K1606-0001-0600	Cory Components
Tri-Star				
Screw	1	NAS1802-06-11	An available source	
KIT01-1210	Cover	1	CWCC-10	Cory Components
				Tri-Star
	Lockwasher	1	AN936A10C-316	An available source
	O-Ring	1	K1606-0001-1000	Cory Components
Tri-Star				
Screw	1	NAS1802-3-11	An available source	

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ASSEMBLY OF TRI-STAR CWC(), CORY CWC(), AND WALLACE-BLACK WB() CONNECTORS

Table 7 (continued)

Kit	Hardware	Quantity	Part Number	Supplier
KIT01-2006	Cover	1	CWCC-06	Cory Components
				Tri-Star
	Lockwasher	1	AN936A6C-316	An available source
	O-Ring	1	K1606-0001-0600	Cory Components
Tri-Star				
Screw	1	NAS1802-06-10	An available source	
KIT01-2010	Cover	1	CWCC-10	Cory Components
				Tri-Star
	Lockwasher	1	AN936A10C-316	An available source
	O-Ring	1	K1606-0001-1000	Cory Components
Tri-Star				
Screw	1	NAS1802-3-10	An available source	
KIT02-1206	Cover	2	CWCC-06	Cory Components
				Tri-Star
	Lockwasher	2	AN936A6C-316	An available source
	O-Ring	2	K1606-0001-0600	Cory Components
Tri-Star				
Screw	2	NAS1802-06-11	An available source	
KIT02-2006	Cover	2	CWCC-06	Cory Components
				Tri-Star
	Lockwasher	2	AN936A6C-316	An available source
	O-Ring	2	K1606-0001-0600	Cory Components
Tri-Star				
Screw	2	NAS1802-06-10	An available source	
KIT02-2010	Cover	2	CWCC-10	Cory Components
				Tri-Star
	Lockwasher	2	AN936A10C-316	An available source
	O-Ring	2	K1606-0001-1000	Cory Components
Tri-Star				
Screw	2	NAS1802-3-10	An available source	

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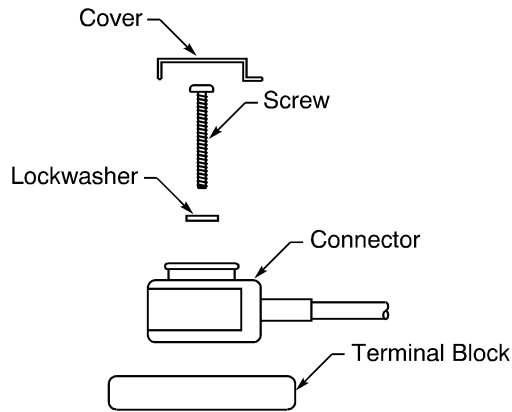
ASSEMBLY OF TRI-STAR CWC(), CORY CWC(), AND WALLACE-BLACK WB() CONNECTORS

2. CONNECTOR DISASSEMBLY

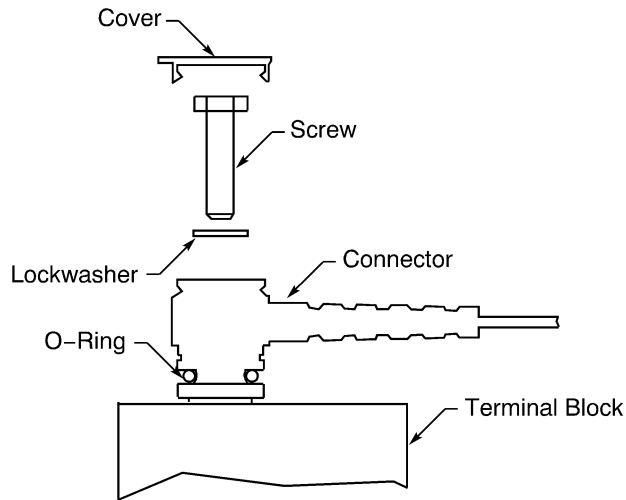
A. Separation of the Connector and the Terminal Block

**Table 8
NECESSARY TOOLS**

Tool	Description	Supplier
Screwdriver	Phillips	An available source



**CONNECTOR SEPARATION - WB() CONNECTORS
Figure 1**



**CONNECTOR SEPARATION - CWC() CONNECTORS
Figure 2**

Refer to Figure 1 or Figure 2.

- (1) Make a selection of a screwdriver from Table 8.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CWC(), CORY CWC(), AND WALLACE-BLACK WB() CONNECTORS

- (2) Remove each cover from the connector.
- (3) Hold the terminal block and at the same time, remove each screw.

CAUTION: THE TERMINAL BLOCK MUST BE HELD IN ITS POSITION WHEN THE SCREW IS REMOVED. IF THE TERMINAL BLOCK MOVES, DAMAGE TO THE TERMINAL BLOCK CAN OCCUR.

- (4) Remove the connector.

3. CONNECTOR ASSEMBLY

A. Connection of the Connector and the Terminal Block - CWC() Connectors

**Table 9
NECESSARY TOOLS**

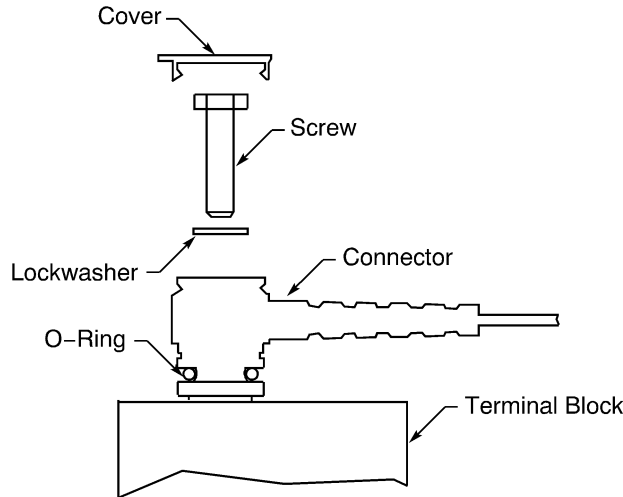
Tool	Description	Supplier
Screwdriver	Phillips	An available source
Torque	Wrench	An available source

**Table 10
SCREW TORQUE VALUES**

Connector	Torque (inch-pounds)	
	Minimum	Maximum
CWC01-1206	12	15
CWC01-1210	25	30
CWC01-2006	12	15
CWC01-2010	25	30
CWC02-1206	12	15
CWC02-2006	12	15
CWC02-2010	25	30

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CONNECTION OF THE CONNECTOR AND THE TERMINAL BLOCK

Figure 3

Refer to Figure 3.

- (1) Make a selection of a screwdriver from Table 9.
- (2) Make a selection of a torque tool from Table 9.
- (3) Put a lockwasher on each screw.
- (4) Put the connector on the terminal block.
- (5) Engage the threads of each screw with the threads in the terminal block.
Make sure that the O-ring is installed between the connector and the terminal block.
- (6) Hold the terminal block with the hand and at the same time, tighten each screw to the specified torque. Refer to Table 10.

CAUTION: THE TERMINAL BLOCK MUST BE HELD IN ITS POSITION WHEN THE SCREW IS TIGHTENED. IF THE TERMINAL BLOCK MOVES, DAMAGE TO THE TERMINAL BLOCK CAN OCCUR.

- (7) Install each cover on the connector.

CAUTION: THE COVER MUST BE INSTALLED BEFORE POWER IS APPLIED TO THE CONNECTOR. IF THE COVER IS NOT INSTALLED WHEN POWER IS APPLIED, ELECTRICAL SHOCK OR DAMAGE TO EQUIPMENT CAN OCCUR.

B. Connection of the Connector and the Terminal Block - WB() Connectors

**Table 11
NECESSARY TOOLS**

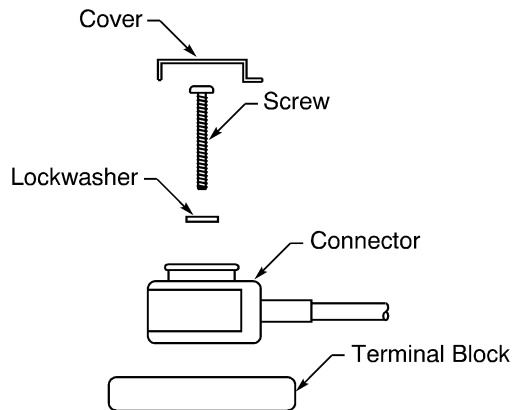
Tool	Description	Supplier
Screwdriver	Phillips	An available source
Torque	Wrench	An available source

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ASSEMBLY OF TRI-STAR CWC(), CORY CWC(), AND WALLACE-BLACK WB() CONNECTORS

**Table 12
SCREW TORQUE VALUES**

Connector	Torque (inch-pounds)	
	Minimum	Maximum
WB0710	25	30
WB0720	25	30
WB0730	12	15
WB1220	25	30
WB1230	12	15
WB1240	25	30



**CONNECTION OF THE CONNECTOR AND THE TERMINAL BLOCK
Figure 4**

Refer to Figure 4.

- (1) If the connector has not been installed before:
 - (a) Discard the screw or screws that are supplied with the connector.
 - (b) Make a selection of a screw from Table 4.
 - (c) Make a selection of a lockwasher from Table 4.
- (2) Make a selection of a screwdriver from Table 11.
- (3) Make a selection of a torque tool from Table 11.
- (4) Put a lockwasher on each screw.
- (5) Put the connector on the terminal block.
- (6) Engage the threads of each screw with the threads in the terminal block.
- (7) Hold the terminal block with the hand and at the same time, tighten each screw to the specified torque. Refer to Table 12.



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ASSEMBLY OF TRI-STAR CWC(), CORY CWC(), AND WALLACE-BLACK WB() CONNECTORS

CAUTION: THE TERMINAL BLOCK MUST BE HELD IN ITS POSITION WHEN THE SCREW IS TIGHTENED. IF THE TERMINAL BLOCK MOVES, DAMAGE TO THE TERMINAL BLOCK CAN OCCUR.

(8) Install each cover on the connector.

CAUTION: THE COVER MUST BE INSTALLED BEFORE POWER IS APPLIED TO THE CONNECTOR. IF THE COVER IS NOT INSTALLED WHEN POWER IS APPLIED, ELECTRICAL SHOCK OR DAMAGE TO EQUIPMENT CAN OCCUR.

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MOLEX 03-06-(), 1625-(), AND AIRFONE AFP30-005()-AA CONNECTORS

1. CONNECTOR PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Description	Contact Quantity	Supplier
03-06-1022	Receptacle	2	Molex
03-06-1121	Receptacle	12	Molex
03-06-1122	Receptacle without mounting ears	12	Molex
03-06-2022	Plug	2	Molex
03-06-2024	Plug	2	Molex
03-06-2121	Plug	12	Molex
03-06-2122	Plug without mounting ears	12	Molex
1625-02P	Plug	2	Molex
1625-12P	Plug	12	Molex
1625-12P1	Plug without mounting ears	12	Molex
1625-12R	Receptacle	12	Molex
1625-12R1	Receptacle without mounting ears	12	Molex
1625-2P2	Plug	2	Molex
1625-2R2	Receptacle	2	Molex
AFP30-0052-AA	Receptacle	2	Airfone
AFP30-0054-AA	Plug	2	Airfone

Table 2
OBSOLETE CONNECTOR PART NUMBERS

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
1625-02P	Molex	03-06-2022	Molex
1625-12P	Molex	03-06-2121	Molex
1625-12P1	Molex	03-06-2122	Molex
1625-12R	Molex	03-06-1121	Molex
1625-2P2	Molex	03-06-2024	Molex
		AFP30-0054-AA	Airfone
1625-2R2	Molex	03-06-1022	Molex
		AFP30-0052-AA	Airfone
1625-12R1	Molex	03-06-1122	Molex

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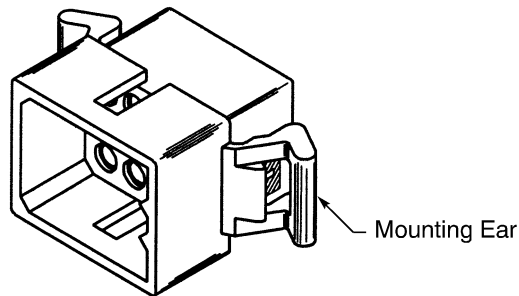
STANDARD WIRING PRACTICES MANUAL

MOLEX 03-06-(), 1625-(), AND AIRFONE AFP30-005()-AA CONNECTORS

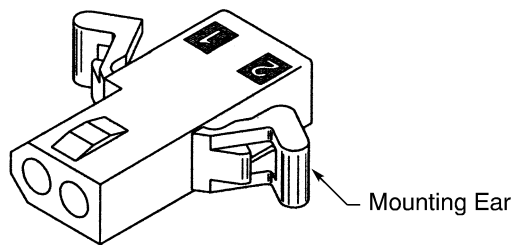
**Table 3
ALTERNATIVE CONNECTOR PART NUMBERS**

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
03-06-1022	Molex	AFP30-0052-AA	Airfone
03-06-2024	Molex	AFP30-0054-AA	Airfone
AFP30-0052-AA	Airfone	03-06-1022	Molex
AFP30-0054-AA	Airfone	03-06-2024	Molex

B. Connector Configurations



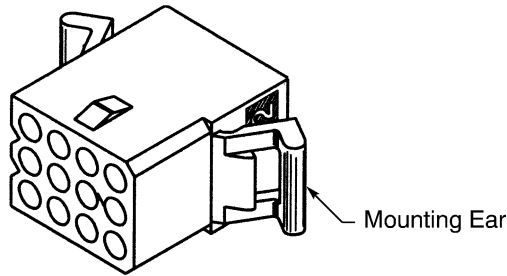
**PLUG CONNECTOR - 12 CONTACTS
Figure 1**



**RECEPTACLE CONNECTOR - 2 CONTACTS
Figure 2**

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RECEPTACLE CONNECTOR - 12 CONTACTS
Figure 3

C. Contact Part Numbers

Table 4
CONTACT PART NUMBERS

Part Number	Type	Finish	Supplier
02-06-1103	Socket	Tin	Molex
02-06-2103	Pin	Tin	Molex
02-06-5102	Socket	Gold	Molex
02-06-6102	Pin	Gold	Molex
1560	Pin	-	Molex
1561	Socket	-	Molex
AFP30-0053-AA	Socket	-	Airfone
AFP30-0241-AA	Pin	-	Airfone

Table 5
OBSOLETE CONTACT PART NUMBERS

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
1560	Molex	02-06-6102	Molex
		AFP30-0241-AA	Airfone
1561	Molex	02-06-5102	Molex
		AFP30-0053-AA	Airfone

Table 6
ALTERNATIVE CONTACT PART NUMBERS

Specified Contact		Alternative Contact	
Part Number	Supplier	Part Number	Supplier
AFP30-0053-AA	Airfone	02-06-5102	Molex

STANDARD WIRING PRACTICES MANUAL

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Table 6 (continued)

Specified Contact		Alternative Contact	
Part Number	Supplier	Part Number	Supplier
AFP30-0241-AA	Airfone	02-06-6102	Molex

2. CONNECTOR DISASSEMBLY

A. Contact Removal

Table 7
CONTACT REMOVAL TOOLS

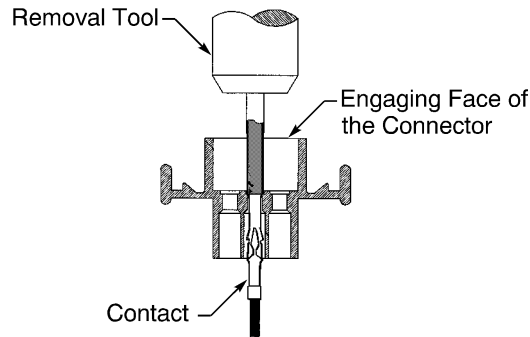
Part Number	Supplier
11-03-0002	Molex
HT-2285	Molex

Table 8
OBSOLETE CONTACT REMOVAL TOOLS

Obsolete Removal Tool		Replacement Removal Tool	
Part Number	Supplier	Part Number	Supplier
HT-2285	Molex	11-03-0002	Molex

- (1) Make a selection of a contact removal tool from Table 7.
- (2) At the rear of the connector, push the wire of the contact assembly forward into the connector.
- (3) Hold the contact assembly forward in the contact cavity.
- (4) Axially align the removal tool with the contact cavity at the engaging face of the connector.
- (5) At the engaging face of the connector, push the tool into the contact cavity until the contact moves out from the rear of the connector. Refer to Figure 4.

NOTE: The retractable spring-loaded tube of the removal tool must compress the retention clips on the sides of the contact before the solid center pin of the tool can push the contact from the connector.



CONTACT REMOVAL
Figure 4

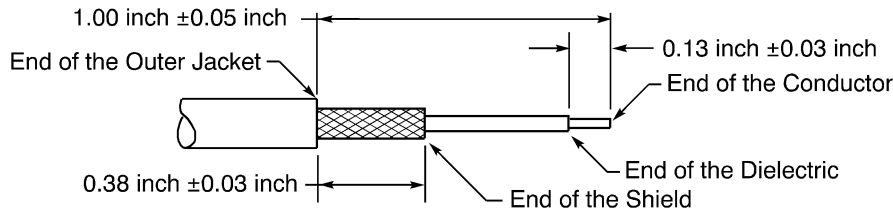
STANDARD WIRING PRACTICES MANUAL

MOLEX 03-06-(), 1625-(), AND AIRFONE AFP30-005()-AA CONNECTORS

(6) Carefully remove the tool from the contact cavity.

3. WIRE PREPARATION

A. Preparation of GTE Airfone Coaxial Cable



PREPARATION OF GTE AIRFONE COAXIAL CABLE
Figure 5

Refer to Figure 5.

- (1) Remove 1.00 inch ± 0.05 inch of the jacket from the end of the cable.
- (2) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the jacket equal to 0.38 inch ± 0.03 inch.
- (3) Remove 0.13 inch ± 0.03 inch of the dielectric from the end of the cable.
- (4) Make a selection of an AWG 20 wire for a shield ground wire. Refer to Subject 20-10-15 for the type of wire.
- (5) Cut a 3.0 inch ± 0.1 inch length of the shield ground wire.
- (6) Assemble the shield ground wire on the shield of the coax cable with a solder sleeve. Refer to Subject 20-10-15.
Make sure that the shield ground wire makes an exit from the solder sleeve away from the end of the coax cable.
- (7) Assemble a contact on the end of the shield ground wire. Refer to Paragraph 4.A.
- (8) Assemble a contact on the conductor of the coax cable. Refer to Paragraph 4.A.

4. CONNECTOR ASSEMBLY

A. Contact Assembly

Table 9
NECESSARY MATERIALS

Material	Specification	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/5 Class 1	An available source

STANDARD WIRING PRACTICES MANUAL

MOLEX 03-06(-), 1625(-), AND AIRFONE AFP30-005(-)AA CONNECTORS

**Table 10
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Crimp Tool	
	Part Number	Die Cavity
24	11-01-0008	A
	11-26-0007	
	63811-3300	
	HTR1719C	
	JHTR1719C	
22	11-01-0008	A
	11-26-0007	
	63811-3300	
	HTR1719C	
	JHTR1719C	
20	11-01-0008	A
	11-26-0007	
	63811-3300	
	HTR1719C	
	JHTR1719C	
18	11-01-0008	B
	11-26-0007	
	63811-3300	
	HTR1719C	
	JHTR1719C	

**Table 11
OBSOLETE CONTACT CRIMP TOOLS**

Obsolete Contact Crimp Tool		Replacement Contact Crimp Tool	
Part Number	Supplier	Part Number	Supplier
11-01-0008	Molex	63811-3300	Molex
11-26-0007	Molex	63811-3300	Molex
HTR1719C	Molex	63811-3300	Molex
JHTR1719C	Molex	63811-3300	Molex

(1) Make a selection of a crimp tool from Table 10.

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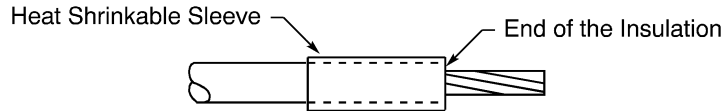
MOLEX 03-06(-), 1625(-), AND AIRFONE AFP30-005(-)AA CONNECTORS

(2) For AWG 20, 22 and 24 wire, make a selection of a heat shrinkable sleeve from Table 9.

NOTE: An equivalent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

Make sure that the sleeve has the smallest diameter that can be moved freely on the wire.

(3) Align the forward end of the sleeve with the end of the wire insulation. Refer to Figure 6.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 6

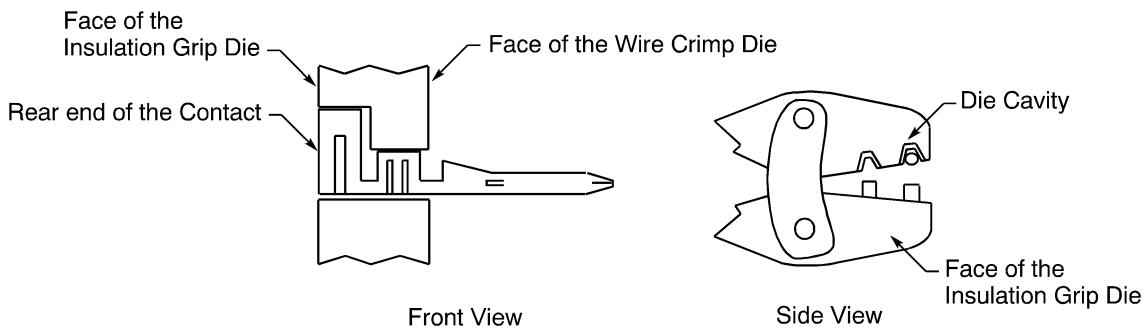
(4) Remove 0.15 inch \pm 0.01 inch of the insulation from the end of the wire.

(5) Shrink the sleeve in its position on the wire. Refer to Subject 20-10-14.

(6) Put the contact into the correct die cavity of the tool.

Refer to:

- Table 10 for the correct die cavity
- Figure 7 for the position of the contact in the tool.



POSITION OF THE CONTACT IN THE DIE OF THE CRIMP TOOL

Figure 7

(7) Close the jaws of the tool until the pressure on the contact is only sufficient to hold the contact in its position in the tool.

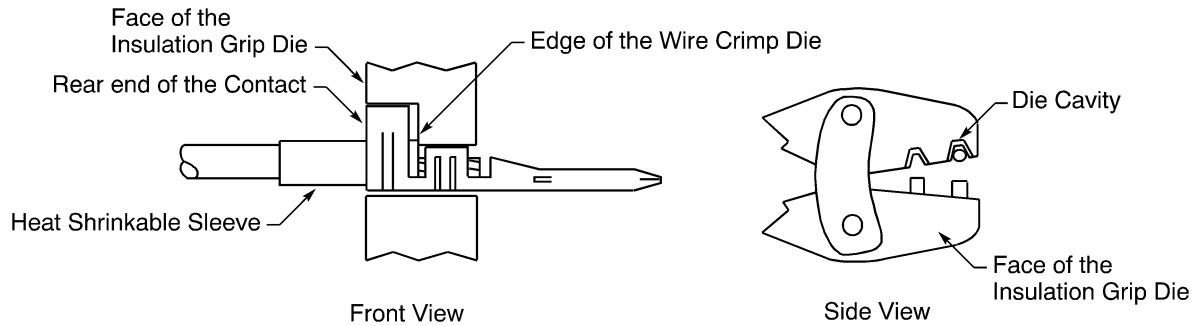
(8) Put the end of the wire in the contact. Refer to Figure 8.

Make sure that:

- The conductor is between the conductor tabs
- The insulation is between the insulation grip tabs
- The forward end of the insulation is against the edge of the wire crimp die.

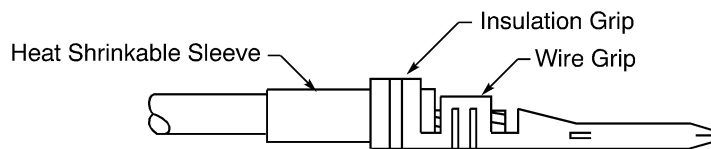
STANDARD WIRING PRACTICES MANUAL

MOLEX 03-06-(), 1625-(), AND AIRFONE AFP30-005()-AA CONNECTORS



POSITION OF THE END OF THE WIRE IN THE CONTACT
Figure 8

- (9) Crimp the contact.
- (10) If it is necessary, while the contact assembly is in the crimp tool, and after the crimp operation is completed, make the terminal straight.
- (11) Remove the contact from the tool.
- (12) Examine the contact. Refer to Figure 9.



COMPLETED CONTACT ASSEMBLY
Figure 9

NOTE: Cuts of the wire insulation in the insulation grip area of the contact assembly are permitted.

5. APPROVED TOOL SUPPLIERS

A. Contact Crimp Tools

Table 12
CONTACT CRIMP TOOL SUPPLIERS

Part Number	Supplier
11-01-0008	Molex
11-26-0007	Molex
63811-3300	Molex
HTR1719C	Molex
JHTR1719C	Molex



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ASSEMBLY OF M39029/57-() SOCKET CONTACTS FOR WINDOW HEAT CONNECTORS

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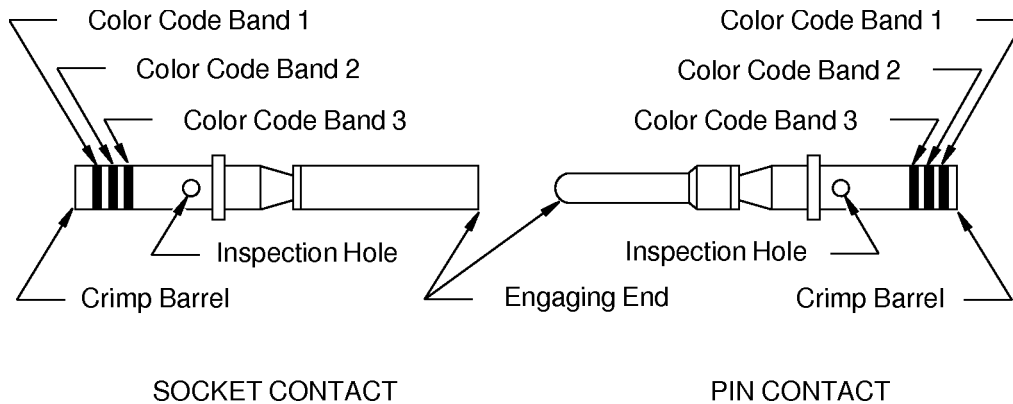
ASSEMBLY OF M39029/57-() SOCKET CONTACTS FOR WINDOW HEAT CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Contact Part Numbers

**Table 1
CONTACT PART NUMBERS**

Contact Size		Type	Color Code			Supplier
Engaging End	Crimp Barrel		Part Number	Band	Color	
16	16	Socket	M39029/57-358	1	Orange	QPL
				2	Green	QPL
				3	Gray	QPL
12	12	Socket	M39029/57-359	1	Orange	QPL
				2	Green	QPL
				3	White	QPL



**LOCATION OF CONTACT COLOR CODES
Figure 1**

NOTE: Color codes start at the crimp barrel end of the contact. Refer to Figure 1.

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 2
RECOMMENDED CONTACT REMOVAL TOOLS**

Contact Size	Material	Part Number
16	Metal	RRX-16RA
12	Metal	RRX-12RA

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF M39029/57-() SOCKET CONTACTS FOR WINDOW HEAT CONNECTORS

**Table 3
ALTERNATIVE CONTACT REMOVAL TOOLS**

Contact Size	Material	Part Number	Color
16	Metal	11-8675-16	-
		11-8795-16	-
		M81969/8-08	-
		MS27495R16	-
		RX16-9	-
	Plastic	M81969/14-03	White
		MS27534-16	White
12	Metal	11-8675-12	-
		11-8795-12	-
		M81969/8-10	-
		MS27495R12	-
		RX12-9	-
	Plastic	M81969/14-04	White
		MS27534-12	White

NOTE: For plastic tools, the color given in Table 3 is the color of the removal end of the combination tools that are both insertion and removal tools.

- (1) Make a selection of a contact removal tool from Table 2.

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

NOTE: The tools specified in Table 3 are satisfactory alternative.

- (2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

- (3) At the rear of the connector, put the removal tool on the wire.
- (4) Axially align the removal tool and the contact cavity.
- (5) Carefully push the removal tool into the rear of the contact cavity until it stops.

CAUTION: DO NOT ROTATE THE TOOL OR SPREAD THE TOOL TIPS WHILE THE TOOL IS STILL IN THE GROMMET.

- (6) Carefully pull the wire and the removal tool from the contact cavity at the same time.

Make sure that the removal tool and the contact cavity stay axially aligned.

- (7) If the contact does not release:
 - (a) Pull the removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.

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ASSEMBLY OF M39029/57-() SOCKET CONTACTS FOR WINDOW HEAT CONNECTORS

(c) Do Step (3) through Step (6) again.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 4
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact Size	Removal Length L (inch)		
		Maximum	Target	Minimum
16	16	0.22	0.19	0.19
12	12	0.22	0.19	0.19

**Table 5
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Size	Crimp Tool				Special Instructions
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
16	16	11148	-	-	Red	Locator block is Blue
		614019	-	-	Red	Locator block is Blue
		M22520/1-01	6	M22520/1-04	-	-
		MS3191-1	-	11-7771-29	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-
12	12	11148	-	-	Red	Locator block is Yellow
		614019	-	-	Red	Locator block is Yellow
		M22520/1-01	8	M22520/1-04	-	-
		MS3191-1	-	11-7771-43	-	-
		ST2220-1-Y	-	ST2220-1-3	-	-

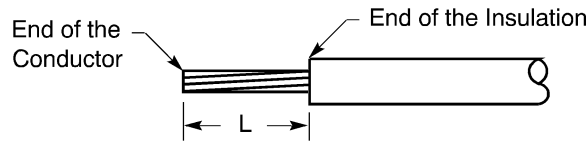
- (1) Make a selection of a crimp tool from Table 5.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 2
- Table 4 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

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ASSEMBLY OF M39029/57-() SOCKET CONTACTS FOR WINDOW HEAT CONNECTORS



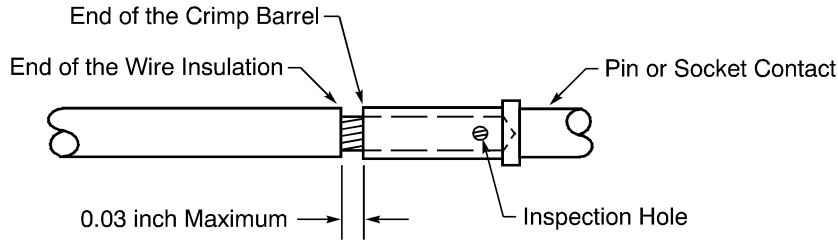
INSULATION REMOVAL LENGTH

Figure 2

(3) Put the end of the conductor in the crimp barrel of the contact. Refer to Figure 3.

Make sure that:

- All the conductor strands are in the crimp barrel
- The conductor strands are visible in the inspection hole of the contact
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE CONDUCTOR IN THE CRIMP BARREL OF THE CONTACT

Figure 3

(4) Crimp the contact.

Make sure that:

- All the conductor strands are in the crimp barrel
- The conductor strands are visible in the inspection hole of the contact
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

B. Contact Insertion

**Table 6
RECOMMENDED CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool	
	Material	Part Number
16	Metal	RIT-16RA
12	Metal	RIT-12RA

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF M39029/57-() SOCKET CONTACTS FOR WINDOW HEAT CONNECTORS

**Table 7
ALTERNATIVE CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool		
	Material	Part Number	Color
16	Metal	11-8674-16	Blue
		11-8794-16	Blue
		M81969/8-07	Blue
		MS27495A16	Blue
		RX16-4	Blue
	Plastic	M81969/14-03	Blue
		MS27534-16	Blue
12	Metal	11-8674-12	Yellow
		11-8794-12	Yellow
		M81969/8-09	Yellow
		MS27495A12	Yellow
		RX12-8	Yellow
	Plastic	M81969/14-04	Yellow
		MS27534-12	Yellow

NOTE: For metal tools, the color given in Table 7 is the color code on the handle of the tool.

NOTE: For plastic tools, the color given in Table 7 is the color of the insertion end of the combination tools that are both insertion and removal tools.

- (1) Make a selection of an insertion tool from Table 6.

CAUTION: DO NOT USE DAMAGED TOOLS.

NOTE: The tools specified in Table 7 are satisfactory alternative.

- (2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

- (3) Put the contact assembly in the insertion tool.
- (4) Axially align the insertion tool and the contact cavity at the rear of the connector.
- (5) Carefully push the contact assembly into the contact cavity until it stops.

Make sure that the insertion tool stays axially aligned with the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF M39029/57-() SOCKET CONTACTS FOR WINDOW HEAT CONNECTORS

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

(6) Carefully pull the tool out of the contact cavity.

Make sure that the tool and the contact cavity stay axially aligned.

(7) Lightly pull the wire to make sure that the contact is locked in the connector.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

(8) If the contact is not locked in the contact cavity:

(a) Pull the contact assembly out of the contact cavity.

(b) Do Step (3) through Step (7) again.

4. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 8
CRIMP TOOL SUPPLIERS**

Tool	Supplier
11148	Astro
11-7771-29	Amphenol
11-7771-43	Amphenol
614019	Astro
M22520/1-01	QPL
M22520/1-04	QPL
MS3191-1	QPL
ST2220-1-2	Boeing
ST2220-1-3	Boeing
ST2220-1-Y	Boeing



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF M39029/57-() SOCKET CONTACTS FOR WINDOW HEAT CONNECTORS

B. Insertion and Removal Tools

Table 9
INSERTION AND REMOVAL TOOL SUPPLIERS

Tool	Supplier
11-8674-12	Amphenol
11-8674-16	Amphenol
11-8675-12	Amphenol
11-8675-16	Amphenol
11-8794-12	Amphenol
11-8794-16	Amphenol
11-8795-12	Amphenol
11-8795-16	Amphenol
M81969/14-03	QPL
M81969/14-04	QPL
M81969/8-07	QPL
M81969/8-08	QPL
M81969/8-09	QPL
M81969/8-10	QPL
MS27495A12	QPL
MS27495A16	QPL
MS27495R12	QPL
MS27495R16	QPL
MS27534-12	QPL
MS27534-16	QPL
RIT-12RA	Russtech
RIT-16RA	Russtech
RRX-12RA	Russtech
RRX-16RA	Russtech
RX12-8	FCI-Burndy
RX12-9	FCI-Burndy
RX16-4	FCI-Burndy
RX16-9	FCI-Burndy

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Supplier
CE9307-10	ITT Cannon
CE9307-11	ITT Cannon
CE9307-18	ITT Cannon
CE9307-19	ITT Cannon
DPA-32-33S	ITT Cannon
DPA-32-33S3	ITT Cannon
DPA-6-33S	ITT Cannon
DPA-6-34P	ITT Cannon
DPAF-2-33S	ITT Cannon
DPAL-L24C2-33S	ITT Cannon
DPAMA-32-33S	ITT Cannon
DPAMA-32-33S-1B	ITT Cannon
DPAMA-32-33SN	ITT Cannon
DPAMA-L24C2-33S	ITT Cannon
DPD-32-33S-()	ITT Cannon
DPD-32-34P-()	ITT Cannon
DPD-45-33S-()	ITT Cannon
DPD-66-33S-()	ITT Cannon
DPD-A15-33S-()	ITT Cannon
DPD-A8-33S-()	ITT Cannon
DPD-B18-33S-()	ITT Cannon
DPDB-20-34P-()	ITT Cannon
DPDB-58-33S-()	ITT Cannon
DPD-G20-33S-()	ITT Cannon
DPD-G20-34P-()	ITT Cannon
DPD-N10-33S-()	ITT Cannon
DPDB-58-34P-()	ITT Cannon
DPDB-G20-34P-()	ITT Cannon
DPDBMA-G20-33S-()	ITT Cannon
DPDBMA-G20-34P-()	ITT Cannon

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Table 1 (continued)

Part Number	Supplier
DPD-G20-33S-()	ITT Cannon
DPD-G20-34P-()	ITT Cannon
DPDMA-32C2-33S-()	ITT Cannon
DPDMA-45-33S-()	ITT Cannon
DPDMA-76-33S-()	ITT Cannon
DPDMA-A32-33S-()	ITT Cannon
DPDMA-G20-33S-()	ITT Cannon
DPDMA-U32C2-33S-()	ITT Cannon
DPDMB-32-33S-()	ITT Cannon
DPDMB-45-33S-()	ITT Cannon
DPDMB-76-33S-()	ITT Cannon
DPDMB-78-33S-()	ITT Cannon
DPDMB-U32C2-33S-()	ITT Cannon
DPD2MA-152-33S-()	ITT Cannon
DPD2MB-152-33S-()	ITT Cannon
DPX-17-33S-()	ITT Cannon
DPX-22017-()	ITT Cannon
DPXA-8-33S-()	ITT Cannon
DPXA-32-33S-()	ITT Cannon
DPXA-32-34P-()	ITT Cannon
DPX2-67S32C2S-33S-()	ITT Cannon
DPX2-B10C3SD32C2S-33B-()	ITT Cannon
DPX2-F40C1SF40C1S-33B-()	ITT Cannon
DPX2DA-26S7S-33B-()	ITT Cannon
DPX2EF-AC3S67S-33B-()	ITT Cannon
DPX2MA-00SD32W4S-33B-()	ITT Cannon
DPX2MA-00S57S-33-()	ITT Cannon
DPX2MA-00S57S-33B-()	ITT Cannon
DPX2MA-106P106P-33B-()	ITT Cannon
DPX2MA-106P57P-33B-()	ITT Cannon
DPX2MA-106PD32C2S-33B-()	ITT Cannon
DPX2MA-106S00S-34B-()	ITT Cannon
DPX2MA-106S106S-34B-()	ITT Cannon

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Table 1 (continued)

Part Number	Supplier
DPX2MA-26P26P-34B-()	ITT Cannon
DPX2MA-26S26S-33B-()	ITT Cannon
DPX2MA-26S45S-33B-()	ITT Cannon
DPX2MA-26S57S-33B-()	ITT Cannon
DPX2MA-32W4SD106P-33B-()	ITT Cannon
DPX2MA-40B1S40B1S-33B-()	ITT Cannon
DPX2MA-40S40S-33B-()	ITT Cannon
DPX2MA-40W1S40W1S-33B-()	ITT Cannon
DPX2MA-45S40S-33B-()	ITT Cannon
DPX2MA-45S45S-33B-()	ITT Cannon
DPX2MA-57P-106S-34B-()	ITT Cannon
DPX2MA-57S00S-33B-()	ITT Cannon
DPX2MA-57S106P-33B-()	ITT Cannon
DPX2MA-57S26S-33B-()	ITT Cannon
DPX2MA-57S40S-32B-()	ITT Cannon
DPX2MA-57S45S-33B-()	ITT Cannon
DPX2MA-57S57S-33B-()	ITT Cannon
DPX2MA-57S57S-34B-()	ITT Cannon
DPX2MA-57S67S-33B-()	ITT Cannon
DPX2MA-57SD106P-33B-()	ITT Cannon
DPX2MA-67S67S-33B-()	ITT Cannon
DPX2MA-67S32A2S-33B-()	ITT Cannon
DPX2MA-67S32C2S-33B-()	ITT Cannon
DPX2MA-67S32W2S-33B-()	ITT Cannon
DPX2MA-67S67S-33B-()	ITT Cannon
DPX2MA-67SD8S-33B-()	ITT Cannon
DPX2MA-A106PA106P-33B-()	ITT Cannon
DPX2MA-67SA106P-33B-()	ITT Cannon
DPX2MA-AC3S67S-33B-()	ITT Cannon
DPX2MA-C2MS57S-33B-()	ITT Cannon
DPX2MA-C2MSF40C1S-33B-()	ITT Cannon
DPX2MA-C2S57S-33B-()	ITT Cannon
DPX2MA-C8AS67S-33B-()	ITT Cannon

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 1 (continued)

Part Number	Supplier
DPX2MA-C8ASC8AS-33B-()	ITT Cannon
DPX2MA-C8CS67S-33B-()	ITT Cannon
DPX2MA-D106P40B1S-33B-()	ITT Cannon
DPX2MA-D106PC8AS-33B-()	ITT Cannon
DPX2MA-D106PD106P-33B-()	ITT Cannon
DPX2MA-D32C2S57S-33B-()	ITT Cannon
DPX2MA-D32C2S67S-33B-()	ITT Cannon
DPX2MA-F40C1SF40C1S-33B-()	ITT Cannon
DPX2MA-W8S67S-33B-()	ITT Cannon
DPX2MB-00S67S-33B-()	ITT Cannon
DPX2MB-26S26S-33B-()	ITT Cannon
DPX2MB-26S67S-33A-()	ITT Cannon
DPX2MB-26S8S-33B-()	ITT Cannon
DPX2MB-26SC8CS-33B-()	ITT Cannon
DPX2MB-40B1S40B1S-33B-()	ITT Cannon
DPX2MB-40S40S-33B-()	ITT Cannon
DPX2MB-40S40S-33F-()	ITT Cannon
DPX2MB-45S45S-33B-()	ITT Cannon
DPX2MB-57S00S-33B-()	ITT Cannon
DPX2MB-57S57S-33A-()	ITT Cannon
DPX2MB-57S57S-33B-()	ITT Cannon
DPX2MB-67S67S-33B-()	ITT Cannon
DPX2MB-AC3S67S-33B-()	ITT Cannon
DPX2MB-C2DS57S-33B-()	ITT Cannon
DPX2MB-D32C2S57S-33B-()	ITT Cannon
DPX2P-67S32C2S-33B-()	ITT Cannon
DPX2-ZA16C3S26S-33B-()	ITT Cannon
DPX2-ZA16C3SB10C3S-33B-()	ITT Cannon
DPX3MA-32W4S-D106P-67S-33-()	ITT Cannon
DPX3MA66565-252	ITT Cannon
DPX3MA-A318-A318-33P-()	ITT Cannon
DPX3MA-B32C4S-D106P-67S-33-()	ITT Cannon
DPX3MA-B96-33S-()	ITT Cannon

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 1 (continued)

Part Number	Supplier
DPX3MA-D32C4S-D106P-67S-33-()	ITT Cannon
DPX3MA-E96-33S-0001	ITT Cannon
DPX3MB-26S-67S-67S-33B-()	ITT Cannon
DPX3ME-D205-33PS-()	ITT Cannon
DPX4MA-105-33S-()	ITT Cannon
DPX4MA-A307-33PS-()	ITT Cannon
DPX51252-1-()	ITT Cannon
DPX51252-2-()	ITT Cannon
DPXAMA-26-33S-()	ITT Cannon
DPXAMA-26-34P-()	ITT Cannon
DPXAMA-32-33S-()	ITT Cannon
DPXAMA-32-34P-()	ITT Cannon
DPXAMA-32B2-33S-()	ITT Cannon
DPXAMA-40-33S-()	ITT Cannon
DPXAMA-57-34P-()	ITT Cannon
DPXAMA-A10-33S-()	ITT Cannon
DPXAMA-26-33S-()	ITT Cannon
DPXAMA-26-34P-()	ITT Cannon
DPXAMA-32B2-33S-()	ITT Cannon
DPXAMA-40-33P-()	ITT Cannon
DPXAMA-40-33S-()	ITT Cannon
DPXAMA-45-33S-()	ITT Cannon
DPXAMB-26-33S-()	ITT Cannon
DPXAMB-32B2-33S-()	ITT Cannon
DPXAMB-32W2-33S-()	ITT Cannon
DPXAMB-57-33S-()	ITT Cannon
DPXB-17-33S-()	ITT Cannon
DPXB-32-33S-()	ITT Cannon
DPXB-40-33S-()	ITT Cannon
DPXB-45-33S-()	ITT Cannon
DPXB-8-33S-()	ITT Cannon
DPXB-32-33S-()	ITT Cannon
DPXBMA-10-33P-()	ITT Cannon

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 1 (continued)

Part Number	Supplier
DPXBMA-32-33S-()	ITT Cannon
DPXBMA-32W4-33S-()	ITT Cannon
DPXBMA-40-33S-()	ITT Cannon
DPXBMA-45-33S-()	ITT Cannon
DPXBMA-57-33S-()	ITT Cannon
DPXBMA-67-33S()	ITT Cannon
DPXBMA-67-33S-()	ITT Cannon
DPXBMA-8-33S-()	ITT Cannon
DPXBMA-8-34S-()	ITT Cannon
DPXBMA-B32C4-33S-()	ITT Cannon
DPXBMA-D106-33P-()	ITT Cannon
DPXBMA-D32C4-33S-()	ITT Cannon
DPXBMA-D32W4-33S-()	ITT Cannon
DPXBMA-32W4-33S-()	ITT Cannon
DPXBMA-57-33S-()	ITT Cannon
DPXBMA-67-33S-()	ITT Cannon
DPXBMA-6733S-()	ITT Cannon
DPXBMA-8-34S-()	ITT Cannon
DPXBMA-D106-33P-()	ITT Cannon
DPXBMB-40-33S-()	ITT Cannon
DPXBMB-45-33S-()	ITT Cannon
DPXBMB-57-33S-()	ITT Cannon
DPXBMB-67-33S-()	ITT Cannon
DPXBMB-8-33S-()	ITT Cannon
DPXBME-10-33S-()	ITT Cannon
DPXBME-40-33S-()	ITT Cannon
DPXBME-57-33S-()	ITT Cannon
DPXBNA-67M-33S-()	ITT Cannon
DPXMA-26-33S-()	ITT Cannon
DPXRC-20C5-33A1-()	ITT Cannon

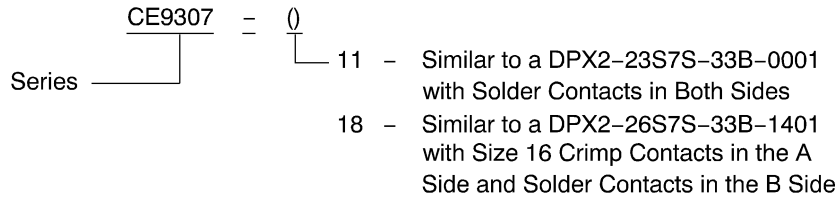
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ITT CANNON DPX, DPD, AND DPA CONNECTORS

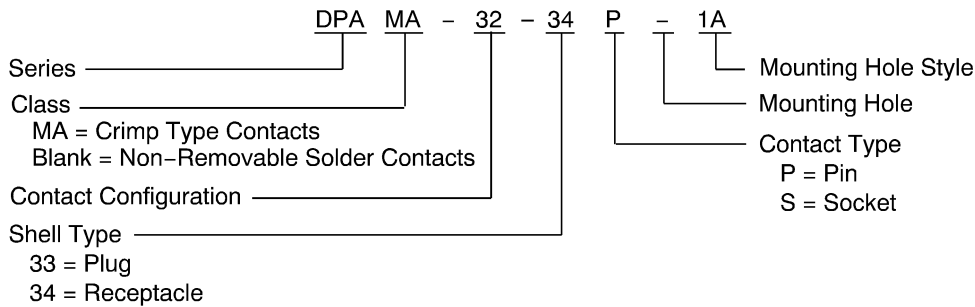
**Table 2
OBSOLETE CONNECTORS**

Specified Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
DPAM()	ITT Cannon	DPAMA()	ITT Cannon



**CE TWO GANG CONNECTOR PART NUMBER STRUCTURE
Figure 1**

NOTE: The CE connectors have DPX insert configurations. Refer to Paragraph 3.C.



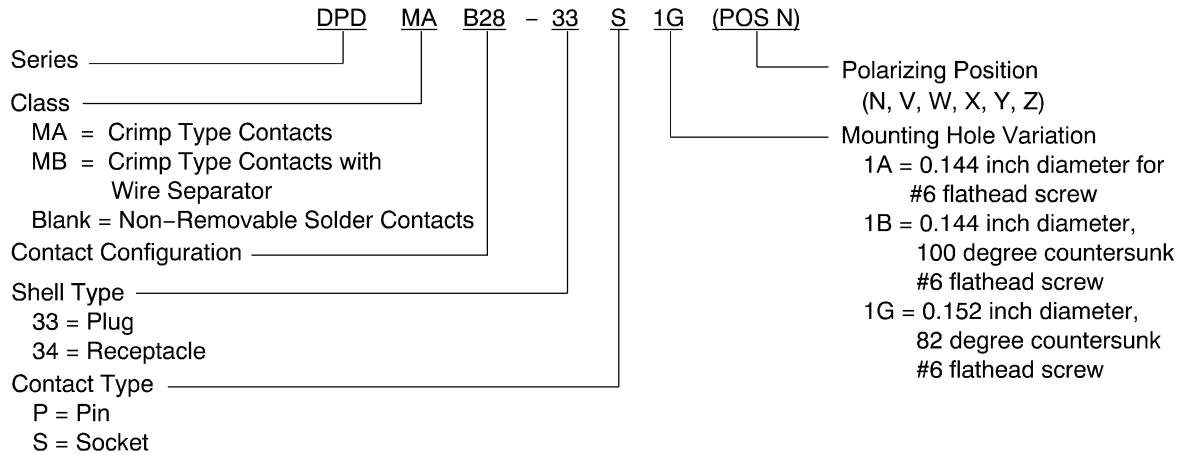
**DPA CONNECTOR PART NUMBER STRUCTURE
Figure 2**

**Table 3
DPA CONNECTOR CLASSES**

Class	Series	DPA Connector Type
None	DPA-	Non-removable solder contacts
F	DPAF-	Non-removable solder contacts, float mount connector shell
L	DPAL-	Non-removable solder contacts, large flange connector shell
MA	DPAMA-	Rear release, crimp contacts

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ITT CANNON DPX, DPD, AND DPA CONNECTORS



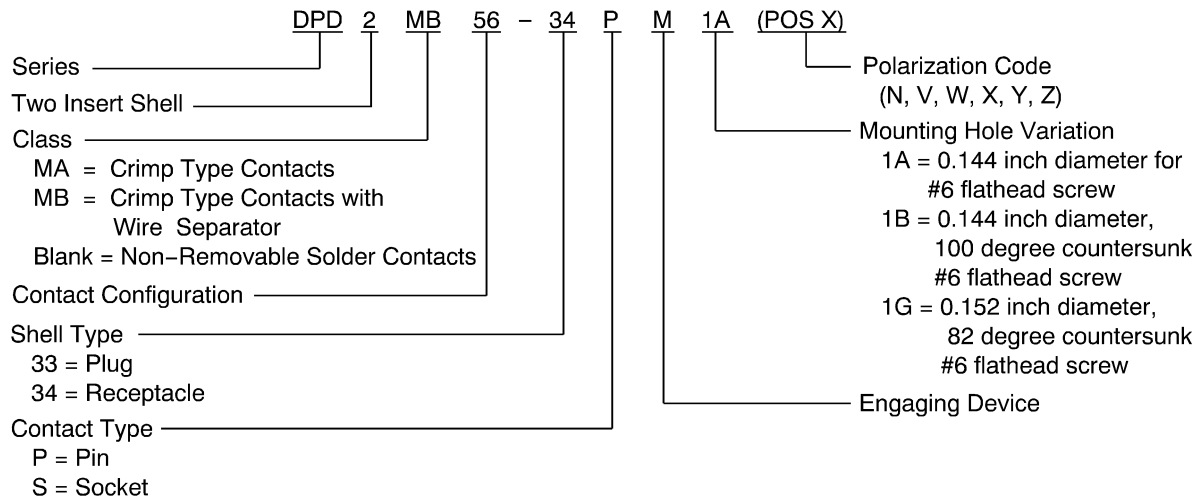
DPD SINGLE GANG CONNECTOR PART NUMBER STRUCTURE
Figure 3

Table 4
DPD CONNECTOR CLASSES

Class	Series	DPD Connector Type
None	DPD-	Non-removable solder contacts
B	DPDB-	Non-removable solder contacts
BMA	DPDBMA-	Rear release, crimp contacts
MA	DPDMA-	Rear release, crimp contacts
	DPD2MA-	Rear release, crimp contacts
MB	DPDMB-	Rear release, crimp contacts, insert that has an elastomeric wire separator
	DPD2MB-	Rear release, crimp contacts, inserts that have an elastomeric wire separator

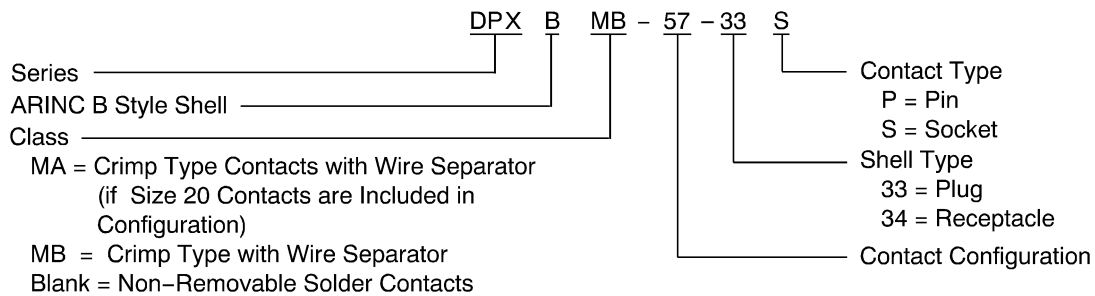
STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPD TWO GANG PART CONNECTOR NUMBER STRUCTURE

Figure 4



DPX SINGLE GANG CONNECTOR PART NUMBER STRUCTURE

Figure 5

Table 5

DPX CONNECTOR SHELL STYLES

Shell Style	Description
NONE	Single insert shell - no polarization
A	Single insert shell - no polarization
B	Single insert shell that has polarization
2	Two insert shell that has polarization
3	Three insert shell that has polarization
4	Four insert shell that has polarization

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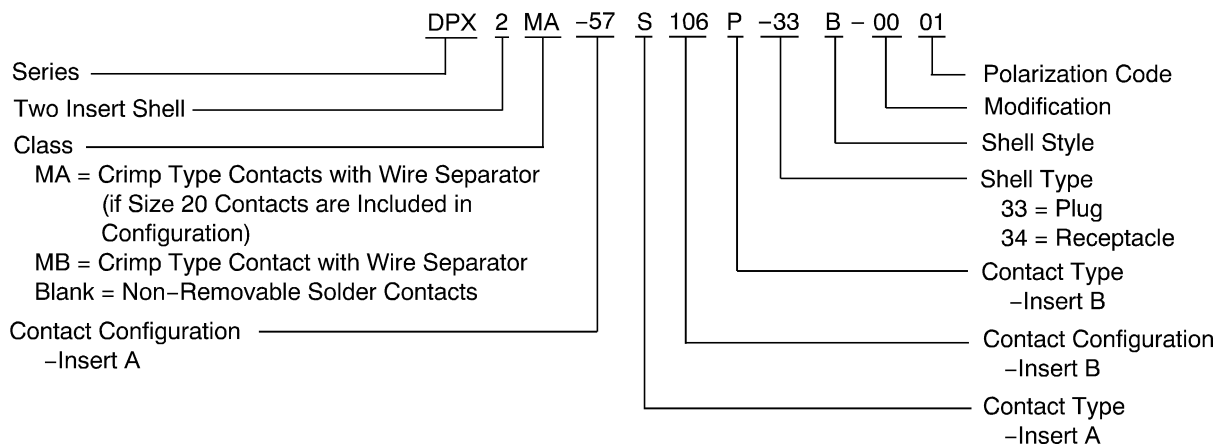
ITT CANNON DPX, DPD, AND DPA CONNECTORS

**Table 6
DPX CONNECTOR CLASSES**

Class	Series	DPX Connector Type
DA	DPX2DA	Rear release crimp contacts in insert A; solder contacts in insert B
MA	DPXAMA	Rear release, crimp contacts
	DPXBMA	
	DPX2MA	
	DPX3MA	
	DPX4MA	
MB	DPXAMB	Rear release, crimp contacts, inserts that have an elastomeric wire separator
	DPXBMB	
	DPX2MB	
	DPX3MB	
	DPX4MB	
ME	DPXAME	Rear release, crimp contacts, inserts that have a rear wire grommet seal
	DPXBME	
	DPX2ME	
	DPX3ME	
	DPX4ME	
NA	DPXANA	Rear release, crimp contacts, military version, connector uses size 2020HD contacts instead of size 2020 contacts.
	DPXBNA	
	DPX2NA	
	DPX3NA	
	DPX4NA	
None	DPX-	Solder contacts
	DPXA	
	DPXB	
	DPX2-	

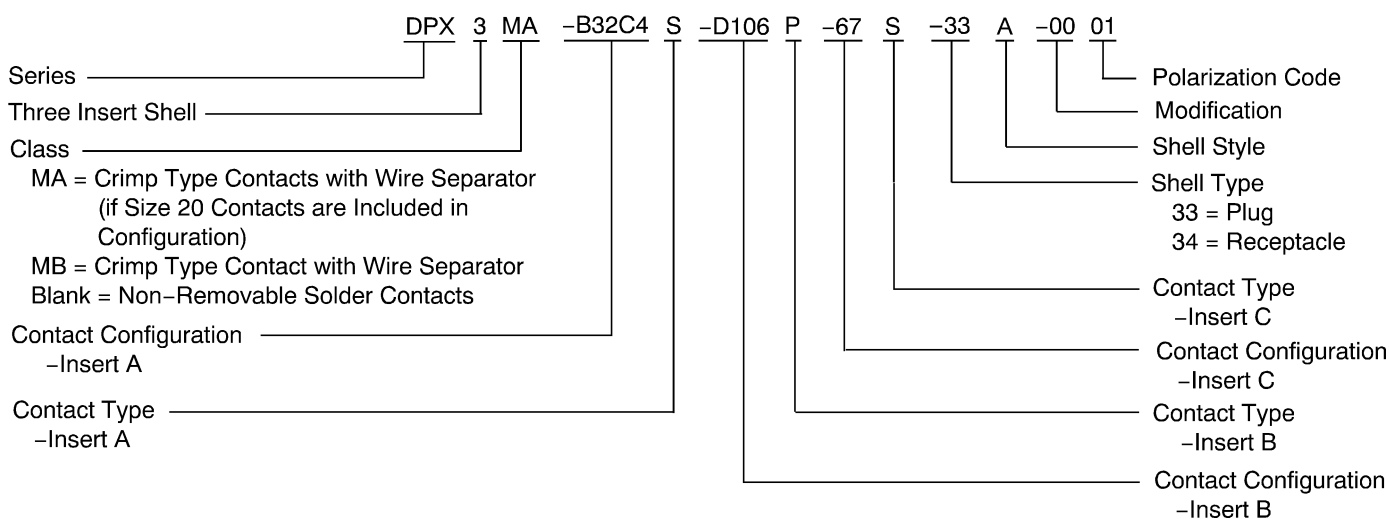
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ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPX TWO GANG CONNECTOR PART NUMBER STRUCTURE

Figure 6



DPX THREE GANG CONNECTOR PART NUMBER STRUCTURE

Figure 7

Table 7

ALTERNATIVE CONNECTOR PART NUMBERS FOR DPX CONNECTORS

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
DPX()	ITT Cannon	CPX()	Cory
	ITT Cannon	CPX()	Tri-Star
DPX2AF-32S45S-33B-00()	ITT Cannon	DPX2-32S45S-33B-00()	ITT Cannon
DPX2DA-26S7S-33B-14()	ITT Cannon	DPX2DA-26S7S-33B-00()	ITT Cannon



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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 7 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
DPX2EF-AC3S67S-33B-00()	ITT Cannon	DPX2MB-AC3S67S-33B-00()	ITT Cannon
	ITT Cannon	DSX2H43S23S00()-00()	Radiall
DPX2EF-C2ESD32C2S-33B-00()	ITT Cannon	DPX2EF-C2S32A2S-33B-00()	ITT Cannon
DPX2MA-()-()-00()	ITT Cannon	DPX2MB-()-()-00()	ITT Cannon
DPX2MA-00P67P-34B-00()	ITT Cannon	DSX2G10S22S00()	Radiall
DPX2MA-00S32W4S-33B-00()	ITT Cannon	DSX2H11S41S00()	Radiall
DPX2MA-106P106P-33B-00()	ITT Cannon	DPX2MA-D106PD106P-33B-00()	ITT Cannon
DPX2MA-106P106P-33M-01()	ITT Cannon	DPX2MA-D106PD106P-33M-01()	ITT Cannon
DPX2MA-106P106P-34F-01()	ITT Cannon	DPX2MA-D106PD106P-34F-01()	ITT Cannon
DPX2MA-106S106S-34F-01()	ITT Cannon	DPX2MA-D106SD106S-34F-01()	ITT Cannon
DPX2MA-26S45S-33B-00()	ITT Cannon	DSX2H15S19S00()	Radiall
DPX2MA-40S40S-33B-00()	ITT Cannon	DSX2H17S17S00()	Radiall
DPX2MA-40W1S40W1S-33B-00()	ITT Cannon	DSX2H29S29S00()	Radiall
DPX2MA-45S40S-33B-00()	ITT Cannon	DSX2H19S17S00()	Radiall
DPX2MA-45S45S-33B-00()	ITT Cannon	DSX2H19S19S00()	Radiall
DPX2MA-57P57P-34B-00()	ITT Cannon	DSX2G20S20S00()	Radiall
DPX2MA-57S106P-33B-00()	ITT Cannon	DSX2H21S24S00()	Radiall
DPX2MA-57S45S-33B-00()	ITT Cannon	DSX2H21S19S00()	Radiall
DPX2MA-57S57S-33B-00()	ITT Cannon	AM2P-57S57S-80()	Amp
	ITT Cannon	DSX2H21S21S00()	Radiall
DPX2MA-57S67S-33B-00()	ITT Cannon	DSX2H21S23S00()	Radiall
DPX2MA-67P67P-34B-00()	ITT Cannon	DSX2G22S22S00()	Radiall
DPX2MA-67S67S-33B-00()	ITT Cannon	AM2P-67S67S-80()	Amp
	ITT Cannon	DSX2H23S23S00()	Radiall
DPX2MA-A106PA106P-33B-00()	ITT Cannon	DPX2MA-A106PD106P-33B-00()	ITT Cannon
	ITT Cannon	DPX2MA-D106PA106P-33B-00()	ITT Cannon
	ITT Cannon	DPX2MA-D106PD106P-33B-00()	ITT Cannon
DPX2MA-AC3S67S-33B-00()	ITT Cannon	DSX2H43S23S00()	Radiall
DPX2MA-C2MS57S-33B-00()	ITT Cannon	DSX2H35X21S00()	Radiall
DPX2MA-C2MSF40C1S-33B-00()	ITT Cannon	DSX2H35X29S00()	Radiall
DPX2MA-C8ASC8AS-33B-00()	ITT Cannon	DSX2H31X31X00()	Radiall

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 7 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
DPX2MA-D106PD106P-33B-00()	ITT Cannon	DPX2MA-A106PA106P-33B-00()	ITT Cannon
	ITT Cannon	DPX2MA-A106PD106P-33B-00()	ITT Cannon
	ITT Cannon	DPX2MA-D106PA106P-33B-00()	ITT Cannon
	ITT Cannon	DSX2H24S24S00()	Radiall
DPX2MA-D32C2S57S-33B-00()	ITT Cannon	DSX2H27S21S00()	Radiall
DPX2MA-D32C2S67S-33B-00()	ITT Cannon	DSX2H27S23S00()	Radiall
DPX2MA-F40C1SF40C1S-33B-00()	ITT Cannon	DSX2H29S29S00()	Radiall
DPX2MA-W8S67S-33B-00()	ITT Cannon	DSX2H31X23S00()	Radiall
DPX2MB-()-()-03()	ITT Cannon	DPX2MA-()-()-03()	ITT Cannon
DPX2MB-00P67P-34B-00()	ITT Cannon	DSX2G10S22S00()	Radiall
DPX2MB-00S67S-33B-00()	ITT Cannon	DSX2H11S23S00()	Radiall
DPX2MB-26P26P-34B-00()	ITT Cannon	DSX2G14S14S00()	Radiall
DPX2MB-26P8P-34B-00()	ITT Cannon	DSX2G14S12S00()	Radiall
DPX2MB-26S8S-33B-00()	ITT Cannon	DSX2H15S13S00()	Radiall
DPX2MB-26SC8CS-33B-00()	ITT Cannon	DSX2H15S31X00()	Radiall
DPX2MB-40B1S40B1S-33B-00()	ITT Cannon	DPX2MB-F40C1SF40C1S-33B-00()	ITT Cannon
	ITT Cannon	DSX2H29S29S00()	Radiall
DPX2MB-40S40S-33B-00()	ITT Cannon	DPX2MA-40S40S-33B-00()	ITT Cannon
DPX2MB-45S45S-33B-00()	ITT Cannon	DSX2H19S19S00()	Radiall
DPX2MB-57P57P-34B-00()	ITT Cannon	DSX2G20S20S00()	Radiall
DPX2MB-57S57S-33-00()	ITT Cannon	DPX2MA-57S57S-33-00()	ITT Cannon
DPX2MB-57S57S-33B-00()	ITT Cannon	DSX2H21S21S00()	Radiall
DPX2MB-67P67P-34B-00()	ITT Cannon	DSX2G22S22S00()	Radiall
DPX2MB-AC3S67S-33B-00()	ITT Cannon	DPX2MA-AC3S67S-33B-00()	ITT Cannon
DPX2MB-D32C2S57S-33B-00()	ITT Cannon	DPX2MA-D32C2S57S-33B-00()	ITT Cannon
	ITT Cannon	DSX2H27S21S00()	Radiall
DPX3MB-26S67S67S-33B-0001	ITT Cannon	DPX3MB-A160-33B-00()	ITT Cannon
DPX3MB-78-34P-00()	ITT Cannon	DSX3G14S14S14S00()	Radiall
DPXAMA-26-34P	ITT Cannon	DSX1E14S00	Radiall
DPXAMB-26-33S	ITT Cannon	DSX1F15S00	Radiall
DPXAMB-26-34P	ITT Cannon	DSX1E14S00	Radiall
DPXAMB-32B2-33S	ITT Cannon	DPXA-F32C2-33S	ITT Cannon

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 7 (continued)

Specified Connector		Alternative Connector	
Part Number	Supplier	Part Number	Supplier
DPXAMB-32W2-33S	ITT Cannon	DSX1F27S00	Radiall
	ITT Cannon	DSX1F27S00	Radiall
DPXAMB-57-33S	ITT Cannon	DPXA-57-33S	ITT Cannon
DPXAMB-67-33S	ITT Cannon	DPXA-67-33S	ITT Cannon
DPXB32-33S-00()	ITT Cannon	CPXBMA32-33S-00()	Cory
	ITT Cannon	CPXBMA32-33S-00()	Tri-Star
DPXBMA-()-33S-00()	ITT Cannon	DPXBMB-()-33S-00()	ITT Cannon
DPXBMA-32-33S-00()	ITT Cannon	DPXBMB-32-33S-00()	ITT Cannon
DPXBMA-32W4-33S-00()	ITT Cannon	DSX1H41S00()	Radiall
DPXBMA-40-33S-00()	ITT Cannon	DSX1H17S00()	Radiall
DPXBMA-45-33S-00()	ITT Cannon	DSX1H19S00()	Radiall
DPXBMA-57-33S-00()	ITT Cannon	AM1P-57S-80()	Amp
	ITT Cannon	DSX1H21S00()	Radiall
	ITT Cannon	AM1P-57S-80()	Amp
DPXBMA-57-34P-00()	ITT Cannon	DSX1G20S00()	Radiall
DPXBMA-67-33S-00()	ITT Cannon	AM1P-67S-80()	Amp
	ITT Cannon	DSX1H23S00()	Radiall
	ITT Cannon	DPXBMB-67-33S-00()	ITT Cannon
DPXBMA-8-33S-00()	ITT Cannon	DSX1H13S00()	Radiall
DPXBMA-D106-33P-00()	ITT Cannon	DSX1H24S00()	Radiall
DPXBMA-D32C4-33S00()	ITT Cannon	DSX1H41S00()	Radiall
DPXBMA-D32C4-34P00()	ITT Cannon	DSX1G40S00()	Radiall
DPXBMB-()-33S-00()	ITT Cannon	DPXBMA-()-33S-00()	ITT Cannon
DPXBMB-40-33S-00()	ITT Cannon	DSX1H17S00()	Radiall
DPXBMB-45-33S-00()	ITT Cannon	DPXBMA-45-33S-00()	ITT Cannon
	ITT Cannon	DSX1H19S00()	Radiall
DPXBMB-57-33S-00()	ITT Cannon	DPXBMA-57-33S-00()	ITT Cannon
	ITT Cannon	DSX1H21S00()	Radiall
DPXBMB-57-34P-00()	ITT Cannon	DSX1G20S00()	Radiall
DPXBMB-67-33S-00()	ITT Cannon	DPXBMA-67-33S-00()	ITT Cannon
	ITT Cannon	DSX1H23S00()	Radiall
DPXBMB-8-33S-00()	ITT Cannon	DPXB-8-33S-00()	ITT Cannon

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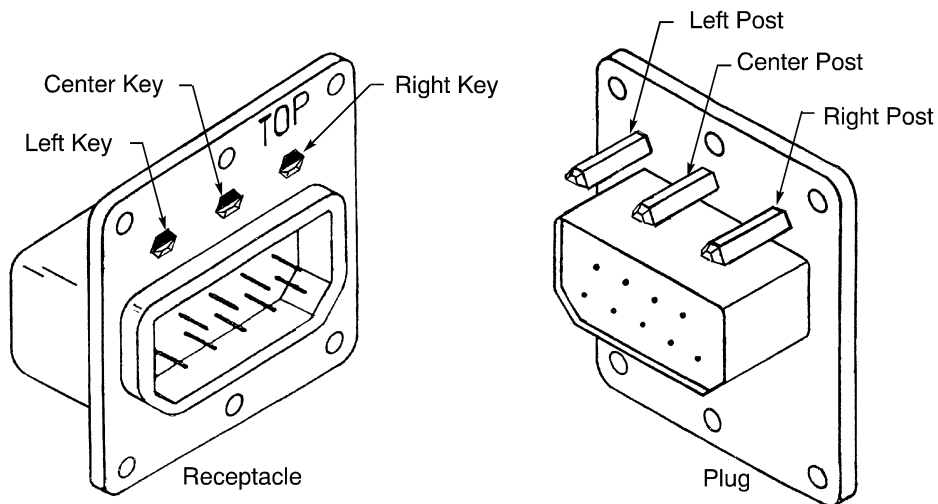
STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

NOTE: The part of the part number within the parentheses in Table 7 must be the same for the specified connector and the alternative connector.

NOTE: The coax contacts for the connectors from the different manufacturers in Table 7 are not interchangeable.

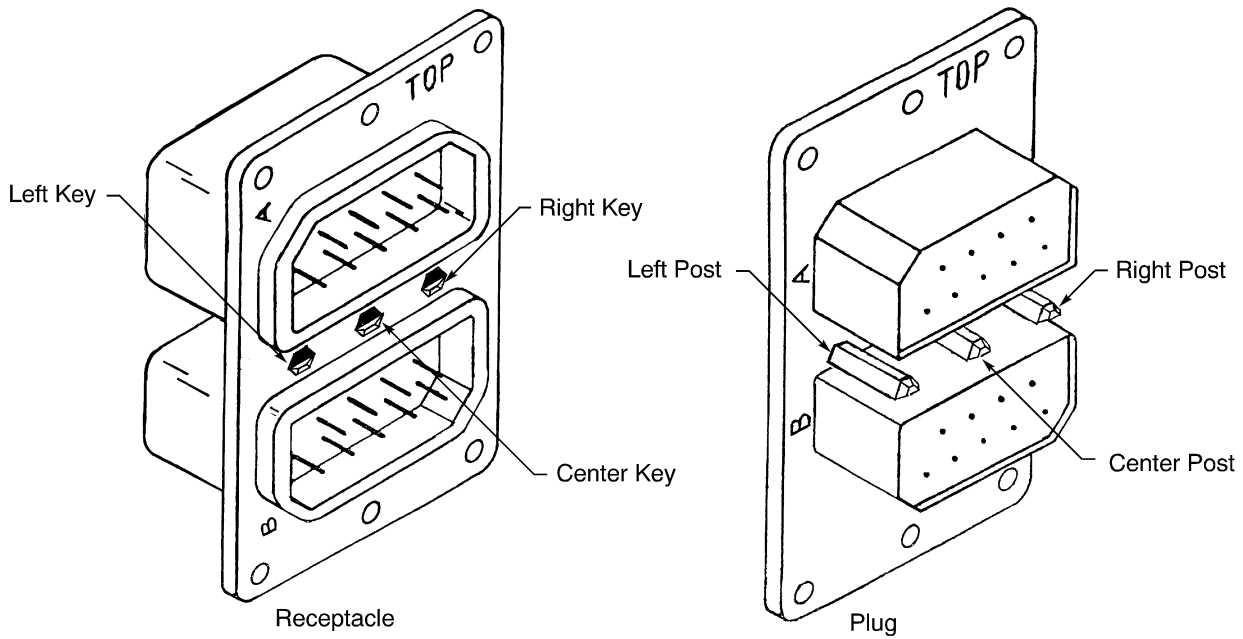
B. Connector Shell Styles



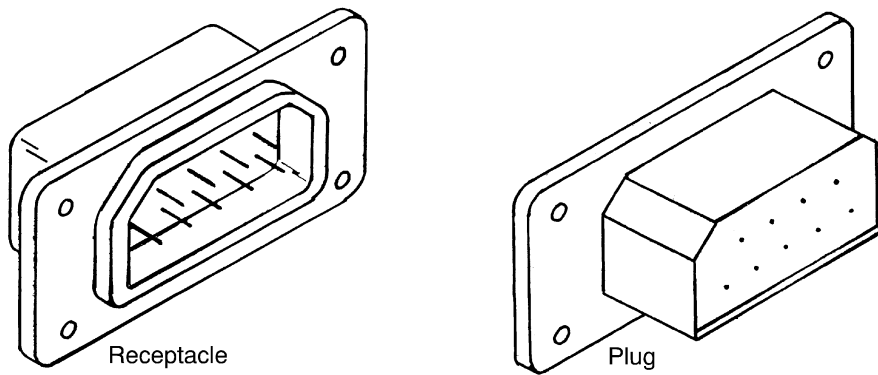
DPXB()34() AND DPXB()33() - SINGLE INSERT CONNECTOR SHELLS WITH POLARIZATION
Figure 8

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS



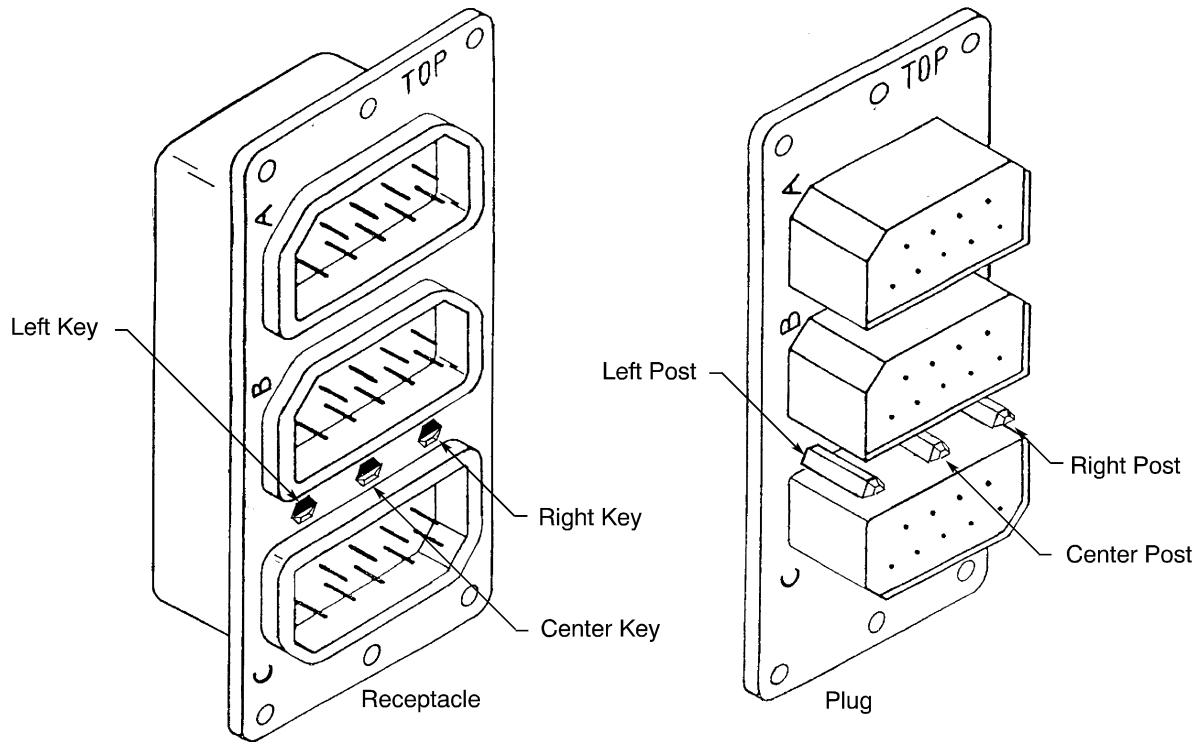
DPX2()34B() AND DPX2()33B() - TWO INSERT CONNECTOR SHELLS WITH POLARIZATION
Figure 9



DPXA()34() AND DPXA()33() - SINGLE INSERT CONNECTOR SHELLS WITHOUT POLARIZATION
Figure 10

STANDARD WIRING PRACTICES MANUAL

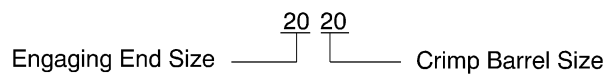
ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPX3()34B() AND DPX3()33B() - THREE INSERT CONNECTOR SHELLS WITH POLARIZATION
Figure 11

C. Contact Part Numbers

This paragraph gives the part numbers for rear release, rear removable, crimp type contacts.



EXAMPLE OF CONTACT SIZE
Figure 12

NOTE: The size 2020HD high density contact has a size 20 engaging end and a size 20 crimp barrel.

Table 8
CONTACT PART NUMBERS FOR DPA() CONNECTORS

Contact Size	Contact Type	Part Number	Supplier
2020	Pin	030-9173-003	ITT Cannon
	Socket	031-9174-003	ITT Cannon

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

**Table 9
CONTACT PART NUMBERS FOR DPD() CONNECTORS**

Contact Size	Contact Type	Part Number	Contact Plating	Supplier
2020	Pin	030-9081-000	Gold	ITT Cannon
		616-220		Radiall
	Socket	031-9134-001	Gold	ITT Cannon
		616-325		Radiall
1616	Pin	030-9083-000	Silver	ITT Cannon
		030-9083-001	Gold	ITT Cannon
		616-230		Radiall
	Socket	031-9206-003	Silver	ITT Cannon
		031-9206-004	Gold	ITT Cannon
		616-330		Radiall
1212	Pin	030-1909-000	Silver	ITT Cannon
		030-1909-001	Gold	ITT Cannon
		616-240		Radiall
	Socket	031-1059-000	Silver	ITT Cannon
		031-1059-001	Gold	ITT Cannon
		616-340		Radiall
0808	Pin	030-1908-000	Silver	ITT Cannon
		030-1908-001	Gold	ITT Cannon
	Socket	030-9201-003	Silver	ITT Cannon
		031-1154-000	Gold	ITT Cannon

NOTE: A gold plated contact and a silver plated contact give equivalent performance.

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

**Table 10
CONTACT PART NUMBERS FOR CE() AND DPX() CONNECTORS**

Contact Size	Contact Type	Part Number	Contact Plating	Supplier
2222	Pin	030-1975-000	Gold	ITT Cannon
		030-1975-005	Gold	ITT Cannon
		030-1975-007	Gold	ITT Cannon
		030-1975-008	Gold	ITT Cannon
		204873-4	Gold	Amp
		616-200	Gold	Radiall
		M39029/11-144	Gold	QPL
	Socket	031-1113-000	Gold	ITT Cannon
		031-1113-007	Gold	ITT Cannon
		031-1113-008	Gold	ITT Cannon
		205103-3	Gold	Amp
		616-300	Gold	Radiall
		M39029/12-148	Gold	QPL

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 10 (continued)

Contact Size	Contact Type	Part Number	Contact Plating	Supplier
2020HD	Pin	030-9081-003	Gold	ITT Cannon
		030-1892-002	Gold	ITT Cannon
		030-1892-004	Gold	ITT Cannon
		204938-3	Gold	Amp
		616-210	Gold	Radiall
		M39029/11-145	Gold	QPL
	Socket	031-1047-002	Gold	ITT Cannon
		031-1047-003	Gold	ITT Cannon
		031-1302-000	Gold	ITT Cannon
		031-9134-004	Gold	ITT Cannon
		118-2020-074	Gold	Tri-Star
		208267-2	Gold	Amp
		205116-1	Gold	Amp
		316-2020-081	Gold	Tri-Star
		318-2020-302	Gold	Tri-Star
		616-310	Gold	Radiall
		620-310	Gold	Radiall
		8660-248	Gold	Souriau
		BACC47EG2	Gold	Boeing
M39029/12-149	Gold	QPL		
2020	Pin	030-2040-000	Gold	ITT Cannon
		030-9081-000	Gold	ITT Cannon
		610-220	Gold	Radiall
	Socket	031-1046-002	Gold	ITT Cannon
		031-9134-001	Gold	ITT Cannon
		610-325	Gold	Radiall

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 10 (continued)

Contact Size	Contact Type	Part Number	Contact Plating	Supplier
1616	Pin	030-9083-001	Gold	ITT Cannon
		030-9083-002	Gold	ITT Cannon
		030-9083-012	Gold	ITT Cannon
		204978-3	Gold	Amp
		616-230	Gold	Radiall
		M39029/11-146	Gold	QPL
	Socket	031-1271-000	Gold	ITT Cannon
		031-9206-004	Gold	ITT Cannon
		031-9206-021	Gold	ITT Cannon
		205117-1	Gold	Amp
		616-330	Gold	Radiall
		M39029/12-150	Gold	QPL
1212	Pin	030-1909-001	Gold	ITT Cannon
		030-1909-002	Gold	ITT Cannon
		030-2045-000	Gold	ITT Cannon
		205763-3	Gold	Amp
		205763-5	Gold	Amp
		616-240	Gold	Radiall
	Socket	M39029/11-147	Gold	QPL
		031-1059-001	Gold	ITT Cannon
		031-1059-002	Gold	ITT Cannon
		205851-2	Gold	Amp
		616-340	Gold	Radiall
		M39029/12-151	Gold	QPL
0808	Pin	030-1908-001	Gold	ITT Cannon
	Socket	031-1154-000	Gold	ITT Cannon
0406	Pin	030-2049-000	Gold	ITT Cannon
	Socket	031-1151-000	Gold	ITT Cannon

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

**Table 11
THERMOCOUPLE CONTACT PART NUMBERS FOR CE(), DPD() AND DPX() CONNECTORS**

Contact Size	Type	Material	Part Number	Supplier
2222	Pin	Alumel	030-1975-009	ITT Cannon
		Chromel	030-1975-010	ITT Cannon
	Socket	Alumel	031-1113-009	ITT Cannon
		Chromel	031-1113-010	ITT Cannon
2020	Pin	Alumel	030-1899-000	ITT Cannon
		Chromel	030-1900-000	ITT Cannon
	Socket	Alumel	031-1048-000	ITT Cannon
		Chromel	031-1049-000	ITT Cannon

**Table 12
OBSOLETE CONTACT PART NUMBERS FOR CE(), DPD() AND DPX() CONNECTORS**

Obsolete Contact				Replacement Contact	
Contact Size	Contact Type	Part Number	Supplier	Part Number	Supplier
2020	Chromel Pin	030-2900-000	ITT Cannon	030-1900-000	ITT Cannon

D. Coax Contact Part Numbers

**Table 13
COAX CONTACT PART NUMBERS**

Coax Contact							Coax Cable	
Part Number	Supplier	Connector Series	Size	Type	Retention Description	Insert	Part Number	Supplier
249-0268-000	ITT Cannon	DPX	-	Socket	Solder, Not Removable	10C3	09-058	QPL
							BA-6903	Boeing
							RG-142	QPL
							RG-223	QPL
							RG-58	QPL
							BA-5903	Boeing
249-0366-000	ITT Cannon	DPD	-	Socket	Not Removable	32C2	RG-59	QPL
							RG-62	QPL
							RG-7	QPL

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 13 (continued)

Coax Contact							Coax Cable	
Part Number	Supplier	Connector Series	Size	Type	Retention Description	Insert	Part Number	Supplier
249-0398-000	ITT Cannon	DPD	-	Socket	Not Removable	U32C2	RG-210	QPL
							RG-59	QPL
							RG-62	QPL
							RG-7	QPL
249-0750-000	ITT Cannon	DPX	5	Socket	Solder, Not Removable	32W2	09-058	QPL
							RG-58	QPL
							RG-142	QPL
							RG-223	QPL
							RG-5903	Boeing
							BA-6903	Boeing
						40W1	09-058	QPL
							RG-58	QPL
							RG-142	QPL
							RG-223	QPL
							RG-5903	Boeing
							BA-6903	Boeing
249-1390-000	ITT Cannon	DPX	5	Socket	Front Release Ring-Loc	D32C2	BA-5903	Boeing
							RG-58	QPL
						32W2	BA-5903	Boeing
							RG-58	QPL
						F40C1	BA-5903	Boeing
							RG-58	QPL
						40W1	BA-5903	Boeing
							RG-58	QPL
249-1398-000	ITT Cannon	DPX	5	Socket	Front Release Ring-Loc	32B2	RG-59	QPL
							RG-62	
						32W2	RG-59	QPL
							RG-62	
						40W1	RG-59	QPL
							RG-62	

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 13 (continued)

Coax Contact							Coax Cable	
Part Number	Supplier	Connector Series	Size	Type	Retention Description	Insert	Part Number	Supplier
249-1400-000	ITT Cannon	DPX	5	Socket	Front Release Ring-Loc	32A2	BA-5903	Boeing
							BMS 13-65 Type OF	QPL
							RG-58	QPL
						32W2	BA-5903	Boeing
							BMS 13-65 Type OF	QPL
							RG-58	QPL
						40B1	BA-5903	Boeing
							BMS 13-65 Type OF	QPL
							RG-58	QPL
40W1	BA-5903	Boeing						
	BMS 13-65 Type OF	QPL						
	RG-58	QPL						
249-1400-003	ITT Cannon	DPX	5	Socket	Front Release Ring-Loc	32A2	5020G3442	Raychem
						32W2		
						40B1		
						40W1		
249-1404-003	ITT Cannon	DPX	5	Socket	Front Release Ring-Loc	32C2	RG-316	QPL
						32W2		
						40W1		
249-1521-000	ITT Cannon	DPX	1	Pin	Mechanical Assembly	C2	BA-6903	Boeing
							RG-214	QPL
249-1522-000	ITT Cannon	DPX	1	Socket	Mechanical Assembly	C2	BA-6903	Boeing
							RG-214	QPL
249-1598-000	ITT Cannon	DPX	5	Socket	Solder, Not Removable	32W2	RG-142	QPL
						40W1		
249-1608-000	ITT Cannon	DPX	5	Socket	Front Release Ring-Loc	32W2	RG-59	QPL
						40W1		

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 13 (continued)

Coax Contact							Coax Cable	
Part Number	Supplier	Connector Series	Size	Type	Retention Description	Insert	Part Number	Supplier
249-1632-000	ITT Cannon	DPX	9	Socket	Rear Release	C8A	BA-5903	Boeing
							RG-58	QPL
						W8	BA-5903	Boeing
							RG-58	QPL
						D32C4	BA-5903	Boeing
							RG-58	QPL
						32W4	BA-5903	Boeing
							RG-58	QPL

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 13 (continued)

Coax Contact							Coax Cable	
Part Number	Supplier	Connector Series	Size	Type	Retention Description	Insert	Part Number	Supplier
249-1634-000	ITT Cannon	DPX	9	Socket	Rear Release	C8C	10-60875	Boeing
							5024A1314	Raychem
							BMS 13-42	Boeing
							BMS 13-48	Boeing
							BMS 13-65 Type OE	Boeing
							RG-174	QPL
							RG-316	QPL
						W8	10-60875	Boeing
							5024A1314	Raychem
							BMS 13-42	Boeing
							BMS 13-48	Boeing
							BMS 13-65 Type OE	Boeing
							RG-174	QPL
							RG-316	QPL
						B32C4	10-60875	Boeing
							5024A1314	Raychem
							BMS 13-42	Boeing
							BMS 13-48	Boeing
							BMS 13-65 Type OE	Boeing
							RG-174	QPL
							RG-316	QPL
						32W4	10-60875	Boeing
							5024A1314	Raychem
							BMS 13-42	Boeing
BMS 13-48	Boeing							
BMS 13-65 Type OE	Boeing							
RG-174	QPL							
RG-316	QPL							

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 13 (continued)

Coax Contact							Coax Cable	
Part Number	Supplier	Connector Series	Size	Type	Retention Description	Insert	Part Number	Supplier
249-1830-000	ITT Cannon	DPX	7	Socket	Mechanical Assembly	AC3	BA-5903	Boeing
							RG-58	QPL
249-1858-000	ITT Cannon	-	-	Pin	-	-	RG-115	QPL
249-1959-000	ITT Cannon	DPX	9	Socket	Rear Release	W8	RG-223	QPL
						32C4		
						32W4		
249-1982-000	ITT Cannon	DPX	9	Pin	Rear Release	W8	BMS 13-65 Type OF	Boeing
						32W4		
249-1983-000	ITT Cannon	DPX	9	Socket	Rear Release	W8	BMS 13-65 Type OF	Boeing
						32W4		
249-2020-001	ITT Cannon	DPX	9	Socket	Rear Release	W8	BMS 13-65 Type OF	Boeing
						32W4		
249-5008-000	ITT Cannon	DPA	-	Socket	Snap-In, Not Removable	L24C2	BA-5903	Boeing
249-5027-004	ITT Cannon	DPX	3	Socket	Mechanical Assembly	AC3	BA-6903	Boeing
							RG-214	QPL
249-9104-000	ITT Cannon	-	-	-	-	-	BA-5903	Boeing
							RG-233	QPL

Table 14

ALTERNATIVE COAX CONTACT PART NUMBERS

Specified Contact		Alternative Contact	
Part Number	Supplier	Part Number	Supplier
249-1983-000	ITT Cannon	249-2020-001	ITT Cannon
249-2020-001	ITT Cannon	249-1983-000	ITT Cannon

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

E. Ferrule Part Numbers

**Table 15
FERRULES FOR SPECIFIED CONTACTS AND COAX CABLES**

Contact	Cable	Boeing Standard	
		Inner Ferrule	Outer Ferrule
249-0268-000	BA6903	BACS13S128B	BACS13S187C
	RG-142	BACS13S128B	BACS13S205C
	RG-223	BACS13S134B	BACS13S219C
	RG-5903	BACS13S128B	BACS13S187C
249-0366-000	RG-59	BACS13S219B	BACS13S297C
	RG-62	BACS13S219B	BACS13S281C
	RG-71	BACS13S219B	BACS13S312C
249-0398-000	RG-59	BACS13S219B	BACS13S297C
	RG-62	BACS13S219B	BACS13S281C
	RG-71	BACS13S219B	BACS13S312C
249-0750-000	BA6903	BACS13S128B	BACS13S187C
	RG-142	BACS13S128B	BACS13S205C
	RG-223	BACS13S134B	BACS13S219C
	RG-5903	BACS13S128B	BACS13S187C
249-1398-000	RG-59	BACS13S232B	BACS13S297C
	RG-62	BACS13S232B	BACS13S297C
249-1400-000	BA5903	BACS13S156B	BACS13S219C
	RG-58	BACS13S165B	BACS13S232C
249-1598-000	RG-142	BACS13S165B	BACS13S261C
249-1608-000	RG-59	BACS13S232B	BACS13S297C
249-1858-000	RG-115	BACS13S297B	BACS13S405C

F. Replacement Polarization Component Part Numbers for DPX Connectors

**Table 16
REPLACEMENT POLARIZATION COMPONENT PART NUMBERS**

DPX Shell Type	Polarization Component		
	Type	Part Number	Supplier
Plug	Post	230-0113-001	ITT Cannon
	Nut	217-0979-000	ITT Cannon
	Washer	990-0019-062	ITT Cannon

20-71-11

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 16 (continued)

DPX Shell Type	Polarization Component		
	Type	Part Number	Supplier
Receptacle	Key	201-0070-000	ITT Cannon
	Plate	227-1153-000	ITT Cannon
	Screw	980-0000-635	ITT Cannon

2. PROTECTIVE CAP PART NUMBERS AND DESCRIPTION

A. General Data

Protective caps are used on DPA, DPD, and DPX connectors:

- To keep contamination from the contacts
- To prevent damage that can be caused by electrostatic discharge (ESD)
- To prevent mechanical damage.

B. Protective Cap Part Numbers

**Table 17
CONDUCTIVE PROTECTIVE CAP PART NUMBERS**

Connector		Protective Cap	
Series	Shell	Part Number	Supplier
DPX	Plug	DPXA-59	ITT Cannon
		025-0749-001	ITT Cannon
	Receptacle	DPXB-60-1	ITT Cannon
		025-0767-001	ITT Cannon

**Table 18
NON-CONDUCTIVE PROTECTIVE CAP PART NUMBERS**

Connector		Protective Cap	
Series	Shell	Part Number	Supplier
DPD	-	025-0585-000	ITT Cannon
DPA	Plug	DPA-59	ITT Cannon
		025-0572-000	ITT Cannon
	Receptacle	DPA-60	ITT Cannon
		025-0573-000	ITT Cannon
DPX	Plug	DPX-59	ITT Cannon
		025-0749-000	ITT Cannon
	Receptacle	DPX-60	ITT Cannon
		025-0767-000	ITT Cannon

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

3. INSERT CONFIGURATIONS

A. DPA Insert Configurations

**Table 19
CONNECTORS THAT HAVE DPA INSERT CONFIGURATIONS**

Part Number	Contact Description	Insert
DPA-32-33S	Solder, Not Removable	32
DPA-32-33S3	Solder, Not Removable	32
DPA-6-33S	Solder, Not Removable	6
DPA-6-34P	Solder, Not Removable	6
DPAF-2-33S	Solder, Not Removable	2
DPAL-L24C2-33S	Solder, Not Removable	L24C2
DPAMA-32-33S	Crimp, Removable	32
DPAMA-32-33S-1B	Crimp, Removable	32
DPAMA-32-33SN	Crimp, Removable	32
DPAMA-L24C2-33S	Crimp, Removable	L24C2

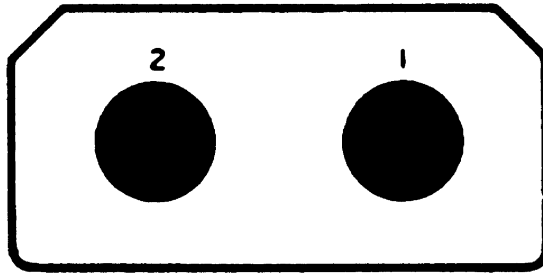
**Table 20
DPA CONNECTOR INSERT CONFIGURATIONS**

Insert	Contacts or Contact Cavities				
	Count	Size	Type	Notes	Reference
2	2	0404	-	Non-removable Solder Contacts	Figure 13
6	2	2020	-	Non-removable Solder Contacts	Figure 14
	2	1212	-	Non-removable Solder Contacts	
	2	0808	-	Non-removable Solder Contacts	
L24C2	22	2020	-	Crimp, Rear Release Contacts	Figure 15
	2	-	Coax	Rear Release Contacts	
	22	2020	-	Non-removable Solder Contacts	Figure 15
	2	-	Coax		
32	32	2020	-	Crimp, Rear Release Contacts	Figure 16
	32	2020	-	Non-removable Solder Contacts	Figure 16

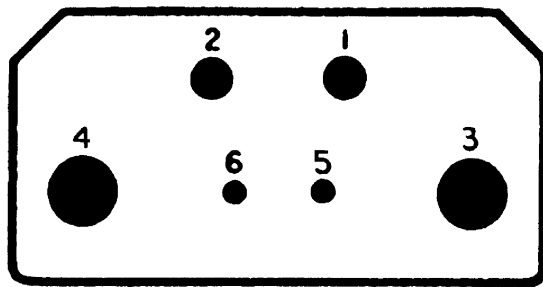
NOTE: Figure 13 through Figure 16 show the rear face of an insert that has socket contacts. The view of the rear face of an insert that has pin contacts is the mirror image of this view.

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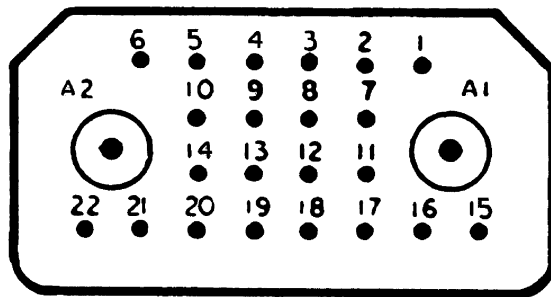
ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPA INSERT 2
Figure 13



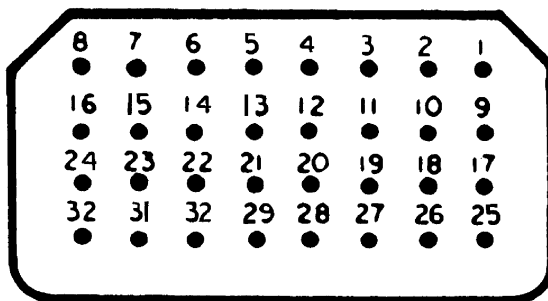
DPA INSERT 6
Figure 14



DPA INSERT L24C2
Figure 15

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ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPA INSERT 32
Figure 16

B. DPD Insert Configurations

Table 21
CONNECTORS THAT HAVE DPD INSERT CONFIGURATIONS

Part Number	Contact Description	Insert	
		A	B
DPD-32-33S-()	Solder, Not Removable	32	-
DPD-32-34P-()	Solder, Not Removable	32	-
DPD-45-33S-()	Solder, Not Removable	45	-
DPD-66-33S-()	Solder, Not Removable	-	-
DPD-A15-33S-()	Solder, Not Removable	-	-
DPD-A8-33S-()	Solder, Not Removable	-	-
DPD-B18-33S-()	Solder, Not Removable	-	-
DPDB-20-34P-()	Solder, Not Removable	-	-
DPDB-58-33S-()	Solder, Not Removable	-	-
DPD-G20-33S-()	Solder, Not Removable	G20	-
DPD-G20-34P-()	Solder, Not Removable	G20	-
DPD-N10-33S-()	Solder, Not Removable	N10	-
DPDB-58-34P-()	Solder, Not Removable	-	-
DPDB-G20-34P-()	Solder, Not Removable	G20	-
DPDBMA-G20-33S-()	Crimp, Removable	G20	-
DPDBMA-G20-34P-()	Crimp, Removable	G20	-
DPD-G20-33S-()	Solder, Not Removable	G20	-
DPD-G20-34P-()	Solder, Not Removable	G20	-
DPDMA-32C2-33S-()	Crimp, Removable	32C2	-
DPDMA-45-33S-()	Crimp, Removable	45	-

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 21 (continued)

Part Number	Contact Description	Insert	
		A	B
DPDMA-76-33S-()	Crimp, Removable	76	-
DPDMA-A32-33S-()	Solder, Removable in A1, A2	32C2	-
DPDMA-G20-33S-()	Crimp, Removable	G20	-
DPDMA-U32C2-33S-()	Crimp, Removable	U32C2	-
DPDMB-32-33S-()	Crimp, Removable	32	-
DPDMB-45-33S-()	Crimp, Removable	45	-
DPDMB-76-33S-()	Crimp, Removable	76	-
DPDMB-78-33S-()	Crimp, Removable	78	-
DPDMB-U32C2-33S-()	Crimp, Removable	U32C2	-
DPD2MA-152-33S-()	Crimp, Removable	76	76
DPD2MB-152-33S-()	Crimp, Removable	76	76

Table 22

DPD CONNECTOR INSERT CONFIGURATIONS

Insert	Contacts or Contact Cavities				
	Count	Size	Type	Notes	Reference
20	-	-	-	-	-
32	28	1616	-	Non-removable Solder Contacts	Figure 19
	4	0808	-		
32C2	28	1616	-	Crimp, Rear Release Contacts	Figure 20
	2	0808	-		
	2	-	Coax	249-0366-000, Not Removable	
45	43	1616	-	Non-removable Solder Contacts	Figure 21
	2	1010	-		
58	-	-	-	-	-
66	-	-	-	-	-
76	73	2020	-	Non-removable Solder Contacts	Figure 22
	3	1616	-		
78	78	1616	-	Non-removable Solder Contacts	Figure 23
A8	-	-	-	-	-
A15	-	-	-	-	-

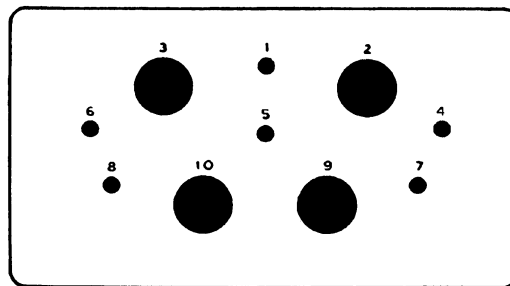
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ITT CANNON DPX, DPD, AND DPA CONNECTORS

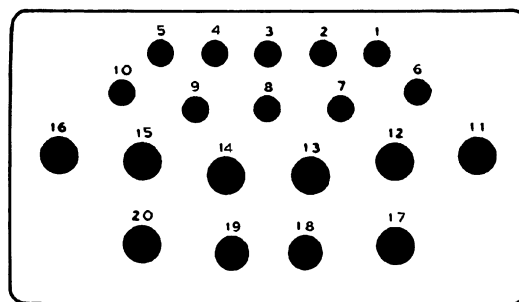
Table 22 (continued)

Insert	Contacts or Contact Cavities				Reference
	Count	Size	Type	Notes	
A32	30	1616	-	Non-removable Solder Contacts	Figure 20
	2	0808	-	Removable Contacts	
B18	-	-	-	-	-
G20	10	1414	-	Crimp, Rear Release Contacts	Figure 18
	2	1010	-		
	8	0808	-		
N10	5	0404	-	Non-removable Solder Contacts	Figure 17
	6	1616	-		
U32C2	28	1616	-	Crimp, Rear Release Contacts	Figure 20
	2	0808	-		
	2	-	Coax	249-0398-000, Not Removable	

NOTE: Figure 17 through Figure 23 show the rear face of an insert that has socket contacts. The view of the rear face of an insert that has pin contacts is the mirror image of this view.



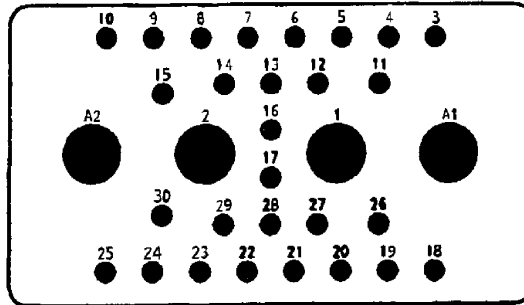
DPD INSERT N10
Figure 17



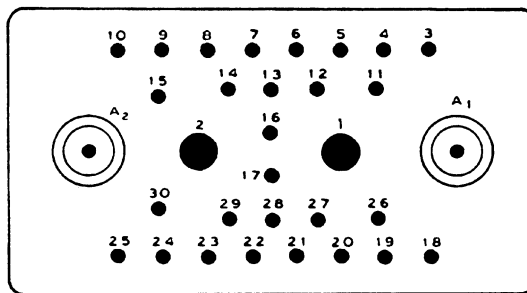
DPD INSERT G20
Figure 18

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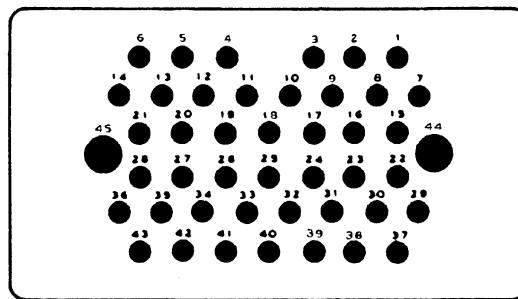
ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPD INSERT 32
Figure 19



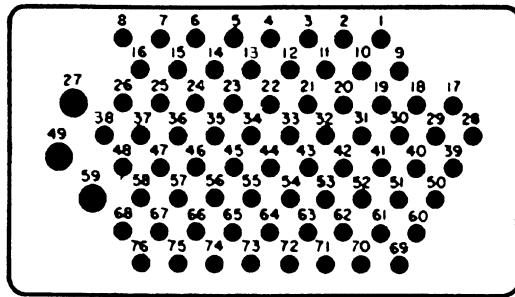
DPD INSERT 32C2
Figure 20



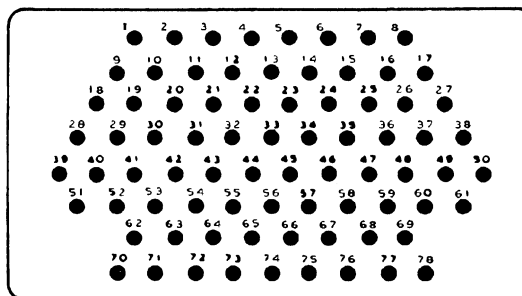
DPD INSERT 45
Figure 21

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ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPD INSERT 76
Figure 22



DPD INSERT 78
Figure 23

C. DPX Insert Configurations

Table 23
CONNECTORS THAT HAVE DPX INSERT CONFIGURATIONS

Part Number	Contact Description	Insert				Notes
		A	B	C	D	
CE9307-10	Solder, Not Removable	23	7	-	-	Receptacle
CE9307-11	Solder, Not Removable	23	7	-	-	Plug
CE9307-18	Insert A Crimp, Insert B Solder	26	7	-	-	Plug
CE9307-19	Insert A Crimp, Insert B Solder	26	7	-	-	Receptacle
DPX-17-33S-()	Solder, Not Removable	17	-	-	-	-
DPX-22017-()	Solder, Not Removable	-	-	-	-	-
DPXA-8-33S-()	Solder, Not Removable	8	-	-	-	-
DPXA-32-33S-()	Solder, Not Removable	32	-	-	-	-
DPXA-32-34P-()	Solder, Not Removable	32	-	-	-	-

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 23 (continued)

Part Number	Contact Description	Insert				Notes
		A	B	C	D	
DPX2-67S32C2S-33S-()	Solder, Not Removable	67	32C2	-	-	-
DPX2-B10C3SD32C2S-33B-()	Solder, Not Removable	B10C3	D32C2	-	-	-
DPX2-F40C1SF40C1S-33B-()	Solder, Not Removable	F40C1	F40C1	-	-	-
DPX2DA-26S7S-33B-()	Insert A Crimp, Insert B Solder	26	7	-	-	-
DPX2EF-AC3S67S-33B-()	-	AC3	67	-	-	-
DPX2MA-00SD32W4S-33B-()	Crimp, Removable	00	D32 [~] W4	-	-	-
DPX2MA-00S57S-33-()	Crimp, Removable	00	57	-	-	-
DPX2MA-00S57S-33B-()	Crimp, Removable	00	57	-	-	-
DPX2MA-106P106P-33B-()	Crimp, Removable	106	106	-	-	-
DPX2MA-106P57P-33B-()	Crimp, Removable	106	57	-	-	-
DPX2MA-106PD32C2S-33B-()	Crimp, Removable	106	D32C2	-	-	-
DPX2MA-106S00S-34B-()	Crimp, Removable	106	00	-	-	-
DPX2MA-106S106S-34B-()	Crimp, Removable	106	106	-	-	-
DPX2MA-26P26P-34B-()	Crimp, Removable	26	26	-	-	-
DPX2MA-26S26S-33B-()	Crimp, Removable	26	26	-	-	-
DPX2MA-26S45S-33B-()	Crimp, Removable	26	45	-	-	-
DPX2MA-26S57S-33B-()	Crimp, Removable	26	57	-	-	-
DPX2MA-32W4SD106P-33B-()	Crimp, Removable	32W4	D106	-	-	-
DPX2MA-40B1S40B1S-33B-()	Crimp, Removable	40B1	40B1	-	-	-
DPX2MA-40S40S-33B-()	Crimp, Removable	40	40	-	-	-
DPX2MA-40W1S40W1S-33B-()	Crimp, Removable	40W1	40W1	-	-	-
DPX2MA-45S40S-33B-()	Crimp, Removable	45	40	-	-	-
DPX2MA-45S45S-33B-()	Crimp, Removable	45	45	-	-	-
DPX2MA-57P-106S-34B-()	Crimp, Removable	57	106	-	-	-
DPX2MA-57S00S-33B-()	Crimp, Removable	57	00	-	-	-
DPX2MA-57S106P-33B-()	Crimp, Removable	57	106	-	-	-
DPX2MA-57S26S-33B-()	Crimp, Removable	57	26	-	-	-
DPX2MA-57S40S-32B-()	Crimp, Removable	57	40	-	-	-
DPX2MA-57S45S-33B-()	Crimp, Removable	57	45	-	-	-
DPX2MA-57S57S-33B-()	Crimp, Removable	57	57	-	-	-
DPX2MA-57S57S-34B-()	Crimp, Removable	57	57	-	-	-

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STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 23 (continued)

Part Number	Contact Description	Insert				Notes
		A	B	C	D	
DPX2MA-57S67S-33B-()	Crimp, Removable	57	67	-	-	-
DPX2MA-57SD106P-33B-()	Crimp, Removable	57	D106	-	-	-
DPX2MA-67S67S-33B-()	Crimp, Removable	67	67	-	-	-
DPX2MA-67S32A2S-33B-()	Crimp, Removable	67	32A2	-	-	-
DPX2MA-67S32C2S-33B-()	Crimp, Removable	67	32C2	-	-	-
DPX2MA-67S32W2S-33B-()	Crimp, Removable	67	32W2	-	-	-
DPX2MA-67S67S-33B-()	Crimp, Removable	67	67	-	-	-
DPX2MA-67SD8S-33B-()	Crimp, Removable	67	8	-	-	-
DPX2MA-A106PA106P-33B-()	Crimp, Removable	A106	A106	-	-	-
DPX2MA-67SA106P-33B-()	Crimp, Removable	67	A106	-	-	-
DPX2MA-AC3S67S-33B-()	Crimp, Removable	AC3	67	-	-	-
DPX2MA-C2MS57S-33B-()	Crimp, Removable	C2M	57	-	-	-
DPX2MA-C2MSF40C1S-33B-()	Crimp, Removable	C2M	40C1	-	-	-
DPX2MA-C2S57S-33B-()	Crimp, Removable	C2	57	-	-	-
DPX2MA-C8AS67S-33B-()	Crimp, Removable	C8A	67	-	-	-
DPX2MA-C8ASC8AS-33B-()	Crimp, Removable	C8A	C8A	-	-	-
DPX2MA-C8CS67S-33B-()	Crimp, Removable	C8C	67	-	-	-
DPX2MA-D106P40B1S-33B-()	Crimp, Removable	D106	40B1	-	-	-
DPX2MA-D106PC8AS-33B-()	Crimp, Removable	D106	C8A	-	-	-
DPX2MA-D106PD106P-33B-()	Crimp, Removable	D106	D106	-	-	-
DPX2MA-D32C2S57S-33B-()	Crimp, Removable	D32C2	57	-	-	-
DPX2MA-D32C2S67S-33B-()	Crimp, Removable	D32C2	67	-	-	-
DPX2MA-F40C1SF40C1S-33B-()	Crimp, Removable	F40C1	F40C1	-	-	-
DPX2MA-W8S67S-33B-()	Crimp, Removable	W8	67	-	-	-
DPX2MB-00S67S-33B-()	Crimp, Removable	00	67	-	-	-
DPX2MB-26S26S-33B-()	Crimp, Removable	26	26	-	-	-
DPX2MB-26S67S-33A-()	Crimp, Removable	26	67	-	-	-
DPX2MB-26S8S-33B-()	Crimp, Removable	26	8	-	-	-
DPX2MB-26SC8CS-33B-()	Crimp, Removable	26	C8C	-	-	-
DPX2MB-40B1S40B1S-33B-()	Crimp, Removable	40B1	40B1	-	-	-
DPX2MB-40S40S-33B-()	Crimp, Removable	40	40	-	-	-
DPX2MB-40S40S-33F-()	Crimp, Removable	40	40	-	-	-

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STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 23 (continued)

Part Number	Contact Description	Insert				Notes
		A	B	C	D	
DPX2MB-45S45S-33B-()	Crimp, Removable	45	45	-	-	-
DPX2MB-57S00S-33B-()	Crimp, Removable	57	00	-	-	-
DPX2MB-57S57S-33A-()	Crimp, Removable	57	57	-	-	-
DPX2MB-57S57S-33B-()	Crimp, Removable	57	57	-	-	-
DPX2MB-67S67S-33B-()	Crimp, Removable	67	67	-	-	-
DPX2MB-AC3S67S-33B-()	Crimp, Removable	AC3	67	-	-	-
DPX2MB-C2DS57S-33B-()	Crimp, Removable	C2D	57	-	-	-
DPX2MB-D32C2S57S-33B-()	Crimp, Removable	D32C2	57	-	-	-
DPX2P-67S32C2S-33B-()	Crimp, Removable	67	32C2	-	-	-
DPX2-ZA16C3S26S-33B-()	-	-	26	-	-	-
DPX2-ZA16C3SB10C3S-33B-()	-	-	B10C3	-	-	-
DPX3MA-32W4S-D106P-67S-33-()	Crimp, Removable	32W4	D106	67	-	-
DPX3MA66565-252	Crimp, Removable	3	26	67	-	Polarization Code 66
DPX3MA-A318-A318-33P-()	Crimp, Removable	A106	A106	A106	-	-
DPX3MA-B32C4S-D106P-67S-33-()	Crimp, Removable	B32C4	D106	67	-	-
DPX3MA-B96-33S-()	Crimp, Removable	32W4	32W4	32W4	-	-
DPX3MA-D32C4S-D106P-67S-33-()	Crimp, Removable	D32C4	D106	67	-	-
DPX3MA-E96-33S-0001	Crimp, Removable	3	26	67	-	Polarization Code 66
DPX3MB-26S-67S-67S-33B-()	Crimp, Removable	26	67	67	-	-
DPX3ME-D205-33PS-()	Crimp, Removable	-	-	-	-	-
DPX4MA-105-33S-()	Crimp, Removable	W8	57	W8	32W4	-
DPX4MA-A307-33PS-()	Crimp, Removable	-	-	-	-	-
DPX51252-1-()	Solder, Not Removable	-	-	-	-	-
DPX51252-2-()	Solder, Not Removable	-	-	-	-	-
DPXAMA-26-33S-()	Crimp, Removable	26	-	-	-	-
DPXAMA-26-34P-()	Crimp, Removable	26	-	-	-	-
DPXAMA-32-33S-()	Crimp, Removable	32	-	-	-	-
DPXAMA-32-34P-()	Crimp, Removable	32	-	-	-	-
DPXAMA-32B2-33S-()	Crimp, Removable	32B2	-	-	-	-



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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 23 (continued)

Part Number	Contact Description	Insert				Notes
		A	B	C	D	
DPXAMA-40-33S(-)	Crimp, Removable	40	-	-	-	-
DPXAMA-57-34P(-)	Crimp, Removable	57	-	-	-	-
DPXAMA-A10-33S(-)	Crimp, Removable	A10	-	-	-	-
DPXAMA-26-33S(-)	Crimp, Removable	26	-	-	-	-
DPXAMA-26-34P(-)	Crimp, Removable	26	-	-	-	-
DPXAMA-32B2-33S(-)	Crimp, Removable	32B2	-	-	-	-
DPXAMA-40-33P(-)	Crimp, Removable	40	-	-	-	-
DPXAMA-40-33S(-)	Crimp, Removable	40	-	-	-	-
DPXAMA-45-33S(-)	Crimp, Removable	45	-	-	-	-
DPXAMB-26-33S(-)	Crimp, Removable	26	-	-	-	-
DPXAMB-32B2-33S(-)	Crimp, Removable	32B2	-	-	-	-
DPXAMB-32W2-33S(-)	Crimp, Removable	32B2	-	-	-	-
DPXAMB-57-33S(-)	Crimp, Removable	57	-	-	-	-
DPXB-17-33S(-)	Solder, Not Removable	17	-	-	-	-
DPXB-32-33S(-)	Solder, Not Removable	32	-	-	-	-
DPXB-40-33S(-)	Solder, Not Removable	40	-	-	-	-
DPXB-45-33S(-)	Solder, Not Removable	45	-	-	-	-
DPXB-8-33S(-)	Solder, Not Removable	8	-	-	-	-
DPXB-32-33S(-)	Solder, Not Removable	32	-	-	-	-
DPXBMA-10-33P(-)	Crimp, Removable	10	-	-	-	-
DPXBMA-32-33S(-)	Crimp, Removable	32	-	-	-	-
DPXBMA-32W4-33S(-)	Crimp, Removable	32W4	-	-	-	-
DPXBMA-40-33S(-)	Crimp, Removable	40	-	-	-	-
DPXBMA-45-33S(-)	Crimp, Removable	45	-	-	-	-
DPXBMA-57-33S(-)	Crimp, Removable	57	-	-	-	-
DPXBMA-67-33S(-)	Crimp, Removable	67	-	-	-	-
DPXBMA-67-33S(-)	Crimp, Removable	67	-	-	-	-
DPXBMA-8-33S(-)	Crimp, Removable	8	-	-	-	-
DPXBMA-8-34S(-)	Crimp, Removable	8	-	-	-	-
DPXBMA-B32C4-33S(-)	Crimp, Removable	B32C4	-	-	-	-
DPXBMA-D106-33P(-)	Crimp, Removable	D106	-	-	-	-
DPXBMA-D32C4-33S(-)	Crimp, Removable	32W4	-	-	-	-

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 23 (continued)

Part Number	Contact Description	Insert				Notes
		A	B	C	D	
DPXBMA-D32W4-33S-()	Crimp, Removable	32W4	-	-	-	-
DPXBMA-32W4-33S-()	Crimp, Removable	32W4	-	-	-	-
DPXBMA-57-33S-()	Crimp, Removable	57	-	-	-	-
DPXBMA-67-33S-()	Crimp, Removable	67	-	-	-	-
DPXBMA-6733S-()	Crimp, Removable	67	-	-	-	-
DPXBMA-8-34S-()	Crimp, Removable	8	-	-	-	-
DPXBMA-D106-33P-()	Crimp, Removable	D106	-	-	-	-
DPXBMB-40-33S-()	Crimp, Removable	40	-	-	-	-
DPXBMB-45-33S-()	Crimp, Removable	45	-	-	-	-
DPXBMB-57-33S-()	Crimp, Removable	57	-	-	-	-
DPXBMB-67-33S-()	Crimp, Removable	67	-	-	-	-
DPXBMB-8-33S-()	Crimp, Removable	8	-	-	-	-
DPXBME-10-33S-()	Crimp, Removable	10	-	-	-	-
DPXBME-40-33S-()	Crimp, Removable	40	-	-	-	-
DPXBME-57-33S-()	Crimp, Removable	57	-	-	-	-
DPXBNA-67M-33S-()	Crimp, Removable	67	-	-	-	-
DPXMA-26-33S-()	Crimp, Removable	26	-	-	-	-
DPXRC-20C5-33A1-()	-	-	-	-	-	-

Table 24

DPX CONNECTOR INSERT CONFIGURATIONS

Insert	Contacts or Contact Cavities				Reference
	Count	Size	Type	Notes	
00	-	-	-	Blank Insert	Figure 24
10	8	2020	-	Crimp, Rear Release	Figure 32
	2	0808	-		
106	106	2222	-	Crimp, Rear Release; 106 is a satisfactory alternative to A106 and D106.	Figure 47
17	17	2020	-	Fixed Position Solder, Non-removable	Figure 36
23	23	2020	-	Fixed Position Solder, Non-removable	Figure 37
26	26	1616	-	Crimp, Rear Release	Figure 38
				Fixed Position Solder, Non-removable	
3	3	0406	-	Crimp, Rear Release	Figure 26

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 24 (continued)

Insert	Contacts or Contact Cavities				Reference
	Count	Size	Type	Notes	
32	29	2020	-	Fixed Position Solder, Non-removable	Figure 39
	3	1616	-		
32A2	30	2020	-	Crimp, Rear Release	Figure 40
	2	5	Coax	Front Release, Ring-Loc Retention	
32B2	30	2020	-	Crimp, Rear Release	Figure 40
	2	5	Coax	Front Release, Ring-Loc Retention	
32C2	30	2020	-	Crimp, Rear Release	Figure 40
	2	5	Coax	Front Release, Ring-Loc Retention	
32W2	30	2020	-	Crimp, Rear Release	Figure 40
	2	5	Coax	Front Release, Ring-Loc Retention	
32W4	24	2020HD	-	Crimp, Rear Release	Figure 41
	4	1616	-		
	4	9	Coax	Rear Release	
40	40	2020	-	Crimp, Rear Release	Figure 42
				Fixed Position Solder, Non-removable	
40B1	39	2020	-	Crimp, Rear Release	Figure 43
	1	5	Coax	Front Release, Ring-Loc Retention	
40W1	39	2020	-	Crimp, Rear Release	Figure 43
	1	5	Coax	Front Release, Ring-Loc Retention	
45	45	2020	-	Crimp, Rear Release	Figure 44
				Fixed Position Solder, Non-removable	
57	57	2020	-	Crimp, Rear Release	Figure 45
				Fixed Position Solder, Non-removable	
67	64	2020HD	-	Crimp, Rear Release	Figure 46
	3	1616	-		
	64	2020	-	Fixed Position Solder, Non-removable	Figure 46
	3	1616	-		
67M	64	2020HD	-	Crimp, Rear Release	Figure 46
	3	1616	-		
7	7	0808	-	Fixed Position Solder, Non-removable	Figure 28
8	8	12	-	Crimp, Rear Release	Figure 29
				Fixed Position Solder, Non-removable	

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Table 24 (continued)

Insert	Contacts or Contact Cavities				Reference
	Count	Size	Type	Notes	
A10	8	1616	-	Crimp, Rear Release	Figure 33
	2	0406	-		
A106	106	2222	-	Crimp, Rear Release; A106 is a satisfactory alternative to 106 and D106.	Figure 47
AC3	2	7	Coax	Fixed Position Solder, Non-removable	Figure 27
	1	3			
	2	7	Coax	Mechanical Assembly - Refer to Paragraph 4.C.. or Paragraph 7.B..	
	1	3			
B10C3	7	2020HD	-	Crimp, Rear Release	Figure 34
	3	11	Coax	Rear Release	
B16C3	13	1616	-	Crimp, Rear Release	Figure 35
	3	5	Coax	Front Release, Ring-Loc Retention	
B32C4	24	2020HD	-	Crimp, Rear Release	Figure 41
	4	1616	-		
	4	9	Coax	Rear Release	
C2	2	1	Coax	Plug connector has ITT Cannon 249-1522-000 socket contacts	Figure 25
C2D	2	1	Coax	-	Figure 25
C2M	2	1	Coax	Plug connector has ITT Cannon 249-5027-001 socket contacts	Figure 25
C8A	8	9	Coax	Rear Release	Figure 31
C8C	8	9	Coax	Rear Release	Figure 31
D106	106	2222	-	Crimp, Rear Release; D106 is a satisfactory alternative to 106 and A106.	Figure 47
D32C2	30	2020	-	Crimp, Rear Release	Figure 40
	2	5	Coax	Front Release, Ring-Loc Retention	
D32C4	24	2020HD	-	Crimp, Rear Release	Figure 41
	4	1616	-		
	4	9	Coax	Rear Release	
D32W4	24	2020HD	-	Crimp, Rear Release	Figure 41
	4	1616	-		
	4	9	Coax	Rear Release	
D8	4	1616	-	Crimp, Rear Release	Figure 30
	4	1212	-		

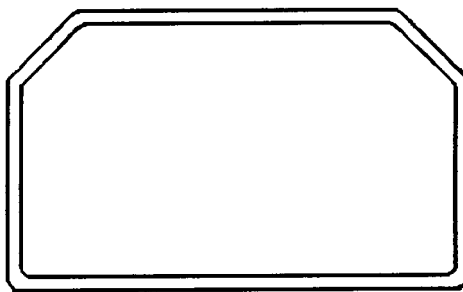
STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

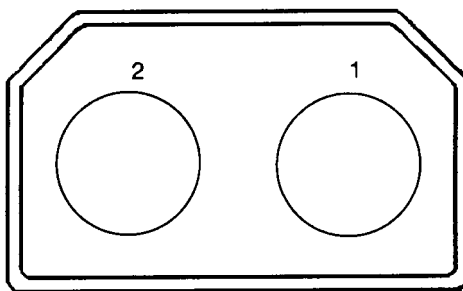
Table 24 (continued)

Insert	Contacts or Contact Cavities				Reference
	Count	Size	Type	Notes	
F40C1	39	2020	-	Crimp, Rear Release	Figure 43
	1	5	Coax	Front Release, Ring-Loc Retention	
W8	8	9	Coax	Rear Release	Figure 31
ZA16~ C3	13	1616	-	-	Figure 35
	3	5	Coax	-	

NOTE: Figure 24 through Figure 47 show the rear face of an insert that has socket contacts. The view of the rear face of an insert that has pin contacts is the mirror image of this view.



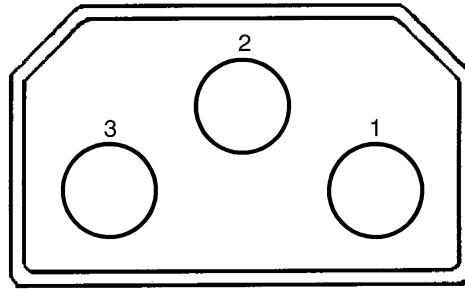
DPX INSERT 00
Figure 24



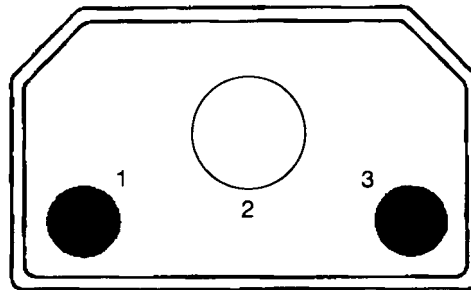
DPX INSERT C2
Figure 25

STANDARD WIRING PRACTICES MANUAL

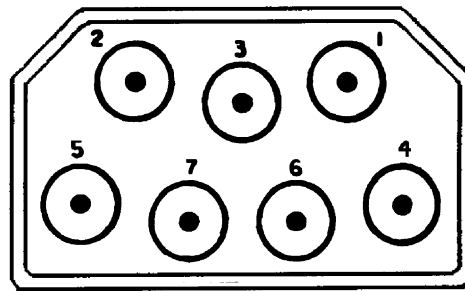
ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPX INSERT 3
Figure 26



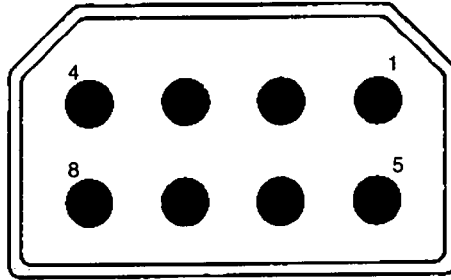
DPX INSERT AC3
Figure 27



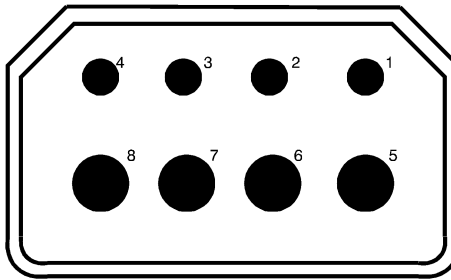
DPX INSERT 7
Figure 28

STANDARD WIRING PRACTICES MANUAL

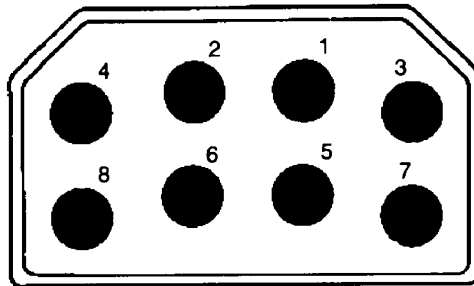
ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPX INSERT 8
Figure 29



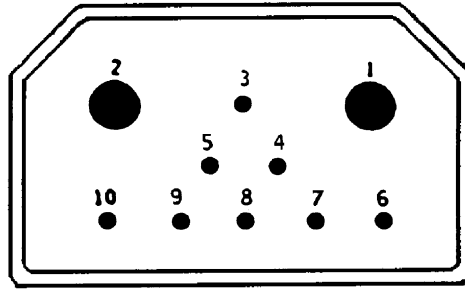
DPX INSERT D8
Figure 30



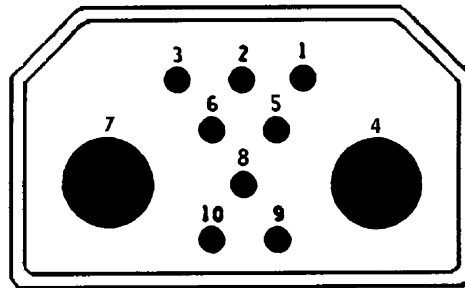
DPX INSERT W8
Figure 31

STANDARD WIRING PRACTICES MANUAL

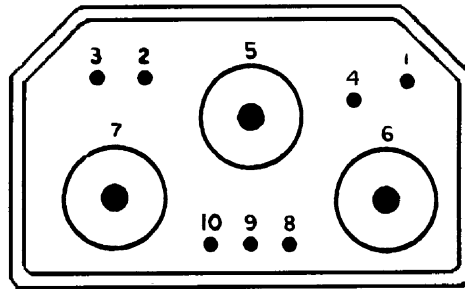
ITT CANNON DPX, DPD, AND DPA CONNECTORS



DPX INSERT 10
Figure 32



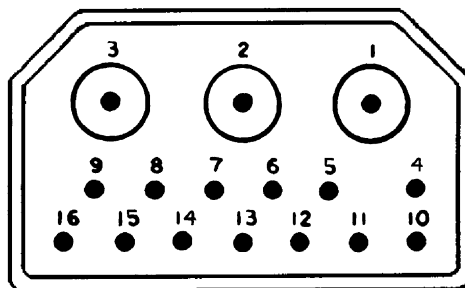
DPX INSERT A10
Figure 33



DPX INSERT 10W3
Figure 34

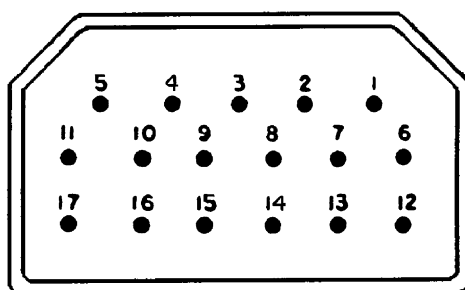
STANDARD WIRING PRACTICES MANUAL

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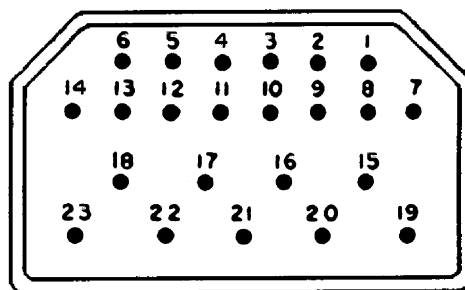
DPX INSERT B16C3

Figure 35



DPX INSERT 17

Figure 36

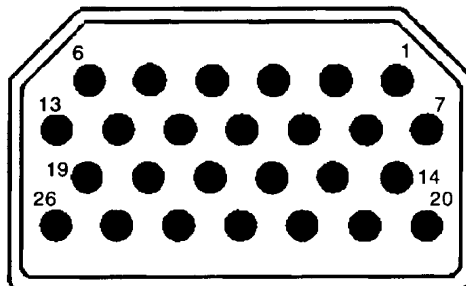


DPX INSERT 23

Figure 37

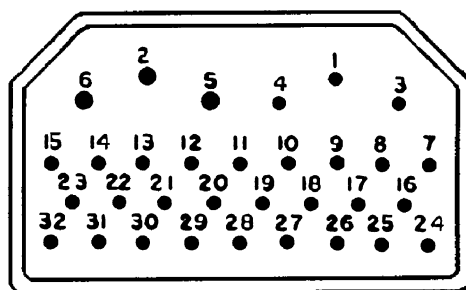
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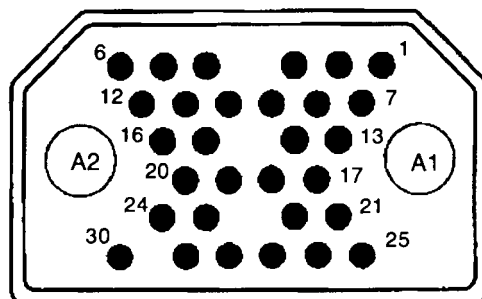
DPX INSERT 26

Figure 38



DPX INSERT 32

Figure 39

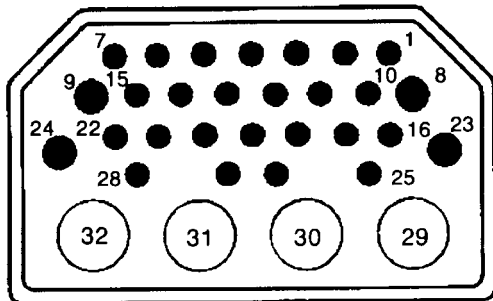


DPX INSERT 32W2

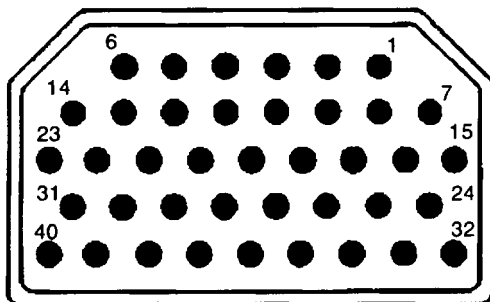
Figure 40

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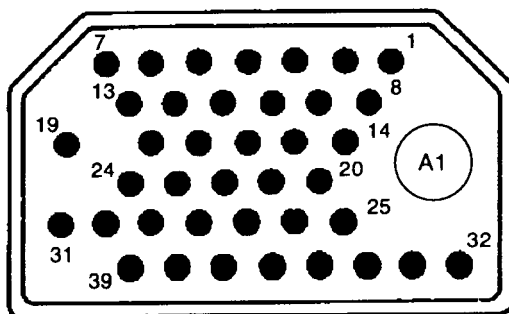
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DPX INSERT 32W4
Figure 41



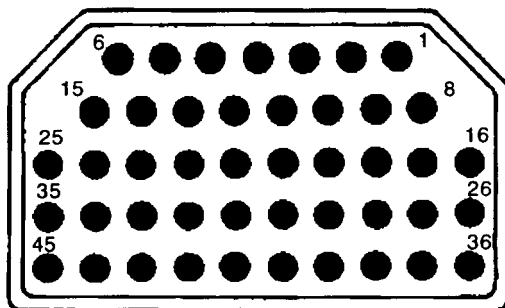
DPX INSERT 40
Figure 42



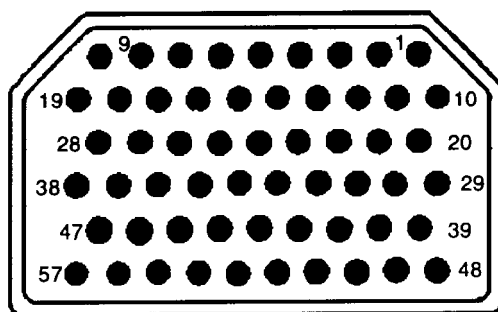
DPX INSERT 40W1
Figure 43

STANDARD WIRING PRACTICES MANUAL

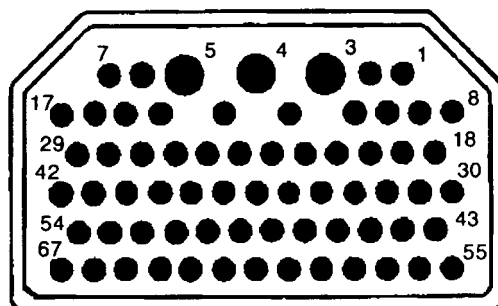
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DPX INSERT 45
Figure 44



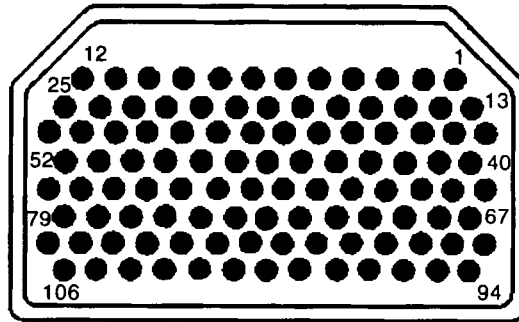
DPX INSERT 57
Figure 45



DPX INSERT 67
Figure 46

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DPX INSERT 106
Figure 47

4. CONNECTOR DISASSEMBLY

A. Contact Removal

Table 25
CONTACT REMOVAL TOOLS

Contact Size	Removal Tool		
	Part Number	Size	Type
2222	282880	22	Rear Release
	282890		
	8660-162		
	91066-1		
	ATBO2054		
	ATC1054		
	CET-DPXMA-22		
	CIET-22		
	CIET-22DPXMA		
	DRK2663		
	DRK266J		
	M81969/1-01		
	MS3156-22		

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Table 25 (continued)

Contact Size	Removal Tool		
	Part Number	Size	Type
2020HD	282881	20HD	Rear Release
	282891		
	91066-4		
	ATC2073		
	CET-20D-1		
	CIET		
	CIET-20 HDL		
	DRK145		
	M81969/1-02		
	M81969/14-10		
	MS3156-20		
	ST2220-3-33		
	2020		
91066-2			
ATR1080			
ATR2080			
CET-20			
CET-20-8			
CIET-20			
M81969/14-11			
ST2220-3-6			
1616	282892	16	Rear Release
	282929		
	91066-3		
	CET-16-15		
	CET-16-9		
	DRK83-16		
	M81969/1-03		
	MS3156-16		
	ST2220-3-7		

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Table 25 (continued)

Contact Size	Removal Tool		
	Part Number	Size	Type
1212	282945	12	Rear Release
	91078-1		
	CE912-4		
	CET-12-4		
	CIET-12		
	M81969/28-02		
	MS3178-002		
0808	CET-8-2	8	Rear Release
0406	CET-4-8	4	Rear Release

Table 26

COAX CONTACT REMOVAL TOOLS

Coax Contact			Removal Tool	
Part Number	Size	Type	Part Number	Type
249-0268-000	-	Non-removable	-	-
249-0366-000	-	Non-removable	-	-
249-0398-000	-	Non-removable	-	-
249-0750-000	-	Non-removable	-	-
249-1390-000	5	Ring-Loc Front Release	CET-C4	Front Release Impact Extraction
249-1398-000	5	Ring-Loc Front Release	CET-C4	Front Release Impact Extraction
249-1400-000	5	Ring-Loc Front Release	CET-C4	Front Release Impact Extraction
249-1400-003	5	Ring-Loc Front Release	CET-C4	Front Release Impact Extraction
249-1404-003	5	Ring-Loc Front Release	CET-C4	Front Release Impact Extraction
249-1521-000	1	Mechanical Assembly	-	-
249-1522-000	1	Mechanical Assembly	-	-
249-1598-000	5	Ring-Loc Front Release	CET-C4	Front Release Impact Extraction
249-1608-000	5	Ring-Loc Front Release	CET-C4	Front Release Impact Extraction
249-1632-000	9	Rear Release	CET-C8	Rear Release

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Table 26 (continued)

Coax Contact			Removal Tool	
Part Number	Size	Type	Part Number	Type
249-1634-000	9	Rear Release	CET-C8	Rear Release
249-1830-000	7	Mechanical Assembly	-	-
249-1858-000	11	Rear Release	CET-4-8	Rear Release
249-1959-000	9	Rear Release	CET-C8	Rear Release
249-1982-000	9	Rear Release	CET-C8	Rear Release
249-1983-000	9	Rear Release	CET-C8	Rear Release
249-2020-001	9	Rear Release	CET-C8	Rear Release
249-5008-000	-	Snap-In, Non-removable	-	-
249-5027-004	3	Mechanical Assembly	-	-
249-9104-000	-	-	CET-C11	-

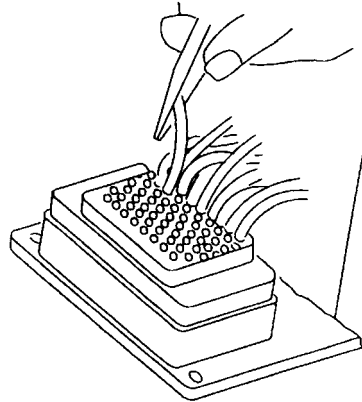
NOTE: Some coax contacts, and contacts in solder type connectors are not removable from some connectors. Refer to:

- Table 1 for the connector part number
- Table 13 for the coax contact part number
- Table 20 for the DPA insert configuration
- Table 22 for the DPD insert configuration
- Table 24 for the DPX insert configuration.

- (1) If the contact is in a DPX AC3 insert, refer to Paragraph 4.C. for the procedure to remove the contacts from the insert.
- (2) If the contact is a snap-in, non-removable contact, refer to Paragraph 4.D. for the procedure to replace the contact.
- (3) If a contact removal tool is specified, make a selection of a removal tool from:
 - Table 25 for the removal of standard contacts
 - Table 26 for the removal of coax contacts.
- (4) If the contact removal tool specified in Table 26 is the CET-C4 front release, impact extraction tool, refer to Paragraph 4.B. for the procedure to remove a Ring-Loc contact.
- (5) At the rear of the connector, put tip of the rear release removal tool on the wire. Refer to Figure 48.

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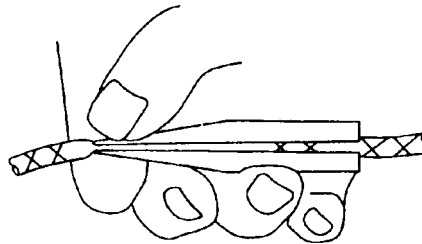
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POSITION OF THE WIRE IN THE REMOVAL TOOL

Figure 48

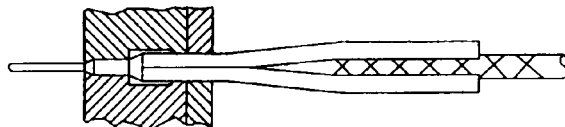
- (6) Put the wire through the forward part of the tool. Refer to Figure 49.



POSITION OF THE WIRE IN THE FORWARD PART OF THE REMOVAL TOOL

Figure 49

- (7) Align the removal tool and the contact cavity.
(8) Push the tool into the contact cavity until it stops. Refer to Figure 50.
Make sure to keep the tool aligned with the contact cavity.



REMOVAL TOOL FULLY INSERTED IN THE CONTACT CAVITY

Figure 50

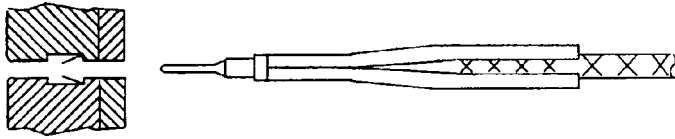
CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN THE TOOL IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (9) Carefully pull the wire and the tool from the contact cavity at the same time. Refer to Figure 51.
Make sure to keep the tool aligned with the contact cavity.

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TOOL AND CONTACT REMOVED FROM THE CONTACT CAVITY
Figure 51

- (10) If the contact is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees on its axis.
 - (c) Do Step (6) through Step (9) again.

B. Removal of Front Release Ring-Loc Coax Contacts

NOTE: This procedure is applicable for the removal of size 5 Ring-Loc coax contacts in the 32W2 or the 40W1 contact configurations in DPX connectors. Refer to:

- Table 13 for the coax contact
- Table 24 for the DPX insert configuration.

Table 27
NECESSARY TOOLS

Description	Supplier
CET-C4 Impact Extraction Tool	ITT Cannon
Hammer or Mallet	an available source

- (1) Push the seal sleeve and the support bushing back on the cable away from the connector.
- (2) At the front face of the connector, put the CET-C4 contact removal tool on the engaging end of the contact.
- (3) Push the tool into the connector until it stops.
- (4) Tap the end of the tool with a hammer until the contact is released.

CAUTION: APPLY ONLY THE SUFFICIENT AMOUNT OF FORCE NECESSARY TO RELEASE THE CONTACT.

- (5) Carefully pull the contact assembly from the rear of the connector.

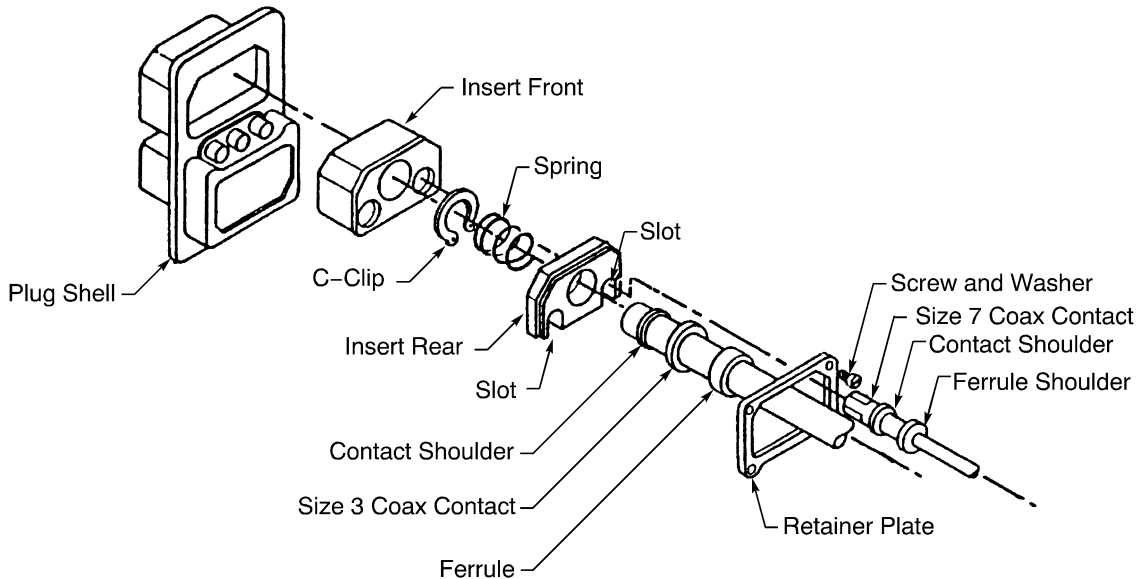
C. Removal of Coax Contacts from the DPX AC3 Insert

Table 28
NECESSARY TOOLS

Description	Supplier
Snap Ring Pliers	An available source
Screwdriver	An available source

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CONTACT REMOVAL FROM THE DPX AC3 INSERT

Figure 52

Refer to Figure 52:

- (1) Remove the retainer plate screws and washers.
Make sure to keep the screws and washers for the reassembly of the connector.
- (2) Move the retainer plate away from the connector and rearward on the cables.
- (3) Push on the engaging end of the contacts to move the contacts rearward in the connector.
- (4) Pull the insert rear and the three coax contacts rearward from the connector.
- (5) Remove the small coax contacts from the slots in the insert rear.
- (6) Remove the small coax contacts from the retainer plate.
- (7) Make a selection of a snap-ring pliers from Table 28.
- (8) Use the snap-ring pliers to remove the C-clip from the large coax contact.
- (9) Remove the spring from the front of the large coax contact.
- (10) Push the large coax contact rearward through the insert rear.
- (11) Remove the large coax contact from the retainer plate.

D. Replacement of Snap-In, Non-Removable Contacts

NOTE: Some contacts are identified as snap-in, non-removable. Refer to:

- Table 13 for the coax contact part number
- Table 20 for the DPA insert configuration
- Table 22 for the DPD insert configuration
- Table 24 for the DPX insert configuration.

- (1) If a snap-in, non-removable contact has damage, the connector must be replaced:
 - (a) Cut the cable at the rear of the connector as close to the non-removable contact as possible.

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- (b) Assemble a new contact on the end of the cable.
- (c) Install the new contact assembly in the correct cavity of the new connector.
- (d) Do Step (a) through Step (c) for the remainder of the snap-in, non-removable contacts in the connector.
- (e) Remove a removable contact from the old connector.
- (f) Install the contact in the correct cavity in the new connector.
- (g) Do Step (e) and Step (f) for the remainder of the removable contacts in the old connector.

5. CONTACT ASSEMBLY

A. Contact Assembly

This paragraph gives the procedures to assemble crimp type contacts to stranded wire. Refer to:

- Paragraph 5.B. for the procedures to assemble crimp contacts to solid conductor wire
- Subject 20-40-00 for the procedures to assemble connectors that have non-removable solder type contacts.

**Table 29
NECESSARY MATERIALS**

Material	Part Number	Description	Supplier
Sleeve, Heat Shrinkable	TFE 4X	3/16 inch diameter	Chemplast
			Zeus Industrial Products
		1/4 inch diameter	Chemplast
			Zeus Industrial Products

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

**Table 30
INSULATION REMOVAL LENGTH**

Number of Wires in the Crimp Barrel	Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
			Target	Tolerance	
1	26	22	0.19	± 0.03	-
		20	0.38	± 0.03	Fold the conductor back
1	24	22	0.19	± 0.03	-
		20	0.19	± 0.03	-
		16	0.56	± 0.03	Fold the conductor back
2	24	20	0.25	± 0.03	-
1	22	22	0.19	± 0.03	-
		20	0.19	± 0.03	-
		16	0.56	± 0.03	Fold the conductor back

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Table 30 (continued)

Number of Wires in the Crimp Barrel	Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
			Target	Tolerance	
2	22	20	0.25	±0.03	-
		16	0.28	±0.03	-
1	20	20	0.19	±0.03	-
		16	0.28	±0.03	-
1	18	16	0.28	±0.03	-
1	16	16	0.28	±0.03	-
		12	0.28	±0.03	-
1	14	12	0.28	±0.03	-
1	12	12	0.28	±0.03	-
		8	0.38	±0.03	One 10 AWG filler wire and one 14 AWG filler wire are required.
1	10	8	0.38	±0.03	One 10 AWG filler wire is required.
1	8	8	0.38	±0.03	-
		6	0.50	±0.03	One 10 AWG filler wire is required.
1	6	6	0.50	±0.03	-

Table 31

INDENTER TYPE CONTACT CRIMP TOOLS FOR A CONTACT THAT HAS ONE WIRE

Number of Wires	Contact Size	Wire Size (AWG)	Basic Unit		Locator		Die Part Number
			Part Number	Setting	Part Number	Color	
1	2222	26	612916	Blue	-	Red	-
			M22520/2-01	3	M22520/2-23	-	-
			WA22	3	M22520/2-23	-	-
		24	612916	Blue	-	Red	-
			M22520/2-01	3	M22520/2-23	-	-
			WA22	3	M22520/2-23	-	-
		22	612916	Blue	-	Blue	-
			M22520/2-01	4	M22520/2-23	-	-
			WA22	4	M22520/2-23	-	-

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Table 31 (continued)

Number of Wires	Contact Size	Wire Size (AWG)	Basic Unit		Locator		Die Part Number
			Part Number	Setting	Part Number	Color	
1	2020HD	26	11148	Red	-	Red	-
			M22520/2-01	4	M22520/2-08	-	-
			MS3191-1	-	P20-3191-1	-	-
		24	11148	Red	-	Red	-
			M22520/2-01	5	M22520/2-08	-	-
			WA22	5	M22520/2-08	-	-
		22	11148	Red	-	Red	-
			M22520/2-01	6	M22520/2-08	-	-
			WA22	6	M22520/2-08	-	-
		20	11148	Red	-	Red	-
			M22520/2-01	7	M22520/2-08	-	-
			MS3191-1	-	11637-1	-	-
			MS3191-1	-	P20-3191-1	-	-
			MS3191-1	-	P20-3191-2	-	-
			WA22	7	M22520/2-08	-	-

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Table 31 (continued)

Number of Wires	Contact Size	Wire Size (AWG)	Basic Unit		Locator		Die Part Number
			Part Number	Setting	Part Number	Color	
1	2020	26	11148	Red	-	Red	-
			614019	Red	-	Red	-
			M22520/2-01	5	M22520/2-02	-	-
			MS3191-1	-	MS3191-20	Red	-
		24	11148	Red	-	Red	-
			612916	Blue	-	Yellow	-
			614019	Red	-	Red	-
			M22520/2-01	5	M22520/2-02	-	-
			M22520/1-01	2	M22520/1-02	Red	-
			MS3191-1	-	MS3191-20	Red	-
			WA22	5	M22520/2-02	-	-
			WA27F	2	M22520/1-02	Red	-
		22	11148	Red	-	Red	-
			612916	Red	-	Yellow	-
			614019	Red	-	Red	-
			M22520/1-01	3	M22520/1-02	Red	-
			M22520/2-01	6	M22520/2-02	-	-
			MS3191-1	-	MS3191-20	Red	-
			WA22	6	M22520/2-02	-	-
			WA27F	3	M22520/1-02	Red	-
		20	11148	Red	-	Red	-
			612916	Blue	-	Yellow	-
			614019	Red	-	Red	-
			M22520/1-01	4	M22520/1-02	Red	-
			M22520/2-01	7	M22520/2-02	-	-
			MS3191-1	-	MS3191-20	Red	-
			WA22	7	M22520/2-02	-	-
			WA27F	4	M22520/1-02	Red	-

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Table 31 (continued)

Number of Wires	Contact Size	Wire Size (AWG)	Basic Unit		Locator		Die Part Number
			Part Number	Setting	Part Number	Color	
1	1616	24	11148	Red	-	Blue	-
			614019	Red	-	Blue	-
			M22520/1-01	2	M22520/1-02	Blue	-
			MS3191-1	-	MS3191-16	Blue	-
		22	11148	Red	-	Blue	-
			614019	Red	-	Blue	-
			M22520/1-01	3	M22520/1-02	Blue	-
			MS3191-1	-	MS3191-16	Blue	-
		20	11148	Red	-	Blue	-
			614019	Red	-	Blue	-
			M22520/1-01	4	M22520/1-02	Blue	-
			MS3191-1	-	MS3191-16	-	-
			WA27F	4	M22520/1-02	Blue	-
		18	11148	Red	-	Blue	-
			614019	Red	-	Blue	-
			M22520/1-01	5	M22520/1-02	Blue	-
			MS3191-1	-	MS3191-16	-	-
			WA27F	5	M22520/1-02	Blue	-
		16	11148	Red	-	Blue	-
			614019	Red	-	Blue	-
M22520/1-01	6		M22520/1-02	Blue	-		
MS3191-1	-		MS3191-16	-	-		
WA27F	6		M22520/1-02	Blue	-		

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Table 31 (continued)

Number of Wires	Contact Size	Wire Size (AWG)	Basic Unit		Locator		Die Part Number		
			Part Number	Setting	Part Number	Color			
1	1212	24	M22520/1-01	7	M22520/1-02	Yellow	-		
			MS3191-1	-	MS3191-12	-	-		
			WA27F	7	M22520/1-02	Yellow	-		
		22	M22520/1-01	7	M22520/1-02	Yellow	-		
			MS3191-1	-	MS3191-12	-	-		
			WA27F	7	M22520/1-02	Yellow	-		
		20	M22520/1-01	7	M22520/1-02	Yellow	-		
			MS3191-1	-	MS3191-12	-	-		
			WA27F	7	M22520/1-02	Yellow	-		
		16	M22520/1-01	6	M22520/1-02	Yellow	-		
			MS3191-1	-	MS3191-12	-	-		
		14	M22520/1-01	7	M22520/1-11	Yellow	-		
			M22520/1-01	7	M22520/1-02	Yellow	-		
			MS3191-1	-	MS3191-12	-	-		
			WA27F	7	M22520/1-11	Yellow	-		
			WA27F	7	M22520/1-02	Yellow	-		
		12	M22520/1-01	8	M22520/1-11	Yellow	-		
			M22520/1-01	8	M22520/1-02	Yellow	-		
			MS3191-1	-	MS3191-12	-	-		
			WA27F	8	M22520/1-11	Yellow	-		
			WA27F	8	M22520/1-02	Yellow	-		
		1	0808	10	CBT-600B	-	CCHP-8-6	-	-
				8	400B	-	4046A	-	414DA-8N
					AMT23B	-	AMT23009L	-	AMT23002DA
CBT-600B	-				CCHP-8-6	-	-		
M22520/23-01	-				M22520/23-09	-	M22520/23-02		
WA23	-				WA23-9	-	WA23-2		

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Table 31 (continued)

Number of Wires	Contact Size	Wire Size (AWG)	Basic Unit		Locator		Die Part Number
			Part Number	Setting	Part Number	Color	
1	0406	8	AMT23B	-	AMT23011L	-	AMT23004DA
			M22520/23-01	-	M22520/23-11	-	M22520/23-04
			WA23	-	WA23-11	-	WA23-4
		6	AMT23B	-	AMT23011L	-	AMT23004DA
			M22520/23-01	-	M22520/23-11	-	M22520/23-04
			WA23	-	WA23-11	-	WA23-4

Table 32

INDENTER TYPE CONTACT CRIMP TOOLS FOR A CONTACT THAT HAS TWO WIRES

Number of Wires	Contact Size	Wire Size (AWG)	Basic Unit		Locator	
			Part Number	Setting	Part Number	Color
2	2020	24	11148	Red	-	Red
			612916	Blue	-	Yellow
			614019	Red	-	Red
			M22520/1-01	3	M22520/1-02	Red
			M22520/2-01	8	M22520/2-02	-
			MS3191-1	-	MS3191-20	Red
			WA22	7	M22520/2-02	-
			WA27F	4	M22520/1-02	Red
		22	11148	Red	-	Red
			612916	Blue	-	Yellow
			614019	Red	-	Red
			M22520/1-01	4	M22520/1-02	Red
			M22520/2-01	7	M22520/2-02	-
			MS3191-1	-	MS3191-20	Red
			WA22	7	M22520/2-02	Red
			WA27F	4	M22520/1-02	Red
2	1616	22	11148	Red	-	Blue
			614019	Red	-	Blue
			M22520/1-01	4	M22520/1-02	Blue
			MS3191-1	-	MS3191-16	-
			WA27F	4	M22520/1-02	Blue

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Table 33
CONTACT CRIMP TOOLS FOR A DPA() 031-9174-003 CONTACT THAT HAS TWO AWG 24 WIRES

Applicable Connector	Contact Part Number	Number of Wires	Wire Size (AWG)	Basic Unit		Locator	
				Part Number	Setting	Part Number	Color
DPA()	031-9174-003	2	24	M22520/2-01	6	M22520/2-02	-
				WA22	6	M22520/2-02	-

Table 34
HEX TYPE CONTACT CRIMP TOOLS

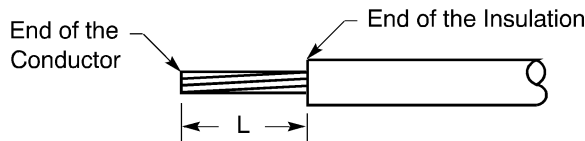
Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit	Primary Die	Secondary Die
8	8	13642	ST2354-5	11732

- (1) Remove the necessary length of insulation from the end of the wire or wires.

Refer to:

- Figure 53
- Table 30 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

NOTE: If the wire size and a larger crimp barrel are not given in Table 30, refer to Subject 20-60-00.



INSULATION REMOVAL LENGTH
Figure 53

- (2) If it is specified, fold the conductor back. Refer to Figure 54.



CONDUCTOR FOLDED BACK
Figure 54

- (3) Make a selection of the applicable contact from Table 8 or Table 9.
(4) If filler wire is specified, put the conductor of the filler wire in the crimp barrel of the contact.

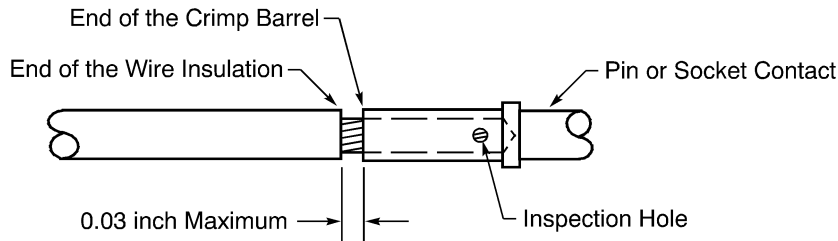
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- (5) Make a selection of a crimp tool from:
 - Table 34 for DPA 031-9174-003 contacts that have two wires in the crimp barrel
 - Table 32 for DPD and DPX contacts that have two wires in the crimp barrel
 - Table 31 or Table 34 for size 0808 contacts
 - Table 31 for contacts that have one wire in the crimp barrel.
- (6) Put the end of the wire or wires in the crimp barrel of the contact. Refer to Figure 55.

Make sure that:

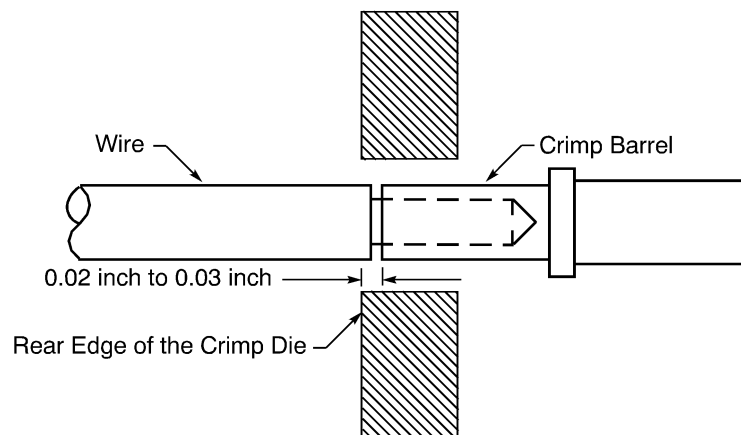
- All of the strands of the conductor are in the crimp barrel
- If two wires are to be terminated in the same contact, all of the strands of the conductors from both wires are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CONTACT

Figure 55

- (7) If the contact size is 0808, and the crimp tool is a hex type crimp tool:
 - (a) Put the contact and the wire into the primary die of the crimp tool.
Make sure that the end of the crimp barrel that is adjacent to the insulation of the wire is 0.02 to 0.03 inch past the edge of the die. Refer to Figure 56.



POSITION OF THE CONTACT AND WIRE IN THE HEX CRIMP TOOL DIE

Figure 56

- (b) Crimp the contact.

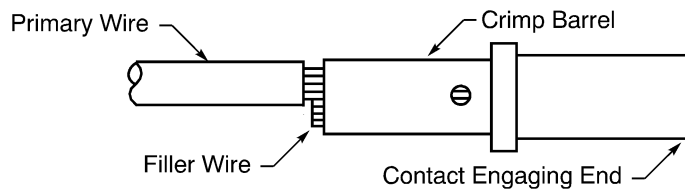
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- (c) Turn the contact approximately 60 degrees.
 - (d) Do Step (a) and Step (b) with the secondary die.
 - (e) Remove the contact assembly from the crimp tool.
 - (f) Turn the contact approximately 60 degrees.
 - (g) Put the contact in the crimp tool.
 - (h) Crimp the contact with the secondary die again to remove the unwanted metal from the outer surface of the crimp barrel of the contact.
- (8) If the crimp tool is an indenter type tool, crimp the contact.

NOTE: A pneumatic indenter crimp tool cannot be used to assemble a size 0808 or larger contact that has an adapter sleeve in the crimp barrel.

- (9) If the contact has a filler wire, carefully remove the unwanted length of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 57.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE

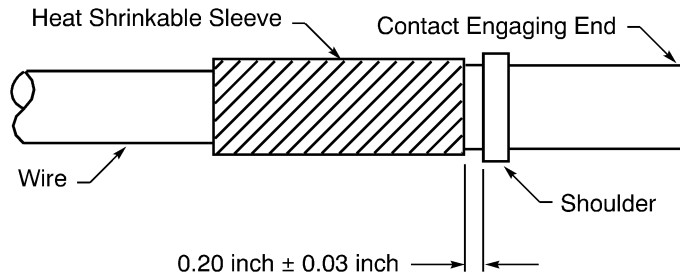
Figure 57

CAUTION: DO NOT CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR OF THE PRIMARY WIRE. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (10) If the pin or socket contact is size 0406 or 0808, install the heat shrinkable sleeve:
- (a) Make a selection of a heat shrinkable sleeve from Table 29.
Make sure that the sleeve has the smallest diameter that will let the sleeve move easily on the cable jacket and on the contact crimp barrel.
 - (b) Put a 1.00 inch \pm 0.13 inch length of the sleeve on the wire and on the rear of the contact. Refer to Figure 58.
Make sure that:
 - The sleeve is on the wire insulation and on the crimp barrel of the contact
 - The forward end of the sleeve is 0.20 inch \pm 0.03 inch from the rear edge of the shoulder of the contact.

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POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE SIZE 0808 OR SIZE 0406 CONTACT
Figure 58

(c) Shrink the sleeve into its position. Refer to Subject 20-10-14.

B. Assembly of a Contact with Solid Conductor Wire

This paragraph gives the procedure to assemble size 2020 and size 2020HD contacts with solid conductor wire and, if necessary, stranded filler wire.

NOTE: Only stranded wire can be used for the filler wire.

Table 35
INSULATION REMOVAL LENGTH

Crimp Barrel Size	Removal Length (inch)	
	Target	Tolerance
20	0.19	± 0.03

Table 36
SELECTION OF FILLER WIRE SIZE

Crimp Barrel Size	Solid Conductor Wire		Stranded Filler Wire (AWG)
	First Wire (AWG)	Second Wire (AWG)	
20	28	-	22
	26	-	
	26	26	

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**Table 37
CRIMP TOOLS FOR CONTACTS WITH SOLID CONDUCTORS**

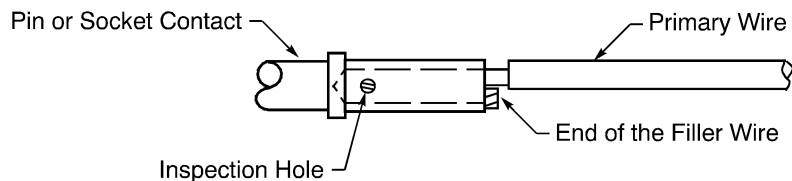
Contact Size	Solid Conductor Wire		Stranded Filler Wire (AWG)	Crimp Tool			
	First Wire (AWG)	Second Wire (AWG)		Basic Unit		Locator	
				Setting	Part Number	Part Number	Color
2020	28	-	22	3	AF8	TH1A	Red
					M22520/1-01	M22520/1-02	
	26	-	22	4	AF8	TH1A	Red
					M22520/1-01	M22520/1-02	
	26	26	22	4	AF8	TH1A	Red
					M22520/1-01	M22520/1-02	
2020HD	28	-	22	3	AF8	TH1A	Red
					M22520/1-01	M22520/1-02	
	26	-	22	4	AF8	TH1A	Red
					M22520/1-01	M22520/1-02	
	26	26	22	4	AF8	TH1A	Red
					M22520/1-01	M22520/1-02	

- (1) Make a selection of a filler wire size from Table 36.
- (2) Make a selection of a crimp tool from Table 37.
- (3) Remove the necessary length of insulation from the end of the solid conductor wire.
Refer to:
 - Table 35 for the insulation removal length
 - Subject 20-00-15 for the insulation removal procedures.
- (4) If a filler wire is specified, remove 0.5 inch of insulation from the end of the filler wire.
Refer to Subject 20-00-15 for the insulation removal procedures.
- (5) Put the conductor in the crimp barrel of the contact.
 - (a) If filler wire is not specified, put the end of the solid conductor wire in the crimp barrel of the contact.
 - (b) If filler wire is specified, put the end of the solid conductor wire and the filler wire in the crimp barrel of the contact.
Make sure that:
 - All of the strands of the filler wire and the solid conductor are in the crimp barrel of the contact
 - The strands of the conductors are visible in the inspection hole of the contact
 - The distance between the end of the crimp barrel and the insulation of the wire is a maximum of 0.03 inch.
- (6) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL

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- (7) If the contact has a filler wire, remove the unwanted length of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 59.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE

Figure 59

C. Assembly of an AWG 24 to AWG 18 Wire in a Size 12 or Larger Solder Contact

This paragraph gives the procedure to terminate one AWG 16, 18, 20, 22, or 24 wire in a non-removable, size 12 or larger solder contact.

**Table 38
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem
	PLF 100	Plastronic
	RW-175	Raychem

**Table 39
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Removal Length (L) (inch)		
	Target	Minimum	Maximum
24	0.19	0.16	0.19
22	0.19	0.16	0.19
20	0.19	0.16	0.19
18	0.19	0.16	0.19
16	0.19	0.16	0.19

**Table 40
BACC47DE CONTACTS**

Wire Size Range (AWG)		Insulation Diameter Range (inch)		Contact		
Minimum	Maximum	Minimum	Maximum	Boeing Standard	Plating	Color Band
20	16	0.080	0.110	BACC47DE1A	Gold	Brown
24	22	0.070	0.080	BACC47DE3A	Gold	None



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Table 40 (continued)

Wire Size Range (AWG)		Insulation Diameter Range (inch)		Contact		
Minimum	Maximum	Minimum	Maximum	Boeing Standard	Plating	Color Band
24	22	0.041	0.065	BACC47DE4A	Gold	Green
20	16	0.063	0.083	BACC47DE5A	Gold	Blue
20	18	0.056	0.069	BACC47DE6A	Gold	Black
22	20	0.047	0.065	BACC47DE7A	Gold	Red
24	24	0.032	0.045	BACC47DE8A	Gold	Violet

Table 41

SUPPLIER PART NUMBERS FOR BOEING STANDARD BACC47DE CONTACTS

Boeing Standard	Contact	
	Part Number	Supplier
BACC47DE1A	YHMM16-6D28	Burndy
	417-1215-332	Tri-Star
BACC47DE3A	YHMM22-4D28	Burndy
	417-1223-332	Tri-Star
BACC47DE4A	YHMM22-5D28	Burndy
	417-1222-332	Tri-Star
BACC47DE5A	YHMM16-7D28	Burndy
	417-1216-332	Tri-Star
BACC47DE6A	YHMM18-3D28	Burndy
	417-1218-332	Tri-Star
BACC47DE7A	YHMM20-3D28	Burndy
	417-1220-332	Tri-Star
BACC47DE8A	YHMM24-3D28	Burndy
	417-1224-332	Tri-Star

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**Table 42
CRIMP TOOLS FOR BACC47DE CONTACTS**

Contact	Crimp Tool			
	Basic Unit		Locator	Die
	Part Number	Type		
BACC47DE()	M10S-1	Manual	SL-53	S-1
	YD2-1	Power	-	YDD-1
	AM2-4	Power	-	AMK-11
	AM4D-1	Power	-	AMK-11
	WA22HPB	Power	D30	-
	WA27XF	Power	TP904	-
	WA27FAP	Power	AP27SA	-

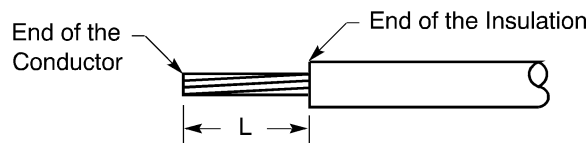
- (1) Make a selection of a BACC47DE contact from Table 40.
Use the wire AWG size and the wire insulation diameter to make the selection.
- (2) Make a selection of a crimp tool from Table 42.
- (3) Make a selection of a heat shrinkable sleeve from Table 38.
Make sure that the sleeve has the smallest diameter that will let the sleeve move easily on the solder cup of the large gage non-removable contact.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (4) Put a 2.5 inch ± 0.25 inch length of the heat shrinkable sleeve on the wire.
- (5) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 60
- Table 39 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



INSULATION REMOVAL LENGTH

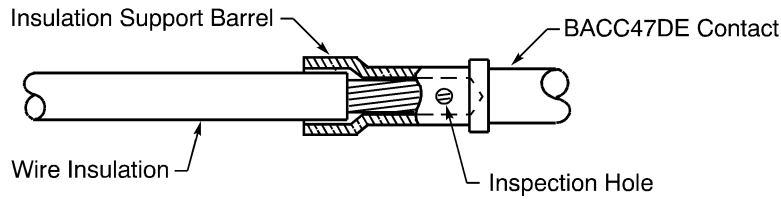
Figure 60

- (6) Put the end of the wire into the crimp barrel of the BACC47DE contact.
Make sure that:

- All of the conductor strands are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact
- The wire insulation is in the insulation grip area of the contact.

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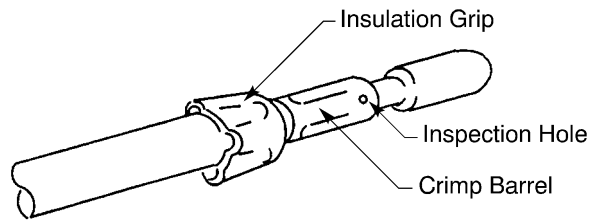


POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 61

(7) Crimp the contact.

Make sure that:

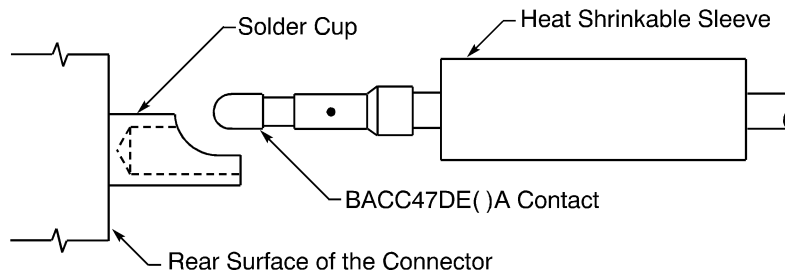
- The contact crimp barrel has four crimp indents
- The insulation grip has four crimp indents.



BACC47DE CONTACT ASSEMBLY
Figure 62

(8) Solder the engaging end of the BACC47DE contact in the solder cup of the large gage solder contact. Refer to Figure 63 and Figure 64.

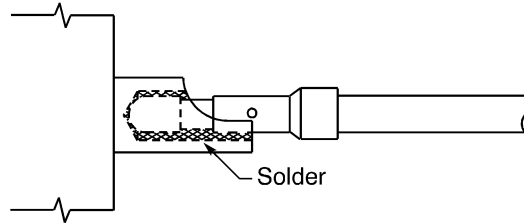
Make sure that a solder fillet is fully around the engaging end of the contact.



TERMINATION COMPONENTS
Figure 63

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CONFIGURATION OF THE SOLDER TERMINATION
Figure 64

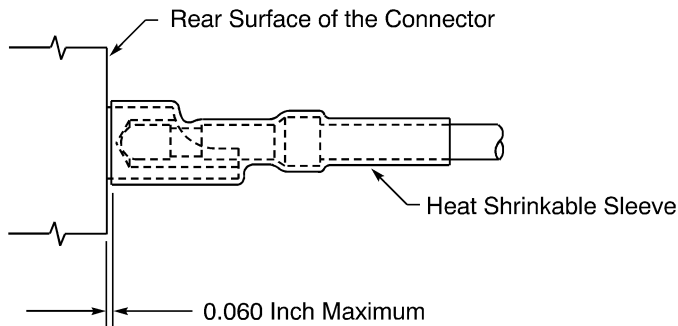
- (9) Push the heat shrinkable sleeve forward on the wire and on the solder cup until the sleeve is against the rear surface of the connector. Refer to Figure 65.

Make sure that the distance between the forward end of the heat shrinkable sleeve and the rear surface of the connector is 0.06 inch maximum.

- (10) Shrink the sleeve into its position.

Refer to:

- Figure 65.
- Subject 20-10-14.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 65

D. Coax Contact Assembly

For the procedures to assemble coax contacts refer to Table 43.

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**Table 43
COAX CONTACT ASSEMBLY PROCEDURES**

Coax Contact			Connector		Coax Cable	Assembly Procedure
Part Number	Size	Type	Series	Insert		
249-0268-000	-	Socket	DPX	10C3	09-058	Paragraph 6.A.
					BA-6903	
					RG-142	
					RG-223	
					RG-58	
					BA-5903	
249-0366-000	-	Socket	DPD	32C2	RG-59	Paragraph 6.B.
					RG-62	
					RG-7	
249-0398-000	-	Socket	DPD	U32C2	RG-210	Paragraph 6.B.
					RG-59	
					RG-62	
					RG-7	
249-0750-000	5	Socket	DPX	32W2	09-058	Paragraph 6.A.
					RG-58	
					RG-142	
					RG-223	
					RG-5903	
					BA-6903	
				40W1	09-058	
					RG-58	
					RG-142	
					RG-223	
					RG-5903	
					BA-6903	

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Table 43 (continued)

Coax Contact			Connector		Coax Cable	Assembly Procedure					
Part Number	Size	Type	Series	Insert							
249-1390-000	5	Socket	DPX	D32C2	BA-5903	Paragraph 6.C.					
					RG-58						
				32W2	BA-5903						
					RG-58						
				F40C1	BA-5903						
					RG-58						
				40W1	BA-5903						
					RG-58						
249-1398-000	5	Socket	DPX	32B2	RG-59	Paragraph 6.D.					
					RG-62						
				32W2	RG-59						
					RG-62						
				40W1	RG-59						
					RG-62						
				249-1400-000	5		Socket	DPX	32A2	BA-5903	Paragraph 6.E.
										BMS 13-65 Type OF	
RG-58											
32W2	BA-5903										
	BMS 13-65 Type OF										
	RG-58										
40B1	BA-5903										
	BMS 13-65 Type OF										
	RG-58										
40W1	BA-5903										
	BMS 13-65 Type OF										
	RG-58										

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Table 43 (continued)

Coax Contact			Connector		Coax Cable	Assembly Procedure
Part Number	Size	Type	Series	Insert		
249-1400-003	5	Socket	DPX	32A2	5020G3442	Paragraph 6.E.
				32W2	5020G3442	
				40B1	5020G3442	
				40W1	5020G3442	
249-1404-003	5	Socket	DPX	32C2	RG-316	Paragraph 6.E.
				32W2	RG-316	
				40W1	RG-316	
249-1521-000	1	Pin	DPX	C2	BA-6903	Paragraph 6.F.
					RG-214	
249-1522-000	1	Socket	DPX	C2	BA-6903	Paragraph 6.F.
					RG-214	
249-1598-000	5	Socket	DPX	32W2	RG-142	Paragraph 6.G.
				40W1	RG-142	
249-1608-000	5	Socket	.	.	RG-59	Paragraph 6.D.
249-1632-000	9	Socket	DPX	C8A	BA-5903	Paragraph 6.H.
					RG-58	
				W8	BA-5903	
					RG-58	
				D32C4	BA-5903	
					RG-58	
				32W4	BA-5903	
					RG-58	

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 43 (continued)

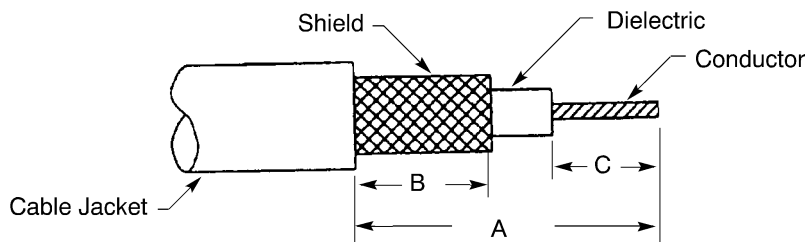
Coax Contact			Connector		Coax Cable	Assembly Procedure
Part Number	Size	Type	Series	Insert		
249-1634-000	9	Socket	DPX	C8C	10-60875	Paragraph 6.J.
					5024A1314	Paragraph 6.H.
					BMS 13-42	Paragraph 6.K.
					BMS 13-48	
					BMS 13-65 Type OE	Paragraph 6.I.
					RG-174	Paragraph 6.H.
					RG-316	
				W8	10-60875	Paragraph 6.J.
					5024A1314	Paragraph 6.H.
					BMS 13-42	Paragraph 6.K.
					BMS 13-48	
					BMS 13-65 Type OE	Paragraph 6.I.
					RG-174	Paragraph 6.H.
					RG-316	
				B32C4	10-60875	Paragraph 6.J.
					5024A1314	Paragraph 6.H.
					BMS 13-42	Paragraph 6.K.
					BMS 13-48	
					BMS 13-65 Type OE	Paragraph 6.I.
					RG-174	Paragraph 6.H.
					RG-316	
				32W4	10-60875	Paragraph 6.J.
					5024A1314	Paragraph 6.H.
					BMS 13-42	Paragraph 6.K.
BMS 13-48						
BMS 13-65 Type OE	Paragraph 6.I.					
RG-174	Paragraph 6.H.					
RG-316						

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Table 43 (continued)

Coax Contact			Connector		Coax Cable	Assembly Procedure
Part Number	Size	Type	Series	Insert		
249-1830-000	7	Socket	DPX	AC3	BA-5903	Paragraph 6.L.
					RG-58	
249-1858-000	-	Pin	-	-	RG-115	Paragraph 6.M.
249-1959-000	9	Socket	DPX	W8	RG-223	Paragraph 6.N.
				32C4	RG-223	
				32W4	RG-223	
249-1982-000	9	Pin	DPX	W8	BMS 13-65 Type OF	Paragraph 6.O.
				32W4	BMS 13-65 Type OF	
249-1983-000	9	Socket	DPX	W8	BMS 13-65 Type OF	Paragraph 6.O.
				32W4	BMS 13-65 Type OF	
249-2020-001	9	Socket	DPX	W8	BMS 13-65 Type OF	Paragraph 6.O.
				32W4	BMS 13-65 Type OF	
249-5008-000	-	Socket	DPA	L24C2	BA-5903	Paragraph 6.P.
					Unshielded Wire	Paragraph 6.Q.
249-5027-004	3	Socket	DPX	AC3	BA-6903	Paragraph 6.R.
					RG-214	
249-9104-000	-	-	-	-	BA-5903	Paragraph 6.C.
					RG-233	Paragraph 6.S.



COAX CABLE TRIM DIMENSIONS
Figure 66

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

**Table 44
COAX CABLE TRIM DIMENSIONS**

Contact	Coax Cable	Cable Trim		
		Dimension	Target (inch)	Tolerance (inch)
249-0268-000	BA6903	A	0.88	±0.03
		B	0.30	±0.02
		C	0.16	±0.03
	RG-142	A	0.88	±0.03
		B	0.30	±0.02
		C	0.16	±0.03
	RG-223	A	0.88	±0.03
		B	0.30	±0.02
		C	0.16	±0.03
	RG-5903	A	0.88	±0.03
		B	0.30	±0.02
		C	0.16	±0.03
249-0366-000	RG-59	A	1.00	±0.03
		B	0.38	±0.03
		C	0.16	±0.03
	RG-62	A	1.00	±0.03
		B	0.38	±0.03
		C	0.16	±0.03
	RG-71	A	1.00	±0.03
		B	0.38	±0.03
		C	0.16	±0.03
249-0398-000	RG-59	A	1.00	±0.03
		B	0.38	±0.03
		C	0.16	±0.03
	RG-62	A	1.00	±0.03
		B	0.38	±0.03
		C	0.16	±0.03
	RG-71	A	1.00	±0.03
		B	0.38	±0.03
		C	0.16	±0.03

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Table 44 (continued)

Contact	Coax Cable	Cable Trim		
		Dimension	Target (inch)	Tolerance (inch)
249-0750-000	BA6903	A	0.88	±0.03
		B	0.30	±0.02
		C	0.16	±0.03
	RG-142	A	0.88	±0.03
		B	0.30	±0.02
		C	0.16	±0.03
	RG-223	A	0.88	±0.03
		B	0.30	±0.02
		C	0.16	±0.03
	RG-5903	A	0.88	±0.03
		B	0.30	±0.02
		C	0.16	±0.03
249-1390-000	BA5903	A	0.75	±0.06
		B	-	-
		C	0.09	±0.03
	RG-58	A	0.75	±0.06
		B	-	-
		C	0.09	±0.03
249-1398-000	RG-59	A	0.69	±0.03
		B	-	-
		C	0.16	±0.03
	RG-62	A	0.69	±0.03
		B	-	-
		C	0.16	±0.03
249-1400-000	BA5903	A	1.06	±0.02
		B	-	-
		C	0.38	±0.03
	RG-58	A	1.06	±0.02
		B	-	-
		C	0.38	±0.03

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 44 (continued)

Contact	Coax Cable	Cable Trim		
		Dimension	Target (inch)	Tolerance (inch)
249-1521-000	BA6903	A	0.59	±0.02
		B	-	-
		C	0.13	±0.02
	RG-214	A	0.59	±0.02
		B	-	-
		C	0.13	±0.02
249-1522-000	BA6903	A	0.59	±0.02
		B	-	-
		C	0.13	±0.02
	RG-214	A	0.59	±0.02
		B	-	-
		C	0.13	±0.02
249-1598-000	RG-142	A	0.63	±0.02
		B	-	-
		C	0.09	±0.03
249-1608-000	RG-59	A	0.69	±0.02
		B	-	-
		C	0.16	±0.03
249-1632-000	BA5903	A	0.63	±0.02
		B	0.25	±0.02
		C	0.14	±0.03
	RG-58	A	0.63	±0.02
		B	0.25	±0.02
		C	0.14	±0.03

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 44 (continued)

Contact	Coax Cable	Cable Trim		
		Dimension	Target (inch)	Tolerance (inch)
249-1634-000	10-60875	A	1.13	±0.06
		B	1.13	±0.06
		C	0.16	±0.03
	5024A1314	A	0.72	±0.03
		B	0.34	±0.03
		C	0.14	±0.03
	RG-174	A	0.72	±0.03
		B	0.34	±0.03
		C	0.14	±0.02
	S280W503-1	A	0.72	±0.02
		C	0.14	±0.03
	249-1830-000	BA5903	A	0.69
B			0.28	±0.03
C			0.25	±0.03
RG-58		A	0.69	±0.03
		B	0.28	±0.03
		C	0.25	±0.03
249-1858-000	RG-115	A	1.00	±0.06
		B	-	-
		C	0.19	±0.03
249-1959-000	RG-223	A	0.66	±0.03
		B	0.41	±0.03
		C	0.14	±0.03
249-5008-000	BA5903	A	0.75	±0.06
		B	-	-
		C	0.09	±0.03

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

Table 44 (continued)

Contact	Coax Cable	Cable Trim		
		Dimension	Target (inch)	Tolerance (inch)
249-5027-004	BA6903	A	0.81	±0.03
		B	0.31	±0.03
		C	0.38	±0.03
	RG-214	A	0.81	±0.03
		B	0.31	±0.03
		C	0.38	±0.03
249-9104-000	BA5903	A	0.75	±0.06
		B	-	-
		C	0.09	±0.03
	RG-233	A	1.16	±0.03
		B	-	-
		C	0.09	±0.03

**Table 45
FERRULE CRIMP TOOLS**

Contact	Wire or Coax Cable	Crimp Tool		
		Basic Unit	Die	
			Part Number	Cavity
249-0268-000	BA6903	WT-206	-	-
	RG-142	WT-208	-	-
	RG-223	WT-208	-	-
	RG-5903	WT-206	-	-
249-0366-000	RG-59	WT-214	-	-
	RG-62	WT-214	-	-
	RG-71	ST965-1	ST965-06	-
249-0398-000	RG-62	WT-214	-	-
	RG-71	ST965-1	ST965-06	-
249-0750-000	BA6903	WT-206	-	-
	RG-142	WT-208	-	-
	RG-223	WT-208	-	-
	RG-5903	WT-206	-	-

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Table 45 (continued)

Contact	Wire or Coax Cable	Crimp Tool		
		Basic Unit	Die	
			Part Number	Cavity
249-1398-000	RG-59	WT-214	-	-
	RG-62	WT-214	-	-
249-1400-000	BA5903	WT-210	-	-
		M22520/5-01	Y823	180
	RG-58	WT-210	-	-
		M22520/5-01	Y823	180
249-1598-000	RG-142	WT-214	-	-
249-1608-000	RG-59	WT-214	-	-
249-1632-000	BA5903	CCT408M	-	-
	RG-58	CCT408M	-	-
249-1634-000	10-60875	WT202-06-08	-	-
	5024A1314	CCTDM	-	-
	BMS13-42	ST965-1	WT-206	-
	BMS13-48	ST965-1	WT-206	-
	RG-174	CCTDM	-	-
	SW280W503-1	CCTDM	-	-
		M22520/5-01	Y322	-
249-1830-000	BA5903	KTH-2233	-	-
		ST965	WT-206	-
		ST965-1	-	-
		ST965A-6	-	-
		ST965B-6	-	-
		WT202-06-08	-	-
		RG-58	KTH-2233	-
	ST965		WT-206	-
	ST965-1		-	-
	ST965A-6		-	-
	ST965B-6		-	-
	WT202-06-08		-	-
	249-1858-000	RG-115	WT-218	-

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Table 45 (continued)

Contact	Wire or Coax Cable	Crimp Tool		
		Basic Unit	Die	
			Part Number	Cavity
249-5027-004	BA6903	612648	612807	B
		KTH-1000	KTH-2004	A
			KTH-2235	A
		M22520/5-01	M22520/5-25	A
		ST2352-5-2	-	A
				B
		ST2352-5-Y	ST2352-5-2	-
	ST2966M	ST2966M-16	-	
	RG-214	612648	612807	B
		KTH-1000	KTH-2004	A
			KTH-2235	A
		M22520/5-01	M22520/5-25	A
		ST2352-5-2	-	A
				B
ST2352-5-Y		ST2352-5-2	-	
ST2966M	ST2966M-16	-		

6. ASSEMBLY OF COAX CONTACTS

A. Assembly of 249-0268-000 and 249-0750-000 Contacts for DPX Connectors

- (1) Make a selection of the inner and outer ferrules from Table 15.
- (2) Remove the identification color dye from the outer ferrule.
- (3) Tin the external surface of the outer ferrule.

Make sure that the solder:

- Is applied to 1/3 the length of the ferrule from one end
- Extends around the circumference of the ferrule.

- (4) Make a selection of heat shrinkable sleeve. Refer to Subject 20-10-14.

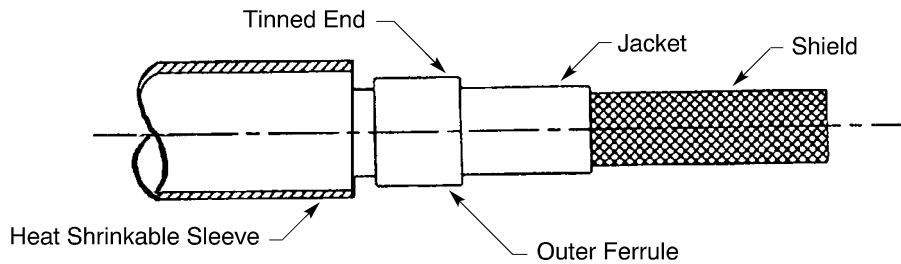
Make sure that the sleeve has the smallest diameter that can be moved on the cable jacket.

- (5) Put a 1.13 inch ±0.05 inch length of the sleeve on the cable jacket.
- (6) Put the outer ferrule on the cable. Refer to Figure 67.

Make sure that the tinned end points to the end of the cable.

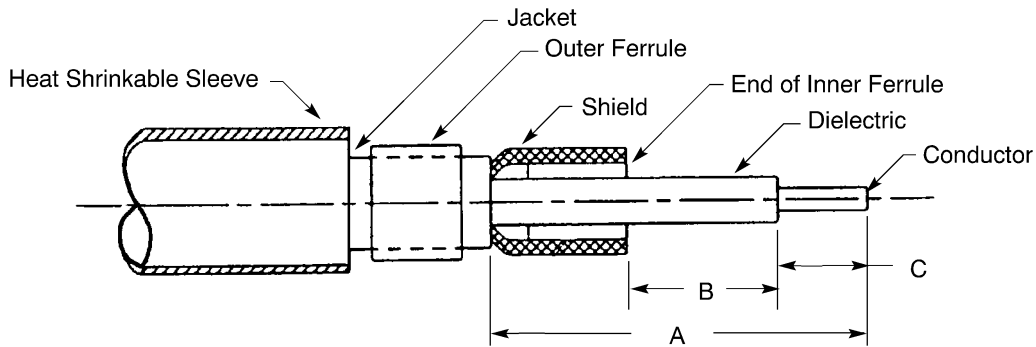
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PREPARATION OF THE FERRULE
Figure 67

- (7) Prepare the cable:
Refer to Figure 68 and Table 44.



CABLE PREPARATION
Figure 68

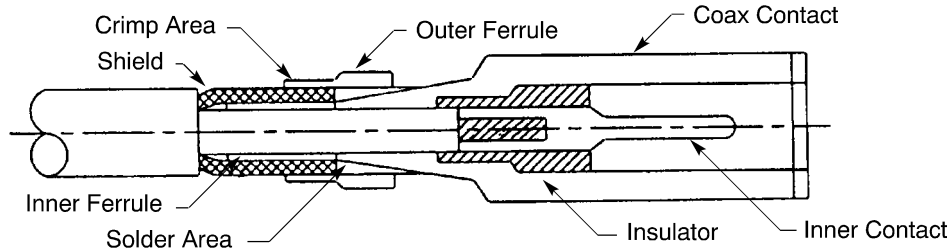
- (a) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.
- CAUTION:** MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.
- (b) Push the end of the shield back.
- (c) Put the inner ferrule on the cable so that the ferrule is:
- Under the shield
 - Against the end of the jacket.
- (d) Put the shield on the inner ferrule.
Make sure that the shield strands are even and symmetrical around the ferrule.
- (e) Cut the shield at the end of the ferrule.
- (f) Remove the necessary length of the dielectric to make the distance from the end of the inner ferrule to the end of the dielectric equal to Dimension B.
- (g) Remove the necessary length of the conductor to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (8) Tin the conductor.

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- (9) Put the conductor in the solder barrel of the inner contact.
Make sure the rear end of the contact is against the dielectric.



COAX CONTACT ASSEMBLY
Figure 69

- (10) Solder the contact.

CAUTION: DO NOT PUT MORE THAN THE NECESSARY QUANTITY OF SOLDER ON THE CONTACT AND CONDUCTOR. UNWANTED SOLDER ON THE INNER CONTACT CAN PREVENT THE INSERTION OF THE CONTACT INTO THE INSULATOR.

- (11) Make a selection of a ferrule crimp tool from Table 45.
- (12) Push the wired inner contact into the coax contact. Refer to Figure 69.
Make sure that the end of the coax contact is against the inner ferrule.
- (13) Push the outer ferrule against the shoulder of coax contact.
- (14) Remove the coax contact from the inner contact.
Make sure that the position of outer ferrule is not changed.
- (15) Crimp the outer ferrule.
- (16) Tin the external surface of the smaller end of the coax contact.
- (17) Push the inner contact into the coax contact until the areas that have solder touch. Refer to Figure 69.
- (18) Apply heat to melt the solder.

CAUTION: DO NOT ADD MORE SOLDER.

- (19) Move the heat shrinkable sleeve on the contact assembly.
Make sure that the end of the sleeve is aligned with the engaging end of the coax contact.
- (20) Shrink the sleeve into its position. Refer to Subject 20-10-14.
Make sure that the distance between the end of the sleeve and the end of the coax contact is less than 0.06 inch.

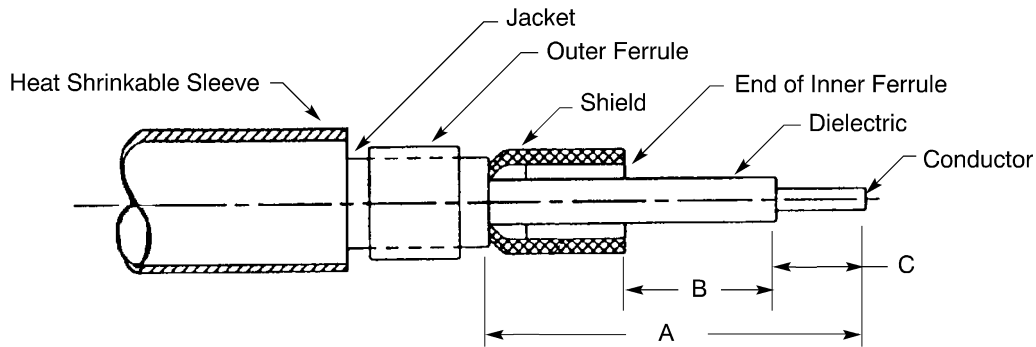
B. Assembly of 249-0366-000 and 249-0398-000 Contacts for DPD Connectors

- (1) Make a selection of Teflon heat shrinkable sleeve. Refer to Subject 20-10-14.
Make sure to use a sleeve that has the smallest diameter that can be moved on the cable jacket and below the inner ferrule.
- (2) Put a 0.56 inch ± 0.06 inch length of the sleeve on the cable jacket. Refer to Figure 67.
- (3) Make a selection of the inner and outer ferrules from Table 15.
- (4) Remove the identification color dye from the outer ferrule.

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- (5) Tin the external surface to the outer ferrule.
Make sure that the solder:
 - Is applied to 1/3 the length of the ferrule from one end
 - Extends around the circumference of the ferrule.
- (6) Put the outer ferrule on the cable.
- (7) Prepare the cable.
Refer to Figure 70 and Table 44.



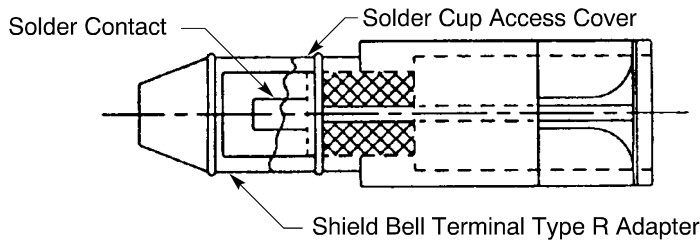
CABLE PREPARATION
Figure 70

- (a) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.
- (b) Push the end of the shield back on the cable.
- (c) Put the inner ferrule on the cable.
- (d) Push the inner ferrule on the heat shrinkable sleeve and below the shield until the ferrule is against the cable jacket.
- (e) Put the shield on the inner ferrule.
Make sure that the shield strands are even and symmetrical around the ferrule.
- (f) Remove the unwanted length of the shield strands that extend beyond the forward end of the inner ferrule.
- (g) Remove the necessary length of the dielectric to make the distance from the end of the inner ferrule to the end of the dielectric equal to Dimension B.
- (h) Remove the necessary length of the conductor to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (8) Tin the center conductor. Refer to Figure 71.

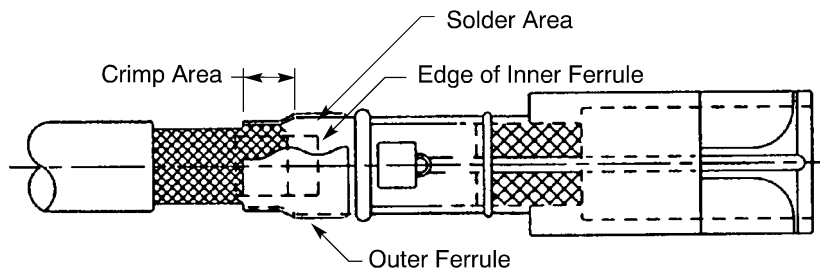
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COAX CONTACT CONFIGURATION
Figure 71

- (9) Make a selection of a ferrule crimp tool from Table 45.
- (10) Remove the solder cup access cover from the coax contact type R adapter.
- (11) Discard the type R adapter.
- (12) Put the contact on the coax cable.
- (13) Push the contact solder cup against the dielectric.
- (14) Push the outer ferrule against the shoulder of the outer coax contact.
- (15) Remove the coax cable and the outer ferrule from the coax contact.
Make sure that the position of outer ferrule does not change.
- (16) Crimp the outer ferrule. Refer to Figure 72.



POSITION OF THE OUTER FERRULE
Figure 72

- (17) Put the heat shrinkable sleeve on the dielectric and below the inner ferrule.
- (18) Tin the smaller end of the contact.
- (19) Put the cable conductor into the solder barrel of the inner contact.
Make sure that the dielectric is against the inner contact.
- (20) Solder the conductor to the inner contact.
- (21) Put the solder cup access cover on the contact.
- (22) Push the outer ferrule against the smaller end of coax contact.
- (23) Apply heat and melt the solder.

CAUTION: DO NOT ADD MORE SOLDER. IT IS POSSIBLE THAT THE COMPONENTS WILL NOT FIT TOGETHER.

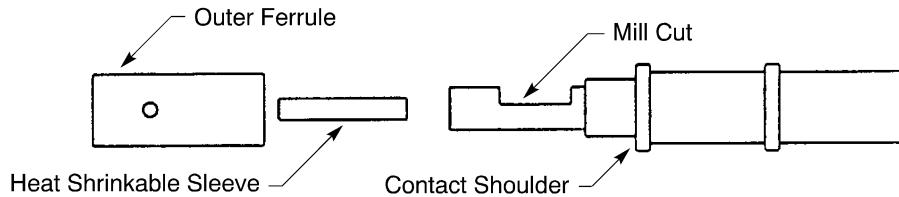
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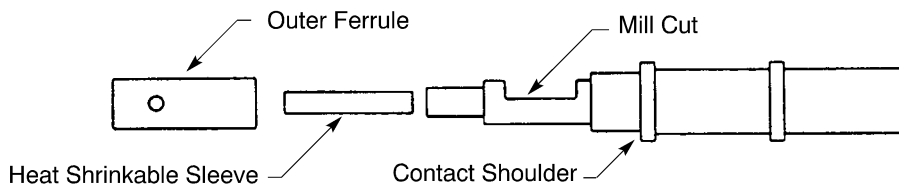
C. Assembly of 249-1390-000 and 249-9104-000 Contacts with BA-5903 Cable

This paragraph give the procedure to assemble the contacts for these connectors:

- The DPA() and DPAMA() connectors with the 249-9104-000 contact
- The DPX() and DPXAMA() connectors with the 249-1390-000 contact.



249-1390-000 CONTACT CONFIGURATION
Figure 73



249-9104-000 CONTACT CONFIGURATION
Figure 74

- (1) Put the outer ferrule on the cable. Refer to Figure 73 and Figure 74.
 Make sure that the end without the hole points forward to the end of the cable.
- (2) Prepare the cable:
 Refer to Figure 66 and Table 44.
 - (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

 - (c) Push the end of the shield back on the cable.
 - (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (3) Tin the conductor.
- (4) Put a 0.50 inch ±0.03 inch length of 1/8 inch diameter TFE-R heat shrinkable sleeve on the cable.
 Make sure that the sleeve is on the dielectric and below the shield.

CAUTION: DO NOT USE THE SLEEVE THAT IS SUPPLIED WITH THE CONTACT.

- (5) Put the conductor in the solder cup of the contact.

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Make sure that the mill cut area on the solder cup is adjacent to the open side of the contact.

- (6) Solder the conductor to the solder cup.
- (7) Push the heat shrinkable sleeve on the contact until the end of the sleeve is against the shoulder of the contact.
- (8) Put the shield on the contact.

Make sure that the shield strands are even and symmetrical around the contact.

- (9) Push the outer ferrule forward on the shield until the ferrule is against the contact shoulder.
- (10) Remove the unwanted length of the shield strands that extend beyond the contact shoulder.
- (11) Solder the outer ferrule to contact through the hole in the ferrule.
- (12) Make a selection of heat shrinkable sleeve. Refer to Subject 20-10-14.

Make sure to use a sleeve that has the smallest diameter that can be moved on the cable jacket.

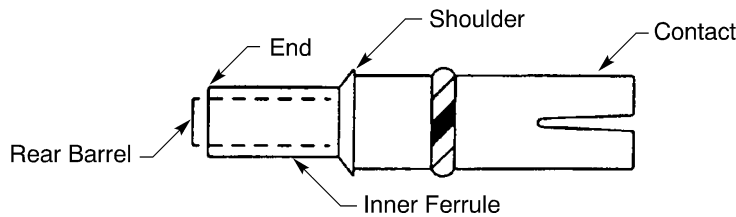
- (13) Put a sufficient length of the heat shrinkable sleeve on the cable.

Make sure that:

- The forward end of the heat shrinkable sleeve is against the shoulder of the contact
- The distance from the rear end of the heat shrinkable sleeve to the rear end of the outer ferrule is 0.50 inch minimum.

- (14) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Assembly of 249-1398-000 and 249-1608-000 Contacts for DPX Connectors



COAX CONTACT CONFIGURATION
Figure 75

- (1) Tin the external surface of the rear barrel of the contact from the end of the contact to the shoulder.
- (2) Make a selection of the inner and outer ferrules from Table 15.
- (3) Remove the identification color dye from the inner ferrule.
- (4) Put the inner ferrule on the rear barrel of the coax contact.
- (5) Push the inner ferrule forward until it is against the contact shoulder.
- (6) Apply heat to the inner ferrule to melt the solder.

CAUTION: DO NOT ADD MORE SOLDER. IT IS POSSIBLE THAT THE COMPONENTS WILL NOT HAVE THE CORRECT FIT.

- (7) Make a selection of heat shrinkable sleeve. Refer to Subject 20-10-14.
Make sure that the sleeve has the smallest diameter that can be moved on the cable jacket.
- (8) Put a 1.13 inch minimum length of the heat shrinkable sleeve on the cable jacket.
- (9) Put the outer ferrule on the cable.

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- (10) Prepare the cable:

Refer to Figure 66 and Table 44.

- (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
- (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

- (c) Push the end of the shield back on the cable.
- (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.

- (11) Tin the center conductor of the cable.

- (12) Put the conductor in the solder barrel of center contact.

Make sure that the distance between the rear end of the contact and the dielectric is 0.03 inch maximum.

- (13) Solder the contact and the conductor.

CAUTION: DO NOT LET THE END OF THE CONTACT TO TOUCH THE DIELECTRIC AT THE SAME TIME THAT THE SOLDER IS APPLIED.

- (14) Make a selection of a ferrule crimp tool from Table 45.

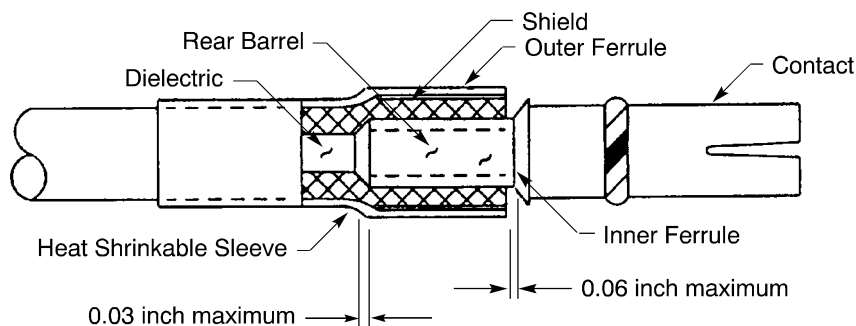
- (15) Push the conductor and center contact into the outer contact until the end of the conductor is against the contact.

- (16) Put the shield on the inner ferrule.

Make sure that the shield strands are even and symmetrical around the inner ferrule.

- (17) Push the outer ferrule forward on the shield. Refer to Figure 76.

Make sure that distance from the forward end of the inner ferrule to the forward edge of the outer ferrule is 0.06 inch maximum.



COAX CONTACT ASSEMBLY
Figure 76

- (18) Crimp the outer ferrule.

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- (19) Remove the unwanted length of the shield strands that extend beyond the forward end of the outer ferrule.
- (20) Push the heat shrinkable sleeve on the contact until the forward end of the sleeve is aligned with the forward end of the outer ferrule.
- (21) Shrink the sleeve into its position.
Refer to Figure 76 and Subject 20-10-14.

E. Assembly of 249-1400-000 and 249-1400-003 Contacts for DPX Connectors

- (1) Make a selection of inner and outer ferrules from Table 15.
- (2) Remove the identification color dye from the ferrules.
- (3) Tin the external surface of the inner ferrule.

Make sure that the solder:

- Is applied to 1/3 of the length of the ferrule from one end
- Extends around the circumference of the ferrule.

- (4) Tin the external surface of the larger end of the outer ferrule.

Make sure that the solder:

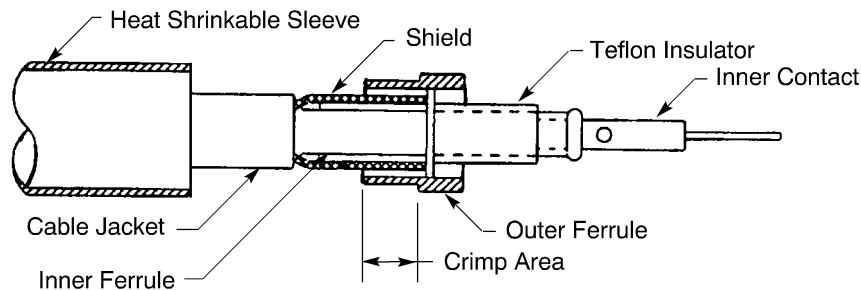
- Is applied to 1/3 of the length of the ferrule from the larger end
- Extends around the circumference of the ferrule.

- (5) Make a selection of heat shrinkable sleeve. Refer to Subject 20-10-14.

Make sure that the sleeve has the smallest diameter that can be moved on the cable jacket.

- (6) Put a 1.13 inch minimum length of heat shrinkable sleeve on the cable.
- (7) Put the outer ferrule on the cable Refer to Figure 77.

Make sure that the end of the ferrule that has the solder points forward to the end of the cable.



CENTER CONTACT ASSEMBLY
Figure 77

- (8) Make a selection of a ferrule crimp tool from Table 45.
- (9) Prepare the cable:
Refer to Figure 66 and Table 44.
 - (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

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CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

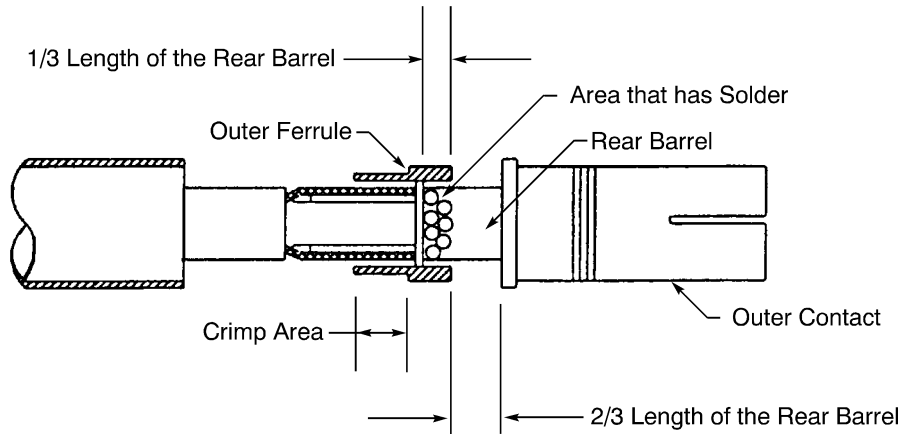
- (10) Push the end of the shield away from the end of the cable.
- (11) Put the inner ferrule on the cable.
Make sure that end of the ferrule that has solder points forward to the end of the cable.
- (12) Push the inner ferrule under the shield until the inner ferrule is against the end of the cable jacket.
- (13) Remove the unwanted length of the shield strands that extend beyond the forward end of the inner ferrule.
- (14) Move the outer ferrule on the shield and the inner ferrule until 1/2 the length of the outer ferrule extends beyond the edge of the inner ferrule.
- (15) Crimp the 0.5 inch of the outer ferrule in the area that is on the inner ferrule.
- (16) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
Refer to Figure 66 and Table 44.
- (17) Push the Teflon insulator on the dielectric and the conductor until the end of the insulator is against the end of the ferrules.
Make sure that the end that has the larger diameter points to the ferrules.
- (18) Tin the center conductor.
- (19) Push the conductor into the solder barrel of the inner contact until the contact is against the Teflon insulator.
Make sure that the conductor can be seen in the contact inspection hole.
- (20) Solder the contact to the conductor. Refer to Figure 77.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY QUANTITY OF SOLDER. THE INNER CONTACT CANNOT BE INSTALLED IN THE OUTER CONTACT IF THERE IS TOO MUCH SOLDER ON THE INNER CONTACT.

- (21) Tin the rear surface of the rear barrel of the contact. Refer to Figure 78.
Make sure that the solder:
 - Is applied to one third of the length of the rear barrel at the rear
 - Extends around the circumference of the rear barrel.

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SOLDER AREA OF THE CONTACT
Figure 78

- (22) Put the inner contact into the outer contact.
Make sure that the forward area of the outer ferrule that has solder is on the area of the rear barrel that has solder.
- (23) Apply heat and melt the solder. Refer to Figure 78.
CAUTION: DO NOT ADD MORE SOLDER. IT IS POSSIBLE THAT THE COMPONENTS WILL NOT HAVE THE CORRECT FIT.
- (24) Push the heat shrinkable sleeve on the rear barrel of the contact until the end of the sleeve is against the shoulder of the contact.
- (25) Shrink the sleeve into its position. Refer to Subject 20-10-14.
Make sure that the distance between the forward end of the sleeve and the shoulder of the contact is 0.06 inch maximum.

F. Assembly of 249-1521-000 and 249-1522-000 Contacts

Table 46
SEAL RING PART NUMBERS

Coax Contact	Seal Ring	
	Part Number	Supplier
249-1521-000	075-90001-000	ITT Cannon
249-1522-000	075-90001-000	ITT Cannon

- (1) In this sequence, put these components on the cable:
 - The nut
 - The compression ring
 - The seal ring.

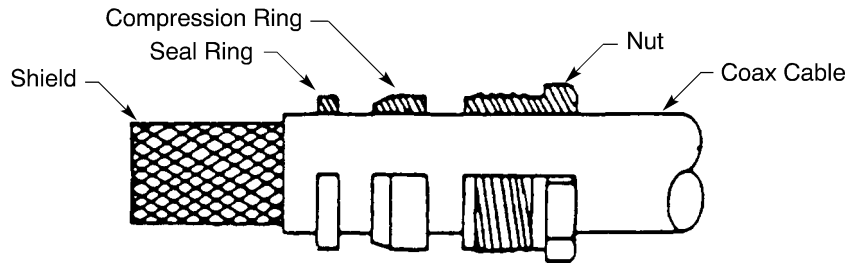
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CAUTION: THE SEAL RING MUST BE REPLACED EACH TIME THE CONTACT IS ASSEMBLED; IT IS PERMANENTLY CHANGED WHEN THE COAX BODY AND NUT ARE TIGHTENED.

NOTE: If is necessary to replace a seal ring, make a selection from Table 46.

Refer to Figure 79.



POSITION OF THE COMPRESSION RING IN RELATION TO THE SEAL RING AND THE NUT
Figure 79

(2) Prepare the cable:

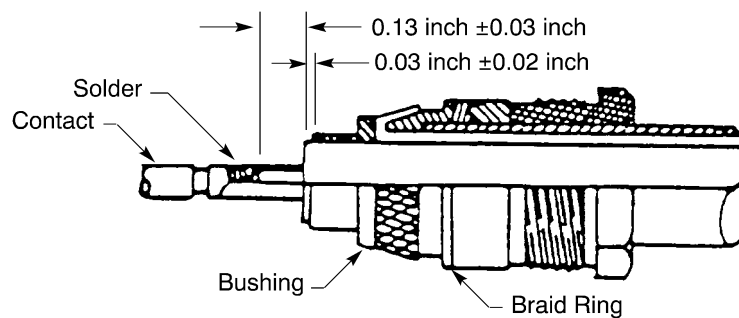
Refer to Figure 66 and Table 44.

- (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
- (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

(3) Put the braid ring on the cable. Refer to Figure 80.

Make sure that the end that has the smaller diameter points forward to the end of the cable.



LENGTH OF THE DIELECTRIC AND THE CONDUCTOR
Figure 80

- (4) Push the braid ring on the shield until it is against the cable jacket.
- (5) Move the strands of the shield apart.
- (6) Fold the strands shield back on the braid ring.

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Make sure that the shield strands are even and symmetrical around the ring.

- (7) Remove the unwanted length of the shield strands that extend beyond the end of the braid ring. Refer to Figure 80.
- (8) Move the bushing on the dielectric until the bushing is against the shield.
- (9) Remove the necessary length of the dielectric to make the distance from the end of the bushing to the end of the dielectric equal to 0.03 inch \pm 0.02 inch.

CAUTION: MAKE SURE THAT NO DAMAGE OCCURS TO THE CONDUCTOR WHEN THE DIELECTRIC IS REMOVED. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (10) Remove the necessary length of conductor to make the distance from the end of the conductor to the end of the dielectric equal to 0.13 inch \pm 0.03 inch. Refer to Figure 80.
- (11) Remove the retention washer from the center contact.
- (12) Push the center conductor into the solder barrel of the center contact until the end of the contact is against the dielectric.

Make sure that all of the strands of the center conductor:

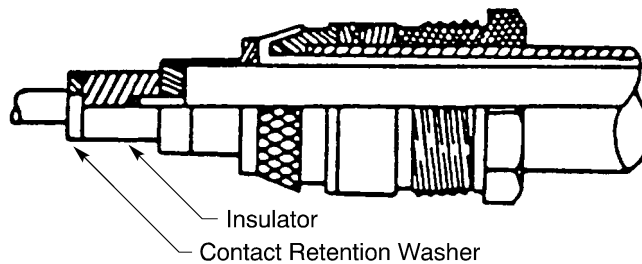
- Are in the solder barrel of the contact
- Can be seen in the inspection hole.

- (13) Solder the center conductor to the center contact through the inspection hole.

Make sure that the solder is even.

CAUTION: DAMAGE OCCURS WHEN THE BUSHING OR THE DIELECTRIC BECOME TOO HOT. DAMAGE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (14) Push the insulator on the center contact until the insulator is against the bushing. Refer to Figure 81.



POSITION OF THE INSULATOR AND THE CONTACT RETENTION WASHER

Figure 81

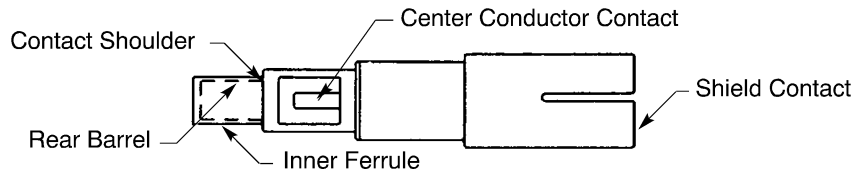
- (15) Push the contact retention washer on the center contact until the washer moves into the groove on the center contact.

Make sure that the end of the seal ring is flat against the sharp edge of the compression ring.

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G. Assembly of 249-1598-000 Contacts for DPX Connectors



249-1598-000 CONTACT CONFIGURATION
Figure 82

- (1) Make a selection of the inner and outer ferrules from Table 15.
- (2) Remove the identification color dye from the inner ferrule.
- (3) Tin the contact from the end of the rear barrel of the contact to the shoulder. Refer to Figure 82.
- (4) Put the inner ferrule on the rear barrel.
Make sure that the ferrule is against the shoulder.
- (5) Apply heat and melt the solder.

CAUTION: DO NOT ADD MORE SOLDER. IT IS POSSIBLE THAT THE COMPONENTS WILL NOT HAVE THE CORRECT FIT.

- (6) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14.
Make sure that the sleeve has the smallest diameter that can be moved on the cable jacket.
- (7) Put a 1.13 inch minimum length of a heat shrinkable sleeve on the cable.
- (8) Put the outer ferrule on the cable.
- (9) Prepare the cable:
Refer to Figure 66 and Table 44.
 - (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

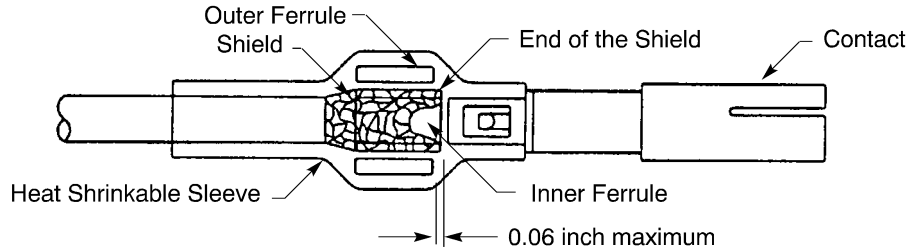
CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

- (c) Push the end of the shield back on the cable.
- (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (10) Solder the contact to the conductor:
 - (a) Apply heat to the solder cup to melt solder in the solder cup.
 - (b) Put the conductor into the solder cup.
 - (c) Remove the source of the heat to let the solder cup become solid.
- (11) Make a selection of a ferrule crimp tool from Table 45.
- (12) Put the shield on the inner ferrule.
Make sure that the shield strands are even and symmetrical around the ferrule.

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- (13) Move the outer ferrule on the shield to make the distance from the forward edge of the outer ferrule to the forward edge of the inner ferrule equal to 0.06 inch maximum. Refer to Figure 83.

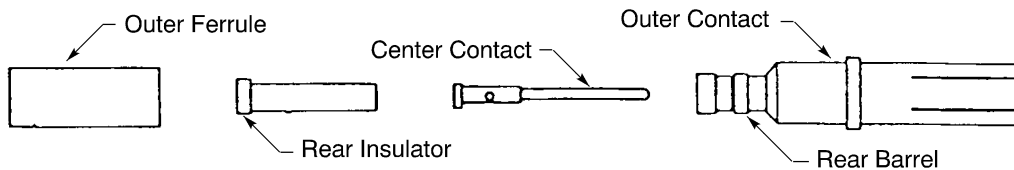


POSITION OF THE OUTER FERRULE ON THE INNER FERRULE

Figure 83

- (14) Crimp the outer ferrule.
- (15) Remove the unwanted length of the shield strands that extend beyond the forward edge of the outer ferrule.
- (16) Put the heat shrinkable sleeve on the ferrule and the center contact. Refer to Figure 83. Make sure that the end of the sleeve extends rearward farther than the contact.
- (17) Shrink the sleeve into its position. Refer to Subject 20-10-14.

H. Assembly of 249-1632-000 and 249-1634-000 Shielded Contacts



249-1634-000 CONTACT CONFIGURATION

Figure 84

- (1) Put the crimp ring on the cable. Refer to Figure 84.
- (2) Prepare the cable:
Refer to Figure 66 and Table 44.
 - (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

- (c) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to Dimension B.
- (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.

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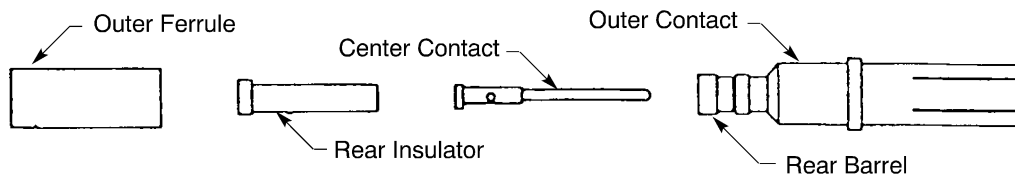
CAUTION: MAKE SURE THAT DAMAGE TO THE CONDUCTOR DOES NOT OCCUR. IF THE CONDUCTOR IS CUT SO THAT THE BASE METAL CAN BE SEEN, THE CONDUCTOR CAN GIVE UNSATISFACTORY PERFORMANCE.

- (3) Tin the conductor.
- (4) Fold the shield back on the cable jacket.
- (5) Push the rear insulator on the dielectric until the end of the insulator is against the shield.
- (6) Put the conductor in the solder barrel of the center contact.
Make sure that contact is against the dielectric.
- (7) Solder the center contact to the conductor through the inspection hole. Refer to Subject 20-40-00.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER.

- (8) Make a selection of a crimp tool from Table 45.
- (9) Push the center contact assembly into the outer contact.
- (10) Fold the shield forward on the rear insulator.
Make sure that the shield is even and symmetrical around the contact.
- (11) Push the crimp ring on the shield until the ring is against the contact.
- (12) Crimp the crimp ring.

I. Assembly of 249-1634-000 Contacts with BMS 13-65 Type OE or S280W503-1 Cable



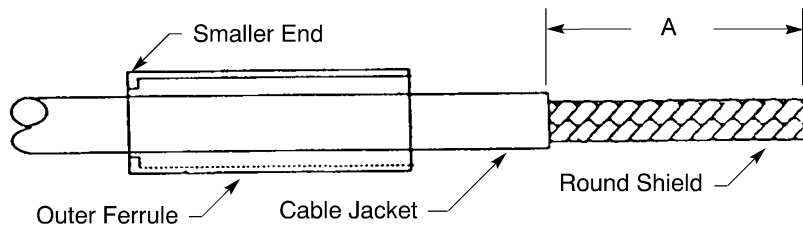
249-1634-000 CONTACT CONFIGURATION
Figure 85

- (1) Put the outer ferrule on the cable. Refer to Figure 85.
Make sure that the end of the ferrule that has the larger hole points forward to the end of the cable.
- (2) Prepare the cable:
Refer to Table 44 for the trim dimensions.
 - (a) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

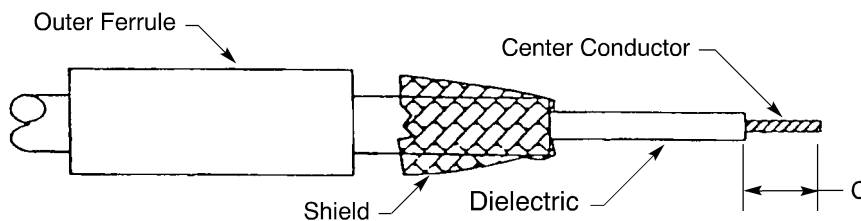
STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS



JACKET REMOVAL LENGTH
Figure 86

- (b) Open the end of each shield.
- (c) Move the strands of the flat shield apart.
- (d) Make the strands of the flat shield straight.
- (e) Fold each shield away from the end of the cable jacket.
- (f) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.



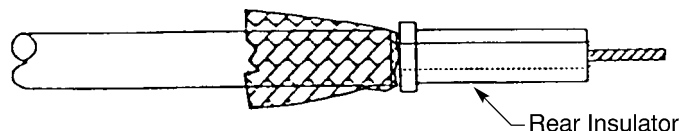
DIELECTRIC REMOVAL LENGTH
Figure 87

- (3) Put the rear insulator on the cable.

Make sure that:

- The smaller end of the insulator points to the end of the cable
- The larger end is against the shield.

Refer to Figure 88.



POSITION OF THE REAR INSULATOR AGAINST THE SHIELD
Figure 88

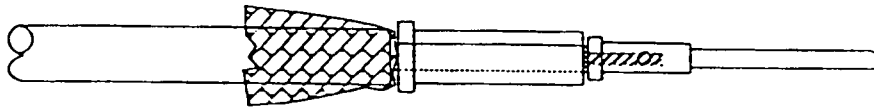
- (4) Put the conductor in the solder barrel of the center contact so that the conductor touches the bottom of the solder barrel.

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Make sure that all of the strands of the conductor:

- Are in the contact solder barrel
 - Can be seen in the inspection hole of the contact.
- (5) Push the center contact until it is against the rear insulator.
- (6) Solder the center contact to the conductor through the inspection hole. Refer to Subject 20-40-00.



CENTER CONTACT SOLDERED TO THE CONDUCTOR

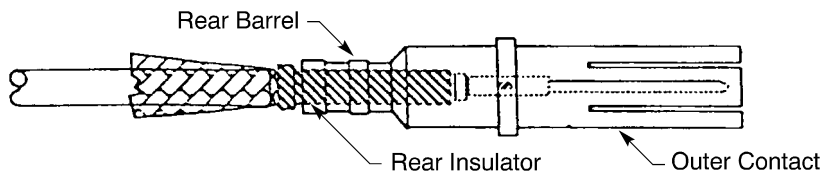
Figure 89

- (7) Make a selection of a ferrule crimp tool from Table 45.
- (8) Find the crimp tool settings in Table 47.
- Make sure that the die opening is 0.202 inch between the flat sides of the closed hex crimp die.

**Table 47
CRIMP TOOL SETTINGS**

Crimp Tool	Setting
CCTDM	C
M22520/5-01	A

- (9) Put the center contact assembly into the outer contact. Refer to Figure 90.
- Make sure that the rear insulator is against the outer contact.



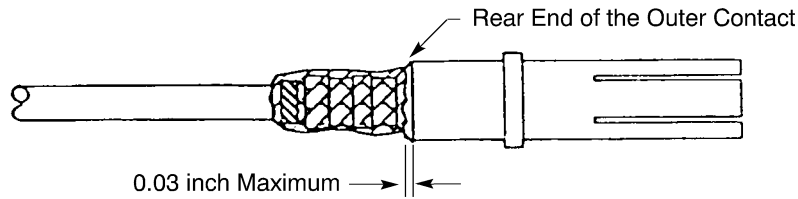
POSITION OF THE OUTER CONTACT

Figure 90

- (10) Put the flat shield on the round shield.
- Make sure that the shield is even and symmetrical around the rear barrel of the outer contact.
- (11) Put the round shield on the rear barrel of the outer contact.
- Make sure that the shield is even and symmetrical around the rear barrel of the outer contact.
- (12) Cut the strands of the shield to make the distance from the end of the shield strands to the rear end of the outer contact equal to 0.03 inch maximum. Refer to Figure 91.

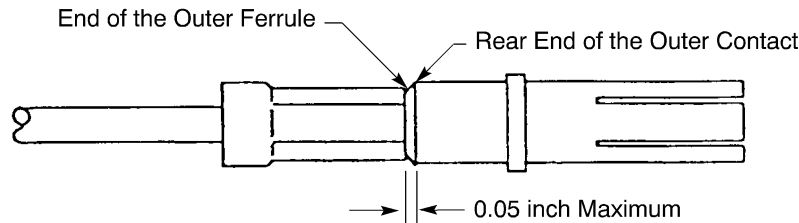
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LENGTH OF SHIELD
Figure 91

- (13) Push the outer ferrule on the shield and the rear barrel of the outer contact until it is against the body of the outer contact.
- (14) Crimp the outer ferrule. Refer to Figure 92.
Make sure that the distance between the forward end of the ferrule and the outer contact is 0.05 inch maximum.



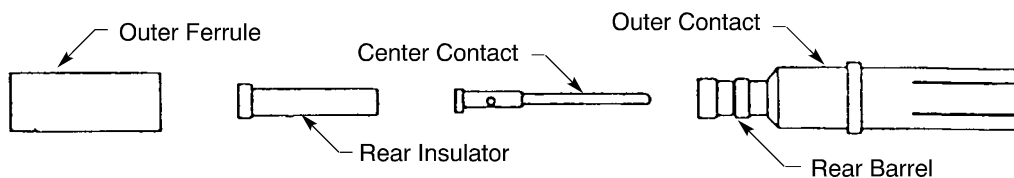
POSITION OF THE OUTER FERRULE
Figure 92

- (15) Remove the unwanted length of the shield strands that can be seen.

J. Assembly of 249-1634-000 Contacts with 10-60875-() AWG 20 Shielded Cable

This paragraph give the procedure to assemble the contact for:

- The DPXM() connectors
- The DPX2M() connectors.



249-1634-000 CONTACT CONFIGURATION
Figure 93

- (1) Put the outer ferrule on the cable. Refer to Figure 93.
Make sure that the end of the ferrule that has the larger hole points to the end of the cable.
- (2) Prepare the cable:
Refer to Figure 66 and Table 44.

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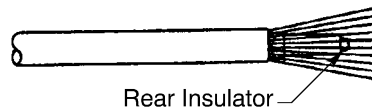
- (a) Remove the necessary length of the cable jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

- (b) Push the end of the shield back on the cable.
(c) Remove a 0.38 inch \pm 0.06 inch length from the end of the cable.
(d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (3) Tin the conductor.
(4) Make a selection of a crimp tool from Table 45.
(5) Move the strands of the shield apart.
(6) Put the rear insulator on the dielectric. Refer to Figure 94.

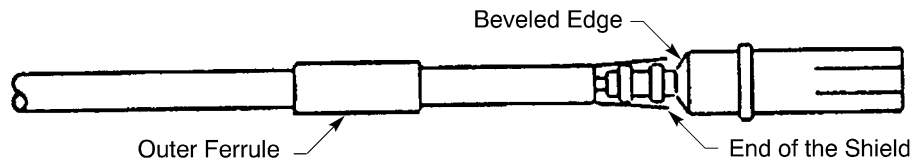
Make sure that:

- The smaller end of the insulator points forward to the end of the cable
- The shield is on the rear insulator.



POSITION OF THE REAR INSULATOR
Figure 94

- (7) Put the conductor in the solder barrel of the center contact.
(8) Solder the center contact to the conductor.
(9) Push the center contact assembly into the outer contact until it stops.
Make sure that the end of the insulator is against the contact.
(10) Put the shield on the rear barrel of the outer contact.
Make sure that the shield is even and symmetrical around the rear barrel.
(11) Cut the ends of the shield strands to make the distance from the end of the shield strands to the beveled edge of the outer contact equal to or less than 0.03 inch. Refer to Figure 95.



LOCATION OF THE END OF THE SHIELD
Figure 95

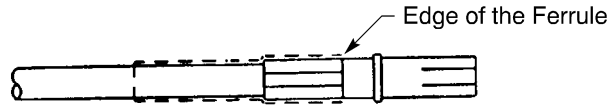
- (12) Push the outer ferrule on the shield.
Make sure that the ferrule is against the beveled edge of the outer contact.

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

- (13) Crimp the outer ferrule.
- (14) Make a selection of heat shrinkable sleeve. Refer to Subject 20-10-14.
Make that the sleeve has the smallest diameter that can be moved on the cable jacket.
- (15) Put a 1.50 inch \pm 0.25 inch length of heat shrinkable sleeve on the assembly. Refer to Figure 96.

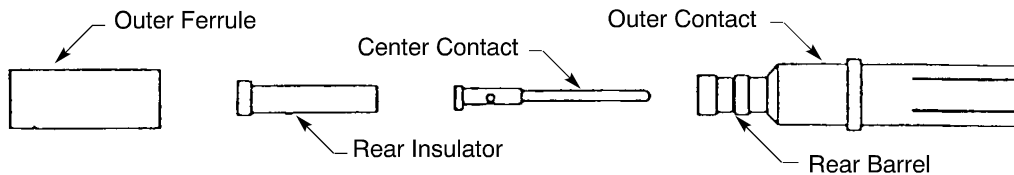


POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 96

- (16) Shrink the sleeve into its position. Refer to Subject 20-10-14.
Make sure that the distance from the forward end of the sleeve to the forward edge of the ferrule is 0.06 inch maximum.

K. Assembly of 249-1634-000 Contacts with BMS 13-42 and BMS 13-48 Wire

This paragraph gives the procedure to assemble the contacts with AWG 20 wire.



249-1634-000 CONTACT CONFIGURATION
Figure 97

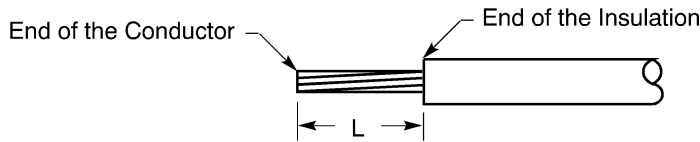
Table 48
INSULATION REMOVAL LENGTH

Contact	Wire	Length L (inch)	
		Target	Tolerance
249-1634-000	BMS 13-42	0.16	\pm 0.03
	BMS 13-48	0.16	\pm 0.03

- (1) Put the outer ferrule on the wire.
Make sure that the end of the ferrule that has the larger hole points forward to the end of the wire.
- (2) Put the rear insulator on the wire.
Make sure that the end of the insulator that has the smaller hole points forward to the end of the wire.
- (3) Remove the necessary length of the insulation.
Make sure that the distance from the end of the insulation to the end of the wire is Length L.
Refer to Figure 98 and Table 48.

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INSULATION REMOVAL LENGTH

Figure 98

- (4) Put the conductor of the wire into the solder barrel of the center contact.
- (5) Solder the center contact to the wire.
- (6) Make a selection of a crimp tool from Table 45.
- (7) Put the center contact into the outer contact.
- (8) Push the rear insulator into the outer contact until the insulator is against the center contact.
- (9) Put the outer ferrule on the outer contact.
Make sure that the end of the ferrule is against the shoulder of the contact.
- (10) Crimp the outer ferrule.

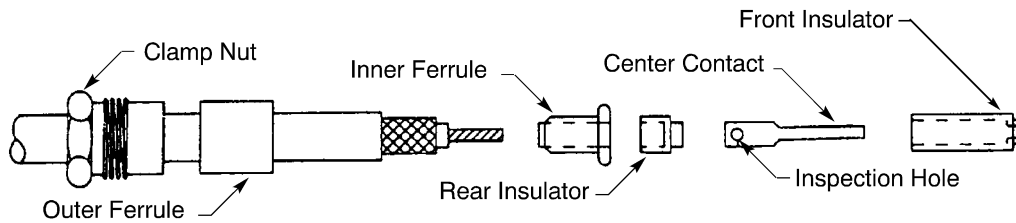
L. Assembly of 249-1830-000 Size 7 Coax Contacts for the DPX AC3 Insert

**Table 49
NECESSARY MATERIALS**

Description	Part Number	Supplier
Thread Lock Compound	222	Loctite

**Table 50
NECESSARY TOOLS**

Description	Supplier
Torque tool	An available source



249-1830-000 CONTACT CONFIGURATION

Figure 99

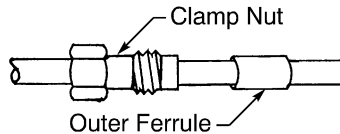
- (1) Make a selection of a ferrule crimp tool from Table 45.

STANDARD WIRING PRACTICES MANUAL

ITT CANNON DPX, DPD, AND DPA CONNECTORS

- (2) Put these components on the cable in this sequence:
- The clamp nut
 - The outer ferrule.

Refer to Figure 99.



COMPONENTS ON THE CABLE
Figure 100

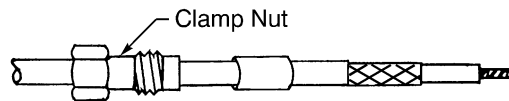
- (3) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable. Keep the discarded end of the cable for Step (4).
- (4) If the fit between the outside of the cable and the inside of the clamp nut can be improved with a layer of heat shrinkable sleeve on the cable:

NOTE: The clamp nut must be able to move and turn easily on a cable that has an increased diameter. It can be necessary to determine the fit between the clamp nut and a cable with an increased diameter on a short length of discarded cable.

- (a) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14. Make sure that the sleeve has the smallest diameter that can be moved on the cable.
- (b) Put a 2.00 inch \pm 0.13 inch length of the heat shrinkable sleeve on the cable.
- (5) Prepare the cable.

Refer to:

- Figure 66
- Table 44
- Figure 101.



CABLE PREPARATION
Figure 101

- (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
- (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

- (c) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to Dimension B.

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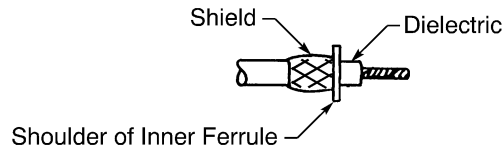
ITT CANNON DPX, DPD, AND DPA CONNECTORS

- (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (6) Put the inner ferrule on the cable. Refer to Figure 102.

Make sure that no strands of the shield are between the dielectric and the inner ferrule.

Make sure that the inner ferrule is:

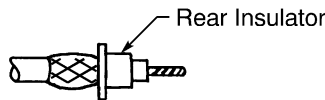
- On the dielectric
- Under the shield
- Against the end of the cable jacket.



INNER FERRULE ON THE CABLE
Figure 102

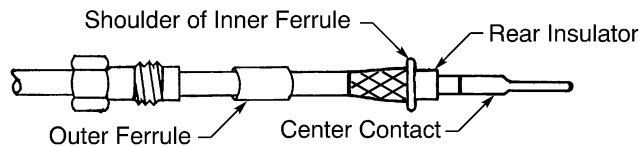
- (7) Put the strands of the shield on the inner ferrule.
- (8) Remove the unwanted length of the shield strands that extend beyond the rear edge of the shoulder of the inner ferrule.
- (9) Put the rear insulator on the cable. Refer to Figure 103.

Make sure that the rear insulator is against the cable dielectric.



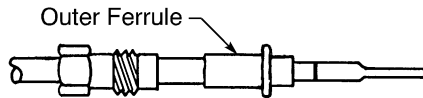
REAR INSULATOR ON THE CABLE
Figure 103

- (10) Tin the conductor.
 - (11) Put the conductor into the solder barrel of the center contact. Refer to Figure 104.
- Make sure that the conductor can be seen in the inspection hole of the contact.

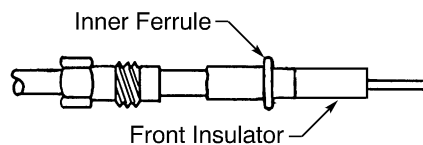


POSITION OF THE CENTER CONTACT
Figure 104

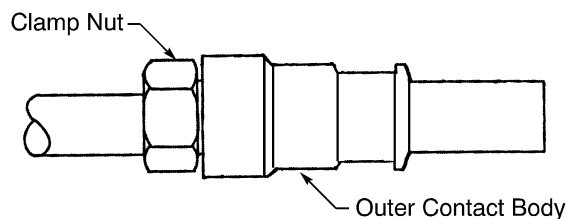
- (12) Solder the contact to the conductor.
- (13) Push the outer ferrule forward on the shield and the inner ferrule until it is against the forward shoulder of the inner ferrule. Refer to Figure 105.

STANDARD WIRING PRACTICES MANUAL**ITT CANNON DPX, DPD, AND DPA CONNECTORS****OUTER FERRULE AGAINST THE SHOULDER OF THE INNER FERRULE****Figure 105**

- (14) Crimp the outer ferrule.
Make sure that 0.13 inch of the jacket is below the outer ferrule.
- (15) If the heat shrinkable sleeve is on the cable:
 - (a) Move the sleeve forward until the forward end of the heat shrinkable sleeve is against the rear end of the outer ferrule.
 - (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (16) Put the front insulator on the front of the center contact. Refer to Figure 106.
Make sure that the front insulator is against the rear insulator.

**FRONT INSULATOR ON THE CENTER CONTACT****Figure 106**

- (17) Make a selection of a thread lock compound from Table 49.
- (18) Apply a drop of thread lock compound to the threads of the clamp nut.
- (19) Engage the threads of the contact body and the clamp nut. Refer to Figure 107.

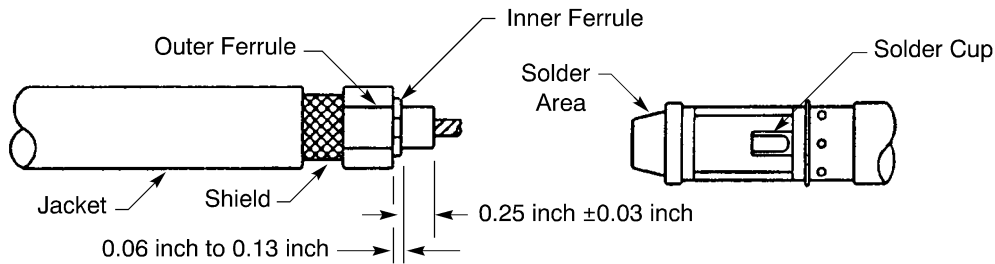
**POSITION OF THE CLAMP NUT IN THE COMPLETED CONTACT ASSEMBLY****Figure 107**

- (20) Hold the body of the contact and torque the clamp nut to 45 inch-pounds \pm 5 inch-pounds.

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M. Assembly of 249-1858-000 Contacts with RG-115 Cable



249-1858-000 CONTACT CONFIGURATION

Figure 108

- (1) Remove the solder cup access cover from contact. Refer to Figure 108.
- (2) Put solder into the solder cup.
- (3) Tin the contact from the small end of the contact to the shoulder.
- (4) Make a selection of heat shrinkable sleeve. Refer to Subject 20-10-14.
Make sure that the sleeve has the smallest diameter that can be moved on the cable jacket.
- (5) Put a 2.00 inch ± 0.06 inch length of heat shrinkable sleeve on the cable.
- (6) Make a selection of the inner and outer ferrules from Table 15.
- (7) Put the outer ferrule on the cable.
- (8) Prepare the cable.
Refer to Figure 66 and Table 44.
 - (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

 - (c) Push the end of the shield back on the cable.
 - (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (9) Remove the identification color dye from the inner ferrule.
- (10) Tin one end and the internal surface of the inner ferrule.
- (11) Make a selection of a ferrule crimp tool from Table 45.
- (12) Push the inner ferrule on the dielectric and below the shield braid.
Make sure that:
 - The tinned end is pointed forward to the end of the cable
 - The dielectric extends 0.25 inch ± 0.03 inch farther than the end of the ferrule.
- (13) Push the outer ferrule on the shield and the inner ferrule.
Make sure that 0.06 inch to 0.13 inch of the inner ferrule extends farther than the outer ferrule.

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

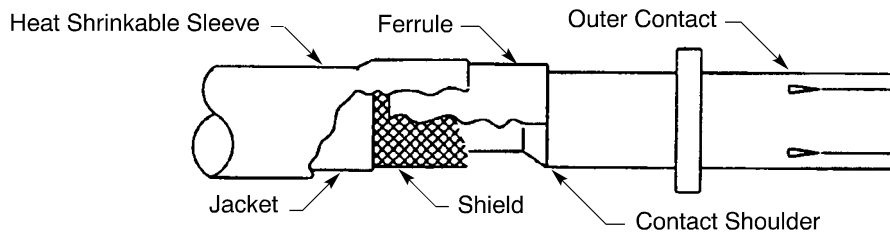
Refer to Figure 108.

- (14) Crimp the outer ferrule.
- (15) Remove the unwanted length of the shield strands that extend beyond the end of the outer ferrule.
- (16) Solder the center contact:
 - (a) Hold the conductor on the solder cup of the contact.
 - (b) Apply heat to the inner contact and push the conductor into the contact at the same time.
 - (c) Remove the heat and hold the conductor in the contact until the solder becomes solid.

Make sure that the distance between the end of the dielectric and solder cup is less than 0.06 inch.
- (17) At the same time, apply heat to the inner ferrule and push the smaller end of the contact into the inner ferrule.
- (18) Remove the heat and hold the inner ferrule and the contact until solder becomes solid.
- (19) Put the solder cup access cover on the contact.
- (20) Push the sleeve on the ferrule and contact.

Make sure that the distance between the forward end of the sleeve and the surface of the connector insert is 0.06 inch maximum.
- (21) Shrink the sleeve into its position. Refer to Subject 20-10-14.

N. Assembly of 249-1959-000 Contacts with RG-223 Cable



249-1959-000 CONTACT CONFIGURATION

Figure 109

- (1) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14.

Make sure that the sleeve has the smallest diameter that can be moved on the cable jacket.
- (2) Put a 1.13 inch ± 0.06 inch length of the heat shrinkable sleeve on the cable.
- (3) Prepare the cable.

Refer to Figure 66 and Table 44.

 - (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

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ITT CANNON DPX, DPD, AND DPA CONNECTORS

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

- (c) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to Dimension B.
- (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (4) Tin the center conductor.
- (5) Put the conductor in the solder barrel of the inner contact.
Make sure that the conductor is against the bottom of the solder barrel.
- (6) Solder the conductor to the inner contact.

CAUTION: DO NOT PUT MORE THAN THE NECESSARY QUANTITY OF SOLDER ON THE CONTACT AND CONDUCTOR. UNWANTED SOLDER ON THE INNER CONTACT CAN PREVENT THE INSERTION OF THE CONTACT INTO THE FERRULE.

- (7) Tin the inner wall of the ferrule.
- (8) Put the ferrule on the cable.
- (9) Tin the outer contact from the back edge to the shoulder.
- (10) Move the shield away from the dielectric.
- (11) Push inner contact assembly into the outer contact until it stops. Refer to Figure 109.
- (12) Put the shield strands on the outer contact.
Make sure that the shield strands are even and symmetrical around the outer contact.
- (13) Push the ferrule forward on the shield until the forward end of the ferrule is against the shoulder of the outer contact. Refer to Figure 109.
- (14) Solder the ferrule.

CAUTION: DAMAGE TO THE CABLE CAN OCCUR WHEN HEAT IS APPLIED TO THE FERRULE FOR A LONGER TIME THAN NECESSARY TO MELT THE SOLDER.

- (15) Push the heat shrinkable sleeve on the ferrule until the end of the sleeve is aligned with the center of the ferrule. Refer to Figure 109.
- (16) Shrink the sleeve into its position. Refer to Subject 20-10-14.

O. Assembly of 249-1982-000, 249-1983-000 and 249-2020-001 Coax Contacts

**Table 51
COAX CENTER CONTACT CRIMP TOOLS**

Coax Contact Part Number	Center Contact Attachment Procedure	Crimp Tool		
		Basic Unit	Locator	
			Part Number	Setting
249-1982-000	Solder	-	-	-
249-1983-000	Crimp	M22520/2-01	M22520/2-23	6
		M22520/2-01	K267-1	6
249-2020-001	Solder	-	-	-

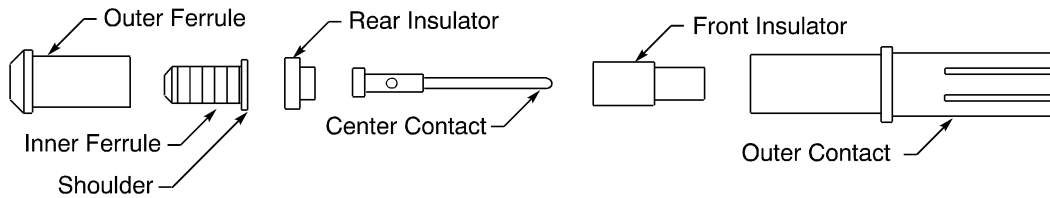
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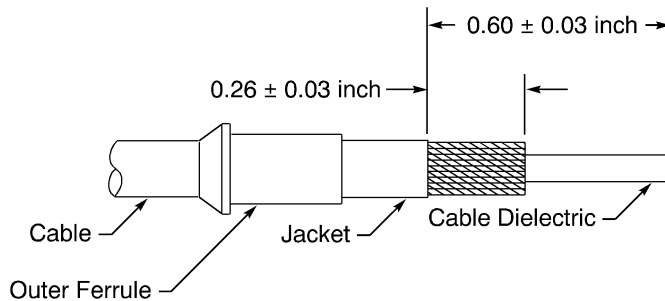
**Table 52
COAX OUTER CONTACT CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
249-1982-000	M22520/5-01	M22520/5-45	A
		M22520/5-19	B
		KTH-2001	A
249-1983-000	M22520/5-01	M22520/5-45	A
		M22520/5-19	B
		KTH-2001	A
249-2020-001	M22520/5-01	M22520/5-45	A
		M22520/5-19	B
		KTH-2001	A



ITT CANNON 249-1982-000, 249-1983-000 AND 249-2020-001 COAX CONTACT COMPONENTS
Figure 110

- (1) Put the outer ferrule on the cable.
Make sure that the larger end of the ferrule points rearward, away from the end of the cable.
- (2) Prepare the cable. Refer to Figure 111.



COAX CABLE TRIM DIMENSIONS
Figure 111

- (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.

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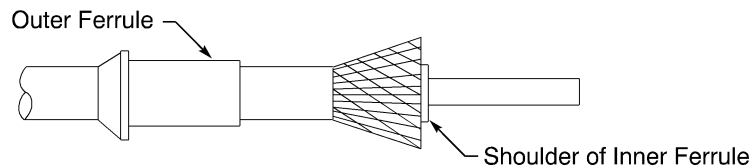
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- (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to 0.60 inch \pm 0.03 inch.

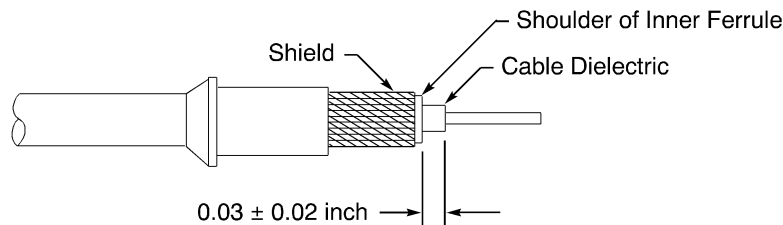
CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

- (c) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to 0.26 inch \pm 0.03 inch.
- (3) Push the inner ferrule on the cable between the dielectric and the shield strands. Refer to Figure 112. Make sure that the inner ferrule is under the shield.



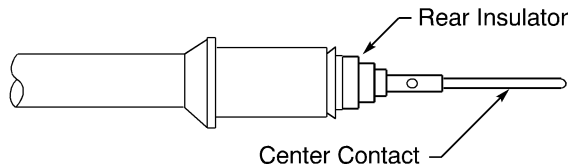
POSITION OF THE INNER FERRULE AND THE LENGTH OF THE SHIELD
Figure 112

- (4) Remove the strands of the flat shield from the end of the jacket forward to the end of the cable.
- (5) Remove the unwanted length of the shield strands that extend forward beyond the rear edge of the shoulder of the inner ferrule. Refer to Figure 112.
- (6) Put the strands of the shield against the inner ferrule. Refer to Figure 113. Make sure that the shield strand ends are aligned with the rear edge of the shoulder of the inner ferrule.



POSITION OF THE SHIELD STRANDS REARWARD OF THE INNER FERRULE SHOULDER
Figure 113

- (7) Hold the inner ferrule in its location and, at the same time, push the outer ferrule forward until it is against the shoulder of the inner ferrule.
- (8) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the forward end of the inner ferrule equal to 0.03 inch \pm 0.02 inch. Refer to Figure 113.
- (9) Put the rear insulator on the center conductor. Refer to Figure 114. Make sure that the smaller end of the insulator points forward.

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POSITION OF THE REAR INSULATOR AND THE CENTER CONTACT
Figure 114

(10) Put the center conductor into the wire barrel of the center contact. Refer to Figure 114.

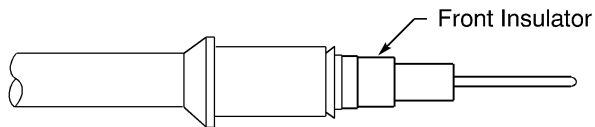
(11) Attach the center contact to the center conductor.

Refer to:

- Table 51 for the attachment procedure and tools
- Figure 114 for the position of the center contact
- Subject 20-40-00 for the solder procedures, if solder is specified.

(12) Put the front insulator on the center contact. Refer to Figure 115.

Make sure that the smaller end of the insulator points forward.



POSITION OF THE FRONT INSULATOR
Figure 115

(13) Push the center contact assembly into the outer contact.

(14) Make a selection of an outer contact crimp tool from Table 52.

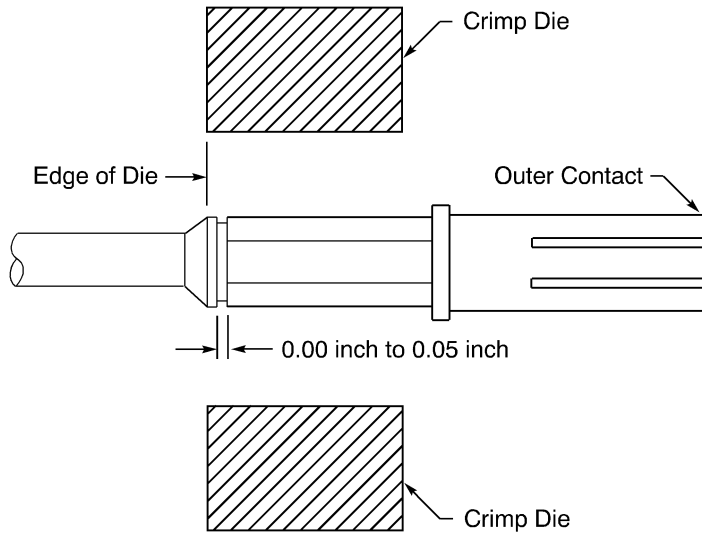
(15) Crimp the outer contact. Refer to Figure 116.

Make sure that:

- The edge of the crimp die is aligned with the rear end of the outer ferrule
- The distance between the shoulder of the outer ferrule and the rear edge of the outer contact is not more than 0.05 inch.

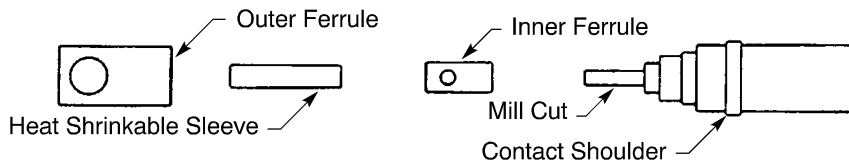
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CONFIGURATION OF THE COMPLETED COAX CONTACT ASSEMBLY
Figure 116

P. Assembly of 249-5008-000 Contacts with BA-5903 Cable



249-5008-000 CONTACT CONFIGURATION
Figure 117

- (1) Put the outer ferrule on the cable. Refer to Figure 117.
 Make sure that the end of the ferrule that has the hole points rearward, away from the end of the cable.
- (2) Prepare the cable.
 Refer to Figure 66 and Table 44.
 - (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

 - (c) Push the end of the shield back on the cable.
 - (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (3) Tin the conductor.

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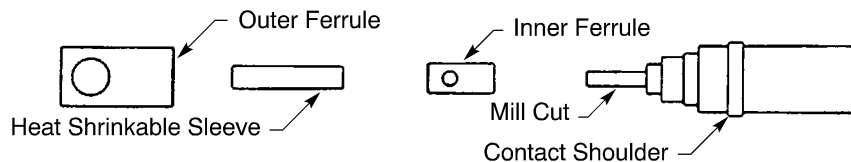
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- (4) Put a 0.50 inch \pm 0.03 inch length of 1/8 inch diameter TFE-R heat shrinkable sleeve on the cable. Make sure that the sleeve is on the dielectric and below the shield.

CAUTION: DO NOT USE THE SLEEVE THAT IS SUPPLIED WITH THE CONTACT.

- (5) Push the inner ferrule on the heat shrinkable sleeve and below the shield strands. Make sure that:
 - The end of the inner ferrule that has the hole points rearward, away from the end of the cable
 - The inner ferrule is between the heat shrinkable sleeve and the shield strands.
- (6) Put the conductor in the solder cup of the contact.
- (7) Solder the conductor to the contact.
- (8) Push the heat shrinkable sleeve on the soldered contact until end of the sleeve is against the dielectric.
- (9) Put the inner ferrule on the contact. Make sure that the hole in the ferrule is aligned with the mill cut side of the contact.
- (10) Solder the inner ferrule to the contact through the hole.
- (11) Put the shield strands on the inner sleeve. Make sure that the shield strands are even and symmetrical around the sleeve.
- (12) Push the outer ferrule forward on the shield and the contact until the forward edge of the outer ferrule is against the shoulder of the contact.
- (13) Solder the outer ferrule to the contact through the hole in the outer ferrule.
- (14) Make a selection of heat shrinkable sleeve. Refer to Subject 20-10-14. Make sure that the heat shrinkable sleeve has the smallest diameter that can be moved on the cable jacket.
- (15) Put the necessary length of heat shrinkable sleeve on the cable. Make sure that:
 - The forward end of the sleeve is aligned with the rear edge of the shoulder of the contact
 - The distance from the rear end of the sleeve to the rear of the end of the outer ferrule is 0.50 inch minimum.
- (16) Shrink the sleeve into its position. Refer to Subject 20-10-14.

Q. Assembly of 249-5008-000 Contacts with Unshielded Wire



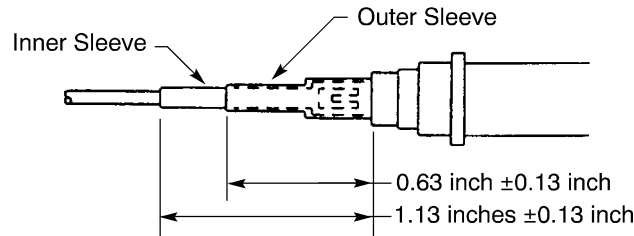
249-5008-000 CONTACT CONFIGURATION
Figure 118

- (1) Discard the inner ferrule and the outer ferrule. Refer to Figure 118.
- (2) Remove the necessary length of the wire insulation to make the distance from the end of the insulation to the end of the conductor equal to Dimension C.

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- (3) Tin the conductor.
- (4) Put the wire into the solder cup of the contact.
- (5) Solder the wire to the contact.
- (6) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14.
- (7) Install the heat shrinkable sleeves. Refer to Figure 119.



POSITION OF THE HEAT SHRINKABLE SLEEVES
Figure 119

- (a) Put a 1.13 inch ± 0.13 inch length of heat shrinkable sleeve on the solder cup and the wire.
- (b) Shrink the sleeve in position. Refer to Subject 20-10-14.
- (c) Put a 0.63 inch ± 0.06 inch length of heat shrinkable sleeve on the assembly.
- (d) Shrink the sleeve in position. Refer to Subject 20-10-14.

R. Assembly of 249-5027-004 Size 3 Coax Contacts for the DPX AC3 Insert

Table 53
NECESSARY MATERIALS

Description	Part Number	Supplier
Thread Lock Compound	222	Loctite

Table 54
NECESSARY TOOLS

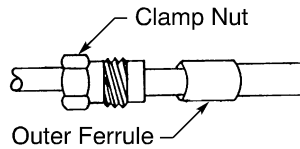
Description	Supplier
Torque tool	An available source

- (1) Make a selection of a ferrule crimp tool from Table 45.
- (2) In sequence, put these components on the cable:
 - The clamp nut
 - The outer ferrule.

Refer to Figure 120.

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COMPONENTS ON THE CABLE

Figure 120

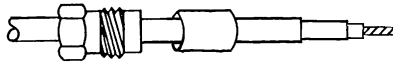
- (3) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable. Keep the discarded end of the cable for Step (4).
- (4) If the fit between the outside of the cable and the inside of the clamp nut can be improved with a layer of heat shrinkable sleeve on the cable:

NOTE: The clamp nut must be able to move and turn easily on a cable that has an increased diameter. It can be necessary to determine the fit between the clamp nut and a cable with an increased diameter on a short length of discarded cable.

- (a) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14. Make sure that the sleeve has the smallest diameter that can be moved on the cable.
 - (b) Put a 2.00 inch \pm 0.13 inch length of the heat shrinkable sleeve on the cable.
- (5) Prepare the cable.

Refer to:

- Figure 66
- Table 44
- Figure 121.



COMPONENTS ON THE PREPARED CABLE

Figure 121

- (a) Remove the necessary length of the cable jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.
CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.
 - (b) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to Dimension B.
CAUTION: MAKE SURE THAT DAMAGE TO THE DIELECTRIC DOES NOT OCCUR. IF THE DIELECTRIC HAS DAMAGE, THE DIELECTRIC CAN GIVE UNSATISFACTORY PERFORMANCE.
 - (c) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (6) Tin the center conductor.

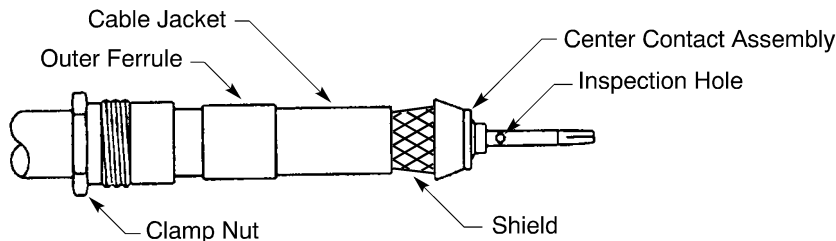
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- (7) Put the center contact assembly on the cable:

Refer to Figure 122.

Make sure that:

- All of the strands of the conductor are in the solder barrel of the center contact
- The inner ferrule is on the dielectric and below the shield
- The rear end of the inner ferrule is against the cable jacket
- The strands of the conductor can be seen in the inspection hole of the center contact
- No strands of the shield are between the dielectric and the center contact.

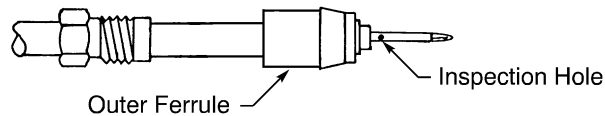


CENTER CONTACT ASSEMBLY ON THE CABLE

Figure 122

- (8) Solder the center contact through the inspection hole.

- (9) Push the outer ferrule forward on the shield and the inner ferrule until it stops. Refer to Figure 123.



OUTER FERRULE AGAINST THE CENTER CONTACT

Figure 123

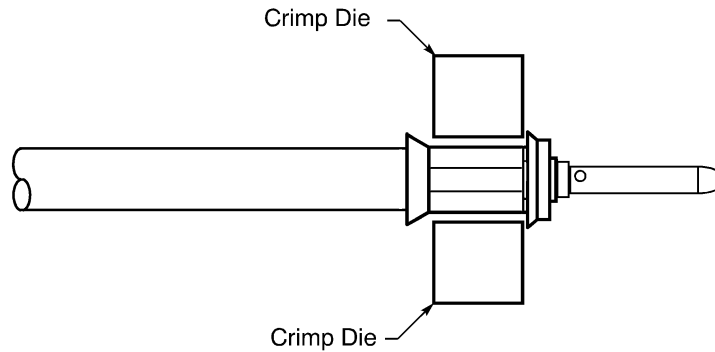
- (10) If necessary, remove the unwanted length of the shield strands that extend beyond the forward end of the outer ferrule.
- (11) Crimp the outer ferrule. Refer to Figure 124.

Make sure that:

- The gap between the forward end of the outer ferrule and the center contact is less than or equal to 0.07 inch
- The edge of the dies of the crimp tool are aligned with the forward edge of the outer ferrule

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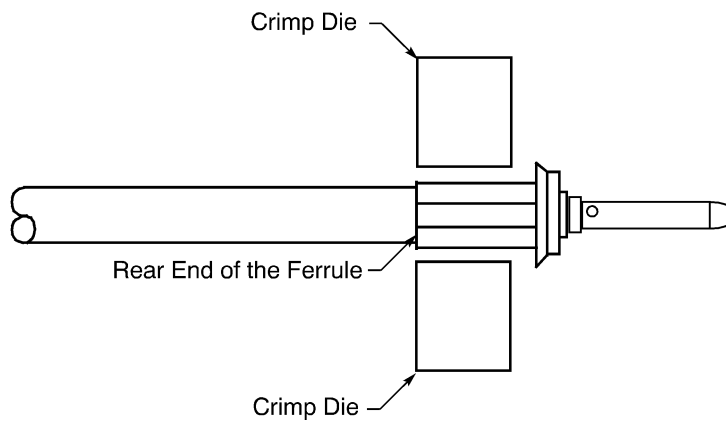


POSITION OF THE CRIMP DIES FOR THE FIRST OUTER FERRULE CRIMP
Figure 124

(12) Crimp the outer ferrule again. Refer to Figure 125.

Make sure that:

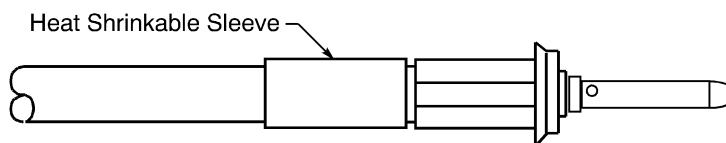
- The edge of the dies of the crimp tool are aligned with the rear edge of the outer ferrule.
- The dies of the crimp tool will crimp the bend in the outer ferrule made by the first crimp.



POSITION OF THE CRIMP DIES FOR THE SECOND OUTER FERRULE CRIMP
Figure 125

(13) If the heat shrinkable sleeve is on the cable:

Refer to Figure 126.

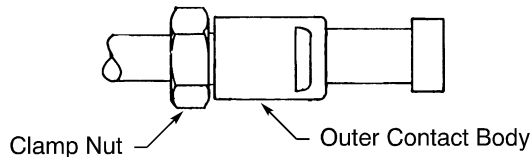


POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 126

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- (a) Move the sleeve forward until the forward end of the heat shrinkable sleeve is against the rear end of the outer ferrule.
- (b) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (14) Push the center contact assembly into the outer contact body.
- (15) Make a selection of a thread lock compound from Table 53.
- (16) Apply a drop of thread lock compound to the threads of the clamp nut.
- (17) Engage the threads of the outer contact body and the clamp nut. Refer to Figure 127.

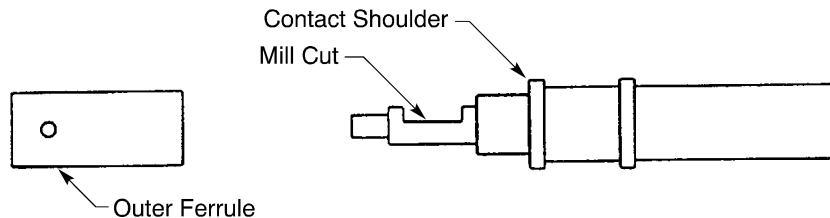


POSITION OF THE CLAMP NUT IN THE COMPLETED CONTACT ASSEMBLY
Figure 127

- (18) Hold the body of the contact and torque the clamp nut to 95 inch-pounds \pm 5 inch-pounds.

S. Assembly of 249-9104-000 Contacts with RG-223 Cable

This paragraph gives the procedure to assemble the contacts for the DPAMA() connectors.



249-9104-000 CONTACT CONFIGURATION
Figure 128

- (1) Prepare the cable.
 - Refer to Figure 66 and Table 44.
 - (a) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (b) Remove the necessary length of the outer jacket to make the distance from the end of the jacket to the end of the cable equal to Dimension A.

CAUTION: MAKE SURE THAT DAMAGE TO THE SHIELD DOES NOT OCCUR. IF THE SHIELD IS CUT TO MAKE IT POSSIBLE TO SEE THE BASE METAL OF THE SHIELD STRANDS, THE SHIELD CAN GIVE UNSATISFACTORY PERFORMANCE.

- (c) Put the outer ferrule on the cable. Refer to Figure 128.
 - Make sure that the end of the ferrule that has the hole points away from the end of the cable.
- (d) Push the end of the shield back on the cable.

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- (e) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (2) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14.
Make sure that the sleeve has the smallest diameter that can be moved on the outer ferrule.
- (3) Put a 2.00 inch \pm 0.13 inch length of 1/4 inch diameter heat shrinkable sleeve on the cable.
- (4) Tin the conductor.
- (5) Put the cable in the contact. Refer to Figure 128.
Make sure that the mill end of the solder cup points to the end of the cable.
- (6) Solder the conductor to the contact.
- (7) Move the strands of the shield apart.
- (8) Put the shield on the contact.
Make sure that the shield is even and symmetrical around the contact.
- (9) Push the outer ferrule forward on the shield until the end of the outer ferrule is against the shoulder of the contact.
- (10) Solder the outer ferrule to the contact through the hole in the outer ferrule.
- (11) Put the 2.00 inch \pm 0.13 inch length of 1/4 inch diameter heat shrinkable sleeve on the outer ferrule.
Make sure that the end of the heat shrinkable sleeve is against the contact shoulder.
- (12) Shrink the sleeve into its position. Refer to Subject 20-10-14.

7. CONNECTOR ASSEMBLY

A. Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector.

**Table 55
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool	
	Part Number	Size
2222	282880	22
	8660-162	
	ATBO1054	
	CIET-22	
	CIET-22DPXMA	
	CIT-DPXMA-22-1	
	DAK266	
	DAK266J	
	M81969/1-01	
	MS3156-22	

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Table 55 (continued)

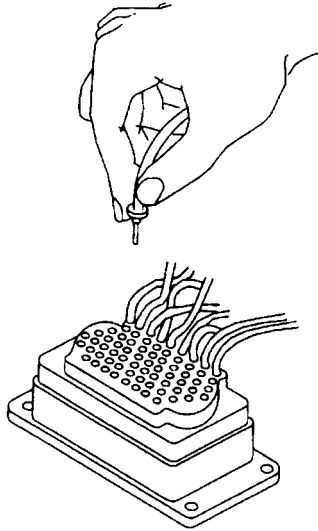
Contact Size	Insertion Tool	
	Part Number	Size
2020HD	282881	20HD
	91066-4	
	ATC2073	
	CIET	
	CIET-20 HDL	
	DAK145J	
	M81969/1-02	
	MS3156-20	
2020	CIET-20	20
1616	282892	16
	282929	
	91066-3	
	DAK55-16	
	M81969/1-03	
	MS3156-16	
1212	CIET-12	12
	M81969/28-02	
	MS3178-002	
0808	-	-
0406	-	-

- (1) Make a selection of an insertion tool from Table 55.
It is not necessary to use a tool to insert contacts that are larger than size 20.
- (2) Put the contact assembly in the insert tool.
Make sure that the end of the tool is against the rear shoulder of the contact.
- (3) Axially align the insertion tool, the contact, and the contact cavity at the rear of the connector.
- (4) Carefully push the contact into the contact cavity until it stops. Refer to Figure 129.
Make sure that the contact and the insertion tool stay axially aligned with contact cavity.

CAUTION: DO NOT TURN THE INSERT TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

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MANUAL CONTACT INSERTION
Figure 129

- (5) Carefully pull the tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (2) through Step (6) again.

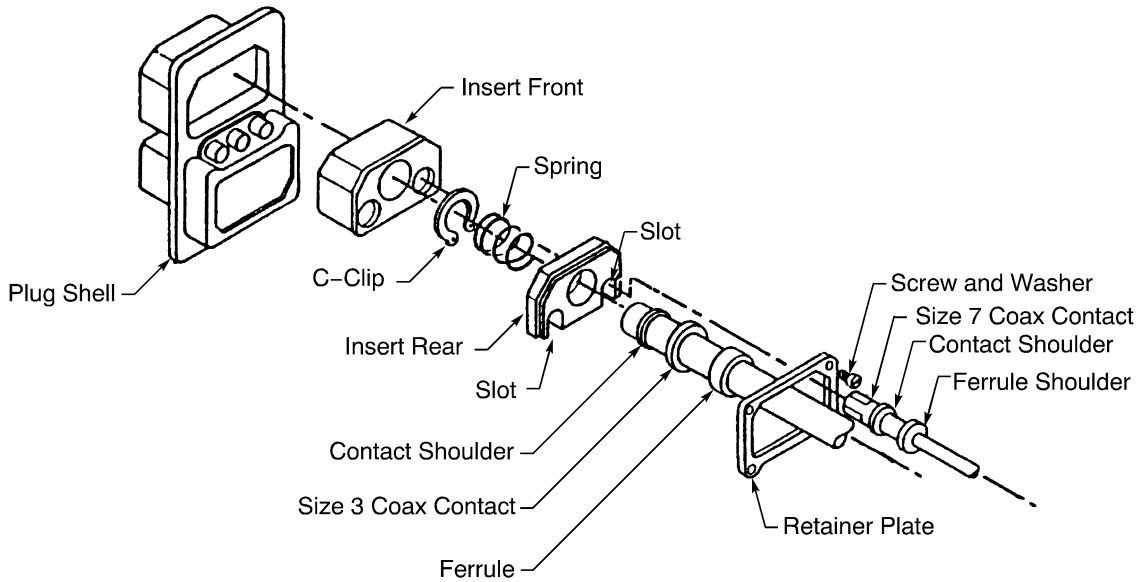
B. Installation of Coax Contacts in the DPX AC3 Insert

Table 56
NECESSARY TOOLS

Description	Supplier
Snap Ring Pliers	An available source
Screwdriver	An available source

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DPX AC3 INSERT ASSEMBLY

Figure 130

Refer to Figure 130:

- (1) Put the large coax contact through the retainer plate.
- (2) Push the large coax contact into the large cavity in the insert rear.
Make sure that the side of the insert rear that has the contact identification numbers points rearward.
- (3) Put the spring on the front of the large coax contact forward of the insert rear.
- (4) Make a selection of a snap-ring pliers from Table 56.
- (5) Use the snap-ring pliers to put the C-clip on the large coax contact rearward of the contact shoulder and forward of the spring.
Make sure that:
 - The C-clip is located between the spring and the rear edge of the contact shoulder.
 - The ground face side of the C-clip that has the sharp corners points forward against the rear edge of the contact shoulder.
- (6) Release the C-clip from the pliers.
Make sure that the C-clip is in its correct position on the contact.
- (7) Put the small coax contacts through the retainer plate.
- (8) Put the small coax contacts into the slots in the insert rear.
Make sure that the insert rear is on the small coax contacts between the ferrule shoulder and the contact shoulder.
- (9) At the rear of the connector, hold the insert rear assembly with the hand and align the ends of the contacts with the holes in the insert front.
- (10) Push the insert rear assembly forward into the connector until the insert rear is against the insert front.
- (11) Move the retainer plate forward on the cables and into its position on the rear of the connector.

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Make sure that the retainer plate is flat against the connector shell.

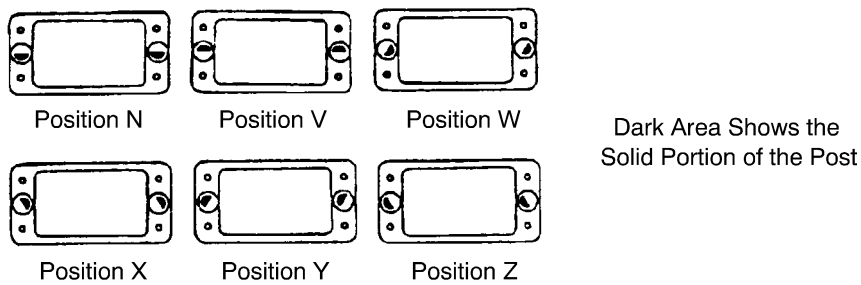
- (12) Attach the retainer plate to the connector shell with the four screws and washers that are supplied with the connector.
- (13) Tighten the retainer plate screws.

C. Seal Plug or Spare Contact Installation

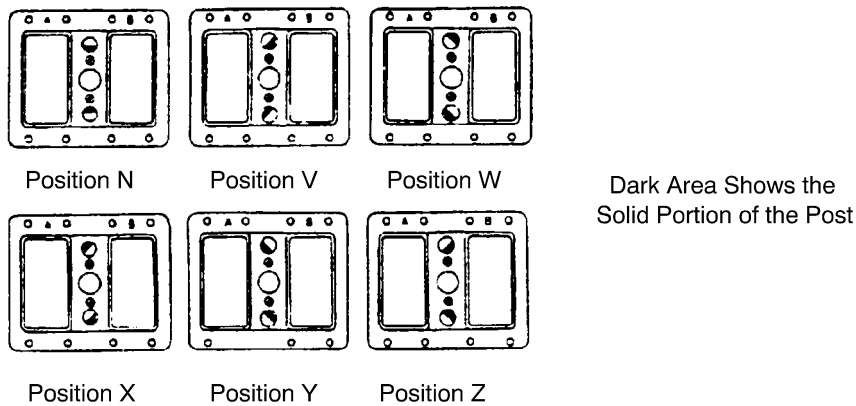
- (1) Install a spare contact or a seal plug into each contact cavity that does not have a wired contact.
Refer to Subject 20-60-08.

8. CONNECTOR POLARIZATION AND THE CONNECTOR PART NUMBER

A. DPD Connectors



POLARIZATION OF A SINGLE GANG DPD PLUG CONNECTOR
Figure 131



POLARIZATION OF A TWO GANG DPD PLUG CONNECTOR
Figure 132

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B. DPX Connectors



POLARIZATION POST POSITIONS

Figure 133

NOTE: For the plug, the dark area shows the polarization post. For the receptacle, the dark area shows the solid part of the polarization key.

**Table 57
CONNECTOR POLARIZATION - POST AND KEY POSITIONS**

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
01	4	4	4	1	1	1
02	4	4	3	2	1	1
03	4	4	2	3	1	1
04	4	4	1	4	1	1
05	4	4	6	5	1	1
06	4	4	5	6	1	1
07	5	4	4	1	1	6
08	5	4	3	2	1	6
09	5	4	2	3	1	6
10	5	4	1	4	1	6
11	5	4	6	5	1	6
12	5	4	5	6	1	6
13	6	4	4	1	1	5
14	6	4	3	2	1	5
15	6	4	2	3	1	5
16	6	4	1	4	1	5
17	6	4	6	5	1	5
18	6	4	5	6	1	5
19	1	4	4	1	1	4
20	1	4	3	2	1	4
21	1	4	2	3	1	4
22	1	4	1	4	1	4
23	1	4	6	5	1	4

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Table 57 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
24	1	4	5	6	1	4
25	2	4	4	1	1	3
26	2	4	3	2	1	3
27	2	4	2	3	1	3
28	2	4	1	4	1	3
29	2	4	6	5	1	3
30	2	4	5	6	1	3
31	3	4	4	1	1	2
32	3	4	3	2	1	2
33	3	4	2	3	1	2
34	3	4	1	4	1	2
35	3	4	6	5	1	2
36	3	4	5	6	1	2
37	4	3	4	1	2	1
38	4	3	3	2	2	1
39	4	3	2	3	2	1
40	4	3	1	4	2	1
41	4	3	6	5	2	1
42	4	3	5	6	2	1
43	5	3	4	1	2	6
44	5	3	3	2	2	6
45	5	3	2	3	2	6
46	5	3	1	4	2	6
47	5	3	6	5	2	6
48	5	3	5	6	2	6
49	6	3	4	1	2	5
50	6	3	3	2	2	5
51	6	3	2	3	2	5
52	6	3	1	4	2	5
53	6	3	6	5	2	5
54	6	3	5	6	2	5
55	1	3	4	1	2	4

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Table 57 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
56	1	3	3	2	2	4
57	1	3	2	3	2	4
58	1	3	1	4	2	4
59	1	3	6	5	2	4
60	1	3	5	6	2	4
61	2	3	4	1	2	3
62	2	3	3	2	2	3
63	2	3	2	3	2	3
64	2	3	1	4	2	3
65	2	3	6	5	2	3
66	2	3	5	6	2	3
67	3	3	4	1	2	2
68	3	3	3	2	2	2
69	3	3	2	3	2	2
70	3	3	1	4	2	2
71	3	3	6	5	2	2
72	3	3	5	6	2	2
73	4	2	4	1	3	1
74	4	2	3	2	3	1
75	4	2	2	3	3	1
76	4	2	1	4	3	1
77	4	2	6	5	3	1
78	4	2	5	6	3	1
79	5	2	4	1	3	6
80	5	2	3	2	3	6
81	5	2	2	3	3	6
82	5	2	1	4	3	6
83	5	2	6	5	3	6
84	5	2	5	6	3	6
85	6	2	4	1	3	5
86	6	2	3	2	3	5
87	6	2	2	3	3	5

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Table 57 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
88	6	2	1	4	3	5
89	6	2	6	5	3	5
90	6	2	5	6	3	5
91	1	2	4	1	3	4
92	1	2	3	2	3	4
93	1	2	2	3	3	4
94	1	2	1	4	3	4
95	1	2	6	5	3	4
96	1	2	5	6	3	4
97	2	2	4	1	3	3
98	2	2	3	2	3	3
99	2	2	2	3	3	3

C. Change of the Polarization Posts and Keys

(1) Posts:

- (a) Remove the nut and washer from the threaded end of the post.
- (b) Remove the post from the hexagonal hole in the connector shell.
- (c) Align the post with the correct position.
- (d) Put the post back into the hexagonal hole.
Make sure that the post is in the correct position.
- (e) Put the washer and nut on the threaded end of the post.
- (f) Tighten the nut.

(2) Keys:

- (a) Remove the screws from the retainer plate.
- (b) Remove the retainer plate from the connector shell.
- (c) Remove the key from the hexagonal hole.
- (d) Align the key with the correct position.
- (e) Put the key back into the hexagonal hole.
Make sure that the post or key is in the correct position.
- (f) Put the retainer plate over the keys.
- (g) Install and tighten the screws.

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D. Change of the Polarization Code, Any Part of the Connector Part Number, or the Complete Part Number on the Connector Shell

**Table 58
NECESSARY MATERIALS**

Material	Part Number	Supplier
Ink	No. 68 Fast Dry	Independent
	No. 73X NW Opaque	Independent
	No. 73X Opaque	Independent
Paint, Clear	683-3-2	Akzo
	Clear Lacquer	Tartan
	EC-776	3M
	EC-776SR	3M
Pen	Permanent Ink Pen, Ultra Fine Point	Sanford Sharpie

- (1) Make a selection of these necessary materials from Table 58:
 - An ink or a permanent ink pen
 - A clear paint.
- (2) If the connector does not have a part number or a polarization code, write the part number and the polarization code in the correct position on the connector shell.
Refer to Paragraph 1.C. for the details of the applicable connector part number.
- (3) If the part number or the polarization code on the connector is incorrect:
 - (a) Apply a layer of ink on the incorrect part number and polarization code on the connector shell.
Make sure that the incorrect part number and polarization code cannot be read.
 - (b) Write the new part number or polarization code on the connector shell:
 - Adjacent to the location of the incorrect part number and polarization code
 - In the correct position on the connector shell.
 Refer to Paragraph 1.C. for the details of the applicable connector part number.
- (4) Let the ink dry for a minimum of 10 minutes.
- (5) Apply a layer of clear paint on the part number on the connector shell.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. PAINT ON THE SURFACE OF A CONTACT CAN CAUSE UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

- (6) Let the paint dry before the connector shell is touched or moved.

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9. APPROVED TOOL SUPPLIERS

A. Insertion and Removal Tools

**Table 59
INSERTION AND REMOVAL TOOL SUPPLIERS**

Tool	Supplier
282880	Radiall
282881	Radiall
282890	Radiall
282891	Radiall
282892	Radiall
282929	Radiall
282943	Radiall
282945	Radiall
8660-162	Souriau
91066-1	AMP
91066-2	AMP
91066-3	AMP
91066-4	AMP
91078-1	AMP
ATBO1054	Astro
ATBO2054	Astro
ATC1054	Astro
ATC2073	Astro
ATR1080	Astro
ATR2080	Astro
CE912-4	ITT Cannon
CET-DPXMA-22	ITT Cannon
CET-12-4	ITT Cannon
CET-4-8	ITT Cannon
CET-C4	ITT Cannon
CET-C8	ITT Cannon
CET-C11	ITT Cannon
CET-16-15	ITT Cannon
CET-16-9	ITT Cannon
CET-20	ITT Cannon

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Table 59 (continued)

Tool	Supplier
CET-20-8	ITT Cannon
CET-20D-1	ITT Cannon
CET-8-2	ITT Cannon
CIET	ITT Cannon
CIET-12	ITT Cannon
CIET-20	ITT Cannon
CIET-20 HDL	ITT Cannon
CIET-22	ITT Cannon
CIET-22DPXMA	ITT Cannon
CIT-DPXMA-22-1	ITT Cannon
DAK145J	Daniels
DAK266	Daniels
DAK266J	Daniels
DAK55-16	Daniels
DRK145	Daniels
DRK2663	Daniels
DRK266J	Daniels
DRK83-16	Daniels
M81969/1-01	QPL
M81969/1-02	QPL
M81969/1-03	QPL
M81969/14-10	QPL
M81969/14-11	QPL
M81969/28-02	QPL
MS3156-16	QPL
MS3156-20	QPL
MS3156-22	QPL
MS3178-002	QPL
ST2220-3-33	Boeing
ST2220-3-6	Boeing
ST2220-3-7	Boeing

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B. Crimp Tool Suppliers

Table 60
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
11148	Buchanan
11637-1	Buchanan
11732	Thomas & Betts
13642	Thomas & Betts
400B	Pico
4046A	Pico
414DA-8N	Pico
612648	Buchanan
612807	Buchanan
612916	Buchanan
614019	Buchanan
AF8	Daniels
AMT23B	Astro
AMT23002DA	Astro
AMT23004DA	Astro
AMT23009L	Astro
AMT23011L	Astro
CBT-600B	ITT Cannon
CCHP-8-6	ITT Cannon
CCT408M	ITT Cannon
CCTDM	ITT Cannon
KTH-1000	Kings
KTH-2004	Kings
KTH-2233	Kings
KTH-2235	Kings
M22520/1-01	QPL
M22520/1-02	QPL
M22520/1-11	QPL
M22520/2-01	QPL
M22520/2-02	QPL
M22520/2-08	QPL

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Table 60 (continued)

Crimp Tool	Supplier
M22520/2-23	QPL
M22520/5-01	QPL
M22520/5-25	QPL
M22520/23-01	QPL
M22520/23-02	QPL
M22520/23-04	QPL
M22520/23-09	QPL
M22520/23-11	QPL
MS3191-1	QPL
MS3191-12	QPL
MS3191-16	QPL
MS3191-20	QPL
P20-3191-1	ITT Cannon
P20-3191-2	ITT Cannon
ST2352-5-2	Boeing
ST2352-5-Y	Boeing
ST2354-5	Boeing
ST2966M	Boeing
ST2966M-16	Boeing
ST965	Boeing
ST965-06	Boeing
ST965-1	Boeing
ST965A-6	Boeing
ST965B-6	Boeing
TH1A	Daniels
WA22	Daniels
WA23	Daniels
WA23-11	Daniels
WA23-2	Daniels
WA23-4	Daniels
WA23-9	Daniels
WA27F	Daniels
WT-206	Thomas & Betts

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Table 60 (continued)

Crimp Tool	Supplier
WT-208	Thomas & Betts
WT-210	Thomas & Betts
WT-214	Thomas & Betts
WT-218	Thomas & Betts
WT202-06-08	Thomas & Betts
Y322	Daniels
Y823	Daniels

Table 61
SUPPLIERS FOR CRIMP TOOLS FOR BACC47DE CONTACTS

Part Number	Supplier
AMK-11	Burndy
AM2-4	Burndy
AP27SA	Daniels
AM4D-1	Burndy
D30	Daniels
M10S-1	Burndy
S-1	Burndy
SL-53	Burndy
TP904	Daniels
WA22HPB	Daniels
WA27FAP	Daniels
WA27XF	Daniels
YDD-1	Burndy
YD2-1	Burndy

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ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

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20-71-12 CONTENTS

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

1. PART NUMBERS AND DESCRIPTION

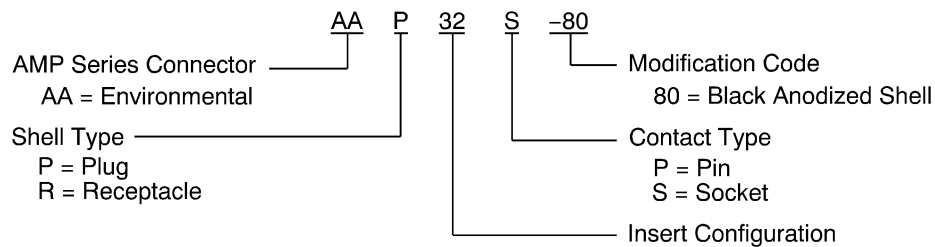
A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier	Reference
10-61430-222-()	Boeing	Table 2
10-61430-411-()	Boeing	Table 2
213()	Amphenol	Figure 3
AA()	AMP	Figure 1
AD()	AMP	Figure 2
AM()	AMP	Figure 2
BD()	AMP	Figure 2

**Table 2
10-61430-() CONNECTOR PART NUMBERS**

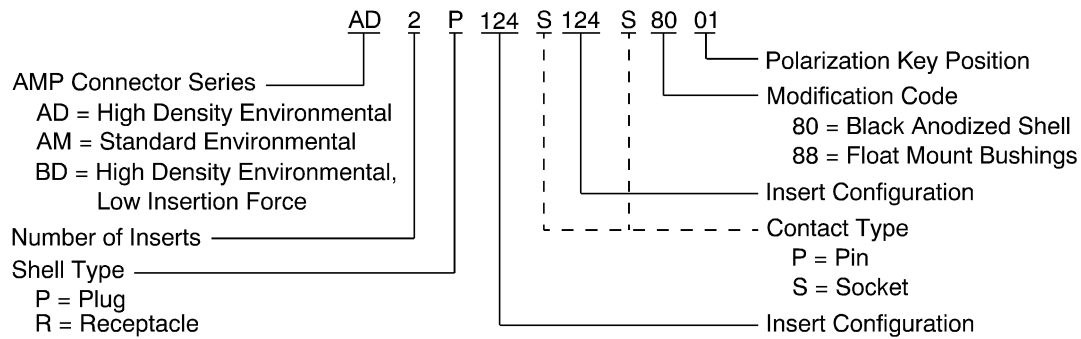
Boeing Standard	Part Number	Supplier	Reference
10-61430-222-()	213-2P57S57S-02()	Amphenol	Figure 3
10-61430-222-()	AM2P57S57S-00()	AMP	Figure 2
10-61430-411-()	213-2R57P57P-02()	Amphenol	Figure 3
10-61430-411-()	AM2R57P57P-00()	AMP	Figure 2



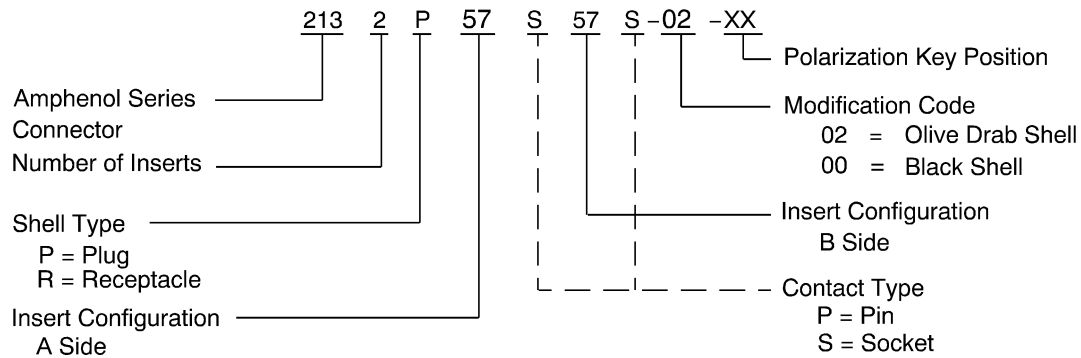
**AMP AA SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS



AMP AD, AM, AND BD SERIES CONNECTOR PART NUMBER STRUCTURE
 Figure 2



AMPHENOL 213 SERIES CONNECTOR PART NUMBER STRUCTURE
 Figure 3

B. Contact Part Numbers

Table 3
CONTACT SELECTION

Connector	Contact Type	Reference
10-61430-222-()	Standard	Table 4
10-61430-411-()	Coax	Table 5
213()	Standard	Table 4
AA()	Standard	Table 4
AD()	Standard	Table 4
	Coax	Table 5
AM()	Standard	Table 4
	Coax	Table 5
BD()	Low Insertion Force	Table 6

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

**Table 4
STANDARD CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	203768-2	AMP
			213-36001-03	Amphenol
		Socket	203767-1	AMP
			213-36000-03	Amphenol
Sub-20	20	Pin	203840-2	AMP
			213-36017-03	Amphenol
		Socket	203841-1	AMP
			213-36009-03	Amphenol
16	16	Pin	203884-2	AMP
			213-36018-03	Amphenol
		Socket	203885-1	AMP
			213-36012-03	Amphenol

**Table 5
COAX CONTACT PART NUMBERS**

Contact Size	Contact Type	Part Number	Supplier
1	Socket	51781-1	AMP

**Table 6
LOW INSERTION FORCE CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Socket	445591-1	AMP

C. Key Post Screw Part Numbers

**Table 7
REPLACEMENT KEY POST SCREW PART NUMBERS**

Connector Series	Part Number	Supplier
AMP AD	MS35190-212	QPL
AMP AM	MS35190-212	QPL
AMP BD	MS35190-212	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

2. INSERT CONFIGURATIONS

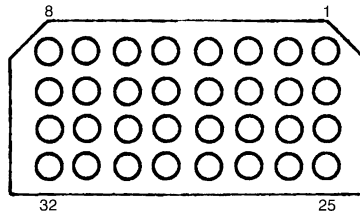
A. AMP AA Series Connectors

NOTE: The contact cavity size that is specified in Table 8 is equivalent to the size of the engaging end of the contact.

**Table 8
AMP AA SERIES INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
32	32	Sub-20	Figure 4

NOTE: Figure 4 shows the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.



**INSERT CONFIGURATION 32
Figure 4**

B. AMP AD and AM Series Connectors

NOTE: The contact cavity size that is specified in Table 9 is equivalent to the size of the engaging end of the contact.

**Table 9
AMP AD AND AM SERIES INSERT CONFIGURATIONS**

Insert Configurations	Contact Cavity		Connector Part Number Modification Code	Reference
	Count	Size		
44	44	20	00, 03, 13, 25, 98, 99	Figure 5
		Sub-20	All other codes	
57	57	20	00, 03, 13, 25, 98, 99	Figure 6
		Sub-20	All other codes	
67	64	20	00, 03, 13, 25, 98, 99	Figure 7
		Sub-20	All other codes	
	3	16	-	
124	124	20	00, 03, 13, 25, 98, 99	Figure 8
		Sub-20	All other codes	

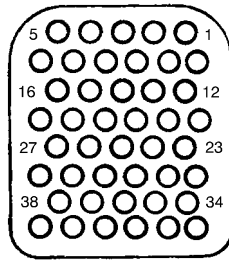
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

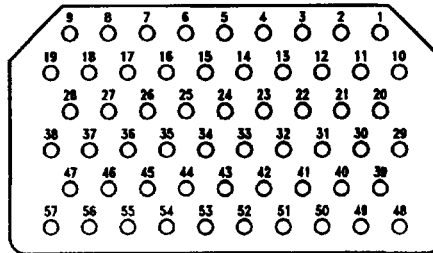
Table 9 (continued)

Insert Configurations	Contact Cavity		Connector Part Number Modification Code	Reference
	Count	Size		
C2	2	1	-	Figure 9

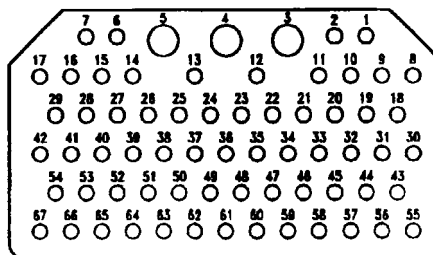
NOTE: Figure 5 through Figure 9 show the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.



INSERT CONFIGURATION 44
Figure 5



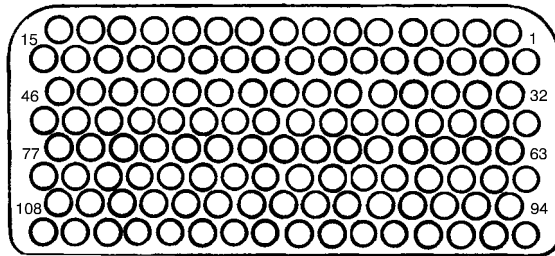
INSERT CONFIGURATION 57
Figure 6



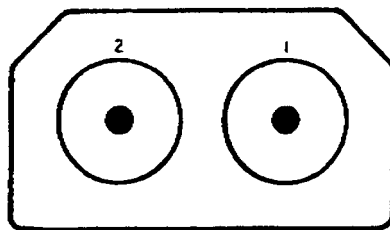
INSERT CONFIGURATION 67
Figure 7

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS



INSERT CONFIGURATION 124
Figure 8



INSERT CONFIGURATION C2
Figure 9

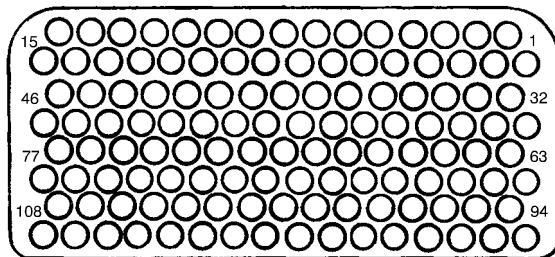
C. AMP BD Series Connectors

NOTE: The contact cavity size that is specified in Table 10 is equivalent to the size of the engaging end of the contact.

Table 10
AMP BD SERIES INSERT CONFIGURATIONS

Insert Configuration	Contact Cavity		Reference
	Count	Size	
124	124	20	Figure 10

NOTE: Figure 10 shows the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.



INSERT CONFIGURATION 124
Figure 10

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

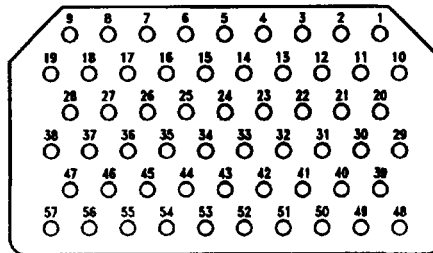
D. Amphenol 213 Series Connectors

NOTE: The contact cavity size that is specified in Table 11 is equivalent to the size of the engaging end of the contact.

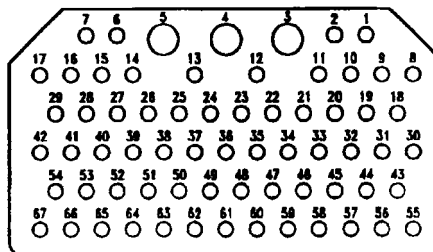
**Table 11
AMPHENOL 213 SERIES INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
57	57	20	Figure 11
67	64	Sub-20	Figure 12
	3	16	

NOTE: Figure 11 through Figure 12 show the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.



**INSERT CONFIGURATION 57
Figure 11**



**INSERT CONFIGURATION 67
Figure 12**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

3. CONNECTOR DISASSEMBLY

A. Seal Plug and Seal Rod Removal

**Table 12
NECESSARY TOOLS**

Tool	Type
Pliers	Needle Nose

(1) Make a selection of a pliers from Table 12.

CAUTION: MAKE SURE THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, remove a plastic tie strap or a wire harness tie that is less than 6 inches from the connector.
- (3) Hold the end of the seal plug or the seal rod tightly in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod from the contact cavity.

B. Contact Removal

This Paragraph gives the procedure to remove standard contacts. For the procedure to remove coax contacts, refer to Paragraph 3.C.

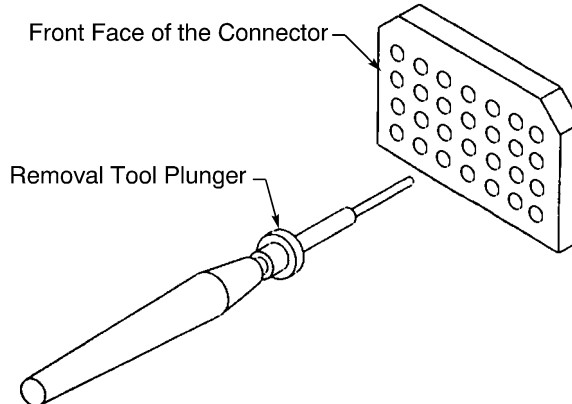
**Table 13
CONTACT REMOVAL TOOLS**

Engaging End Size	Removal Tool		
	Basic Unit	Tip	Color
20	ATA2079	-	-
	ATSE2070	-	-
	294-280	-	Red
	91040-2	126118-2	Red
Sub-20	DRK56-22A	-	-
	M81969/34-01	-	-
	91040-1	126118-1	Green
16	ATF2115	-	-
	DRK56-16	-	-
	294-219	-	Blue
	91040-3	126118-3	Blue

- (1) Make a selection of a contact removal tool from Table 13.
- (2) Axially align the tool and the contact cavity at the front face of the connector. Refer to Figure 13. Make sure that the plunger of the removal tool is fully retracted.

STANDARD WIRING PRACTICES MANUAL

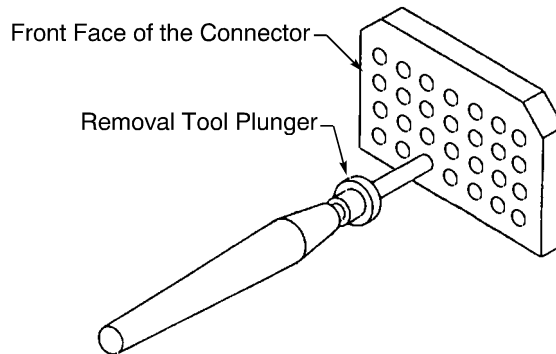
ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS



ALIGNMENT OF THE CONTACT REMOVAL TOOL AND THE CONTACT CAVITY
Figure 13

- (3) Push the tool into the contact cavity until it stops. Refer to Figure 14.

CAUTION: DO NOT USE MORE FORCE THAN THE FORCE THAT IS NECESSARY TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.



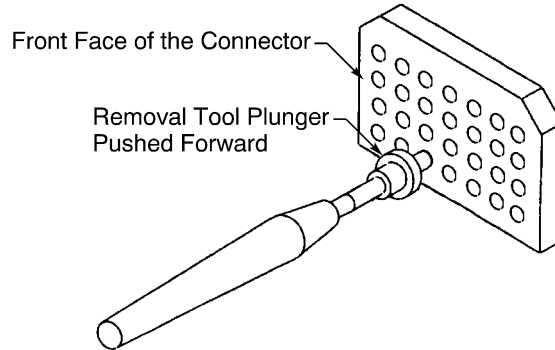
POSITION OF THE CONTACT REMOVAL TOOL IN THE CONTACT CAVITY
Figure 14

- (4) Push the plunger of the tool until the contact starts to come out of the contact cavity. Refer to Figure 15.

Make sure that the removal tool stays in the contact cavity until the contact starts to come out of the cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS



POSITION OF THE CONTACT REMOVAL TOOL
Figure 15

- (5) Carefully pull the tool out from the contact cavity.
Make sure that the removal tool stays axially aligned with the contact cavity.
- (6) Pull the contact out of the contact cavity from the rear of the connector.

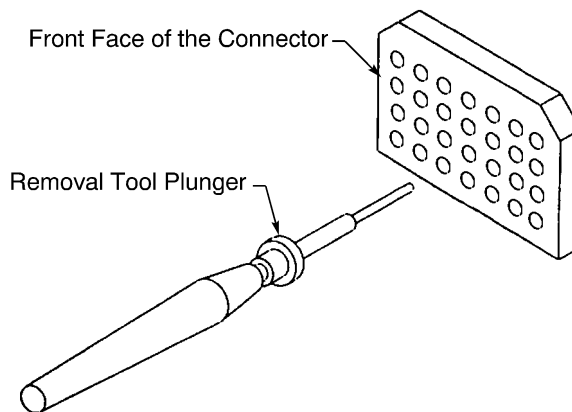
C. Coax Contact Removal

This Paragraph gives the procedure to remove coax contacts. For the procedure to remove standard contacts, refer to Paragraph 3.B.

Table 14
COAX CONTACT REMOVAL TOOLS

Engaging End Size	Removal Tool	
	Basic Unit	Tip
1	91040-7	126118-7

- (1) Make a selection of a contact removal tool from Table 14.
- (2) Axially align the tool and the contact cavity at the front face of the connector. Refer to Figure 16.
Make sure that the plunger of the removal tool is fully retracted.



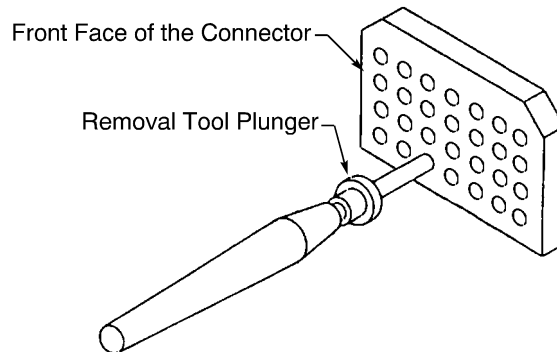
ALIGNMENT OF THE CONTACT REMOVAL TOOL AND THE CONTACT CAVITY
Figure 16

20-71-12

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS**

- (3) Push the tool into the contact cavity until it stops. Refer to Figure 17.

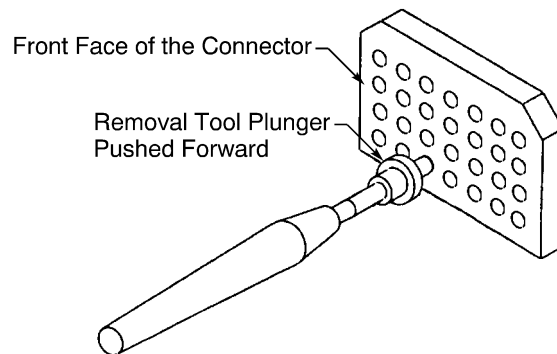
CAUTION: DO NOT USE MORE FORCE THAN THE FORCE THAT IS NECESSARY TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.



POSITION OF THE CONTACT REMOVAL TOOL IN THE CONTACT CAVITY
Figure 17

- (4) Push the plunger of the tool until the contact starts to come out of the contact cavity. Refer to Figure 18.

Make sure that the removal tool stays in the contact cavity until the contact starts to come out of the cavity.



POSITION OF THE CONTACT REMOVAL TOOL
Figure 18

- (5) Carefully pull the tool out from the contact cavity.
Make sure that the removal tool stays axially aligned with the contact cavity.
- (6) Pull the contact out of the contact cavity from the rear of the connector.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

4. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 15
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact Size		Removal Length L (inch)		Special Instructions
	Engaging End	Crimp Barrel	Target	Tolerance	
24	20	20	0.43	±0.03	Fold the conductor back
	Sub-20	20	0.43	±0.03	Fold the conductor back
	16	16	0.56	±0.03	Fold the conductor back
22	20	20	0.18	±0.03	-
	Sub-20	20	0.18	±0.03	-
	16	16	0.56	±0.03	Fold the conductor back
20	20	20	0.18	±0.03	-
	Sub-20	20	0.18	±0.03	-
	16	16	0.28	±0.03	-
18	16	16	0.28	±0.03	-
16	16	16	0.28	±0.03	-

**Table 16
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Size		Crimp Tool			
	Engaging End	Crimp Barrel	Basic Unit		Locator	
			Part Number	Setting	Part Number	Color
24	Sub-20	20	M22520/1-01	2	M22520/1-02	Red
			M22520/2-01	5	M22520/2-02	-
	20	20	M22520/1-01	2	M22520/1-02	Red
			M22520/2-01	5	M22520/2-02	-
			MS3191-1	-	MS3191-20A	-
	16	16	M22520/1-01	4	M22520/1-02	Blue
			MS3191-1	-	MS3191-16A	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

Table 16 (continued)

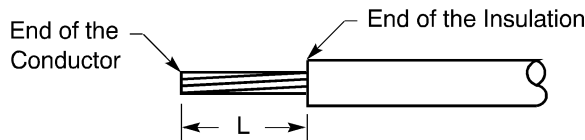
Wire Size (AWG)	Contact Size		Crimp Tool			
	Engaging End	Crimp Barrel	Basic Unit		Locator	
			Part Number	Setting	Part Number	Color
22	Sub-20	20	M22520/1-01	3	M22520/1-02	Red
			M22520/2-01	6	M22520/2-02	-
	20	20	M22520/1-01	3	M22520/1-02	Red
			M22520/2-01	6	M22520/2-02	-
			MS3191-1	-	MS3191-20A	-
	16	16	M22520/1-01	5	M22520/1-02	Blue
			MS3191-1	-	MS3191-16A	-
	20	Sub-20	20	M22520/1-01	4	M22520/1-02
M22520/2-01				7	M22520/2-02	-
20		20	M22520/1-01	4	M22520/1-02	Red
			M22520/2-01	7	M22520/2-02	-
			MS3191-1	-	MS3191-20A	-
16		16	M22520/1-01	4	M22520/1-02	Blue
			MS3191-1	-	MS3191-16A	-
18		16	16	M22520/1-01	5	M22520/1-02
	MS3191-1			-	MS3191-16A	-
16	16	16	M22520/1-01	6	M22520/1-02	Blue
			MS3191-1	-	MS3191-16A	-

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 19
- Table 15 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

NOTE: If the wire size and a larger crimp barrel size are not given in Table 16, refer to Subject 20-60-00.



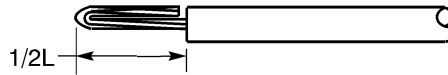
INSULATION REMOVAL LENGTH
Figure 19

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

(2) If necessary, fold the conductor back.

Refer to Figure 20.



CONDUCTOR FOLDED BACK

Figure 20

(3) Make a selection of a crimp tool from Table 16.

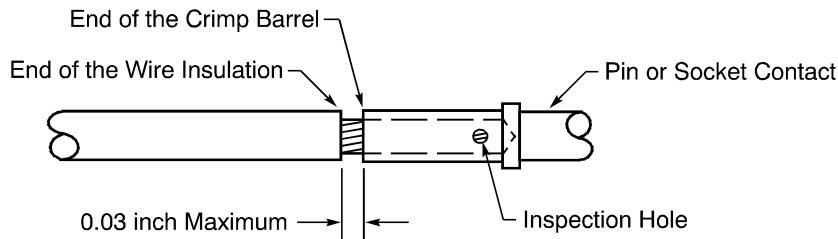
(4) Put the contact in the locator and the crimp tool.

NOTE: As an alternative procedure, the wire can be put in the contact crimp barrel before the contact is inserted in the locator.

(5) Put end of the wire in the crimp barrel. Refer to Figure 21.

Make sure that:

- All of the conductor strands are in the crimp barrel
- The conductor is seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CONTACT

Figure 21

(6) Crimp the contact.

B. Coax Contact Assembly

Table 17

COAX CONTACT CENTER CONTACT CRIMP TOOLS

Basic Unit	Die
69646	Cavity B

Table 18

COAX CONTACT FERRULE CRIMP TOOLS

Basic Unit	Die
69646	Cavity A

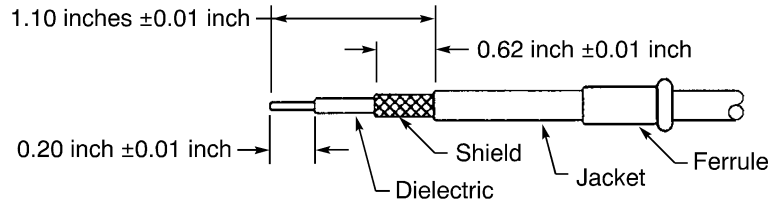
(1) Put the ferrule on the cable.

STANDARD WIRING PRACTICES MANUAL

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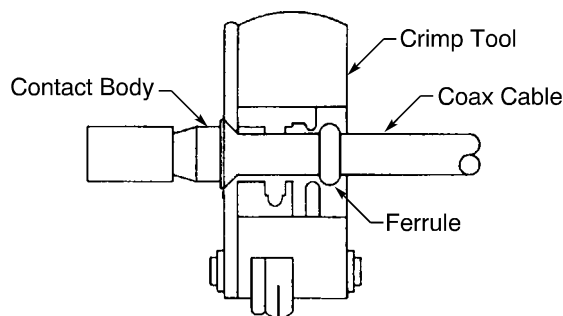
Make sure that the end of the ferrule that has a gasket points rearward.

- (2) Prepare the cable. Refer to Figure 22.



CABLE PREPARATION
Figure 22

- (a) Remove 1.10 inches ± 0.01 inch of the jacket from the end of the cable.
 - (b) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the jacket equal to 0.62 inch ± 0.01 inch.
 - (c) Remove 0.20 inches ± 0.01 inch of the dielectric from the end of the cable.
- (3) Make a selection of a center contact crimp tool from Table 17.
- (4) Put the center conductor into the crimp barrel of the contact.
- Make sure that all of the strands of the conductor are in the crimp barrel of the contact.
- Make sure that the distance between the dielectric and the end of the crimp barrel is not more than 0.03 inch.
- (5) Crimp the center contact.
- Make sure that the contact is against the rear surface of the tool.
- (6) Make a selection of a ferrule crimp tool from Table 18.
- (7) Push the contact body onto the center contact until it stops.
- Make sure that:
- The small end of the contact body is between the shield and the dielectric
 - The dielectric is against the contact body.
- (8) Push the ferrule forward over the shield until the ferrule is against the contact body.
- (9) Put the assembly in the crimp tool. Refer to Figure 23.



POSITION OF THE CONTACT IN THE FERRULE CRIMP TOOL
Figure 23

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

(10) Crimp the ferrule.

C. Contact Insertion

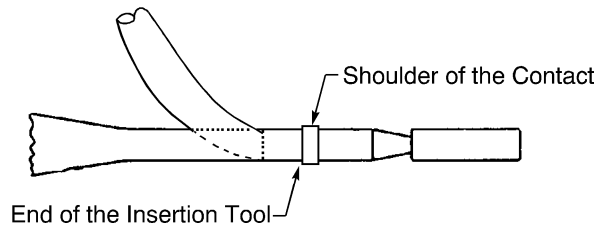
This Paragraph gives the procedure to insert standard contacts. For the procedure to insert coax contacts, refer to Paragraph 4.D.

**Table 19
CONTACT INSERTION TOOLS**

Engaging End Size	Insertion Tool		
	Handle	Tip	Color
20	294-279	-	Red
	91039-1	126117-1	Green
Sub-20	91039-1	126117-1	Green
16	294-192	-	Blue
	91039-3	126117-3	Blue

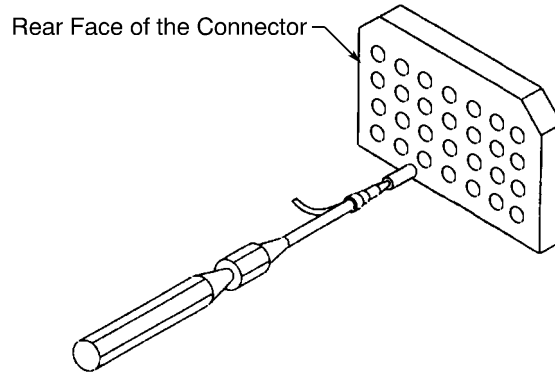
- (1) Make a selection of an insertion tool from Table 19.
- (2) Put the contact assembly in the insertion tool. Refer to Figure 24.

Make sure that the end of the tool is against the rear edge of the shoulder of the contact.



**POSITION OF THE CONTACT IN THE INSERTION TOOL
Figure 24**

- (3) Axially align the insertion tool and the contact cavity at the rear of the connector.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS****ALIGNMENT OF THE CONTACT AND THE CAVITY****Figure 25**

- (4) Carefully push the insertion tool and the contact assembly into the contact cavity until it stops. Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out of the contact cavity.
(6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
(a) Pull the contact assembly out of the contact cavity.
(b) Do Step (3) through Step (6) again.

D. Coax Contact Insertion

This Paragraph gives the procedure to insert coax contacts. For the procedure to insert standard contacts, refer to Paragraph 4.C.

NOTE: A tool is not necessary for the insertion of a coax contact assembly.

- (1) Axially align the coax contact assembly and the contact cavity at the rear of the connector.
(2) Carefully push the coax contact assembly into the contact cavity until it stops.
(3) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (4) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (1) through Step (3) again.

E. Seal of an Empty Contact Cavity

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

5. CONNECTOR POLARIZATION AND CONNECTOR PART NUMBER

A. Connector Polarization and the Connector Part Number

NOTE: The polarization code in the connector part number identifies the polarization position of the posts and keys.

- (1) Find the polarization code in the connector part number from the equipment list.
- (2) For that code, find the correct connector polarization for the:
 - Post positions on the plug
 - Key positions on the receptacle.

Refer to Figure 26 and Table 20.

- (3) If the polarization position of the posts and keys on the connector do not agree with the polarization code, put the posts and the keys in the correct position.

Refer to Paragraph 5.C.

- (4) If the polarization code in the part number on the connector does not agree with the polarization positions, change the part number on the connector.

Refer to Paragraph 5.D.

B. Polarization Post and Key Positions



For the Plug, the Dark Area Shows the Polarization Post
 For the Receptacle, the Dark Area Shows the Solid Part of the Polarization Key

POLARIZATION POSITIONS
Figure 26

Table 20
CONNECTOR POLARIZATION - POST AND KEY POSITION

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
01	4	4	4	1	1	1

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

Table 20 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
02	4	4	3	2	1	1
03	4	4	2	3	1	1
04	4	4	1	4	1	1
05	4	4	6	5	1	1
06	4	4	5	6	1	1
07	5	4	4	1	1	6
08	5	4	3	2	1	6
09	5	4	2	3	1	6
10	5	4	1	4	1	6
11	5	4	6	5	1	6
12	5	4	5	6	1	6
13	6	4	4	1	1	5
14	6	4	3	2	1	5
15	6	4	2	3	1	5
16	6	4	1	4	1	5
17	6	4	6	5	1	5
18	6	4	5	6	1	5
19	1	4	4	1	1	4
20	1	4	3	2	1	4
21	1	4	2	3	1	4
22	1	4	1	4	1	4
23	1	4	6	5	1	4
24	1	4	5	6	1	4
25	2	4	4	1	1	3
26	2	4	3	2	1	3
27	2	4	2	3	1	3
28	2	4	1	4	1	3
29	2	4	6	5	1	3
30	2	4	5	6	1	3
31	3	4	4	1	1	2
32	3	4	3	2	1	2
33	3	4	2	3	1	2

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ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

Table 20 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
34	3	4	1	4	1	2
35	3	4	6	5	1	2
36	3	4	5	6	1	2
37	4	3	4	1	2	1
38	4	3	3	2	2	1
39	4	3	2	3	2	1
40	4	3	1	4	2	1
41	4	3	6	5	2	1
42	4	3	5	6	2	1
43	5	3	4	1	2	6
44	5	3	3	2	2	6
45	5	3	2	3	2	6
46	5	3	1	4	2	6
47	5	3	6	5	2	6
48	5	3	5	6	2	6
49	6	3	4	1	2	5
50	6	3	3	2	2	5
51	6	3	2	3	2	5
52	6	3	1	4	2	5
53	6	3	6	5	2	5
54	6	3	5	6	2	5
55	1	3	4	1	2	4
56	1	3	3	2	2	4
57	1	3	2	3	2	4
58	1	3	1	4	2	4
59	1	3	6	5	2	4
60	1	3	5	6	2	4
61	2	3	4	1	2	3
62	2	3	3	2	2	3
63	2	3	2	3	2	3
64	2	3	1	4	2	3
65	2	3	6	5	2	3

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

Table 20 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
66	2	3	5	6	2	3
67	3	3	4	1	2	2
68	3	3	3	2	2	2
69	3	3	2	3	2	2
70	3	3	1	4	2	2
71	3	3	6	5	2	2
72	3	3	5	6	2	2
73	4	2	4	1	3	1
74	4	2	3	2	3	1
75	4	2	2	3	3	1
76	4	2	1	4	3	1
77	4	2	6	5	3	1
78	4	2	5	6	3	1
79	5	2	4	2	3	6
80	5	2	3	2	3	6
81	5	2	2	3	3	6
82	5	2	1	4	3	6
83	5	2	6	5	3	6
84	5	2	5	6	3	6
85	6	2	4	1	3	5
86	6	2	3	2	3	5
87	6	2	2	3	3	5
88	6	2	1	4	3	5
89	6	2	6	5	3	5
90	6	2	5	6	3	5
91	1	2	4	1	3	4
92	1	2	3	2	3	4
93	1	2	2	3	3	4
94	1	2	1	4	3	4
95	1	2	6	5	3	4
96	1	2	5	6	3	4
97	2	2	4	1	3	3

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ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

Table 20 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
98	2	2	3	2	3	3
99	2	2	2	3	3	3
100	5	1	2	3	4	6

C. Change of the Polarization Posts and Keys

- (1) To change the polarization of a post:
 - (a) Remove the nut and washer from the threaded end of the post.
 - (b) Remove the post from the hexagonal hole in the connector shell.
 - (c) Align the post with the correct position.
 - (d) Put the post back into the hexagonal hole.
Make sure that the post is in the correct position.
 - (e) Put the washer and the nut on the threaded end of the post.
 - (f) Tighten the nut.
- (2) To change the polarization of a key:
 - (a) Remove the necessary screws from the connector shell.
 - (b) Remove the key from the hexagonal hole.
 - (c) Align the key with the correct position.
 - (d) Put the key back into the hexagonal hole.
Make sure the key is in the correct position.
 - (e) Install and tighten the screws.

D. Change of the Polarization Code, Any Part of the Connector Part Number, or the Complete Part Number, on the Connector Shell

**Table 21
NECESSARY MATERIALS**

Material	Part Number	Supplier
Ink	No. 68 Fast Dry	Independent
	No. 73X NW Opaque	
	No. 73X Opaque	
Paint, Clear	683-3-2	Akzo
	Clear Lacquer	Tartan
	EC-776	3M
	EC-776SR	
Pen	Permanent Ink Pen, Ultra Fine Point	Sanford Sharpie

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ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

- (1) Make a selection of these materials from Table 21.
 - An ink or a permanent ink pen
 - A clear paint.
- (2) If the connector does not have a part number or a polarization code, write the part number and polarization code in the correct position on the connector shell.

Refer to the details of the applicable connector part number:

- Figure 1 for the Amp AA series
- Figure 2 for the Amp AD, AM, and BD series
- Figure 3 for the Amphenol 213 series.

- (3) If the connector has an incorrect part number or polarization code:
 - (a) Apply a layer of ink on the incorrect part number or polarization code.
Make sure that the incorrect part number or code cannot be read.
 - (b) Write the new part number or polarization code on the connector shell:
 - Adjacent to the location of the incorrect code
 - In the correct position in the part number.

Refer to the details of the applicable connector part number:

- Figure 1 for the Amp AA series
- Figure 2 for the Amp AD, AM, and BD series
- Figure 3 for the Amphenol 213 series.

- (4) Let the ink dry for a minimum of 10 minutes.
- (5) Apply a layer of the clear paint on the part number on the connector shell.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. PAINT ON THE SURFACE OF A CONTACT CAN CAUSE UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

- (6) Let the paint dry before the connector shell is touched or moved.

6. APPROVED TOOL SUPPLIERS

A. Crimp Tools

**Table 22
CRIMP TOOL SUPPLIERS**

Crimp Tools	Supplier
69646	AMP
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
MS3191-1	QPL
MS3191-16A	QPL
MS3191-20A	QPL

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ASSEMBLY OF AMP AA, AD, AM, AND BD CONNECTORS AND AMPHENOL 213 CONNECTORS

B. Removal Tools

**Table 23
REMOVAL TOOL SUPPLIERS**

Removal Tools	Supplier
126118-1	AMP
126118-2	AMP
126118-3	AMP
126118-7	AMP
294-219	Amphenol
294-280	Amphenol
91040-1	AMP
91040-2	AMP
91040-3	AMP
91040-7	AMP
ATA2079	Astro
ATF2115	Astro
ATSE2070	Astro
DRK56-16	Daniels
DRK56-22A	Daniels
M81969/34-01	QPL

C. Insertion Tools

**Table 24
INSERTION TOOL SUPPLIERS**

Insertion Tools	Supplier
126117-1	AMP
126117-3	AMP
294-192	Amphenol
294-279	Amphenol
91039-1	AMP
91039-3	AMP



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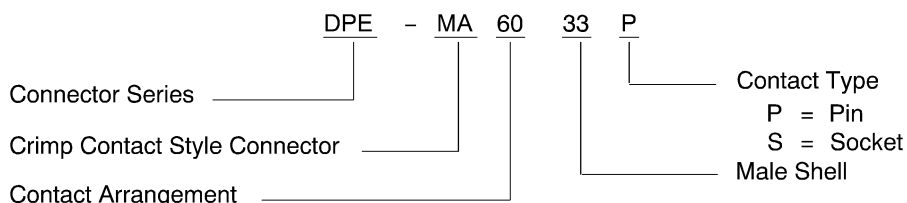
ASSEMBLY OF CANNON DPE-MA SERIES CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
DPE-MA()	Cannon



**CANNON DPE-MA SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1**

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	030-2040-000	Cannon
		Socket	031-1046-002	Cannon
16	16	Pin	030-1895-002	Cannon
		Socket	031-9206-021	Cannon
12	12	Pin	030-2045-000	Cannon
		Socket	031-1059-002	Cannon

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool
20	CIET-20
16	CIET-16
12	CIET-12

(1) Make a selection of a contact removal tool from Table 3.

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- (2) Put the white tip of the tool on the wire near the contact cavity.
- (3) Carefully push the tool tip into the contact cavity until it stops.
- (4) Pull the wire and the tool out of the contact cavity at the same time.

3. CONTACT ASSEMBLY

A. Contact Assembly

**Table 4
INSULATION REMOVAL LENGTH**

Crimp Barrel Size	Removal Length (inch)	
	Target	Tolerance
20	3/16	± 1/32
16	9/32	± 1/32
12	9/32	± 1/32

**Table 5
CONTACT CRIMP TOOLS**

Crimp Barrel Size	Crimp Tool		
	Basic Unit	Locator	
		Part Number	Color
20	MS3191-1	MS3191-20	Red
	CCT-2016-20	-	-
16	MS3191-1	MS3191-16	Blue
	CCT-2016-16	-	-
	CCT-1612	L-1612-17	-
12	MS3191-1	MS3191-12	Yellow
	CCT-1612	L-1612-18	-

- (1) Remove the necessary length of insulation from the end of the wire. Refer to Table 4.
- (2) Make a selection of a contact crimp tool from Table 5.
- (3) Put the conductor in the crimp barrel of the contact so that the end of the conductor is against the bottom of the crimp barrel.
Make sure that all of the strands of the conductor are in the crimp barrel.
- (4) Crimp the contact.



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B. Contact Insertion

Table 6
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool
20	CIET-20
16	CIET-16
12	CIET-12

- (1) Make a selection of a contact insertion tool from Table 6.
- (2) Put the wired contact into the colored end of the insertion tool.
- (3) From the rear of the connector, axially align the contact and the tool with the contact cavity.
- (4) Push the tool straight in the contact cavity until the tool stops.
- (5) Carefully remove the tool from the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the wired contact out of the cavity.
 - (b) Do Step (2) through Step (6) again.

4. APPROVED SUPPLIERS

A. Contact Removal Tools

Table 7
REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
CIET-12	Cannon
CIET-16	Cannon
CIET-20	Cannon

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B. Contact Crimp Tools

Table 8
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
CCT-1612	Cannon
CCT-2016-16	Cannon
CCT-2016-20	Cannon
L-1612-17	Cannon
L-1612-18	Cannon
MS3191-1	Cannon
MS3191-12	Cannon
MS3191-16	Cannon
MS3191-20	Cannon

C. Contact Insertion Tools

Table 9
INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
CIET-12	Cannon
CIET-16	Cannon
CIET-20	Cannon

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

This Subject gives the disassembly and assembly procedures for:

- The Boeing ARINC 600 connectors
- The Boeing S280W551 connectors.

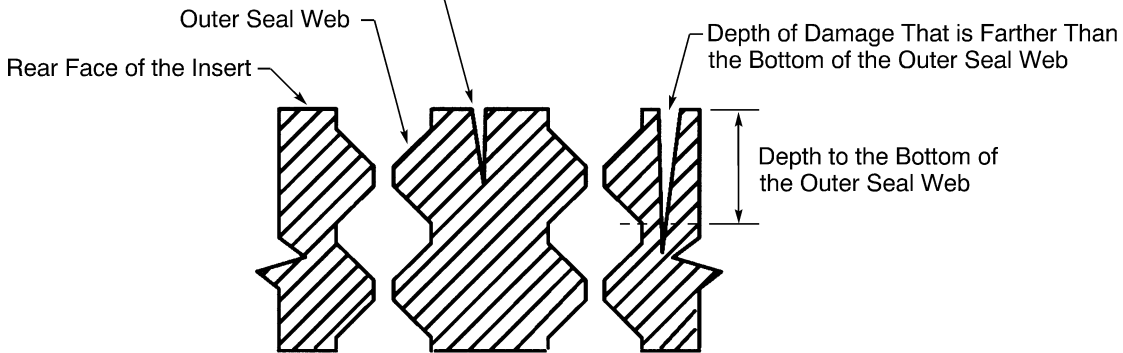
1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

The insert must be replaced when one or more of these conditions occur that make the cable assembly unserviceable:

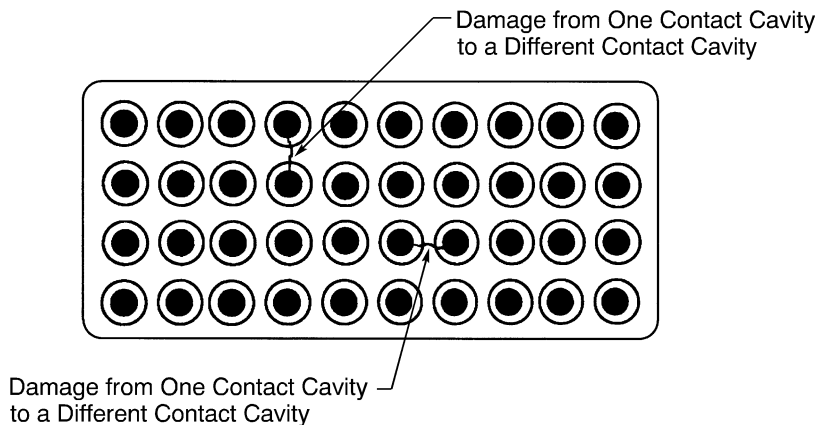
- The depth of the damage extends farther than the bottom of the outer seal web; refer to Figure 1
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 2
- The damage extends from one contact terminus cavity to a different contact terminus cavity; refer to Figure 3.

Depth of the Damage That is not Farther Than the Bottom of the Seal Web



REAR FACE OF THE INSERT - DEPTH OF DAMAGE

Figure 1



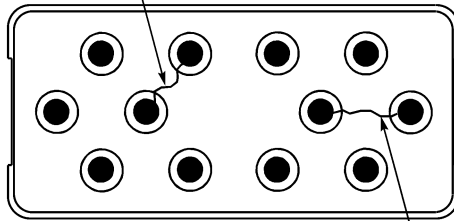
REAR FACE OF THE INSERT - LENGTH OF DAMAGE

Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Damage from One Contact Terminus Cavity to a Different Contact Terminus Cavity



Damage from One Contact Terminus Cavity to a Different Contact Terminus Cavity

REAR FACE OF THE CONTACT TERMINUS INSERT - LENGTH OF DAMAGE

Figure 3

B. Damage Conditions - Front Face of the Insert

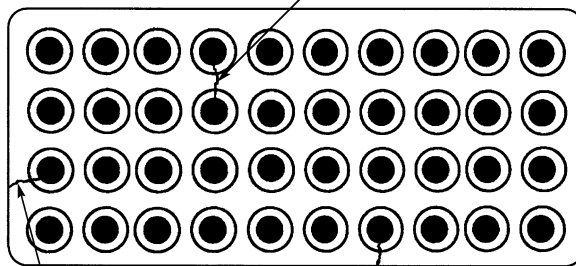
The insert for electrical contacts must be replaced when one or more of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity; refer to Figure 4
- The damage extends from one contact cavity to the outer edge of the insert; refer to Figure 4.

The insert for fiber optic contact termini must be replaced when one or more of these conditions occur that make the cable assembly unserviceable:

- The damage extends from one contact terminus cavity to a different contact terminus cavity; refer to Figure 5
- The damage extends from one contact terminus cavity to the outer edge of the insert; refer to Figure 5.

Damage from One Contact Cavity to a Different Contact Cavity



Damage from a Contact Cavity to the Outer Edge

FRONT FACE OF THE CONTACT INSERT - LENGTH OF DAMAGE

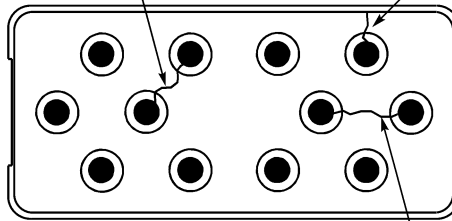
Figure 4

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Damage from One Contact Terminus Cavity to a Different Contact Terminus Cavity

Damage from a Contact Terminus Cavity to the Outer Edge



Damage from One Contact Terminus Cavity to a Different Contact Terminus Cavity

FRONT FACE OF THE CONTACT TERMINUS INSERT - LENGTH OF DAMAGE

Figure 5

C. Damage Conditions - EMI/RFI Ground Spring

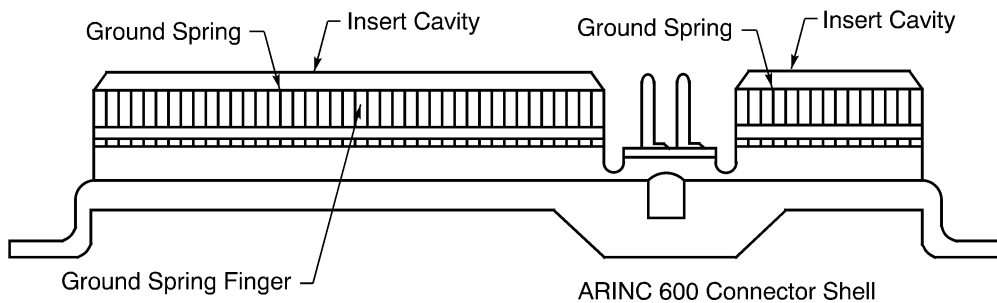
From the ground spring of any one insert cavity of the connector shell:

- As many as 5 adjacent ground spring fingers can be missing
- More than one group of a maximum of 5 adjacent ground spring fingers can be missing as long as a group of a minimum of 5 adjacent fingers is between the groups of missing fingers.

The connector shell must be replaced if any of the ground springs are in an unserviceable condition.

Refer to:

- Figure 6 for the initial configuration of the ground springs
- Figure 7 for the serviceable conditions of damage to the ground spring
- Figure 8 for the unserviceable conditions of damage to the ground spring.

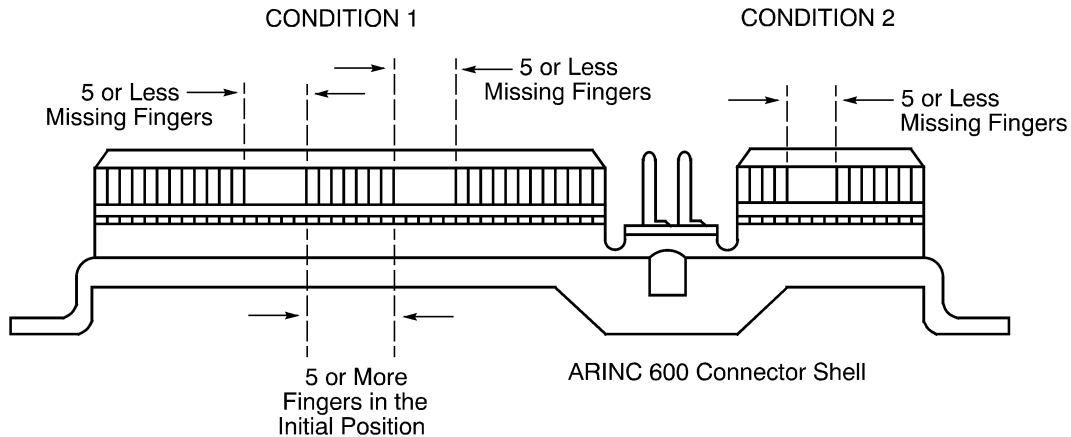


ARINC 600 CONNECTOR GROUND SPRINGS

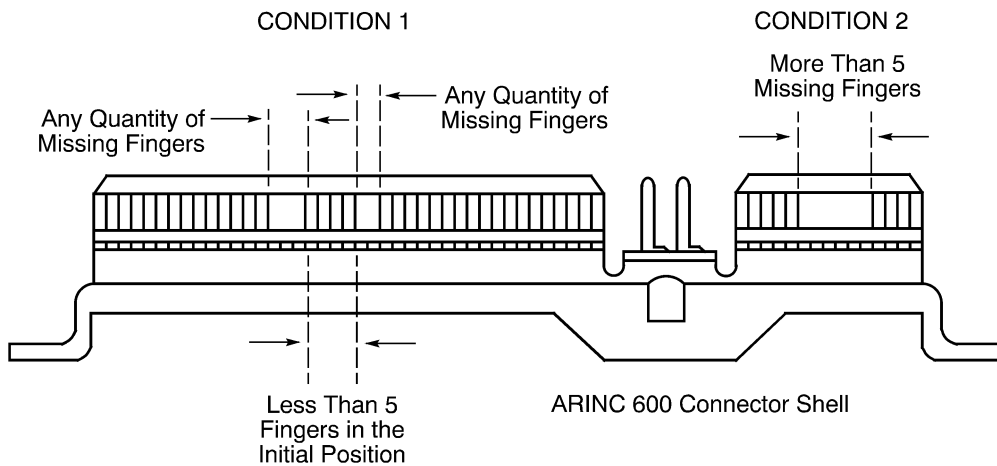
Figure 6

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



GROUND SPRING DAMAGE - SERVICEABLE CONDITIONS
Figure 7



GROUND SPRING DAMAGE - UNSERVICEABLE CONDITIONS
Figure 8

If the connector shell is replaced, these general conditions are applicable:

- The connector part number must be marked on the shell
- The replacement shell must be of the same Class as the initial connector shell.

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

NOTE: Connector shell part numbers are not specified. Refer to the connector supplier for replacement connector shells.

D. Damage Conditions - Connector Shell

If the connector shell has a bend, the connector shell must be replaced.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

If the connector shell is replaced, these general conditions are applicable:

- The connector part number must be marked on the shell
- The replacement shell must be of the same Class as the initial connector shell.

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

NOTE: Connector shell part numbers are not specified. Refer to the connector supplier for replacement connector shells.

E. Damage Conditions - BACC69A Fiber Optic Cable Assembly

The cable assembly must be replaced when one of these conditions occur:

- The fiber optic cable has damage that makes the cable assembly unserviceable; refer to Subject 20-12-20
- The fiber optic terminus has damage; refer to Subject 20-12-20.

F. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. for the satisfactory seal in the grommet hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

Contact Cavity Size	Minimum Wire O.D. (inch)
20	0.040
16	0.068
12	0.097
8	0.183

2. CONNECTOR PART NUMBERS AND DESCRIPTION

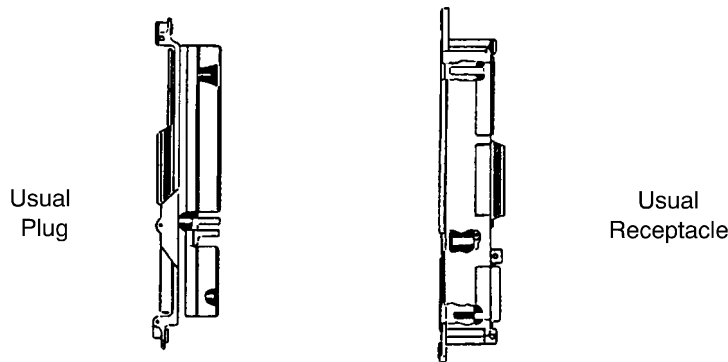
A. Connector Description

The ARINC 600 and S280W551 connectors are the interface between avionics equipment boxes and the airplane wiring and have these features:

- Rectangular metal shells
- Size 22, 20, 16, 12, 8, and 5 rear release, rear removable contacts
- ARINC 600 connectors have 3 or 6 inserts
- S280W551 connectors have 2, 4, or 5 inserts
- Receptacle connectors are mounted on the avionics equipment boxes
- Plug connectors are mounted on the rack or the tray backplates
- Plug connectors are assembled to the airplane wiring.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



ARINC 600 CONNECTOR PROFILES
Figure 9

CAUTION: PROTECTIVE CAPS ARE RECOMMENDED FOR CONNECTORS WITH GROUND SPRINGS WHEN THEY ARE REMOVED FROM THE RACK. IF GROUND SPRINGS DO NOT HAVE PROTECTION, DAMAGE TO THE GROUND SPRINGS CAN OCCUR.

B. Connector Part Numbers

The details for the:

- Boeing ARINC 600 connector part numbers are given in Paragraph 2.C.
- ITT Cannon ARINC 600 connector part numbers are given in Paragraph 2.D.
- Souriau ARINC 600 connector part numbers are given in Paragraph 2.E.
- AMP ARINC 600 connector part numbers are given in Paragraph 2.F.
- Radiall ARINC 600 connector part numbers are given in Paragraph 2.G.
- Tri-Star ARINC 600 connector part numbers are given in Paragraph 2.H.
- Boeing S280W551 connector part numbers are given in Paragraph 2.I.

Table 2
ARINC 600 CONNECTOR PART NUMBERS

Boeing Standard	Part Number	Supplier
-	BKA()1-120-3	ITT Cannon
-	BKA()2-105-3	ITT Cannon
-	BKA()2-158-3	ITT Cannon
-	BKA()2-158M-3	ITT Cannon
-	BKA()2-167-3	ITT Cannon
-	BKA()2-187-3	ITT Cannon
-	BKA()2-67402-203	ITT Cannon
-	BKA()2-67402-229	ITT Cannon
-	BKA()2-67402-316	ITT Cannon
-	BKA()2-67403-22-51	ITT Cannon
-	BKA()2-67403-22-56	ITT Cannon

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 2 (continued)

Boeing Standard	Part Number	Supplier
-	BKA()2-68134-101	ITT Cannon
-	BKA()2-B234M-3	ITT Cannon
-	BKA()2-BW234-3	ITT Cannon
-	BKA()3-067404-0080	ITT Cannon
-	BKA()3-271C-3	ITT Cannon
-	BKA()3-494-3	ITT Cannon
-	BKA()3-537-3	ITT Cannon
-	BKA()3-67404-62	ITT Cannon
-	BKA()3-67404-80	ITT Cannon
-	BKA()3-67404-91	ITT Cannon
-	BKA()3-67405-54	ITT Cannon
-	BKA()3-67405-54-40	ITT Cannon
-	BKA()3-68135-21	ITT Cannon
-	BKA()3-68135-25	ITT Cannon
-	BKA()3-68135-95	ITT Cannon
-	BKA()3-770-3	ITT Cannon
-	C-06A3-B305-1100	Tri-Star
-	C-06A5-9940-1100	Tri-Star
BACC66F11	BKA()1-125-3	ITT Cannon
	NIC66F11()AA	AMP
	NSX()1P101()00	Radiall
	SB6()1-MG-05()P00	Souriau
BACC66F12	BKA()1-100-3	ITT Cannon
BACC66F13	BKA()1-124-3	ITT Cannon
BACC66H122	BKA()2-A234M-3	ITT Cannon
	NIC66H22()AA	AMP
	NSX()2P202()00	Radiall
	SB6()2-MG-13W2P03	Souriau
BACC66H123	BKA()2-155M-3	ITT Cannon
	NIC66H23()AA	AMP
	NSX()2P203()00	Radiall
	SB6()2-MG-13W2P01	Souriau

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 2 (continued)

Boeing Standard	Part Number	Supplier
BACC66H125	BKA()2-234M-3	ITT Cannon
	NIC66H25()AA	AMP
	NSX()2P205()00	Radiall
	SB6()2-MG-13W2P02	Souriau
BACC66H21	BKA()2-313-3	ITT Cannon
	NIC66H21()AA	AMP
	NSX()2P201()00	Radiall
	SB6()2-MG-13W2P00	Souriau
BACC66H22	BKA()-A234-3	ITT Cannon
BACC66H23	BKA()-155-3	ITT Cannon
BACC66H24	BKA()2-A164-3	ITT Cannon
	SB6()2-MG-13W2PF3	Souriau
BACC66H25	BKA()-234-3	ITT Cannon
BACC66H26	BKA()2-400-3	ITT Cannon
	NIC66H26()AA	AMP
	NSX()2P206()00	Radiall
	SB6()2-MG-13K5P00	Souriau
BACC66H27	BKA()2-V155M-3	ITT Cannon
	NIC66H20()AA	AMP
	NSX()2P221()00	Radiall
	SB6()2-MG-13K5P12	Souriau
BACC66H28	BKA()2-A158M-3	ITT Cannon
	NIC66H28()AA	AMP
	NSX()2P216()00	Radiall
	SB6()2-MG-13A1PE6	Souriau
BACC66H29	BKA()2-340-3	ITT Cannon
BACC66H30	BKA()2-248-3	ITT Cannon
BACC66H31	BKA()2-137-3	ITT Cannon
BACC66H32	BKA()2-066-3	ITT Cannon
BACC66H33	BKA()2-385-3	ITT Cannon
BACC66H34	BKA()2-370-3	ITT Cannon
BACC66H35	BKA()2-246-3	ITT Cannon
BACC66H36	BKA()2-167T-3	ITT Cannon

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 2 (continued)

Boeing Standard	Part Number	Supplier
BACC66H37	BKA()2-324-3	ITT Cannon
BACC66H38	BKA()2-165M-3	ITT Cannon
	NSX()2P219()00	Radiall
BACC66H39	BKA()2-359-3	ITT Cannon
BACC66H40	BKA()2-A137-3	ITT Cannon
BACC66H41	BKA()2-188-3	ITT Cannon
BACC66H42	BKA()2-042-3	ITT Cannon
BACC66H43	BKA()2-133-3	ITT Cannon
BACC66H44	BKA()2-215-3	ITT Cannon
BACC66H45	BKA()2-B234-3	ITT Cannon
BACC66H46	BKA()2-154-3	ITT Cannon
	NXS()2P286()00	Radiall
BACC66H47	NSX()2P522()00	Radiall
BACC66H48	BKA()2-253-3	ITT Cannon
BACC66K31	BKA()3-626-3	ITT Cannon
	NIC66K31()AA	AMP
	NSX()3P()301()00	Radiall
	SB6()3-M()-13W2P00	Souriau
BACC66K32	BKA()3-713-3	ITT Cannon
	NIC66K32()AA	AMP
	NSX()3P()302()00	Radiall
	SB6()3-M()-13K3P00	Souriau
BACC66K33	BKA()3-A713-3	ITT Cannon
	NIC66K33()AA	AMP
	NSX()3P()303()00	Radiall
	SB6()3-M()-13K2P00	Souriau
BACC66K34	BKA()3-800-3	ITT Cannon
	NIC66K34()AA	AMP
	NSX()3P()304()00	Radiall
	SB6()3-M()-13K1P00	Souriau

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 2 (continued)

Boeing Standard	Part Number	Supplier
BACC66K35	BKA()3-271T-3	ITT Cannon
	C-06()5-99	Tri-Star
	NIC66K36()AA	AMP
	NSX()3P()310()00	Radiall
	SB6()3-M()-13K2PE901	Souriau
BACC66K36	BKA()3-608-3	ITT Cannon
BACC66K37	BKA()3-496-3	ITT Cannon
BACC66K38	BKA()3-784-3	ITT Cannon
BACC66K39	BKA()3-718-3	ITT Cannon
BACC66K40	BKA()3-A759-3	ITT Cannon

Table 3

S280W551 CONNECTOR PART NUMBERS

Boeing Specification	Description	Part Number	Supplier
S280W551-209A	Size 1 Plug	BGG1P-044D1001	ITT Cannon
S280W551-211A	Size 1 Plug	BGG1P-069D1201	ITT Cannon
S280W551-213A	Size 1 Plug	BGG1P-134A1301	ITT Cannon
S280W551-401A	Size 2 Plug	BGG2P-406D1101	ITT Cannon
S280W551-405A	Size 2 Plug	BGG2P-272D1101	ITT Cannon
S280W551-407A	Size 2 Plug	BGG2P-220D1101	ITT Cannon
S280W551-413A	Size 2 Plug	BGG2P-254D1101	ITT Cannon
S280W551-503A	Size 3 Plug	BGG3P-084D1101	ITT Cannon

Table 4

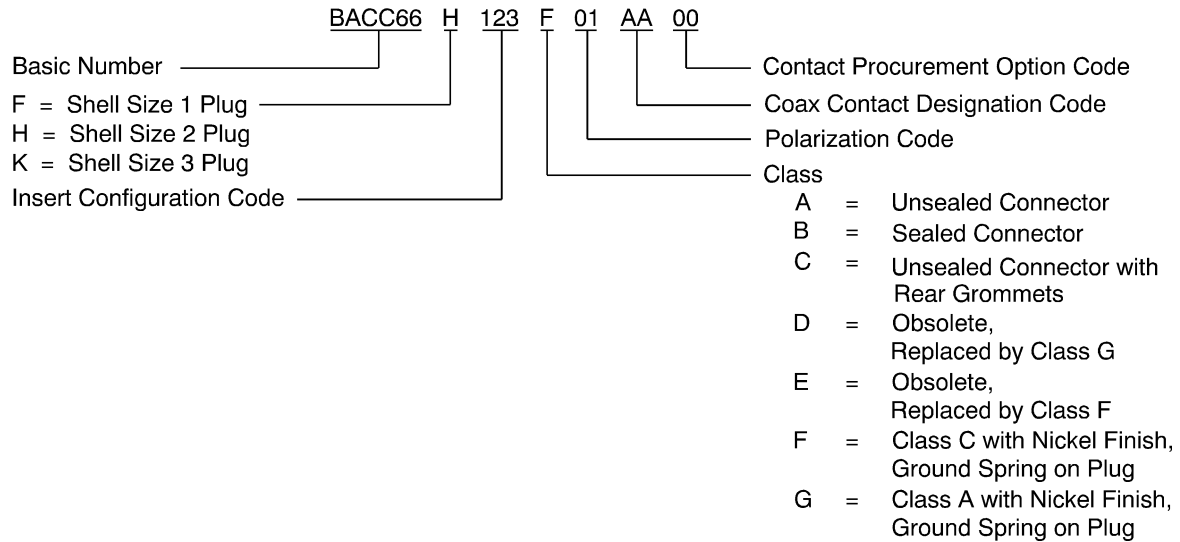
OBSOLETE S280W551 CONNECTOR PART NUMBERS

Obsolete Connector			Replacement Connector	
Boeing Specification	Part Number	Supplier	Part Number	Supplier
S280W551-209	BGG1P-044D0001	ITT Cannon	S280W551-209A	Boeing
S280W551-211	BGG1P-069D0201	ITT Cannon	S280W551-211A	Boeing
S280W551-401	BGG2P-406D0101	ITT Cannon	S280W551-401A	Boeing
S280W551-405	BGG2P-272D0101	ITT Cannon	S280W551-405A	Boeing
S280W551-407	BGG2P-220D0101	ITT Cannon	S280W551-407A	Boeing
S280W551-413	BGG2P-254D0101	ITT Cannon	S280W551-413A	Boeing
S280W551-503	BGG3P-084D0101	ITT Cannon	S280W551-503A	Boeing

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

C. Boeing ARINC 600 Connectors



BOEING BACC66() SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 10

For the Boeing connector part number:

- Insert configuration codes, refer to Table 5
- Polarization codes and positions, refer to Table 141 and Figure 222
- The coax contact designation codes for BACC66F connectors, refer to Table 8
- The coax contact designation codes for BACC66H connectors, refer to Table 9
- The coax contact designation codes for BACC66K connectors, refer to Table 10
- The contact procurement option codes, refer to Table 11.

NOTE: The coax contact designation code is used on purchase orders and does not appear on connectors as part of the part number.

NOTE: The contact procurement option code is used on purchase orders and does not appear on connectors as part of the part number.

Table 5
BOEING ARINC 600 CONNECTOR INSERT CONFIGURATION CODES

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
1	11	A	01	-
		B	01	-
		C	03	-
1	12	A	20	-
		B	20	-
		C	19	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 5 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
1	13	A	01	-
		B	01	-
		C	21	-
2	122	A	05	For size 1 coax contact with standard mounting block
		B	02	-
		C	04	-
2	123	A	05	For size 1 coax contact with standard mounting block
		B	05	For size 1 coax contact with standard mounting block
		C	04	-
2	125	A	02	-
		B	05	For size 1 coax contact with standard mounting block
		C	04	-
2	21	A	02	-
		B	02	-
		C	04	-
2	22	A	05	For size 1 coax contact with special mounting block hole spacing
		B	02	-
		C	04	-
2	23	A	05	For size 1 coax contact with special mounting block hole spacing
		B	05	For size 1 coax contact with special mounting block hole spacing
		C	04	-
2	24	A	06	-
		B	02	-
		C	04	-
2	25	A	02	-
		B	05	For size 1 coax contact with special mounting block hole spacing
		C	04	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 5 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
2	26	A	02	-
		B	02	-
		C	07	-
2	27	A	08	-
		B	05	For size 1 coax contact with standard mounting block
		C	04	-
2	28	A	09	For size 1 coax contacts with standard mounting blocks
		B	08	For size 1 coax contact with standard mounting block
		C	10	-
2	29	A	14	-
		B	14	-
		C	07	-
2	30	A	15	-
		B	15	-
		C	13	-
2	31	A	15	-
		B	12	-
		C	13	-
2	32	A	BLANK	-
		B	17	-
		C	18	-
2	33	A	02	-
		B	02	-
		C	10	-
2	34	A	14	-
		B	02	-
		C	07	-
2	35	A	14	-
		B	14	-
		C	13	-

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 5 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
2	36	A	11	This insert has 4 BACA19BK1 TNC adapters
		B	02	-
		C	04	-
2	37	A	02	-
		B	02	-
		C	24	-
2	38	A	02	-
		B	25	For size 1 coax contacts with standard mounting blocks
		C	04	-
2	39	A	02	-
		B	02	-
		C	22	-
2	40	A	11	This insert has 4 BACA19BK1 TNC adapters
		B	14	-
		C	04	-
2	41	A	02	-
		B	11	This insert has 4 BACA19BK1 TNC adapters
		C	16	-
2	42	A	11	This insert has 4 BACA19BK1 TNC adapters
		B	11	This insert has 4 BACA19BK1 TNC adapters
		C	16	-
2	43	A	17	-
		B	17	-
		C	04	-
2	44	A	15	-
		B	17	-
		C	16	-
2	45	A	08	For size 1 coax contact with standard mounting block
		B	02	-
		C	04	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 5 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
2	46	A	17	-
		B	17	-
		C	16	-
2	47	A	30	Fiber optic cable and termini are not supplied with the connector.
		B	14	-
		C	04	-
2	48	A	14	-
		B	14	-
		C	04	-
2	49	A	12	-
		B	12	-
		C	10	-
2	50	A	31	Fiber optic cable and termini are not supplied with the connector.
		B	14	-
		C	04	-
2	51	A	02	-
		B	17	-
		C	16	-
2	52	A	02	-
		B	32	-
		C	04	-
2	53	A	14	-
		B	02	-
		C	04	-
3	31	A	02	-
		B	02	-
		C	04	-
		D	02	-
		E	02	-
		F	04	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 5 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
3	32	A	02	-
		B	02	-
		C	07	-
		D	02	-
		E	02	-
		F	04	-
3	33	A	02	-
		B	02	-
		C	04	-
		D	02	-
		E	02	-
		F	07	-
3	34	A	02	-
		B	02	-
		C	07	-
		D	02	-
		E	02	-
		F	07	-
3	35	A	11	This insert has 4 BACA19BK1 TNC adapters
		B	11	This insert has 4 BACA19BK1 TNC adapters
		C	04	-
		D	BLANK	-
		E	02	-
		F	07	-
3	36	A	14	-
		B	02	-
		C	16	-
		D	14	-
		E	02	-
		F	16	-

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Table 5 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
3	37	A	15	-
		B	15	-
		C	13	-
		D	15	-
		E	15	-
		F	13	-
3	38	A	02	-
		B	02	-
		C	26	-
		D	02	-
		E	02	-
		F	07	-
3	39	A	02	-
		B	02	-
		C	22	-
		D	02	-
		E	02	-
		F	22	-
3	40	A	02	-
		B	02	-
		C	22	-
		D	02	-
		E	02	-
		F	07	-
3	41	A	11	-
		B	14	-
		C	33	Fiber optic cable and termini are not supplied with the connector.
		D	11	-
		E	14	-
		F	34	-



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**Table 6
OBSOLETE BOEING INSERT CONFIGURATION CODES**

Obsolete Code	Replacement Code
22	122
23	123
25	125

**Table 7
OBSOLETE BOEING CLASSES**

Obsolete Class	Replacement Class
D	G
E	F

**Table 8
COAX CONTACT DESIGNATION CODES FOR BACC66F CONNECTORS**

Code	Cable	Contact		
		Socket	Size	Type
AA	-	-	-	-
AB	RG-58	BACC47EU1	5	Coax
	BA-5903			
AC	5021K1011	BACC47EU2	5	Coax
AD	BMS 13-65 Type OE, S280W503-1	BACC47EU3	5	Coax
AE	BMS 13-65 Type OF, S280W503-2	BACC47EU4	5	Coax
AF	S280W502-1	S280W552-205	8	Concentric Twinax

**Table 9
COAX CONTACT DESIGNATION CODES FOR BACC66H CONNECTORS**

Code	Cable	Contact			
		Socket	Style	Size	Type
AA	-	-	-	-	-
AB	BA-5903	BACC47EU1	-	5	Coax
	RG-58				
	RG-142B				
AC	5021K1011	BACC47EU2	-	5	Coax

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 9 (continued)

Code	Cable	Contact			
		Socket	Style	Size	Type
AD	BA-5903	BACC47EU1	-	5	Coax
	RG-58				
	BA-6903	BACC47EN1	-	1	Coax
	RG-214				
	RG-393				
AE	5012H3012	BACC47EN3	-	1	Coax
	5021K1011	BACC47EU2	-	5	Coax
AF	5021K1011	BACC47EU2	-	5	Coax
	RG-393	BACC47EN2	-	1	Coax
AG	-	BACC47EN4	TNC Adapter	1	Coax
	BA-5903	BACC47EU1	-	5	Coax
	RG-58				
AH	-	BACC47EN4	TNC Adapter	1	Coax
	5021K1011	BACC47EU2	-	5	Coax
AJ	-	BACC47EN4	TNC Adapter	1	Coax
	BMS 13-65 Type OE, S280W503-1	BACC47EU3	-	5	Coax
AK	-	BACC47EN4	TNC Adapter	1	Coax
	S280W503-2	BACC47EU4	-	5	Coax
AL	BMS 13-65 Type OE, S280W503-1	S280W554-111	-	8	Coax
AM	S280W503-2	S280W554-113	-	8	Coax
AN	S280W502-1	S280W552-205	-	8	Concentric Twinax
AP	BACC69AAA()	-	-	16	Fiber Optic
AR	BACC69AAC()	-	-	16	Fiber Optic
	BACC69ACC()				
AT	BMS13-72T03C04G024	BACC47GB1	-	8	Quadrx
BD	RG-214	BACC47EN1	-	1	Coax
	BA-6903				
BE	5012H3012	BACC47EN3	-	1	Coax
BF	RG-393	BACC47EN2	-	1	Coax
BG	-	BACC47EN4	TNC Adapter	1	Coax

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 9 (continued)

Code	Cable	Contact			
		Socket	Style	Size	Type
BH	BA-5903	BACC47EU1	-	5	Coax
	RG-58				
	RG-393	BACC47EN2	-	1	Coax
BJ	BMS 13-65 Type OF, S280W503-2	BACC47EU4	-	5	Coax
BK	-	BACA19BK1	TNC Adapter	1	Coax
BL	BMS 13-65 Type OF, S280W503-2	BACC47EU4	-	5	Coax
	-	BACA19BK1	TNC Adapter	1	Coax

**Table 10
COAX CONTACT DESIGNATION CODES FOR BACC66K CONNECTORS**

Code	Cable	Contact			
		Socket	Style	Size	Type
AA	-	-	-	-	-
AB	RG-58	BACC47EU1	-	5	Coax
	BA-5903		-		
AC	5021K1011	BACC47EU2	-	5	Coax
AD	-	BACA19BK1	TNC Adapter for BACI10AH11 Insert	1	Coax
AE	RG-58	BACC47EU1	-	5	Coax
	BA-5903		-		
	-	BACA19BK1	TNC Adapter for BACI10AH11 Insert	1	Coax
AF	5021K1011	BACC47EU2	-	5	Coax
	-	BACA19BK1	TNC Adapter for BACI10AH11 Insert	1	Coax
AG	BMS 13-65 Type OE, S280W503-1	BACC47EU3	-	5	Coax
AH	BMS 13-65 Type OF, S280W503-2	BACC47EU4	-	5	Coax
AJ	BMS 13-65 Type OE, S280W503-1	BACC47EU3	-	5	Coax
	-	BACA19BK1	TNC Adapter for BACI10AH11 Insert	1	Coax
AK	BMS 13-65 Type OF, S280W503-2	BACC47EU4	-	5	Coax
	-	BACA19BK1	TNC Adapter for BACI10AH11 Insert	1	Coax

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 10 (continued)

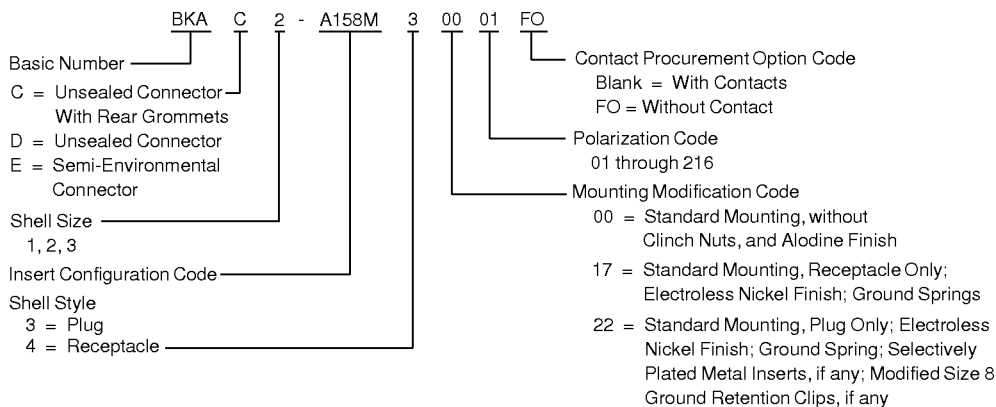
Code	Cable	Contact			
		Socket	Style	Size	Type
AL	BMS 13-65 Type OE, S280W503-1	S280W554-111	-	8	Coax
AM	BMS 13-65 Type OF, S280W503-2	S280W554-113	-		
AN	S280W502-1	S280W552-205	-	8	Concentric Twinax
AP	BACC69AAA()	-	-	16	Fiber Optic
AR	BACC69AAC()	-	-	16	Fiber Optic
	BACC69ACC()				
AT	BMS13-72T03C04G024	BACC47GB1	-	8	Quadrax

Table 11

CONTACT PROCUREMENT OPTION CODES

Contact Procurement Option Code	Contact Procurement Option
00	Connector is supplied without contacts.
01	Connector is supplied with all contacts.
02	Connector is supplied with coax contacts and/or twinax contacts only.
03	Connector is supplied with BACC47EF and BACC47EG contacts only.
04	Connector is supplied with BACC47EF1 contacts only.
05	Connector is supplied with all contacts except coax and twinax contacts.

D. ITT Cannon ARINC 600 Connectors



ITT CANNON BKA() SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 11

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

NOTE: If an ITT Cannon BACI10AH11 insert does not have TNC adapters or outer coax contact bodies in the size 1 contact cavities, it is recommended that four BACA19BK1 TNC adapters be installed in the insert. Refer to Paragraph 15.K.

**Table 12
ITT CANNON ARINC 600 INSERT CONFIGURATION CODES**

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
1	100	A	20	-
		B	20	-
		C	19	-
1	120	A	01	-
		B	01	-
		C	-	This insert cavity is empty
1	124	A	01	-
		B	01	-
		C	21	-
1	125	A	01	-
		B	01	-
		C	03	-
2	066	A	BLANK	This insert cavity has a blank insert
		B	17	-
		C	18	-
2	105	A	12	-
		B	12	-
		C	10	-
2	124	A	BLANK	This insert cavity has a blank insert
		B	29	-
		C	07	-
2	133	A	17	-
		B	17	-
		C	04	-
2	137	A	15	-
		B	12	-
		C	13	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC10AH Insert	Notes
2	154	A	17	-
		B	17	-
		C	16	-
2	155	A	05	For size 1 coax contact with special mounting block hole spacing
		B	05	For size 1 coax contact with special mounting block hole spacing
		C	04	-
2	155M	A	05	For size 1 coax contact with standard mounting block
		B	05	For size 1 coax contact with standard mounting block
		C	04	-
2	158	A	15	-
		B	29	-
		C	04	-
2	158M	A	09	For size 1 coax contacts with standard mounting blocks
		B	05	For size 1 coax contact with standard mounting block
		C	10	-
2	165M	A	02	-
		B	25	For size 1 coax contacts with standard mounting blocks
		C	04	-
2	167	A	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		B	02	-
		C	04	-
2	167T	A	11	This insert has 4 BACA19BK1 TNC adapters
		B	02	-
		C	04	-
2	187	A	29	-
		B	02	-
		C	04	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC10AH Insert	Notes
2	188	A	02	-
		B	11	In early connectors, This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits In later connectors, this insert has 4 BACA19BK1 TNC adapters
		C	16	-
2	215	A	15	-
		B	17	-
		C	16	-
2	234	A	02	-
		B	05	For size 1 coax contact with special mounting block hole spacing
		C	04	-
2	234M	A	02	-
		B	05	For size 1 coax contact with standard mounting block
		C	04	-
2	246	A	14	-
		B	14	-
		C	13	-
2	248	A	15	-
		B	15	-
		C	13	-
2	253	A	14	-
		B	14	-
		C	04	-
2	313	A	02	-
		B	02	-
		C	04	-
2	324	A	02	-
		B	02	-
		C	24	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC10AH Insert	Notes
2	340	A	14	-
		B	14	-
		C	07	-
2	359	A	02	-
		B	02	-
		C	22	-
2	370	A	14	-
		B	02	-
		C	07	-
2	385	A	02	-
		B	02	-
		C	10	-
2	400	A	02	-
		B	02	-
		C	07	-
2	042	A	11	This insert does not have size 1 coax outer bodies or TNC adapters
		B	11	This insert does not have size 1 coax outer bodies or TNC adapters
		C	16	-
2	67402-203	A	15	This connector is supplied without contacts
		B	15	
		C	18	
2	67402-229	A	02	Connector does not have the grounding spring
		B	02	
		C	04	
2	67402-316	A	11	This insert has 4 BACA19BK1 TNC adapters
		B	14	-
		C	04	-
2	67403-22-51	A	02	-
		B	02	-
		C	04	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
2	67403-22-56	A	02	-
		B	02	-
		C	04	-
2	68134-101	A	15	Connector is supplied without contacts
		B	15	
		C	13	
2	A137	A	11	This insert has 4 BACA19BK1 TNC adapters
		B	14	-
		C	04	-
2	A158M	A	09	For size 1 coax contacts with standard mounting blocks
		B	08	For size 1 coax contact with standard mounting block
		C	10	-
2	A164	A	-	This insert cavity is empty
		B	02	-
		C	04	-
2	A234	A	05	For size 1 coax contact with special mounting block hole spacing
		B	02	-
		C	04	-
2	A234M	A	05	For size 1 coax contacts with standard mounting block
		B	02	-
		C	04	-
2	A238	A	15	-
		B	15	-
		C	18	-
2	B234	A	08	For size 1 coax contact with standard mounting block
		B	02	-
		C	04	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC10AH Insert	Notes
2	B234M	A	08	For size 1 coax contact with standard mounting block
		B	02	-
		C	04	-
2	BW234	A	02	-
		B	05	For size 1 coax contact with special mounting block hole spacing
		C	04	-
2	V155M	A	08	For size 1 coax contact with standard mounting block
		B	05	For size 1 coax contact with standard mounting block
		C	04	-
3	067404-0080	A	11	This insert does not have size 1 coax outer bodies or TNC adapters
		B	11	This insert does not have size 1 coax outer bodies or TNC adapters
		C	04	-
		D	BLANK	This insert cavity has a blank insert
		E	02	-
		F	07	-
3	271C	A	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		B	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		C	04	-
		D	BLANK	This insert cavity has a blank insert
		E	02	-
		F	07	-
3	271T	A	11	This insert has 4 BACA19BK1 TNC adapters
		B	11	This insert has 4 BACA19BK1 TNC adapters
		C	04	-
		D	BLANK	This insert cavity has a blank insert
		E	02	-
		F	07	-



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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
3	494	A	15	-
		B	14	-
		C	13	-
		D	15	-
		E	14	-
		F	13	-
3	496	A	15	-
		B	15	-
		C	13	-
		D	15	-
		E	15	-
		F	13	-
3	537	A	11	This insert does not have size 1 coax outer bodies or TNC adapters
		B	14	-
		C	07	-
		D	02	-
		E	02	-
		F	04	-
3	608	A	14	-
		B	02	-
		C	16	-
		D	14	-
		E	02	-
		F	16	-
3	626	A	02	-
		B	02	-
		C	04	-
		D	02	-
		E	02	-
		F	04	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC110AH Insert	Notes
3	67404-62	A	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		B	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		C	04	-
		D	BLANK	This insert cavity has a blank insert
		E	02	-
		F	07	-
3	67404-80	A	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		B	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		C	04	-
		D	BLANK	This insert cavity has a blank insert
		E	02	-
		F	07	-
3	67404-91	A	15	-
		B	14	-
		C	13	-
		D	15	-
		E	14	-
		F	13	-
3	67405-54	A	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		B	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		C	04	-
		D	BLANK	This insert cavity has a blank insert
		E	02	-
		F	07	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
3	67405-54-40	A	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		B	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		C	04	-
		D	BLANK	This insert cavity has a blank insert
		E	02	-
		F	07	-
3	68135-21	A	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		B	11	This insert has 4 size 1 outer contact bodies for ITT Cannon termination kits
		C	04	-
		D	BLANK	This insert cavity has a blank insert
		E	02	-
		F	07	-
3	68135-25	A	15	-
		B	14	-
		C	13	-
		D	15	-
		E	14	-
		F	13	-
3	68135-25-103	A	15	-
		B	14	-
		E	14	-
		D	15	-
		C	13	-
		F	13	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert	Notes
3	68135-95	A	11	This insert does not have size 1 coax outer bodies or TNC adapters
		B	14	-
		C	07	-
		D	02	-
		E	02	-
		F	04	-
3	713	A	02	-
		B	02	-
		C	07	-
		D	02	-
		E	02	-
		F	04	-
3	718	A	02	-
		B	02	-
		C	22	-
		D	02	-
		E	02	-
		F	22	-
3	770	A	02	-
		B	02	-
		C	10	-
		D	02	-
		E	02	-
		F	10	-
3	784	A	02	-
		B	02	-
		C	26	-
		D	02	-
		E	02	-
		F	07	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 12 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC110AH Insert	Notes
3	800	A	02	-
		B	02	-
		C	07	-
		D	02	-
		E	02	-
		F	07	-
3	A713	A	02	-
		B	02	-
		C	04	-
		D	02	-
		E	02	-
		F	07	-
3	A759	A	02	-
		B	02	-
		C	22	-
		D	02	-
		E	02	-
		F	07	-

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

**Table 13
ITT CANNON INSERT PART NUMBERS**

BAC110AH() Insert	ITT Cannon Code	Part Number	Description	Supplier
01	60#22	143-1910-001	With rear grommet	ITT Cannon
		143-1910-000	Without rear grommet	
02	150	143-1906-001	With rear grommet	ITT Cannon
		143-1906-000	Without rear grommet	
03	5W2	143-1913-001	With rear grommet	ITT Cannon
		143-1913-000	Without rear grommet	
04	13W2	143-1909-001	With rear grommet	ITT Cannon
		143-1909-000	Without rear grommet	

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Table 13 (continued)

BAC110AH() Insert	ITT Cannon Code	Part Number	Description	Supplier
05	71W1A	143-2085-000	For size 1 coax contact with standard mounting block, and with rear grommet - Supplied with 1 C-Bracket Spacer	ITT Cannon
		143-2085-001	For size 1 coax contact with standard mounting block, and without rear grommet - Supplied with 1 C-Bracket Spacer	ITT Cannon
	71W1	143-1958-002	For size 1 coax contact with special mounting block hole spacing, and with rear grommet	ITT Cannon
		143-1958-000	For size 1 coax contact with special mounting block hole spacing, and without rear grommet	ITT Cannon
06	-	317-1641-000	Wave Guide	ITT Cannon
07	100	143-2015-001	With rear grommet	ITT Cannon
		143-2015-000	Without rear grommet	
08	71W1B	143-1114-000	For size 1 coax contact with standard mounting block, and with rear grommet - Supplied with 1 C-Bracket Spacer	ITT Cannon
		143-1113-000	For size 1 coax contact with standard mounting block, and without rear grommet - Supplied with 1 C-Bracket Spacer	ITT Cannon
09	2W2	144-2944-000	For 2 size 1 coax contacts with standard mounting blocks, no grommet - Supplied with 2 C-Bracket Spacers	ITT Cannon
10	85	143-3879-000	With rear grommet	ITT Cannon
		143-3877-000	Without rear grommet	
11	4W4	177-1000-000	With 4 size 1 outer contact bodies for ITT Cannon coax termination kits	ITT Cannon
		177-1000-003	With 4 BACA19BK1 TNC adapters	ITT Cannon
12	10T10	228-1027-001	With rear grommet	ITT Cannon
		228-1027-002	Without rear grommet	
13	6T6	228-1012-001	With rear grommet	ITT Cannon
		228-1012-003	Without rear grommet	
14	120T2	143-1165-003	With rear grommet	ITT Cannon
15	121	143-1150-001	With rear grommet	ITT Cannon
		143-1150-002	Without rear grommet	
16	34	143-1098-005	With rear grommet	ITT Cannon
17	60#20	143-3715-003	With rear grommet	ITT Cannon
18	6	143-1155-001	With rear grommet	ITT Cannon

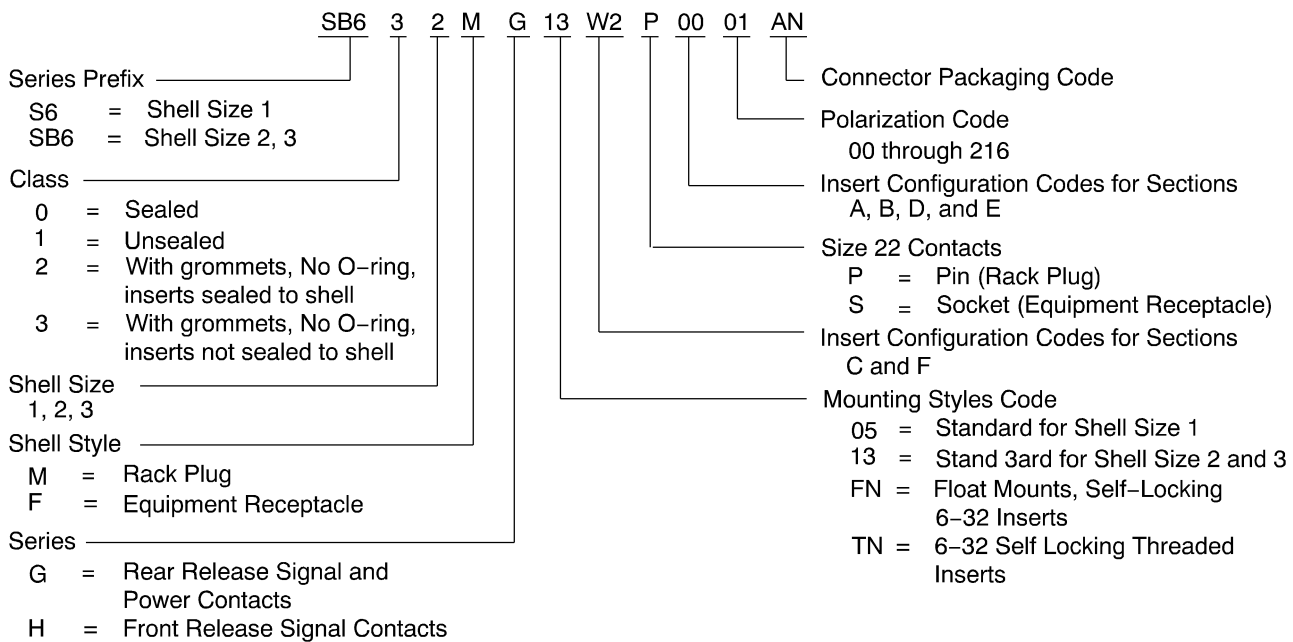
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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 13 (continued)

BACI10AH() Insert	ITT Cannon Code	Part Number	Description	Supplier
19	40	143-1171-001	With rear grommet	ITT Cannon
20	30T2	143-1173-001	With rear grommet	ITT Cannon
		143-1173-000	Without rear grommet	
21	4#12	143-1157-001	With rear grommet	ITT Cannon
22	59	143-1167-001	With rear grommet	ITT Cannon
23	110	143-1182-000	With rear grommet	ITT Cannon
24	24T4	143-1096-004	With rear grommet	ITT Cannon
25	2W2 SPCL	144-2944-004	For 2 size 1 coax contacts with standard mounting blocks, no grommet - Supplied with 2 C-Bracket Spacers	ITT Cannon
26	84	143-1195-001	With rear grommet	ITT Cannon
29	24	143-1102-005	With rear grommet	ITT Cannon

E. Souriau ARINC 600 Connectors



SOURIAU SB6() SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 12



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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 14
SOURIAU ARINC 600 CONNECTOR INSERT CONFIGURATION CODES**

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC10AH Insert
1	00	A	01
		B	01
1	W2	C	03
2	00	A	02
		B	02
2	01	A	05
		B	05
2	02	A	02
		B	05
2	03	A	05
		B	02
2	04	A	BLANK
		B	05
2	F3	A	06
		B	02
2	K5	C	07
2	W2	C	04
3	00	A	02
		B	02
		D	02
		E	02
3	E9	A	11
		B	11
		D	BLANK
		E	02
3	K1	C	07
		F	07
3	K2	C	04
		F	07
3	K3	C	07
		F	04

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 14 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert
3	W2	C	04
		F	04

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

Table 15

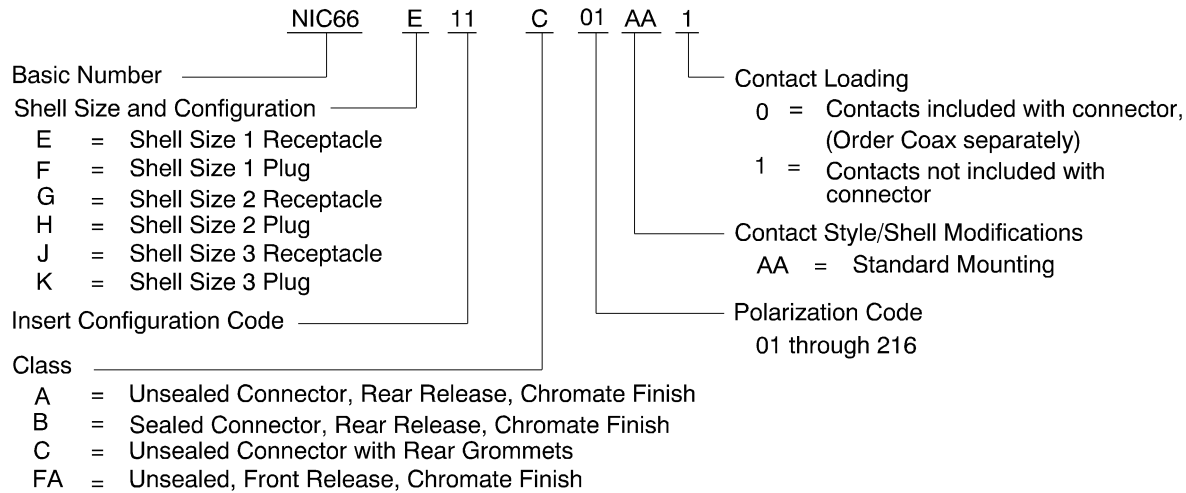
SOURIAU ARINC 600 CONNECTOR INSERT PART NUMBERS

BACI10AH() Insert	Description	Part Number	Supplier
01	With rear grommet	8660-J30-100-17A/00	Souriau
	Without rear grommet	8660-J30-100-07A/00	Souriau
02	With rear grommet	8660-J30-200-11A/00	Souriau
	Without rear grommet	8660-J30-200-01A/00	Souriau
03	With rear grommet	8660-J31-100-62A/00	Souriau
	Without rear grommet	8660-J31-100-52A/00	Souriau
04	With rear grommet	8660-J31-200-63A/00	Souriau
	Without rear grommet	8660-J31-200-53A/00	Souriau
05	With rear grommet	8660-J30-200-19A/00	Souriau
	Without rear grommet	8660-J30-200-09A/00	Souriau
06	Wave Guide	Wave Guide	Souriau
07	With rear grommet	8660-J30-200-60A/00	Souriau
	Without rear grommet	8660-J30-200-50A/00	Souriau

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

F. AMP ARINC 600 Connectors



AMP NIC66() SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 13

Table 16
AMP ARINC 600 CONNECTOR INSERT CONFIGURATION CODES

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC110AH Insert
1	11	A	01
		B	01
		C	03
2	20	A	08
		B	05
		C	04
2	21	A	02
		B	02
		C	04
2	22	A	05
		B	02
		C	04
2	23	A	05
		B	05
		C	04
2	25	A	02
		B	05
		C	04

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 16 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert
2	26	A	02
		B	02
		C	07
2	28	A	09
		B	08
		C	10
3	31	A	02
		B	02
		C	04
		D	02
		E	02
		F	04
3	32	A	02
		B	02
		C	07
		D	02
		E	02
		F	04
3	33	A	02
		B	02
		C	04
		D	02
		E	02
		F	07
3	34	A	02
		B	02
		C	07
		D	02
		E	02
		F	07

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 16 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert
3	36	A	11
		B	11
		C	04
		D	BLANK
		E	02
		F	07

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

Table 17

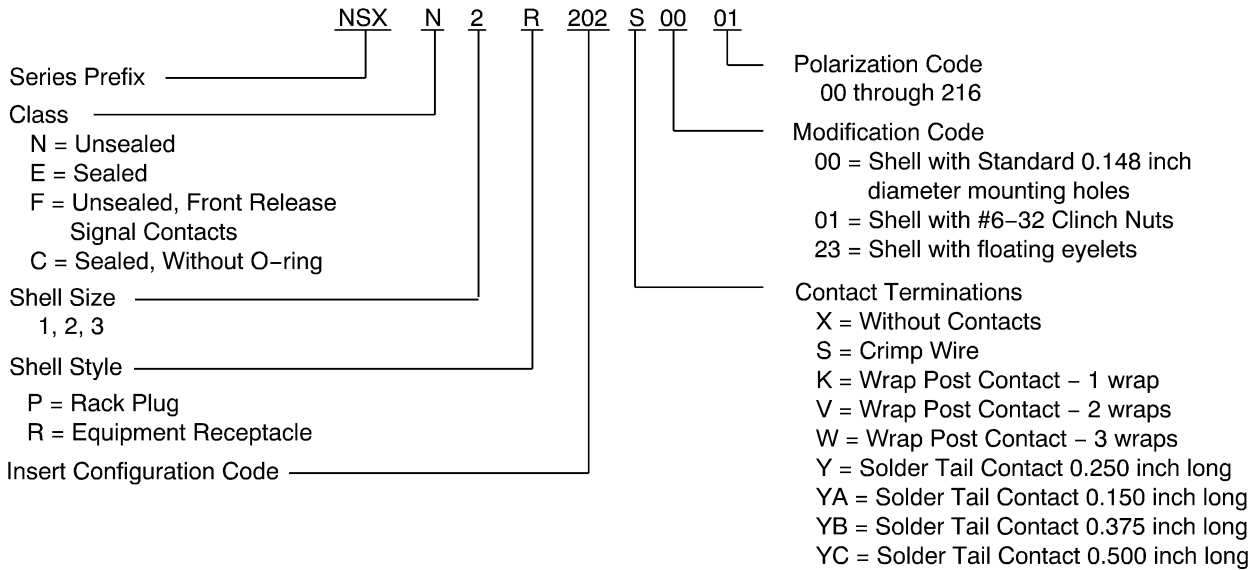
AMP ARINC 600 CONNECTOR INSERT PART NUMBERS

BACI10AH() Insert	Description	Part Number	Supplier
01	With rear grommet	208592-3	AMP
02	With rear grommet	208906-5	AMP
03	With rear grommet	208596-3	AMP
04	With rear grommet	208909-5	AMP
05	With rear grommet	211222-2	AMP
07	With rear grommet	211135-5	AMP
08	With rear grommet	211222-6	AMP

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

G. Radial ARINC 600 Connectors



RADIAL NSX() SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 14

Table 18

RADIAL ARINC 600 CONNECTOR INSERT CONFIGURATION CODES

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert
1	101	A	01
		B	01
		C	03
2	201	A	02
		B	02
		C	04
2	202	A	05
		B	02
		C	04
2	203	A	05
		B	05
		C	04
2	204	A	06
		B	02
		C	04



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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 18 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BAC10AH Insert
2	205	A	02
		B	05
		C	04
2	206	A	02
		B	02
		C	07
2	216	A	09
		B	08
		C	10
2	221	A	08
		B	05
		C	04
2	522	A	30
		B	14
		C	04
3	301	A	02
		B	02
		C	04
		D	02
		E	02
		F	04
3	302	A	02
		B	02
		C	07
		D	02
		E	02
		F	04
3	303	A	02
		B	02
		C	04
		D	02
		E	02
		F	07

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 18 (continued)

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert
3	304	A	02
		B	02
		C	07
		D	02
		E	02
		F	07
3	310	A	11
		B	11
		C	04
		D	BLANK
		E	02
		F	07

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPACLE DO NOT SATISFACTORILY ENGAGE.

Table 19
RADIALL ARINC 600 CONNECTOR INSERT PART NUMBERS

BACI10AH() Insert	Description	Part Number	Supplier
01	With rear grommet	620501009	Radiall
02	With rear grommet	620503350	Radiall
03	With rear grommet	620503053	Radiall
04	With rear grommet	620502002	Radiall
	Without rear grommet	620502004	Radiall
14	With rear grommet	620503250	Radiall
30	With rear grommet	620503650	Radiall

H. Tri-Star ARINC 600 Connectors

Table 20
TRI-STAR ARINC 600 CONNECTOR INSERTS

Shell Size	Connector	Insert Cavity	BACI10AH Insert
2	C-06A3-B305-1100	A	05
		B	05
		C	04

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 20 (continued)

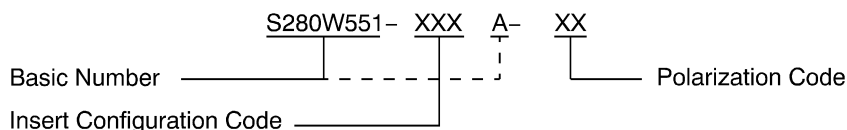
Shell Size	Connector	Insert Cavity	BACI10AH Insert
3	C-06A5-9940-1100	A	11
		B	11
		C	04
		D	BLANK
		E	02
		F	07

Table 21

TRI-STAR ARINC 600 CONNECTOR INSERT PART NUMBERS

BACI10AH() Insert	Description	Part Number	Supplier
02	With rear grommet	C-06A3-0150-5201	Tri-Star
	Without rear grommet	C-06B3-0150-5201	Tri-Star
04	With rear grommet	C-06A3-13W2-5301	Tri-Star
	Without rear grommet	C-06B3-13W2-5301	Tri-Star
05	With rear grommet	C-06A3-71W1-5201	Tri-Star
	Without rear grommet	C-06B3-71W1-5201	Tri-Star
06	Wave Guide	C0600-RG67-W001	Tri-Star
07	With rear grommet	C-06A3-0100-5201	Tri-Star
	Without rear grommet	C-06B3-0100-5201	Tri-Star
11	-	C-0600-04W4-G701	Tri-Star

I. Boeing S280W551 Connectors



BOEING S280W551 CONNECTOR PART NUMBER STRUCTURE

Figure 15

CAUTION: AN INSERT OF AN S280W551 CONNECTOR OR AN ARINC 600 CONNECTOR FROM SUPPLIERS OTHER THAN ITT CANNON OR RADIAL, MUST BE NOT USED IN A S280W551 CONNECTOR. THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

NOTE: An ITT Cannon S280W551 insert can be installed in a Radial S280W551 connector.



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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

NOTE: A Radiall S280W551 insert can be installed in an ITT Cannon S280W551 connector.

Table 22
S280W551 PLUG CONNECTOR INSERT CONFIGURATION CODES

Connector Shell Size	Insert Configuration Code	Insert Cavity	BACI10AH Insert
1	209	A	12
		B	16
	211	A	12
		B	22
	213	A	23
		B	24
2	401	A	02
		B	07
		C	02
		D	13
	405	A	23
		B	13
		C	02
		D	13
	407	A	12
		B	07
		C	12
		D	07
	413	A	15
		B	13
		C	15
		D	13
3	503	A	12
		B	21
		C	18
		D	17
		E	21

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 23
S280W551 CONNECTOR INSERT PART NUMBERS

BACI10AH()	Boeing Standard
02	S280W551-702
07	S280W551-707
12	S280W551-712
13	S280W551-713
15	S280W551-715
16	S280W551-716
17	S280W551-717
18	S280W551-718
21	S280W551-721
22	S280W551-722
23	S280W551-723
24	S280W551-724

Table 24
APPROVED SUPPLIERS FOR BOEING STANDARD S280W551 INSERTS

Boeing Standard	Supplier
S280W551-702	ITT Cannon
	Radiall
S280W551-707	ITT Cannon
	Radiall
S280W551-712	ITT Cannon
	Radiall
S280W551-713	ITT Cannon
	Radiall
S280W551-715	ITT Cannon
	Radiall
S280W551-716	ITT Cannon
	Radiall
S280W551-717	ITT Cannon
	Radiall
S280W551-718	ITT Cannon
	Radiall

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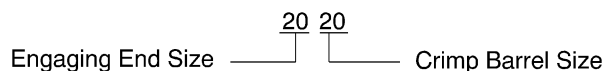
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 24 (continued)

Boeing Standard	Supplier
S280W551-721	ITT Cannon
	Radiall
S280W551-722	ITT Cannon
	Radiall
S280W551-723	ITT Cannon
	Radiall
S280W551-724	ITT Cannon
	Radiall

3. CONTACT PART NUMBERS AND DESCRIPTION

A. Standard Contacts



EXAMPLE OF A CONTACT SIZE
Figure 16

NOTE: The size 2020HD high density contact has a size 20 engaging end and a size 20 crimp barrel.

Table 25
BOEING STANDARD CONTACTS

Contact Size	Contact Type	Boeing Standard	Color Code	
			Band	Color
2222	Pin	BACC47EF1	1	Orange
			2	Green
2020HD	Socket	BACC47EG2	1	Orange
			2	Red
1616	Socket	BACC47EG3	1	Orange
			2	Blue
1212	Socket	BACC47EG4	1	Orange
			2	Yellow
0808	Power Socket	S280W553-2	1	Orange
			2	Brown
0808	Ground Socket	S280W553-4	1	Orange
			2	Black

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 26
SUPPLIER PART NUMBERS FOR BOEING STANDARD CONTACTS**

Boeing Standard	Contact	
	Part Number	Supplier
BACC47EF1	030-2259-000	ITT Cannon
	208262-3	AMP
	317-2222-301	Tri-Star
	620200	Radiall
	8660-202	Souriau
BACC47EG2	031-1302-000	ITT Cannon
	208267-2	AMP
	318-2020-302	Tri-Star
	620310	Radiall
	8660-248	Souriau
BACC47EG3	031-1303-000	ITT Cannon
	208270-2	AMP
	620330	Radiall
	8660-249	Souriau
BACC47EG4	031-1308-000	ITT Cannon
	208273-2	AMP
	620340	Radiall
	8660-250	Souriau
S280W553-2	031-1154-000	ITT Cannon
S280W553-4	031-3300-000	ITT Cannon

NOTE: A size 12 contact can be installed in the cavity of a cavity reducer; refer to Paragraph 3.F.

B. Eyelet Part Numbers

**Table 27
EYELET PART NUMBERS**

Part Number	Supplier
CE46FC	Circon
CE66FC	Circon
Y-6015-C	International Eyelets
Y-9015-C	International Eyelets

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C. Crimp Barrel Adapter Part Numbers

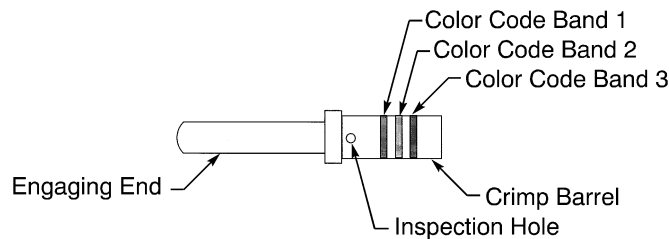
**Table 28
CRIMP BARREL ADAPTER PART NUMBERS**

Part Number	Supplier
252-1231-000	ITT Cannon

D. Ground Block Contacts

**Table 29
GROUND BLOCK CONTACTS**

Contact Size		Contact Type	Part Number	Supplier	Color Code	
Engaging End	Crimp Barrel				Band	Color
16	20	Pin	M39029/1-101	QPL	1	Brown
					2	Black
					3	Brown
		Pin	S280W555-920	Tri-Star	1	Red
					2	Red
					3	Red
	18	Pin	S280W555-918	Tri-Star	1	Red
					2	White
					3	Red



**GROUND BLOCK CONTACTS
Figure 17**

E. Size 12 Coax and Shielded Contacts

**Table 30
SIZE 12 COAX CONTACTS**

Contact Size	Contact Type	Part Number	Supplier	Coax Cable
12	Socket	618040	Radiall	RG-316

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 31
SIZE 12 SHIELDED CONTACTS**

Contact Size	Contact Type	Part Number	Supplier	Shielded Wire or Coax Cable
12	Socket	151700-0688	ITT Cannon	AWG 22 Shielded Wire, 8 mil insulation
		249-1768-000	ITT Cannon	AWG 24 Shielded Wire, RG-174, RG-316
		249-2203-000	ITT Cannon	AWG 24 Shielded Wire

**Table 32
ALTERNATIVE SIZE 12 CONTACTS**

Specified Contact		Alternative Contact	
Part Number	Supplier	Part Number	Supplier
249-1768-000	ITT Cannon	618040	Radiall

NOTE: A size 12 contact can be installed in the cavity of a cavity reducer; refer to Paragraph 3.F.

F. Size 5 to Size 12 Cavity Reducers and the Related Sealing Boots

For the procedure to install a size 12 contact in a size 5 coax contact cavity, refer to Paragraph 15.D.

NOTE: The Cavity Reducer is not removable from the connector after it is installed.

**Table 33
SIZE 5 TO SIZE 12 CAVITY REDUCERS**

Contact Cavity		Cavity Reducer	
Size	Reduced Size	Part Number	Supplier
5	12	021-8757-000	ITT Cannon
		8600-344	Souriau

**Table 34
SEALING BOOTS FOR AWG 12 WIRE IN A SIZE 5 CAVITY**

Contact Cavity		Sealing Boot	
Size	Wire Size (AWG)	Part Number	Supplier
5	12	317-1717-000	ITT Cannon
		8660-2152	Souriau

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G. Size 8 Coax Contacts

**Table 35
SIZE 8 COAX CONTACTS**

Contact Size	Contact Type	Boeing Standard	Color Band	Coax Cable
8	Socket	S280W554-111	Red	S280W503-1
				BMS13-65 Type OE
8	Socket	S280W554-113	Green	S280W503-2
				BMS13-65 Type OF

NOTE: The size 8 coax socket contact has an outer socket contact and an inner pin contact.

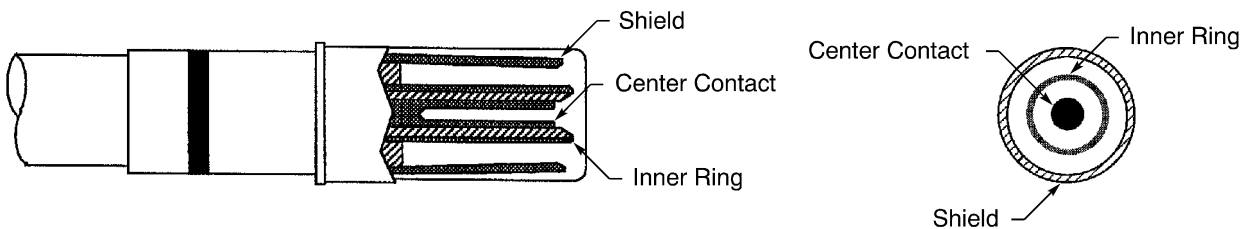
**Table 36
ALTERNATIVE PART NUMBERS FOR SIZE 8 COAX CONTACTS**

Boeing Standard	Contact	
	Part Number	Supplier
S280W554-111	349-1087-003	ITT Cannon
S280W554-113	349-1087-004	ITT Cannon

H. Size 8 Twinax Contacts

**Table 37
BOEING STANDARD SIZE 8 TWINAX CONTACTS**

Contact Size	Type	Retention	Boeing Standard	Color Code	
				Band	Color
8	Socket	Rear Release, Rear Removal	S280W552-105	1	Blue
				2	-
			S280W552-205	1	Blue
				2	Blue

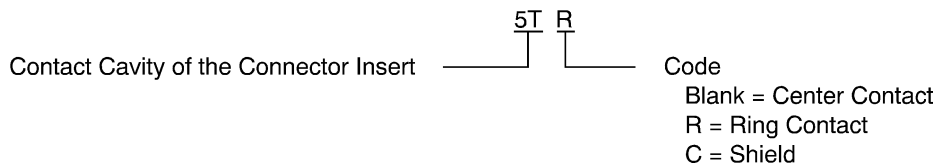


**TWINAX CONTACT ELECTRICAL COMPONENTS
Figure 18**

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



TWINAX CONTACT TERMINATION IDENTIFICATION
Figure 19

Table 38
SIZE 8 TWINAX CONTACT TERMINATION IDENTIFICATION

Twinax Cable Component	Twinax Contact Termination Component	Code	Reference
Blue Wire	Center Contact	Blank	Figure 18
			Figure 19
White Wire	Inner Ring	R	Figure 18
			Figure 19
Shield	Outer Contact Body	C	Figure 18
			Figure 19

Table 39
OBSOLETE PART NUMBERS FOR SIZE 8 TWINAX CONTACTS

Obsolete Contact	Replacement Contact
S280W552-105	S280W552-205

Table 40
SUPPLIER PART NUMBERS FOR BOEING STANDARD SIZE 8 TWINAX CONTACTS

Boeing Standard	Alternative Contact	
	Part Number	Supplier
S280W552-205	349-1081-001	ITT Cannon
	318-L8T2-614	Tri-Star

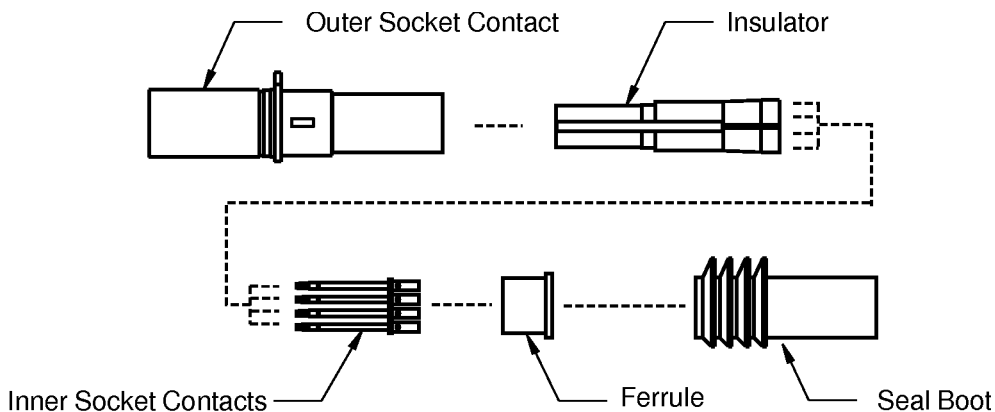
I. Size 8 Quadrax Contacts

Table 41
BOEING STANDARD SIZE 8 QUADRAX CONTACTS

Contact Size	Type	Boeing Standard
8	Socket	BACC47GB1

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



COMPONENTS SUPPLIED WITH THE BACC47GB QUADRAX CONTACT
Figure 20

Table 42
SUPPLIER PART NUMBERS FOR BOEING STANDARD SIZE 8 QUADRAX CONTACTS

Boeing Standard	Alternative Contact	
	Part Number	Supplier
BACC47GB1	1445693-4	Tyco

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

J. Size 5 Coax Contacts

**Table 43
SIZE 5 COAX CONTACTS**

Contact Size	Contact Type	Seal	Part Number	Supplier	Coax Cable		
5	Socket	Sealed	349-0013-000	ITT Cannon	RG-58 BA-5903		
			349-0015-000	ITT Cannon	5021K1011		
			BACC47EU1	Boeing	RG-58 BA-5903 BA14349		
			BACC47EU2	Boeing	5021K1011		
			BACC47EU3	Boeing	S280W503-1 BMS 13-65 Type 0E		
			BACC47EU4	Boeing	S280W503-2 BMS 13-65 Type 0F		
			BACC47EU1A	Boeing	RG-58 BA-5903 BA14349		
		BACC47EU2A	Boeing	5021K1011			
		BACC47EU3A	Boeing	S280W503-1 BMS 13-65 Type 0E			
		BACC47EU4A	Boeing	S280W503-2 BMS 13-65 Type 0F			
				Not sealed			

NOTE: The size 5 coax socket contact has an outer socket contact and an inner pin contact.

NOTE: The size 5 coax contact cavity can accept a cavity reducer; refer to Paragraph 3.F.

**Table 44
SUPPLIER PART NUMBERS FOR BOEING STANDARD SIZE 5 COAX CONTACTS**

Boeing Standard	Contact	
	Part Number	Supplier
BACC47EU1	225791-1	AMP
	349-0013-000	ITT Cannon
	620020	Radiall
	8660-2485	Souriau

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Table 44 (continued)

Boeing Standard	Contact	
	Part Number	Supplier
BACC47EU1A	349-0013-001	ITT Cannon
	620020-001	Radiall
	8660-2285	Souriau
BACC47EU2	349-0015-000	ITT Cannon
	620026	Radiall
	8660-2298D	Souriau
	8660-2298E	Souriau
BACC47EU2A	349-0015-001	ITT Cannon
	620026-001	Radiall
	8660-2498E	Souriau
BACC47EU3	349-1102-000	ITT Cannon
BACC47EU3A	349-1102-003	ITT Cannon
BACC47EU4	349-1102-002	ITT Cannon
BACC47EU4A	349-1102-004	ITT Cannon

**Table 45
ALTERNATIVE SIZE 5 COAX CONTACTS**

Specified Contact			Alternative Contact		
Part Number	Note	Supplier	Part Number	Note	Supplier
8660-2298	Crimped Center Contact	Souriau	8660-298	Soldered Center Contact	Souriau
8660-2298E	-	Souriau	8660-2298A	-	Souriau
			8660-2298D	-	Souriau

K. Size 1 Coax Contacts for the BACI10AH05, 08, 09 and 25 Inserts

The size 1 contacts in this paragraph have a mounting block and are applicable for these connector insert configurations:

- BACI10AH05
- BACI10AH08
- BACI10AH09
- BACI10AH25

Refer to Paragraph 3.L. for the size 1 contacts for the BACI10AH11 insert.

NOTE: Refer to Table 66 for the relation between the insert configurations and the applicable contacts.

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NOTE: Refer to Table 12 for the relation between the insert configuration code in the ITT Cannon connector part number and the applicable contacts in the inserts of the ITT Cannon connector.

Table 46
CONNECTORS THAT HAVE STANDARD AND SPECIAL SIZE 1 COAX MOUNTING BLOCKS

Connector	Size 1 Coax Socket Contact	
	Description	Reference
BACC66H122()	Connector has a standard mounting block	Table 47
BACC66H123()	Connector has a standard mounting block	Table 47
BACC66H125()	Connector has a standard mounting block	Table 47
BACC66H22()	Connector has special mounting block hole spacing	Table 50
BACC66H23()	Connector has special mounting block hole spacing	Table 50
BACC66H25()	Connector has special mounting block hole spacing	Table 50
BKA()2-155-3()	Connector has special mounting block hole spacing	Table 50
BKA()2-155M-3()	Connector has a standard mounting block	Table 47
BKA()2-158M-3()	Connector has a standard mounting block	Table 47
BKA()2-234-3()	Connector has special mounting block hole spacing	Table 50
BKA()2-234M-3()	Connector has a standard mounting block	Table 47
BKA()2-A234-3()	Connector has special mounting block hole spacing	Table 50
BKA()2-A234M-3()	Connector has a standard mounting block	Table 47
BKA()2-V155M-3()	Connector has a standard mounting block	Table 47

Table 47
SIZE 1 COAX CONTACTS THAT HAVE STANDARD MOUNTING BLOCKS FOR THE BACI10AH05, 08, 09, AND 25 INSERT CONFIGURATIONS

Size 1 Coax Contact					Coax Cable
Part Number	Type	Seal	Supplier	Assembly Procedure	
BACC47EN1	Contact	Sealed	Boeing	Paragraph 14.A.	BA6903
					RG-214
BACC47EN1A	Contact	Not sealed	Boeing	Paragraph 14.A.	BA6903
					RG-214
BACC47EN2	Contact	Sealed	Boeing	Paragraph 14.A.	RG-393
BACC47EN2A	Contact	Not sealed	Boeing	Paragraph 14.A.	RG-393
BACC47EN3	Contact	Sealed	Boeing	Paragraph 14.A.	Raychem 5012H3012
BACC47EN3A	Contact	Not sealed	Boeing	Paragraph 14.A.	Raychem 5012H3012
BACC47EN4	TNC Adapter	Sealed	Boeing	Paragraph 14.A.	Refer to Table 48



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Table 47 (continued)

Size 1 Coax Contact					Coax Cable
Part Number	Type	Seal	Supplier	Assembly Procedure	
BACC47EN4A	TNC Adapter	Not sealed	Boeing	Paragraph 14.A.	Refer to Table 48
3011-1-103	Contact	Not sealed	Kings	Paragraph 14.C.	BMS 13-65 Type 0J
					S280W503-5
349-0005-000	Contact	Not sealed	ITT Cannon	Paragraph 14.A.	RG-142
					Thermax 691-295

NOTE: The BACC47EN4 contact has a TNC receptacle at the rear end. The TNC receptacle can connect to a TNC plug connector designed for a specific coax cable. Refer to Table 48.

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Table 48

TNC PLUG CONNECTOR PART NUMBERS FOR THE BACC47EN4 ADAPTER CONTACT IN THE BAC110AH05, 08, 09, AND 25 INSERT CONFIGURATIONS

TNC Adapter Contact				Applicable TNC Plug Connector		
Contact Size	Engaging End	Rear End	Boeing Standard	Coax Cable	Part Number	Supplier
1	Socket	TNC Receptacle	BACC47EN4	BA-5903	KA-59-277	Kings
				BA-6903	KA-59-185	Kings
				BMS 13-65 Type 0F, S280W503-2	125-94-9	Kings
				BMS 13-65 Type 0G, S280W503-3	125-96-9	Kings
				BMS 13-65 Type 0H, S280W503-4	125-101-9	Kings
				BMS 13-65 Type 0J, S280W503-5	125-92-9	Kings
				BMS 13-65 Type 0K, S280W503-6	125-105-9	Kings
				Raychem 5012H3012	KA-59-391-M06	Kings
				Raychem 5021K1011	KA-59-392-M06	Kings
				RG-58	KA-59-277	Kings
				RG-142	125-98-9	Kings
				RG-174	KA-59-260	Kings
				RG-214	KA-59-185	Kings
				RG-316	KA-59-260	Kings
				RG-393	KA-59-353-M06	Kings

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Table 48 (continued)

TNC Adapter Contact				Applicable TNC Plug Connector		
Contact Size	Engaging End	Rear End	Boeing Standard	Coax Cable	Part Number	Supplier
1	Socket	TNC Receptacle	BACC47EN4A	BA-5903	KA-59-277	Kings
				BA-6903	KA-59-185	Kings
				BMS 13-65 Type 0F, S280W503-2	125-94-9	Kings
				BMS 13-65 Type 0G, S280W503-3	125-96-9	Kings
				BMS 13-65 Type 0H, S280W503-4	125-101-9	Kings
				BMS 13-65 Type 0J, S280W503-5	125-92-9	Kings
				BMS 13-65 Type 0K, S280W503-6	125-105-9	Kings
				Raychem 5012H3012	KA-59-391-M06	Kings
				Raychem 5021K1011	KA-59-392-M06	Kings
				RG-58	KA-59-277	Kings
				RG-142	125-98-9	Kings
				RG-174	KA-59-260	Kings
				RG-214	KA-59-185	Kings
				RG-316	KA-59-260	Kings
RG-393	KA-59-353-M06	Kings				

Refer to Subject 20-51-15 for the procedures to assemble the TNC plug connectors.

Table 49

ALTERNATIVE SIZE 1 COAX CONTACTS THAT HAVE STANDARD MOUNTING BLOCKS

Specified Contact		Alternative Contact		Coax Cable
Part Number	Supplier	Part Number	Supplier	
8660-2295A	Souriau	8660-2295	Souriau	RG-214
				BA6903

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Table 49 (continued)

Specified Contact		Alternative Contact		Coax Cable
Part Number	Supplier	Part Number	Supplier	
BACC47EN1	Boeing	349-0017-000	ITT Cannon	RG-214 BA6903
		620101	Radiall	RG-214 BA6903
		8660-2295	Souriau	RG-214 BA6903
BACC47EN1A	Boeing	BACC47EN1	Boeing	RG-214
		349-0017-001	ITT Cannon	RG-214 BA6903
		620101-001	Radiall	RG-214 BA6903
		8660-2260	Souriau	RG-214 BA6903
BACC47EN2	Boeing	349-0017-000	ITT Cannon	RG-393
		620101	Radiall	
		8660-2299	Souriau	
BACC47EN2A	Boeing	BACC47EN2	Boeing	RG-393
		349-0017-001	ITT Cannon	
		620101-001	Radiall	
		8660-2263	Souriau	
BACC47EN3	Boeing	349-0018-000	ITT Cannon	5012H3012
		620102	Radiall	
		8660-2297	Souriau	
BACC47EN3A	Boeing	BACC47EN3	Boeing	5012H3012
		349-0018-001	ITT Cannon	
		620102-001	Radiall	
		8660-2262	Souriau	
BACC47EN4	Boeing	349-1112-000	ITT Cannon	TNC Adapter
		620101-003	Radiall	
BACC47EN4A	Boeing	BACC47EN4	Boeing	TNC Adapter
		349-1112-001	ITT Cannon	
		620101-004	Radiall	

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Table 50

ITT CANNON SIZE 1 COAX CONTACTS THAT HAVE SPECIAL MOUNTING BLOCK HOLE SPACING

Coax Cable	Size 1 Coax Contact			Applicable Connector
	Part Number	Supplier	Assembly Procedure	
RG-142	249-1882-000	ITT Cannon	Paragraph 14.A.	BACC66H22()
				BACC66H23()
				BACC66H25()
RG-214	249-5123-000	ITT Cannon	Paragraph 14.A.	BACC66H22()
				BACC66H23()
				BACC66H25()
RG-58	249-1882-000	ITT Cannon	Paragraph 14.A.	BACC66H22()
				BACC66H23()
				BACC66H25()

NOTE: The contacts in Table 50 have special mounting block hole spacing and can only be installed in BACC66H22, BACC66H23, and BACC66H25 connectors supplied by ITT Cannon.

NOTE: An ITT Cannon size 1 coax contact that has a mounting block with special hole spacing can be modified to have a standard mounting block. Refer to Table 51.

Table 51

ITT CANNON SIZE 1 COAX CONTACT MOUNTING BLOCK CONVERSION KIT

Description	Part Number	Supplier	Assembly Procedure
Size 1 Coax Mounting Block Conversion Kit	320-0091-000	ITT Cannon	Paragraph 14.B.

Refer to:

- Paragraph 7.E. for the procedure to remove a size 1 coax contact that has a mounting block from the insert
- Paragraph 15.I. for the procedure to install a size 1 coax contact that has a mounting block in the insert.

L. Size 1 Coax Contacts for the BACI10AH11 Insert

NOTE: Refer to Table 66 for the relation between the insert configurations and the applicable contacts.

NOTE: Refer to Table 12 for the relation between the insert configuration code in the ITT Cannon connector part number and the applicable contacts in the inserts of the ITT Cannon connector.

Table 52

COAX CONTACTS FOR THE BACI10AH11 INSERT

Part Number	Applicable Coax Cable	Description	Supplier	Assembly Procedure
320-1066-006	RG-142	Coax Termination Kit	ITT Cannon	Paragraph 14.D.
320-1066-015	RG-142	Coax Termination Kit	ITT Cannon	Paragraph 14.E.

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Table 52 (continued)

Part Number	Applicable Coax Cable	Description	Supplier	Assembly Procedure
BACA19BK1	Refer to Table 55	TNC Adapter Contact	Refer to Table 56.	Paragraph 15.K.

NOTE: The BACA19BK1 adapter contact has a TNC receptacle at the rear end. The TNC receptacle can connect to a TNC plug connector designed for a specific coax cable. Refer to Table 55 for the part numbers of the special reduced diameter TNC plug connectors for the BACI10AH11 insert configuration.

Table 53

SIZE 1 COAX CONTACTS FOR SOME CONNECTOR PART NUMBERS

Connector	Size 1 Coax Socket Contact	
	Description	Reference
BKA()2-167-3()	ITT Cannon Coax Termination Kit	Table 52
BKA()3-271C-3()	ITT Cannon Coax Termination Kit	Table 52
BKA()3-67404-62()	ITT Cannon Coax Termination Kit	Table 52
BKA()3-67404-80()	ITT Cannon Coax Termination Kit	Table 52
BKA()3-67405-54()	ITT Cannon Coax Termination Kit	Table 52
BKA()3-68135-21()	ITT Cannon Coax Termination Kit	Table 52

Table 54

EQUIVALENT COAX TERMINATION KIT CONTACTS

Specified Contact		Equivalent Contact	
Part Number	Supplier	Part Number	Supplier
320-1066-006	ITT Cannon	320-1066-015	ITT Cannon
320-1066-015	ITT Cannon	320-1066-006	ITT Cannon

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Table 55
BACA19BK1 TNC ADAPTER CONTACT AND THE RELATED TNC PLUG CONNECTORS

TNC Adapter Contact				Applicable Insert Configuration	Applicable Special TNC Plug Connector		
Contact Size	Engaging End	Rear End	Boeing Standard		Coax Cable	Part Number	Supplier
1	Socket	TNC Receptacle	BACA19BK1	BACI10AH11	BMS 13-65 Type 0F, S280W503-2	125-94-9	Kings
					BMS 13-65 Type 0G, S280W503-3	125-96-9	Kings
					BMS 13-65 Type 0H, S280W503-4	125-101-9	Kings
					RG-142	125-98-9	Kings

Refer to Subject 20-51-15 for the procedures to assemble the TNC plug connectors.

Table 56
ALTERNATIVE PART NUMBERS FOR BOEING STANDARD TNC ADAPTER CONTACTS

Boeing Standard	Part Number	Supplier
BACA19BK1	447346-1	AMP
	349-1047-001	ITT Cannon
	3019-1-101	Kings
	620116	Radiall
	500-00054	Souriau
	C-600-TNCS-E201	Tri-Star

For the procedure to remove:

- A termination kit contact from the outer contact body in the BACI10AH11 insert, refer to Paragraph 7.F.
- The outer contact body that holds a termination kit contact from a BACI10AH11 insert, refer to Paragraph 7.G.
- A BACA19BK1 TNC adapter from a BACI10AH11 insert, refer to Paragraph 7.G.

For the procedure to install:

- A termination kit contact in the outer contact body in the BACI10AH11 insert, refer to Paragraph 15.J.
- The outer contact body that holds a termination kit contact in a BACI10AH11 insert, refer to Paragraph 15.K.
- A BACA19BK1 TNC adapter in a BACI10AH11 insert, refer to Paragraph 15.K.

M. Fiber Optic Contact Terminus Part Numbers

NOTE: The BACT64A() fiber optic terminus is part of the fiber optic cable assembly and cannot be removed. If it is necessary to replace a terminus, the fiber optic cable assembly must be replaced.

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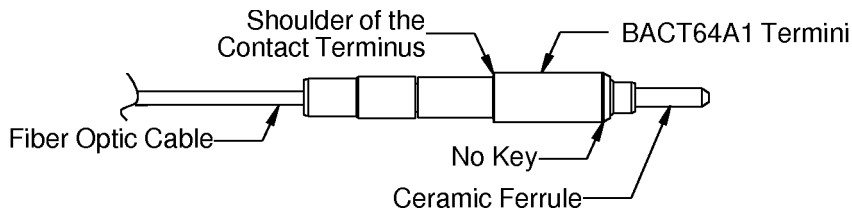
Refer to Subject 20-12-20 for:

- The inspection and cleaning procedures for fiber optic termini
- The fiber optic cable assembly part numbers.

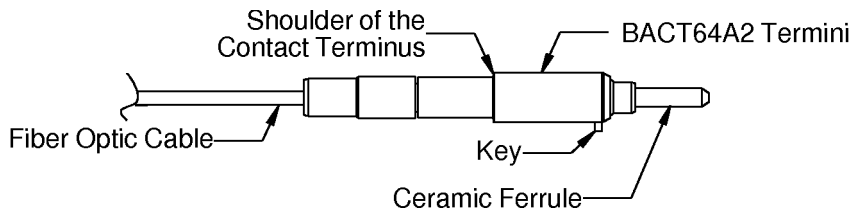
**Table 57
FIBER OPTIC CONTACT TERMINUS PART NUMBERS**

Cable Assembly	Contact Terminus			
	Type	Size	Part Number	Reference
BACC69()AA	A (Non-keyed)	16	BACT64A1	Figure 21
BACC69()CC	C(Keyed)	16	BACT64A2	Figure 22
BACC69()AC	A(Non-keyed), C(Keyed)	16	BACT64A1, BACT64A2	-

NOTE: A contact terminus that has a key can only be installed in a contact terminus cavity that has a keyway.



**NON-KEYED FIBER OPTIC CONTACT TERMINUS
Figure 21**



**KEYED FIBER OPTIC CONTACT TERMINUS
Figure 22**

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4. CONNECTOR ASSEMBLY COMPONENT PART NUMBERS AND DESCRIPTION

A. Ground Block Part Numbers

**Table 58
CONNECTOR GROUND BLOCK PART NUMBERS**

Connector	Shell Size	Ground Block		
		Contact Cavities	Housing Material	Boeing Standard
BACC66()	1	42	Metal	S280W601-101
		48	Metal	S280W601-106
			Plastic	S280W601-301
		2	48	Metal
	Plastic			S280W601-301
	62		Metal	S280W601-116
			Metal	S280W601-104
	92		Metal	S280W601-103
			Metal	S280W601-105
	3	48	Metal	S280W601-106
			Plastic	S280W601-301
		62	Metal	S280W601-116
			Metal	S280W601-104
		92	Metal	S280W601-103
			Metal	S280W601-105
	S280W551-()	1	16	Metal
Plastic				S280W601-213
32			Metal	S280W601-201
2		16	Metal	S280W601-203
			Plastic	S280W601-213
		32	Metal	S280W601-201
		100	Metal	S280W601-202
3		16	Metal	S280W601-203
			Plastic	S280W601-213
		32	Metal	S280W601-201

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NOTE: The S280W601-301 ground block has an integral S280W555 track which is used to mount S280W555 terminal blocks. Refer to:

- Figure 28 for the S280W601-301 ground block
- Subject 20-90-15 for the assembly of S280W555 terminal blocks.

**Table 59
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTOR GROUND BLOCKS**

Boeing Standard	Approved Supplier
S280W601-101	Souriau
S280W601-103	Souriau
S280W601-104	Souriau
S280W601-105	Souriau
S280W601-106	Souriau
S280W601-116	Souriau
S280W601-201	Tri-Star
S280W601-202	Souriau
	Tri-Star
S280W601-203	Souriau
S280W601-213	Souriau
S280W601-301	Souriau

**Table 60
OBSOLETE CONNECTOR GROUND BLOCKS**

Obsolete Ground Block		Replacement Ground Block	
Part Number	Supplier	Part Number	Supplier
S280W601-101	Cory Components	S280W601-116	Souriau
	Tri-Star	S280W601-116	Souriau
S280W601-103	Cory Components	S280W601-116	Souriau
	Tri-Star	S280W601-116	Souriau
S280W601-104	Cory Components	S280W601-116	Souriau
	Tri-Star	S280W601-116	Souriau
S280W601-105	Cory Components	S280W601-116	Souriau
	Tri-Star	S280W601-116	Souriau
S280W601-106	Cory Components	S280W601-116	Souriau
	Tri-Star	S280W601-116	Souriau
S280W601-201	Cory Components	S280W601-201	Tri-Star

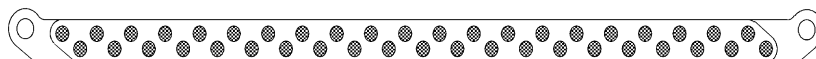
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Table 60 (continued)

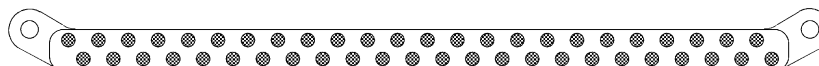
Obsolete Ground Block		Replacement Ground Block	
Part Number	Supplier	Part Number	Supplier
S280W601-202	Cory Components	S280W601-202	Souriau
			Tri-Star
S280W601-203	Cory Components	S280W601-213	Souriau
	Tri-Star	S280W601-213	Souriau

B. Ground Blocks for BACC66() Connectors



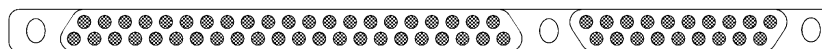
42 Contact Cavities

S280W601-101 GROUND BLOCK
Figure 23



48 Contact Cavities

S280W601-106 AND S280W601-116 GROUND BLOCK
Figure 24

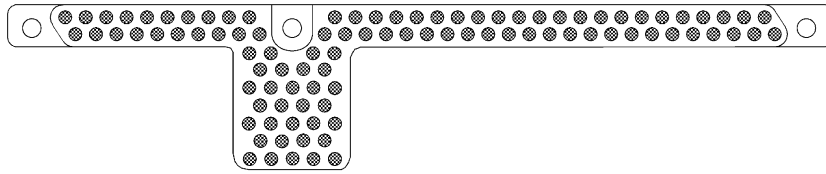


62 Contact Cavities

S280W601-104 GROUND BLOCK
Figure 25

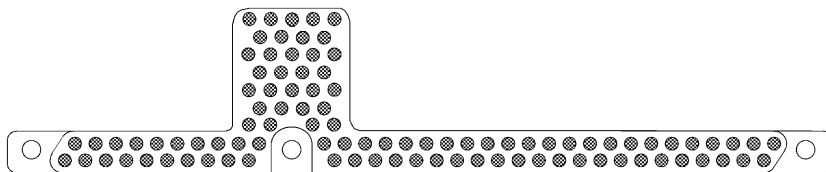
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



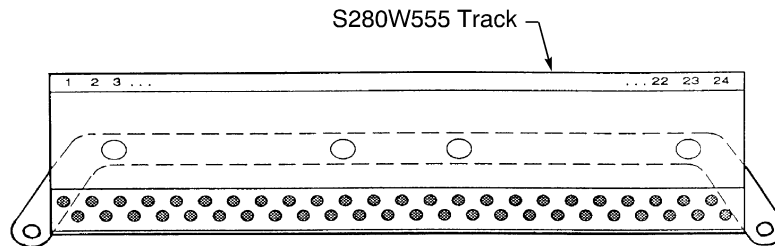
92 Contact Cavities
Left Side

S280W601-103 LEFT SIDE GROUND BLOCK
Figure 26



92 Contact Cavities
Right Side

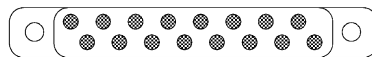
S280W601-105 RIGHT SIDE GROUND BLOCK
Figure 27



48 Contact Cavities

S280W601-301 GROUND BLOCK
Figure 28

C. Ground Blocks for S280W551(-) Connectors



16 Contact Cavities

S280W601-203 AND S280W601-213 GROUND BLOCK
Figure 29

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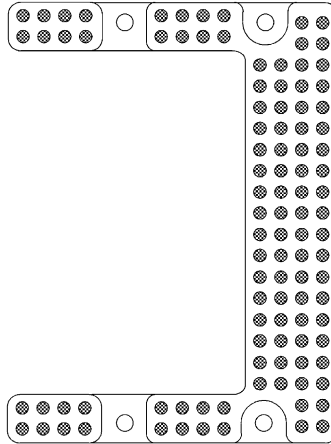
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



32 Contact Cavities

S280W601-201 GROUND BLOCK

Figure 30



92 Contact Cavities

S280W601-202 GROUND BLOCK

Figure 31

D. Backshell Part Numbers

**Table 61
BACKSHELL PART NUMBERS**

Connector	Backshell		Assembly Procedure
	Part Number	Supplier	
ARINC 600 Plug, Shell Size 1	527-187()	Glenair	Paragraph 17.B.
ARINC 600 Plug, Shell Size 2	527-212()	Glenair	Paragraph 17.C.
S280W551-407	046-1000-000	ITT Cannon	Paragraph 17.A.

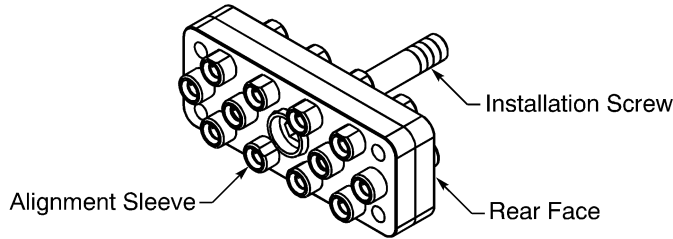
E. Fiber Optic Alignment Sleeve Insert Part Numbers

**Table 62
ALIGNMENT SLEEVE INSERT PART NUMBERS**

Boeing Standard	Configuration
BACI10AU12R	Rectangular

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ALIGNMENT SLEEVE INSERT
Figure 32

Table 63
APPROVED SUPPLIERS OF BOEING STANDARD ALIGNMENT SLEEVE INSERTS

Boeing Standard	Supplier
BACI10AU12R	Radiall
	Jerrik

5. PROTECTIVE CAP PART NUMBERS AND DESCRIPTION

A. General Data

Protective caps are used on ARINC 600 and S280W551 connectors:

- To keep contamination off the contacts
- To prevent damage that can be caused by electrostatic discharge (ESD)
- To prevent mechanical damage.

B. Protective Caps for ARINC 600 Class A, Class B, and Class C Plug Connectors

Table 64
PROTECTIVE CAP PART NUMBERS

Connector		Protective Cap	
Shell Size	Insert Cavity	Part Number	Supplier
1	A	025-1121-001	ITT Cannon
		211600-1	AMP
		240-92-702	Radiall
	B	025-1121-001	ITT Cannon
		211600-1	AMP
		240-92-702	Radiall
	C	025-1122-001	ITT Cannon
		211600-1	AMP
		240-92-703	Radiall

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Table 64 (continued)

Connector		Protective Cap	
Shell Size	Insert Cavity	Part Number	Supplier
2	A	025-1123-001	ITT Cannon
		211600-2	AMP
		240-92-707	Radiall
	B	025-1123-001	ITT Cannon
		211600-2	AMP
		240-92-707	Radiall
	C	025-1124-001	ITT Cannon
		211600-2	AMP
		240-92-706	Radiall
3	A	025-1123-001	ITT Cannon
		211600-2	AMP
		240-92-707	Radiall
	B	025-1123-001	ITT Cannon
		211600-2	AMP
		240-92-707	Radiall
	C	025-1124-001	ITT Cannon
		211600-2	AMP
		240-92-706	Radiall

C. Protective Caps for ARINC 600 and S280W551 Class D and Class E Plug Connectors

NOTE: These protective caps also give the necessary mechanical protection for the ground springs on the shell.

**Table 65
PROTECTIVE CAP PART NUMBERS**

Connector	Shell Size	Protective Cap	
		Part Number	Supplier
BACC66()D()	1	025-1218-001	ITT Cannon
	2	025-1218-000	ITT Cannon
	3		
BACC66()E()	1	025-1218-001	ITT Cannon
	2	025-1218-000	ITT Cannon
	3		

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 65 (continued)

Connector	Shell Size	Protective Cap	
		Part Number	Supplier
S280W551-()	1	025-1183-000	ITT Cannon

6. INSERT CONFIGURATIONS

A. ARINC 600 Type Connectors

NOTE: The contacts shown in Table 66 are for plug connectors.

**Table 66
BACI10AH INSERT CONFIGURATIONS**

BACI10AH Insert	Contact Cavity				Reference
	Count	Size	Applicable Contacts	Notes	
01	60	22	BACC47EF1 Pin	-	Figure 33
02	150	22	BACC47EF1 Pin	-	Figure 34
03	1	12	BACC47EG4 Socket, Coax Socket, or Shielded Socket	-	Figure 35
	2	16	BACC47EG3 Socket	-	
	2	5	Coax Socket, or Cavity Reducer	-	
04	4	12	BACC47EG4 Socket, Coax Socket, or Shielded Socket	-	Figure 36
	3	16	BACC47EG3 Socket	-	
	4	20HD	BACC47EG2 Socket	-	
	2	5	Coax Socket, or Cavity Reducer	-	
05	70	22	BACC47EF1 Pin	-	Figure 37
	1	1	BACC47EN4 TNC Adapter with Mounting Block, or Coax Socket Contact with Mounting Block	-	
06	-	-	Wave Guide	-	Figure 38
07	100	22	BACC47EF1 Pin	-	Figure 39
08	1	1	BACC47EN4 TNC Adapter with Mounting Block, or Coax Socket Contact with Mounting Block	-	Figure 40
	70	22	BACC47EF1 Pin	-	
09	2	1	BACC47EN4 TNC Adapter with Mounting Block, or Coax Socket Contact with Mounting Block	-	Figure 41

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 66 (continued)

BAC10AH Insert	Contact Cavity				Reference
	Count	Size	Applicable Contacts	Notes	
10	1	16	BACC47EG3 Socket	-	Figure 42
	4	20HD	BACC47EG2 Socket	-	
	80	22	BACC47EF1 Pin	-	
11	4	1	BACA19BK1 TNC Adapter or ITT Cannon Outer Coax Body for ITT Cannon Coax Termination Kit	-	Figure 43
12	10	8	Coax, Twinax, or S280W553-4 Ground Socket	Cavities are grounded to the connector shell	Figure 44
13	6	8	Coax, Twinax, or S280W553-4 Ground Socket	Cavities are grounded to the connector shell	Figure 45
14	2	8	Coax, Twinax, or S280W553-4 Ground Socket	Cavities are grounded to the connector shell	Figure 46
	118	22	BACC47EF1 Pin	-	
15	5	16	BACC47EG3 Socket	-	Figure 47
	6	20HD	BACC47EG2 Socket	-	
	110	22	BACC47EF1 Pin	-	
16	10	16	BACC47EG3 Socket	-	Figure 48
	24	20HD	BACC47EG2 Socket	-	
17	60	20HD	BACC47EG2 Socket	-	Figure 49
18	6	8	S280W553-2 Power Socket	-	Figure 50
19	40	22	BACC47EF1 Pin	-	Figure 51
20	2	8	Coax, Twinax, or S280W553-4 Ground Socket	Cavities are grounded to the connector shell	Figure 52
	28	22	BACC47EF1 Pin	-	
21	4	12	BACC47EG4 Socket, Coax Socket, or Shielded Socket	-	Figure 53
22	4	12	BACC47EG4 Socket, Coax Socket, or Shielded Socket	-	Figure 54
	5	16	BACC47EG3 Socket	-	
	50	22	BACC47EF1 Pin	-	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 66 (continued)

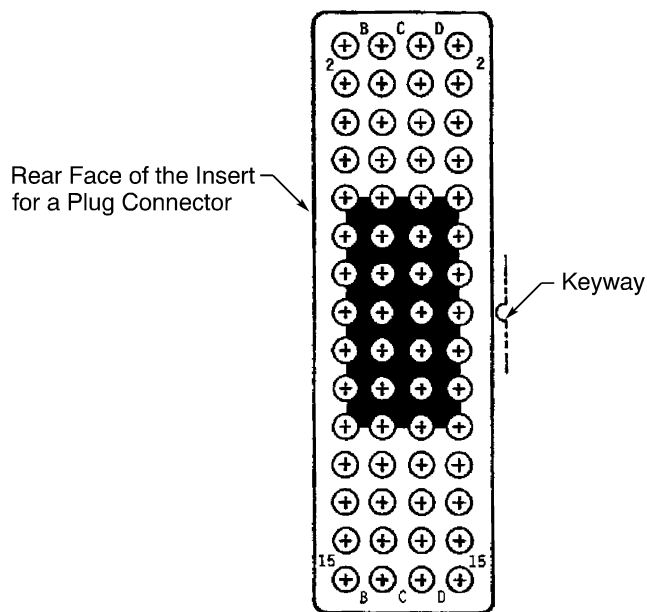
BAC10AH Insert	Contact Cavity				Reference
	Count	Size	Applicable Contacts	Notes	
23	5	12	BACC47EG4 Socket, Coax Socket, or Shielded Socket	-	Figure 55
	5	20HD	BACC47EG2 Socket	-	
	100	22	BACC47EF1 Pin	-	
24	4	8	Coax, Twinax, or S280W553-4 Ground Socket	-	Figure 56
	20	20HD	BACC47EG2 Socket	-	
25	2	1	BACC47EN4 TNC Adapter with Mounting Block, or Coax Socket Contact with Mounting Block	-	Figure 57
26	4	20HD	BACC47EG2 Socket	-	Figure 58
	80	22	BACC47EF1 Pin	-	
27	4	5	Coax Socket, or Cavity Reducer	Cavities are grounded to the connector shell	Figure 59
28	8	12	BACC47EG4 Socket, Coax Socket, or Shielded Socket	-	Figure 60
	2	16	BACC47EG3 Socket	-	
29	24	12	BACC47EG4 Socket, Coax Socket, or Shielded Socket	-	Figure 61
30	12	16	Fiber Optic Terminus - (Not Keyed)	-	Figure 62
	8	8	Coax, Twinax, or S280W553-4 Ground Socket	Cavities are grounded to the connector shell	
31	12	16	Fiber Optic Terminus - (Keyed)	-	Figure 63
	8	8	Coax, Twinax, or S280W553-4 Ground Socket	Cavities are grounded to the connector shell	
32	11	8	BACC47GB1 Quadrax Socket	Cavities are grounded to the connector shell	Figure 64
33	2	8	BACC47GB1 Quadrax Socket	-	Figure 65
	3	16	BACC47EG3 Socket	-	
	12	16	Fiber Optic Terminus - (Keyed)	-	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 66 (continued)

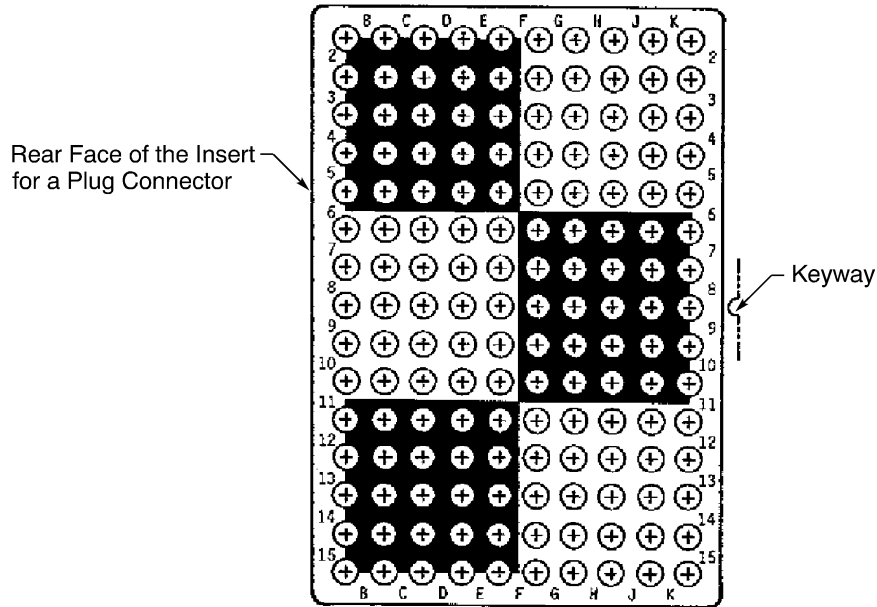
BAC10AH Insert	Contact Cavity			Reference
	Count	Size	Applicable Contacts	
34	2	8	BACC47GB1 Quadrax Socket	-
	4	12	BACC47EG4 Socket, Coax Socket, or Shielded Socket	-
	3	16	BACC47EG3 Socket	-
	4	20HD	BACC47EG2 Socket	-



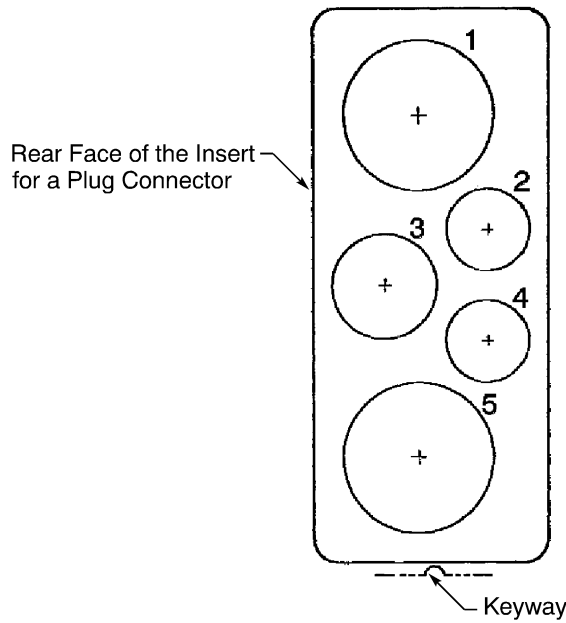
BAC10AH INSERT 01
Figure 33

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



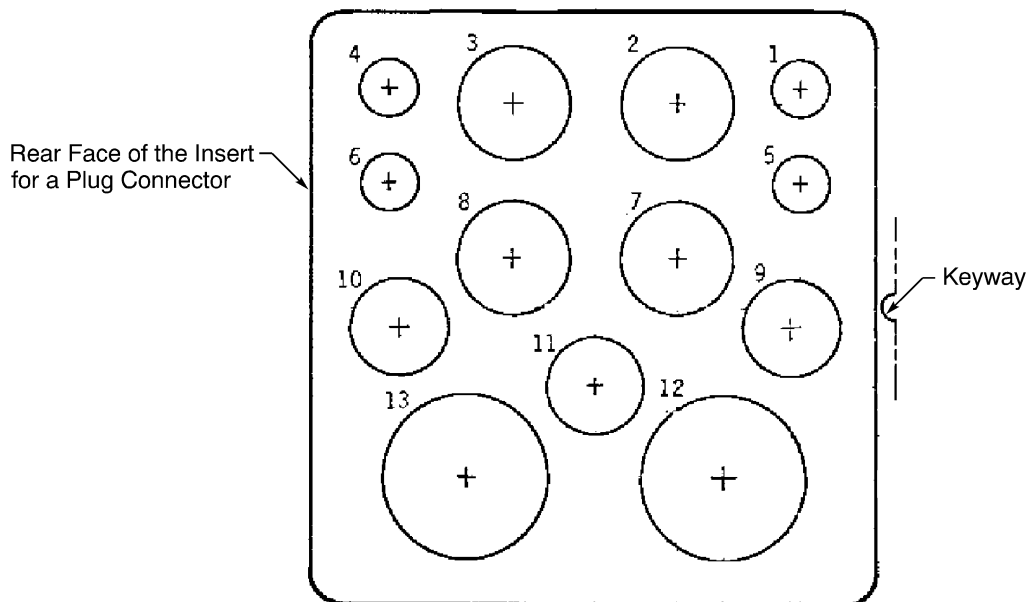
BACI10AH INSERT 02
Figure 34



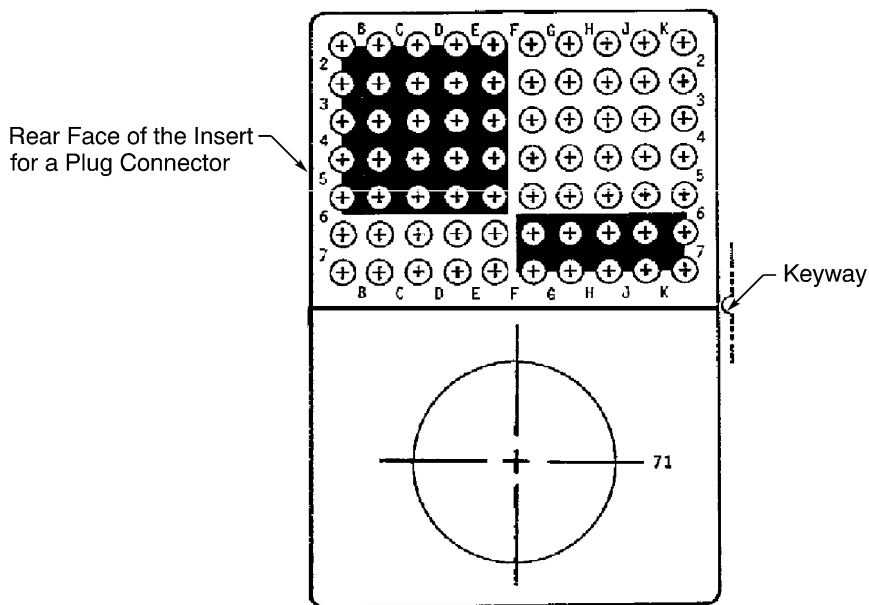
BACI10AH INSERT 03
Figure 35

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



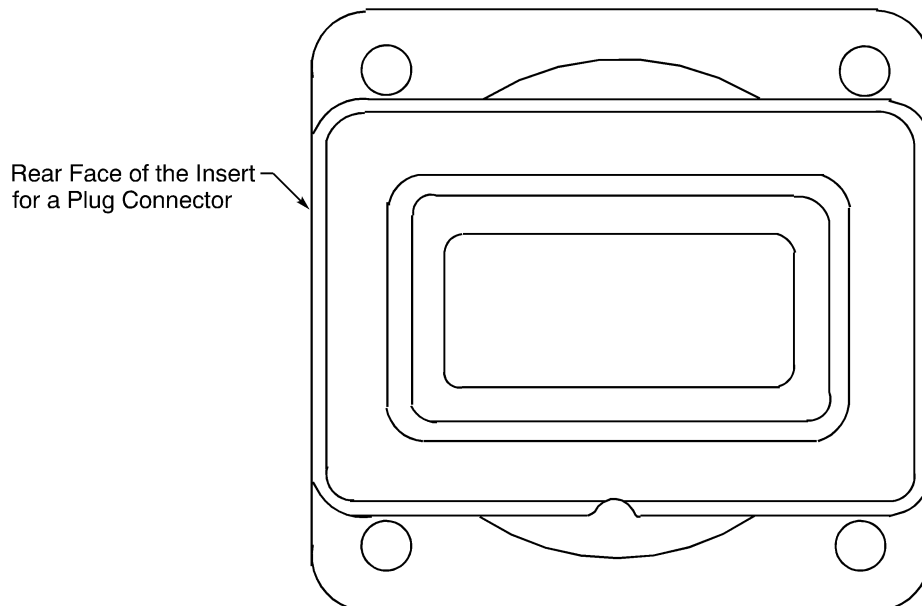
BACI10AH INSERT 04
Figure 36



BACI10AH INSERT 05
Figure 37

STANDARD WIRING PRACTICES MANUAL

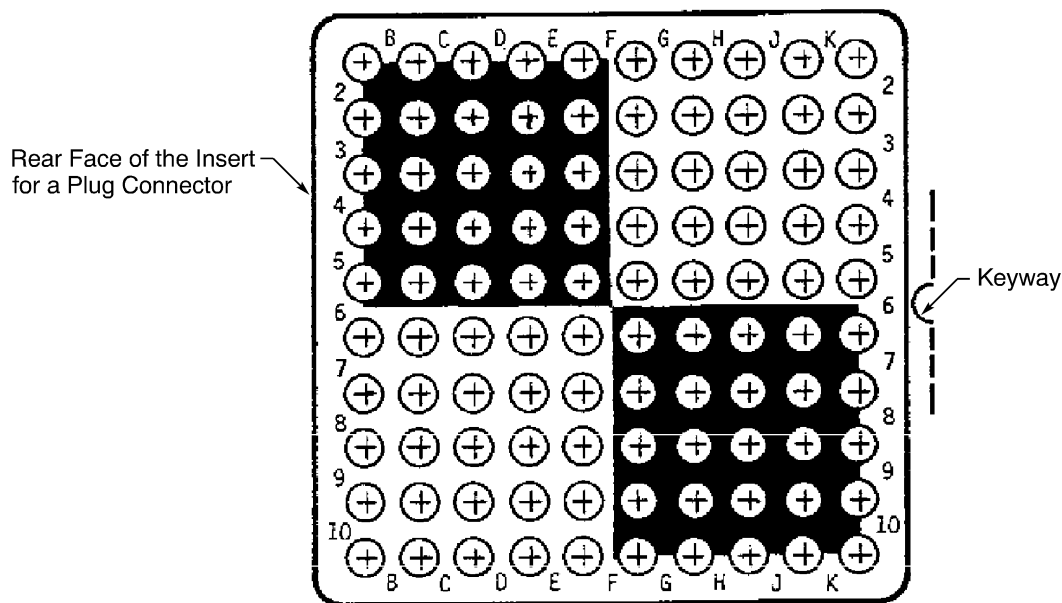
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



Rear Face of the Insert
for a Plug Connector

BACH10AH INSERT 06

Figure 38



Rear Face of the Insert
for a Plug Connector

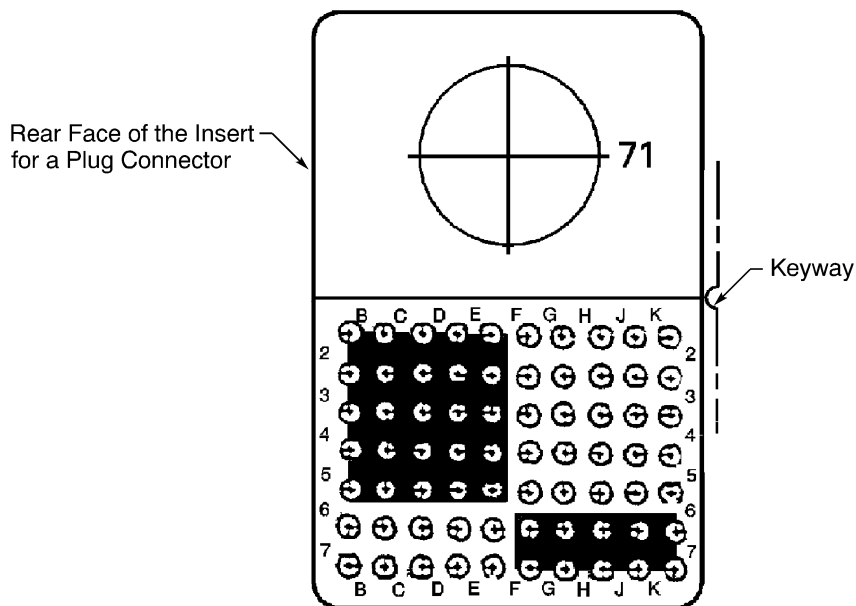
Keyway

BACH10AH INSERT 07

Figure 39

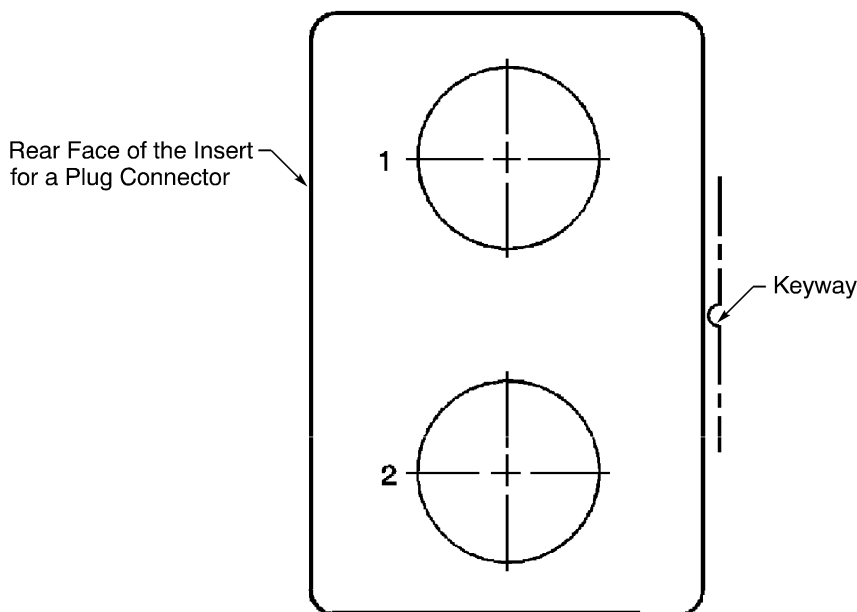
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



BACH10AH INSERT 08

Figure 40

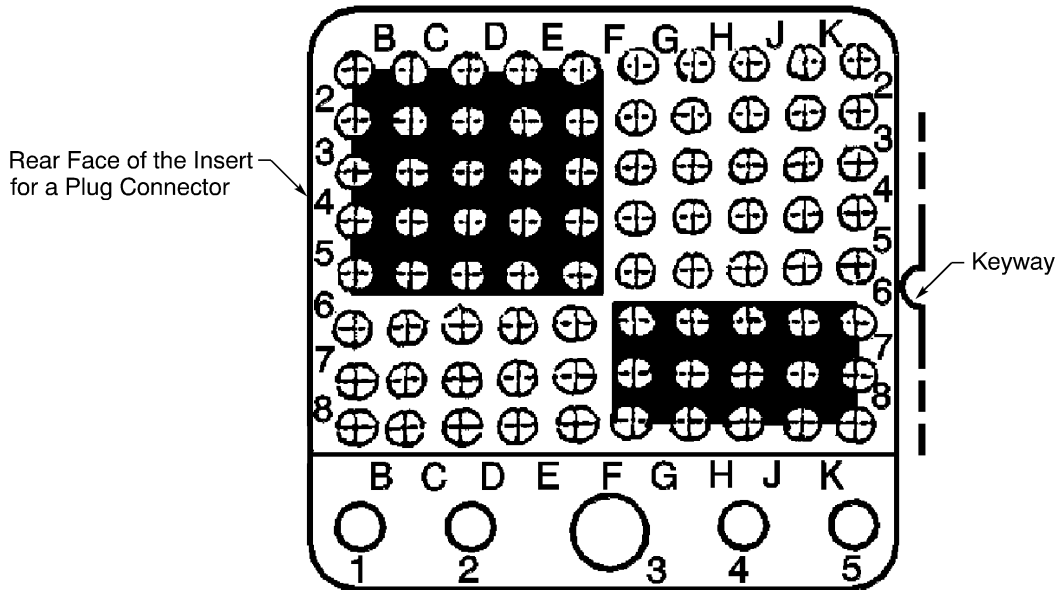


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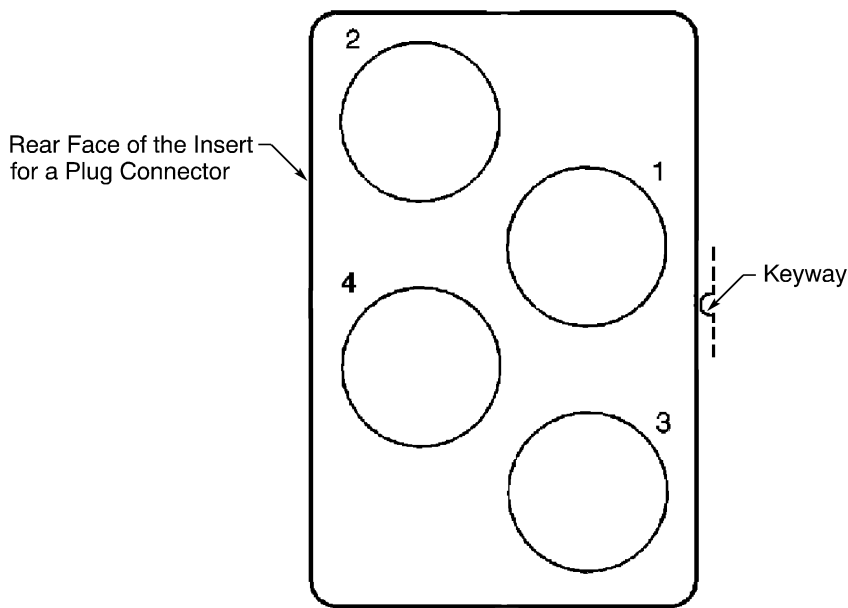
Figure 41

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



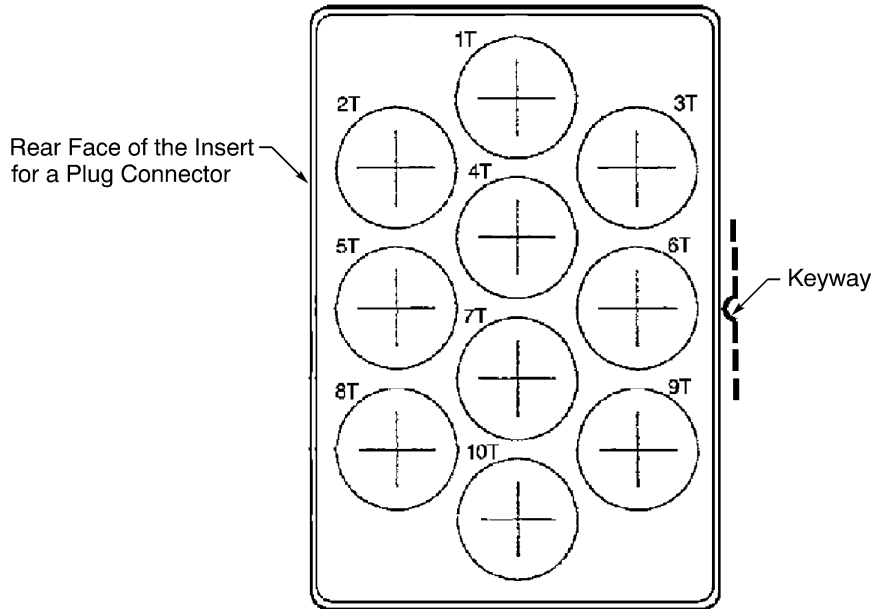
BACH10AH INSERT 10
Figure 42



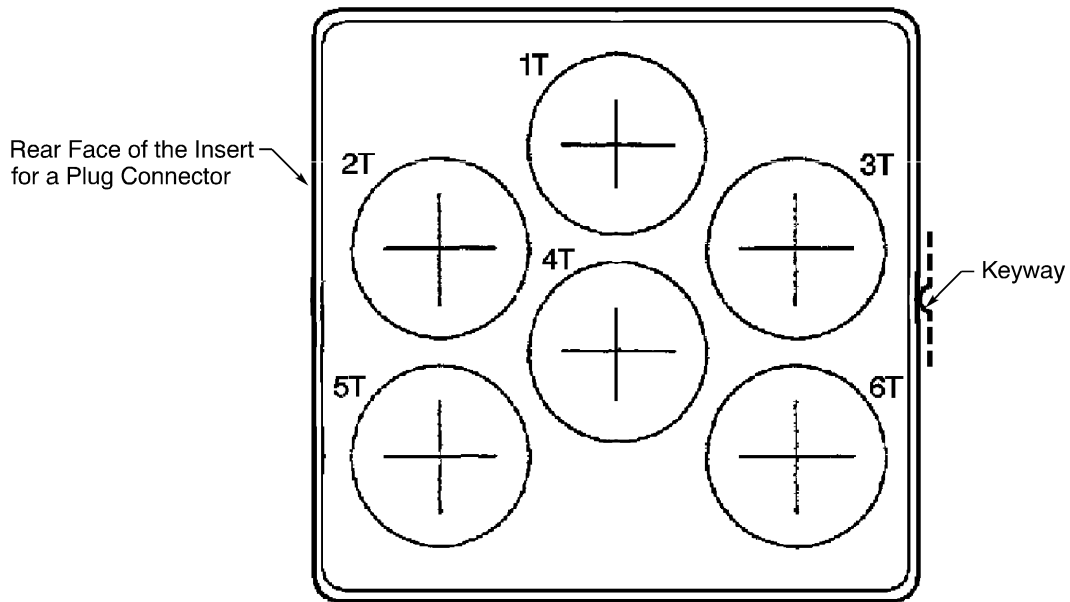
BACH10AH INSERT 11
Figure 43

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



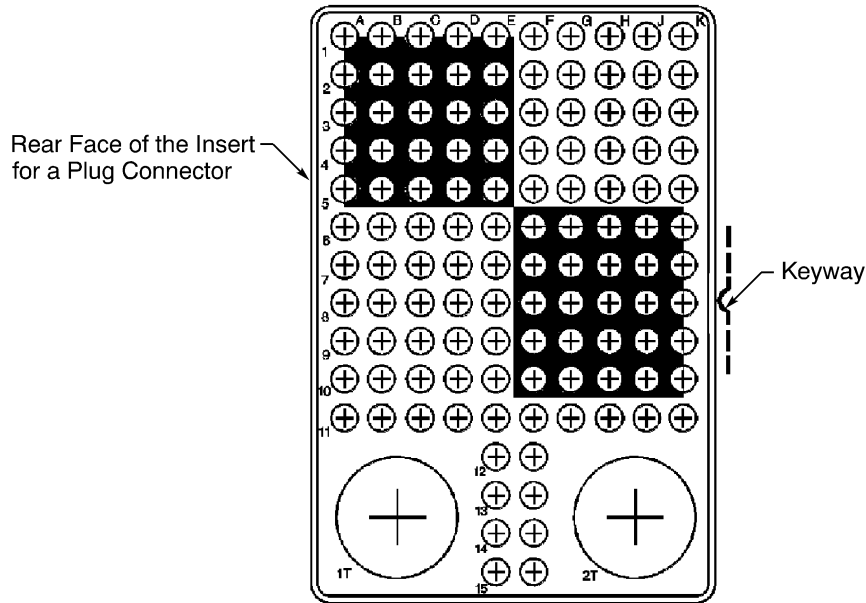
BACI10AH INSERT 12
Figure 44



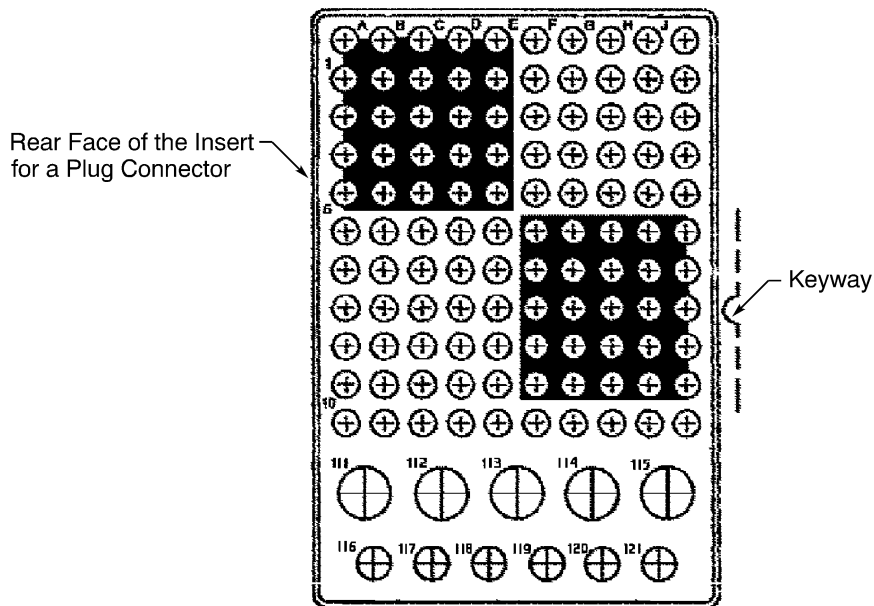
BACI10AH INSERT 13
Figure 45

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



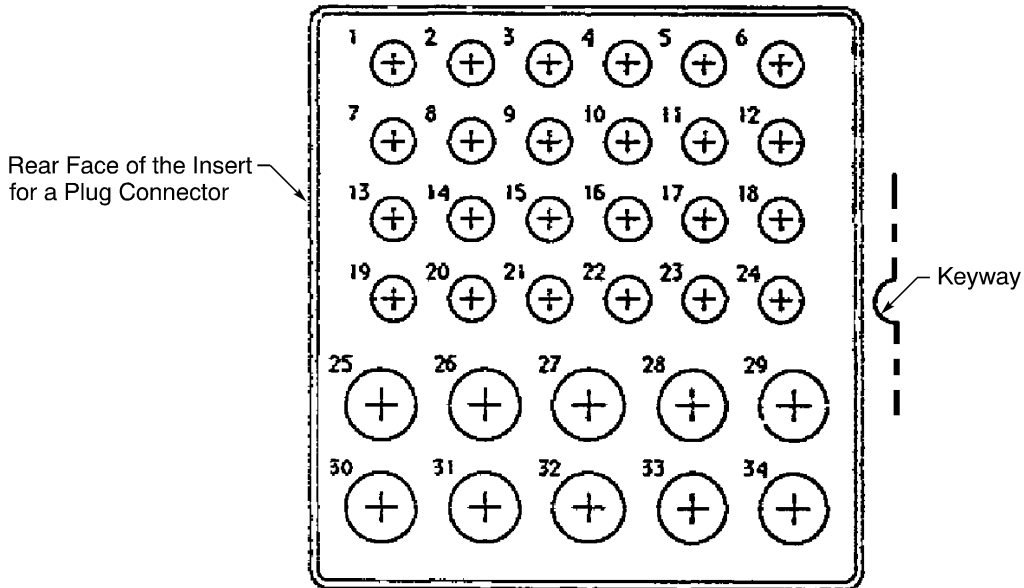
BACH10AH INSERT 14
Figure 46



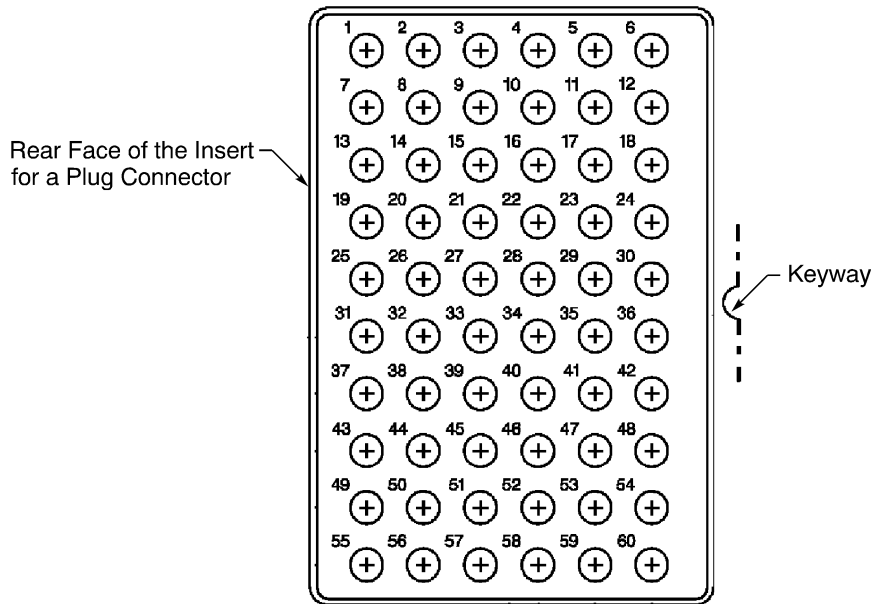
BACH10AH INSERT 15
Figure 47

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



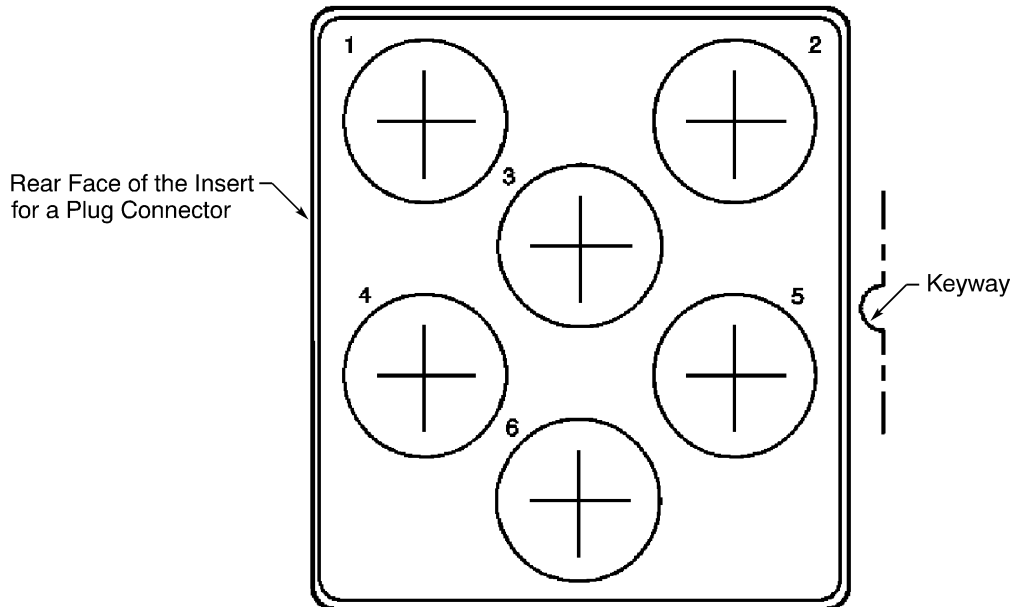
BAC10AH INSERT 16
Figure 48



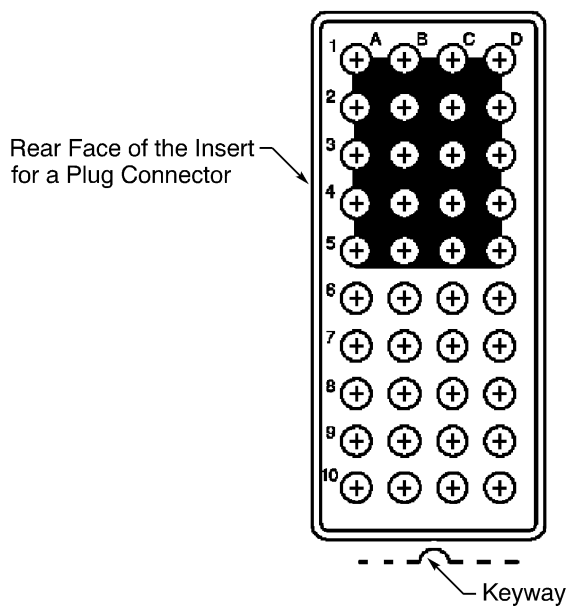
BAC10AH INSERT 17
Figure 49

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



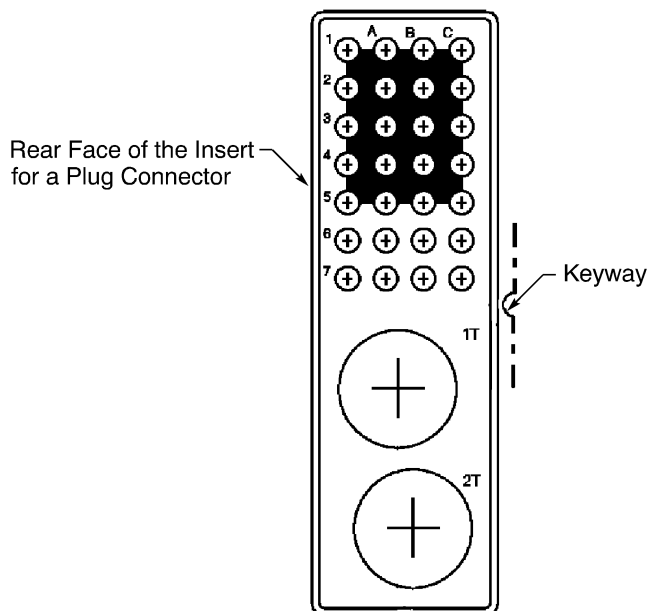
BACI10AH INSERT 18
Figure 50



BACI10AH INSERT 19
Figure 51

STANDARD WIRING PRACTICES MANUAL

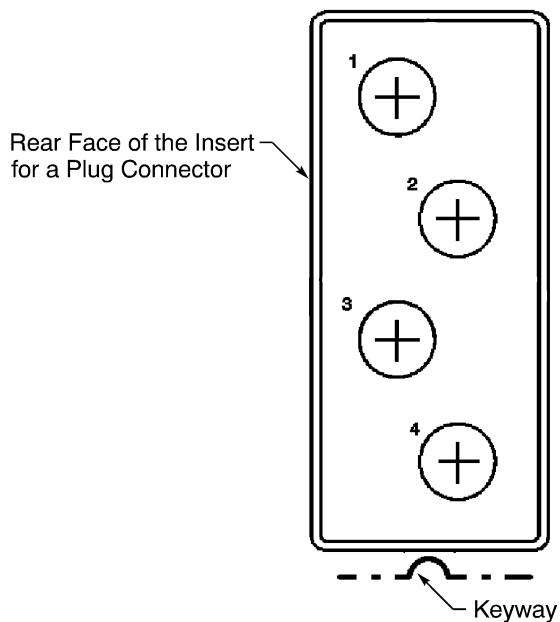
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



Rear Face of the Insert
for a Plug Connector

Keyway

BACI10AH INSERT 20
Figure 52



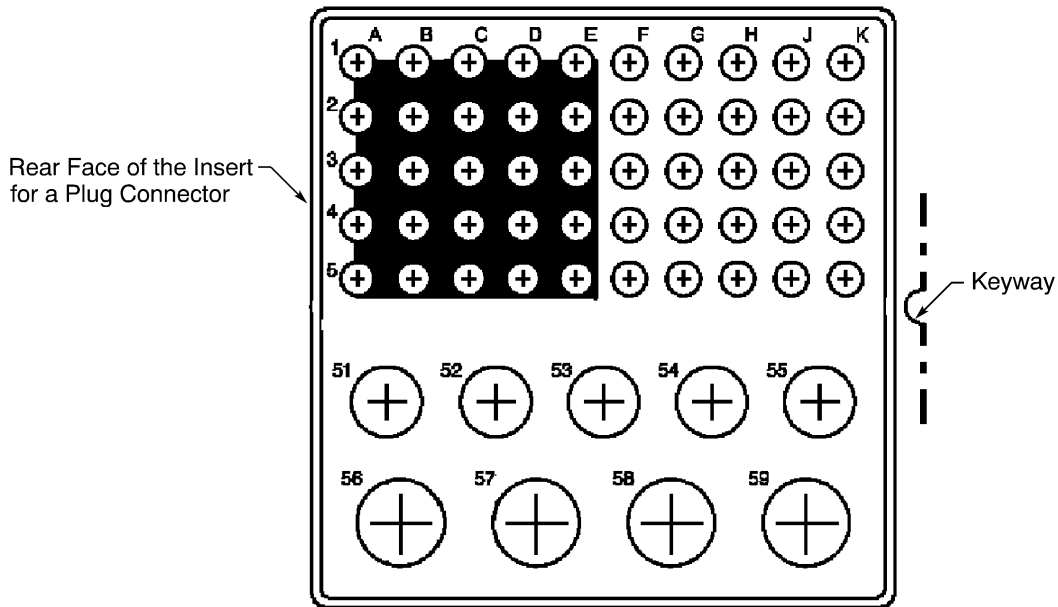
Rear Face of the Insert
for a Plug Connector

Keyway

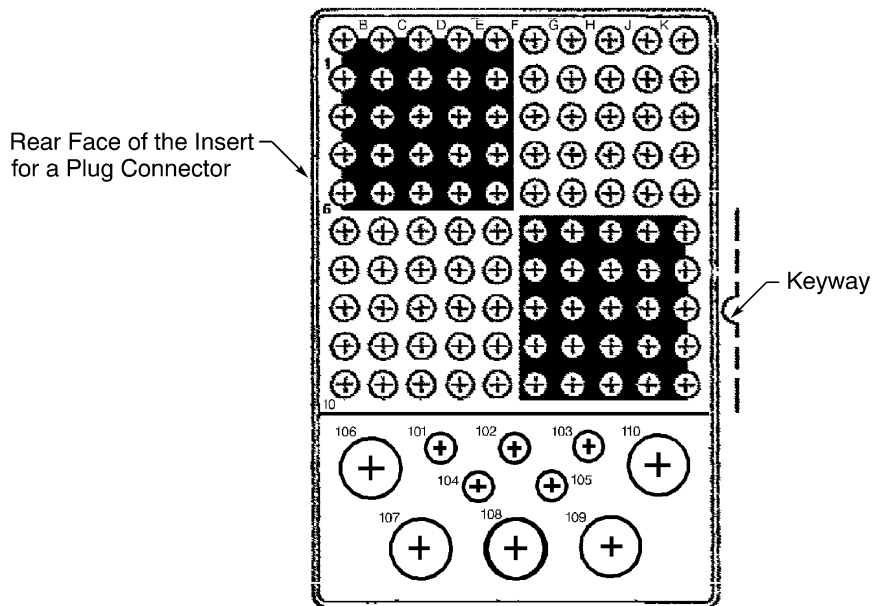
BACI10AH INSERT 21
Figure 53

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



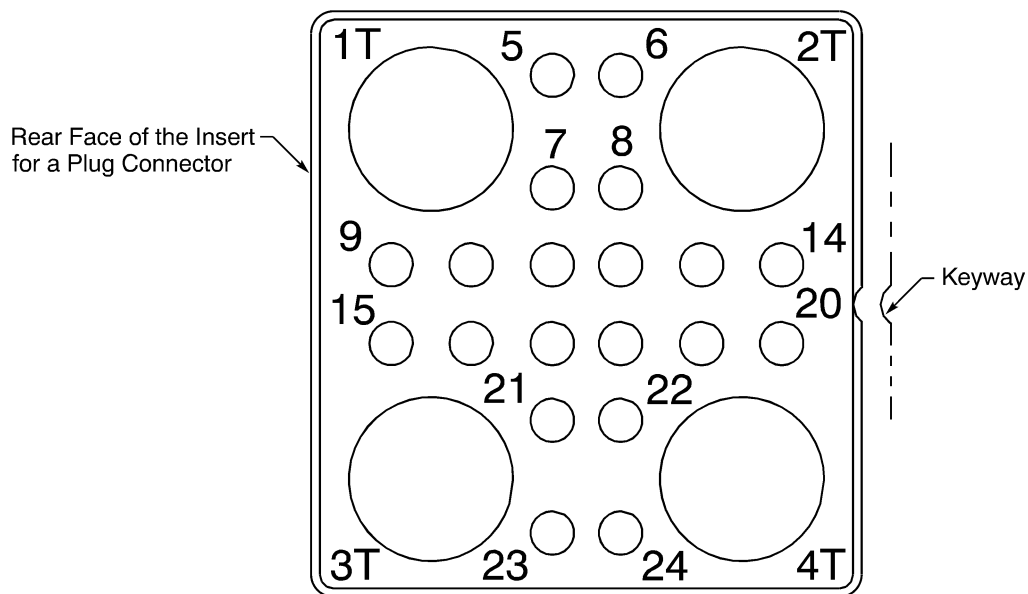
BACH10AH INSERT 22
Figure 54



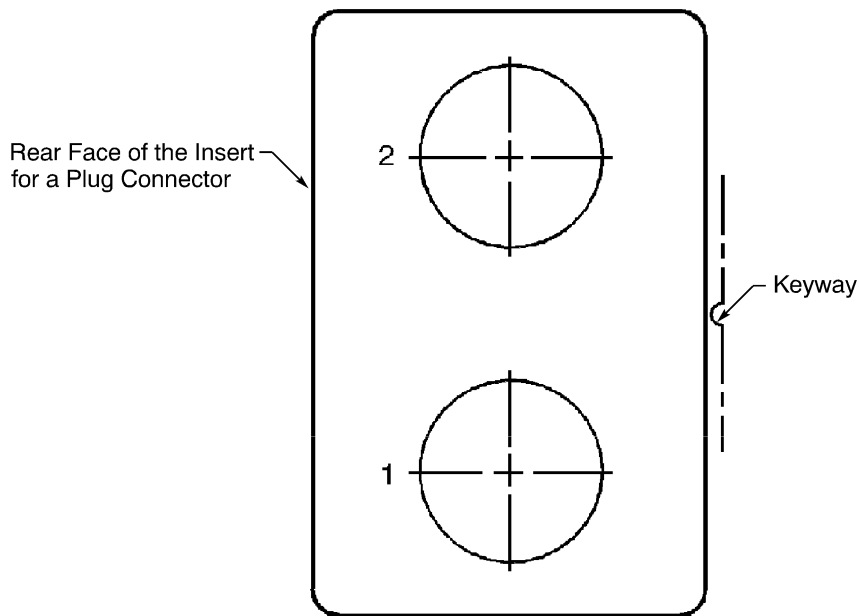
BACH10AH INSERT 23
Figure 55

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



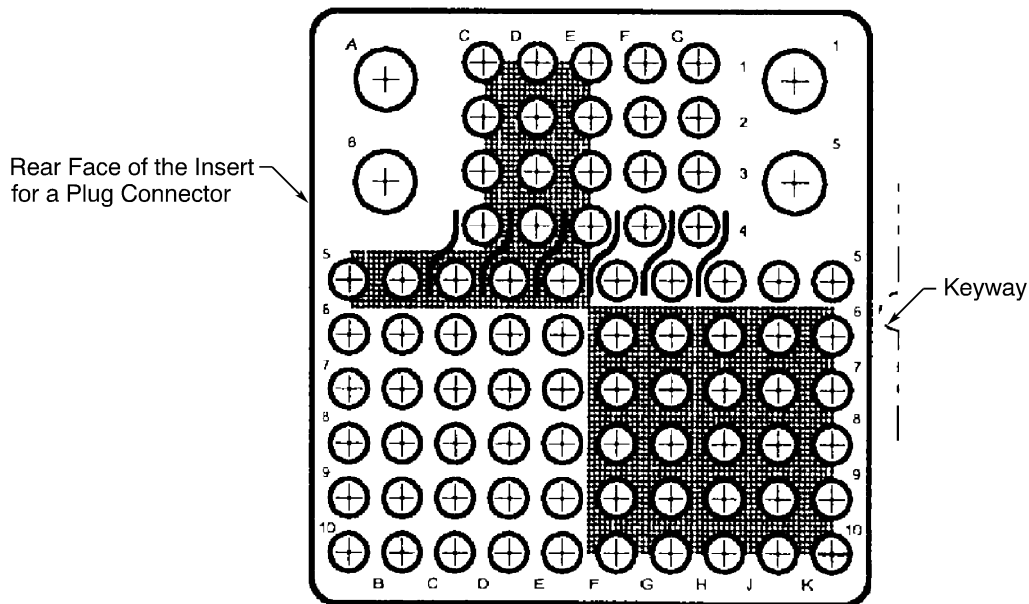
BAC10AH INSERT 24
Figure 56



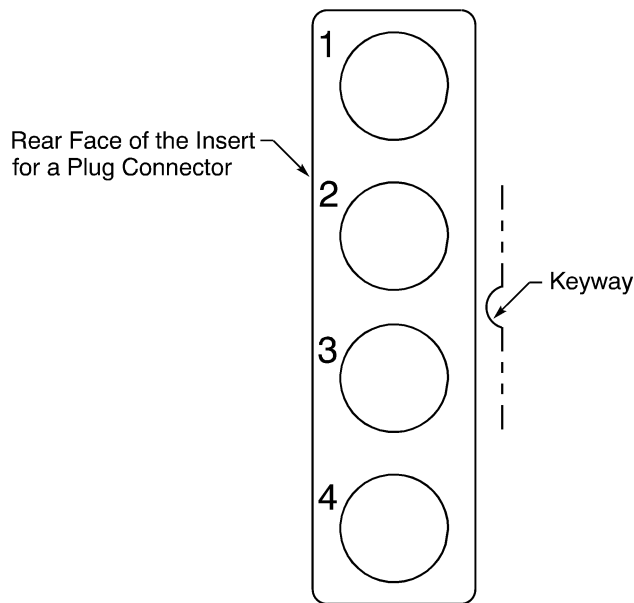
BAC10AH INSERT 25
Figure 57

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



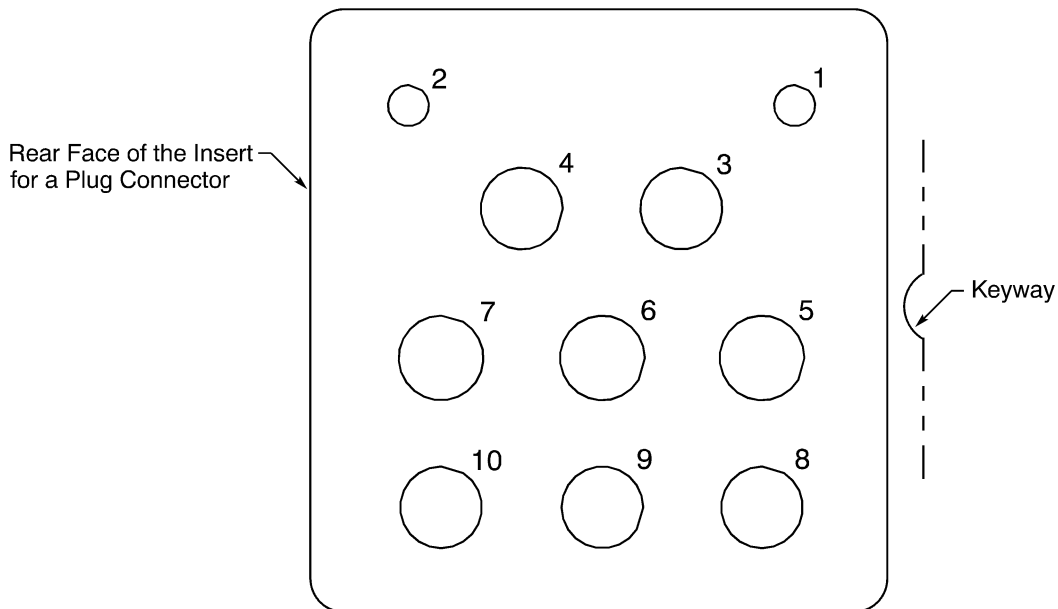
BACH10AH INSERT 26
Figure 58



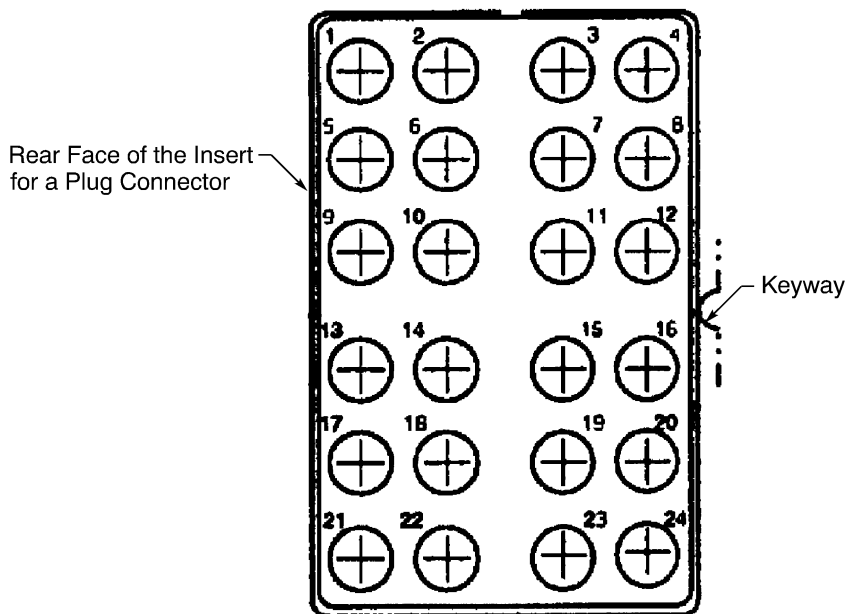
BACH10AH INSERT 27
Figure 59

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



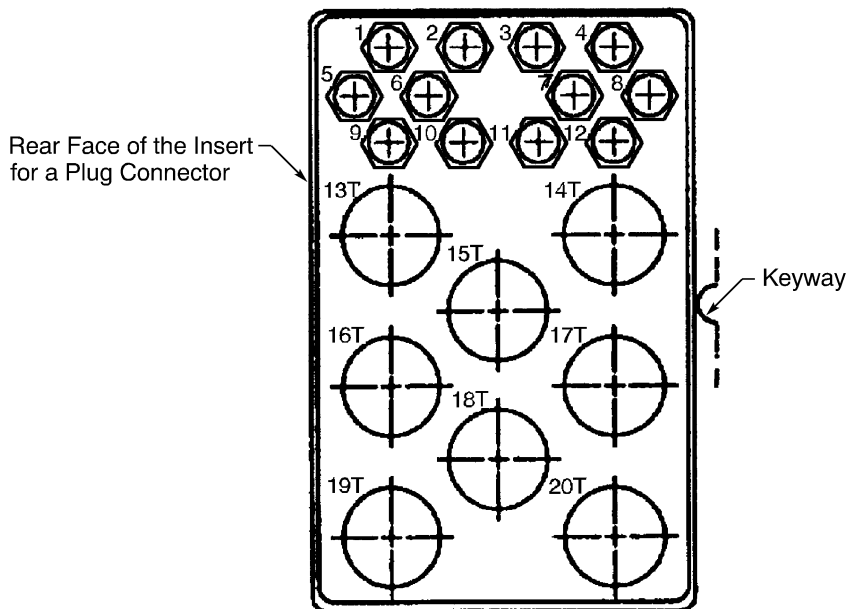
BACH10AH INSERT 28
Figure 60



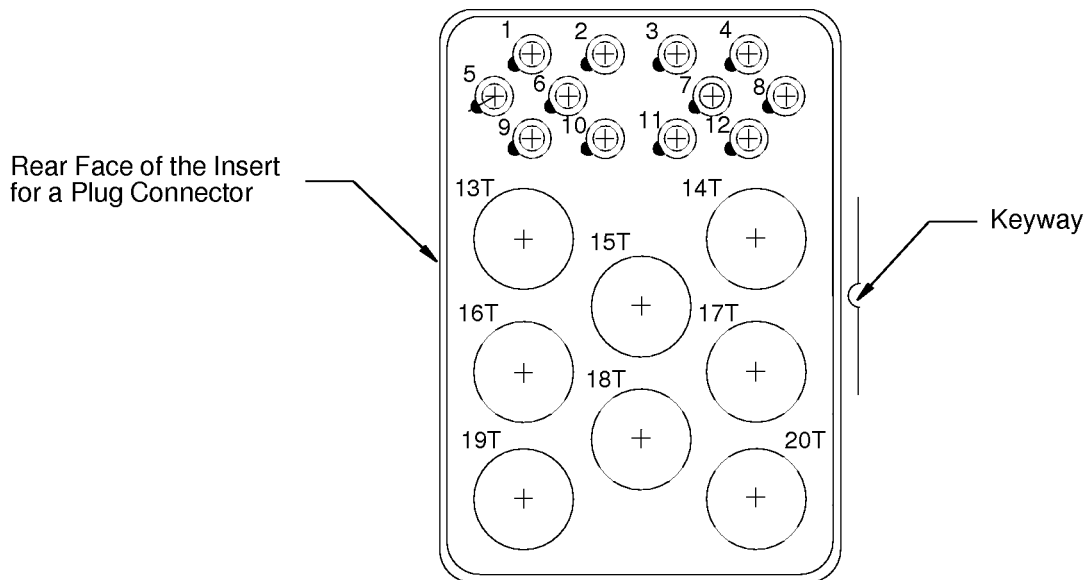
BACH10AH INSERT 29
Figure 61

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



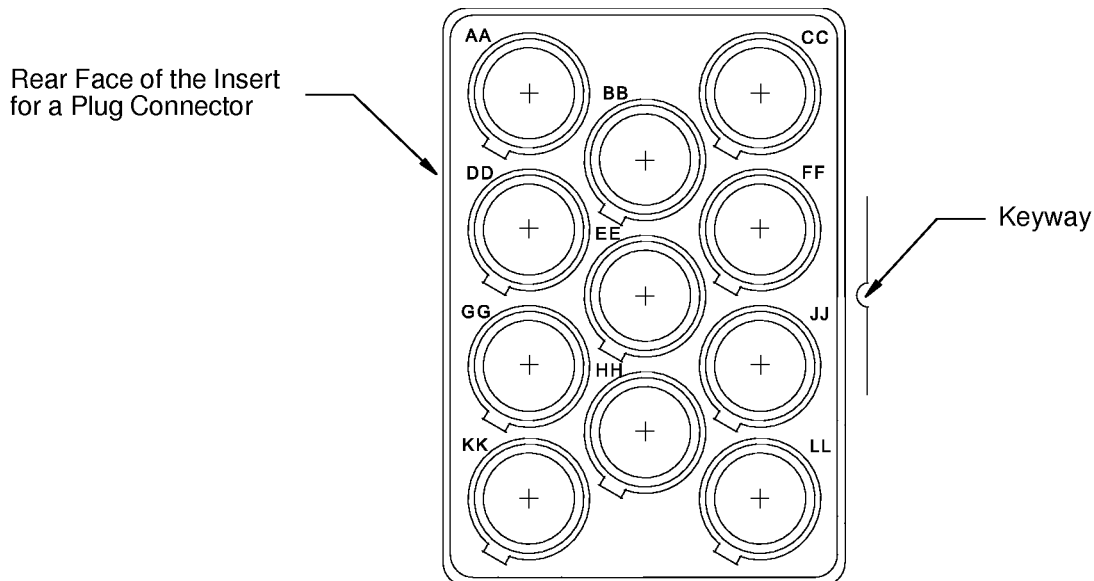
BAC10AH INSERT 30
Figure 62



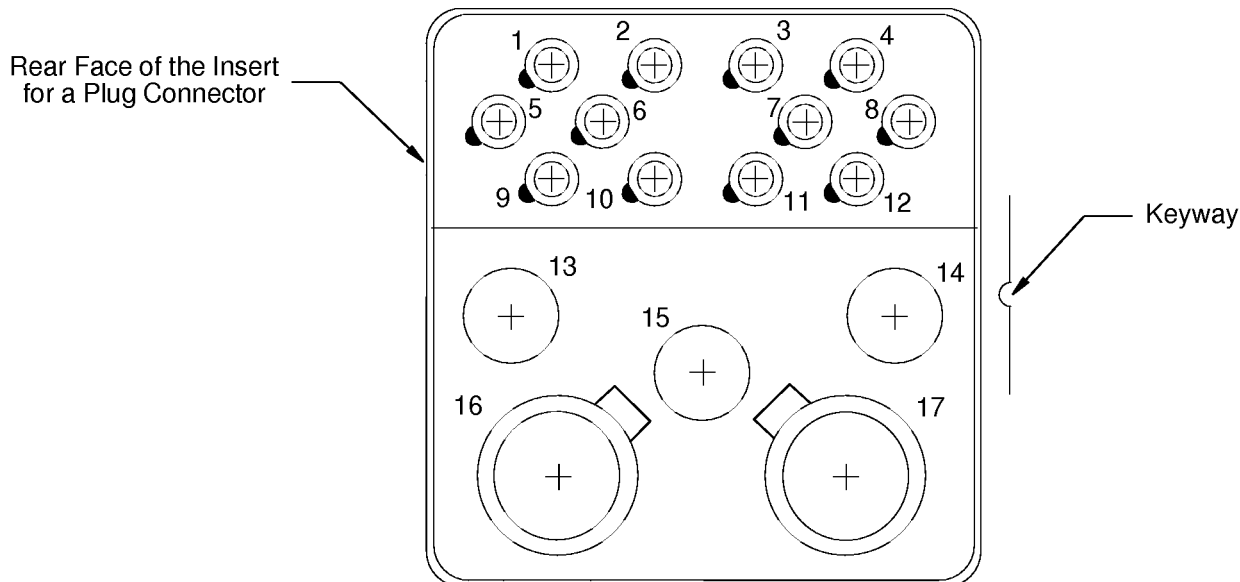
BAC10AH INSERT 31
Figure 63

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



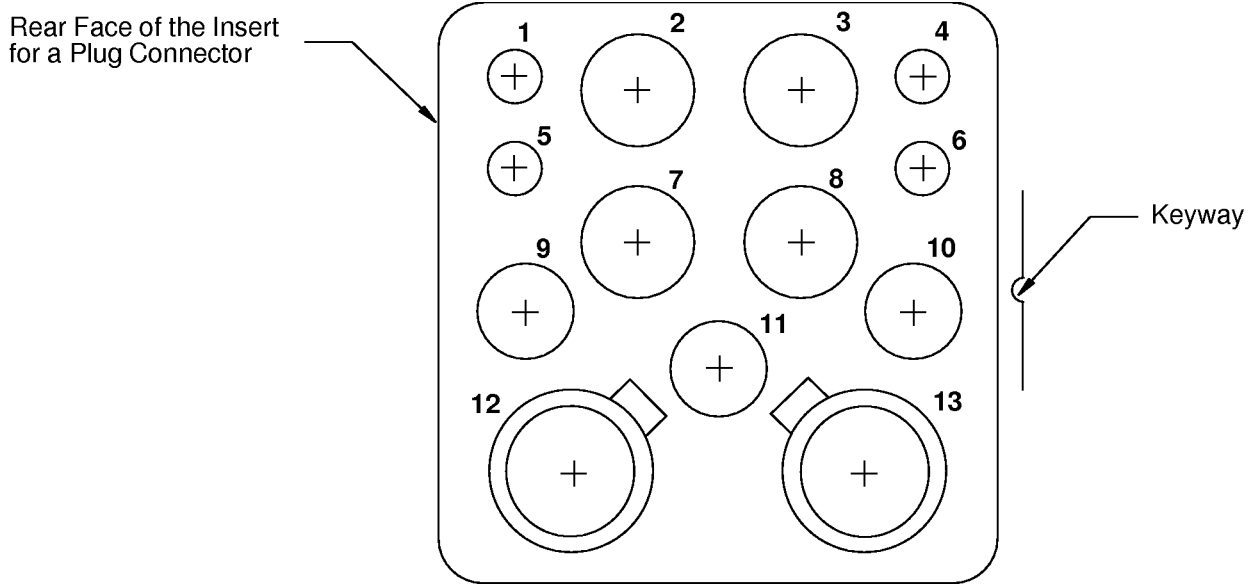
BAC10AH INSERT 32
Figure 64



BAC10AH INSERT 33
Figure 65

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



BACI10AH INSERT 34
Figure 66

7. CONNECTOR DISASSEMBLY

A. Removal of Standard Contacts

This paragraph give the procedure to remove size 22, 20, 16 and 12 contacts. For the procedure to remove size 8 contacts, refer to Paragraph 7.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 67
CONTACT REMOVAL TOOLS FOR BOEING STANDARD CONTACTS**

Contact		Removal Tool		
Size	Part Number	Part Number	Size	Type
2222	BACC47EF1	282880	22	Rear Release
		282890		
		8660-162		
		91066-1		
		ATBO2054		
		ATC1054		
		CET-DPXMA-22		
		CIET-22		
		CIET-22DPXMA		
		DRK2663		
		DRK266J		
		M81969/1-01		
		MS3156-22		
2020HD	BACC47EG2	282881	20HD	Rear Release
		282891		
		91066-4		
		ATC2073		
		CET-20D-1		
		CIET		
		CIET-20 HDL		
		DRK145		
		M81969/1-02		
		M81969/14-10		
		MS3156-20		
		ST2220-3-33		

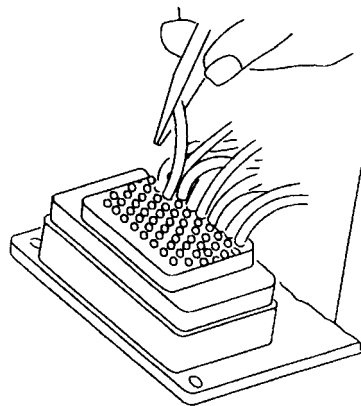
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 67 (continued)

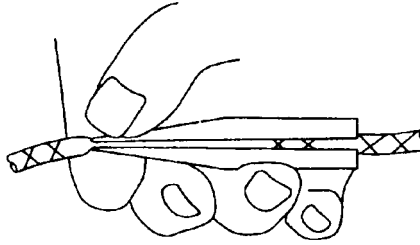
Contact		Removal Tool		
Size	Part Number	Part Number	Size	Type
1616	BACC47EG3	282892	16	Rear Release
		282929		
		91066-3		
		CET-16-15		
		CET-16-9		
		DRK83-16		
		M81969/1-03		
		MS3156-16		
		ST2220-3-7		
1212	BACC47EG4	282945	12	Rear Release
		91078-1		
		CE912-4		
		CET-12-4		
		CIET-12		
		M81969/28-02		
		MS3178-002		

- (1) Make a selection of a removal tool from Table 67.
- (2) At the rear of the connector, put the removal tool on the wire. Refer to Figure 67.

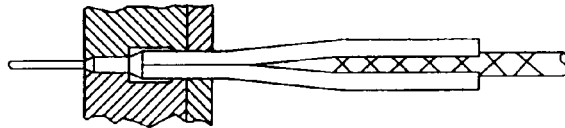


POSITION OF THE WIRE IN THE REMOVAL TOOL
Figure 67

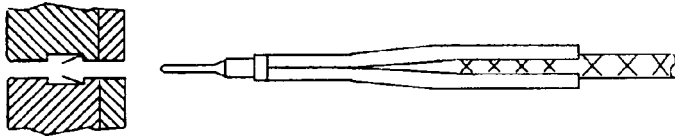
- (3) Put the wire through the forward part of the tool. Refer to Figure 68.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS****POSITION OF THE WIRE IN THE FORWARD PART OF THE REMOVAL TOOL****Figure 68**

- (4) Align the removal tool with the contact cavity.
- (5) Push the tool into the contact cavity until it stops. Refer to Figure 69.

**REMOVAL TOOL FULLY INSERTED IN THE CONTACT CAVITY****Figure 69**

- (6) Carefully pull the wire and the tool from the contact cavity at the same time. Refer to Figure 70.

**TOOL AND CONTACT REMOVED FROM THE CAVITY****Figure 70**

- (7) If the contact is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (3) through Step (6) again.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

B. Removal of Size 12 Coax and Size 12 Shielded Contacts

Table 68
SIZE 12 CONTACT REMOVAL TOOLS

Contact Cavity Size	Removal Tool	
	Part Number	Type
12	282945	Rear Release
	91078-1	
	CE912-4	
	CET-12-4	
	CIET-12	
	M81969/28-02	
	MS3178-002	

- (1) Make a selection of a removal tool from Table 68.
- (2) Remove the contact. Refer to Paragraph 7.C.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

C. Removal of Size 8 Power, Ground, Coax, Twinax and Quadrax Contacts

**Table 69
CONTACT REMOVAL TOOLS FOR SIZE 8 CONTACTS**

Contact			Removal Tool		
Size	Part Number	Type	Part Number	Size	Type
8	S280W552-105	Twinax	CET8-T	8	Rear Release
			M81969/28-03		
			RRX-04-C-1		
	S280W552-205	Twinax	CET8-T	8	Rear Release
			M81969/28-03		
			RRX-04-C-1		
	S280W553-2	Power	CET8-2	8	Rear Release
	S280W553-4	Ground	CET8-T	8	Rear Release
			M81969/28-03		
			RRX-04-C-1		
	S280W554-111	Coax	CET8-T	8	Rear Release
			M81969/28-03		
			RRX-04-C-1		
	S280W554-113	Coax	CET8-T	8	Rear Release
M81969/28-03					
RRX-04-C-1					
BACC47GB1	Quadrax	1738894-1	8	Rear Release	

**Table 70
LUBRICANTS**

Lubricant	Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

- (1) Make a selection of a removal tool from Table 69.
- (2) If there is a seal boot on the cable, pull the boot away from the insert to prevent interference with the removal tool..
- (3) At the rear of the connector, put the bit of the removal tool on the wire near the connector insert.
- (4) Align the bit of the removal tool with the contact cavity.
- (5) Push the tool into the contact cavity until it stops and the contact retention clip unlocks the contact.

NOTE: A lubricant can be used to make it easier to push the tool into the contact cavity. Refer to Table 70.

- (6) Carefully pull the tool and the wire from the contact cavity at the same time.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

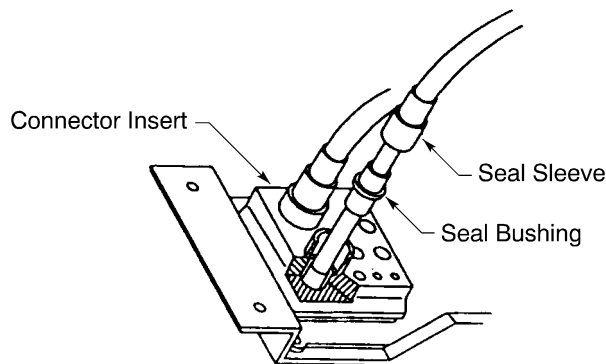
- (7) If the contact is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (3) through Step (6) again.
- (8) Push the seal boot forward on the contact to protect the contact from damage.

D. Removal of Size 5 Coax Contacts

**Table 71
CONTACT REMOVAL TOOLS FOR SIZE 5 COAX CONTACTS**

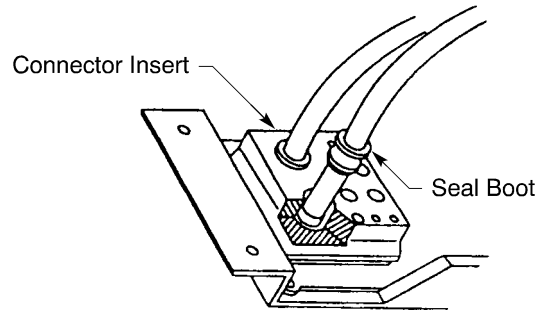
Contact		Removal Tool		
Size	Type	Part Number	Size	Type
5	Coax	91174-1	5	Rear Release
		CET-C8		
		MS3178-001		
		SET-C8		

- (1) Make a selection of a size 5 removal tool from Table 71.
- (2) Push the sealing sleeve back away from the connector insert. Refer to Figure 71.



**POSITION OF THE SEAL SLEEVE ON THE COAX CABLE
Figure 71**

- (3) Push the seal bushing or the seal boot back away from the connector insert. Refer to Figure 72.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS****POSITION OF THE SEAL BOOT ON THE COAX CABLE****Figure 72**

- (4) Put the removal tool on the cable.
- (5) Align the tool and the contact cavity.
- (6) Push the tool into the insert cavity until it stops.
- (7) Carefully pull the wire and the tool from the contact cavity at the same time.

E. Removal of Size 1 Coax Contacts from the BACI10AH05, 08, 09 and 25 Inserts

This paragraph gives the procedure to remove a size 1 coax contact or a TNC adapter that has a mounting block from these inserts:

- BACI10AH05
- BACI10AH08
- BACI10AH09
- BACI10AH25

Refer to Paragraph 7.F. for the procedure to remove a size 1 coax termination kit contact from the BACI10AH11 insert.

- (1) If the coax cable is connected to the ARINC connector with a TNC connector, turn the coupling ring of the TNC plug in the counterclockwise direction until the TNC plug separates from the TNC adapter.

NOTE: It is not necessary to remove the TNC adapter from the ARINC connector to disconnect the coax cable from the ARINC connector.

- (2) For Boeing connector part numbers that have an obsolete insert configuration code 22, 23 or 25, remove the retainer plates on the rear of the connector.

NOTE: If the Boeing connector part number has insert configuration code 122, 123 or 125, it is not necessary to remove the retainer plates from the connector to remove the size 1 coax contact.

- (a) From the rear side of the connector shell, remove the screws that hold the insert retainer plates.
 - (b) Remove the insert retainer plates.
- (3) Remove the four screws from the front face of the connector insert.
 - (4) Remove the contact from the rear of the connector.

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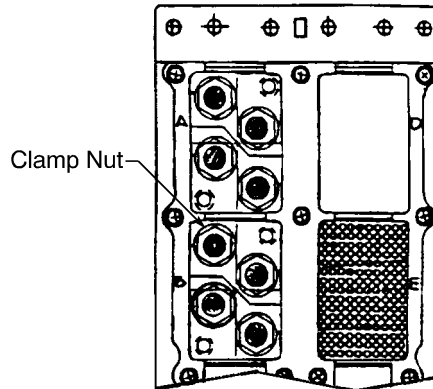
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

F. Removal of ITT Cannon Size 1 Coax Termination Kit Contacts from the BACI10AH11 insert

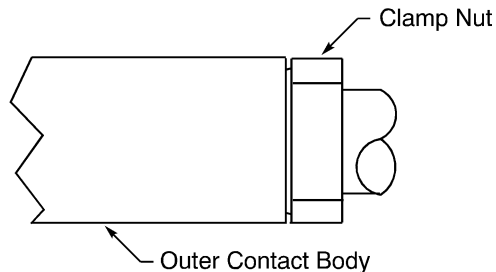
This procedure is applicable for the removal of ITT Cannon size 1 coax termination kit contacts 320-1066-006 and 320-1066-015.

NOTE: The coax contact termination kit contains the center contact assembly.

- (1) At the rear of the connector, turn the clamp nut in the counterclockwise direction to loosen it. Refer to Figure 73 and Figure 74.



LOCATION OF THE CLAMP NUTS ON THE BACI10AH11 INSERT
Figure 73



CENTER CONTACT ASSEMBLY INSTALLED IN THE OUTER CONTACT BODY
Figure 74

- (2) Disengage the threads of the clamp nut and the outer contact body.
- (3) Pull the center contact assembly out of the outer contact body.

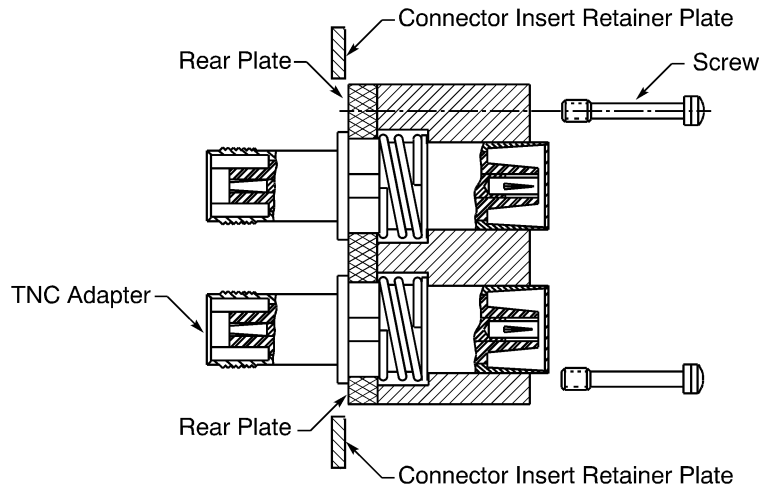
G. Removal of the BACA19BK1 TNC Adapters or the Outer Coax Bodies from the BACI10AH11 Insert

- (1) Remove the screws from the engaging face of the insert. Refer to Figure 75.

NOTE: It is possible that these screws are captivated and cannot be completely removed from the insert.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



BACA19BK1 TNC ADAPTERS IN THE BACI10AH11 INSERT

Figure 75

- (2) Pull the rear plate that holds the four TNC adapters or outer coax bodies rearward from the insert.
NOTE: It can be necessary to push on the engaging ends of the contacts at the same time to help move the plate rearward.
- (3) If the connector insert retainer plates prevent the movement of the rear plate from the connector, remove the connector insert retainer plates:
 - (a) From the rear side of the connector shell, remove the screws that hold the insert retainer plates.
 - (b) Remove the insert retainer plates from the connector.
- (4) Pull the rear plate that holds the four TNC adapters or outer coax bodies rearward from the insert.
NOTE: It can be necessary to push on the engaging ends of the contacts at the same time to help move the plate rearward.
- (5) Remove the TNC adapters or the outer coax bodies from the plate.

H. Removal of Fiber Optic Contact Termini

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A SEALED CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**Table 72
CONTACT TERMINUS REMOVAL TOOLS**

Terminus Size	Removal Tool	
	Part Number	Color
16	M81969/14-03	White

- (1) Make a selection of a contact terminus removal tool from Table 72.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS**

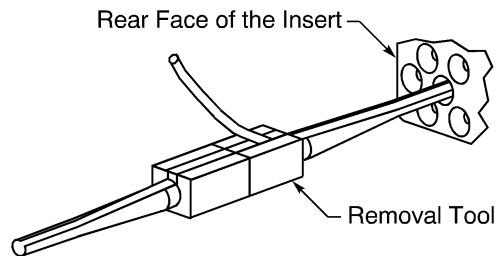
CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) Remove the plastic tie straps or the wire harness ties that are less than 6 inches from the connector.
- (3) At the rear of the connector, put the tip of the removal tool on the cable.
- (4) Axially align the removal tool and contact terminus cavity.
- (5) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

**POSITION OF THE REMOVAL TOOL IN THE CONTACT TERMINUS CAVITY****Figure 76**

- (6) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out of the cavity.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (7) If the contact terminus is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees on the cable assembly.
 - (c) Do Step (3) through Step (6) again.
- (8) If it is necessary, examine the contact terminus. Refer to Subject 20-12-20.
- (9) If the inspection is not necessary, put a clean protection cap on the contact terminus.

Refer to Subject 20-12-20 for the protection cap part numbers.

NOTE: A clean plastic bag is a satisfactory alternative for the protection cap.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

I. Removal of the Fiber Optic Alignment Sleeve Insert

CAUTION: DO NOT PULL, SHAKE, OR TWIST THE ALIGNMENT SLEEVE INSERT FROM THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

**Table 73
NECESSARY TOOLS**

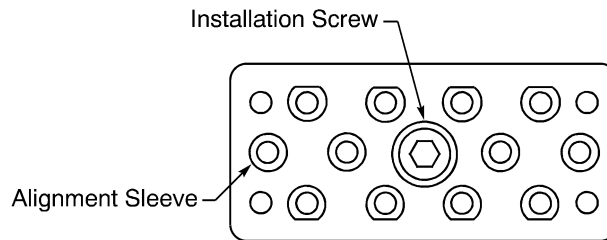
Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64

- (1) Make a selection of a driver from Table 73.

NOTE: The driver can have a ball type end.

- (2) Turn the installation screw in a counterclockwise direction until the screw is disengaged from the face of the connector.

CAUTION: DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT TO REMOVE IT FROM THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.



**FRONT FACE OF THE ALIGNMENT SLEEVE INSERT
Figure 77**

- (3) Put the alignment sleeve insert in a clean plastic bag.

CAUTION: KEEP THE ALIGNMENT SLEEVE INSERT IN A CLEAN PLASTIC BAG UNTIL IT IS INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

J. Seal Plug Removal

This paragraph gives the procedure to remove a MS27488 type seal plug from a contact cavity. Refer to Paragraph 7.K. for the procedure to remove a S280W552-109 conductive seal plug from a grounded size 8 contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 74
NECESSARY TOOLS**

Tool	Type
Pliers	Needle Nose
Tweezers	-

- (1) Make a selection of a tool from Table 74.

CAUTION: MAKE SURE THAT THE PLIERS OR TWEEZERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. TOOLS WITH A ROUGH SURFACE OR SHARP EDGES CAN CAUSE DAMAGE TO THE REAR GROMMET.

NOTE: An acceptable alternative is to use the fingers.

- (2) Remove the plastic tie straps or the wire harness ties, that are less than 6 inches from the connector, from the wire harness.
- (3) Tightly hold the end of the seal plug or the seal rod.
- (4) Pull the seal plug or the seal rod out of the contact cavity.

K. Removal of a Conductive Seal Plug From a Grounded Size 8 Contact Cavity

This paragraph gives the procedure to remove a S280W552-109 conductive seal plug from a grounded size 8 contact cavity.

**Table 75
SIZE 8 SEAL PLUG REMOVAL TOOLS**

Contact Cavity Size	Removal Tool	
	Part Number	Supplier
8	M81969/28-03	QPL
	RRX-04-C-1	Russtech

- (1) Make a selection of a seal plug removal tool from Table 75.
- (2) From the rear of the insert, put the end of the tool on the end of the seal plug.
- (3) Push the tool into the contact cavity until it stops.
- (4) From the front of the connector, put the end of a plastic rod against the end of the seal plug.

Make sure that:

- The rod has a flat end
- The diameter of the rod is 0.20 inch minimum to 0.22 inch maximum.

- (5) Push the seal plug and the removal tool out of the rear of the cavity with the rod.
- (6) If the seal plug is not released:
 - (a) Carefully remove the removal tool from the contact cavity.

CAUTION: DO NOT TURN THE REMOVAL TOOL. IF THE TOOL IS TURNED, DAMAGE TO THE CONTACT RETENTION MECHANISM OCCURS.

- (b) Do Step (3) through Step (5) again.
- (7) Pull the tool and the seal plug from the contact cavity.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS****L. Removal of a Connector Insert**

To get access to a connector that is installed on a shelf in the electronic rack, either of these alternatives are acceptable:

- The shelf can be removed
- The connector can be disconnected from the shelf.

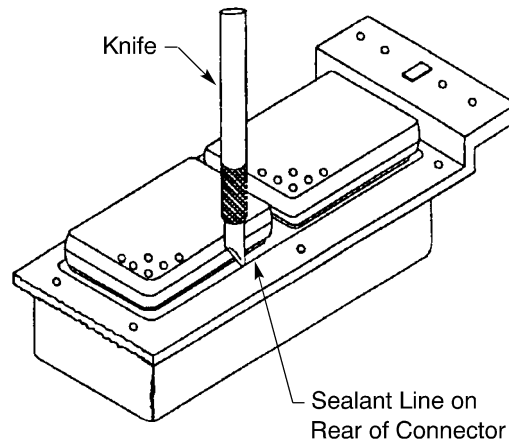
NOTE: Sufficient clearance around the connector is necessary to let both hands do the work. Access to both the front and rear of the connector is necessary.

- (1) Remove the necessary wire harness ties and clamps that are necessary to make the removal of the connector contacts easier.
- (2) Remove the screws, washers, and retainer plates from the rear of the connector.
- (3) Put the screws in a safe place.

NOTE: The initial connectors from Souriau are installed with metric screws; replacements screws can be difficult to find.

- (4) If the insert is installed in a BACC66()B() environmental connector, cut the resilient seal material around the rear of the insert with a sharp knife. Refer to Figure 78.

CAUTION: DO NOT CUT THE SEALANT AROUND THE OTHER INSERTS.

**REMOVAL OF THE SEALANT LINE AROUND THE INSERT****Figure 78**

- (5) From the front face of the connector, push the insert out of the connector shell with both thumbs.

Make sure that:

- The force is applied equally to each end of the insert
- One end of the insert does not catch on the connector shell, or on an adjacent insert.

NOTE: If the end of an adjacent insert makes an overlap with the insert, remove the adjacent insert, then remove the insert.

- (6) If the insert does not move from the connector shell, hold the connector shell in a fixture and push the front face of the insert with a larger force.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Make sure that:

- The force is applied equally to each end of the insert
- One end of the insert does not catch on the connector shell
- One end of the insert does not catch on an adjacent insert.

CAUTION: DO NOT CAUSE A BEND OR OTHER DAMAGE TO THE CONNECTOR SHELL DURING THE FORCE.

8. CONTACT ASSEMBLY

A. Assembly of Standard Contacts

NOTE: Refer to Subject 20-60-00 for contact assembly with filler wire as an alternative to the assembly of a contact with a folded back conductor and an eyelet.

**Table 76
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Target	Tolerance	
26	22	0.15	±0.03	-
	20	0.34	±0.03	Fold the conductor back
24	22	0.15	±0.03	-
	20	0.17	±0.03	-
	16	0.56	±0.03	Fold the conductor back
		0.28	±0.03	Use a Y-6015-C or a CE46FC eyelet
	12	0.56	±0.03	Fold the conductor back and use a Y-9015-C or a CE66FC eyelet
22	22	0.15	±0.02	-
	20	0.17	±0.03	-
	16	0.56	±0.03	Fold the conductor back
		0.28	±0.03	Use a Y-6015-C or a CE46FC eyelet
	12	0.56	±0.03	Fold the conductor back and use a Y-9015-C or a CE66FC eyelet
20	20	0.17	±0.03	-
	16	0.28	±0.03	-
	12	0.56	±0.03	Fold the conductor back
		0.28	±0.03	Use a Y-9015-C or a CE66FC eyelet
18	16	0.28	±0.03	-
	12	0.28	±0.03	-
16	16	0.28	±0.03	-
	12	0.28	±0.03	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 76 (continued)

Wire Size (AWG)	Crimp Barrel Size	Removal Length (inch)		Special Instructions
		Target	Tolerance	
14	12	0.28	±0.03	-
12	12	0.28	±0.03	-

**Table 77
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
26	2222	85-220	3	M22520/2-23	-
		M22520/2-01	3	M22520/2-23	-
		WA22	3	M22520/2-23	-
	2020HD	M22520/2-01	6	M22520/2-08	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 77 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
24	2222	85-220	3	M22520/2-23	-	
		M22520/2-01	3	M22520/2-23	-	
		WA22	3	M22520/2-23	-	
		WA22LC	3	M22520/2-23	-	
	2020HD	85-220		5	L-3198-20HD	-
				5	M22520/2-02	-
				5	M22520/2-08	-
				5	M22520/2-08	-
		M22520/2-01		5	L-3198-20HD	-
				5	M22520/2-02	-
				5	M22520/2-08	-
				5	M22520/2-08	-
		WA22		5	L-3198-20HD	-
				5	M22520/2-02	-
				5	M22520/2-08	-
				5	M22520/2-08	-
	1616	85-550		4	M22520/1-02	Blue
				4	M22520/1-02	Blue
				4	M22520/1-02	Blue
	1212	M22520/1-01		7	M22520/1-02	Yellow
				7	M22520/1-11	-
		WA27F		7	M22520/1-02	Yellow
				7	M22520/1-11	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 77 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
22	2222	85-220	4	M22520/2-23	-	
		M22520/2-01	4	M22520/2-23	-	
		WA22	4	M22520/2-23	-	
		WA22LC	4	M22520/2-23	-	
	2020HD	85-220		6	L-3198-20HD	-
				6	M22520/2-02	-
				6	M22520/2-08	-
				6	M22520/2-08	-
		M22520/2-01		6	L-3198-20HD	-
				6	M22520/2-02	-
				6	M22520/2-08	-
				6	M22520/2-08	-
		WA22		6	L-3198-20HD	-
				6	M22520/2-02	-
				6	M22520/2-08	-
				6	M22520/2-08	-
	1616	85-550		4	M22520/1-02	Blue
				4	M22520/1-02	Blue
				4	M22520/1-02	Blue
	1212	M22520/1-01		7	M22520/1-02	Yellow
				7	M22520/1-11	-
		WA27F		7	M22520/1-02	Yellow
				7	M22520/1-11	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 77 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
20	2020HD	85-220	7	L-3198-20HD	-
			7	M22520/2-02	-
			7	M22520/2-08	-
		M22520/2-01	7	L-3198-20HD	-
			7	M22520/2-02	-
			7	M22520/2-08	-
		WA22	7	L-3198-20HD	-
			7	M22520/2-02	-
			7	M22520/2-08	-
	WA22LC	7	M22520/2-08	-	
	1616	85-550	4	M22520/1-02	Blue
		M22520/1-01	4	M22520/1-02	Blue
		WA27F	4	M22520/1-02	Blue
	1212	85-550	7	M22520/1-11	-
		M22520/1-01	7	M22520/1-02	Yellow
			7	M22520/1-11	-
		WA27F	7	M22520/1-02	Yellow
			7	M22520/1-11	-
18	1616	85-550	5	M22520/1-02	Blue
		M22520/1-01	5	M22520/1-02	Blue
		WA27F	5	M22520/1-02	Blue
	1212	85-550	7	M22520/1-11	-
		M22520/1-01	6	M22520/1-02	Yellow
			6	M22520/1-11	-
		WA27F	6	M22520/1-02	Yellow
			6	M22520/1-11	-

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 77 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
16	1616	85-550	6	M22520/1-02	Blue
		M22520/1-01	6	M22520/1-02	Blue
		WA27F	6	M22520/1-02	Blue
	1212	85-550	7	M22520/1-11	-
		M22520/1-01	7	M22520/1-02	Yellow
			7	M22520/1-11	-
		WA27F	7	M22520/1-02	Yellow
			7	M22520/1-11	-
14	1212	85-550	7	M22520/1-11	-
		M22520/1-01	7	M22520/1-02	Yellow
			7	M22520/1-11	-
		WA27F	7	M22520/1-02	Yellow
			7	M22520/1-11	-
12	1212	85-550	8	M22520/1-11	-
		M22520/1-01	8	M22520/1-02	Yellow
			8	M22520/1-11	-
		WA27F	8	M22520/1-02	Yellow
			8	M22520/1-11	-

(1) If the contact is a size 12 and it must be installed in a size 5 cavity, install the sealing boot on the wire. Refer to Paragraph 15.D.

(2) Remove the necessary length of insulation from the end of the wire.

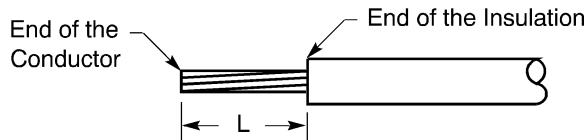
Refer to:

- Figure 79
- Table 76 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

NOTE: If the wire size and a larger crimp barrel size are not specified in Table 76, refer to Subject 20-60-00 for the alternate procedure to prepare the wire.

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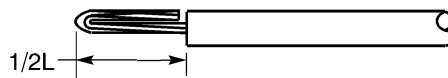
INSULATION REMOVAL LENGTH

Figure 79

- (3) If the contact cavity is larger than size 22 and the O.D. of the wire is less than the minimum seal diameter of the grommet holes, increase the O.D. of the wire. Refer to Paragraph 1.F.
- (4) If it is necessary, put the eyelet in the crimp barrel of the contact. Refer to Table 76.
- (5) If it is necessary, fold the conductor back on itself.

Refer to:

- Table 76
- Figure 80.



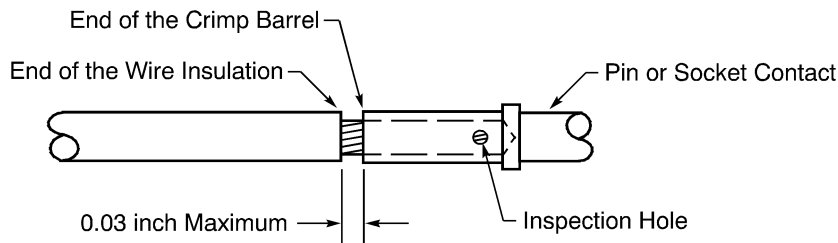
FOLDED BACK CONDUCTOR

Figure 80

- (6) Make a selection of a crimp tool from Table 77.
- (7) Put the end of the wire in the crimp barrel or in the eyelet in the crimp barrel. Refer to Figure 81.

Make sure that:

- All of the strands of the conductor are in the crimp barrel or in the eyelet
- If an eyelet is not in the crimp barrel, the conductor can be seen in the inspection hole.
- If an eyelet is in the crimp barrel, the flange of the eyelet stays against the rear end of the crimp barrel
- The distance from the end of the insulation to the crimp barrel or to the end of the eyelet is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CONTACT CRIMP BARREL

Figure 81

- (8) Crimp the contact.

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B. Assembly of a Contact with Oversize Wire

This procedure is applicable if the outside diameter of the wire insulation is larger than the maximum wire O.D. specified in Table 78.

**Table 78
MAXIMUM WIRE OUTSIDE DIAMETER**

Contact Cavity Size	Wire Size (AWG)	Maximum Wire O.D. (inch)
22	22	0.054
20HD	20	0.071

**Table 79
NECESSARY MATERIALS**

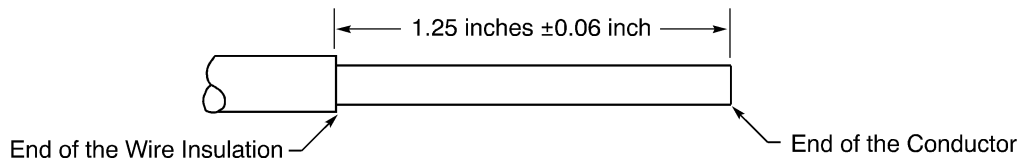
Material	Part Number	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/12 Class 5	An available source
	RT850	Raychem
	RW175	
	TFE 4X	Chemplast
		Zeus

- (1) Make a selection of a 1.50 inch ± 0.06 inch length of heat shrinkable sleeve from Table 79.

NOTE: An equivalent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

Make sure that the sleeve has the smallest diameter that can move easily on the wire.

- (2) Remove 1.25 inch ± 0.06 inch length of insulation from the end of the wire. Refer to Figure 82.



**INSULATION REMOVAL LENGTH
Figure 82**

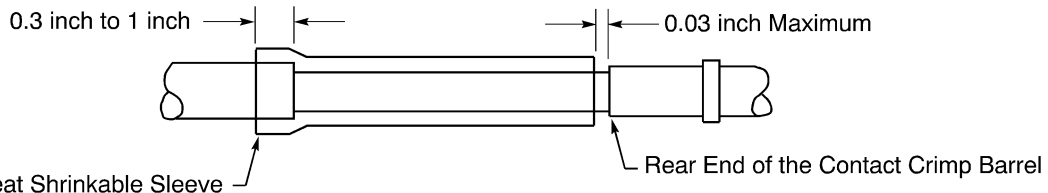
- (3) Put the sleeve on the wire.
- (4) Put the conductor into the crimp barrel of the contact.
Make sure that:
 - All of the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole of the contact.
- (5) Crimp the contact. Refer to Paragraph 8.A.
- (6) Align the sleeve. Refer to Figure 83.

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Make sure that:

- The sleeve makes a 0.3 inch to 1 inch overlap with the wire insulation
- The distance from the forward end of the sleeve to the rear end of the contact crimp barrel is not more than 0.03 inch.



POSITION OF THE HEAT SHRINKABLE SLEEVE

Figure 83

(7) Shrink the sleeve into its position. Refer to Subject 20-10-14.

C. Assembly of a Contact with Solid Conductor Wire

This paragraph gives the procedure to assemble BACC47EF and BACC47EG contacts with solid conductor wire and, if necessary, stranded filler wire.

NOTE: Only stranded wire can be used for the filler wire.

**Table 80
INSULATION REMOVAL LENGTH**

Crimp Barrel Size	Removal Length (inch)	
	Target	Tolerance
22	0.15	± 0.02
20	0.17	± 0.03
16	0.28	± 0.03

**Table 81
SELECTION OF FILLER WIRE SIZE**

Crimp Barrel Size	Solid Conductor Wire		Stranded Filler Wire (AWG)
	First Wire (AWG)	Second Wire (AWG)	
22	30	-	24
		28	24
		26	None
	28	-	24
		26	None
		-	24

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 81 (continued)

Crimp Barrel Size	Solid Conductor Wire		Stranded Filler Wire (AWG)
	First Wire (AWG)	Second Wire (AWG)	
20	30	-	22
		28	22
		26	22
	28	-	22
		26	22
		26	22
16	30	-	18
		28	18
		26	18
	28	-	18
		26	18
		26	18

Table 82

CRIMP TOOLS FOR CONTACTS WITH SOLID CONDUCTORS

Crimp Barrel Size	Solid Conductor Wire		Stranded Filler Wire (AWG)	Crimp Tool		
	First Wire (AWG)	Second Wire (AWG)		Basic Unit		Locator
				Setting	Part Number	
22	30	-	24	5	AFM8	K267-1
					M22520/2-01	M22520/2-23
				28	24	5
		M22520/2-01	M22520/2-23			
		None	4		AFM8	K267-1
				M22520/2-01	M22520/2-23	
	26			4	AFM8	K267-1
		M22520/2-01	M22520/2-23			
	28	-	24	5	AFM8	K267-1
					M22520/2-01	M22520/2-23
		26	None	4	AFM8	K267-1
					M22520/2-01	M22520/2-23
26	-	24	6	AFM8	K267-1	
				M22520/2-01	M22520/2-23	

20-71-14

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 82 (continued)

Crimp Barrel Size	Solid Conductor Wire		Stranded Filler Wire (AWG)	Crimp Tool			
	First Wire (AWG)	Second Wire (AWG)		Basic Unit		Locator	
				Setting	Part Number		
20	30	-	22	3	AF8	TH1A	
					M22520/1-01	M22520/1-02	
		28	28	22	4	AF8	TH1A
						M22520/1-01	M22520/1-02
		26	26	22	4	AF8	TH1A
						M22520/1-01	M22520/1-02
	28	-	22	3	AF8	TH1A	
					M22520/1-01	M22520/1-02	
		26	26	22	4	AF8	TH1A
						M22520/1-01	M22520/1-02
	26	-	22	4	AF8	TH1A	
					M22520/1-01	M22520/1-02	
30		-	18	6	AF8	TH1A	
					M22520/1-01	M22520/1-02	
28		28	18	7	AF8	TH1A	
					M22520/1-01	M22520/1-02	
26	26	18	7	AF8	TH1A		
				M22520/1-01	M22520/1-02		
16	28	-	18	6	AF8	TH1A	
					M22520/1-01	M22520/1-02	
	26	26	18	7	AF8	TH1A	
					M22520/1-01	M22520/1-02	
	26	-	18	7	AF8	TH1A	
					M22520/1-01	M22520/1-02	

- (1) Make a selection of a filler wire size from Table 81.
- (2) Make a selection of a crimp tool from Table 82.
- (3) Remove the necessary length of insulation from the end of the solid conductor wire.

Refer to:

- Table 80 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

- (4) If a filler wire is specified, remove 0.5 inch of insulation from the end of the filler wire.

STANDARD WIRING PRACTICES MANUAL

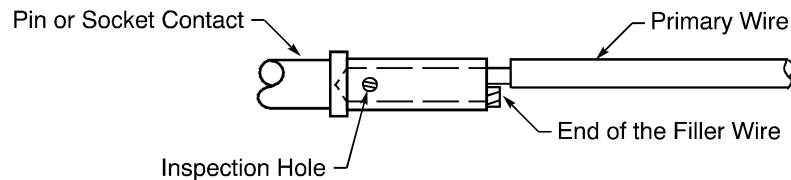
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Refer to Subject 20-00-15 for the insulation removal procedures.

- (5) Put the conductor in the crimp barrel of the contact.
 - (a) If filler wire is not specified, put the end of the solid conductor wire in the crimp barrel of the contact.
 - (b) If filler wire is specified, put the end of the solid conductor wire and the filler wire in the crimp barrel of the contact.

Make sure that:

- All of the strands of the filler wire and the solid conductor are in the crimp barrel of the contact
 - The strands of the conductors are visible in the inspection hole of the contact
 - The distance between the end of the crimp barrel and the insulation of the wire is a maximum of 0.03 inch.
- (6) Crimp the contact.
 - (7) If the contact has a filler wire, remove the unwanted length of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 84.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE
Figure 84

D. Assembly of S280W553-() Size 0808 Power and Ground Contacts

This paragraph gives the procedure to assemble these contacts:

- S280W553-2 power contact socket
- S280W553-4 ground contact socket.

Table 83

CRIMP BARREL ADAPTER SLEEVE PART NUMBERS

Crimp Barrel Size	Wire Size (AWG)	Adapter Sleeve	
		Part Number	Supplier
8	12	252-1231-000	ITT Cannon
	10		

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 84
CONTACT CRIMP TOOLS FOR SIZE 0808 CONTACTS**

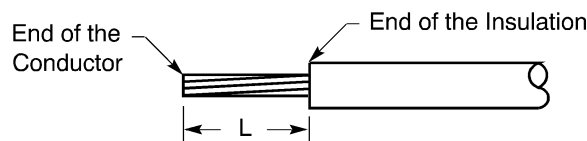
Contact Type	Contact Part Number	Wire Size (AWG)	Crimp Tool					
			Tool Type	Basic Unit	Locator	Die		
						Primary	Secondary	
Power	S280W553-2	12	Hex Crimp	13642	-	ST2354-5	11732	
			Indenter	400B	4046A	414DA-8N	-	
				M22520/23-01	M22520/23-09	M22520/23-02	-	
			Hex Crimp	13642	-	ST2354-5	11732	
				Indenter	400B	4046A	414DA-8N	-
			M22520/23-01		M22520/23-09	M22520/23-02	-	
		8	Hex Crimp	13642	-	ST2354-5	11732	
				Indenter	400B	4046A	414DA-8N	-
			M22520/23-01		M22520/23-09	M22520/23-02	-	
			12	Indenter	400B	4046	414DA-8N	-
					M22520/23-01	M22520/23-09	M22520/23-02	-
				10	Indenter	400B	4046	414DA-8N
M22520/23-01	M22520/23-09	M22520/23-02				-		
8	Indenter	400B	4046	414DA-8N	-			
		M22520/23-01	M22520/23-09	M22520/23-02	-			

NOTE: A pneumatic indenter crimp tool cannot be used to assemble a size 0808 or larger contact that has an adapter sleeve in the crimp barrel.

- (1) Make a selection of a crimp tool from Table 84.
- (2) Remove 0.50 inch ± 0.03 inch of insulation from the end of the wire.

Refer to:

- Figure 85
- Subject 20-00-15 for the insulation removal procedures.



**INSULATION REMOVAL LENGTH
Figure 85**

- (3) If the wire size is 12 AWG:
 - (a) Cut a 2.00 inch ± 0.25 inch length of AWG 14 filler wire.
 - (b) Remove the insulation from the AWG 14 filler wire.

STANDARD WIRING PRACTICES MANUAL

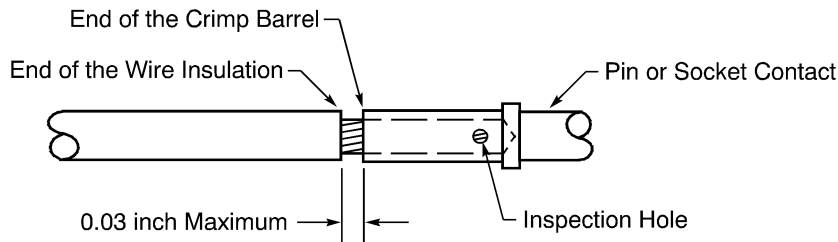
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (c) Put the filler wire into the crimp barrel of the contact.
- (4) If the wire size is 10 AWG or 12 AWG:
 - (a) Make a selection of a crimp barrel adapter sleeve from Table 83.
- (b) Push the adapter sleeve into the crimp barrel of the contact until it stops.
- (5) Put the conductor into the crimp barrel of the contact. Refer to Figure 86.

NOTE: A pneumatic indenter crimp tool cannot be used to assemble a size 0808 or larger contact that has an adapter sleeve in the crimp barrel.

Make sure that:

- All of the strands of the conductor are in the contact crimp barrel
- If a filler wire is used, all of the strands of the filler wire are in the crimp barrel of the contact
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CONTACT CRIMP BARREL

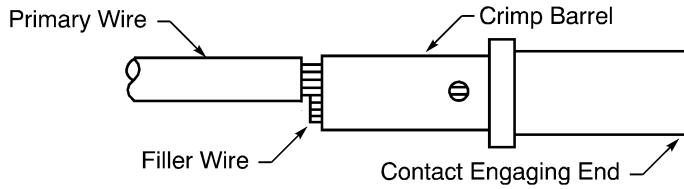
Figure 86

- (6) If the crimp tool is an indenter type, crimp the contact.

NOTE: A pneumatic indenter crimp tool cannot be used to assemble a size 0808 or larger contact that has an adapter sleeve in the crimp barrel.
- (7) If the crimp tool is a hex crimp type:
 - (a) Put the primary die in the crimp tool.
 - (b) Put the contact and the conductor in the crimp tool.
 - (c) Crimp the contact.
 - (d) Remove the primary die from the crimp tool.
 - (e) Put the secondary die in the crimp tool.
 - (f) Turn the contact approximately 60 degrees around the longitudinal axis.
 - (g) Crimp the contact.
 - (h) If the crimp area of the contact has flash, turn the contact approximately 60 degrees around the longitudinal axis and crimp the contact again with the secondary die.
- (8) If the contact has a filler wire, carefully remove the unwanted length of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 87.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE

Figure 87

CAUTION: DO NOT CAUSE DAMAGE TO THE STRANDS OF THE CONDUCTOR OF THE PRIMARY WIRE. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

E. Assembly of Ground Block Contacts

**Table 85
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	20	0.15	± 0.02	-
	16	0.54	± 0.04	Fold the conductor back
22	20	0.15	± 0.02	-
	16	0.54	± 0.04	Fold the conductor back
20	20	0.15	± 0.02	-
	16	0.27	± 0.02	-
18	18	0.15	± 0.02	-
	16	0.27	± 0.02	-
16	16	0.27	± 0.02	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 86
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-11	-
		WA22	5	M22520/2-11	-
		WA22LC	5	M22520/2-11	-
		WA27	2	M22520/1-02	Red
	16	M22520/1-01	5	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	5	M22520/1-02	Blue
	22	20	M22520/1-01	3	M22520/1-02
M22520/2-01			6	M22520/2-11	-
WA22			6	M22520/2-11	-
WA22LC			6	M22520/2-11	-
WA27			3	M22520/1-02	Red
16		M22520/1-01	6	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	6	M22520/1-02	Blue
20		20	M22520/1-01	4	M22520/1-02
	M22520/2-01		7	M22520/2-11	-
	WA22		7	M22520/2-11	-
	WA22LC		7	M22520/2-11	-
	WA27		4	M22520/1-02	Red
	16	M22520/1-01	4	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	4	M22520/1-02	Blue
	18	18	M22520/1-01	5	M22520/1-02
WA27			5	M22520/1-02	Red
16		M22520/1-01	5	M22520/1-02	Blue
		WA27	5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
		WA27	6	M22520/1-02	Blue

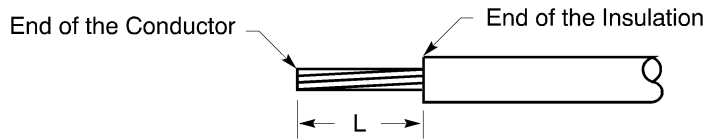
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 88
- Table 85
- Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 88

- (2) If it is specified, fold the conductor back. Refer to Figure 89.

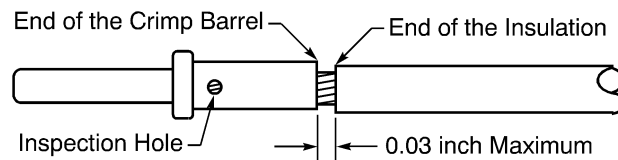


CONDUCTOR FOLDED BACK
Figure 89

- (3) Make a selection of a crimp tool from Table 86.
- (4) Put the end of the wire into the crimp barrel of the contact. Refer to Figure 90.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is a maximum of 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 90

- (5) Crimp the contact.
- (6) Examine the contact assembly for these types of damage:
 - Broken strands of the conductor
 - Strands of the conductor on which the base metal can be seen
 - Cracks in the crimp barrel of the contact.
- (7) If the contact or the wire has damage, replace the contact.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

F. Assembly of a Shield Ground Wire with a Ground Block Contact

- (1) Make a selection of a contact from Table 29.
- (2) Remove 2.0 inches \pm 0.2 inch of the outer jacket from the end of the shielded wire or coax cable.
- (3) Cut a 2.75 inch \pm 0.25 inch length of wire that has the applicable AWG size.
- (4) Assemble a shield ground wire. Refer to Subject 20-10-15.
- (5) Assemble the contact on the end of the shield ground wire. Refer to Paragraph 8.E.

9. ASSEMBLY OF SIZE 12 COAX AND SIZE 12 SHIELDED CONTACTS

A. Assembly of ITT Cannon 249-1768-000 and 249-2203-000 Size 12 Shielded Contacts

**Table 87
CENTER CONTACT CRIMP TOOLS**

Wire Size (AWG)	Shielded Contact Size	Contact Part Number	Crimp Tool		
			Basic Unit		Locator
			Part Number	Setting	
24	12	249-1768-000	M22520/2-01	2	K-182
		249-2203-000	M22520/2-01	3	K-644 22-944

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 88
OUTER CONTACT BODY CRIMP TOOLS**

Wire Size (AWG)	Shielded Contact Size	Contact Part Number	Crimp Tool			
			Basic Unit	Die		Secondary Part Number
				Primary		
				Part Number	Cavity	
24	12	249-1768-000	612648	612778	B	-
			KTH-1000	KTH-2011	A	-
				KTH-2021	A	-
				KTH-2022	A	-
			M22520/5-01	M22520/5-03	A	-
				M22520/5-08	-	-
				M22520/5-35	B	-
		Y119		A	-	
		WT-400	-	-	-	
		ST2966M	ST2966M-1	-	-	
		249-2203-000	M22520/5-01	M22520/5-03	A	M22520/5-17 Y193
				M22520/5-08	-	M22520/5-17 Y193
			WT-400	-	-	M22520/5-17 Y193
				-	-	-

**Table 89
NECESSARY MATERIALS**

Material	Part Number	Supplier
Heat Shrinkable Sleeve	DWP-125	Raychem
	MWSF	Remtek

- (1) Make a selection of a center contact crimp tool from Table 87.
- (2) Make a selection of an outer contact body crimp tool and a primary die from Table 88.
- (3) If it is specified, make a selection of an outer contact body crimp tool and a secondary die from Table 88.
- (4) If the contact must be installed in a size 5 cavity, install the sealing boot on the wire or cable. Refer to Paragraph 15.D.
- (5) Make a selection of a heat shrinkable sleeve from Table 89.

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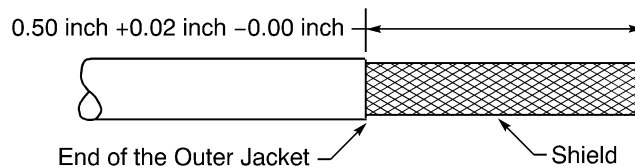
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Make sure that the sleeve has the smallest diameter that can be moved over the rear end of the contact.

NOTE: An equivalent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

- (6) Put a 1.00 inch ± 0.13 inch length of the heat shrinkable sleeve on the shielded wire or cable.
- (7) Cut the cable to make its end perpendicular to its longitudinal axis.
- (8) Remove 0.50 inch $+0.02$ inch -0.00 inch of the outer jacket. Refer to Figure 91.

CAUTION: DO NOT CAUSE ANY DAMAGE TO THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

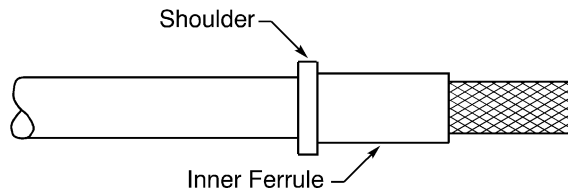


CABLE JACKET PREPARATION
Figure 91

- (9) Put the inner ferrule on the cable. Refer to Figure 92.

Make sure that:

- The end of the ferrule that has the shoulder is pointed rearward away from the end of the cable
- The shoulder of the ferrule is against the end of the jacket.



POSITION OF THE INNER FERRULE ON THE CABLE
Figure 92

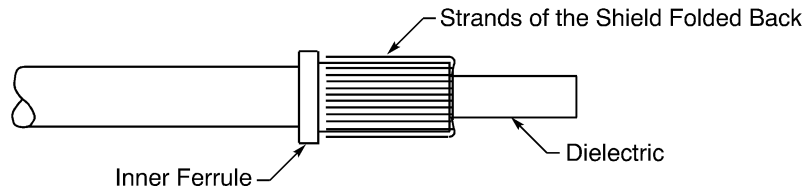
- (10) Move the strands of the shield apart.
- (11) Fold the strands of the shield back on the ferrule. Refer to Figure 93.

Make sure that:

- The strands of the shield are on the ferrule
- The strands of the shield are symmetrical around the circumference of the ferrule.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

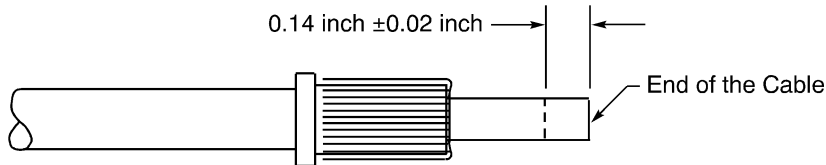


POSITION OF THE SHIELD ON THE FERRULE

Figure 93

- (12) Remove 0.14 inch \pm 0.02 inch of the dielectric and the conductor from the end of the cable. Refer to Figure 94.

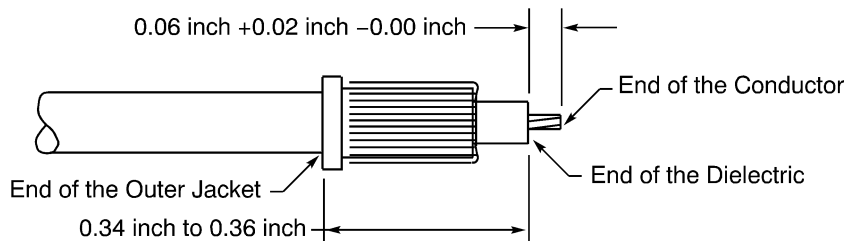
Make sure that the distance from the end of the jacket to the end of the dielectric is 0.34 inch to 0.36 inch.



REMOVAL OF THE END OF THE CABLE

Figure 94

- (13) Remove 0.06 inch $+0.02$ inch -0.00 inch of the dielectric from the end of the conductor. Refer to Figure 95.



INSULATION REMOVAL LENGTH

Figure 95

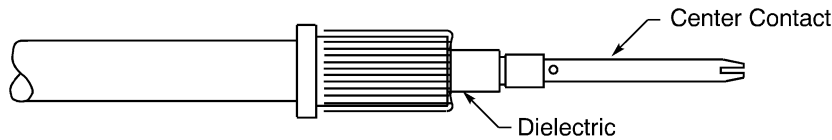
- (14) Put the conductor in the crimp barrel of the center contact. Refer to Figure 96.

Make sure that:

- The rear end of the contact is against the end of the dielectric
- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact.

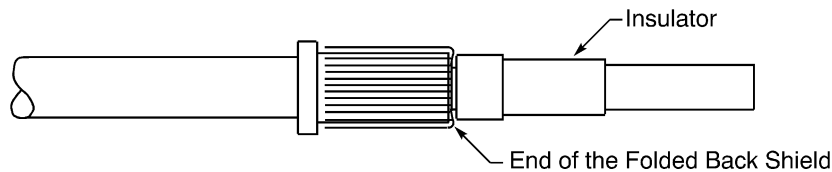
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



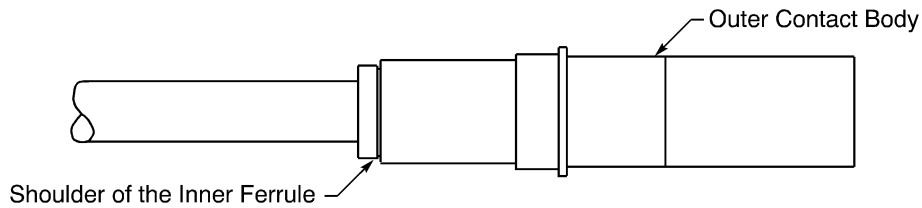
CENTER CONTACT ASSEMBLY
Figure 96

- (15) Crimp the center contact.
- (16) Put the white insulator, large end first, on the center contact assembly until it stops.



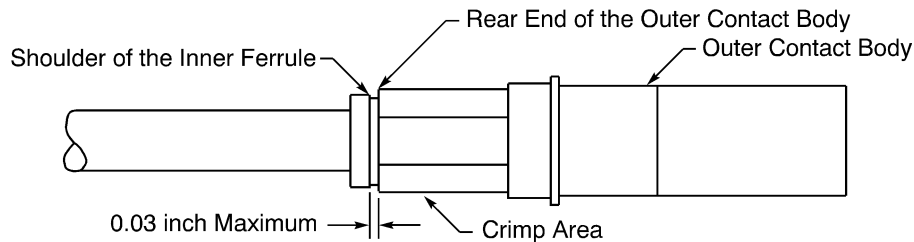
INSULATOR ON THE CENTER CONTACT
Figure 97

- (17) Push the center contact assembly into the outer contact body. Refer to Figure 98.



POSITION OF THE OUTER CONTACT BODY ON THE CENTER CONTACT ASSEMBLY
Figure 98

- (18) Remove the unwanted strands of the shield that extend farther than the shoulder of the inner ferrule. Make sure that the end of the shield is aligned with the forward end of the shoulder of the ferrule.
- (19) Crimp the rear end of the outer contact body with the primary crimp die. Refer to Figure 99. Make sure that the distance between the shoulder of the inner ferrule and the rear end of the outer contact body is 0.03 inch maximum.



POSITION OF THE CRIMP ON THE OUTER CONTACT BODY
Figure 99

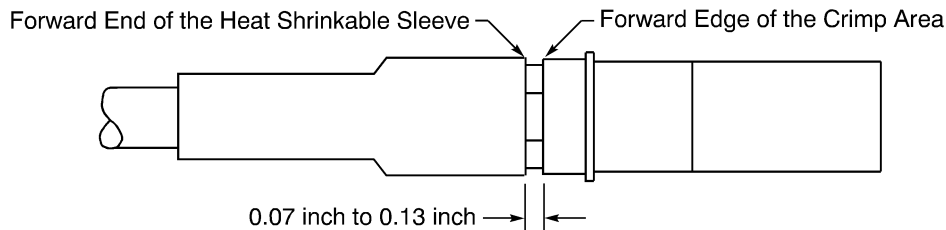
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (20) If a secondary crimp die is specified, crimp the rear end of the outer contact body again with the secondary crimp die.
- (21) Push the heat shrinkable sleeve forward on the end of the contact assembly. Refer to Figure 100.
Make sure that the distance from the forward end of the sleeve to the shoulder of the contact body is a maximum of 0.13 inch. Refer to Figure 100.
- (22) Shrink the sleeve into its position.

Refer to:

- Figure 100
- Subject 20-10-14.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONTACT ASSEMBLY
Figure 100

B. Assembly of ITT Cannon 151700-0688 Size 12 Shielded Contacts with AWG 22 Shielded Wire

Table 90
CENTER CONTACT CRIMP TOOLS

Wire Size (AWG)	Shielded Contact Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
22	12	M22520/2-01	5	K-644
			5	22-944

Table 91
OUTER FERRULE CRIMP TOOLS

Wire Size (AWG)	Shielded Contact Size	Crimp Tool		
		Basic Unit	Die	
			Part Number	Cavity
22	12	M22520/5-01	M22520/5-33	B

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

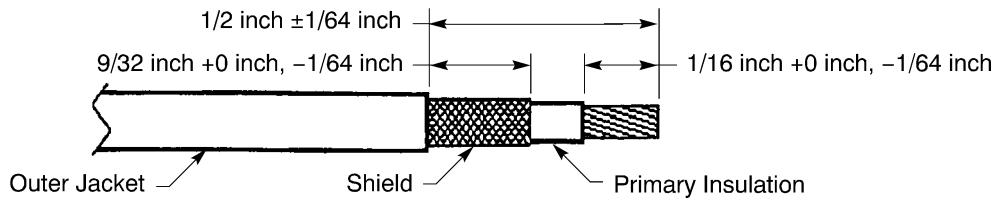
**Table 92
NECESSARY MATERIALS**

Material	Part Number	Supplier
Heat Shrinkable Sleeve	DWP-125	Raychem
	MWSF	Remtek

- (1) Make a selection of a center contact crimp tool from Table 90.
- (2) Make a selection of an outer ferrule crimp tool from Table 91.
- (3) If the contact must be installed in a size 5 cavity, install the sealing boot on the wire or cable. Refer to Paragraph 15.D.
- (4) Make a selection of a heat shrinkable sleeve from Table 92.

NOTE: An equivalent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.

- (5) Put a 1 inch length of 3/16 inch diameter heat shrinkable sleeve on the wire.
- (6) Put the ferrule on the wire.
- (7) Prepare the cable. Refer to Figure 101.

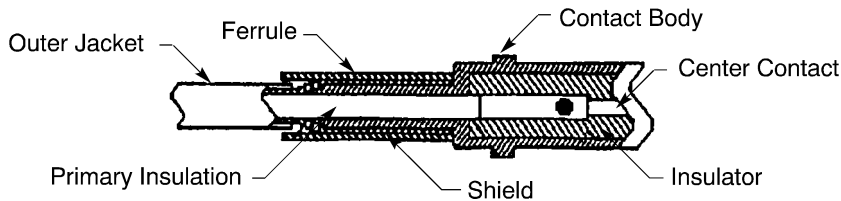


**BMS 13-51 WIRE PREPARATION
Figure 101**

- (a) Remove $1/2 \text{ inch} \pm 1/64 \text{ inch}$ of the outer jacket from the end of the shielded wire.
 - (b) Remove the necessary length of the shield to make the distance from end of the outer jacket to the end of the shield equal to $9/32 \text{ inch} +0 \text{ inch}, -1/64 \text{ inch}$.
 - (c) Remove the necessary length of the primary insulation to make the distance from the end of the conductor to the end of the primary insulation equal to $1/16 \text{ inch} +0 \text{ inch}, -1/64 \text{ inch}$.
- (8) Put the conductor into the crimp barrel of the center contact
- Make sure that:
- All of the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole of the contact.
- (9) Crimp the center contact.
- (10) Put the contact body on the center contact assembly. Refer to Figure 102.
- Make sure that the shield is on the small end of the contact body.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



POSITION OF THE CONTACT BODY ON THE CABLE
Figure 102

- (11) Push the ferrule forward on the shield until the forward end of the ferrule is against the rear end of the contact body.
- (12) Crimp the ferrule.
- (13) Remove the unwanted length of the remaining shield.
- (14) Push the heat shrinkable sleeve forward until the forward end of the sleeve is against the rear edge of the contact body.
 Make sure that the sleeve is fully on the ferrule.
- (15) Shrink the sleeve into its position. Refer to Subject 20-10-14.
 Make sure that the forward end of the heat shrinkable sleeve is aligned with the rear edge of the contact body.

C. Assembly of Radiall 618040 Size 12 Coax Contacts with RG-316 Cable

Table 93
CENTER CONTACT CRIMP TOOLS

Coax Contact Size	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
12	M22520/2-01	4	282580

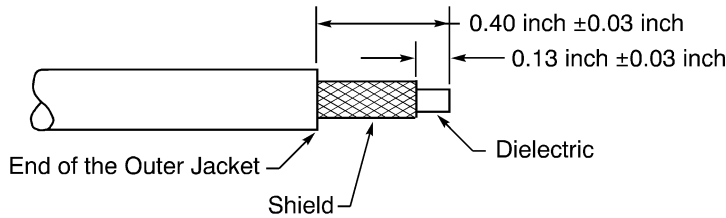
Table 94
OUTER CONTACT BODY CRIMP TOOLS

Coax Contact Size	Crimp Tool	
	Basic Unit	Die
12	KTH-1000	KTH-2177

- (1) Make a selection of a center contact crimp tool from Table 93.
- (2) Make a selection of an outer ferrule crimp tool from Table 94.
- (3) If the contact must be installed in a size 5 cavity, install the sealing boot on the wire or cable. Refer to Paragraph 15.D.
- (4) Prepare the cable. Refer to Figure 103.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

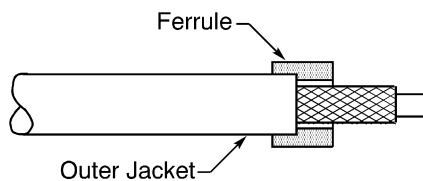


CABLE JACKET PREPARATION
Figure 103

- (a) Cut the cable to make its end perpendicular to its longitudinal axis.
 - (b) Remove the necessary length of the jacket from the end of the cable to make the distance from the end of the jacket to the end of the cable equal to 0.40 inch ±0.03 inch.
 - (c) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable equal to 0.13 inch ±0.03 inch.
- (5) Put the ferrule on the cable. Refer to Figure 104.

Make sure that:

- The end of the ferrule that has the larger inner diameter is pointed rearward away from the end of the cable.
- The inner shoulder of the ferrule in the end that has the larger inner diameter is against the end of the jacket.

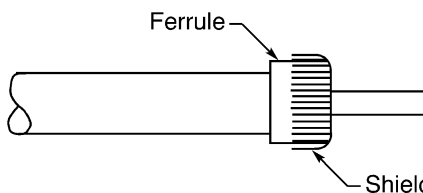


POSITION OF THE INNER FERRULE ON THE CABLE
Figure 104

- (6) Move the strands of the shield apart.
- (7) Fold the strands of the shield back on the ferrule. Refer to Figure 105.

Make sure that:

- The strands of the shield are on the ferrule
- The strands of the shield are symmetrical around the circumference of the ferrule.

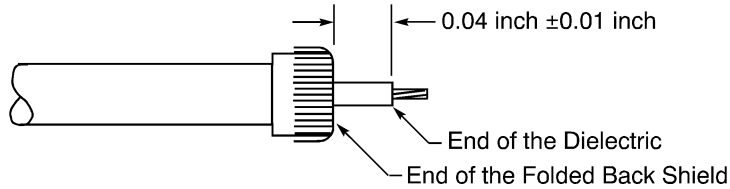


POSITION OF THE SHIELD ON THE FERRULE
Figure 105

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (8) Remove the necessary length of the dielectric to make the distance from the end of the folded back shield to the end of the dielectric equal to 0.04 inch \pm 0.01 inch. Refer to Figure 106.

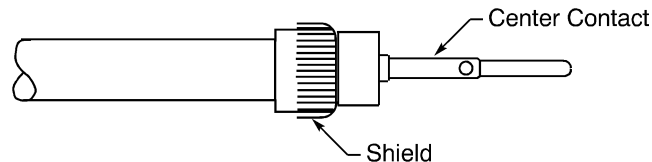


DIELECTRIC REMOVAL LENGTH
Figure 106

- (9) Put the conductor in the crimp barrel of the center contact. Refer to Figure 107.

Make sure that:

- The rear end of the contact is against the end of the dielectric
- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact.

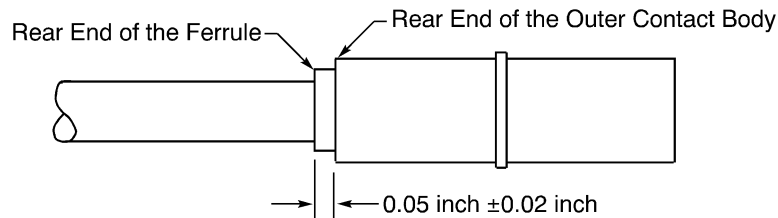


CENTER CONTACT ASSEMBLY
Figure 107

- (10) Crimp the center contact.

- (11) Push the center contact assembly into the outer contact body. Refer to Figure 108.

Make sure that the distance from the rear end of the ferrule to the rear end of the outer contact body is 0.05 inch \pm 0.02 inch.



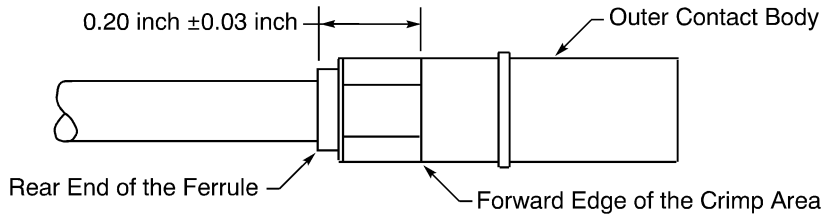
POSITION OF THE OUTER CONTACT BODY ON THE CENTER CONTACT ASSEMBLY
Figure 108

- (12) Crimp the rear end of the outer contact body. Refer to Figure 109.

Make sure that the distance from the rear end of the ferrule to the forward edge of the crimp area is 0.20 inch \pm 0.03 inch.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



POSITION OF THE CRIMP ON THE OUTER CONTACT BODY
Figure 109

(13) If necessary, remove the unwanted length of the shield strands that extend farther than the rear end of the outer contact body. Refer to Figure 109.

10. ASSEMBLY OF S280W554(-) SIZE 8 COAX CONTACTS

A. Assembly of Size 8 Coax Contacts

Table 95
CENTER CONTACT CRIMP TOOLS

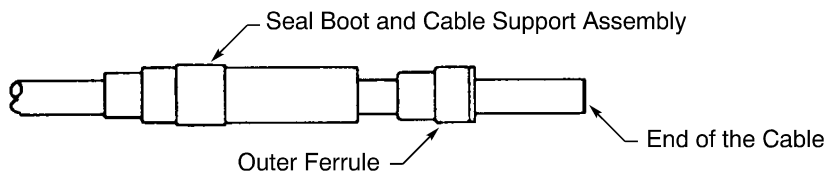
Coax Contact Size	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
8	M22520/2-01	5	K1025S

Table 96
OUTER CONTACT CRIMP TOOLS

Coax Contact Size	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
8	M22520/5-01	Y793A	A

- (1) Make a selection of a center contact crimp tool from Table 95.
- (2) Make a selection of an outer contact crimp tool from Table 96.
- (3) Put these components on the cable:
 - The seal boot and cable support assembly
 - The outer ferrule.

Refer to Figure 110.



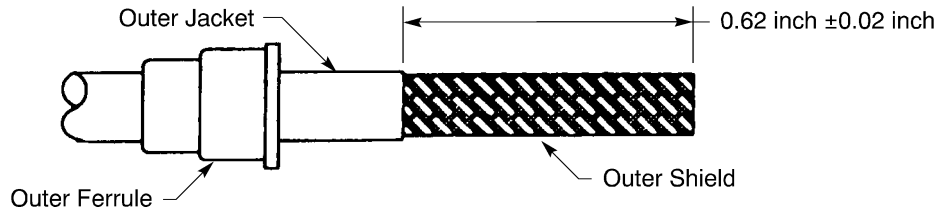
POSITION OF THE SEAL BOOT AND THE OUTER FERRULE ON THE CABLE
Figure 110

20-71-14

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

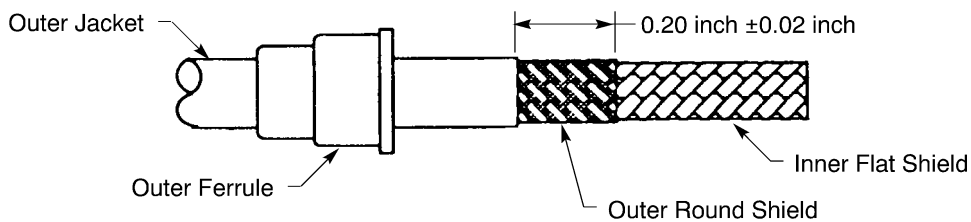
- (4) Remove 0.62 inch \pm 0.02 inch of jacket from the end of the cable. Refer to Figure 111.



OUTER JACKET REMOVAL LENGTH
Figure 111

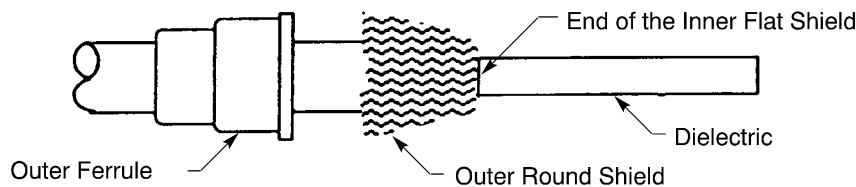
- (5) Cut the outer round shield to make the distance from the end of the cable jacket to the end of the round shield equal to 0.20 inch \pm 0.02 inch.

Refer to Figure 112.



REMOVAL OF THE OUTER ROUND SHIELD
Figure 112

- (6) Loosen the round shield and fold it back on the cable jacket.
 (7) Cut the inner flat shield to align the edge of the shield with the edge of the folded back outer round shield. Refer to Figure 113.

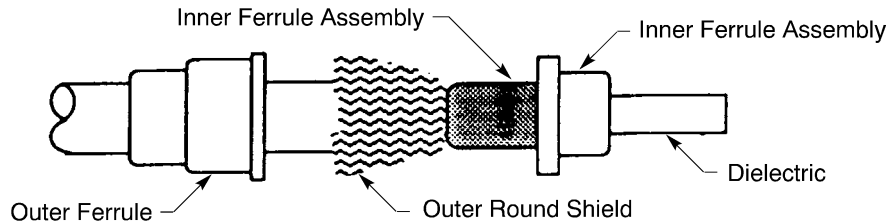


OUTER ROUND SHIELD FOLDED BACK
Figure 113

- (8) Push the inner ferrule assembly rearward on the dielectric until it is against the edge of the round shield. Refer to Figure 114.

STANDARD WIRING PRACTICES MANUAL

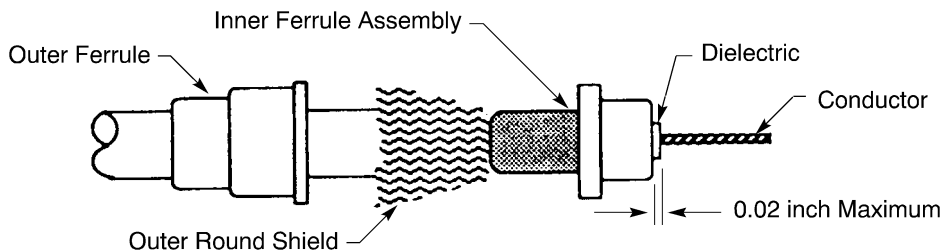
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



POSITION OF THE INNER FERRULE ASSEMBLY ON THE CABLE
Figure 114

- (9) Remove the length of the dielectric between the end of the inner ferrule assembly and the end of the cable. Refer to Figure 115.

Make sure that the distance from the end of the dielectric to the edge of the inner ferrule assembly is not greater than 0.02 inch.



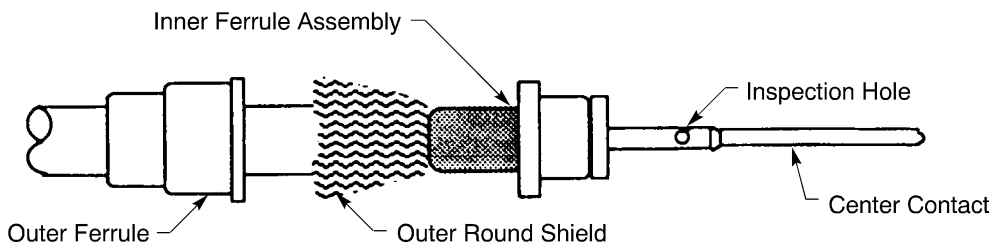
DIELECTRIC REMOVAL
Figure 115

- (10) Put the conductor into the crimp barrel of the center contact.

Make sure that:

- All of the strands of the conductor are in the center contact
- The conductor can be seen in the inspection hole.

- (11) Push the center contact rearward toward the outer ferrule until the inner ferrule assembly is against the outer round shield. Refer to Figure 116.



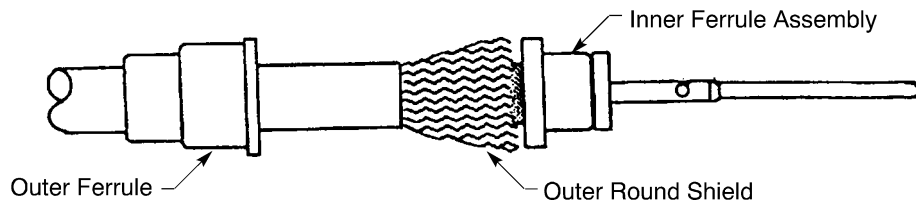
POSITION OF THE CENTER CONTACT ON THE CABLE
Figure 116

- (12) Crimp the center contact.

- (13) Symmetrically put the outer round shield around the inner ferrule assembly. Refer to Figure 117.

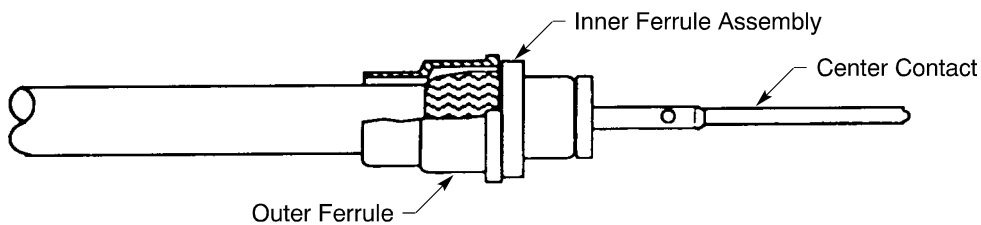
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



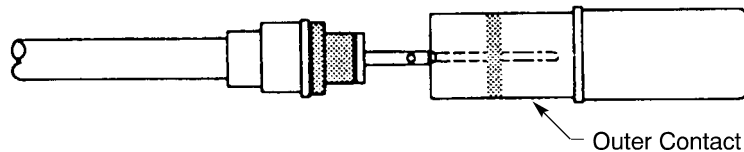
POSITION OF THE OUTER ROUND SHIELD ON THE INNER FERRULE ASSEMBLY
Figure 117

- (14) Push the outer ferrule forward until it is against the inner ferrule assembly. Refer to Figure 118. Make sure that the shield is between the outer ferrule and the inner ferrule assembly.



POSITION OF THE OUTER FERRULE AGAINST THE INNER FERRULE ASSEMBLY
Figure 118

- (15) Remove the unwanted length of the shield strands. Make sure that the end of the shield strands aligns with the rear edge of the shoulder of the inner ferrule assembly.
- (16) Push the cable and the inner contact assembly into the outer contact assembly until it stops. Refer to Figure 119.

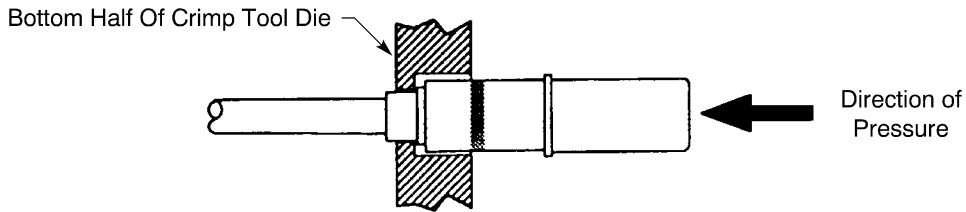


ALIGNMENT OF THE CENTER CONTACT AND THE OUTER CONTACT
Figure 119

- (17) Apply pressure on the outer contact toward the outer and inner ferrule and crimp the outer contact. Refer to Figure 120. Make sure that the outer contact is against the outer ferrule during the crimp operation.

STANDARD WIRING PRACTICES MANUAL

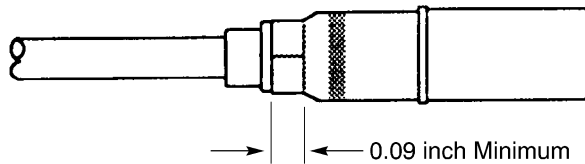
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



DIRECTION OF PRESSURE DURING THE CRIMP OPERATION
Figure 120

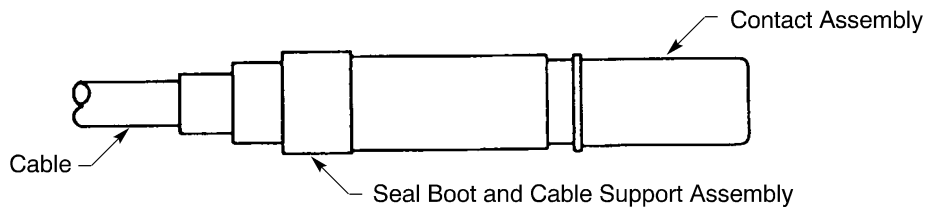
- (18) Examine the crimp area of the outer contact.

Make sure that the length of the crimp area on the outer contact is 0.09 inch or longer. Refer to Figure 121.



CRIMP AREA OF THE OUTER CONTACT
Figure 121

- (19) Push the seal boot and cable support assembly toward the contact assembly until it stops. Refer to Figure 122.



POSITION OF THE SEAL BOOT AGAINST THE CONTACT ASSEMBLY
Figure 122

11. ASSEMBLY OF S280W552-() SIZE 8 TWINAX CONTACTS

A. Twinax Cable Preparation

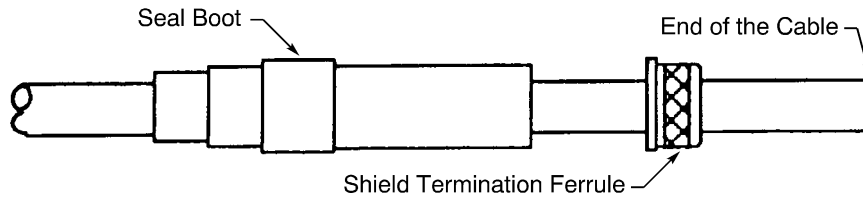
This paragraph gives the procedure to prepare the S280W502-1 twinax cable for the assembly of the twinax contact.

- (1) Put the seal boot on the cable. Refer to Figure 123.

Make sure that the larger end of the seal boot is pointed forward to the end of the cable.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

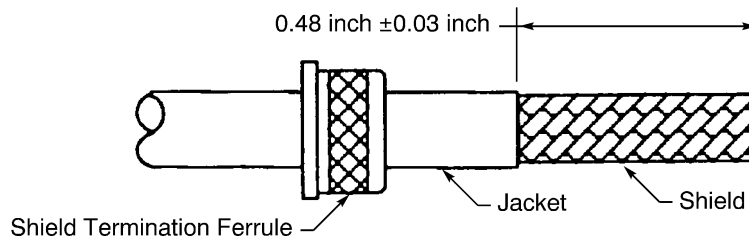


POSITION OF THE SEAL BOOT AND THE FERRULE ON THE CABLE

Figure 123

- (2) Put the shield termination ferrule on the cable. Refer to Figure 123.
Make sure that the larger end of the shield termination ferrule is pointed rearward away from the end of the cable.
- (3) Remove 0.48 inch \pm 0.03 inch of the jacket from the end of the cable.
Refer to Figure 124 and Subject 20-00-15.

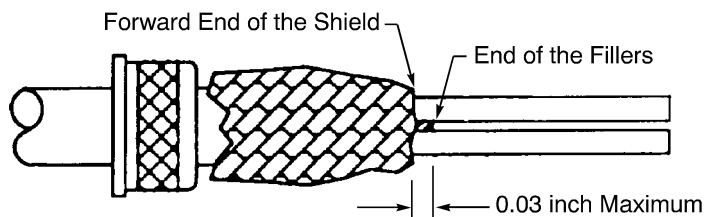
CAUTION: DO NOT CAUSE DAMAGE TO THE STRANDS OF THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.



CABLE JACKET REMOVAL LENGTH

Figure 124

- (4) Fold the shield back against the jacket of the cable.
- (5) Cut the fillers at the necessary location to make the distance from the forward end of the shield to the end of the fillers equal to or less than 0.03 inch. Refer to Figure 125.



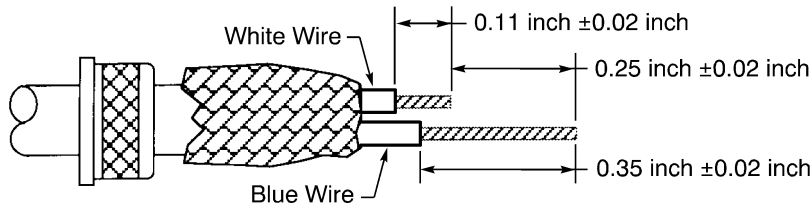
REMOVAL OF THE CABLE FILLERS

Figure 125

- (6) Prepare the wires. Refer to Figure 126.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



INSULATION REMOVAL LENGTH

Figure 126

- (a) Cut the white wire 0.25 inch ±0.02 inch from the end of the wire.
- (b) Remove 0.11 inch ±0.02 inch of the insulation from the end of the white wire.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.

- (c) Remove 0.35 inch ±0.02 inch of the insulation from the end of the blue wire.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.

B. Assembly of Twinax Contacts

Refer to Paragraph 3.H. for the twinax contact termination identification.

**Table 97
CRIMP TOOLS FOR THE TWINAX CONTACT INNER CONTACTS**

Twinax Cable Component	Twinax Contact			Crimp Tool			
	Code	Component	Conductor Cavity Location	Basic Unit		Die	
				Part Number	Setting	Part Number	Cavity
Blue Wire	Blank	Center Contact	Center	AFM-2	6	-	-
White Wire	R	Inner Ring	Side	M22520/5-01	-	Y797	A

**Table 98
CRIMP TOOLS FOR THE TWINAX CONTACT OUTER CONTACT BODY**

Twinax Cable Component	Twinax Contact			Crimp Tool		
	Code	Component	Conductor Location	Basic Unit	Die	
					Part Number	Cavity
Shield	C	Outer Contact Body	Outer Contact Body	M22520/5-01	Y797	B

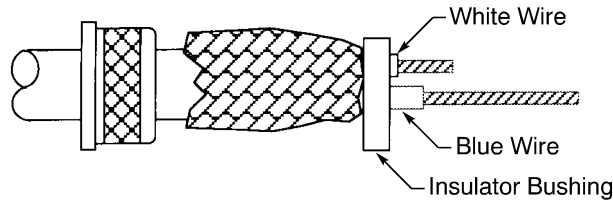
- (1) Put the insulator bushing on the cable. Refer to Figure 127.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Make sure that:

- The white wire is in the hole near the edge of the bushing
- The blue wire is in the hole near the center of the bushing
- The bushing is against the shield.



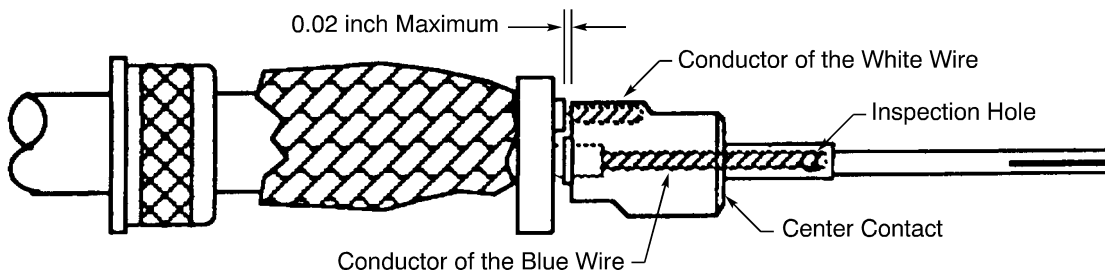
POSITION OF THE INSULATOR BUSHING ON THE CABLE

Figure 127

- (2) Align the conductor of the blue wire and the longer cavity in the center of the center contact.
- (3) Align the conductor of the white wire and the shorter cavity near the side of the center contact.
Make sure that the conductor of the blue wire stays aligned with the longer cavity in the center of the contact.
- (4) Put the center contact on the wires. Refer to Figure 128.

Make sure that:

- All of the strands of the conductor of the blue wire are in the longer center cavity
- All of the strands of the conductor of the white wire are in the shorter side cavity
- The conductor of the blue wire can be seen in the inspection hole
- The distance between the center contact and the end of the insulation of the white wire is a maximum of 0.02 inch.



POSITION OF THE CENTER CONTACT ON THE CABLE

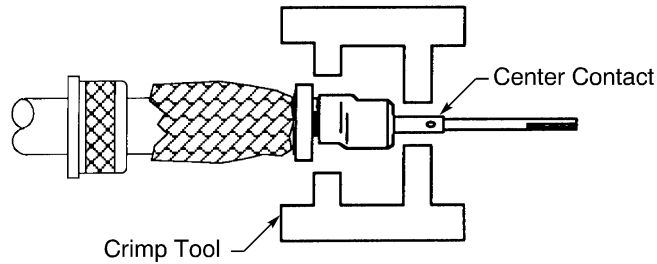
Figure 128

- (5) Make a selection of a center contact crimp tool for the blue wire from Table 97.
- (6) Put the center contact in the crimp tool.
- (7) Crimp the contact.
- (8) Make a selection of a center contact crimp tool for the white wire from Table 97.
- (9) Put the center contact in the crimp tool. Refer to Figure 129.

Make sure that the contact is correctly aligned in the tool.

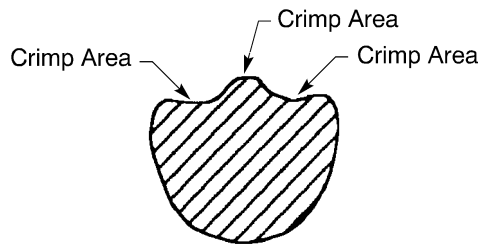
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



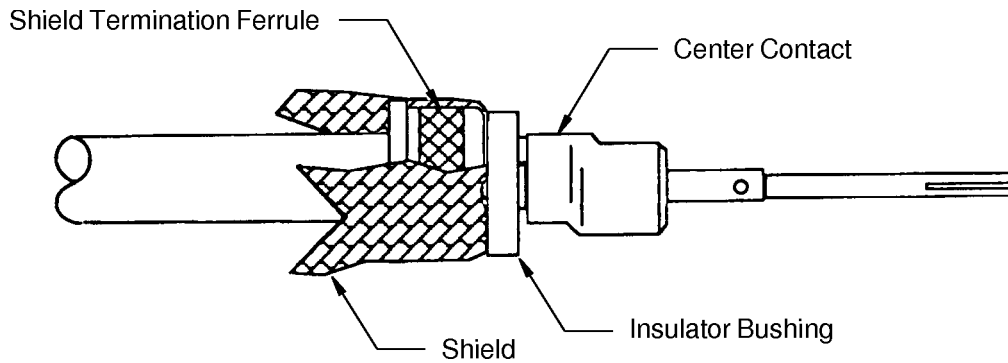
POSITION OF THE CENTER CONTACT IN THE CRIMP TOOL
Figure 129

- (10) Crimp the contact.
- (11) Examine the crimp area of the contact. Refer to Figure 130.
 Make sure that each crimp area does not have a crack.



CRIMP AREAS OF THE CENTER CONTACT
Figure 130

- (12) Push the shield termination ferrule forward until it is against the insulator bushing. Refer to Figure 131.

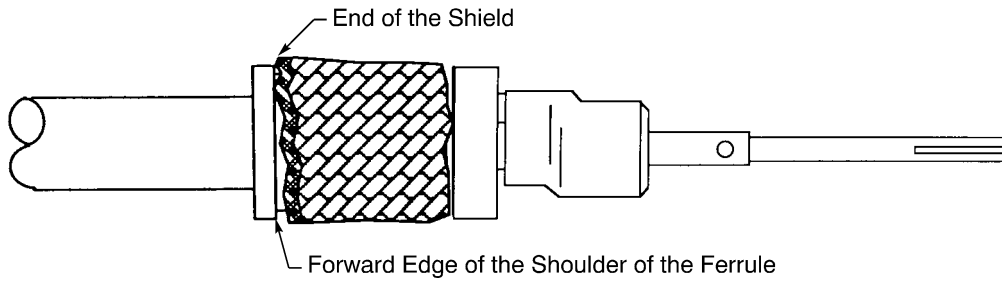


POSITION OF THE FERRULE
Figure 131

- (13) Make the shield flat against the outer surface of the ferrule.
- (14) Cut the shield at the forward edge of the shoulder of the ferrule. Refer to Figure 132.

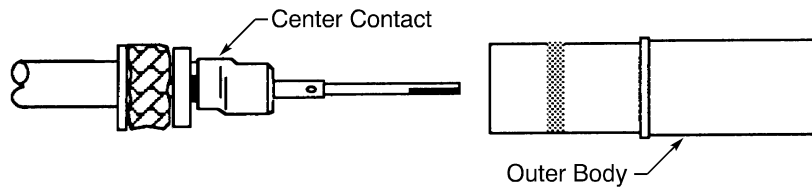
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



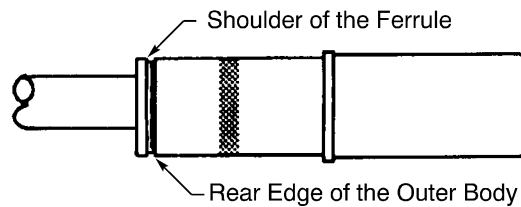
LOCATION OF SHIELD REMOVAL
Figure 132

- (15) Make a selection of an outer contact body crimp tool from Table 98.
- (16) Align the center contact and the outer body. Refer to Figure 133.



ALIGNMENT OF THE CENTER CONTACT AND THE OUTER BODY
Figure 133

- (17) Push the center contact into the outer body until it stops.
 Make sure that the rear edge of the outer body is against the shoulder of the ferrule. Refer to Figure 134.

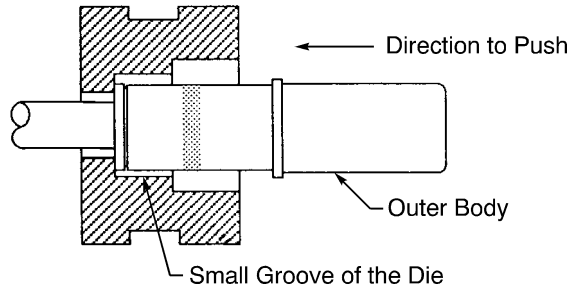


POSITION OF THE OUTER BODY ON THE CENTER CONTACT
Figure 134

- (18) Put the contact in the crimp tool. Refer to Figure 135.
 Make sure that the contact is in the small groove of the die.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

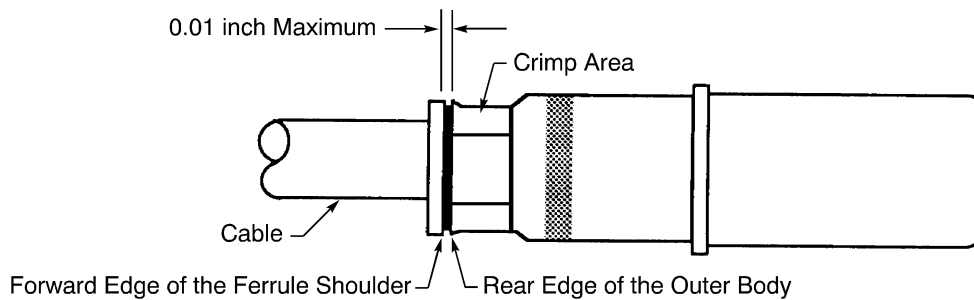


POSITION OF THE CONTACT IN THE CRIMP TOOL
Figure 135

- (19) Push the outer body against the die.
- (20) Continue to push the outer body against the die and crimp the outer body.
 Make sure that the contact stays tight against the die during the crimp operation.
- (21) Examine the crimp area of the contact. Refer to Figure 136.

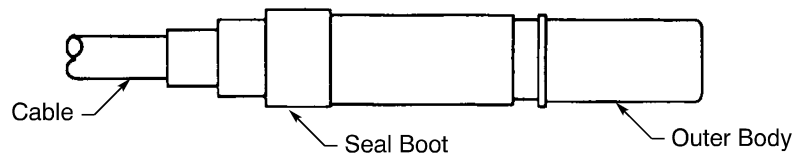
Make sure that:

- The crimp area does not have a crack
- The distance from the rear edge of the outer body to the forward edge of the shoulder of the ferrule is not more than 0.01 inch.



POSITION OF THE OUTER BODY AFTER THE CRIMP OPERATION
Figure 136

- (22) If the crimp area has deformed metal on the edges, do Step (18) through Step (21) again with the contact turned 60 degrees from its position in the initial crimp operation.
- (23) Remove the unwanted strands of the shield between the outer body and the ferrule.
- (24) Carefully push the seal boot forward until it stops. Refer to Figure 137.



POSITION OF THE SEAL BOOT ON THE CONTACT
Figure 137

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (25) Examine the position of the engaging end of the center contact.
- (26) If the engaging end of the center contact is not located at the center of the outer contact, carefully push it into its correct position.

CAUTION: IF THE ENGAGING END OF THE CENTER CONTACT IS NOT LOCATED AT THE CENTER OF THE OUTER CONTACT, DAMAGE TO THE CONTACT, THE CONNECTOR, OR THE RECEPTACLE CONNECTOR CAN OCCUR.

12. ASSEMBLY OF SIZE 8 QUADRAX CONTACTS

A. Assembly of the BACC47GB1 Quadrax Contact

**Table 99
QUADRAX CONTACT INNER CONTACT CRIMP TOOLS**

Quadrax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	Part Number
BACC47GB1	M22520/2-01	5	K709

**Table 100
QUADRAX CONTACT OUTER CONTACT CRIMP TOOLS**

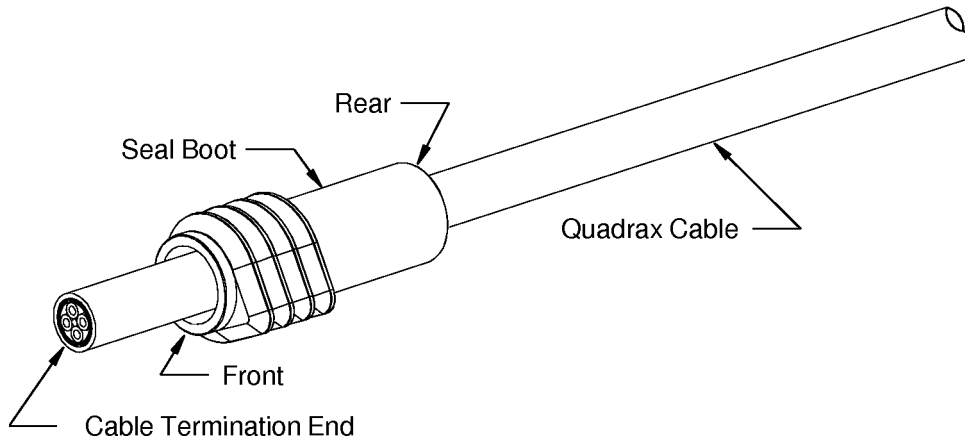
Quadrax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACC47GB1	M22520/5-01	M22520/5-45	B

- (1) Make a selection of an inner contact crimp tool from Table 99.
- (2) Make a selection of an outer contact crimp tool from Table 100.
- (3) Cut the cable perpendicular to its longitudinal axis.
- (4) Put the seal boot on the cable. Refer to Figure 138.

Make sure that the end of the seal boot that has the smaller diameter points rearward, away from the end of the cable.

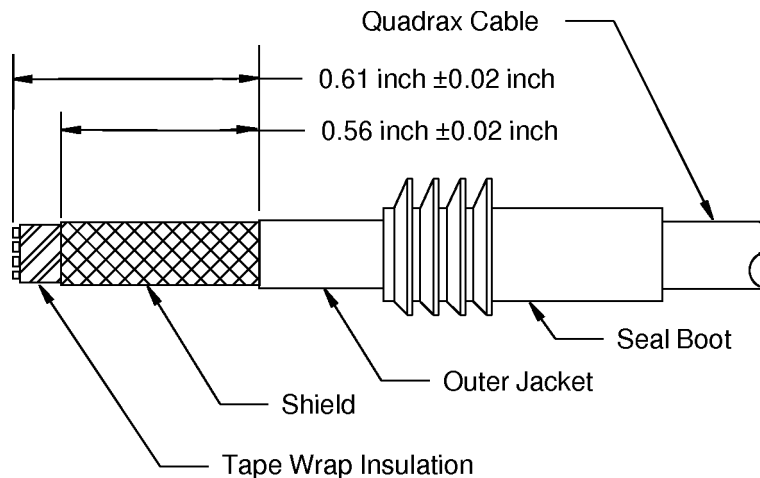
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



THE SEAL BOOT ON THE CABLE
Figure 138

- (5) Move the seal boot away from the end of the cable.
- (6) Prepare the end of the cable. Refer to Figure 139.



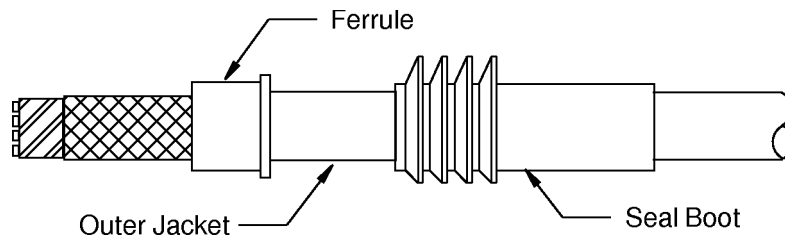
QUADRAX CABLE TRIM DIMENSIONS
Figure 139

- (a) Remove 0.61 inch ± 0.02 inch of the outer jacket from the end of the cable.
- (b) Remove the necessary length of the shield from the end of the cable to make the distance from the end of the outer jacket to the end of the shield equal to 0.56 inch ± 0.02 inch.
- (7) Put the ferrule on the cable. Refer to Figure 140.

Make sure that the end of the ferrule that has the smaller diameter is pointed forward toward the end of the cable.

STANDARD WIRING PRACTICES MANUAL

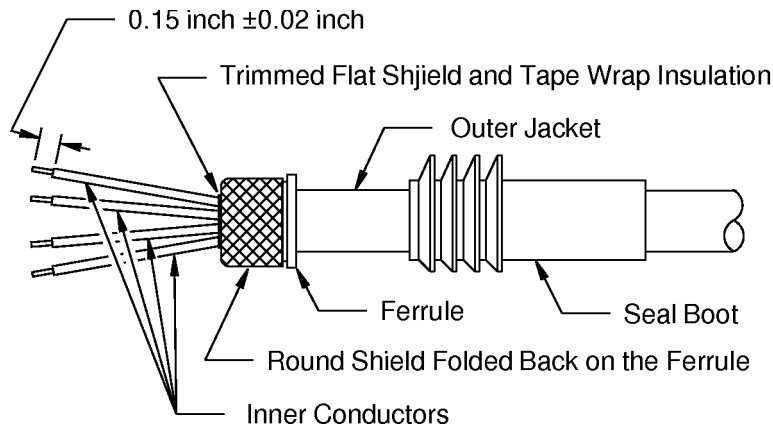
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



POSITION OF THE FERRULE ON THE CABLE

Figure 140

- (8) Push the ferrule rearward until it is against the end of the outer jacket. Refer to Figure 140.
- (9) Fold the outer round shield back on the ferrule. Refer to Figure 141.



INNER CONDUCTOR INSULATION REMOVAL DIMENSIONS AND SHIELD PREPARATION

Figure 141

- (10) Remove the necessary length of the inner flat shield and the tape wrap insulation.
Make sure that the ends of the flat shield and the tape wrap are approximately aligned with the front end of the ferrule.
- (11) Move the four inner conductors apart.
Make sure that:
 - The inner conductors do not cross each other
 - The initial positions of the inner conductors in the cable is not changed.
- (12) Remove the necessary length of the filler rods.
Make sure that the ends of the filler rods are approximately aligned with the front end of the ferrule.
- (13) Remove 0.15 inch \pm 0.02 inch of insulation from each of the four inner conductors.
Refer to:
 - Refer to Figure 141.
 - Subject 20-00-15 for the procedure to remove the wire insulation.
- (14) Crimp an inner contact on each of the four inner conductors.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

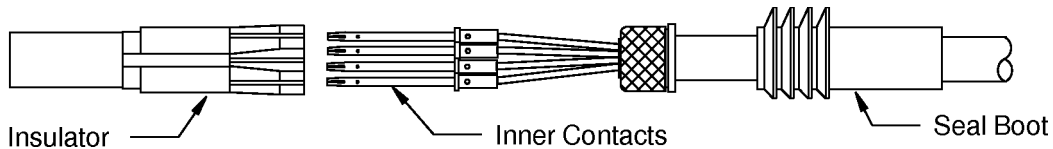
Make sure that:

- The distance between the wire insulation and the end of each inner contact crimp barrel is 0.02 inch maximum
- The wire insulation is not in the crimp barrel
- The conductor strands can be seen in the inspection hole
- All conductor strands are in the crimp barrel
- The conductor strands do not go out of the inspection hole
- The plating of each inner contact is not removed
- The inner contacts have no cracks.

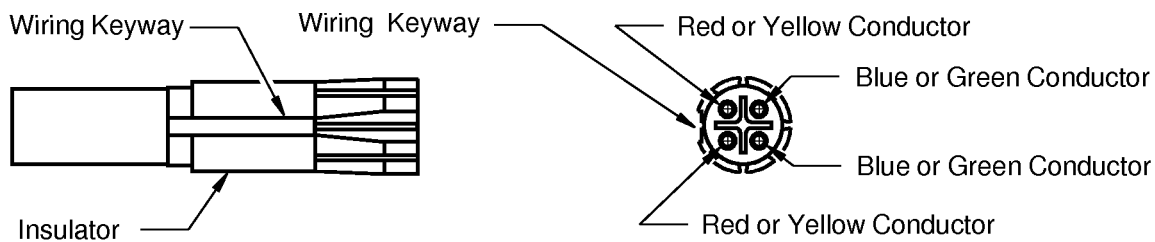
(15) Put the inner contacts into the larger end of the insulator. Refer to Figure 142 and Figure 143.

Make sure that:

- The red conductor and the yellow conductor are adjacent to the wiring keyway of the insulator
- The position of the conductors in the insulator is the same as the position of the conductors in the cable
- Each inner contact is fully installed in the insulator
- The conductors do not cross each other.



INSTALLATION OF THE INNER CONTACTS IN THE INSULATOR
Figure 142

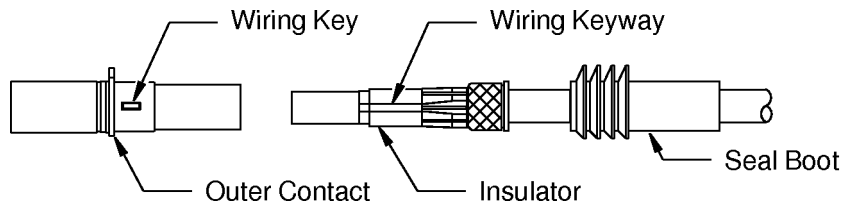


INSULATOR REAR VIEW - WIRE SIDE
POSITION OF THE INNER CONTACTS IN THE INSULATOR
Figure 143

(16) Align the wiring key on the outer contact and the wiring keyway of the insulator. Refer to Figure 144.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

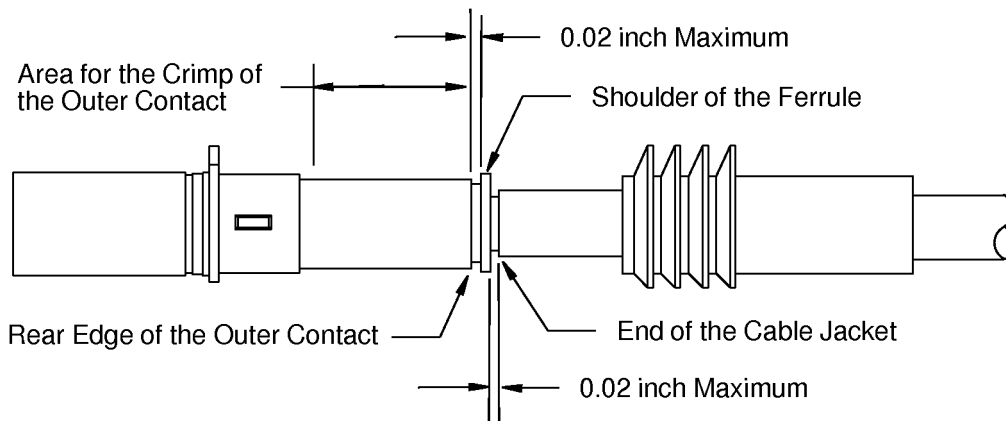


ALIGNMENT OF THE OUTER CONTACT AND THE INSULATOR ASSEMBLY
Figure 144

(17) Push the insulator assembly into the outer contact until it stops . Refer to Figure 145.

Make sure that:

- The wiring key on the outer contact and the wiring keyway of the insulator are aligned
- The rear of the insulator is against the shield that is folded back on the ferrule
- The distance from the rear edge of the outer contact to the shoulder of the ferrule is not more than 0.02 inch
- The distance from the rear end of the ferrule to the end of the cable jacket is not more than 0.02 inch.



QUADRAX CONTACT ASSEMBLY
Figure 145

(18) Crimp the outer contact. Refer to Figure 145.

(19) Remove all of the strands of the shield that are between the rear edge of the outer contact and the shoulder of the ferrule.

13. ASSEMBLY OF SIZE 5 COAX CONTACTS

A. Assembly of ITT Cannon Size 5 Coax Contacts

For the assembly of size 5 coax contacts with S280W503(-) coax cable, refer to Paragraph 13.D.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 101
CABLE TRIM DIMENSIONS**

Contact	Removal Length		
	Dimension	Target (inch)	Tolerance (inch)
349-0013-000	A	0.59	±0.06
	B	0.35	±0.06
349-0013-001	A	0.59	±0.06
	B	0.35	±0.06
349-0015-000	A	0.59	±0.06
	B	0.35	±0.06
349-0015-001	A	0.59	±0.06
	B	0.35	±0.06

**Table 102
COAX CONTACT CENTER CONTACT CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
349-0013-000	M22520/2-01	5	K345
349-0013-001	M22520/2-01	5	K345
349-0015-000	M22520/2-01	6	K345
349-0015-001	M22520/2-01	6	K345

**Table 103
COAX CONTACT OUTER CONTACT CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
349-0013-000	612648	612971	B
	CCT-HX3-156	-	-
	KTH-1000	KTH-2221	B
	M22520/10-01	M22520/10-23	A
	M22520/5-01	M22520/5-45	B

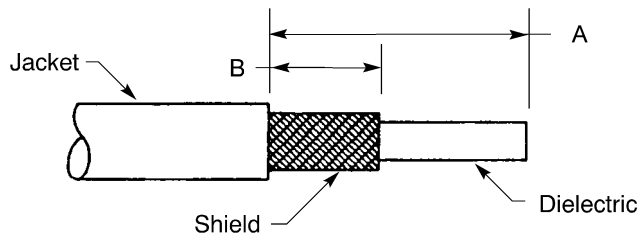
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 103 (continued)

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
349-0013-001	612648	612971	B
	CCT-HX3-156	-	-
	KTH-1000	KTH-2221	B
	M22520/10-01	M22520/10-23	A
	M22520/5-01	M22520/5-45	B
349-0015-000	612648	613365	B
	KTH-1000	KTH-2221	A
	M22520/5-01	M22520/5-45	A
	ST2966M	ST2966M-7	-
	ST965-4	-	C
	WT201-03-10	-	-
349-0015-001	612648	613365	B
	KTH-1000	KTH-2221	A
	M22520/5-01	M22520/5-45	A
	ST2966M	ST2966M-7	-
	ST965-4	-	C
	WT201-03-10	-	-

- (1) Make a selection of a center contact crimp tool from Table 102.
- (2) Make a selection of an outer contact crimp tool from Table 103.
- (3) In this sequence, put these components on the cable:
 - The seal boot
 - The crimp sleeve.
- (4) Prepare the cable. Refer to Figure 146.
Refer to Table 101 for the trim dimensions.

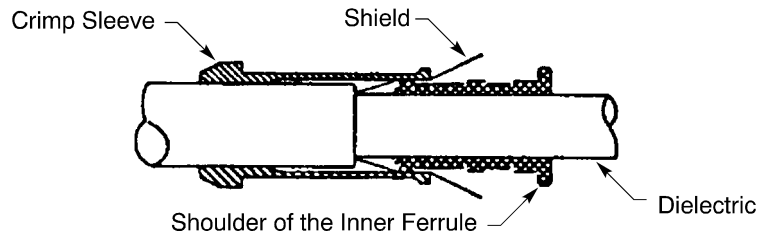


COAX CABLE PREPARATION
Figure 146

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

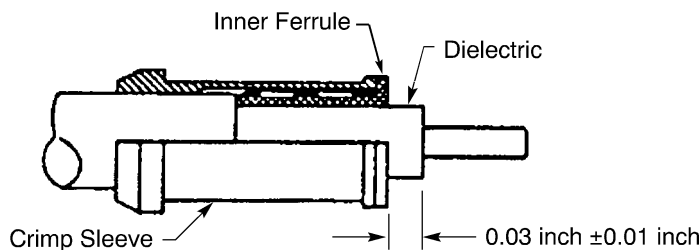
- (a) Cut the cable to make its end perpendicular to its longitudinal axis.
- (b) Remove the necessary length of the jacket from the end of the cable to make the distance from the end of the jacket to the end of the cable equal to Dimension A.
- (c) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to Dimension B.
- (5) Move the end of the shield strands to increase the diameter of the shield at the end of the shield by approximately 50 percent.
- (6) Push the inner ferrule rearward until it stops.
Make sure that all of the strands of the shield are on the ferrule.
- (7) Push the crimp sleeve forward until it holds the shield against the inner ferrule. Refer to Figure 147.



POSITION OF THE SHIELD BETWEEN THE INNER FERRULE AND THE CRIMP SLEEVE

Figure 147

- (8) Remove the unwanted length of the strands of the shield.
Make sure that the end of the shield strands is aligned with the forward shoulder of the inner ferrule.
- (9) Push the crimp sleeve forward until it is against the shoulder of the ferrule.
- (10) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the forward shoulder of the inner ferrule equal to 0.03 inch \pm 0.01 inch. Refer to Figure 148.



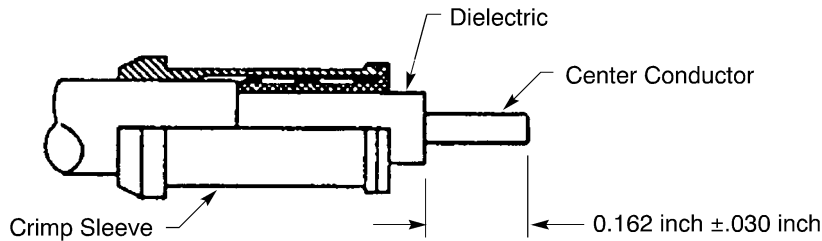
DIELECTRIC REMOVAL LENGTH

Figure 148

- (11) Remove the necessary length of the conductor to make the distance from the end of the conductor to the end of the dielectric equal to 0.162 inch \pm 0.030 inch. Refer to Figure 149.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

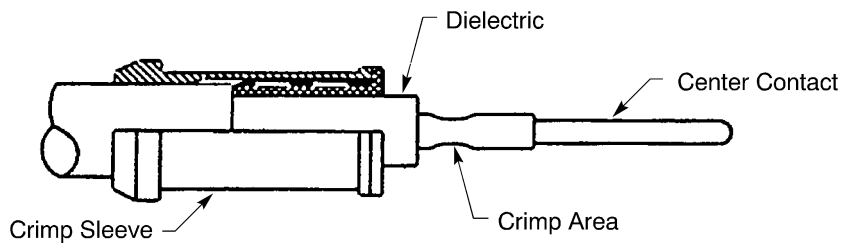


CONDUCTOR REMOVAL LENGTH
Figure 149

(12) Put the center conductor in the crimp barrel of the center contact. Refer to Figure 150.

Make sure that:

- The rear end of the contact is against the end of the dielectric
- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact.

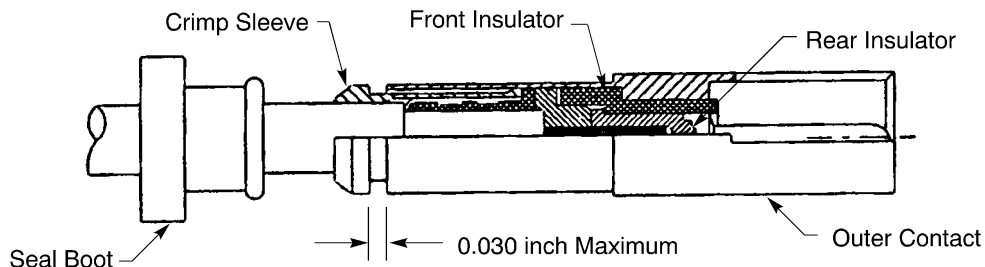


CENTER CONTACT ASSEMBLY
Figure 150

(13) Crimp the center contact.

(14) Put the rear insulator and the front insulator on the center contact. Refer to Figure 151.

Make sure that the rear end of the rear insulator is against the dielectric.



OUTER CONTACT ASSEMBLY
Figure 151

(15) Push the outer contact rearward on the center contact assembly. Refer to Figure 151.

Make sure that the distance from the forward edge of the shoulder of the crimp sleeve to the rear edge of the outer contact is not greater than 0.030 inch.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

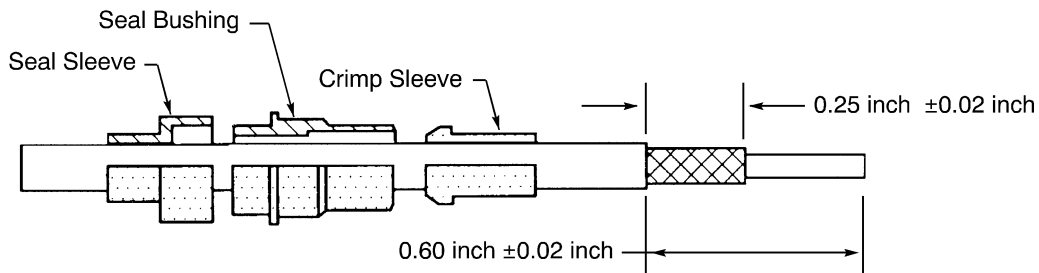
- (16) Crimp the outer contact.
- (17) Push the seal boot forward until the forward end of the boot is against the rear end of the outer contact.

B. Assembly of ITT Cannon 249-2108-000 Size 5 Coax Contacts with RG-142 Cable

**Table 104
COAX CONTACT OUTER CONTACT CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
249-2108-000	M22520/5-01	M22520/5-45	B

- (1) Prepare the cable. Refer to Figure 152.



**CABLE PREPARATION
Figure 152**

- (a) Cut the cable to make its end perpendicular to its longitudinal axis.
 - (b) In this sequence, put these components on the cable:
 - The seal sleeve
 - The seal bushing
 - The crimp sleeve.
 - (c) Remove 0.60 inch \pm 0.02 inch of the jacket from the end of the cable.

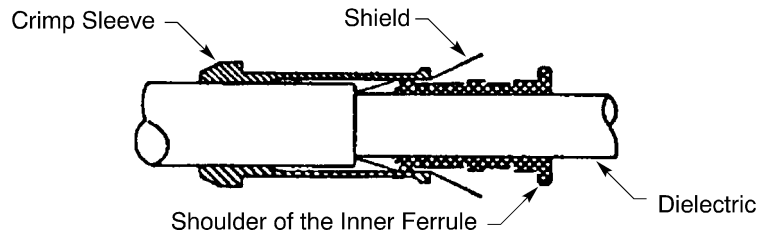
CAUTION: DO NOT CAUSE ANY DAMAGE TO THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE CABLE.
 - (d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.25 inch \pm 0.02 inch.
- (2) Assemble the center contact:
 - (a) Loosen the strands of the shield.
 - (b) Put the inner ferrule on the cable.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Make sure that:

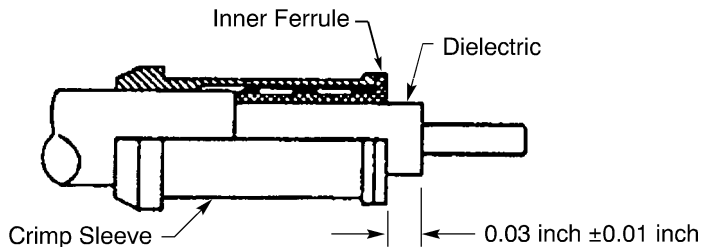
- The shield makes an overlap with the rear end of the inner ferrule
 - The rear end of the inner ferrule is against the end of the jacket
 - The shield is smooth and symmetrical around the circumference of the inner ferrule.
- (c) Push the crimp sleeve forward on the shield until it makes an overlap with the end of the inner ferrule. Refer to Figure 153.



POSITION OF THE SHIELD BETWEEN THE INNER FERRULE AND THE CRIMP SLEEVE

Figure 153

- (d) Remove the unwanted length of shield at the rear edge of the shoulder of the ferrule.
- (e) Push the crimp sleeve forward until it is against the shoulder of the inner ferrule.
- (f) Remove the necessary length of dielectric to make the distance from the end of the crimp sleeve to the end of the dielectric equal to 0.03 inch \pm 0.01 inch. Refer to Figure 154.



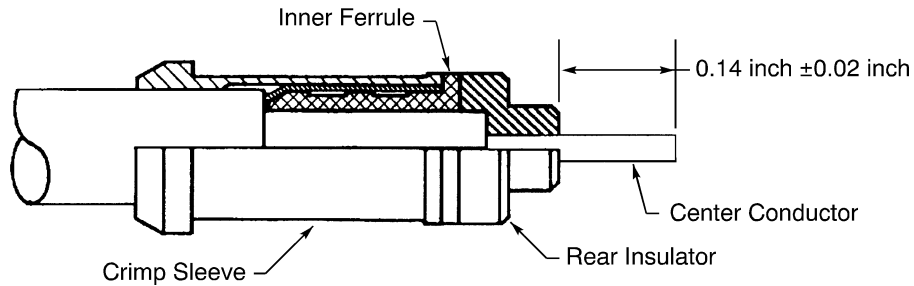
DIELECTRIC REMOVAL LENGTH

Figure 154

- (g) Put the rear insulator on the cable.
Make sure that the rear end of the insulator is against the inner ferrule.
- (h) Remove the necessary length of the center conductor to make the distance from the forward end of the rear insulator to the end of the conductor equal to 0.14 inch \pm 0.02 inch. Refer to Figure 155.

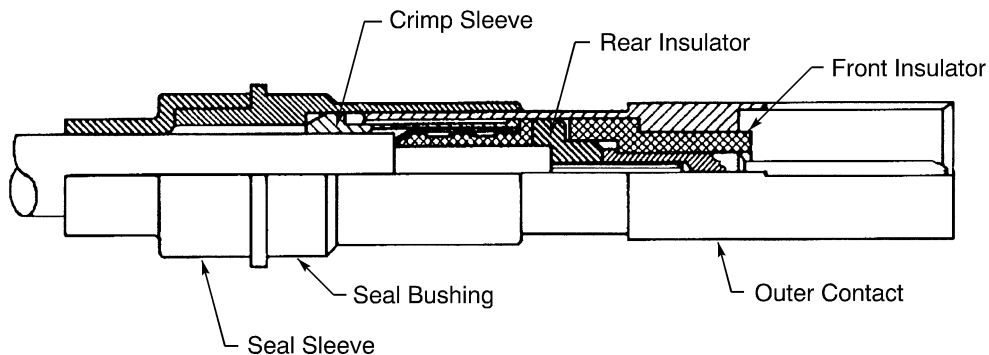
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



CENTER CONDUCTOR LENGTH
Figure 155

- (i) Put the center conductor in the solder cup of the center contact.
 Make sure that:
 - The end of the solder cup of the contact is against the rear insulator
 - All of the strands of the conductor are in the solder cup.
- (j) Solder the contact and the conductor. Refer to Subject 20-40-00.
- (3) Put the front insulator on the center contact.
 Make sure that the rear end of the front insulator is against the shoulder of the rear insulator.
- (4) Assemble the outer contact. Refer to Figure 156.



ITT CANNON 249-2108-000 COAX CONTACT ASSEMBLY
Figure 156

- (a) Make a selection of a crimp tool from Table 104.
- (b) Push the outer contact onto the center contact assembly until it stops.
- (c) Crimp the outer contact.
- (d) Push the seal bushing forward on the outer contact until it stops.
- (e) Push the seal sleeve forward into its position.
 Make sure that:
 - The forward edge of the seal sleeve is against the shoulder of the seal bushing
 - The seal sleeve makes an overlap with the seal bushing.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

C. Assembly of AMP, Radiall, and Souriau Size 5 Coax Contacts

For the assembly of size 5 coax contacts with S280W503(-) coax cable, refer to Paragraph 13.D.

**Table 105
CABLE TRIM DIMENSIONS**

Contact			Removal Length		
Boeing Standard	Supplier Part Number	Supplier	Dimension	Target (inch)	Tolerance (inch)
BACC47EU1	225791-1	AMP	A	0.438	± 0.015
			B	0.219	± 0.015
			C	0.125	± 0.015
	620020	Radiall	A	0.47	± 0.02
			B	0.31	± 0.02
			C	0.16	± 0.02
	8660-2485	Souriau	A	0.60	± 0.02
			B	0.42	± 0.02
			C	0.18	± 0.02
BACC47EU2	8660-2298D	Souriau	A	0.56	± 0.02
			B	0.28	± 0.02
			C	0.17	± 0.02
	8660-2298E	Souriau	A	0.56	± 0.02
			B	0.28	± 0.02
			C	0.17	± 0.02

**Table 106
CENTER CONTACT CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
225791-1	M22520/2-01	5	M22520/2-14
620020	M22520/2-01	5	M22520/2-14
8660-2298D	M22520/2-01	5	M22520/2-14
8660-2298E	M22520/2-01	5	M22520/2-14
8660-2485	M22520/2-01	5	M22520/2-14

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

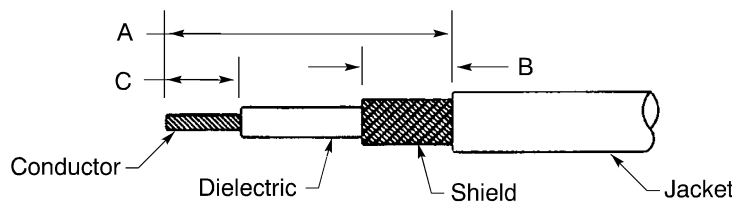
**Table 107
OUTER CONTACT CRIMP TOOLS**

Coax Contact	Crimp Tool	
	Basic Unit	Die
225791-1	612648	620467
620020	612648	620467
8660-2298D	M22520/5-01	612746
		Y120
8660-2298E	M22520/5-01	612746
		Y120
8660-2485	612648	620467

- (1) Make a selection of a center contact crimp tool from Table 106.
- (2) Make a selection of an outer contact crimp tool from Table 107.
- (3) In this order, put these components on the cable:
 - The seal boot
 - The ferrule.

Refer to Figure 159.

- (4) Prepare the cable. Refer to Figure 157.
Refer to Table 105 for the trim dimensions.



**COAX CABLE PREPARATION
Figure 157**

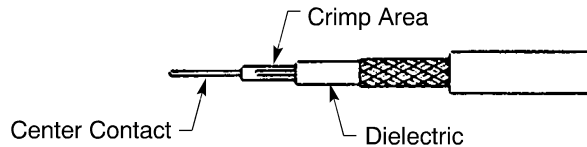
- (a) Cut the cable to make its end perpendicular to its longitudinal axis.
 - (b) Remove the necessary length of the jacket from the end of the cable to make the distance from the end of the jacket to the end of the cable equal to Dimension A.
 - (c) Remove the necessary length of the shield to make the distance from the end of the shield to the end of the cable jacket equal to Dimension B.
 - (d) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension C.
- (5) Put the center conductor in the crimp barrel of the center contact. Refer to Figure 158.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

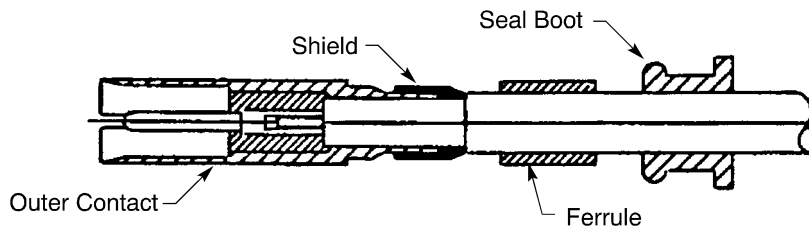
Make sure that:

- The rear end of the contact is against the end of the dielectric
- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact.



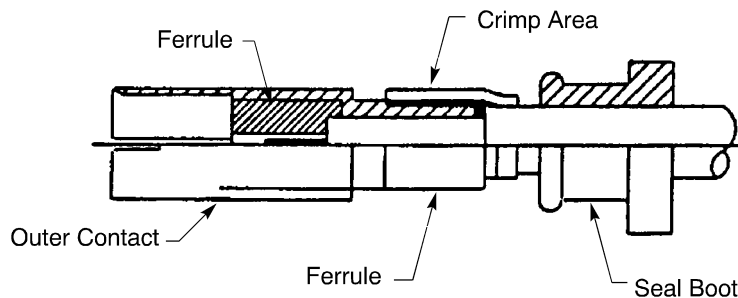
CENTER CONTACT ASSEMBLY
Figure 158

- (6) Crimp the center contact.
- (7) Move the strands of the shield to increase the diameter of the shield approximately 50 percent at end of the shield.
- (8) Put the outer contact on the center contact assembly.
Make sure that the rear end of the outer contact is between the shield and the jacket.
- (9) Push the outer contact rearward until it stops. Refer to Figure 159.
Make sure that the shield is equal and symmetrical around the circumference of the outer contact.



POSITION OF THE OUTER CONTACT ON THE CENTER CONTACT ASSEMBLY
Figure 159

- (10) Push the ferrule forward until the forward edge of the ferrule is against the rear shoulder of the outer contact. Refer to Figure 160.



OUTER CONTACT ASSEMBLY
Figure 160

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (11) Cut the unwanted length of the shield.
Make sure that the end of the shield is aligned with the end of the ferrule.
- (12) Crimp the outer contact.
- (13) Push the seal boot toward the end of the cable until the forward edge of the boot is against the rear shoulder of the outer contact.

D. Assembly of Size 5 Coax Contacts with S280W503-() Coax Cable

**Table 108
CENTER CONTACT CRIMP TOOLS**

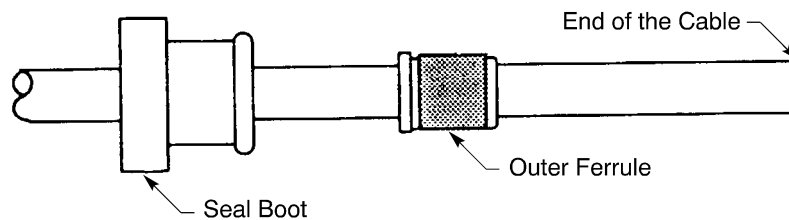
Coax Contact	Coax Cable	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
BACC47EU3	S280W503-1	M22520/2-01	5	K345
BACC47EU4	S280W503-2	M22520/2-01	6	K345

**Table 109
OUTER CONTACT CRIMP TOOLS**

Coax Contact	Coax Cable	Crimp Tool		
		Basic Unit	Die	
			Part Number	Cavity
BACC47EU3	S280W503-1	M22520/5-01	M22520/5-45	B
		M22520/10-01	M22520/10-23	-
BACC47EU4	S280W503-2	M22520/5-01	M22520/5-45	B
		M22520/10-01	M22520/10-23	-

- (1) Make a selection of a center contact crimp tool from Table 108.
- (2) Make a selection of an outer contact crimp tool from Table 109.
- (3) Put these components on the cable:
 - The seal boot
 - The outer ferrule.

Refer to Figure 161.

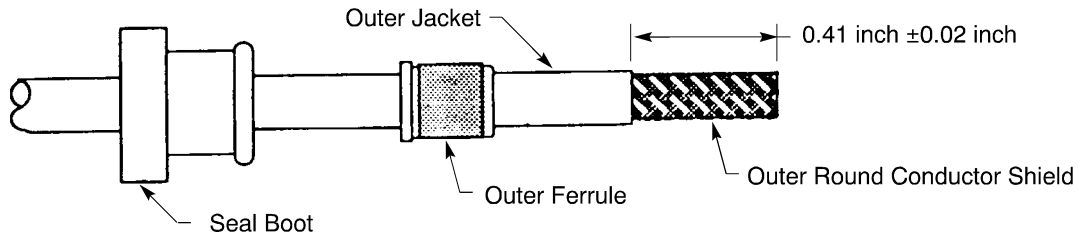


**POSITION OF THE SEAL BOOT AND THE OUTER FERRULE ON THE CABLE
Figure 161**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

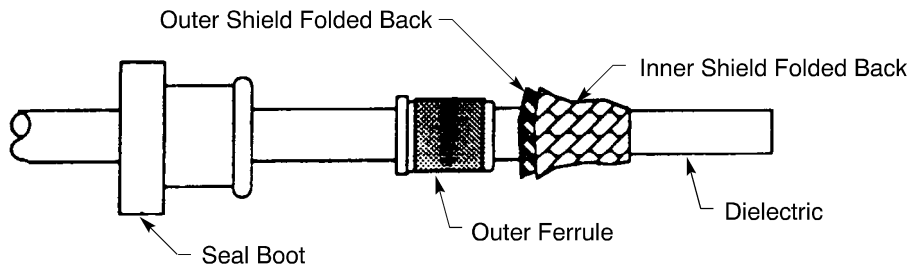
- (4) Remove 0.41 inch \pm 0.02 inch of the outer jacket from the end of the cable. Refer to Figure 162.



CABLE JACKET REMOVAL LENGTH
Figure 162

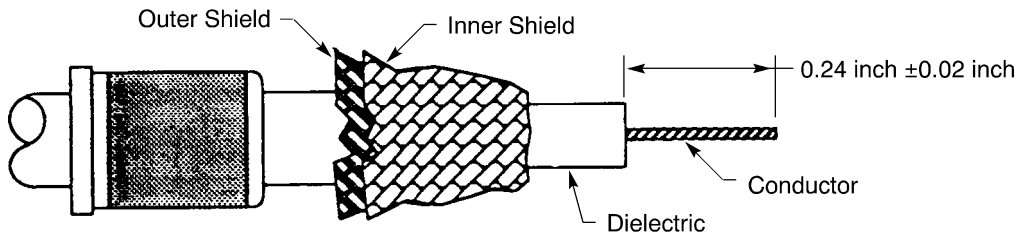
- (5) Fold the outer round conductor shield and the inner flat conductor shield back on the cable jacket. Refer to Figure 163.

If it is necessary, the strands of the inner shield can be moved apart and made straight before they are folded back.



POSITION OF THE OUTER SHIELD AND THE INNER SHIELD FOLDED BACK
Figure 163

- (6) Remove 0.24 inch \pm 0.02 inch of the dielectric from the end of the cable. Refer to Figure 164.

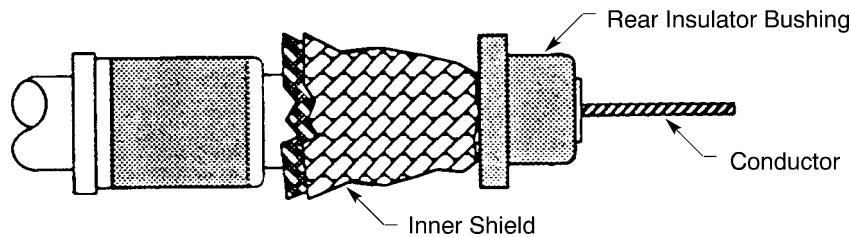


DIELECTRIC REMOVAL LENGTH
Figure 164

- (7) Put the rear insulation bushing on the cable.
Make sure that the large end of the bushing is pointed rearward on the cable.
- (8) Push the bushing rearward until it is against the inner shield. Refer to Figure 165.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



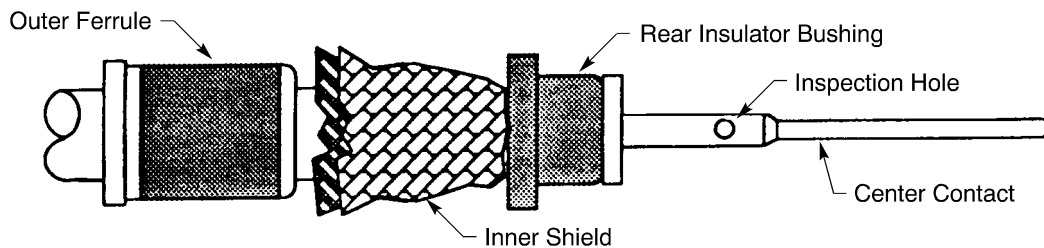
POSITION OF THE REAR INSULATOR BUSHING AGAINST THE INNER SHIELD
Figure 165

(9) Put the conductor in the crimp barrel of the center contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact.

(10) Push the center contact rearward until the end of the contact is against the insulator bushing. Refer to Figure 166.

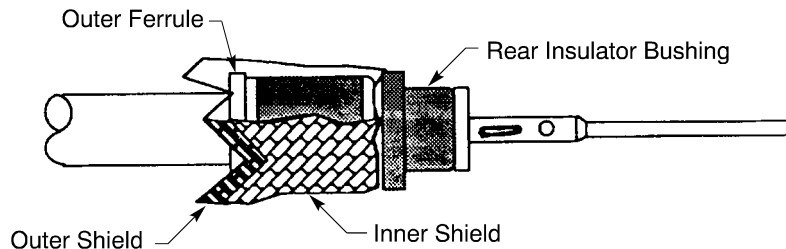


POSITION OF THE CENTER CONTACT ON THE CONDUCTOR
Figure 166

(11) Crimp the center contact.

(12) Push the outer ferrule forward between the cable jacket and the shields until it is against both shields and the rear insulator bushing. Refer to Figure 167.

Make sure that the both shields are symmetrical around the circumference of the outer ferrule.



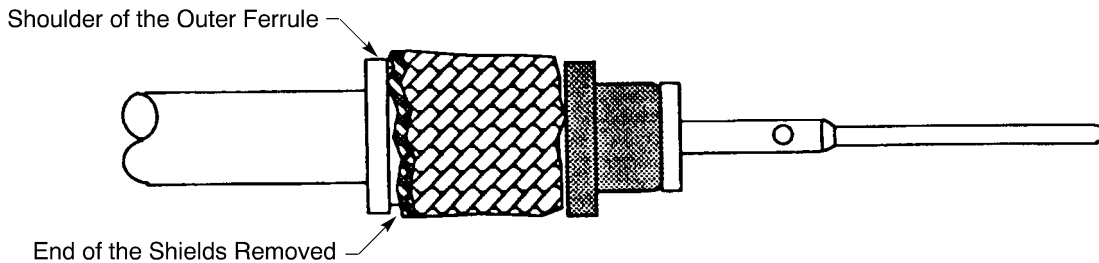
POSITION OF THE OUTER FERRULE BETWEEN THE CABLE JACKET AND THE SHIELDS
Figure 167

(13) Remove the unwanted length of the shields. Refer to Figure 168.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

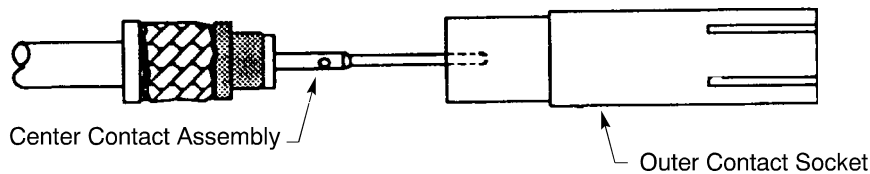
Make sure that the end of the shield strands is aligned with the front edge of the shoulder of the outer ferrule.



REMOVAL OF THE UNWANTED LENGTH OF THE SHIELDS

Figure 168

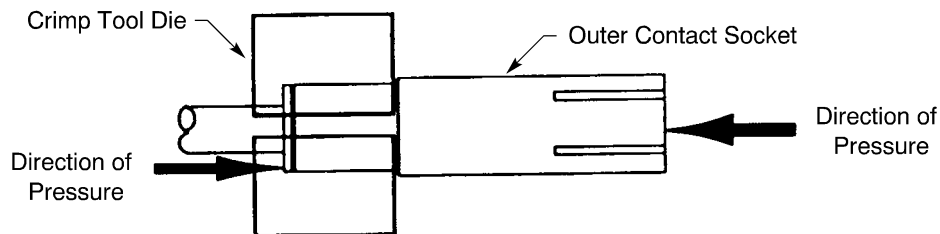
(14) Push the center contact assembly into the outer contact assembly until it stops. Refer to Figure 169.



OUTER CONTACT ASSEMBLY

Figure 169

(15) Assemble the outer contact. Refer to Figure 170.



DIRECTION OF APPLIED PRESSURE DURING THE CRIMP OPERATION

Figure 170

- (a) At the same time, apply pressure:
 - On the outer contact toward the center contact assembly
 - On the center contact assembly toward the outer contact.
- (b) Crimp the outer contact.

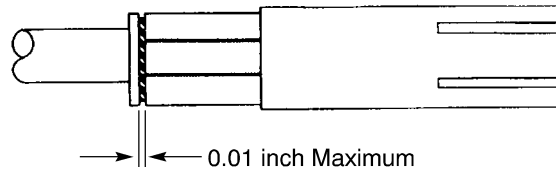
Make sure that the outer contact is tight against the center contact assembly during the crimp operation.

(16) Examine the contact.

Make sure that the distance between the forward edge of the shoulder of the outer ferrule and the rear end of the outer contact is not greater than 0.01 inch. Refer to Figure 171.

STANDARD WIRING PRACTICES MANUAL

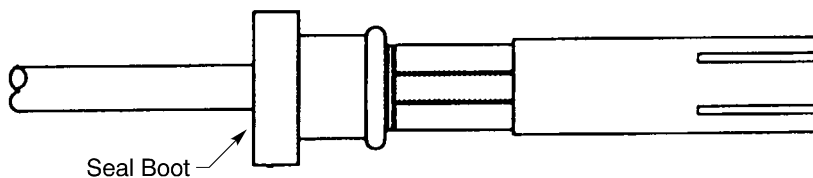
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



DISTANCE BETWEEN THE OUTER FERRULE AND THE OUTER CONTACT

Figure 171

(17) Push the seal boot forward until it is against the rear edge of the outer contact. Refer to Figure 172.



POSITION OF THE SEAL BOOT AGAINST THE OUTER CONTACT

Figure 172

14. ASSEMBLY OF SIZE 1 COAX CONTACTS

A. Assembly of Size 1 Coax Contacts

This paragraph gives the procedures to assemble the BACC47EN1, BACC47EN2, BACC47EN3 and ITT Cannon 349-0005-000 coax contacts. Refer to Table 110 for other size 1 coax contact assembly and installation procedures.

Table 110

OTHER SIZE 1 COAX CONTACT ASSEMBLY AND INSTALLATION PROCEDURES

Procedure	Reference
Install the BACC47EN4 adapter contact in a BACI10AH05, 08, 09 or 25 insert	Paragraph 15.I.
Install the BACA19BK1 adapter contact in a BACI10AH11 insert	Paragraph 15.K.
Assemble the ITT Cannon 320-1066-006 termination kit	Paragraph 14.D.
Assemble the ITT Cannon 320-1066-015 termination kit	Paragraph 14.E.
Assemble the Kings 3011-1-103 coax contact	Paragraph 14.C.
Install a size 1 coax contact that has a mounting block in a BACI10AH05, 08, 09 or 25 insert	Paragraph 15.I.
Install a termination kit contact	Paragraph 15.J.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 111
COAX CABLE JACKET REMOVAL LENGTH**

Contact		Removal Length		
Supplier	Part Number	Dimension	Target (inch)	Tolerance (inch)
ITT Cannon	349-0005-000	A	0.470	±0.06
	349-0017-000	A	0.470	±0.06
	349-0018-000	A	0.470	±0.06
Radiall	620001	A	0.510	±0.03
	620002	A	0.470	±0.03
	620101	A	0.510	±0.03
	620101-001	A	0.510	±0.03
	620102	A	0.470	±0.03
	620102-001	A	0.470	±0.03
Souriau	8660-2295	A	0.600	±0.06
	8660-2297	A	0.511	±0.06
	8660-2299	A	0.511	±0.06

**Table 112
DIELECTRIC REMOVAL LENGTH**

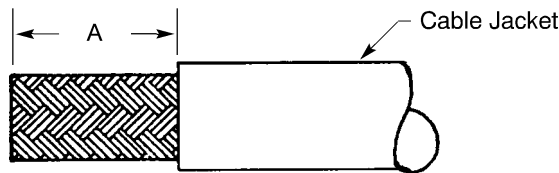
Contact		Removal Length		
Supplier	Part Number	Dimension	Target (inch)	Tolerance (inch)
ITT Cannon	349-0005-000	A	0.24	±0.03
	349-0017-000	A	0.24	±0.03
	349-0018-000	A	0.24	±0.03
Radiall	620001	A	0.24	±0.03
	620002	A	0.24	±0.03
	620101	A	0.24	±0.03
	620101-001	A	0.24	±0.03
	620102	A	0.24	±0.03
	620102-001	A	0.24	±0.03
Souriau	8660-2295	A	0.18	±0.03
	8660-2297	A	0.21	±0.03
	8660-2299	A	0.21	±0.03

(1) Prepare the cable:

STANDARD WIRING PRACTICES MANUAL

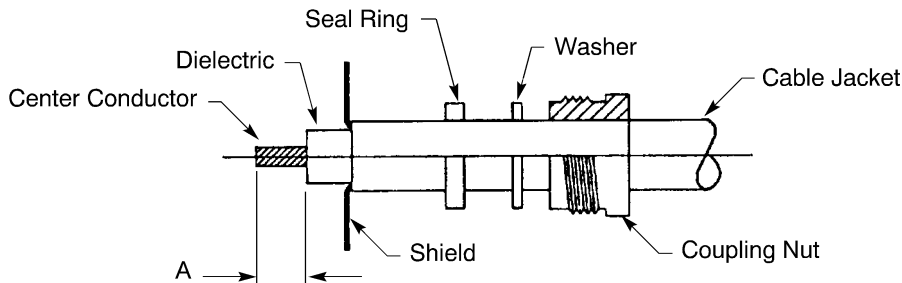
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (a) Cut the cable to make its end perpendicular to its longitudinal axis.
- (b) In this order, put these components on the cable:
 - The coupling nut
 - The washer
 - The seal ring.
- (c) For the Souriau 8660-2295A contact with an RG-393 cable, make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
 Make sure that the diameter of the sleeve is the smallest that can easily move on the cable jacket.
- (d) For the Souriau 8660-2295A contact with an RG-393 cable, put a 1.50 inch \pm 0.25 inch length of the heat shrinkable sleeve on the cable.
- (e) Remove the necessary length of the jacket from the end of the cable to make the distance from the end of the jacket to the end of the cable equal to Dimension A. Refer to Figure 173.
 Refer to Table 111 the value of the dimension.



CABLE JACKET REMOVAL LENGTH
Figure 173

- (f) For the Souriau 8660-2295A contact with an RG-393 cable, shrink the sleeve into position. Refer to Subject 20-10-14.
 Make sure that the forward end of the sleeve is aligned with the end of the cable jacket.
- (g) Move the strands of the shield apart.
- (h) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the cable equal to Dimension A. Refer to Figure 174.
 Refer to Table 112 the value of the dimension.



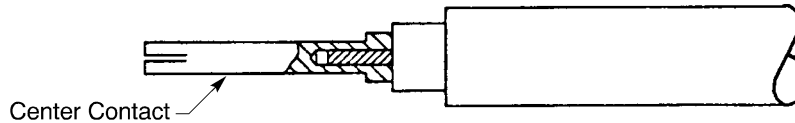
DIELECTRIC REMOVAL LENGTH
Figure 174

- (2) Put the center contact on the conductor.

STANDARD WIRING PRACTICES MANUAL

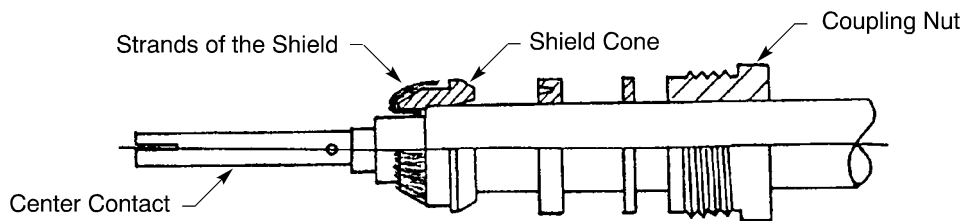
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (3) Solder the contact. Refer to Figure 175 and Subject 20-40-00.



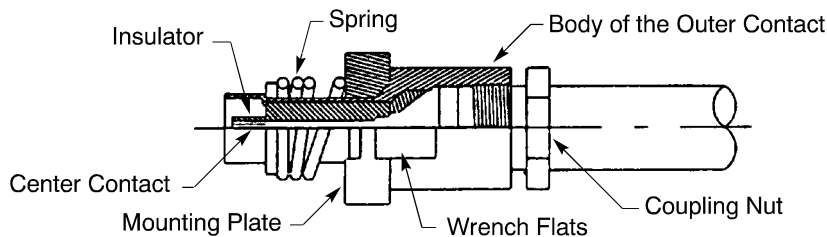
CENTER CONTACT ASSEMBLY
Figure 175

- (4) Put the shield cone on the cable.
Make sure that the forward end of the cone is against the end of the jacket.
- (5) Fold the strands of the shield back on the shield cone.
- (6) Remove the unwanted length of the strands of the shield. Refer to Figure 176.
Make sure that the end of the strands is aligned with the forward edge of the shoulder of the shield cone.



POSITION OF THE SHIELD AND THE SHIELD CONE
Figure 176

- (7) Put the outer contact on the inner contact assembly.
- (8) Engage the threads of the coupling nut and the body of the outer contact. Refer to Figure 177.



OUTER CONTACT ASSEMBLY
Figure 177

- (9) Torque the coupling nut:
- 50 inch-pounds \pm 5 inch-pounds for the ITT Cannon contact
 - 30 inch-pounds \pm 5 inch-pounds for the Souriau contact.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

B. Replacement of a Size 1 Coax Mounting Block that has Special Hole Spacing

This paragraph gives the procedure to remove a size 1 coax contact mounting block that has special hole spacing, and replace it with a standard size 1 coax contact mounting block.

This procedure is applicable if the Boeing connector part number has insert configuration code 122, 123 or 125. These insert configuration codes indicate a connector that has inserts that fit the standard mounting block of the size 1 coax contact.

Table 113

ITT CANNON SIZE 1 COAX CONTACT MOUNTING BLOCK CONVERSION KIT

Description	Part Number	Supplier
Size 1 Coax Mounting Block Conversion Kit	320-0091-000	ITT Cannon

- (1) Make a selection of a size 1 coax contact mounting block conversion kit from Table 113.
- (2) Remove the size 1 coax contact from the connector. Refer to Paragraph 7.E.
- (3) Remove these components from the contact:
 - The retaining ring
 - The washer
 - The O-ring
 - The second washer
 - The spring
 - The mounting block.

NOTE: The O-ring and the second washer are part of the environmental configuration of the size 1 coax contact only.

- (4) Get the mounting block from the conversion kit.
- (5) In this sequence, put these components on the coax contact:
 - The new mounting block
 - The spring
 - The washer
 - The O-ring
 - The second washer
 - The retaining ring.

NOTE: The O-ring and the second washer are part of the environmental configuration of the size 1 coax contact only.

C. Assembly of Kings 3011-1-103 Size 1 Coax Contact with S280W503-5 Cable

Table 114

CENTER CONTACT CRIMP TOOLS

Crimp Tool Basic Unit	Crimp Tool Die	
	Part Number	Cavity
KTH-1000	KTH-2213	A

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 115
OUTER FERRULE CRIMP TOOLS**

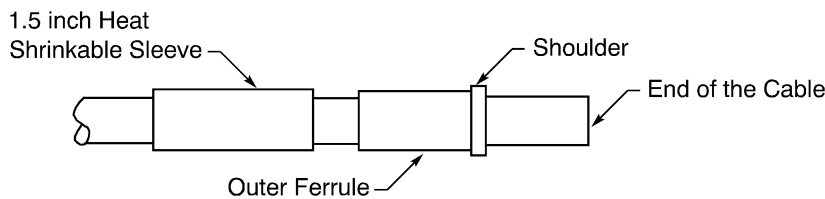
Crimp Tool Basic Unit	Crimp Tool Die	
	Part Number	Cavity
KTH-1000	KTH-2213	B

**Table 116
NECESSARY MATERIALS**

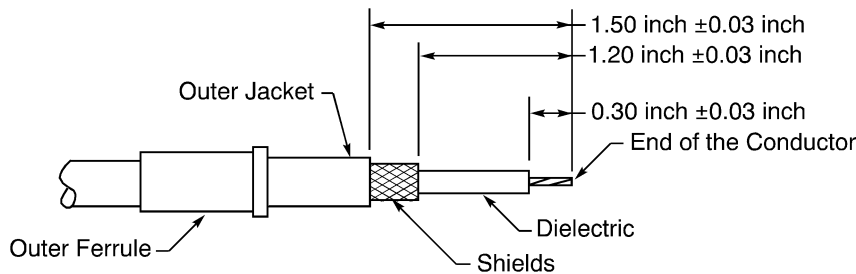
Material	Part Number	Supplier
Heat Shrinkable Sleeve	DWP-125	Raychem
	MWSF	Remtek

- (1) Prepare the cable:
- (a) Cut the cable to make its end perpendicular to its longitudinal axis.
 - (b) Make a selection of a heat shrinkable sleeve from Table 116.

NOTE: An equivalent heat shrinkable sleeve is a satisfactory alternative. Refer to Subject 20-00-11.
 - (c) Put a 1.5 inch minimum length of heat shrinkable sleeve on the cable. Make sure that the sleeve has the smallest diameter that moves easily on the outer ferrule.
 - (d) Put the outer ferrule on the cable. Refer to Figure 178. Make sure that the end of the ferrule that has the shoulder is pointed forward to the end of the cable.



**POSITION OF THE OUTER FERRULE ON THE CABLE
Figure 178**



**CABLE PREPARATION
Figure 179**

STANDARD WIRING PRACTICES MANUAL

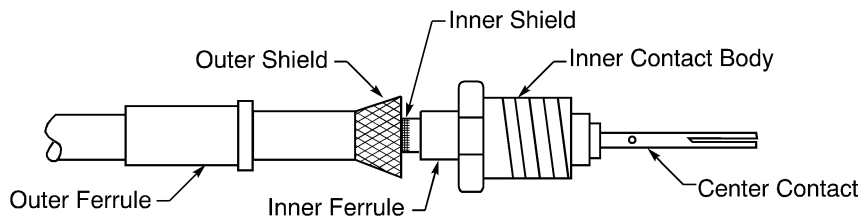
ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Refer to Figure 179:

- (e) Remove the necessary length of the jacket from the end of the cable to make the distance from the end of the jacket to the end of the cable equal to 1.50 inches \pm 0.03 inch.
 - (f) Remove the necessary length of the round and flat shields from the end of the cable to make the distance from the end of the shields to the end of the cable equal to 1.20 inches \pm 0.03 inch.
 - (g) Move the strands of the outer shield apart.
 - (h) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the conductor equal to 0.30 inch \pm 0.03 inch.
- (2) Push the end of the cable into the inner contact body. Refer to Figure 180.

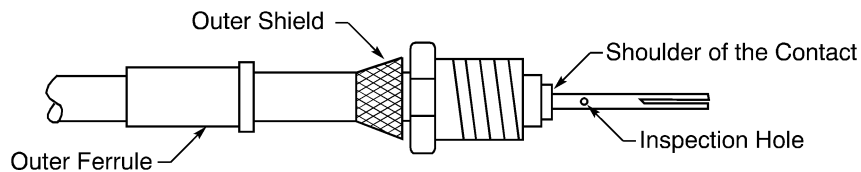
Make sure that:

- The conductor can be seen in the inspection hole of the center contact
- The inner ferrule is between the inner shield and the outer shield.



CENTER CONTACT ASSEMBLY
Figure 180

- (3) Make a selection of a center contact crimp tool from Table 114.
- (4) Crimp the center contact between the contact shoulder and the inspection hole. Refer to Figure 181.

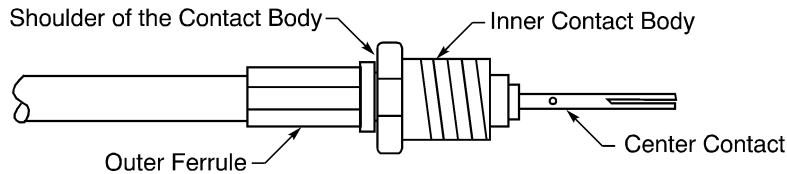


CENTER CONTACT ASSEMBLY
Figure 181

- (5) Push the outer ferrule forward until it is against the shoulder of the contact body.
- (6) Remove the unwanted length of the strands of the shield.
- (7) Make a selection of an outer ferrule crimp tool from Table 115.
- (8) Crimp the outer ferrule. Refer to Figure 182.

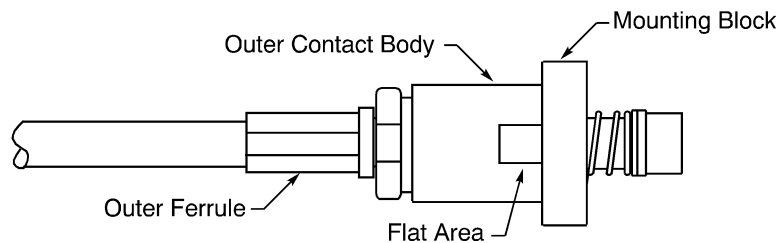
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



CRIMPED OUTER FERRULE ON THE INNER CONTACT ASSEMBLY
Figure 182

- (9) Put the inner contact assembly into the outer contact body.
- (10) Engage the threads of the inner contact body and the threads of the outer contact body. Refer to Figure 183.

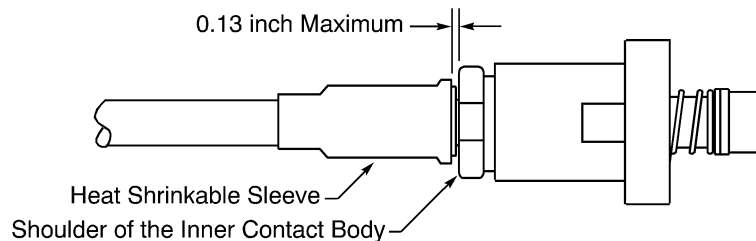


CONTACT ASSEMBLY
Figure 183

- (11) Hold the flat areas of the outer contact body and torque the coupling nut of the inner contact to 30 inch-pounds \pm 3 inch-pounds.
- (12) Push the heat shrinkable sleeve forward on the crimped area of the ferrule. Refer to Figure 184. Make sure that the distance from the forward end of the sleeve to the rear shoulder of the contact body is a maximum of 0.13 inch. Refer to Figure 184.
- (13) Shrink the sleeve into its position.

Refer to:

- Figure 184
- Subject 20-10-14.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONTACT ASSEMBLY
Figure 184

- (14) Install the contact assembly in the connector. Refer to Paragraph 15.I.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

D. Assembly of the ITT Cannon 320-1066-006 Size 1 Coax Contact Termination Kit

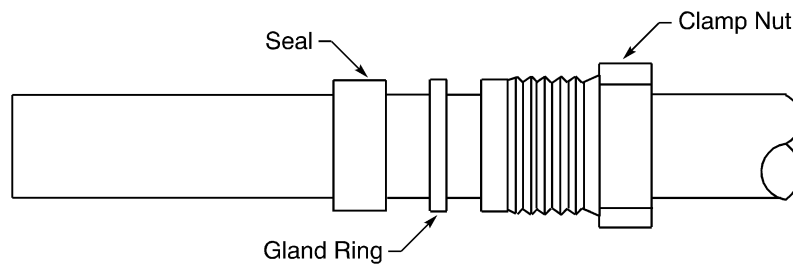
NOTE: The coax contact termination kit contains the center contact assembly.

**Table 117
CENTER CONTACT CRIMP TOOLS**

Basic Unit		Locator
Part Number	Setting	
M22520/1-01	7	M22520/1-02

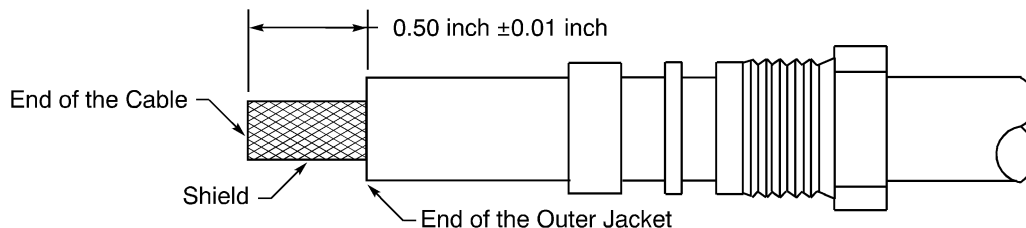
- (1) Make a selection of a center contact crimp tool from Table 117.
- (2) Put these components on the cable in this sequence:
 - The clamp nut
 - The gland ring
 - The seal.

Refer to Figure 185.



**POSITION OF THE CLAMP NUT, THE GLAND RING, AND THE SEAL ON THE CABLE
Figure 185**

- (3) Cut the cable to make its end perpendicular to its longitudinal axis.
- (4) Remove 0.50 inch \pm 0.01 inch of the jacket from the end of the cable. Refer to Figure 186.

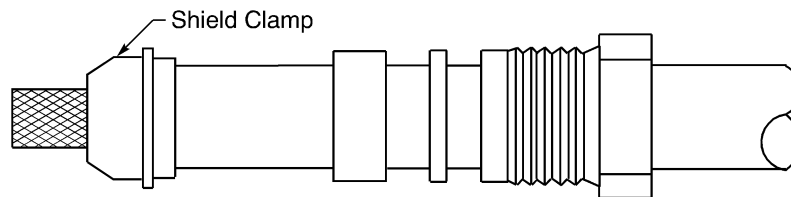


**CABLE JACKET REMOVAL LENGTH
Figure 186**

- (5) Put the shield clamp on the cable. Refer to Figure 187.
Make sure that the end of the clamp is against the end of the jacket.

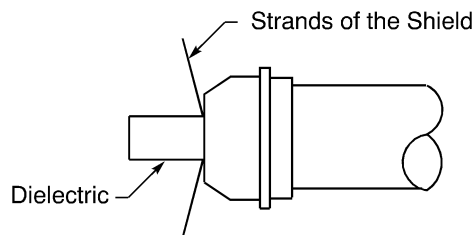
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



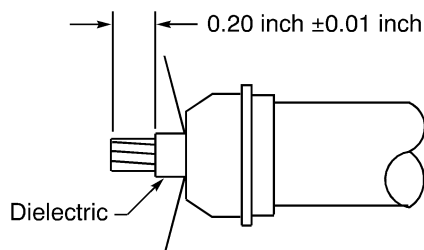
POSITION OF THE SHIELD CLAMP
Figure 187

- (6) Move the strands of the shield apart.
- (7) Make the strands of the shield straight.
- (8) Move the strands of the shield away from the dielectric. Refer to Figure 188.



POSITION OF THE SHIELD STRANDS
Figure 188

- (9) Remove 0.20 inch \pm 0.01 inch of the dielectric from the end of the cable. Refer to Figure 189.

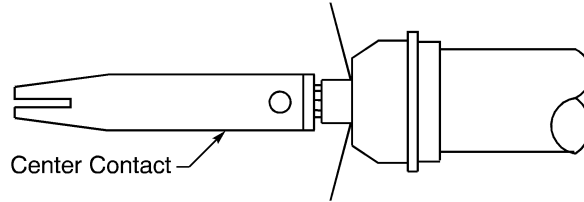


DIELECTRIC REMOVAL
Figure 189

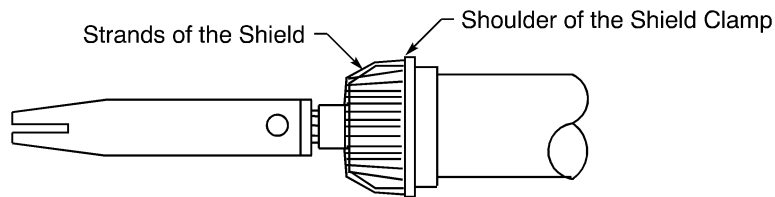
- (10) Put the conductor in the crimp barrel of the center contact. Refer to Figure 190.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact
- The end of the conductor is against the bottom of the crimp barrel of the contact.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS****CENTER CONTACT ASSEMBLY****Figure 190**

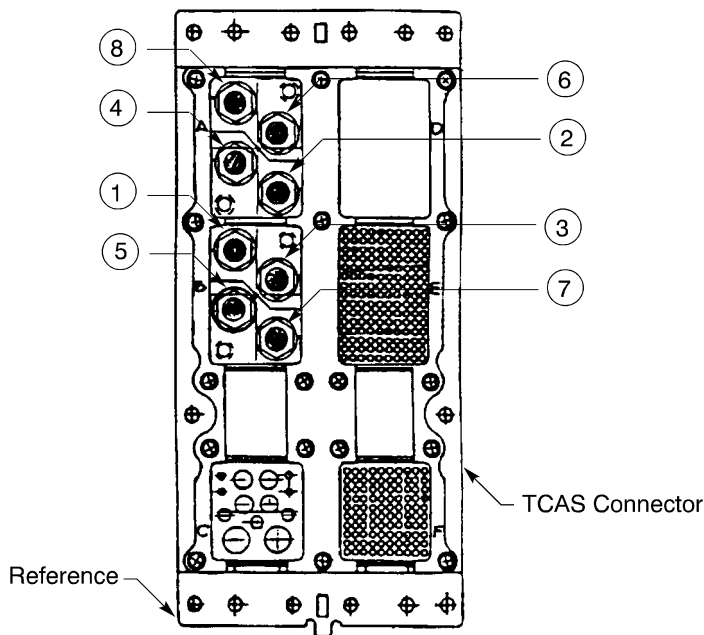
- (11) Crimp the center contact.
- (12) Fold the strands of the shield back on the shield clamp. Refer to Figure 191.

**POSITION OF THE SHIELD ON THE SHIELD CLAMP****Figure 191**

- (13) Remove the length of the strands of the shield that extend farther than the shoulder of the shield clamp. Refer to Figure 191.
Make sure that the ends of the strands are aligned with the forward edge of the shoulder of the shield clamp.
- (14) If the connector is a TCAS connector, find the recommended installation sequence for the 8 coax contacts in the connector. Refer to Figure 192

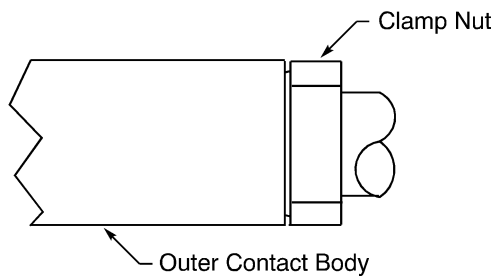
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



COAX CONTACT INSTALLATION SEQUENCE
Figure 192

- (15) Put the center contact assembly into the outer contact body.
- (16) Engage the threads of the clamp nut and the outer contact body. Refer to Figure 193.



CENTER CONTACT ASSEMBLY INSTALLED IN THE OUTER CONTACT BODY
Figure 193

- (17) Torque the clamp nut 18 inch-pounds to 20 inch-pounds.

E. Assembly of the ITT Cannon 320-1066-015 Size 1 Coax Contact Termination Kit

NOTE: The coax contact termination kit contains the center contact assembly.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 118
CENTER CONTACT CRIMP TOOLS**

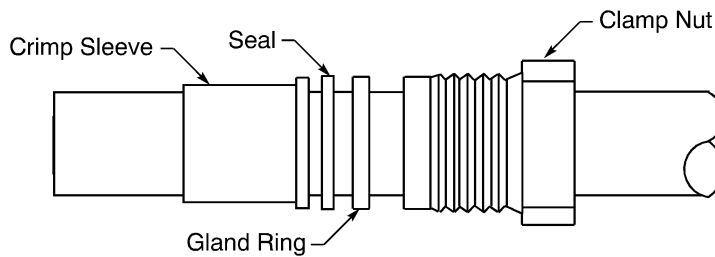
Basic Unit		Locator
Part Number	Setting	
M22520/1-01	7	TP855
		995-0002-239

**Table 119
CRIMP SLEEVE CRIMP TOOLS**

Part Number	Die
M22520/5-01	Y804
	41
CCT-HX4-156	995-0002-233

- (1) Make a selection of a center contact crimp tool from Table 118.
- (2) Make a selection of a crimp sleeve crimp tool from Table 119.
- (3) Put these components on the cable in this sequence:
 - The clamp nut
 - The gland ring
 - The seal
 - The crimp sleeve.

Refer to Figure 194.

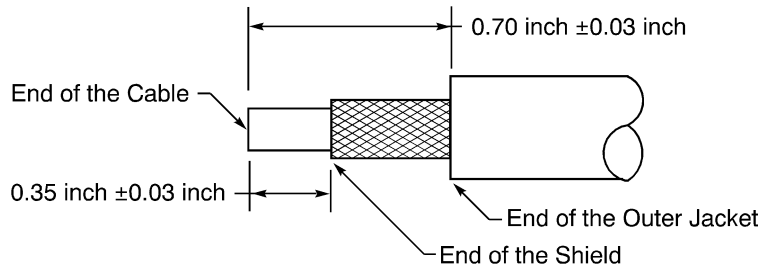


POSITION OF THE CLAMP NUT, THE GLAND RING, THE SEAL, AND THE CRIMP SLEEVE ON THE CABLE
Figure 194

- (4) Cut the cable to make its end perpendicular to its longitudinal axis.
- (5) Remove 0.70 inch ±0.03 inch of the jacket from the end of the cable. Refer to Figure 195.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

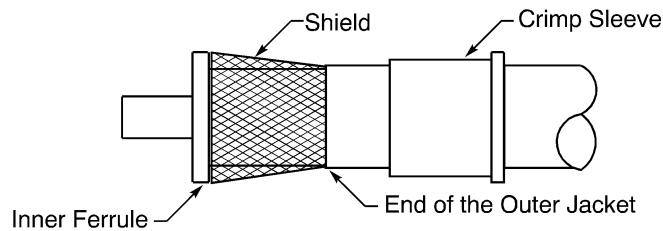


CABLE PREPARATION
Figure 195

- (6) Remove 0.35 inch \pm 0.03 inch of the shield from the end of the cable. Refer to Figure 195.
- (7) Move the strands of the shield apart.
- (8) Move the strands of the shield away from the dielectric.
- (9) Push the inner ferrule rearward on the dielectric until it stops. Refer to Figure 196.

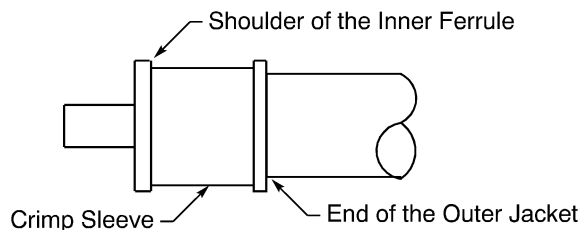
Make sure that:

- The shield strands are on the outer surface of the ferrule
- The rear end of the ferrule is against the end of the cable jacket.



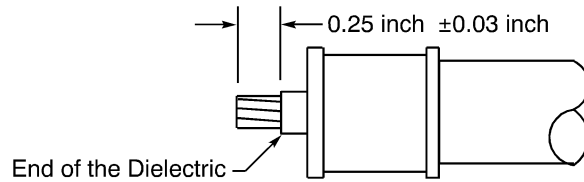
POSITION OF THE INNER FERRULE ON THE DIELECTRIC
Figure 196

- (10) Push the crimp sleeve forward on the shield until the forward end of the crimp sleeve is against the shoulder of the inner ferrule. Refer to Figure 197.



POSITION OF THE CRIMP SLEEVE ON THE SHIELD AND THE INNER FERRULE
Figure 197

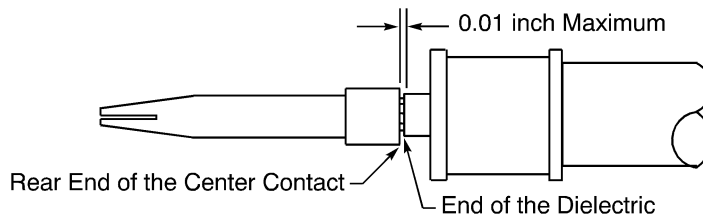
- (11) Remove 0.25 inch \pm 0.03 inch of the dielectric from the end of the cable. Refer to Figure 198.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS****DIELECTRIC REMOVAL LENGTH****Figure 198**

- (12) Put the conductor in the crimp barrel of the center contact. Refer to Figure 199.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole of the contact
- The distance from the end of the dielectric to the rear end of the center contact is 0.01 inch maximum.

**CENTER CONTACT ASSEMBLY****Figure 199**

- (13) Crimp the center contact.

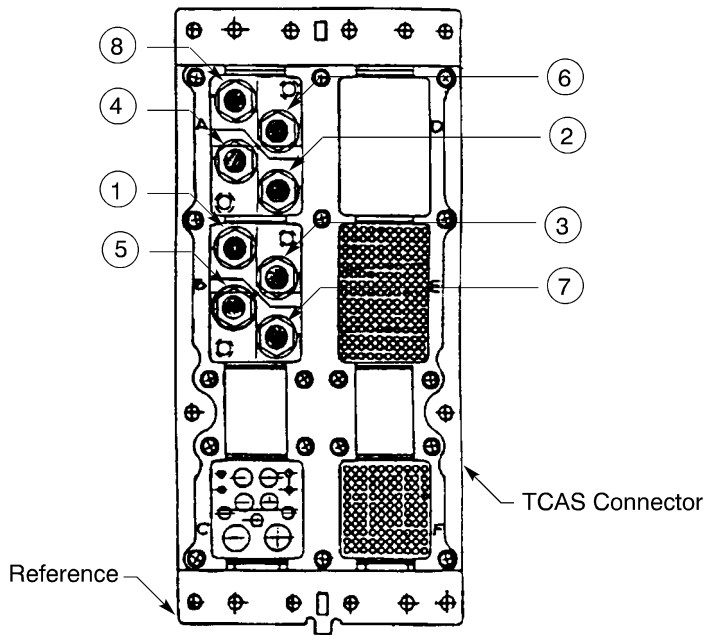
Make sure that the distance from the end of the dielectric to the end of the contact is 0.01 inch maximum.

- (14) Crimp the crimp sleeve.

- (15) If the connector is a TCAS connector, find the recommended installation sequence for the 8 coax contacts in the connector. Refer to Figure 200.

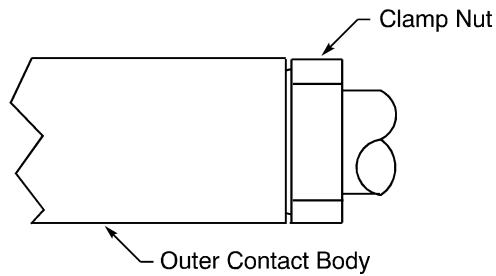
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



COAX CONTACT INSTALLATION SEQUENCE
Figure 200

- (16) Put the center contact assembly into the outer contact body.
- (17) Engage the threads of the clamp nut and the outer contact body. Refer to Figure 201.



CENTER CONTACT ASSEMBLY INSTALLED IN THE OUTER CONTACT BODY
Figure 201

- (18) Torque the clamp nut 45 inch-pounds \pm 5 inch-pounds.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

15. CONNECTOR ASSEMBLY

A. Insertion of Standard Contacts and Size 8 Contacts

**Table 120
INSERTION TOOLS FOR BOEING STANDARD CONTACTS**

Contact Size	Boeing Standard Contact	Insertion Tool	
		Part Number	Size
2222	BACC47EF1	282880	22
		8660-162	
		ATB01054	
		CIET-22	
		CIET-22DPXMA	
		CIT-DPXMA-22-1	
		DAK266	
		DRK266J	
		M81969/1-01	
		MS3156-22	
2020HD	BACC47EG2	282881	20HD
		91066-4	
		ATC2073	
		CIET	
		CIET-20 HDL	
		DAK145J	
		M81969/1-02	
		MS3156-20	
1616	BACC47EG3	282892	16
		282929	
		91066-3	
		DAK55-16	
		M81969/1-03	
		MS3156-16	
1212	BACC47EG4	CIET-12	12
		M81969/28-02	
		MS3178-002	
0808	S280W553-2	-	-
	S280W553-4		

20-71-14

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS**

- (1) Make a selection of an insertion tool from Table 120.

NOTE: A tool is not necessary for the insertion of these contacts:

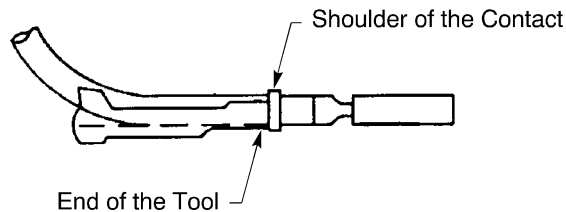
- A size 1616 contact
- A size 1212 contact
- A size 12 coax or shielded contact
- A size 0808 power or ground contact
- A size 8 coax or twinax contact
- A size 5 coax contact.

- (2) Examine the contact.

Make sure that the contact is straight.

- (3) Put the contact assembly in the insertion tool. Refer to Figure 202.

Make sure that the end of the insertion tool is against the rear edge of the shoulder of the contact.



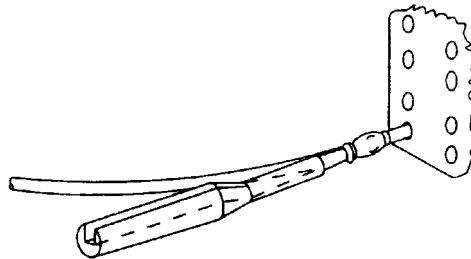
POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL

Figure 202

- (4) At the rear of the connector, axially align the insertion tool, the contact assembly, and the contact cavity. Refer to Figure 203.

Make sure that the insertion tool is perpendicular to the rear face of the insert.

CAUTION: IF THE INSERTION TOOL AND THE CONTACT ASSEMBLY ARE NOT ALIGNED CORRECTLY, DAMAGE TO THE CONNECTOR INSERT OCCURS.



ALIGNMENT OF THE INSERTION TOOL, THE CONTACT ASSEMBLY, AND THE CONTACT CAVITY

Figure 203

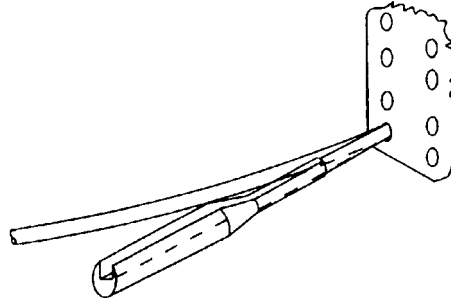
- (5) Carefully push the contact assembly into the contact cavity until it stops. Refer to Figure 204.

Make sure that the insertion tool stays axially aligned with the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.



CONTACT INSERTION
Figure 204

- (6) Carefully pull the insertion tool out of the contact cavity.
- (7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (3) through Step (7) again.

B. Insertion of a Shield Ground Wire Contact in a Connector Ground Block

- (1) Make a selection of an empty contact cavity in the ground block.
Make sure that the shield ground wire is not pulled tightly when the contact is installed.
- (2) Install the contact. Refer to Subject 20-90-15.

C. Insertion of Size 12 Shielded and Coax Contacts

Table 121
SHIELDED CONTACT INSERTION TOOLS

Shielded Contact	Insertion Tool
151700-0688	CIET-12
249-2203-000	CIET-12

- (1) Make a selection of an insertion tool from Table 121.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

CAUTION: MANUAL INSERTION IS NOT AN ACCEPTABLE ALTERNATIVE. MANUAL INSERTION CAN CAUSE DAMAGE TO THE STRANDS OF THE SHIELD OF THE CABLE.

- (2) Insert the contact. Refer to Paragraph 15.A.

NOTE: The size 12 shielded contact is rear release, rear removable.

D. Installation of a Size 12 Contact in a Size 5 Contact Cavity

This procedure is applicable for the installation of a size 12 contact in a size 5 contact cavity.

- (1) Make a selection of a sealing boot from Table 34.
- (2) Make a selection of a cavity reducer from Table 33.
- (3) Put the sealing boot on the wire.
- (4) Assemble the contact.

Refer to:

- Paragraph 8. for standard size 12 contacts
- Paragraph 9. for size 12 coax or shielded contacts.

- (5) Push the cavity reducer into the size 5 coax contact cavity in the connector until it stops.

CAUTION: THE CAVITY REDUCER IS NOT REMOVABLE FROM THE CONNECTOR AFTER IT IS INSTALLED.

- (6) Push the contact into the cavity reducer until it stops.
- (7) Lightly pull the wire to make sure that the contact and the cavity reducer are locked in the contact cavity of the connector.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) Push the sealing boot forward on the wire into the connector grommet.

E. Insertion of Size 8 Power and Ground Contacts

Refer to Paragraph 15.A. for the procedure to insert size 8 power and size 8 ground contacts.

F. Insertion of Size 8 Twinax Contacts

**Table 122
TWINAX CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
8	M81969/28-03
	RIT-04-C-1

- (1) Make a selection of an insertion tool from Table 122.

NOTE: Manual insertion of size 8 twinax contacts is an acceptable alternative.

- (2) Put the contact assembly in the insertion tool.

Make sure that the end of the insertion tool is against the rear edge of the shoulder of the contact.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (3) At the rear of the connector, axially align the insertion tool, the contact assembly, and the contact cavity.

Make sure that the insertion tool is perpendicular to the rear face of the insert.

CAUTION: IF THE INSERTION TOOL AND THE CONTACT ASSEMBLY ARE NOT ALIGNED CORRECTLY, DAMAGE TO THE CONNECTOR INSERT OCCURS.

- (4) Carefully push the contact assembly into the contact cavity until it stops.

Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the insertion tool out of the contact cavity.

- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:

- (a) Pull the contact assembly out of the contact cavity.

- (b) Do Step (2) through Step (6) again.

G. Insertion of Size 8 and Size 5 Coax Contacts

**Table 123
SIZE 8 AND SIZE 5 COAX CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
8	M81969/28-03
	RIT-04-C-1
5	MS3178-001

- (1) Make a selection of an insertion tool from Table 123.

NOTE: Manual insertion of size 8 and size 5 coax contacts is an acceptable alternative.

- (2) Put the contact assembly in the insertion tool.

Make sure that the end of the insertion tool is against the rear edge of the shoulder of the contact.

- (3) At the rear of the connector, axially align the insertion tool, the contact assembly, and the contact cavity.

Make sure that the insertion tool is perpendicular to the rear face of the insert.

CAUTION: IF THE INSERTION TOOL AND THE CONTACT ASSEMBLY ARE NOT ALIGNED CORRECTLY, DAMAGE TO THE CONNECTOR INSERT OCCURS.

- (4) Carefully push the contact assembly into the contact cavity until it stops.

Make sure that the insertion tool stays axially aligned with the contact cavity.

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CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the insertion tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

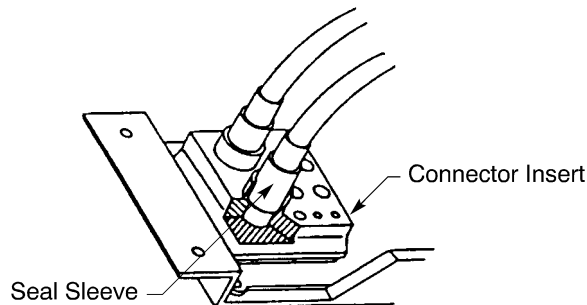
CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (2) through Step (6) again.
- (8) For the size 5 coax contact assembly with a seal bushing and a seal sleeve, install the seal bushing and sleeve, refer to Figure 205.

Make sure that:

- The seal sleeve makes an overlap with the seal bushing
- The forward edge of the seal sleeve is against the shoulder of the seal bushing.

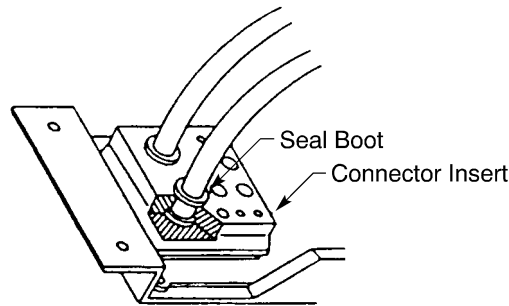


POSITION OF THE SEAL SLEEVE ON THE CABLE
Figure 205

- (a) Push the seal sleeve and boot forward into the contact cavity until it stops.
- (9) For the size 5 coax contact assembly with a seal boot, push the seal boot forward into the contact cavity until the forward edge of the shoulder of the boot is against the connector insert. Refer to Figure 206.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



POSITION OF THE SEAL BOOT ON THE CABLE
Figure 206

H. Installation of Size 8 Quadrax Contacts

Table 124
LUBRICANTS

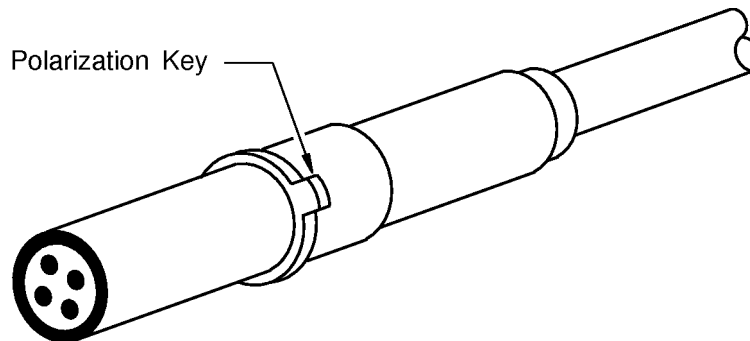
Lubricant	Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

(1) At the rear of the connector, align the contact polarization key and the keyway of the quadrax contact cavity.

Make sure that the longitudinal axis of the contact assembly is perpendicular to the rear face of the connector.

Refer to:

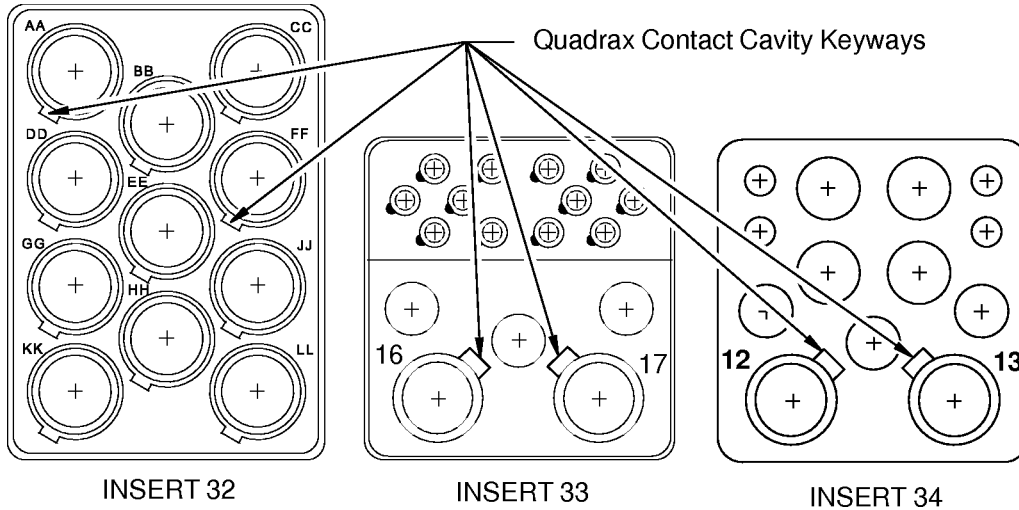
- Figure 207 for the polarization key of the quadrax contact
- Figure 208 for the keyway of the quadrax contact cavity.



POLARIZATION KEY OF THE QUADRAX CONTACT
Figure 207

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



KEYWAY OF THE QUADRAX CONTACT CAVITY
Figure 208

- (2) Push the contact into the contact cavity until the contact stops and is locked.

NOTE: A lubricant can be used to make it easier to push the contact into the contact cavity. Refer to Table 124

- (3) Align the seal boot key with the contact cavity keyway. Refer to Figure 208.

- (4) Push the seal boot into the contact cavity.

Make sure that the rear edge of the seal boot key is aligned with the rear face of the connector.

NOTE: A lubricant can be used to make it easier to push the seal boot into the contact cavity. Refer to Table 124.

- (5) Lightly pull on the cable.

Make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (6) If the contact is not locked in the contact cavity:

- (a) Pull the contact assembly out of the contact cavity.
- (b) Do Step (2) through Step (6) again.

I. Installation of Size 1 Coax Contacts in the BAC10AH05, 08, 09 and 25 Inserts

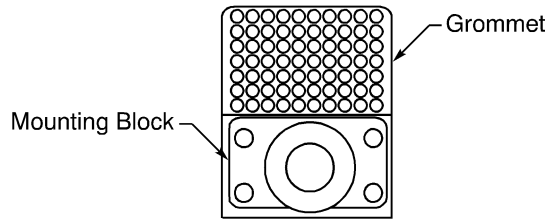
This paragraph gives the procedure to install size 1 coax contacts and TNC adapters that have a mounting block.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

For the procedure to install:

- A BACA19BK1 TNC adapter in a BACI10AH11 insert, refer to Paragraph 15.K.
 - An ITT Cannon size 1 coax termination kit contact in a BACI10AH11 insert, refer to Paragraph 15.J.
- (1) If the coax cable has a TNC plug, connect the TNC plug to the correct TNC receptacle on the ARINC connector.
 - (2) Install the contact in the connector from the rear. Refer to Figure 209.



POSITION OF THE MOUNTING BLOCK OF THE SIZE 1 COAX CONTACT
Figure 209

- (3) If the mounting block does not easily move in, turn the mounting block 180 degrees.
- (4) Install and tighten the four screws on the front face of the connector.
- (5) Torque each screw 7 inch-pounds ± 1 inch-pound.

J. Installation of ITT Cannon Size 1 Coax Termination Kit Contacts in the BACI10AH11 Insert

Installation of the size 1 coax termination kit contact is completed during contact assembly. Refer to Table 125.

Table 125
TERMINATION KIT ASSEMBLY AND CONTACT INSTALLATION PROCEDURES

Part Number	Reference
320-1066-006	Paragraph 14.D.
320-1066-015	Paragraph 14.E.

K. Installation of BACA19BK1 TNC Adapters or Coax Outer Bodies in the BACI10AH11 Insert

Table 126
NECESSARY MATERIALS

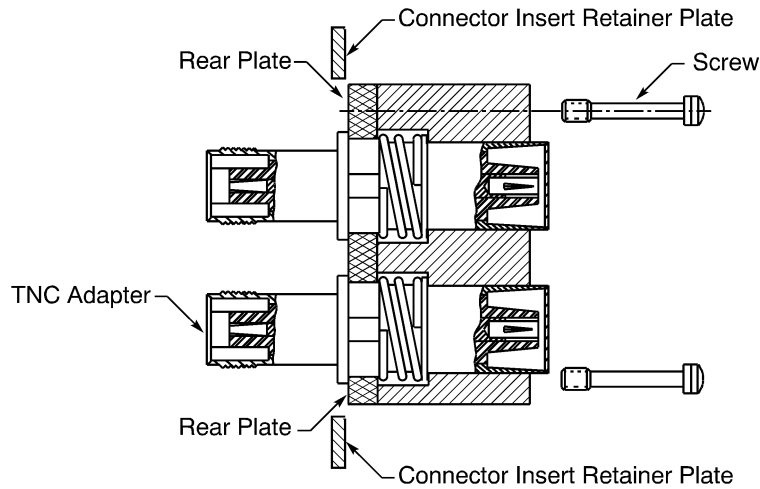
Material	Description	Part Number	Supplier
Lubricant	Oil, Conductive	CRC 3-36	CRC Chemicals

- (1) Remove the screws from the engaging face of the insert. Refer to Figure 210.

NOTE: It is possible that these screws are captivated and cannot be completely removed from the insert.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



BACA19BK1 TNC ADAPTERS IN THE BACI10AH11 INSERT

Figure 210

- (2) If contacts are installed, from the front of the insert, push the engaging ends of the contacts rearward to remove the contact assembly.
- (3) Remove the rear plate from the insert.
- (4) If the connector insert retainer plates prevent the removal of the rear plate from the connector:
 - (a) From the rear side of the connector shell, remove the screws that hold the insert retainer plates.
 - (b) Remove the insert retainer plates from the connector.
 - (c) From the engaging face of the connector, push the insert to the rear and out of the connector shell with the thumbs.
 - (d) Pull the rear plate from the insert.
- (5) Put a TNC adapter contact or a coax outer body in each contact location in the rear plate. Make sure that the springs of the contacts are against the side of the plate that does not have numbers.
- (6) Hold the assembly of the rear plate and the contacts with the hand and push the assembly into the insert from the rear side of the insert. Make sure that the numbers on the rear side of the rear plate can be seen.
- (7) Tighten the screws on the engaging face of the insert. If the insert is removed from the connector, make sure that the position of the edge of the washer below each screw head on the engaging face of the insert is not farther than the edge of the insert.

CAUTION: THE EDGE OF A WASHER THAT IS LOCATED FARTHER THAN THE EDGE OF THE INSERT WILL PREVENT THE INSTALLATION OF THE INSERT INTO THE CONNECTOR SHELL.

- (8) With the finger, push on the engaging end of each of the four size 1 coax contacts in the insert. Make sure that each coax contact returns to its initial position.
- (9) If a contact does not return to its initial position:
 - (a) Make a selection of a conductive lubricant from Table 126.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

- (b) Remove the screws from the engaging face of the insert.
- (c) Pull the rear plate rearward from the insert.
- (d) Remove the contacts from the rear plate.
- (e) Apply one or two drops of the lubricant to the outside of each contact near the spring to help make sure that the spring can push the contact back to its initial position.
Make sure that no lubricant is on an end of a contact.

CAUTION: DO NOT USE A SILICONE, TEFLON OR OTHER NON-CONDUCTIVE LUBRICANT OR A SPRAY LUBRICANT. A NON-CONDUCTIVE, OR A SPRAY LUBRICANT WILL PREVENT THE SATISFACTORY OPERATION OF THE CONTACT AND THE CONNECTOR.

- (f) Clean unwanted lubricant from each contact with a clean wiper.
- (g) Do Step (5) through Step (8) again.
- (10) Torque each of the two screws 7 inch-pounds \pm 1 inch-pound.
- (11) If the insert is removed from the connector, install the insert in the connector:
 - (a) Align the insert with the shell cavity.
Make sure that the insert polarization key is aligned correctly in relation to the shell cavity.
 - (b) Carefully apply equal pressure with the thumbs on the rear of the insert to fully install the insert in the cavity.
Make sure that when the insert is installed:
 - The surface of the insert is parallel with the rear face of the connector shell
 - The insert flange is aligned with the rear face of the connector shell.
 - (c) Install the retainer plates on the rear surface of the connector shell.
 - (d) Put a screw with a washer in each installation hole of the retainer plates.
 - (e) Tighten each screw.
 - (f) Torque each retainer plate screw 5 inch-pounds \pm 1 inch-pound.

L. Insertion of Fiber Optic Contact Termini

NOTE: A contact terminus can be installed before or after the alignment sleeve insert is installed in the connector.

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

Table 127
CONTACT TERMINUS INSERTION TOOLS

Terminus Size	Insertion Tool	
	Part Number	Color
16	M81969/14-03	Blue

- (1) Make a selection of a contact terminus insertion tool from Table 127.

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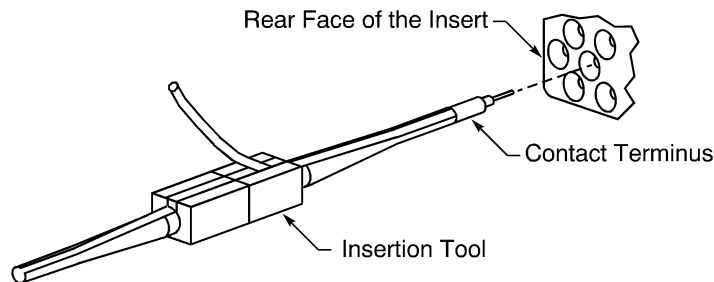
CAUTION: DO NOT USE AN INSERTION TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) If the contact terminus does not have a protection cap or is not in a plastic bag, examine the contact terminus. Refer to Subject 20-12-20.
- (3) Remove the protection from the contact terminus.
- (4) Carefully put the insertion tool on the cable and the contact terminus.

CAUTION: THE CONTACT TERMINUS MUST BE INSTALLED IN THE CONNECTOR IF IT DOES NOT HAVE PROTECTION FROM CONTAMINATION. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

CAUTION: DO NOT TOUCH THE FRONT FACE OF THE TERMINUS. CONTAMINATION ON THE TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (5) At the rear of the connector, axially align the insertion tool and the terminus with the contact terminus cavity.



ALIGNMENT OF THE CONTACT TERMINUS, THE INSERTION TOOL, AND THE CONTACT TERMINUS CAVITY
Figure 211

- (6) If the contact terminus has a key, align the key of the terminus and the keyway of the contact terminus cavity.

NOTE: A contact terminus that has a key can only be installed in a contact terminus cavity that has a keyway.

- (7) Carefully push the insertion tool and the contact terminus into the terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT PUSH THE CABLE. DAMAGE TO THE FIBER OPTIC CABLE CAN OCCUR.

CAUTION: IF THE INSERTION TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (8) Carefully pull the insertion tool out of the terminus cavity.

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Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

(9) Lightly pull the cable to make sure that the terminus is locked in the terminus cavity.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINUS, THE CABLE, OR THE CONNECTOR.

CAUTION: DO NOT MAKE A DENT IN THE CABLE JACKET WITH THE FINGERNAILS. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

(10) If the terminus is not locked in the cavity:

- (a) Pull the terminus out of the cavity.
- (b) Do Step (4) through Step (9) again.

(11) If the connector is not connected immediately, put a protective cap on the connector.

NOTE: A clean plastic bag is a satisfactory alternative for the protection from contamination.

CAUTION: THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

M. Installation of the Fiber Optic Alignment Sleeve Insert

NOTE: The alignment sleeve insert can be installed before or after the contact termini are installed in the connector.

**Table 128
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Allen Wrench	5/64
	Screwdriver, Hex	5/64

(1) Examine the alignment sleeve insert. Refer to Paragraph 19.

(2) Make a selection of these tools from Table 128:

- A driver
- A torque tool.

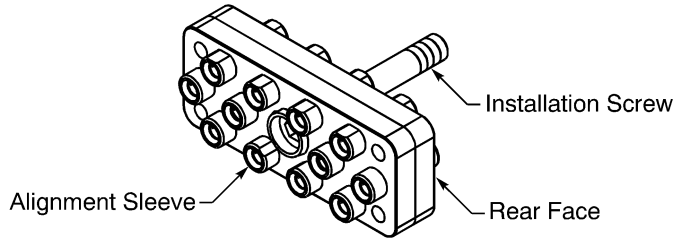
NOTE: The driver can have a ball type end.

(3) Align the rear face of the alignment sleeve insert with the engaging face of the connector.

CAUTION: DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT WHEN IT IS INSTALLED IN THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

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ALIGNMENT SLEEVE INSERT
Figure 212

- (4) Fully engage the threads of the installation screw and the screw hole the connector.
- (5) Torque the screw 8 inch-pounds ± 1 inch-pound.

N. Seal of an Empty Contact Cavity

Empty size 5 and size 8 cavities must be sealed. Refer to Table 129.

Empty contact cavities that are not specified in Table 129 can stay empty.

Table 129
SEAL PROCEDURES FOR EMPTY CONTACT CAVITIES

Contact Cavity Size	Applicable Insert	Seal Condition	Seal Procedure
8	BACI10AH12	S280W552-109 Conductive Seal Plug	Paragraph 15.O.
	BACI10AH13		
	BACI10AH14		
	BACI10AH20		
	BACI10AH30		
5	All other inserts with a rear grommet	ITT Cannon 225-0090-000 Seal plug Seal Rod	Paragraph 15.P.
	Inserts with a rear grommet	ITT Cannon 225-0090-000 Seal plug Seal Rod	Paragraph 15.P.

O. Seal of an Empty Size 8 Cavity with a Conductive Seal Plug

For the conditions that are applicable for this procedure, refer to Paragraph 15.N.

Table 130
CONDUCTIVE SIZE 8 SEAL PLUG PART NUMBERS

Contact Cavity Size	Boeing Specification	Seal Plug	
		Part Number	Supplier
8	S280W552-109	225-1066-000	ITT Cannon

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

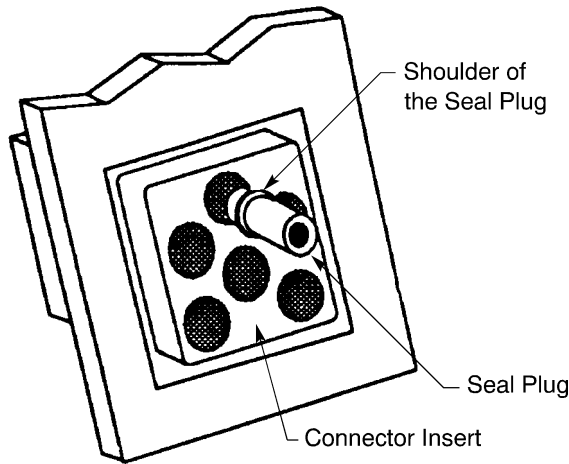
The S280W552-109 seal plug has these technical properties:

- Is a conductive filler plug for size 8 coax or twinax contact cavities
- Is locked in the connector insert by the retention clips of the contact cavity
- Must be removed with a seal plug removal tool.

**Table 131
SIZE 8 SEAL PLUG INSERTION TOOLS**

Contact Cavity Size	Insertion Tool	
	Part Number	Supplier
8	M81969/28-03	QPL
8	RIT-04-C-1	Russtech

- (1) Make a selection of a seal plug from Table 130.
 - (2) Make a selection of a seal plug insertion tool from Table 131.
- NOTE: A plastic awl is a satisfactory alternative to a seal plug insertion tool.
- (3) At the rear of the connector, push the seal plug into the contact cavity until the shoulder of the seal plug is against the surface of the connector insert. Refer to Figure 213.



**POSITION OF THE SEAL PLUG IN THE CONTACT CAVITY
Figure 213**

- (4) Put the insertion tool on the seal plug.
Make sure that the end of the insertion tool is against shoulder of the seal plug.
- (5) Axially align the insertion tool, the seal plug, and the contact cavity.
Make sure that the insertion tool is perpendicular to the rear face of the insert.

CAUTION: IF THE INSERTION TOOL AND THE CONTACT ASSEMBLY ARE NOT ALIGNED CORRECTLY, DAMAGE TO THE CONNECTOR INSERT OCCURS.

- (6) Push the seal plug into the contact cavity until it makes a click.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (7) Carefully pull the insertion tool out of the contact cavity.
- (8) If the seal plug does not make a click:
 - (a) From the front of the connector, put the end of a plastic rod against the seal plug.
Make sure that:
 - The rod has a flat end
 - The diameter of the rod is 0.20 inch minimum to 0.22 inch maximum.
 - (b) Push the seal plug out of the rear of the contact cavity with the rod.
 - (c) From the rear of the connector, push the seal plug into the contact cavity with the rod.
Make sure that the seal plug locks in the contact cavity.

P. Seal of an Empty Size 5 or Size 8 Contact Cavity

For the conditions that are applicable for this procedure, refer to Paragraph 15.N.

**Table 132
SEAL PLUGS FOR SIZE 5 AND SIZE 8 CAVITIES**

Contact Cavity Size	Seal Plug	
	Part Number	Supplier
8	225-0090-000	ITT Cannon
5	225-0090-000	ITT Cannon

**Table 133
SEAL RODS FOR SIZE 5 AND SIZE 8 CAVITIES**

Length (inch)		Diameter (inch)		Material	Specification
Target	Tolerance	Target	Tolerance		
0.50	±0.10	0.313	±0.015	Plastic , polyimide (Nylon)	L-P-410 Type 6/6
				PTFE (Teflon)	AMS 3656
		0.339	±0.015	Silicone rubber	BMS 1-52

- (1) Make a selection of a seal plug from Table 132 or a seal rod from Table 133.
- (2) Put the smaller end of the seal plug in the contact cavity.
- (3) For a size 5 cavity, push the seal plug or the seal rod into the cavity until it stops or until the distance from the rear end of the seal plug or seal rod is less than 0.20 inch from the rear surface of the grommet.
- (4) For a size 8 cavity, push the seal plug or the seal rod into the cavity until it stops or until the distance from the rear end of the seal plug or seal rod is less than 0.35 inch from the rear surface of the grommet.

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Q. Installation of Protective Caps

Refer to Subject 20-10-11.

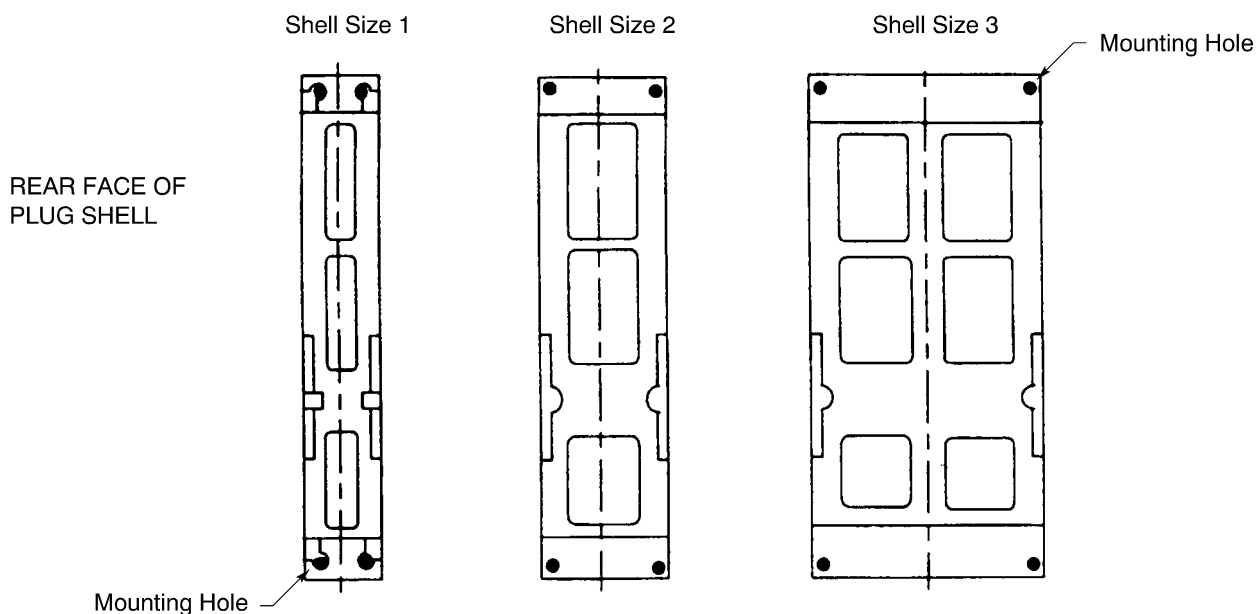
16. INSTALLATION OF CONNECTOR GROUND BLOCKS

A. Installation of Ground Blocks on ARINC 600 Connectors

The ground block for the ARINC 600 connector is installed on the rear face of the plug. The mounting holes are located on the top and the bottom of the connector shell. Refer to Figure 214.

These mounting holes are used to attach:

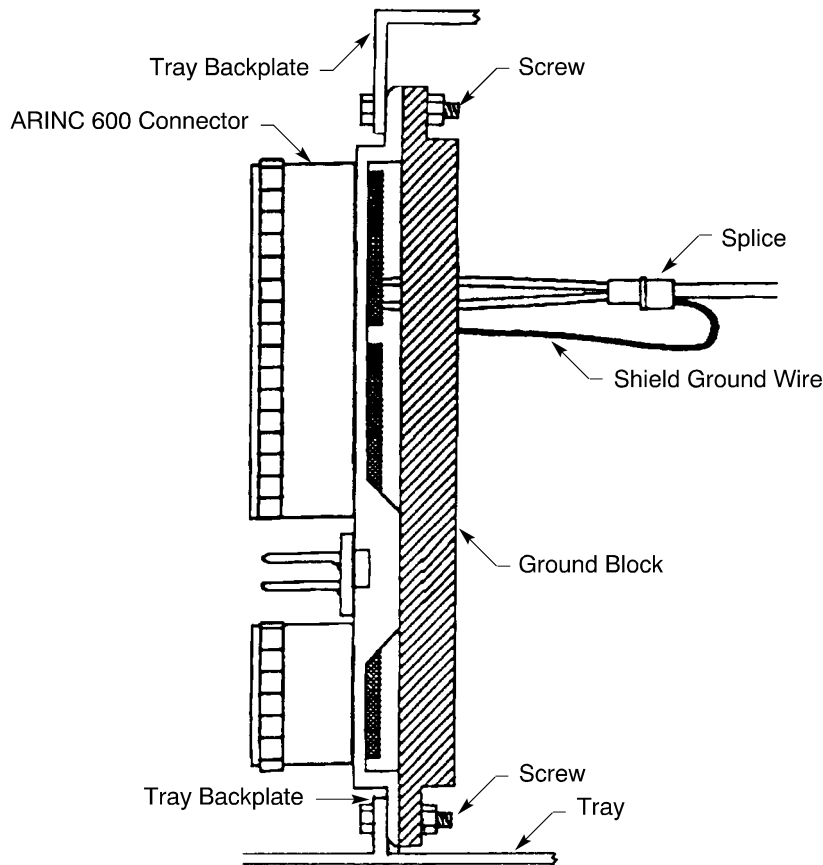
- The connector to the tray backplate
- The ground block to the connector.



MOUNTING HOLES FOR GROUND BLOCKS ON ARINC 600 CONNECTORS
Figure 214

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



INSTALLATION OF THE GROUND BLOCK ON THE ARINC 600 CONNECTOR
Figure 215

Refer to Figure 215.

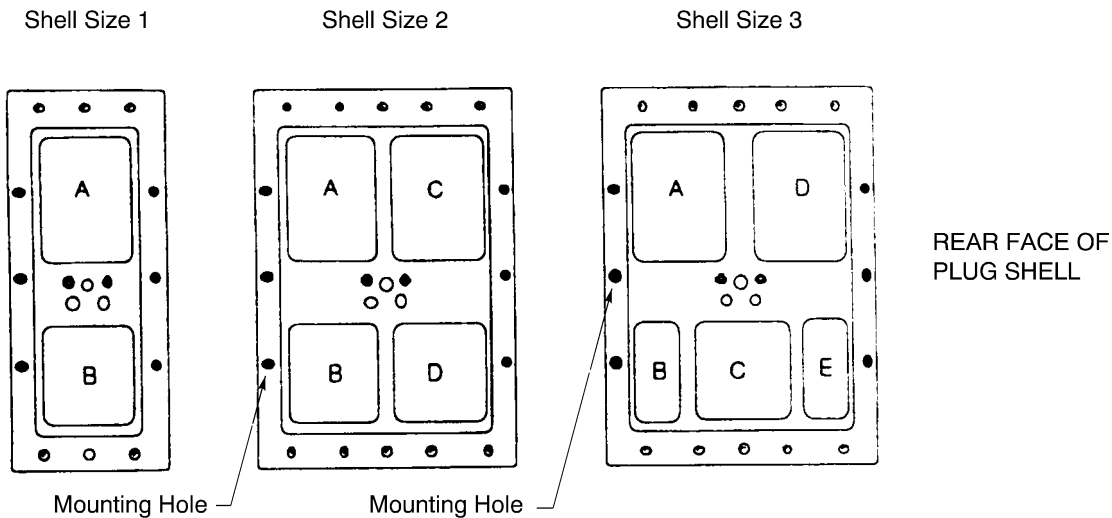
- (1) Clean the surfaces of the connector and the ground block that are against each other when the ground block is installed.
 Refer to Subject 20-20-00 Cleaning Procedure 5, the removal of contamination with cleaning solvent.
NOTE: The ground block must be installed on the connector within 30 minutes after the surfaces are cleaned.
- (2) Put the connector against the backplate of the tray.
 Make sure that the A insert is at the top.
- (3) Put the ground block against the rear of the connector.
- (4) Install the screws, washers, and nuts.
- (5) Tighten the screws.
- (6) Torque the screws 6 inch-pounds to 8 inch-pounds.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

B. Installation of Ground Blocks on S280W551 Connectors

The ground block for the S280W551 connector is installed on the rear face of the plug. The mounting holes are located on the sides of the connector shell. Refer to Figure 216.



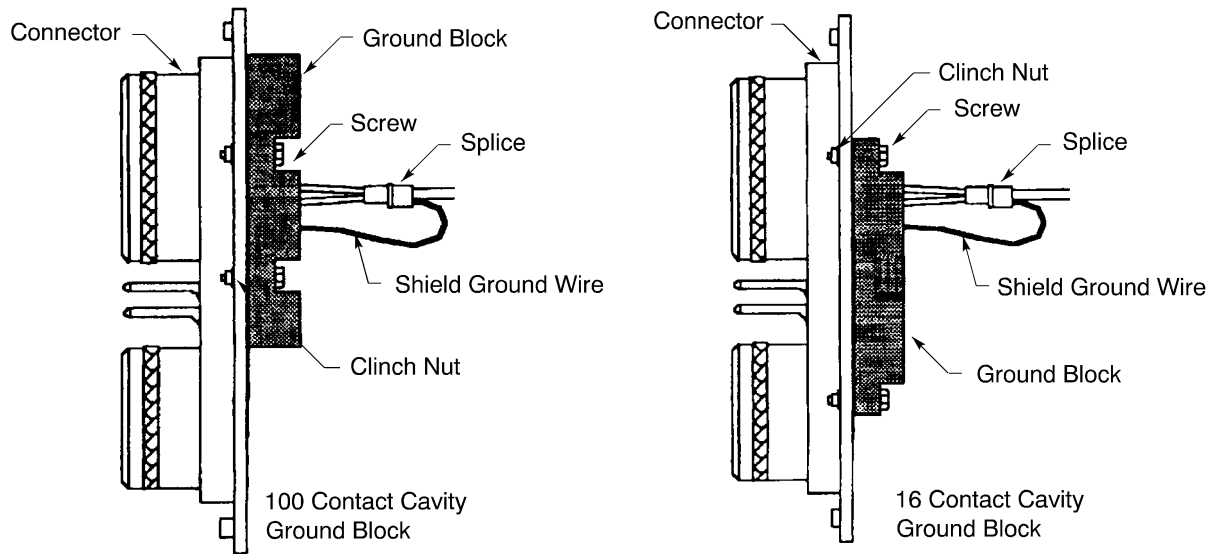
MOUNTING HOLES FOR GROUND BLOCKS ON S280W551 CONNECTORS
Figure 216

Table 134
GROUND BLOCK FASTENERS FOR S280W551 CONNECTORS

Fastener	Part Number	Supplier
Screw	NAS1801-()	QPL

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



INSTALLATION OF THE GROUND BLOCK ON THE S280W551 CONNECTOR
Figure 217

Refer to Figure 217.

- (1) Make a selection of a fastener from Table 134.
- (2) Clean the surfaces of the connector and the ground block that are against each other when the ground block is installed.

Refer to Subject 20-20-00 for Cleaning Procedure 5, the removal of contamination with cleaning solvent.

NOTE: The ground block must be installed on the connector within 30 minutes after the surfaces are cleaned.

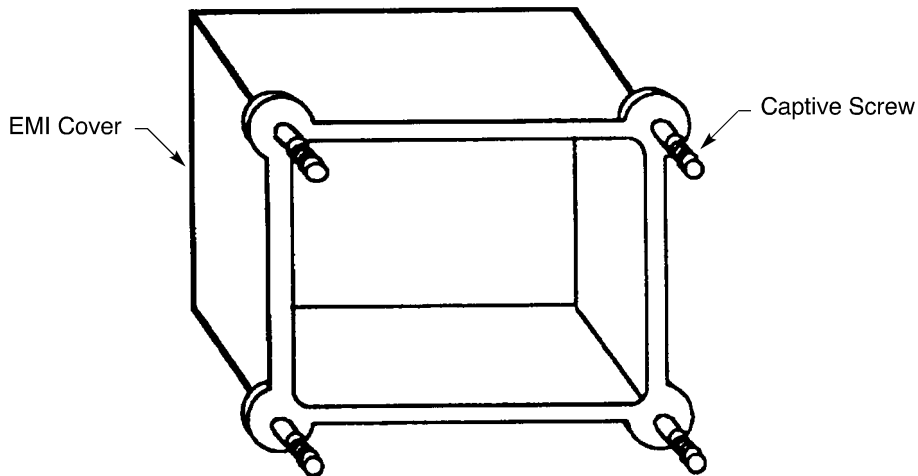
- (3) Install the screws, washers, and nuts.
 Make sure that the A insert is at the top of the connector.
- (4) Tighten the screws.
- (5) Torque the screws 6 inch-pounds to 8 inch-pounds.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

17. BACKSHELL INSTALLATION

A. Installation of the ITT Cannon 046-1000-000 Backshell on the S280W551-407 Connector



ITT CANNON 046-1000-000 BACKSHELL
Figure 218

- (1) Remove the four screws on the connector shell that hold the insert retainer plates on the shell.

NOTE: Do not remove the retainer plates or the connector insert.

- (2) Discard the screws.
- (3) Put the backshell with captive screws against the retainer plates.
- (4) Align the four captive screws of the backshell with the four holes in the retainer plates. Refer to Figure 218.
- (5) Tighten the screws.
- (6) Torque each screw 5 inch-pounds \pm 1 inch-pound.

B. Assembly of the Glenair 527-187() Backshell on a Shell Size 1 ARINC 600 Plug Connector

Refer to Subject 20-25-14.

C. Assembly of the Glenair 527-212() Backshell on a Shell Size 2 ARINC 600 Plug Connector

Refer to Subject 20-25-14.

18. CONNECTOR INSERT INSTALLATION

A. Insert Replacement

These general conditions are applicable:

- Damaged inserts can be removed and replaced
- If an insert is replaced with another insert that does not have the same configuration, the connector part number must be changed; refer to Paragraph 18.B.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS**

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

NOTE: If an insert is replaced with another insert that does not have the same configuration and the insert retainer screws are not long enough to satisfactorily install the new insert, alternative fasteners can be used. Refer to Table 135.

Table 135
ALTERNATIVE INSERT RETAINER PLATE FASTENERS

Fastener Hardware	Part Number	Supplier
Lockwasher	MS35333-69	QPL
Pan Head Screw	MS35206-203	QPL

B. Change of the Connector Part Number

- (1) Remove or erase the necessary part of the connector part number on the shell.

NOTE: It is acceptable to remove or erase all of the part number.

- (2) Stamp the new digits or the whole part number with six-point numerals adjacent to the original number.

C. Insert Installation

For the conditions that are applicable to this procedure, refer to Paragraph 18.A.

This paragraph gives the procedure to install:

- An insert in an ARINC 600 non-environmental or Class A, C, D, E, or F connector
- An insert in an S280W551 connector.

For the procedure to install:

- An insert in a sealed ARINC 600 or Class B connector, refer to Paragraph 18.E.
- The wave guide, refer to Paragraph 18.F.

- (1) Make a selection of the new insert.

Refer to:

- Paragraph 2.D. for ITT Cannon ARINC 600 connectors
- Paragraph 2.E. for Souriau ARINC 600 connectors
- Paragraph 2.F. for AMP ARINC 600 connectors
- Paragraph 2.G. for Radiall ARINC 600 connectors
- Paragraph 2.H. for Tri-Star ARINC 600 connectors
- Paragraph 2.I. for S280W551 connectors.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS**

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

CAUTION: ONLY THOSE INSERTS THAT ARE SPECIFIED CAN BE USED FOR REPLACEMENT IN THE SPECIFIED SHELL FROM THE SPECIFIED SUPPLIER.

(2) Remove the new insert from its sealed package.

(3) Examine the insert.

Make sure that:

- All the contact cavities are clear
- If the insert has a grommet, the seal between the grommet and the insert body is not open.

(4) Clean the sides of the insert with isopropyl alcohol.

(5) If the insert has screws on the engaging face near the edge of the insert:

(a) Tighten the screws on the engaging face of the insert.

Make sure that the position of the edge of the washer under each screw head is not farther than the edge of the insert.

CAUTION: THE EDGE OF A WASHER THAT IS LOCATED FARTHER THAN THE EDGE OF THE INSERT WILL PREVENT THE INSTALLATION OF THE INSERT INTO THE CONNECTOR SHELL.

(b) Torque each screw 7 inch-pounds \pm 1 inch-pound.

(6) Align the insert with the shell cavity.

Make sure that the insert polarization key is aligned correctly in relation to the polarizing rib on the side of the shell cavity.

(7) Carefully apply equal pressure with the thumbs on the rear of the insert to fully install the insert in the cavity.

Make sure that when the insert is installed:

- The surface of the insert is parallel with the rear face of the connector shell
- The insert flange is aligned with the rear face of the connector shell.

(8) If the insert is an ITT Cannon 71W1() or an ITT Cannon 2W2 insert, install the C-bracket spacer. Refer to Paragraph 18.D.

(9) Install the retainer plates on the rear surface of the connector shell.

(10) Put a screw with a washer in each retainer plate hole.

(11) Tighten each screw.

(12) Torque each retainer plate screw 5 inch-pounds \pm 1 inch-pound.

D. Installation of the ITT Cannon C-Bracket Spacer on the ITT Cannon 71W1() or 2W2 Insert

This procedure is applicable to the inserts in Table 136.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

**Table 136
INSERT PART NUMBERS SUPPLIED WITH C-BRACKET SPACERS**

BAC110AH() Insert	ITT Cannon Code	Part Number	Supplier
05	71W1A	143-2085-000	ITT Cannon
		143-2085-001	ITT Cannon
08	71W1B	143-1114-000	ITT Cannon
		143-1113-000	ITT Cannon
09	2W2	144-2944-000	ITT Cannon
25	2W2 SPCL	144-2944-004	ITT Cannon

NOTE: The ITT Cannon C-bracket spacer is supplied with the insert.

This procedure is necessary if:

- The 71W1() or the 2W2 insert is changed to hold a size 1 coax contact that has a standard mounting block
- The C-bracket spacer is missing.

The ITT Cannon C-bracket spacer:

- Is located between the rear surface of the 71W1() or the 2W2 insert and the insert retaining plates
- Keeps the distance between the insert and the plates
- Is located adjacent to the standard mounting block of the size 1 coax contact.

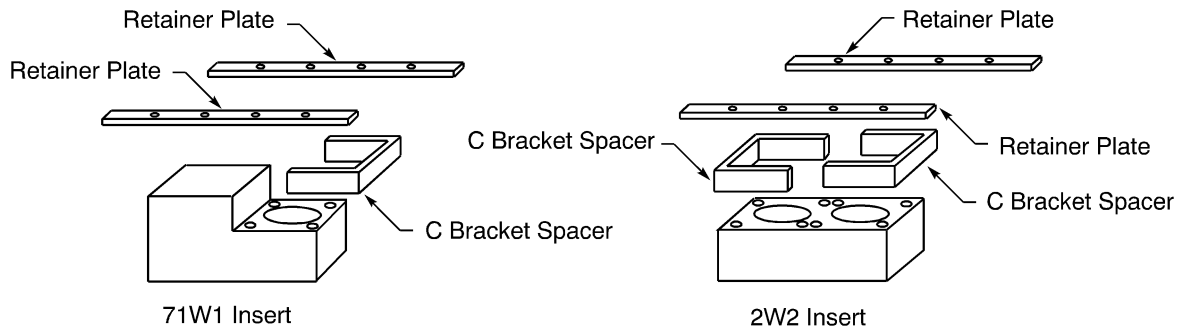
NOTE: Two spacers are required on the 2W2 insert.

- (1) Remove the screws and washers that hold the retainer plates on the rear of the connector.
- (2) Remove the retainer plates from the rear of the connector.
- (3) Remove the screws from the front of the connector that attach the size 1 coax mounting block to the connector insert.
- (4) Pull the size 1 coax contact from the connector.
- (5) Put the C-bracket spacer on the rear of the insert adjacent to the location of the size 1 coax contact. Refer to Figure 219.

Make sure that the short leg of the C-bracket spacer is on the side of the shell cavity that has the polarizing rib.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS



THE INSERT, THE C-BRACKET SPACER, AND THE RETAINING PLATES
Figure 219

- (6) Install the retainer plates on the connector shell with the initial screws and washers.
- (7) Torque each retainer plate screw 5 inch-pounds \pm 1 inch-pound.
- (8) Install the size 1 coax contact in the connector. Refer to Paragraph 15.I.

E. Insert Installation in a Sealed or Class B ARINC 600 Connector

For the conditions that are applicable to this procedure, refer to Paragraph 18.A.

Table 137
NECESSARY MATERIALS

Material		Supplier
Description	Part Number	
Catalyst	Catalyst F	Dow Corning
	Catalyst S	
Sealant	3110	Dow Corning

- (1) Make a selection of the new insert.

Refer to:

- Paragraph 2.D. for ITT Cannon ARINC 600 connectors
- Paragraph 2.E. for Souriau ARINC 600 connectors
- Paragraph 2.F. for AMP ARINC 600 connectors
- Paragraph 2.G. for Radiall ARINC 600 connectors
- Paragraph 2.H. for Tri-Star ARINC 600 connectors.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS**

CAUTION: AN INSERT OF AN ARINC 600 CONNECTOR FROM ONE SUPPLIER MUST BE NOT USED IN A CONNECTOR SHELL FROM AN DIFFERENT SUPPLIER. IF THE SUPPLIER OF THE INSERT AND THE SHELL ARE NOT THE SAME, THE CONNECTOR PLUG AND RECEPTACLE DO NOT SATISFACTORILY ENGAGE.

CAUTION: ONLY THOSE INSERTS THAT ARE SPECIFIED CAN BE USED FOR REPLACEMENT IN THE SPECIFIED SHELL FROM THE SPECIFIED SUPPLIER.

(2) Make a selection of these materials from Table 137:

- A sealant
- A catalyst.

(3) Remove all of the old sealant from the insert cavity with an orangewood stick or cuticle.

CAUTION: DO NOT USE A KNIFE OR ANOTHER SHARP TOOL.

(4) Use a cleaning solvent to fully clean the shell cavity.

CAUTION: DO NOT PERMIT THE CLEANING SOLVENT TO TOUCH ANOTHER PART OF THE CONNECTOR.

(5) Remove the new insert from its sealed package.

(6) Clean the insert flange and the bosses near the flange with isopropyl alcohol.

CAUTION: MAKE SURE THAT THE BOSSES ARE CLEAN. IT IS POSSIBLE THAT THE BOSSES ARE NOT CLEAN WHEN THE NEW INSERT IS REMOVED FROM THE PACKAGE.

(7) If the insert has screws on the engaging face near the edge of the insert:

(a) Tighten the screws on the engaging face of the insert.

Make sure that the position of the edge of the washer under each screw head is not farther than the edge of the insert.

CAUTION: THE EDGE OF A WASHER THAT IS LOCATED FARTHER THAN THE EDGE OF THE INSERT WILL PREVENT THE INSTALLATION OF THE INSERT INTO THE CONNECTOR SHELL.

(b) Torque each screw 7 inch-pounds \pm 1 inch-pound.

(8) Align the insert with the shell cavity.

Make sure that the insert polarization key is aligned correctly in relation to the shell cavity.

(9) Carefully apply equal pressure with the thumbs on the rear of the insert to fully install the insert in the cavity.

Make sure that when the insert is installed:

- The surface of the insert is parallel with the rear face of the connector shell
- The insert flange is aligned with the rear face of the connector shell.

(10) Apply a layer of sealant in the groove around the insert.

Make sure that the top layer of sealant is aligned with the rear face of the shell.

(11) Let the sealant cure until it is not tacky.

(12) Install the retainer plates on the rear surface of the connector shell.

(13) Put a screw with a washer in each retainer plate hole.

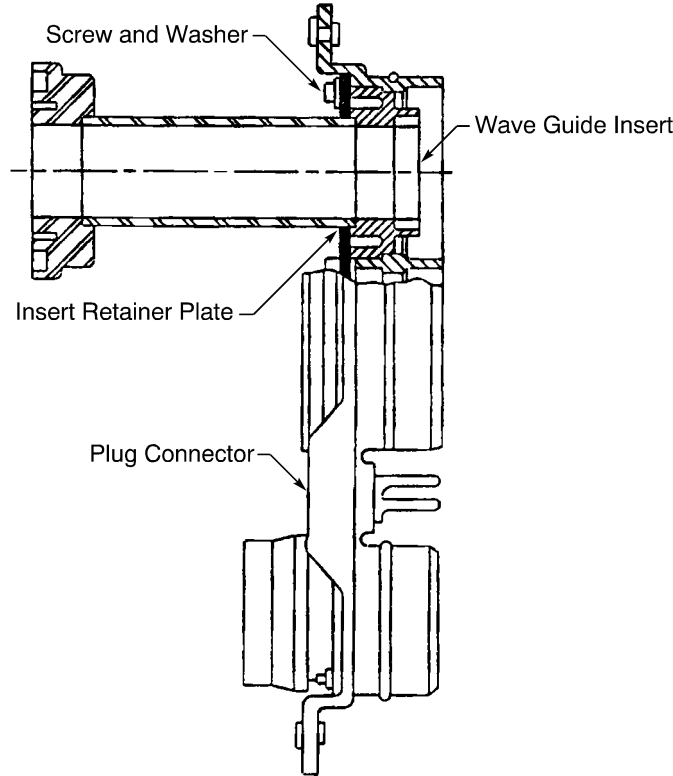
(14) Tighten each screw.

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(15) Torque each retainer plate screw 5 inch-pounds \pm 1 inch-pound.

F. Installation of the Wave Guide Insert



INSTALLATION OF THE WAVE GUIDE INSERT
Figure 220

(1) Make a selection of a BAC110AH06 wave guide.

Refer to:

- Paragraph 2.D. for ITT Cannon ARINC 600 connectors
- Paragraph 2.E. for Souriau ARINC 600 connectors
- Paragraph 2.H. for Tri-Star ARINC 600 connectors.

NOTE: A Tri-Star wave guide can be installed in an ITT Cannon connector.

NOTE: The wave guide insert for the Souriau connector is supplied with the connector.

(2) Remove the screws that hold the insert retainer plates. Refer to Figure 220.

(3) Remove the insert retainer plates.

(4) If the flange of the wave guide insert has a keyway, align the keyway with the key in the insert cavity at the rear of the connector shell.

(5) Put the smaller end of the wave guide insert into shell cavity A.

Make sure that the longitudinal axis of the wave guide insert is perpendicular to the rear face of the connector.

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- (6) Install the retainer plates on the rear surface of the connector shell.
- (7) Put a screw and a washer in each retainer plate hole.
- (8) Tighten the screws.
- (9) Torque each retainer plate screw 5 inch-pounds \pm 1 inch-pound.

19. INSPECTION AND CLEANING OF A FIBER OPTIC ALIGNMENT SLEEVE INSERT

A. Necessary Tools and Materials

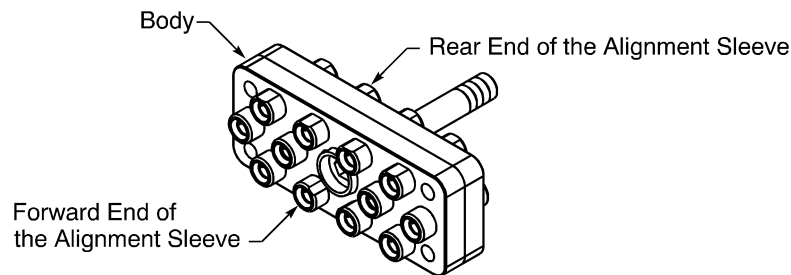
**Table 138
NECESSARY TOOLS**

Tool	Description	Part Number	Supplier
Canned Air	Tetrafluoroethane	ES1620	Chemtronics
Protective Equipment	Finger Cot	-	An available source
	Gloves, Powder Free	-	An available source

**Table 139
SOLVENTS**

Solvent	Specification	Supplier
Alcohol, Ethyl	O-E-760	An available source
Alcohol, Isopropyl	TT-I-735	An available source
Water, Distilled	-	An available source

B. Inspection and Cleaning



**ALIGNMENT SLEEVE INSERT
Figure 221**

CAUTION: KEEP THE ALIGNMENT SLEEVE INSERT IN A CLEAN PLASTIC BAG UNTIL IT IS INSTALLED ON THE CONNECTOR. CONTAMINATION ON THE ALIGNMENT SLEEVE INSERT CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

Refer to Figure 221.

- (1) Without magnification, examine each end of the alignment sleeves of the insert.
- (2) If an alignment sleeve has contamination, clean the sleeve without solvent. Refer to Paragraph 19.C.

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- (3) Without magnification, examine each end of the alignment sleeves again.
- (4) If an alignment sleeve has remaining contamination, clean the sleeve with solvent. Refer to Paragraph 19.D.
 - (a) Without magnification, examine each end of the alignment sleeves again.
 - (b) If an alignment sleeve has remaining contamination, clean the sleeve with solvent again. Refer to Paragraph 19.D.
 - (c) Without magnification, examine the alignment sleeves again.
 - (d) If an alignment sleeve has remaining contamination, replace the alignment sleeve insert.

C. Contamination Removal - Without Solvent

For the conditions that are applicable for this procedure, refer to Paragraph 19.B.

Refer to Figure 221.

- (1) Make a selection of canned air from Table 138.

NOTE: An equivalent canned air is a satisfactory alternative.
- (2) Make a selection of a protection equipment from Table 138.

NOTE: A satisfactory alternative is to clean the hands.
- (3) If the hands are not clean, put the protection equipment on.
- (4) Apply the canned air in each alignment sleeve that has contamination.

D. Contamination Removal - With Solvent

For the conditions that are applicable for this procedure, refer to Paragraph 19.B.

WARNING: SOME SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF A FLAMMABLE SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE ALIGNMENT SLEEVE INSERT.

Refer to Figure 221.

- (1) Make a selection of a canned air from Table 138.

NOTE: An equivalent canned air is a satisfactory alternative.
- (2) Make a selection of these solvents from Table 139:
 - An alcohol
 - Distilled water.
- (3) Make a selection of a protection equipment from Table 138.

NOTE: A satisfactory alternative is to clean the hands.
- (4) If the hands are not clean, put the protection equipment on.
- (5) Put a quantity of alcohol in a small container that can be sealed with a lid.

Make sure that:

 - The container is clean
 - The size of the container is sufficient to hold the alignment sleeve insert
 - The quantity of alcohol is sufficient to put the body of the alignment sleeve insert below the surface of the alcohol.
- (6) Put a quantity of distilled water in a small container that can be sealed with a lid.

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Make sure that:

- The container is clean
 - The size of the container is sufficient to hold the alignment sleeve insert
 - The quantity of distilled water is sufficient to put the body of the alignment sleeve insert below the surface of the alcohol.
- (7) Put the alignment sleeve insert in the container that has alcohol for 30 seconds minimum.
Make sure that the body of the alignment sleeve insert is below the surface of the alcohol.
 - (8) Remove the alignment sleeve insert from the alcohol.
 - (9) Seal the alignment sleeve insert in the container that has distilled water.
Make sure that the body of the alignment sleeve insert is below the surface of the distilled water.
 - (10) Lightly shake the container for 1 to 3 minutes.
 - (11) Remove the alignment sleeve insert from the water.
 - (12) Dry the alignment sleeve insert with the canned air.
 - (13) Put the alignment sleeve insert in the container that has alcohol for 30 seconds minimum.
Make sure that the body of the alignment sleeve insert is below the surface of the alcohol.
 - (14) Remove the alignment sleeve insert from the alcohol.
 - (15) Dry the alignment sleeve insert with the canned air.

20. CONNECTOR POLARIZATION AND CONNECTOR PART NUMBER

A. Polarization Post Positions

**Table 140
LOCATION OF POLARIZATION POST POSITION DETAILS**

Shell Size	Connector	Reference
1	BACC66F	Figure 223
	S280W551	Figure 224
2	BACC66H	Figure 225
	S280W551	Figure 226
3	BACC66K	Figure 227
	S280W551	Figure 228



Dark area shows the polarization post on the plug
Light area shows the polarization key on the receptacle

**POLARIZATION POSITIONS
Figure 222**



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Table 141
PLUG CONNECTOR POLARIZATION POST POSITIONS

Polarization Code	Plug Shell Post		
	Left	Center	Right
01	1	1	1
02	2	1	1
03	3	1	1
04	4	1	1
05	5	1	1
06	6	1	1
07	1	1	6
08	2	1	6
09	3	1	6
10	4	1	6
11	5	1	6
12	6	1	6
13	1	1	5
14	2	1	5
15	3	1	5
16	4	1	5
17	5	1	5
18	6	1	5
19	1	1	4
20	2	1	4
21	3	1	4
22	4	1	4
23	5	1	4
24	6	1	4
25	1	1	3
26	2	1	3
27	3	1	3
28	4	1	3
29	5	1	3
30	6	1	3
31	1	1	2

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Table 141 (continued)

Polarization Code	Plug Shell Post		
	Left	Center	Right
32	2	1	2
33	3	1	2
34	4	1	2
35	5	1	2
36	6	1	2
37	1	2	1
38	2	2	1
39	3	2	1
40	4	2	1
41	5	2	1
42	6	2	1
43	1	2	6
44	2	2	6
45	3	2	6
46	4	2	6
47	5	2	6
48	6	2	6
49	1	2	5
50	2	2	5
51	3	2	5
52	4	2	5
53	5	2	5
54	6	2	5
55	1	2	4
56	2	2	4
57	3	2	4
58	4	2	4
59	5	2	4
60	6	2	4
61	1	2	3
62	2	2	3
63	3	2	3

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Table 141 (continued)

Polarization Code	Plug Shell Post		
	Left	Center	Right
64	4	2	3
65	5	2	3
66	6	2	3
67	1	2	2
68	2	2	2
69	3	2	2
70	4	2	2
71	5	2	2
72	6	2	2
73	1	3	1
74	2	3	1
75	3	3	1
76	4	3	1
77	5	3	1
78	6	3	1
79	1	3	6
80	2	3	6
81	3	3	6
82	4	3	6
83	5	3	6
84	6	3	6
85	1	3	5
86	2	3	5
87	3	3	5
88	4	3	5
89	5	3	5
90	6	3	5
91	1	3	4
92	2	3	4
93	3	3	4
94	4	3	4
95	5	3	4

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 141 (continued)

Polarization Code	Plug Shell Post		
	Left	Center	Right
96	6	3	4
97	1	3	3
98	2	3	3
99	3	3	3
100	4	3	3
101	5	3	3
102	6	3	3
103	1	3	2
104	2	3	2
105	3	3	2
106	4	3	2
107	5	3	2
108	6	3	2
109	1	4	1
110	2	4	1
111	3	4	1
112	4	4	1
113	5	4	1
114	6	4	1
115	1	4	6
116	2	4	6
117	3	4	6
118	4	4	6
119	5	4	6
120	6	4	6
121	1	4	5
122	2	4	5
123	3	4	5
124	4	4	5
125	5	4	5
126	6	4	5
127	1	4	4

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Table 141 (continued)

Polarization Code	Plug Shell Post		
	Left	Center	Right
128	2	4	4
129	3	4	4
130	4	4	4
131	5	4	4
132	6	4	4
133	1	4	3
134	2	4	3
135	3	4	3
136	4	4	3
137	5	4	3
138	6	4	3
139	1	4	2
140	2	4	2
141	3	4	2
142	4	4	2
143	5	4	2
144	6	4	2
145	1	5	1
146	2	5	1
147	3	5	1
148	4	5	1
149	5	5	1
150	6	5	1
151	1	5	6
152	2	5	6
153	3	5	6
154	4	5	6
155	5	5	6
156	6	5	6
157	1	5	5
158	2	5	5
159	3	5	5

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 141 (continued)

Polarization Code	Plug Shell Post		
	Left	Center	Right
160	4	5	5
161	5	5	5
162	6	5	5
163	1	5	4
164	2	5	4
165	3	5	4
166	4	5	4
167	5	5	4
168	6	5	4
169	1	5	3
170	2	5	3
171	3	5	3
172	4	5	3
173	5	5	3
174	6	5	3
175	1	5	2
176	2	5	2
177	3	5	2
178	4	5	2
179	5	5	2
180	6	5	2
181	1	6	1
182	2	6	1
183	3	6	1
184	4	6	1
185	5	6	1
186	6	6	1
187	1	6	6
188	2	6	6
189	3	6	6
190	4	6	6
191	5	6	6

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Table 141 (continued)

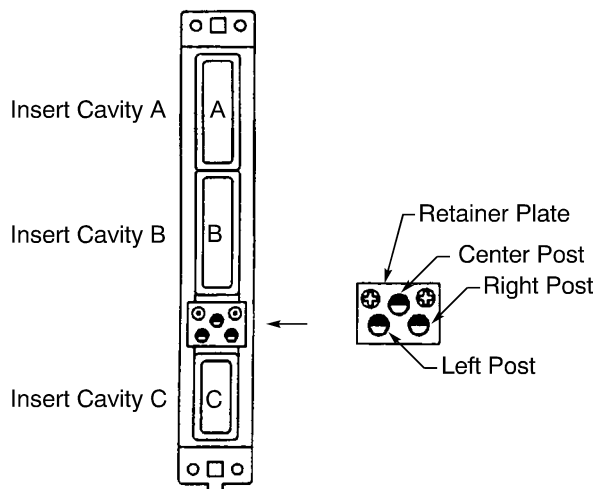
Polarization Code	Plug Shell Post		
	Left	Center	Right
192	6	6	6
193	1	6	5
194	2	6	5
195	3	6	5
196	4	6	5
197	5	6	5
198	6	6	5
199	1	6	4
200	2	6	4
201	3	6	4
202	4	6	4
203	5	6	4
204	6	6	4
205	1	6	3
206	2	6	3
207	3	6	3
208	4	6	3
209	5	6	3
210	6	6	3
211	1	6	2
212	2	6	2
213	3	6	2
214	4	6	2
215	5	6	2
216	6	6	2

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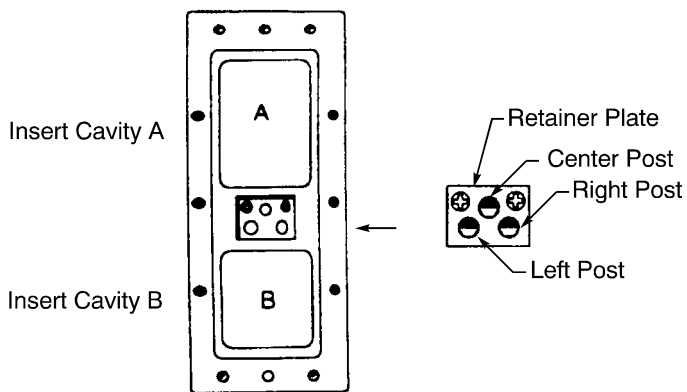
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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

B. Polarization Posts for Shell Size 1



ARINC 600 (BACC66F) SHELL SIZE 1 PLUG
Figure 223

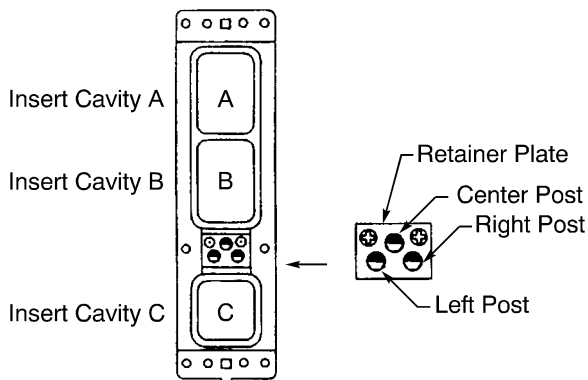


S280W551 SHELL SIZE 1 PLUG
Figure 224

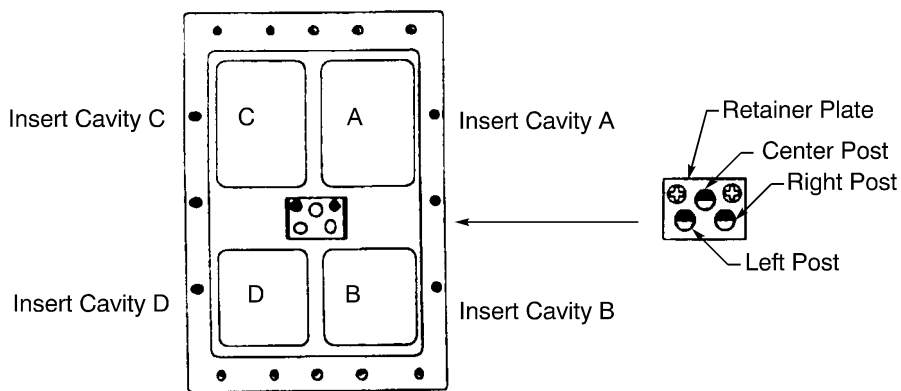
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C. Polarization Posts for Shell Size 2



ARINC 600 (BACC66H) SHELL SIZE 2 PLUG
Figure 225

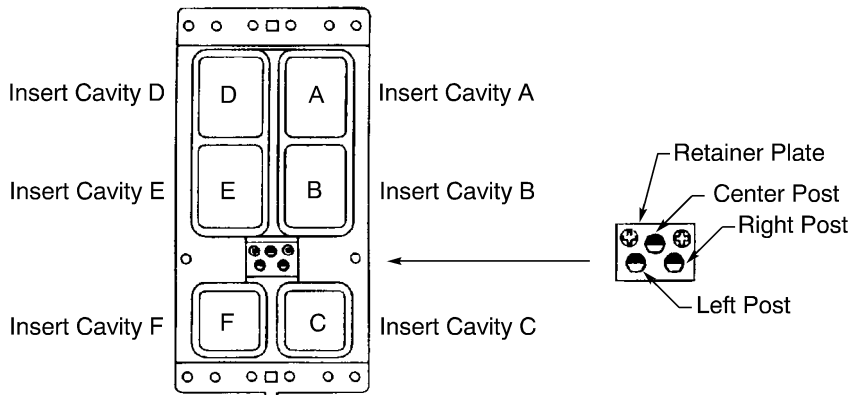


S280W551 SHELL SIZE 2 PLUG
Figure 226

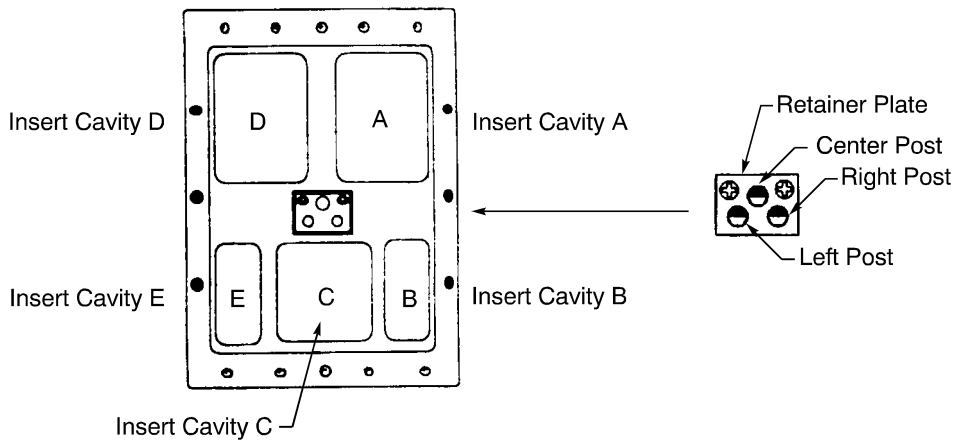
STANDARD WIRING PRACTICES MANUAL

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D. Polarization Posts for Shell Size 3



ARINC 600 (BACC66K) SHELL SIZE 3 PLUG
Figure 227



S280W551 SHELL SIZE 3 PLUG
Figure 228

E. Change of the Polarization Posts

Table 142
REPLACEMENT POLARIZATION POSTS

Post Part Number	Supplier
208018-1	AMP
230-0138-000	ITT Cannon
765-60-060	Radiall
8660-125	Souriau

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**Table 143
REPLACEMENT POLARIZATION RETAINER PLATE FASTENERS**

Screw Part Number	Supplier
NAS514P440-5P	An available source

**Table 144
NECESSARY MATERIALS FOR REPLACEMENT FASTENERS**

Description	Part Number	Supplier
Thread Lock Compound	222	Loctite

CAUTION: IT IS POSSIBLE THAT THE POLARIZATION POSTS OF CONNECTORS FROM DIFFERENT MANUFACTURERS ARE NOT INTERCHANGEABLE.

NOTE: If the polarization posts on a connector are changed, the polarization code in the connector part number must be changed. Refer to Paragraph 20.F.

- (1) Identify the polarization code in the connector part number from the equipment list.
- (2) For that code, find the correct post positions on the plug.
Refer to:
 - Figure 222
 - Table 141.
- (3) If the position of any of the posts on the connector is not correct:
 - (a) From the engaging face of the connector, remove the screws from the polarization retainer plate.
NOTE: It is not necessary to remove the connector from its installed location to change its polarization.
 - (b) Remove the polarization retainer plate from the connector.
 - (c) Remove the incorrect polarization post from the hexagonal hole.
 - (d) Align the post in the correct position.
 - (e) Put the post back into the hexagonal hole.
Make sure that the post is in the correct position.
 - (f) Put the polarization retainer plate on the posts.
 - (g) Engage the threads of each polarization retainer plate screw.
 - (h) Tighten the screws.
- (4) If a polarization plate screw is lost or damaged:
 - (a) Make a selection of a screw from Table 143.
 - (b) Make a selection of a thread lock compound from Table 144.
 - (c) Apply one drop of thread lock compound to the threads of the screw.
 - (d) Engage the threads of the screw and the connector.
 - (e) Tighten the screw.

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F. Change of the Polarization Code, Any Part of the Connector Part Number, or the Complete Part Number on the Connector Shell

**Table 145
NECESSARY MATERIALS**

Material	Part Number or Specification	Supplier
Clear Paint	683-3-2	Akzo
	Clear Lacquer	Tartan
	EC-776	3M
	BMS10-60, Type 1, Grade D, Clear	Boeing
Ink	No. 68 Fast Dry	Independent
	No. 73X NW Opaque	Independent
	No. 73X Opaque	Independent
Pen	Permanent Ink Pen, Ultra Fine Point	Sanford Sharpie

**Table 146
SUPPLIERS OF BOEING STANDARD CLEAR PAINT**

Part Number or Specification	Supplier
BMS10-60	Akzo
	PRC-DeSoto

- (1) Make a selection of these necessary materials from Table 145:
 - A permanent ink pen
 - A clear paint
 - An ink.

- (2) If the connector does not have a part number or a polarization code, write the part number and polarization code in the correct position on the connector shell.
 Refer to the details of the applicable connector part number:
 - Figure 10 for Boeing ARINC 600 Connectors
 - Figure 11 for the ITT Cannon ARINC 600 Connectors
 - Figure 12 for the Souriau ARINC 600 Connectors
 - Figure 13 for the AMP ARINC 600 Connectors
 - Figure 14 for the Radiall ARINC 600 Connectors
 - Figure 15 for the Boeing S280W551 Connectors.

- (3) If the connector has an incorrect part number or polarization code:
 - (a) Apply a layer of ink on the incorrect part number or polarization code.
 Make sure that the incorrect part number or polarization code cannot be read.
 - (b) Write the new part number or polarization code on the connector shell
 - Adjacent to the location of the incorrect part number or polarization code
 - In the correct position.

- (4) Let the ink dry for 10 minutes minimum.

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(5) Paint the new code and the area of the old code with the clear paint.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. ANY PAINT ON THE SURFACE OF A CONTACT CAUSES UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

(6) Let the clear paint dry before the connector shell is touched or moved.

21. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 147
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
1738894-1	Tyco
282890	Radiall
282891	Radiall
282892	Radiall
282945	Radiall
8660-162	Souriau
91066-1	AMP
91066-3	AMP
91066-4	AMP
91078-1	AMP
91174-1	AMP
ATBO2054	Astro
ATC1054	Astro
ATC2073	Astro
CE912-4	ITT Cannon
CET-16-15	ITT Cannon
CET-12-4	ITT Cannon
CET-16-9	ITT Cannon
CET-20D-1	ITT Cannon
CET-C8	ITT Cannon
CET-DPXMA-22	ITT Cannon
CET8-2	ITT Cannon
CET8-T	ITT Cannon
CIET	ITT Cannon
CIET-12	ITT Cannon

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Table 147 (continued)

Removal Tool	Supplier
CIET-20 HDL	ITT Cannon
CIET-22	ITT Cannon
CIET-22DPXMA	ITT Cannon
DRK145	Daniels
DRK2663	Daniels
DRK266J	Daniels
DRK83-16	Daniels
M81969/1-01	QPL
M81969/1-02	QPL
M81969/1-03	QPL
M81969/14-03	QPL
M81969/14-10	QPL
M81969/28-02	QPL
M81969/28-03	QPL
MS3156-16	QPL
MS3156-20	QPL
MS3156-22	QPL
MS3178-001	QPL
MS3178-002	QPL
RRX-04-C-1	Russtech
SET-C8	Daniels
ST2220-3-33	Boeing
ST2220-3-7	Boeing

B. Crimp Tools

**Table 148
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11732	Thomas & Betts
13642	Thomas & Betts
22-944	Balmar
282580	Radiall



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Table 148 (continued)

Crimp Tool	Supplier
400B	Pico
4046	Pico
4046A	Pico
41	ITT Cannon
414DA-8N	Pico
612648	Astro
	Buchanan
612746	Astro
	Buchanan
612778	Astro
	Buchanan
612971	Astro
	Buchanan
613365	Astro
	Buchanan
620467	Astro
	Buchanan
85-220	Balmar
85-550	Balmar
995-0002-239	ITT Cannon
995-0002-233	ITT Cannon
AF8	Daniels
AFM-2	Daniels
AFM8	Daniels
CCT-HX3-156	ITT Cannon
CCT-HX4-156	ITT Cannon
K-182	Daniels
K-644	Daniels
KTH-1000	Kings
KTH-2011	Kings
KTH-2021	Kings
KTH-2022	Kings
KTH-2177	Kings

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Table 148 (continued)

Crimp Tool	Supplier
KTH-2213	Kings
KTH-2221	Kings
K1025S	Daniels
K267-1	Daniels
K345	Daniels
K709	Daniels
L-3198-20HD	Cannon
M22520/1-01	QPL
M22520/1-02	QPL
M22520/1-11	QPL
M22520/10-01	QPL
M22520/10-23	QPL
M22520/2-01	QPL
M22520/2-02	QPL
M22520/2-08	QPL
M22520/2-11	QPL
M22520/2-14	QPL
M22520/2-23	QPL
M22520/23-01	QPL
M22520/23-02	QPL
M22520/23-09	QPL
M22520/5-01	QPL
M22520/5-03	QPL
M22520/5-08	QPL
M22520/5-17	QPL
M22520/5-33	QPL
M22520/5-35	QPL
M22520/5-45	QPL
ST2220-1-Y	Boeing
ST2220-1-2	Boeing
ST2354-5	Boeing
ST2966M	Boeing
ST2966M-1	Boeing

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ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 148 (continued)

Crimp Tool	Supplier
ST2966M-7	Boeing
ST965-4	Boeing
TH1A	Daniels
TP855	Daniels
WA22	Daniels
WA22LC	Daniels
WA27	Daniels
WA27F	Daniels
WT201-03-10	Thomas & Betts
WT-400	Thomas & Betts
Y119	Daniels
Y120	Daniels
Y193	Daniels
Y793A	Daniels
Y797	Daniels
Y804	Daniels

C. Contact Insertion Tools

**Table 149
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
282880	Radiall
282881	Radiall
282892	Radiall
282929	Radiall
8660-162	Souriau
91066-3	AMP
91066-4	AMP
ATB01054	Astro
CIET	ITT Cannon
CIET-12	ITT Cannon
CIET-20 HDL	ITT Cannon



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC66F, H, AND K ARINC 600, AND S280W551 RACK AND PANEL CONNECTORS

Table 149 (continued)

Insertion Tool	Supplier
CIET-22	ITT Cannon
CIET-22DPXMA	ITT Cannon
CIT-DPXMA-22-1	ITT Cannon
DAK145J	Daniels
DAK266	Daniels
DAK55-16	Daniels
DRK266J	Daniels
M81969/1-01	QPL
M81969/1-02	QPL
M81969/1-03	QPL
M81969/14-03	QPL
M81969/28-02	QPL
MS3156-16	QPL
MS3156-20	QPL
MS3156-22	QPL
MS3178-001	QPL
MS3178-002	QPL
RIT-04-C-1	Russtech

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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

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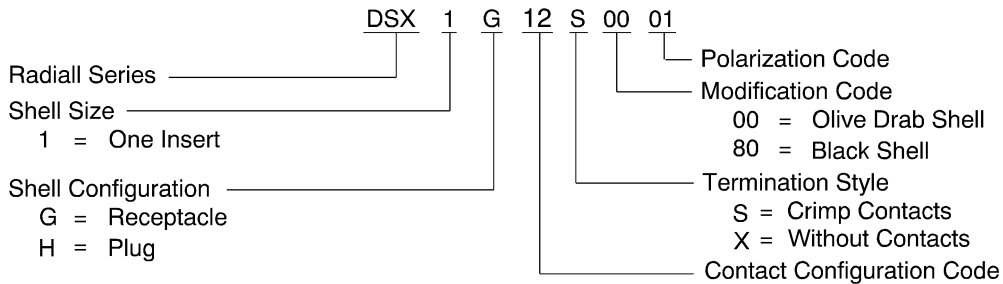
ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

1. PART NUMBERS AND DESCRIPTION

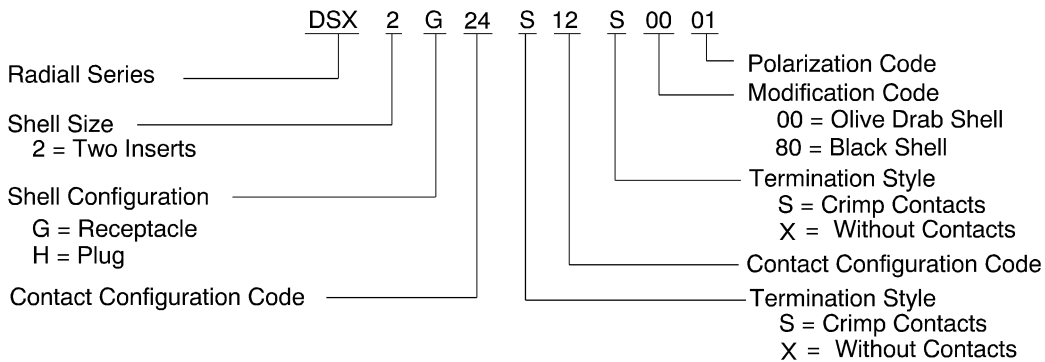
A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Description	Supplier
DSX1()	ARINC 404	Radiall
DSX2()	ARINC 404	Radiall
DSX3()	ARINC 404	Radiall
DSXE()	MIL-C-81659 Type	Radiall
DSXN()	MIL-C-81659 Type	Radiall
DSXT()	MIL-C-81659 Type	Radiall



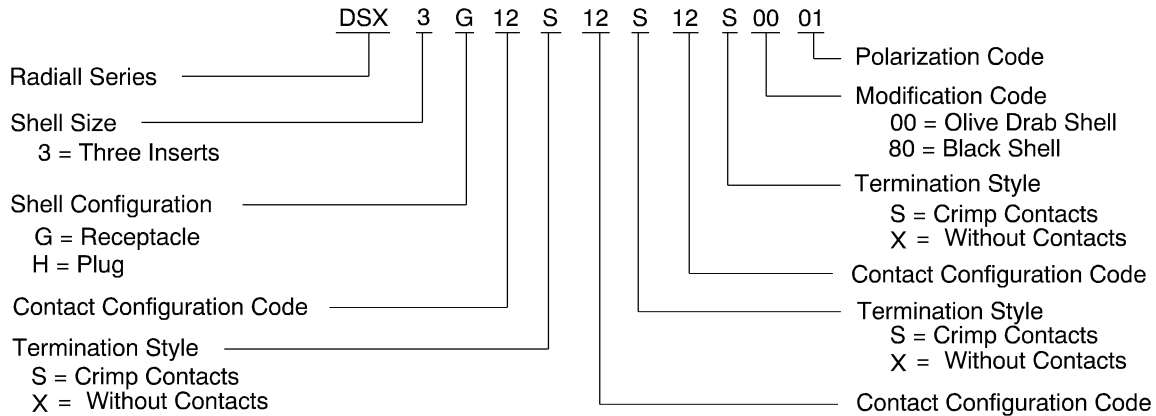
**RADIAL ONE INSERT ARINC 404 CONNECTOR PART NUMBER STRUCTURE
Figure 1**



**RADIAL TWO INSERT ARINC 404 CONNECTOR PART NUMBER STRUCTURE
Figure 2**

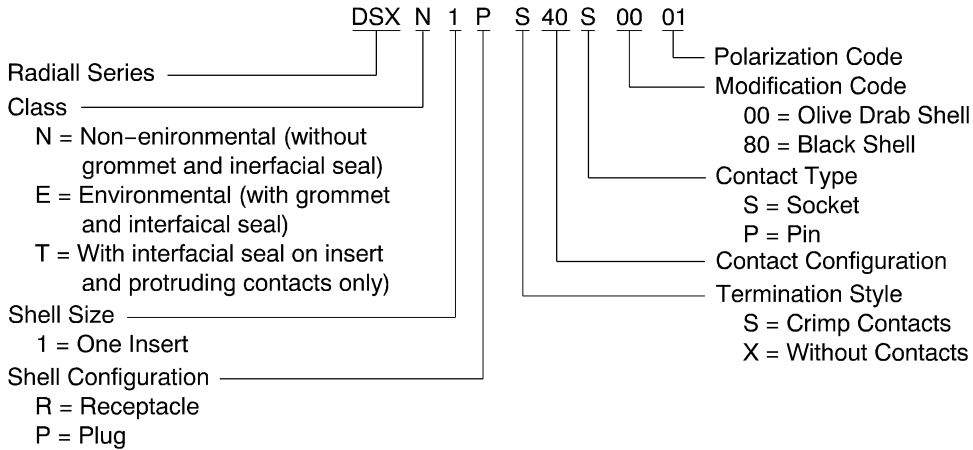
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF RADIALL DSX SERIES CONNECTORS



RADIALL THREE INSERT ARINC 404 CONNECTOR PART NUMBER STRUCTURE

Figure 3

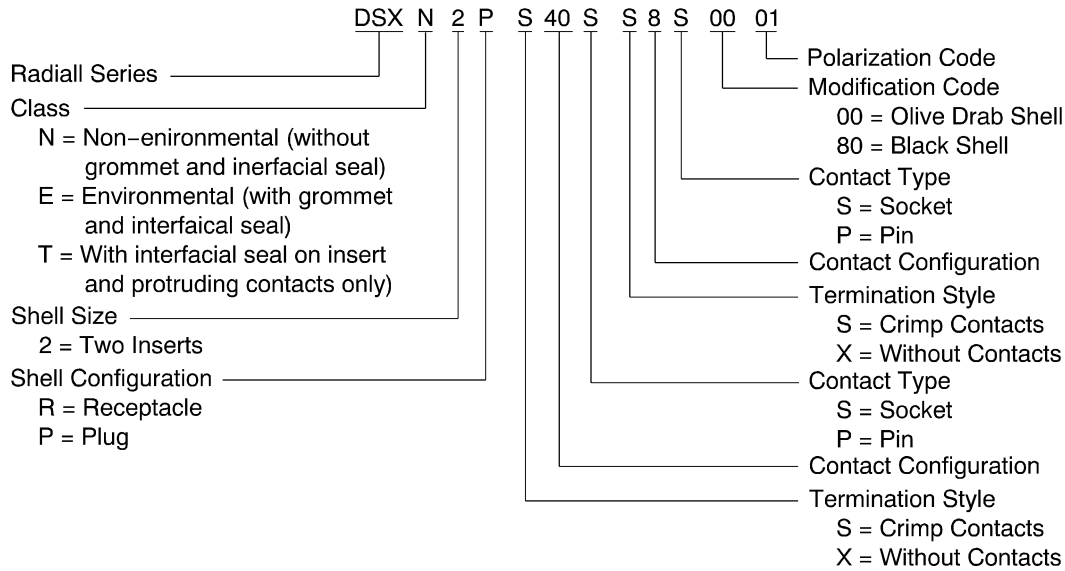


RADIALL ONE INSERT MIL-C-81659 TYPE CONNECTOR PART NUMBER STRUCTURE

Figure 4

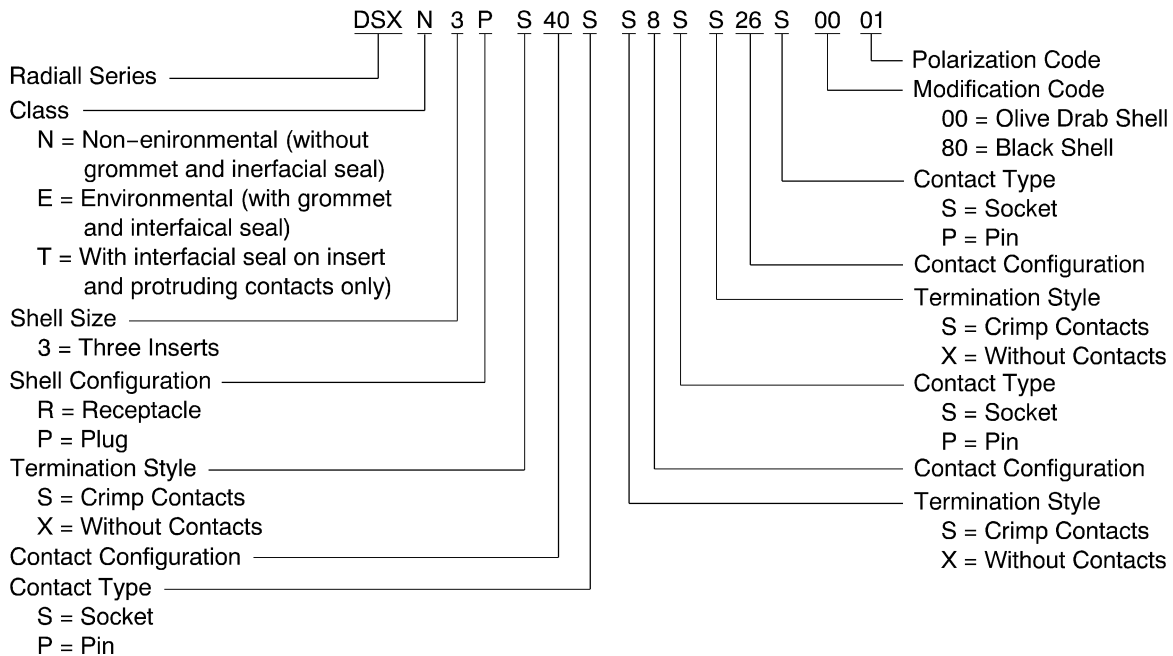
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ASSEMBLY OF RADIALL DSX SERIES CONNECTORS



RADIALL TWO INSERT MIL-C-81659 TYPE CONNECTOR PART NUMBER STRUCTURE

Figure 5



RADIALL THREE INSERT MIL-C-81659 TYPE CONNECTOR PART NUMBER STRUCTURE

Figure 6



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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

B. Alternative Connector Part Numbers

Table 2
ACCEPTABLE ALTERNATIVE DSX SERIES ARINC 404 CONNECTORS

Table with 3 columns: Radial DSX Connector, Alternative Connector Part Number, and Supplier. It lists various connector models and their corresponding part numbers and suppliers (ITT Cannon).

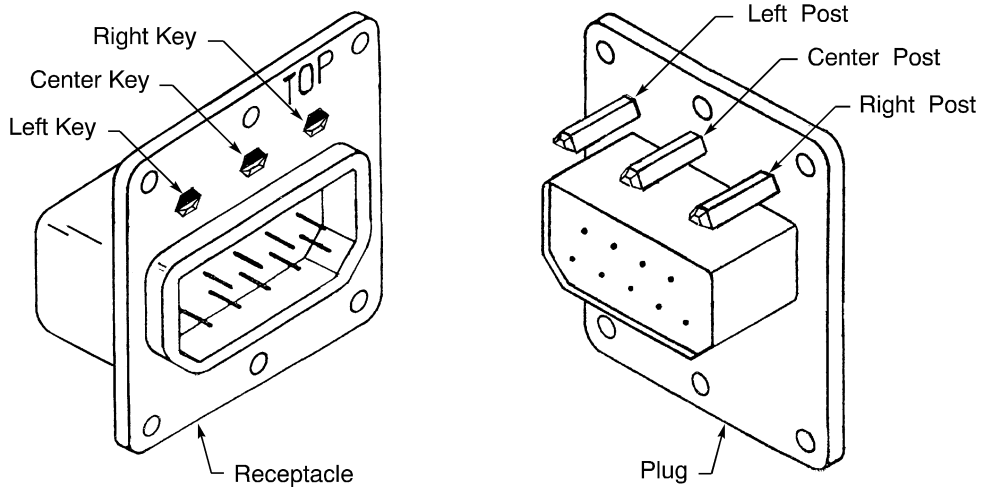
CAUTION: DO NOT USE THE COAX CONTACTS THAT ARE SPECIFIED IN OTHER SUBJECTS WITH THE ACCEPTABLE ALTERNATIVE DSX CONNECTORS. IF THE OTHER COAX CONTACTS ARE INSTALLED, UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE CONNECTOR CAN OCCUR.

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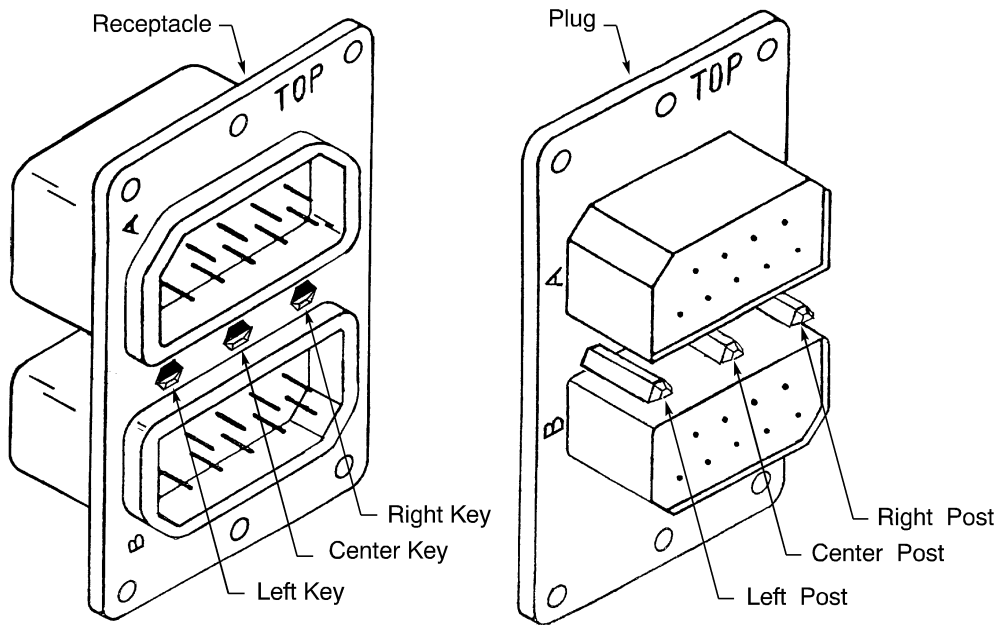
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF RADIALL DSX SERIES CONNECTORS

C. Connector Description



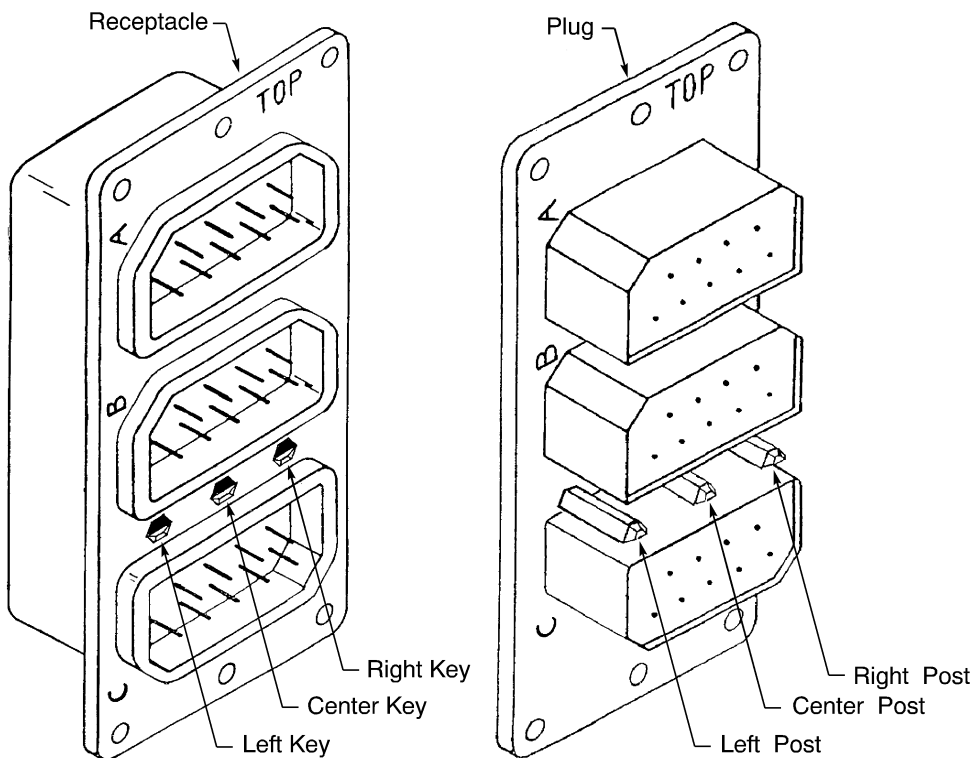
ONE INSERT CONFIGURATION
Figure 7



TWO INSERT CONFIGURATION
Figure 8

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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS



THREE INSERT CONFIGURATION

Figure 9

D. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
22	22	Pin	030-1975-000	ITT
			030-1975-005	ITT
			030-1975-007	ITT
			204873-4	AMP
			616 200	Radiall
			M39029/11-144	QPL
		Socket	030-9081-003	ITT
			616 210	Radiall
			M39029/12-148	QPL



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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

Table 3 (continued)

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20HD	Pin	030-9081-003	ITT
			616 210	Radiall
			M39029/11-145	QPL
		Socket	031-9134-004	ITT
			616 310	Radiall
			M39029/12-149	QPL
	20	Pin	316-2020-081	Tri-Star
			030-9081-000	ITT
			610 220	Radiall
		Socket	031-9134-001	ITT
			610 325	Radiall
16	16	Pin	030-9083-001	ITT
			204978-3	AMP
			616 230	Radiall
			M39029/11-146	QPL
		Socket	031-9206-004	ITT
	205117-1		AMP	
	316-1616-076		Tri-Star	
	616 330		Radiall	
	M39029/12-150		QPL	
	12	12	Pin	030-1909-001
205763-3				AMP
616 240				Radiall
M39029/11-147				QPL
Socket		031-1059-001	ITT	
		205851-2	AMP	
		616 340	Radiall	
		M39029/12-151	QPL	
05	08	Socket	616 366	Radiall

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ASSEMBLY OF RADIALL DSX SERIES CONNECTORS

**Table 4
COAX CONTACT PART NUMBERS**

Connector Type	Contact Size	Contact Type	Part Number	Supplier
ARINC 404	9	Socket	610040	Radiall
	5	Socket	610020001	Radiall
	3	Socket	610118	Radiall
	1	Socket	610108	Radiall
MIL-C-81659	5	Socket	616021	Radiall

**Table 5
OBSOLETE COAX CONTACT PART NUMBERS**

Obsolete Coax Contact		Replacement Coax Contact
Part Number	Supplier	
610 020	Radiall	610020001
610 030	Radiall	610020001

2. INSERT CONFIGURATIONS

A. DSX Series ARINC 404 Connectors

The part numbers for these connectors contain the contact configuration codes. Refer to:

- Figure 1
- Figure 2
- Figure 3.

The contact configuration codes give the insert configurations. Refer to Table 6 and Table 7.

**Table 6
CONTACT CONFIGURATION CODES FOR ARINC 404 CONNECTORS**

Contact		Insert Configuration
Configuration Code	Type	
10	Pin	00
11	Socket	00
12	Pin	8
13	Socket	8
14	Pin	26
15	Socket	26
16	Pin	40
17	Socket	40
18	Pin	45
19	Socket	45

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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

Table 6 (continued)

Contact		Insert Configuration
Configuration Code	Type	
20	Pin	57
21	Socket	57
22	Pin	67
23	Socket	67
24	Pin	106
25	Socket	106
26	Pin	32C2
27	Socket	32C2
28	Pin	40C1
29	Socket	40C1
30	Pin	C8
31	Socket	C8
34	Pin	C2
35	Socket	C2
36	Pin	C3
	Pin	C3 Mod
37	Socket	C3
40	Pin	32C4
41	Socket	32C4
43	Socket	C3 Mod

Table 7

INSERT CONFIGURATIONS FOR ARINC 404 CONNECTORS

Insert Configuration	Contact		
	Count	Size	Type
00	0	-	-
8	8	12	Standard
26	26	16	Standard
40	40	20	Standard
45	45	20	Standard
57	57	20	Standard

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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

Table 7 (continued)

Insert Configuration	Contact		
	Count	Size	Type
67	64	20HD	Standard
	3	16	Standard
32C2	30	20	Standard
	2	5	Coax
32C4	24	20HD	Standard
	4	16	Standard
	4	9	Coax
40C1	39	20	Standard
	1	5	Coax
106	106	22	Standard
C2	2	1	Coax
C3	2	7	Coax
	1	3	Coax
C3 Mod	2	5	Coax
	1	3	Coax
C8	8	9	Coax

B. DSX Series MIL-C-81659 Type Connectors

The part numbers for these connectors contain the insert configurations directly. Refer to:

- Figure 4
- Figure 5
- Figure 6.

Table 8

INSERT CONFIGURATIONS FOR MIL-C-81659 TYPE CONNECTORS

Insert Configuration	Contact		
	Count	Size	Type
00	0	-	-
8	8	12	Standard
26	26	16	Standard
40	40	20HD	Standard
45	45	20HD	Standard
57	57	20HD	Standard



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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

Table 8 (continued)

Insert Configuration	Contact		
	Count	Size	Type
67	64	20HD	Standard
	3	16	Standard
32C2	30	20HD	Standard
	2	5	Coax
32C4	24	20HD	Standard
	4	16	Standard
	4	9	Coax
33C4	25	20HD	Standard
	4	16	Standard
	4	5	Coax
36C7	29	22	Standard
	7	5	Coax
40C1	39	20HD	Standard
	1	5	Coax
106	106	22	Standard
MC2	2	1	Coax
MC3	2	7	Coax
	1	3	Coax
C3 Mod	2	5	Coax
	1	3	Coax
C8	8	9	Coax

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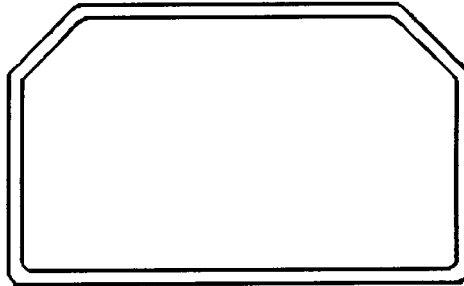
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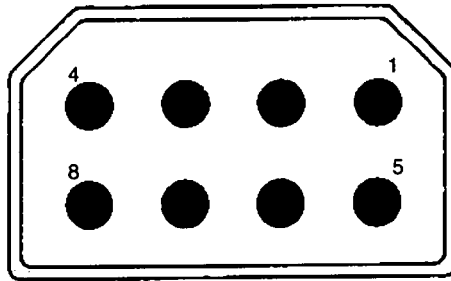
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

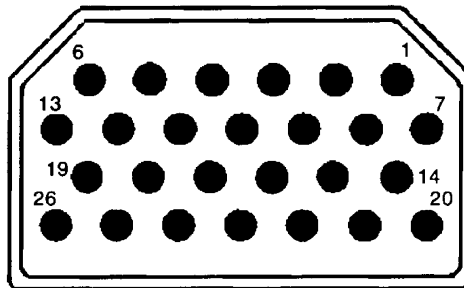
C. DSX Series Connector Inserts



INSERT 00
Figure 10



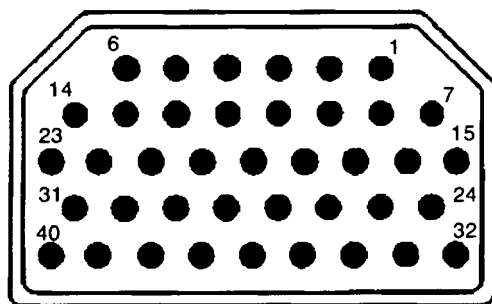
INSERT 8
Figure 11



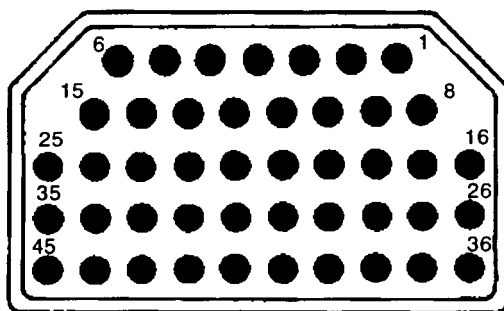
INSERT 26
Figure 12

STANDARD WIRING PRACTICES MANUAL

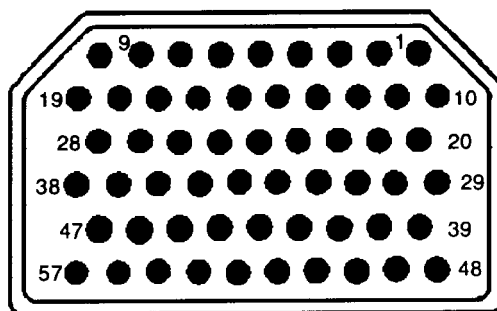
ASSEMBLY OF RADIAL DSX SERIES CONNECTORS



INSERT 40
Figure 13



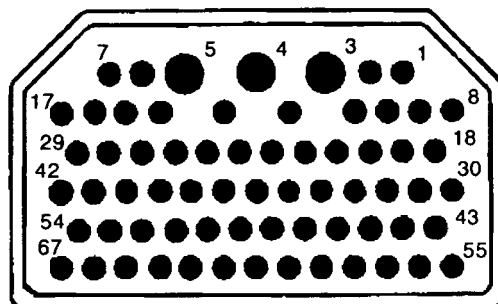
INSERT 45
Figure 14



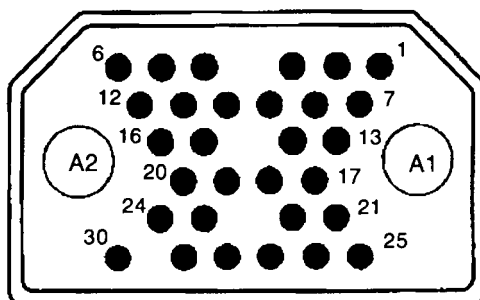
INSERT 57
Figure 15

STANDARD WIRING PRACTICES MANUAL

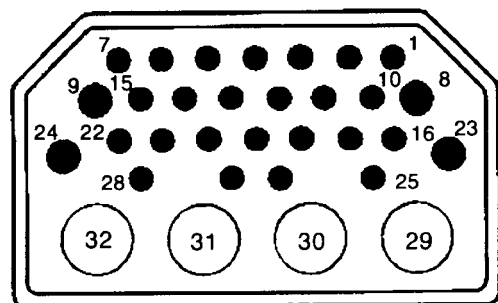
ASSEMBLY OF RADIAL DSX SERIES CONNECTORS



INSERT 67
Figure 16



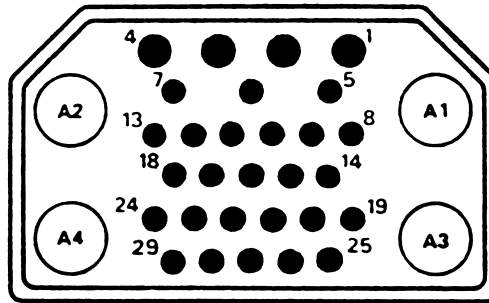
INSERT 32C2
Figure 17



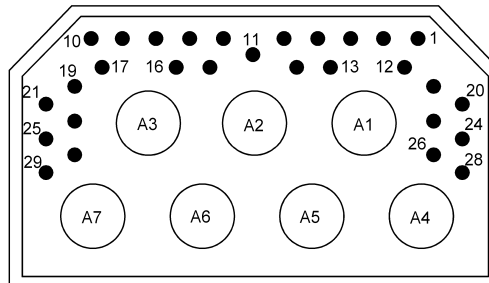
INSERT 32C4
Figure 18

STANDARD WIRING PRACTICES MANUAL

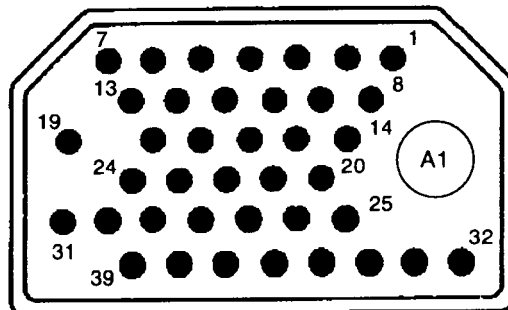
ASSEMBLY OF RADIAL DSX SERIES CONNECTORS



INSERT 33C4
Figure 19



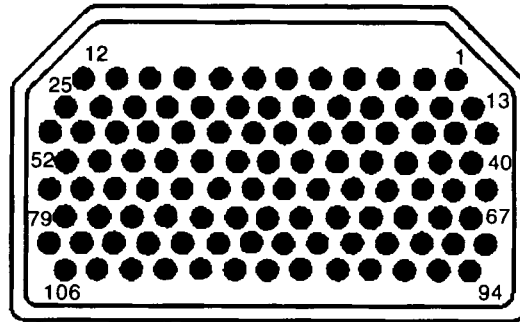
INSERT 36C7
Figure 20



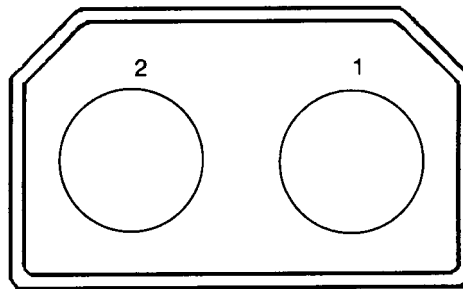
INSERT 40C1
Figure 21

STANDARD WIRING PRACTICES MANUAL

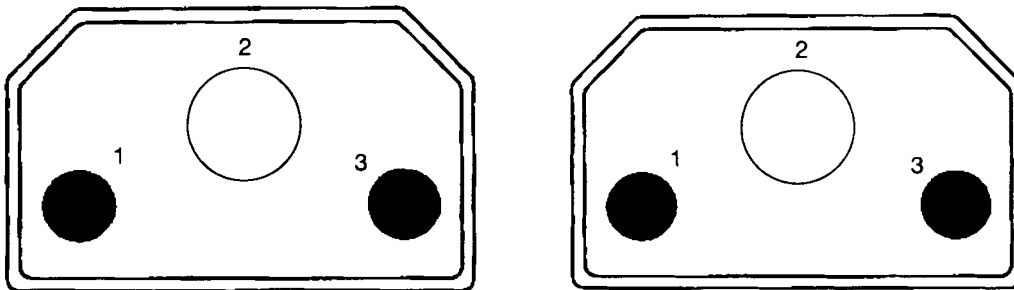
ASSEMBLY OF RADIAL DSX SERIES CONNECTORS



INSERT 106
Figure 22



INSERT C2 AND INSERT MC2
Figure 23



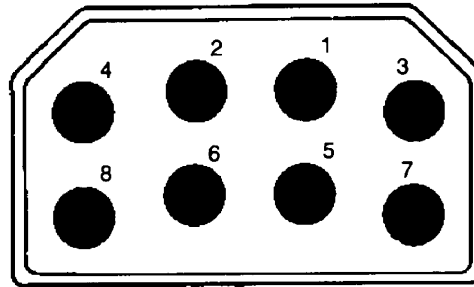
Insert C3

Insert C3 Mod

INSERT C3, INSERT MC3 AND INSERT C3 MOD
Figure 24

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF RADIAL DSX SERIES CONNECTORS



INSERT C8
Figure 25

3. CONNECTOR DISASSEMBLY

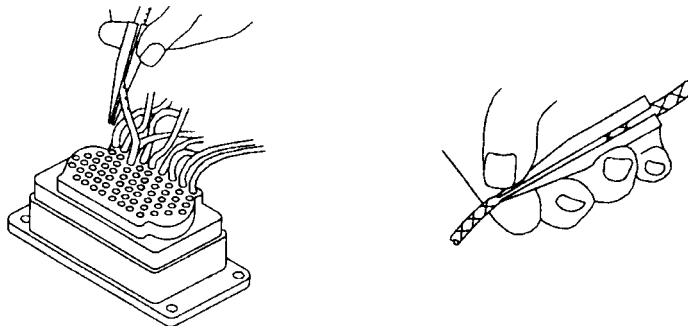
A. Contact Removal

Table 9
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool
22	M81969/1-01
	MS3156-22
	282 880
	282 890
20HD	M81969/1-02
	MS3156-20
	282 881
	282 891
20	282 943
16	M81969/1-03
	MS3156-16
	282 892
	282 929
12	M81969/28-02
	MS3178-002
	282 945
8	CET-C8
	282 946
	M81969/28-01
	DRK310

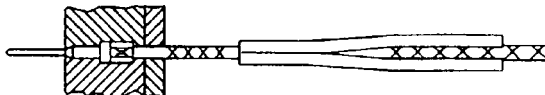
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF RADIAL DSX SERIES CONNECTORS**

- (1) Make a selection of a contact removal tool from Table 9.
- (2) Put the removal tool on the wire. Refer to Figure 26.



ALIGNMENT OF THE REMOVAL TOOL AND THE WIRE
Figure 26

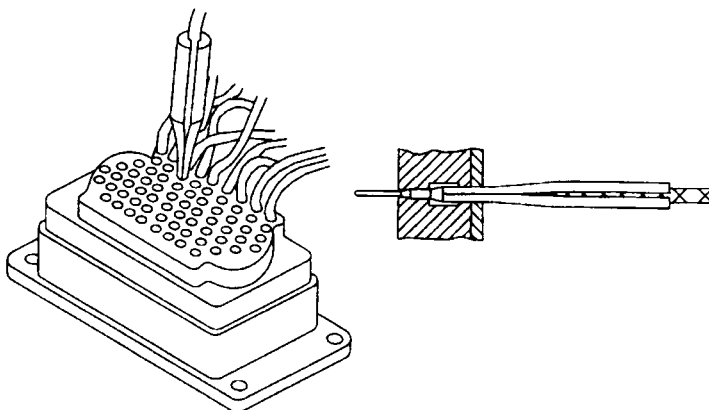
- (3) Axially align the tool on the wire with the contact cavity. Refer to Figure 27.



ALIGNMENT OF THE REMOVAL TOOL AND THE CONTACT CAVITY
Figure 27

- (4) Push the removal tool straight into the contact cavity until:
 - The tool hits the bottom
 - The contact is released.

Refer to Figure 28.

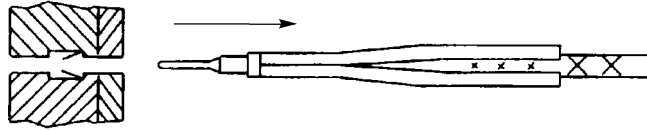


POSITION OF THE REMOVAL TOOL IN THE CONTACT CAVITY
Figure 28

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

(5) Axially pull the tool and the wire from the contact cavity at the same time. Refer to Figure 29.



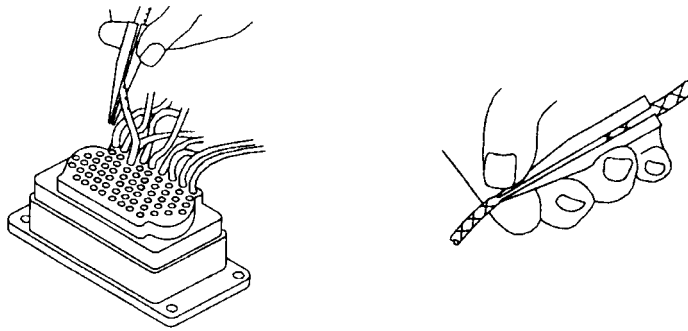
REMOVAL OF THE WIRED CONTACT
Figure 29

B. Coax Contact Removal

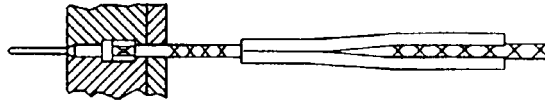
Table 10
COAX CONTACT REMOVAL TOOLS

Contact Size	Removal Tool
9	CET-C8
	DRK310
	M81969/28-01
	282 946
7	CET-C8
	DRK310
	M81969/28-01
	282 946
5	CET-C8
	DRK310
	M81969/28-01
	282 946

- (1) Make a selection of a coax contact removal tool from Table 10.
- (2) Put the removal tool on the wire. Refer to Figure 30.

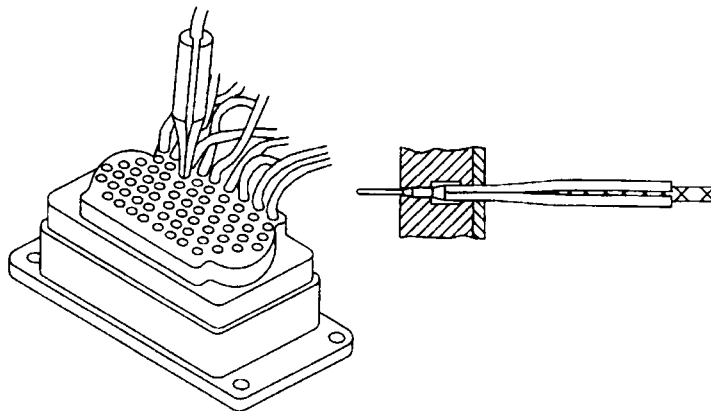
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF RADIAL DSX SERIES CONNECTORS****ALIGNMENT OF THE REMOVAL TOOL AND THE WIRE****Figure 30**

- (3) Axially align the tool on the wire with the contact cavity. Refer to Figure 31.

**ALIGNMENT OF THE REMOVAL TOOL AND THE CONTACT CAVITY****Figure 31**

- (4) Push the removal tool straight into the contact cavity until:
- The tool hits the bottom
 - The contact is released.

Refer to Figure 32.

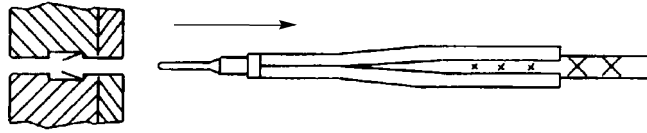
**POSITION OF THE REMOVAL TOOL IN THE CONTACT CAVITY****Figure 32**

- (5) Axially pull the tool and the wire from the contact cavity at the same time. Refer to Figure 33.

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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS



REMOVAL OF THE WIRED CONTACT
Figure 33

4. CONNECTOR ASSEMBLY

A. Contact Assembly

For the assembly of:

- A Radiall 616366 contact, refer to Paragraph 4.B.
- A Radiall 610020001 coax contact, refer to Paragraph 4.C.
- A Radiall 610040 coax contact, refer to Paragraph 4.D.
- A Radiall 610108 coax contact, refer to Paragraph 4.E.
- A Radiall 610118 coax contact, refer to Paragraph 4.F.
- A Radiall 616021 coax contact, refer to Paragraph 4.G.

Table 11
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
26	22	0.19	± 0.03	-
	20HD	0.38	± 0.03	Fold the conductor back
	20	0.38	± 0.03	Fold the conductor back
24	22	0.19	± 0.03	-
	20HD	0.19	± 0.03	
	20	0.19	± 0.03	
	16	0.56	± 0.03	Fold the conductor back
22	22	0.19	± 0.03	-
	20HD	0.19	± 0.03	
	20	0.19	± 0.03	
	16	0.56	± 0.03	Fold the conductor back
20	20HD	0.19	± 0.03	-
	20	0.19	± 0.03	-
	16	0.28	± 0.03	-
18	16	0.28	± 0.03	-

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Table 11 (continued)

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
16	16	0.28	± 0.03	-
	12	0.28	± 0.03	
14	12	0.28	± 0.03	-
12	12	0.28	± 0.03	-

**Table 12
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
26	22	M22520/2-01	3	M22520/2-23	-
	20HD	M22520/2-01	5	M22520/2-08	-
		MS3191-1	-	P20-3191-1	-
	20	11148	-	-	Red
		M22520/2-01	5	M22520/2-02	-
		MS3191-1	-	MS3191-20()	-
24	22	M22520/2-01	3	M22520/2-23	-
	20HD	M22520/2-01	5	M22520/2-08	-
		MS3191-1	-	P20-3191-1	-
	20	11148	-	-	Red
		M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-02	-
		MS3191-1	-	MS3191-20()	-
	16	11148	-	-	Blue
		M22520/1-01	2	M22520/1-02	Blue
		MS3191-1	-	MS3191-16()	-

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ASSEMBLY OF RADIALL DSX SERIES CONNECTORS

Table 12 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
22	22	M22520/2-01	4	M22520/2-23	-	
	20HD	M22520/2-01	6	M22520/2-08	-	
		MS3191-1	-	P20-3191-1	-	
	20	11148	-	-	Red	
		M22520/1-01	3	M22520/1-02	Red	
		M22520/2-01	6	M22520/2-02	-	
		MS3191-1	-	MS3191-20()	-	
	16	11148	-	-	Blue	
		M22520/1-01	3	M22520/1-02	Blue	
		MS3191-1	-	MS3191-16()	-	
	20	20HD	M22520/2-01	7	M22520/2-08	-
			MS3191-1	-	P20-3191-1	-
20		11148	-	-	Red	
		M22520/1-01	4	M22520/1-02	Red	
		M22520/2-01	7	M22520/2-02	-	
		MS3191-1	-	MS3191-20()	-	
16		11148	-	-	Blue	
		M22520/1-01	4	M22520/1-02	Blue	
		MS3191-1	-	MS3191-16()	-	
18		16	11148	-	-	Blue
			M22520/1-01	5	M22520/1-02	Blue
			MS3191-1	-	MS3191-16()	-
16	16	11148	-	-	Blue	
		M22520/1-01	6	M22520/1-02	Blue	
		MS3191-1	-	MS3191-16()	-	
	12	M22520/1-01	6	M22520/1-02	Yellow	
		MS3191-1	-	-	Yellow	
14	12	M22520/1-01	7	M22520/1-02	Yellow	
		MS3191-1	-	-	Yellow	
12	12	M22520/1-01	8	M22520/1-02	Yellow	
		MS3191-1	-	-	Yellow	

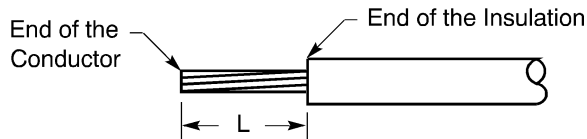
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STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF RADIAL DSX SERIES CONNECTORS**

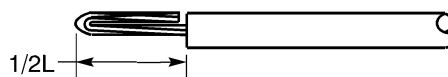
- (1) Make a selection of a crimp tool from Table 12.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 34
- Table 11 for the insulation removal length
- Subject 20-10-15 for the insulation removal procedures.

**INSULATION REMOVAL LENGTH****Figure 34**

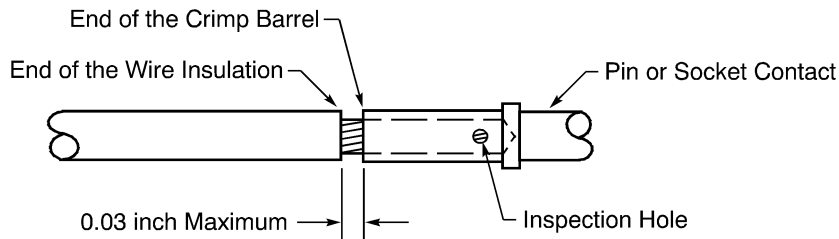
- (3) If it is necessary, fold the conductor back. Refer to Figure 35.

**FOLDED BACK CONDUCTOR****Figure 35**

- (4) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 36.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

**POSITION OF THE WIRE IN THE CONTACT CRIMP BARREL****Figure 36**

- (5) Crimp the contact.

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B. Assembly of the Radiall 616366 Contact

**Table 13
FILLER WIRE**

Wire Size (AWG)	Filler Wire	
	Size (AWG)	Quantity
12	14	1
	10	1
10	10	1
8	-	-

**Table 14
CONTACT CRIMP TOOL**

Basic Unit	Die	Locator
400B	414DA-12N-125	4960
WA23	414DA-12N-125	4960

- (1) Make a selection of filler wire. Refer to Table 13.
Make sure that the wire type of the filler wire is the same as the assembly wire.
- (2) Make a selection of a crimp tool. Refer to Table 14.
- (3) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14.
Make sure that the sleeve has the smallest diameter that can be put on the wire.
- (4) Put a 1.0 inch ± 0.03 inch length of the heat shrinkable sleeve on the wire.
- (5) Remove 0.32 inch ± 0.03 inch insulation from the end of the wire and each filler wire. Refer to Subject 20-00-15.
- (6) If a filler wire is necessary, remove 0.32 inch ± 0.03 inch insulation from the end of the wire. Refer to Subject 20-00-15.
- (7) Put the ends of the wire and the filler wire into the crimp barrel of the contact.

NOTE: If it is possible, put the primary wire in the center of the crimp barrel.

Make sure that:

- All the strands of each conductor are in the crimp barrel
- The end of each conductor is against the bottom of the crimp barrel
- The conductors can be seen in the inspection hole.

- (8) Crimp the contact.
- (9) Remove the unwanted length of the filler wire as close to the end of the crimp barrel as possible.

CAUTION: DO NOT CUT OR CAUSE ANY DAMAGE TO THE STRANDS OF THE PRIMARY WIRE. THE MECHANICAL STRENGTH OF THE WIRE CAN BE DECREASED.

- (10) Push the heat shrinkable sleeve forward on the wire.
Make sure that the sleeve is on the end of the contact crimp barrel and the end of the wire insulation.

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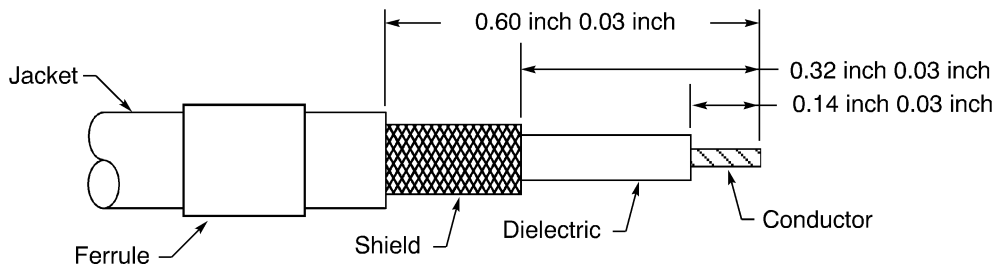
(11) Shrink the sleeve in position. Refer to Subject 20-10-14.

C. Assembly of the Radial 610020001 Coax Contact

**Table 15
FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
612648	612673	A
KTH-100	KTH-2001	B
	KTH-2042	B
	KTH-2220	B
M22520/5-01	M22520/5-05	A
	M22520/5-19	B
	Y142	B
	Y197	A
	Y322	B
ST2966M	ST2966M-6	B

- (1) Make a selection of a ferrule crimp tool. Refer to Table 15.
- (2) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14.
Make sure that the sleeve has the smallest diameter that can be put on the cable.
- (3) Prepare the cable. Refer to Figure 37.



**COAX CABLE PREPARATION
Figure 37**

- (a) Put a 1.5 inch to 3.0 inch length of the heat shrinkable sleeve on the cable.
- (b) Put the ferrule on the cable.
- (c) Cut the end of the cable.
Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.
- (d) Remove 0.60 inch \pm 0.03 inch of the outer jacket from the end of the cable.
- (e) Remove 0.32 inch \pm 0.03 inch of the shield from the end of the cable.
- (f) Remove 0.14 inch \pm 0.03 inch of the dielectric from the end of the cable.

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- (4) Put the center contact on the center conductor.
- (5) Solder the center contact.
- (6) Move the strands of the shield apart.
- (7) Put the contact body on the cable.

Make sure that:

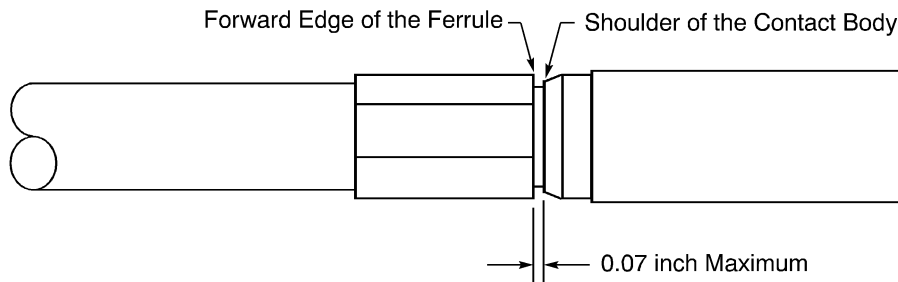
- The crimp barrel of the contact body is between the dielectric and the shield
- The crimp barrel of the contact body is against the end of the cable jacket.

- (8) Push the ferrule forward on the shield until it is against the contact body.
- (9) Remove the unwanted length of the strands of the shield.

Make sure that the shield is aligned with the forward end of the ferrule.

- (10) Crimp the ferrule. Refer to Figure 38.

Make sure that the distance between the end of the ferrule and the shoulder of the contact body is not more than 0.07 inch.



POSITION OF THE FERRULE
Figure 38

- (11) Align the forward end of the heat shrinkable sleeve with the forward end of the ferrule. Make sure that no more than 0.05 inch of the ferrule can be seen.
- (12) Shrink the sleeve in position. Refer to Subject 20-10-14.

D. Assembly of the Radiall 610040 Coax Contact

Table 16
FERRULE CRIMP TOOLS

Basic Unit	Die	
	Part Number	Cavity
282293	282246	A
	M22520/5-05	A
M22520/5-01	282246	A
	M22520/5-05	A

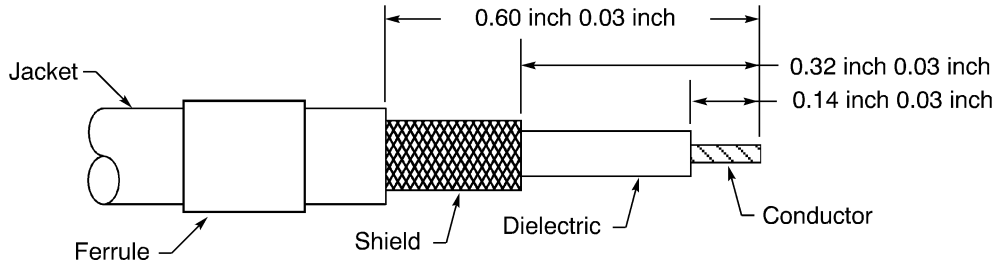
- (1) Make a selection of a ferrule crimp tool. Refer to Table 16.
- (2) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14.

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ASSEMBLY OF RADIALL DSX SERIES CONNECTORS

Make sure that the sleeve has the smallest diameter that can be put on the cable.

- (3) Prepare the cable. Refer to Figure 39.



COAX CABLE PREPARATION

Figure 39

- (a) Put a 1.5 inch to 3.0 inch length of the heat shrinkable sleeve on the cable.
 - (b) Put the ferrule on the cable.
 - (c) Cut the end of the cable.
Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.
 - (d) Remove 0.60 inch \pm 0.03 inch of the outer jacket from the end of the cable.
 - (e) Remove 0.32 inch \pm 0.03 inch of the shield from the end of the cable.
 - (f) Remove 0.14 inch \pm 0.03 inch of the dielectric from the end of the cable.
- (4) Put the center contact on the center conductor.
- (5) Solder the center contact.
- (6) Move the strands of the shield apart.
- (7) Put the contact body on the cable.

Make sure that:

- The crimp barrel of the contact body is between the dielectric and the shield
- The crimp barrel of the contact body is against the end of the cable jacket.

- (8) Push the ferrule forward on the shield until it is against the contact body.
- (9) Remove the unwanted length of the strands of the shield.

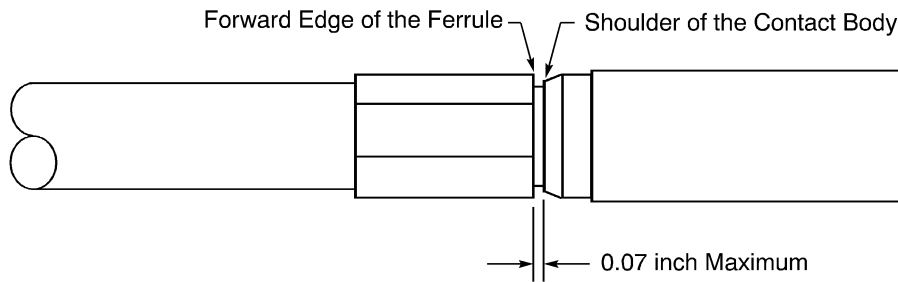
Make sure that the shield is aligned with the forward end of the ferrule.

- (10) Crimp the ferrule. Refer to Figure 40.

Make sure that the distance between the end of the ferrule and the shoulder of the contact body is not more than 0.07 inch.

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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS



CRIMPED FERRULE
Figure 40

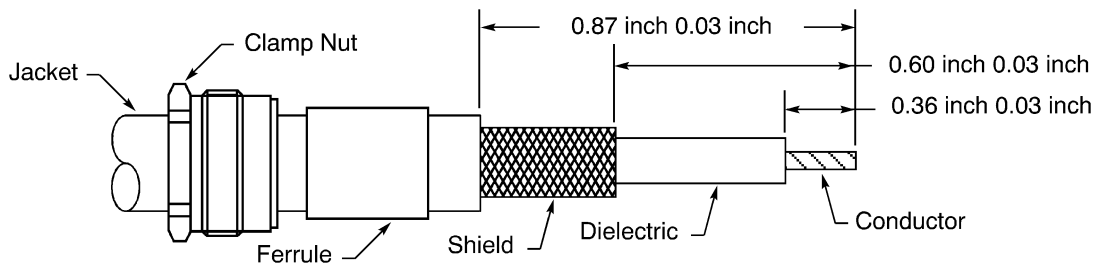
- (11) Align the forward end of the heat shrinkable sleeve with the forward end of the ferrule. Make sure that no more than 0.05 inch of the ferrule can be seen.
- (12) Shrink the sleeve in position. Refer to Subject 20-10-14.

E. Assembly of the Radiall 610108 Coax Contact

Table 17
FERRULE CRIMP TOOLS

Basic Unit	Die	
	Part Number	Cavity
282293	282247	A
	M22520/5-61	A
M22520/5-01	282247	A
	M22520/5-61	A

- (1) Make a selection of a ferrule crimp tool. Refer to Table 17.
- (2) Prepare the cable. Refer to Figure 41.



COAX CABLE PREPARATION
Figure 41

- (a) Put the clamp nut on the cable.
 - (b) Put the ferrule on the cable.
 - (c) Cut the end of the cable.
- Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.

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- (d) Remove 0.87 inch \pm 0.03 inch of the outer jacket from the end of the cable.
- (e) Remove 0.60 inch \pm 0.03 inch of the shield from the end of the cable.
- (f) Remove 0.36 inch \pm 0.03 inch of the dielectric from the end of the cable.
- (3) Move the strands of the shield apart.
- (4) Put the center contact insulator assembly on the cable.

Make sure that:

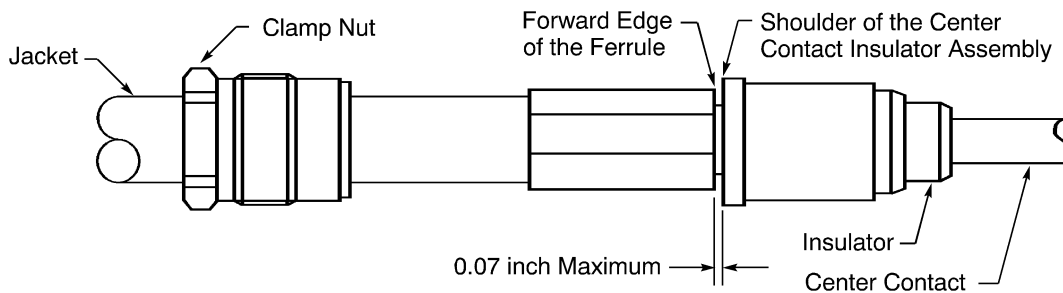
- The crimp barrel of the center contact insulator assembly is between the dielectric and the shield
- The crimp barrel of the center contact insulator assembly is against the end of the cable jacket.

- (5) Solder the center contact on the center conductor.
- (6) Push the ferrule forward on the shield until it is against the contact body.
- (7) Remove the unwanted length of the strands of the shield.

Make sure the shield is aligned with the forward end of the ferrule.

- (8) Crimp the ferrule. Refer to Figure 42.

Make sure that the distance between the end of the ferrule and the shoulder of the center contact insulator assembly is not more than 0.07 inch.



POSITION OF THE FERRULE
Figure 42

- (9) Put the outer contact body on the cable assembly.
- (10) Engage the threads of the clamp nut with the threads of the outer contact body.
- (11) Torque the clamp nut 70 inch-pounds \pm 5 inch-pounds.

F. Assembly of the Radiall 610118 Coax Contact

Table 18
FERRULE CRIMP TOOLS

Basic Unit	Die	
	Part Number	Cavity
612648	612807	B
KTH-100	KTH-2004	A
	KTH-2235	A

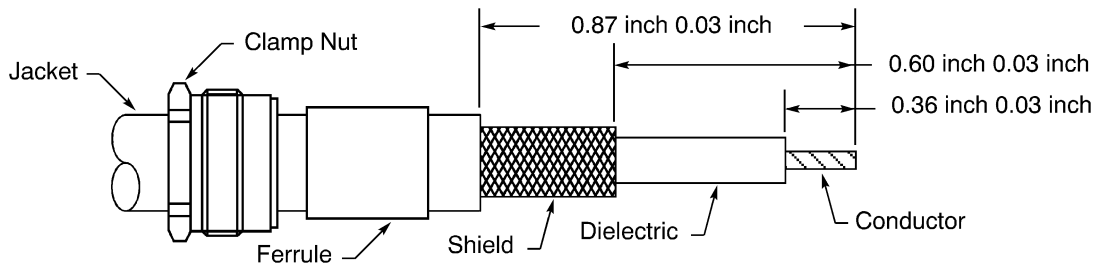
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Table 18 (continued)

Basic Unit	Die	
	Part Number	Cavity
M22520/5-01	M22520/5-25	A
ST2966M	ST266M-16	-

- (1) Make a selection of a ferrule crimp tool. Refer to Table 18.
- (2) Prepare the cable. Refer to Figure 43.

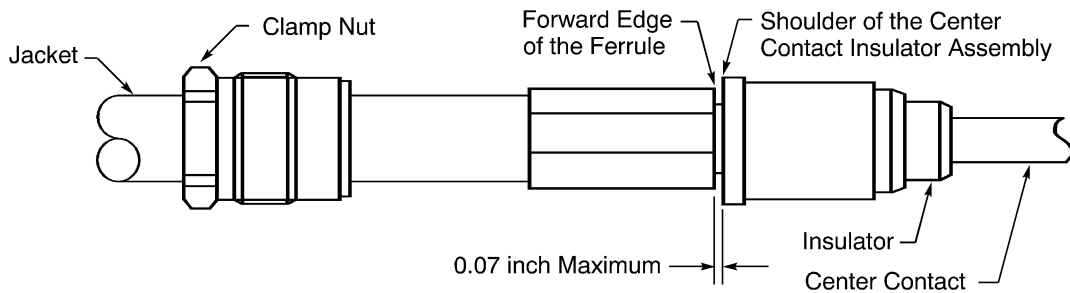


COAX CABLE PREPARATION
Figure 43

- (a) Put the clamp nut on the cable.
 - (b) Put the ferrule on the cable.
 - (c) Cut the end of the cable.
Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.
 - (d) Remove 0.87 inch \pm 0.03 inch of the outer jacket from the end of the cable.
 - (e) Remove 0.60 inch \pm 0.03 inch of the shield from the end of the cable.
 - (f) Remove 0.36 inch \pm 0.03 inch of the dielectric from the end of the cable.
- (3) Move the strands of the shield apart.
 - (4) Put the center contact insulator assembly on the cable.
Make sure that:
 - The crimp barrel of the center contact insulator assembly is between the dielectric and the shield
 - The crimp barrel of the center contact insulator assembly is against the end of the cable jacket.
 - (5) Put the center contact on the center conductor.
 - (6) Solder the center contact.
 - (7) Push the ferrule forward on the shield until it is against the contact body.
 - (8) Remove the unwanted length of the strands of the shield.
Make sure the shield is aligned with the forward end of the ferrule.
 - (9) Crimp the ferrule. Refer to Figure 44.
Make sure that the distance between the end of the ferrule and the shoulder of the center contact insulator assembly is not more than 0.07 inch.

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CRIMPED FERRULE
Figure 44

- (10) Put the outer contact body on the cable assembly.
- (11) Engage the threads of the clamp nut with the threads of the outer contact body.
- (12) Torque the clamp nut 70 inch-pounds \pm 5 inch-pounds.

G. Assembly of the Radiall 616021 Coax Contact

Table 19
CENTER CONTACT CRIMP TOOL

Basic Unit		Locator
Part Number	Setting	
282281	8	282974
M22520/2-01	8	282974

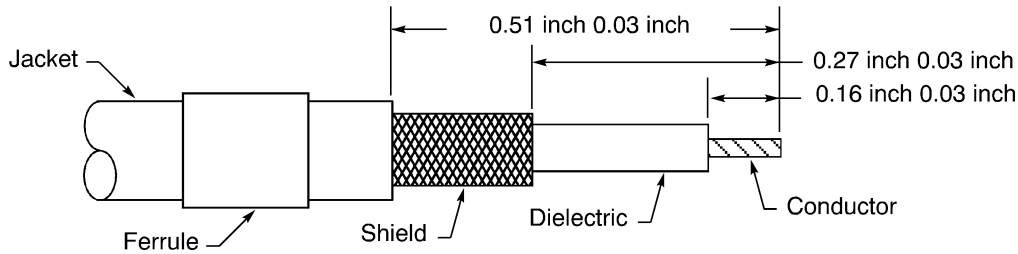
Table 20
FERRULE CRIMP TOOLS

Basic Unit	Die	
	Part Number	Cavity
282293	282246	A

- (1) Make a selection of a center contact crimp tool. Refer to Table 19.
- (2) Make a selection of a ferrule crimp tool. Refer to Table 20.
- (3) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-10-14.
Make sure that the sleeve has the smallest diameter that can be put on the cable.
- (4) Prepare the cable. Refer to Figure 45.

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COAX CABLE PREPARATION
Figure 45

- (a) Put a 1.5 inch to 3.0 inch length of the heat shrinkable sleeve on the cable.
- (b) Put the ferrule on the cable.
- (c) Cut the end of the cable.
Make sure that the end of the cable is perpendicular to the longitudinal axis of the cable.
- (d) Remove 0.51 inch ±0.03 inch of the outer jacket from the end of the cable.
- (e) Remove 0.27 inch ±0.03 inch of the shield from the end of the cable.
- (f) Remove 0.16 inch ±0.03 inch of the dielectric from the end of the cable.

- (5) Put the center contact on the center conductor.
- (6) Crimp the center contact.
- (7) Move the strands of the shield apart.
- (8) Put the contact body on the cable.

Make sure that:

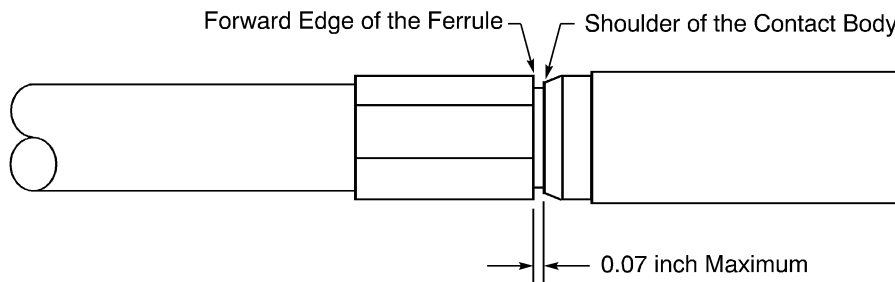
- The crimp barrel of the contact body is between the dielectric and the shield
- The crimp barrel of the contact body is against the end of the cable jacket.

- (9) Push the ferrule forward on the shield until it is against the contact body.
- (10) Remove the unwanted length of the strands of the shield.

Make sure the shield is aligned with the forward end of the ferrule.

- (11) Crimp the ferrule. Refer to Figure 46.

Make sure that the distance between the end of the ferrule and the shoulder of the contact body is not more than 0.07 inch.



CRIMPED FERRULE
Figure 46

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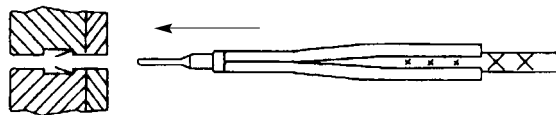
- (12) Align the forward end of the heat shrinkable sleeve with the forward end of the ferrule.
Make sure that no more than 0.05 inch of the ferrule can be seen.
- (13) Shrink the sleeve in position. Refer to Subject 20-10-14.

H. Contact Insertion

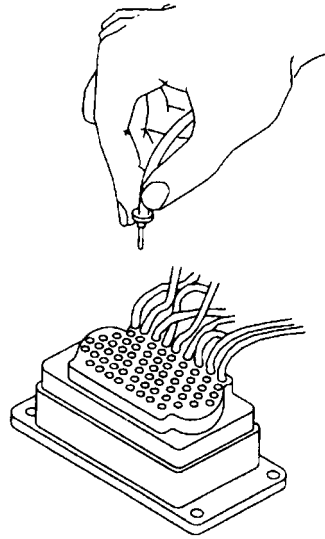
For coax contact insertion, refer to Paragraph 4.I.

**Table 21
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool
22	M81969/1-01
	MS3156-22
	282 880
20HD	M81969/1-02
	MS3156-20
	282 881
20	282 943
16	M81969/1-03
	MS3156-16
	282 929
12	M81969/28-02
	MS3178-002
	282 945



**INSERTION OF THE CONTACT
Figure 47**

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF RADIAL DSX SERIES CONNECTORS****CONTACT INSERTION WITHOUT A TOOL****Figure 48**

Refer to Figure 47 and Figure 48.

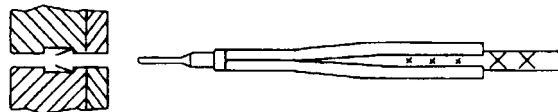
- (1) Make a selection of an insertion tool from Table 21.

NOTE: Contact insertion without a tool is a satisfactory alternative for contact insertion with a tool.

- (2) Put the wired contact in the end of the insertion tool.

Make sure that the end of the tool is against the shoulder of the contact.

- (3) Axially align the tool and the contact with the contact cavity at the rear of the connector. Refer to Figure 49.

**ALIGNMENT OF THE INSERTION TOOL AND THE CONTACT CAVITY****Figure 49**

- (4) Push the tool straight into the contact cavity until it stops. Refer to Figure 47.

CAUTION: MAKE SURE THAT THE TOOL AND THE CONTACT ARE PUSHED STRAIGHT INTO THE CONTACT CAVITY TO PREVENT DAMAGE TO THE CONNECTOR.

- (5) Carefully remove the tool from the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF RADIALL DSX SERIES CONNECTORS**

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
- Pull the wired contact out of the cavity.
 - Do Step (2) through Step (6) again.

I. Coax Contact Insertion

- Axially align the forward end of the coax contact with the contact cavity.
- Push the coax contact into the contact cavity until it stops.
- Lightly pull on the cable to make sure that the contact is locked.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE CABLE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE CABLE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (4) If the contact is not locked in the contact cavity, do Step (1) through Step (3) again.

5. CONNECTOR POLARIZATION AND THE CONNECTOR PART NUMBER**A. Connector Polarization and the Connector Part Number**

NOTE: The polarization code in the connector part number identifies the polarization position of the posts and keys.

- Find the polarization code in the connector part number from the equipment list.
- For that code, find the correct connector polarization for the:
 - Post positions on the plug
 - Key positions on the receptacle.

Refer to Figure 50 and Table 22.

- If the polarization position of the posts and keys on the connector do not agree with the polarization code, put the posts and the keys in the correct position.

Refer to Paragraph 5.C.

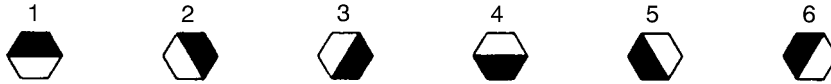
- If the polarization code in the part number on the connector does not agree with the polarization positions, change the part number on the connector.

Refer to Paragraph 5.D.

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B. Polarization Post and Key Positions



For the Plug, the Dark Area Shows the Polarization Post
 For the Receptacle, the Dark Area Shows the Solid Part of the Polarization Key

POLARIZATION POSITIONS
Figure 50

Table 22
CONNECTOR POLARIZATION - POST AND KEY POSITION

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
01	4	4	4	1	1	1
02	4	4	3	2	1	1
03	4	4	2	3	1	1
04	4	4	1	4	1	1
05	4	4	6	5	1	1
06	4	4	5	6	1	1
07	5	4	4	1	1	6
08	5	4	3	2	1	6
09	5	4	2	3	1	6
10	5	4	1	4	1	6
11	5	4	6	5	1	6
12	5	4	5	6	1	6
13	6	4	4	1	1	5
14	6	4	3	2	1	5
15	6	4	2	3	1	5
16	6	4	1	4	1	5
17	6	4	6	5	1	5
18	6	4	5	6	1	5
19	1	4	4	1	1	4
20	1	4	3	2	1	4
21	1	4	2	3	1	4
22	1	4	1	4	1	4
23	1	4	6	5	1	4



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Table 22 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
24	1	4	5	6	1	4
25	2	4	4	1	1	3
26	2	4	3	2	1	3
27	2	4	2	3	1	3
28	2	4	1	4	1	3
29	2	4	6	5	1	3
30	2	4	5	6	1	3
31	3	4	4	1	1	2
32	3	4	3	2	1	2
33	3	4	2	3	1	2
34	3	4	1	4	1	2
35	3	4	6	5	1	2
36	3	4	5	6	1	2
37	4	3	4	1	2	1
38	4	3	3	2	2	1
39	4	3	2	3	2	1
40	4	3	1	4	2	1
41	4	3	6	5	2	1
42	4	3	5	6	2	1
43	5	3	4	1	2	6
44	5	3	3	2	2	6
45	5	3	2	3	2	6
46	5	3	1	4	2	6
47	5	3	6	5	2	6
48	5	3	5	6	2	6
49	6	3	4	1	2	5
50	6	3	3	2	2	5
51	6	3	2	3	2	5
52	6	3	1	4	2	5
53	6	3	6	5	2	5
54	6	3	5	6	2	5
55	1	3	4	1	2	4

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Table 22 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
56	1	3	3	2	2	4
57	1	3	2	3	2	4
58	1	3	1	4	2	4
59	1	3	6	5	2	4
60	1	3	5	6	2	4
61	2	3	4	1	2	3
62	2	3	3	2	2	3
63	2	3	2	3	2	3
64	2	3	1	4	2	3
65	2	3	6	5	2	3
66	2	3	5	6	2	3
67	3	3	4	1	2	2
68	3	3	3	2	2	2
69	3	3	2	3	2	2
70	3	3	1	4	2	2
71	3	3	6	5	2	2
72	3	3	5	6	2	2
73	4	2	4	1	3	1
74	4	2	3	2	3	1
75	4	2	2	3	3	1
76	4	2	1	4	3	1
77	4	2	6	5	3	1
78	4	2	5	6	3	1
79	5	2	4	2	3	6
80	5	2	3	2	3	6
81	5	2	2	3	3	6
82	5	2	1	4	3	6
83	5	2	6	5	3	6
84	5	2	5	6	3	6
85	6	2	4	1	3	5
86	6	2	3	2	3	5
87	6	2	2	3	3	5

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ASSEMBLY OF RADIALL DSX SERIES CONNECTORS

Table 22 (continued)

Code	Receptacle Shell Key			Plug Shell Post		
	Left	Center	Right	Left	Center	Right
88	6	2	1	4	3	5
89	6	2	6	5	3	5
90	6	2	5	6	3	5
91	1	2	4	1	3	4
92	1	2	3	2	3	4
93	1	2	2	3	3	4
94	1	2	1	4	3	4
95	1	2	6	5	3	4
96	1	2	5	6	3	4
97	2	2	4	1	3	3
98	2	2	3	2	3	3
99	2	2	2	3	3	3

C. Change of the Polarization Posts and Keys

- (1) To change the polarization of a post:
 - (a) Remove the nut and washer from the threaded end of the post.
 - (b) Remove the post from the hexagonal hole in the connector shell.
 - (c) Align the post with the correct position.
 - (d) Put the post back into the hexagonal hole.
Make sure that the post is in the correct position.
 - (e) Put the washer and the nut on the threaded end of the post.
 - (f) Tighten the nut.
- (2) To change the polarization of a key:
 - (a) Remove the necessary screws from the connector shell.
 - (b) Remove the key from the hexagonal hole.
 - (c) Align the key with the correct position.
 - (d) Put the key back into the hexagonal hole.
Make sure the key is in the correct position.
 - (e) Install and tighten the screws.

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ASSEMBLY OF RADIAL DSX SERIES CONNECTORS

D. Change of the Polarization Code, Any Part of the Connector Part Number, or the Complete Part Number on the Connector Shell

**Table 23
NECESSARY MATERIALS**

Material	Part Number	Supplier
Ink	No. 68 Fast Dry	Independent
Ink	No. 73X NW Opaque	Independent
Ink	No. 73X Opaque	Independent
Paint, Clear	683-3-2	Akzo
Paint, Clear	Clear Lacquer	Tartan
Paint, Clear	EC-776	3M
Paint, Clear	EC-776SR	3M
Pen	Permanent Ink Pen, Ultra Fine Point	Sanford Sharpie

**Table 24
LOCATION OF CONNECTOR PART NUMBER DATA**

Connector	Number of Inserts	Reference
ARINC 404	1	Figure 1
	2	Figure 2
	3	Figure 3
MIL-C-81659 Type	1	Figure 4
	2	Figure 5
	3	Figure 6

- (1) If the part number on the connector does not have a part number or polarization code:
 - (a) Make a selection of these materials from Table 23.
 - An ink or a permanent ink pen
 - A clear paint.
 - (b) Write the part number and the polarization code on the connector shell in the correct position. Refer to Table 1 and Table 24 for the details of the applicable connector part number.
 - (c) Let the ink dry for a minimum of 10 minutes.
 - (d) Apply a layer of the clear paint on the part number on the connector shell.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. PAINT ON THE SURFACE OF A CONTACT CAN CAUSE UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

- (e) Let the paint dry before the connector shell is touched or moved.
- (2) If the part number or polarization code on the connector is incorrect:
 - (a) Apply a layer of ink on the incorrect part number or polarization code on the connector shell.

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ASSEMBLY OF RADIALL DSX SERIES CONNECTORS

Make sure that the incorrect part number or polarization code cannot be read.

- (3) Write the part number and the polarization code on the connector shell in the correct position.
 - Adjacent to the location of the incorrect part number and polarization code
 - In the correct position on the connector shell.

Refer to the details of the applicable connector part number:

- Figure 1 for the One Insert ARINC 404 Connector
- Figure 2 for the Two Insert ARINC 404 Connector
- Figure 3 for the Three Insert ARINC 404 Connector
- Figure 4 for the One Insert MIL-C-81659 Type Connector
- Figure 5 for the Two Insert MIL-C-81659 Type Connector
- Figure 6 for the Three Insert MIL-C-81659 Type Connector.

- (4) Let the ink dry for a minimum of 10 minutes.
- (5) Apply a layer of ink on the incorrect code on the connector shell.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. PAINT ON THE SURFACE OF A CONTACT CAN CAUSE UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

- (6) Let the paint dry before the connector shell is touched or moved.

6. APPROVED TOOL SUPPLIERS

A. Contact Crimp Tools

**Table 25
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11148	Buchanan
282246	Radiall
282247	Radiall
282281	Radiall
282293	Radiall
282974	Radiall
400B	Pico
414DA-12N-125	Pico
4960	Pico
612648	Buchanan
612673	Buchanan
612807	Buchanan
KTH-100	Kings
KTH-2001	Kings
KTH-2004	Kings
KTH-2042	Kings

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Table 25 (continued)

Crimp Tool	Supplier
KTH-2220	Kings
KTH-2235	Kings
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
M22520/2-08	QPL
M22520/2-23	QPL
M22520/5-01	QPL
M22520/5-05	QPL
M22520/5-19	QPL
M22520/5-25	QPL
M22520/5-61	QPL
MS3191-1	QPL
MS3191-16()	QPL
MS3191-20()	QPL
P20-3191-1	ITT Cannon
ST266M-16	Boeing
ST2966M	Boeing
ST2966M-6	Boeing
WA23	Daniels
Y142	Daniels
Y197	Daniels
Y322	Daniels

B. Contact Insertion Tools

**Table 26
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
282 880	Radiall
282 881	Radiall
282 929	Radiall



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Table 26 (continued)

Insertion Tool	Supplier
282 943	Radiall
282 945	Radiall
M81969/1-01	QPL
M81969/1-02	QPL
M81969/1-03	QPL
M81969/28-02	QPL
MS3156-16	QPL
MS3156-20	QPL
MS3156-22	QPL
MS3178-002	QPL

C. Contact Removal Tools

Table 27
REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
282 880	Radiall
282 881	Radiall
282 890	Radiall
282 891	Radiall
282 892	Radiall
282 929	Radiall
282 943	Radiall
282 945	Radiall
282 946	Radiall
CET-C8	ITT CANNON
DRK310	DANIELS
M81969/1-01	QPL
M81969/1-02	QPL
M81969/1-03	QPL
M81969/28-01	QPL
M81969/28-02	QPL
MS3156-16	QPL

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Table 27 (continued)

Removal Tool	Supplier
MS3156-20	QPL
MS3156-22	QPL
MS3178-002	QPL

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For the conditions that are applicable for the procedures in this Subject, refer to the Subject that is applicable for the assembly of the connector.

1. PART NUMBERS AND DESCRIPTION

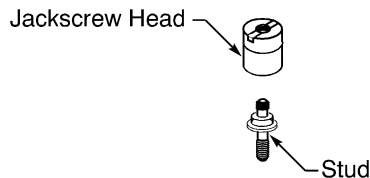
A. Jackscrew and Jackpost Installation Hardware Part Numbers

**Table 1
JACKSCREW AND JACKPOST KITS**

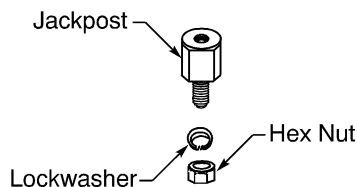
Kit	Part Number	Supplier	Reference
Jackscrew Kit	D110550	ITT Cannon	Figure 1
Jackpost Kit	D110551	ITT Cannon	Figure 2

**Table 2
JACKSCREW AND JACKPOST KIT COMPONENTS**

Kit	Kit Component	
	Description	Quantity
Jackscrew	Jackscrew Head	2
	Stud	2
Jackpost	Jackpost	2
	Lockwasher	2
	Nut	2



**JACKSCREW INSTALLATION HARDWARE
Figure 1**



**JACKPOST INSTALLATION HARDWARE
Figure 2**

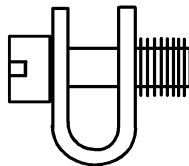
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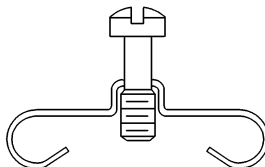
B. Screw Lock Installation Hardware Part Numbers

**Table 3
SCREW LOCK INSTALLATION COMPONENTS**

Component	Length L (inch)	Shell Size		Specification	Supplier	Reference
		M24308 Part Number	Supplier Part Number			
Male Screw Lock, Single Clip	-	All	All	MIL-DTL-24308/25-6	QPL	Figure 3
Male Screw Lock, Double Clip	-	1	E	MIL-DTL-24308/25-9	QPL	Figure 4
		2	A	MIL-DTL-24308/25-9	QPL	Figure 4
		3	B	MIL-DTL-24308/25-9	QPL	Figure 4
		4	C	MIL-DTL-24308/25-9	QPL	Figure 4
		5	D	MIL-DTL-24308/25-10	QPL	Figure 4
Female Screw Lock	0.312	All	All	D20418-2	ITT Cannon	Figure 5
				MIL-DTL-24308/26-1	QPL	Figure 5
	0.625	All	All	D20418-39	ITT Cannon	Figure 5
				MIL-DTL-24308/26-2	QPL	Figure 5



**SINGLE CLIP MALE SCREW LOCK INSTALLATION HARDWARE
Figure 3**

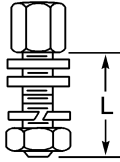


**DOUBLE CLIP MALE SCREW LOCK INSTALLATION HARDWARE
Figure 4**

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FEMALE SCREW LOCK INSTALLATION HARDWARE
Figure 5

C. Slide Latch Installation Hardware Part Numbers

Table 4
SLIDE LATCH KITS

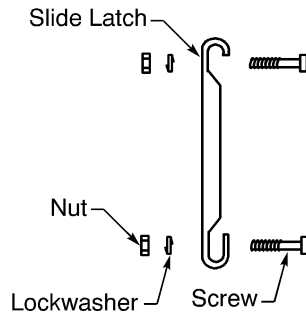
Kit	Shell Size		Part Number	Supplier	Reference
	M24308 Part Number	Supplier Part Number			
Slide Latch Kit	1	E	DE51224-1	ITT Cannon	Figure 6
	2	A	DA51220-1	ITT Cannon	Figure 6
	3	B	DB51221-1	ITT Cannon	Figure 6
	4	C	DC51222-1	ITT Cannon	Figure 6
	5	D	DD51223-1	ITT Cannon	Figure 6
Slide Lock Post Kit	All	All	D53018	ITT Cannon	Figure 7

Table 5
SLIDE LATCH KIT COMPONENTS

Kit	Kit Component	
	Description	Quantity
Slide Latch Kit	Lock Washer	2
	Nut	2
	Screw	2
	Slide Latch	1
Slide Lock Post Kit	Hex Nut	1
	Lock Washers	1
	Slide Lock Post	1
	Spacer Washers	2

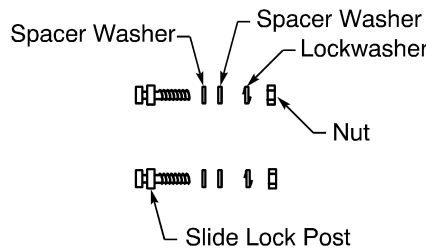
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SLIDE LATCH INSTALLATION HARDWARE

Figure 6



SLIDE LOCK POST INSTALLATION HARDWARE

Figure 7

D. Spring Latch Installation Hardware Part Numbers

**Table 6
SPRING LATCH KITS**

Kit	Shell Size		Part Number	Supplier	Reference
	M24308 Part Number	Supplier Part Number			
Spring Latch Plate Kit	1	E	D110278	ITT Cannon	Figure 8
	2	A	D110278	ITT Cannon	Figure 8
	3	B	D110278	ITT Cannon	Figure 8
	4	C	D110278	ITT Cannon	Figure 8
	5	D	D110279	ITT Cannon	Figure 8
Spring Plate Kit	1	E	D110277	ITT Cannon	Figure 9
	1	E	D110277-1	ITT Cannon	Figure 9
	2	A	D110277	ITT Cannon	Figure 9
	3	B	D110277	ITT Cannon	Figure 9
	4	C	D110277	ITT Cannon	Figure 9

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Table 6 (continued)

Kit	Shell Size		Part Number	Supplier	Reference
	M24308 Part Number	Supplier Part Number			
Spring Plate and Spring Latch Plate Kit	1	E	17-529	Amphenol	Figure 8Figure 9
	1	E	17-529	WPI	Figure 8Figure 9
	2	A	17-529	Amphenol	Figure 8Figure 9
	2	A	17-529	WPI	Figure 8Figure 9
	3	B	17-529	Amphenol	Figure 8Figure 9
	3	B	17-529	WPI	Figure 8Figure 9
	4	C	17-529	Amphenol	Figure 8Figure 9
	4	C	17-529	WPI	Figure 8Figure 9
	5	D	17-770	Amphenol	Figure 8Figure 9
	5	D	17-770	WPI	Figure 8Figure 9

**Table 7
SPRING PLATE KIT SCREW DIMENSIONS**

Kit	Screw Length (inch)
D110277	0.312
D110277-1	0.375

**Table 8
SPRING LATCH KIT COMPONENTS**

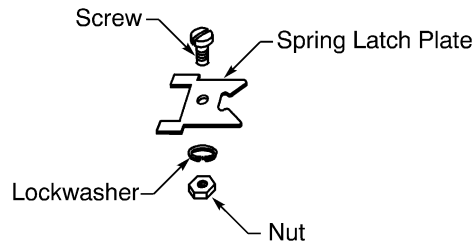
Kit		Kit Component	
Description	Part Number	Description	Quantity
Spring Latch Plate	D110278	Lockwasher	1
		Nut	1
		Screw	1
		Spring Latch Plate	1
Spring Plate	D110277	Lockwasher	1
		Nut	1
		Screw	1
		Spring Plate	1

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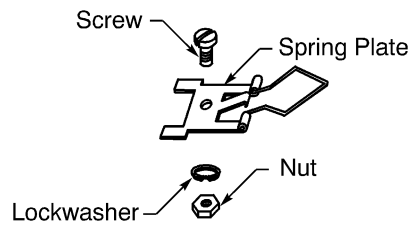
D SUBMINIATURE CONNECTORS: INSTALLATION HARDWARE ASSEMBLY AND CONNECTOR INSTALLATION

Table 8 (continued)

Kit		Kit Component	
Description	Part Number	Description	Quantity
Spring Latch Plate and Spring Plate	17-529	Spring Latch Plate	2
		Spring Plate	2
		Lockwasher	4
		Nut	4
		Screw	4
Spring Latch Plate and Spring Plate	17-770	Spring Latch Plate	2
		Spring Plate	2
		Lockwasher	4
		Nut	4
		Screw	4



SPRING LATCH PLATE INSTALLATION HARDWARE
Figure 8



SPRING PLATE INSTALLATION HARDWARE
Figure 9

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D SUBMINIATURE CONNECTORS: INSTALLATION HARDWARE ASSEMBLY AND CONNECTOR INSTALLATION

E. Necessary Materials

**Table 9
NECESSARY MATERIALS**

Material	Part Number	Supplier
Thread Lock Compound	222	Loctite
	83	Loctite
	Product 081	Loctite

2. CONNECTOR INSTALLATION HARDWARE ASSEMBLY

A. Connector Installation Hardware Assembly Configurations

**Table 10
SELECTION OF A INSTALLATION HARDWARE ASSEMBLY AND CONNECTOR INSTALLATION CONFIGURATION**

Applicable Conditions		Assembly Procedure
Connector Installation Configuration	Installation Hardware	
No Panel	Jackscrew	Paragraph 3.A.
	Jackpost	Paragraph 3.B.
	Male Screw Lock - Single Clip	Paragraph 4.A.
	Male Screw Lock - Double Clip	Paragraph 4.B.
	Female Screw Lock	Paragraph 4.C.
	Slide Latch	Paragraph 5.A.
	Slide Lock Posts	Paragraph 5.B.
	Spring Plate	Paragraph 6.A.
	Spring Latch Plate	Paragraph 6.A.
Panel	Jackpost	Paragraph 3.C.
	Female Screw Lock	Paragraph 4.D.
	Slide Lock Posts	Paragraph 5.C.
	Spring Plate	Paragraph 6.B.

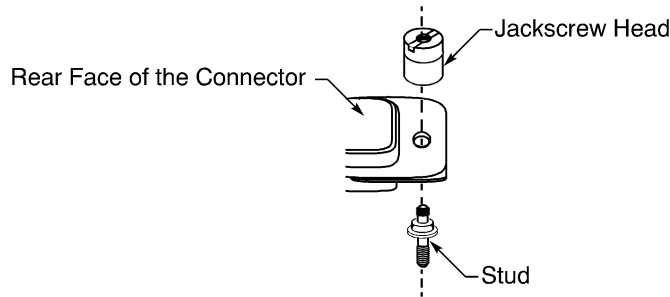
3. INSTALLATION HARDWARE ASSEMBLY - JACKSCREW AND JACKPOST

A. Jackscrew Assembly

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

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D SUBMINIATURE CONNECTORS: INSTALLATION HARDWARE ASSEMBLY AND CONNECTOR INSTALLATION



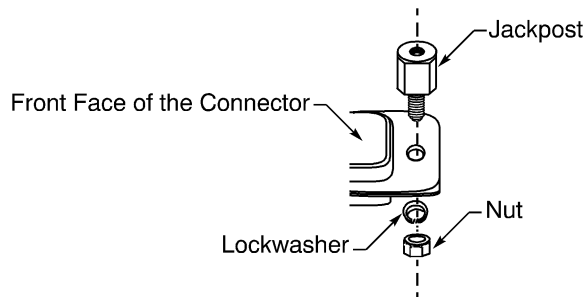
JACKSCREW ASSEMBLY
Figure 10

Refer to Figure 10.

- (1) Make a selection of a thread lock compound from Table 9.
- (2) Put two hex nuts on the stud.
- (3) From the front of the connector, put a stud in the installation hole in the connector shell.
- (4) Apply a drop of thread lock compound on the threads of the stud.
- (5) Put the jackscrew head on the stud.
- (6) Fully tighten the jackscrew head.
- (7) Remove the two hex nuts from the stud.
- (8) Do Step (2) through Step (7) again to install a jackscrew in the other installation hole of the connector.

B. Jackpost Assembly

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



JACKPOST ASSEMBLY
Figure 11

Refer to Figure 11.

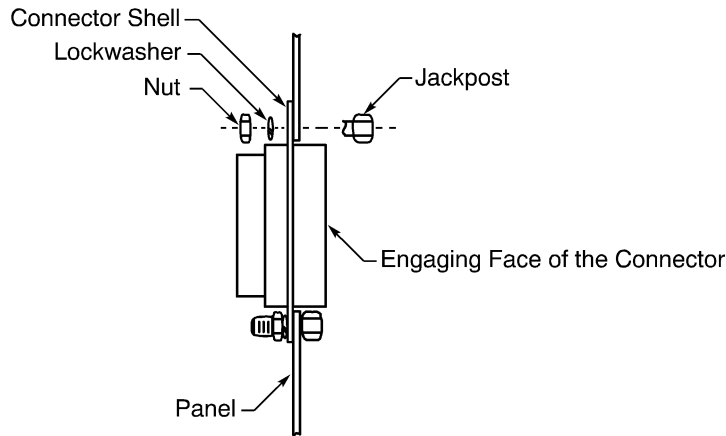
- (1) From the front of the connector, put a jackpost in the installation hole in the connector shell.
- (2) Put a lockwasher on the jackpost.
- (3) Put the nut on the jackpost.
- (4) Fully tighten the jackpost.
- (5) Do Step (1) through Step (4) again to install a jackpost in the other installation hole of the connector.

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C. Jackpost Assembly and Connector Installation in a Panel

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



JACKPOST ASSEMBLY AND CONNECTOR INSTALLATION
Figure 12

Refer to Figure 12.

- (1) From the rear of the panel, put the connector in the hole in the panel.
- (2) Align the installation holes in the connector with the holes in the panel.
- (3) Put the jackpost in the hole in the panel and the connector shell.
- (4) Put a lockwasher on the jackpost.
- (5) Put the nut on the jackpost.
 Make sure the jackpost is not fully tightened.
- (6) Do Step (3) through Step (5) again to install a jackpost in the other installation hole of the connector.
- (7) Fully tighten each jackpost.
 Make sure that the connector does not move in the panel.

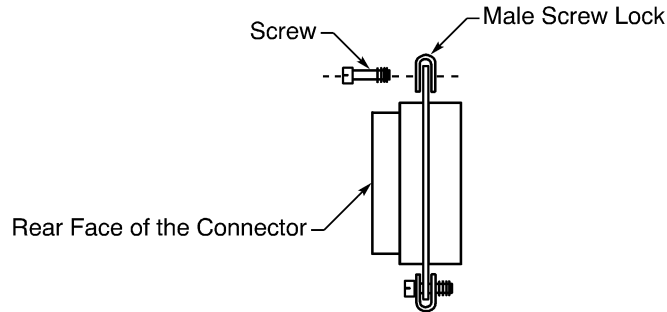
4. INSTALLATION HARDWARE ASSEMBLY - MALE AND FEMALE SCREW LOCK

A. Single Clip Male Screw Lock Assembly

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

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SINGLE CLIP MALE SCREW LOCK ASSEMBLY

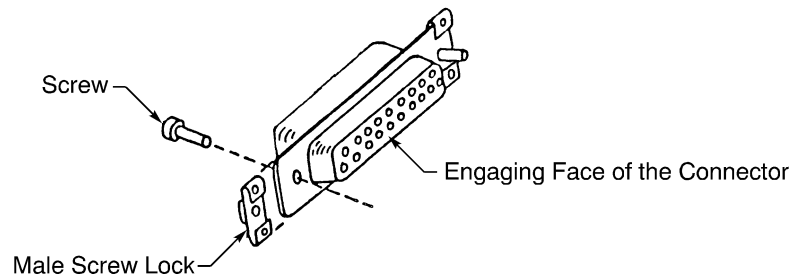
Figure 13

Refer to Figure 13.

- (1) Put a male screw lock on one end of the connector shell.
- (2) Align the installation hole of the screw lock and the connector shell.
- (3) Put a screw in the screw lock from the rear of the connector.
- (4) Do Step (1) through Step (3) again to assemble a screw lock in the other installation hole of the connector.

B. Double Clip Male Screw Lock Assembly

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



DOUBLE CLIP MALE SCREW LOCK ASSEMBLY

Figure 14

Refer to Figure 14.

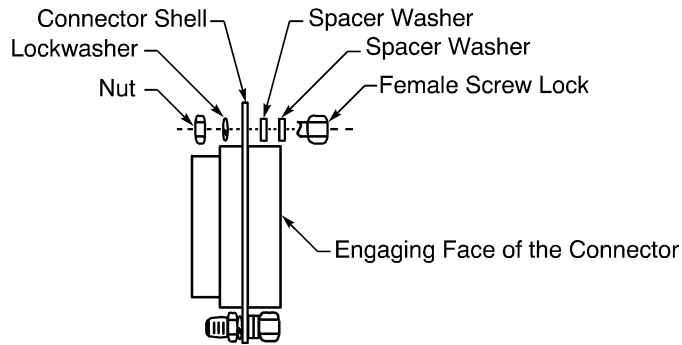
- (1) Put a male screw lock on one end of the connector shell.
- (2) Align the installation hole of the screw lock and the connector shell.
- (3) Put the screw in the screw lock from the rear of the connector.
- (4) Do Step (1) through Step (3) again to assemble a screw lock at the other installation hole of the connector.

C. Female Screw Lock Assembly

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

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FEMALE SCREW LOCK ASSEMBLY
Figure 15

Refer to Figure 15.

- (1) Put two spacer washers on a screw lock.
- (2) From the front of the connector, put the screw lock in installation hole in the connector shell.
- (3) Put a lockwasher on the screw lock.
- (4) Put a nut on the screw lock.
- (5) Fully tighten the screw lock.
- (6) Do Step (1) through Step (5) again to install a screw lock in the other installation hole of the connector.

D. Female Screw Lock Assembly and Connector Installation in a Panel

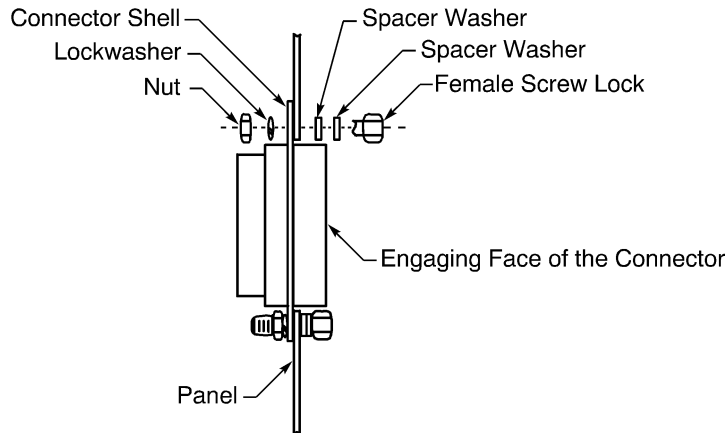
For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

Table 11
SPACER WASHERS FOR DIFFERENT PANEL THICKNESSES

Panel Thickness (inch)		Necessary Number of Washers
Minimum	Maximum	
0.000	0.030	2
0.031	0.060	1
0.061	0.090	0

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FEMALE SCREW LOCK ASSEMBLY AND CONNECTOR INSTALLATION

Figure 16

Refer to Figure 16.

- (1) Measure the thickness of the panel.
- (2) Find the number of washers that are necessary as spacers. Refer to Table 11.
- (3) If one or more washers are specified in Table 11, put the specified quantity of washers on the screw lock.
- (4) From the rear of the panel, put the connector in the hole in the panel.
- (5) Align the installation holes in the connector with the holes in the panel.
- (6) Put the screw lock in the hole in the panel and the connector shell.
- (7) Put a lockwasher on the screw lock.
- (8) Put the nut on the screw lock.
Make sure that the screw lock is not fully tightened.
- (9) Do Step (3) through Step (8) again to install a screw lock in the other installation hole of the connector.
- (10) Fully tighten each screw lock.
Make sure that the connector does not move in the panel.

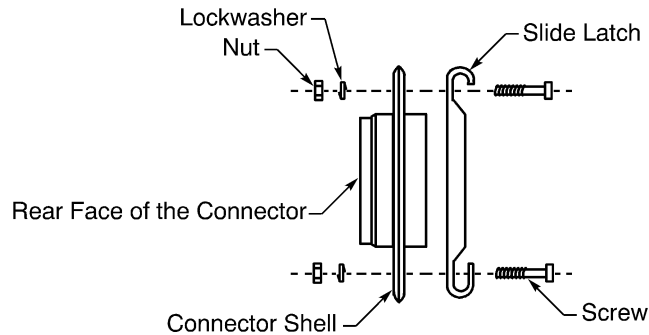
5. INSTALLATION HARDWARE ASSEMBLY - SLIDE LATCH AND SLIDE LOCK POST

A. Slide Latch Assembly

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

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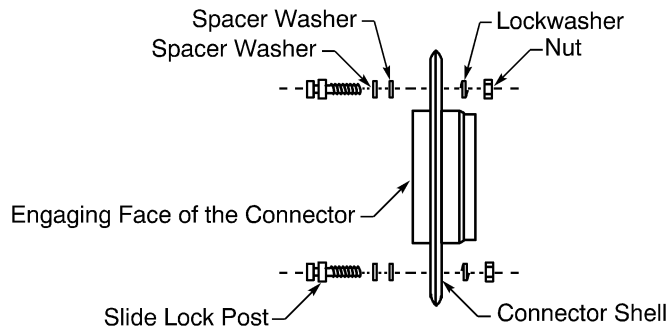
SLIDE LATCH ASSEMBLY
Figure 17

Refer to Figure 17.

- (1) Align the installation hole of the slide latch with the installation hole in the connector shell.
- (2) From the front of the connector, put a screw through the hole in the slide latch and the connector shell.
- (3) Put a lockwasher on the screw.
- (4) Put the nut on the screw.
- (5) Fully tighten the screw.
- (6) Do Step (1) through Step (5) again for the other installation hole of the connector.

B. Slide Lock Post Assembly

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



SLIDE LOCK POST ASSEMBLY
Figure 18

Refer to Figure 18.

- (1) Put two spacer washers on a slide latch post.
- (2) From the front of the connector, put the slide latch post through the installation hole of the connector shell.
- (3) Put a lockwasher on the post.
- (4) Put the nut on the post.
- (5) Fully tighten the post.

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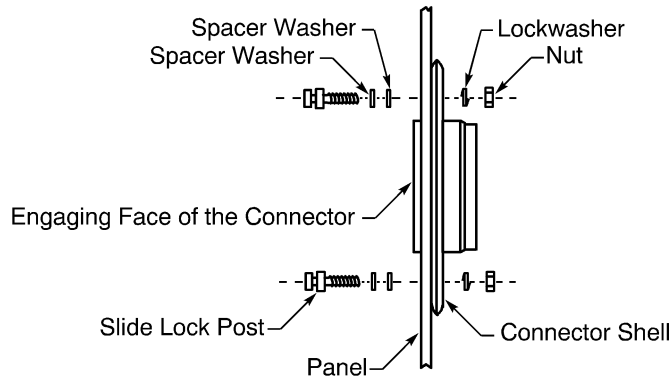
- (6) Do Step (1) through Step (5) again to install a slide lock post in the other installation hole of the connector.

C. Slide Lock Post Assembly and Connector Installation in a Panel

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

**Table 12
SPACER WASHERS FOR DIFFERENT PANEL THICKNESSES**

Panel Thickness (inch)		Necessary Number of Washers
Minimum	Maximum	
0.000	0.030	2
0.031	0.060	1
0.061	0.090	0



**SLIDE LOCK POST ASSEMBLY AND CONNECTOR INSTALLATION
Figure 19**

Refer to Figure 19.

- (1) Measure the thickness of the panel.
- (2) Find the number of washers that are necessary as spacers. Refer to Table 12.
- (3) If one or more washers are specified in Table 12, put the specified quantity of washers on the screw lock.
- (4) From the rear of the panel, put the connector in the hole in the panel.
- (5) Align the installation holes in the connector with the holes in the panel.
- (6) Put the slide lock post in the hole in the panel and the connector shell.
- (7) Put a lockwasher on the slide lock post.
- (8) Put the nut on the slide lock post.
Make sure that the slide lock post is not fully tightened.
- (9) Do Step (5) through Step (8) again to install the other slide lock post in the other installation hole of the connector.

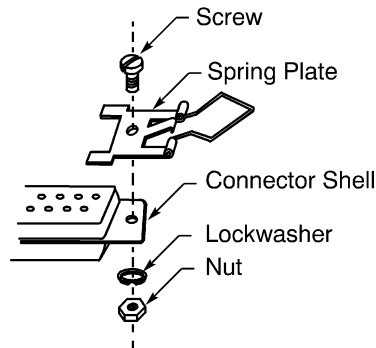
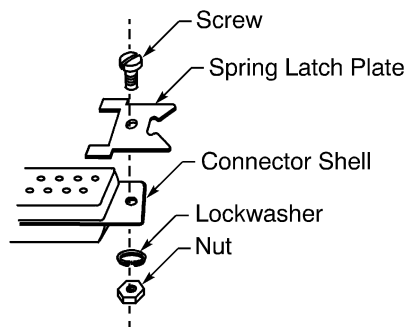
STANDARD WIRING PRACTICES MANUAL**D SUBMINIATURE CONNECTORS: INSTALLATION HARDWARE ASSEMBLY AND CONNECTOR INSTALLATION**

(10) Fully tighten each slide lock post.

Make sure that the connector does not move in the panel.

6. INSTALLATION HARDWARE ASSEMBLY - SPRING PLATE AND SPRING LATCH PLATE**A. Spring Plate or Spring Latch Plate Assembly**

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

**SPRING PLATE ASSEMBLY****Figure 20****SPRING LATCH PLATE ASSEMBLY****Figure 21**

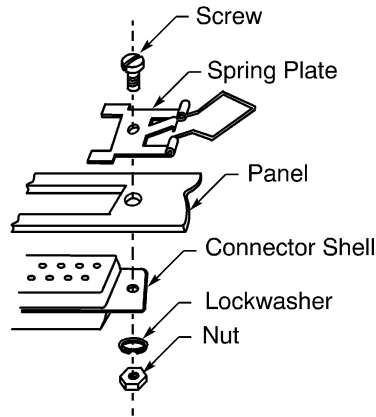
Refer to Figure 21 and Figure 20.

- (1) Align the installation hole of the spring latch plate or spring plate with the installation hole in the connector shell.
- (2) From the front of the connector, put a screw through the installation hole of the spring latch plate or spring plate and the connector shell.
- (3) Put a lockwasher on the screw.
- (4) Put the nut on the screw.
- (5) Fully tighten the screw.
- (6) Do Step (1) through Step (5) again for the other installation hole of the connector.

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STANDARD WIRING PRACTICES MANUAL**D SUBMINIATURE CONNECTORS: INSTALLATION HARDWARE ASSEMBLY AND CONNECTOR INSTALLATION****B. Spring Plate Assembly and Connector Installation in a Panel**

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



SPRING PLATE ASSEMBLY AND CONNECTOR INSTALLATION
Figure 22

Refer to Figure 22.

- (1) From the rear of the panel, put the connector in the hole in the panel.
- (2) Put a screw in the installation hole of the spring plate.
- (3) Align the installation holes in the connector with the holes in the panel.
- (4) Put the screw in the hole in the panel and the connector shell.
- (5) Put the lockwasher on the screw.
- (6) Put the nut on the screw.

Make sure that the screw is not fully tightened.

- (7) Do Step (2) through Step (6) again for the other installation hole of the connector.
- (8) Fully tighten each screw.

Make sure that the connector does not move in the panel.

STANDARD WIRING PRACTICES MANUAL**D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION**

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D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

For the conditions that are applicable for the procedures in this Subject, refer to the Subject that is applicable for the assembly of the connector.

1. PART NUMBERS AND DESCRIPTION

A. Backshell Part Numbers

**Table 1
BACKSHELL PART NUMBERS**

Part Number	Shell Size	Configuration	Description	Strain Relief	Supplier	Reference
17-310-1	E	Straight	Short, Open	Round Cable Clamp	Amphenol	Figure 1
17-310-1	E	Straight	Short, Open	Round Cable Clamp	WPI	Figure 1
17-311-1	A	Straight	Short, Open	Round Cable Clamp	Amphenol	Figure 1
17-311-1	A	Straight	Short, Open	Round Cable Clamp	WPI	Figure 1
17-312-1	B	Straight	Short, Open	Round Cable Clamp	Amphenol	Figure 1
17-312-1	B	Straight	Short, Open	Round Cable Clamp	WPI	Figure 1
17-313-1	C	Straight	Short, Open	Round Cable Clamp	Amphenol	Figure 1
17-313-1	C	Straight	Short, Open	Round Cable Clamp	WPI	Figure 1
17-314-1	D	Straight	Short, Open	Round Cable Clamp	Amphenol	Figure 1
17-314-1	D	Straight	Short, Open	Round Cable Clamp	WPI	Figure 1
DA19678-1	A	Straight	Short, Closed	Cable Clamp Bars	ITT Cannon	Figure 4
DA19977-1	A	Right Angle	Closed	Round Cable Clamp	ITT Cannon	Figure 6
DA20961	A	Straight	Short, Open	Round Cable Clamp	ITT Cannon	Figure 3
DA24658	A	Straight	Long, Closed	Cable Clamp Bars	ITT Cannon	Figure 5
DB19678-2	B	Straight	Short, Closed	Cable Clamp Bars	ITT Cannon	Figure 4
DB19977-2	B	Right Angle	Closed	Round Cable Clamp	ITT Cannon	Figure 6
DB20962	B	Straight	Short, Open	Round Cable Clamp	ITT Cannon	Figure 3
DB24659	B	Straight	Long, Closed	Cable Clamp Bars	ITT Cannon	Figure 5
DC19678-3	C	Straight	Short, Closed	Cable Clamp Bars	ITT Cannon	Figure 4
DC19977-3	C	Right Angle	Closed	Round Cable Clamp	ITT Cannon	Figure 6
DC20963	C	Straight	Short, Open	Round Cable Clamp	ITT Cannon	Figure 3
DC24660	C	Straight	Long, Closed	Cable Clamp Bars	ITT Cannon	Figure 5
DD19678-4	D	Straight	Short, Closed	Cable Clamp Bars	ITT Cannon	Figure 4
DD19977-4	D	Right Angle	Closed	Round Cable Clamp	ITT Cannon	Figure 6
DD20964	D	Straight	Short, Open	Round Cable Clamp	ITT Cannon	Figure 3
DD24661	D	Straight	Long, Closed	Cable Clamp Bars	ITT Cannon	Figure 5
DE19977-5	E	Right Angle	Closed	Round Cable Clamp	ITT Cannon	Figure 6

STANDARD WIRING PRACTICES MANUAL

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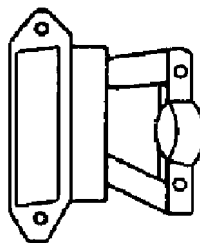
Table 1 (continued)

Part Number	Shell Size	Configuration	Description	Strain Relief	Supplier	Reference
DE24657	E	Straight	Long, Closed	Cable Clamp Bars	ITT Cannon	Figure 5
DE44994	E	Straight	Short, Open	Round Cable Clamp	ITT Cannon	Figure 3
DSB-3	B	Straight	Flat	Wire Harness Tie Tab	Cory Components	Figure 2
DSB-3	B	Straight	Flat	Wire Harness Tie Tab	Tri-Star	Figure 2
DSB-4	C	Straight	Flat	Wire Harness Tie Tab	Cory Components	Figure 2
DSB-4	C	Straight	Flat	Wire Harness Tie Tab	Tri-Star	Figure 2
DSB-5	D	Straight	Flat	Wire Harness Tie Tab	Cory Components	Figure 2
DSB-5	D	Straight	Flat	Wire Harness Tie Tab	Tri-Star	Figure 2

Table 2

OBSOLETE BACKSHELL PART NUMBERS

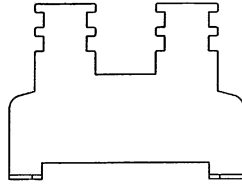
Obsolete Backshell		Replacement Backshell	
Part Number	Supplier	Part Number	Supplier
17-31()-1	Amphenol	17-31()-1	WPI
DSB-()	Cory Components	DSB-()	Tri-Star



17-()-() SERIES BACKSHELL
Figure 1

STANDARD WIRING PRACTICES MANUAL

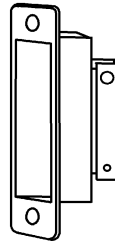
D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



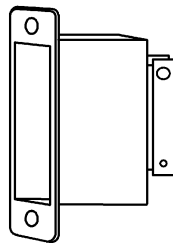
DSB-() SERIES BACKSHELL
Figure 2



SHORT OPEN BACKSHELL
Figure 3



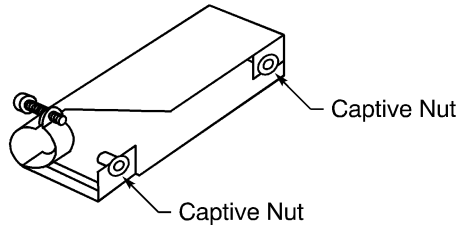
SHORT CLOSED BACKSHELL
Figure 4



LONG CLOSED BACKSHELL
Figure 5

STANDARD WIRING PRACTICES MANUAL

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RIGHT ANGLE BACKSHELL
Figure 6

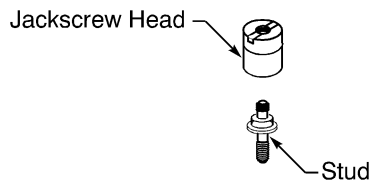
B. Jackscrew and Jackpost Installation Hardware Part Numbers

Table 3
JACKSCREW AND JACKPOST KITS

Kit	Part Number	Supplier	Reference
Jackscrew Kit	D110550	ITT Cannon	Figure 7
Jackpost Kit	D110551	ITT Cannon	Figure 8

Table 4
JACKSCREW AND JACKPOST KIT COMPONENTS

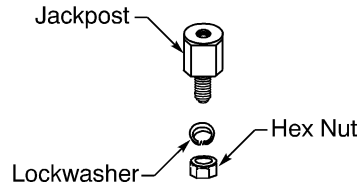
Kit	Kit Component	
	Description	Quantity
Jackscrew	Jackscrew Head	2
	Stud	2
Jackpost	Jackpost	2
	Lockwasher	2
	Nut	2



JACKSCREW INSTALLATION HARDWARE
Figure 7

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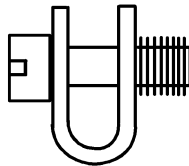


JACKPOST INSTALLATION HARDWARE
Figure 8

C. Screw Lock Installation Hardware Part Numbers

Table 5
SCREW LOCK INSTALLATION COMPONENTS

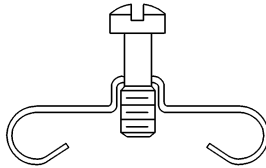
Component	Length L (inch)	Shell Size		Specification	Supplier	Reference
		M24308 Part Number	Supplier Part Number			
Male Screw Lock, Single Clip	-	All	All	MIL-DTL-24308/25-6	QPL	Figure 9
Male Screw Lock, Double Clip	-	1	E	MIL-DTL-24308/25-9	QPL	Figure 10
		2	A	MIL-DTL-24308/25-9	QPL	Figure 10
		3	B	MIL-DTL-24308/25-9	QPL	Figure 10
		4	C	MIL-DTL-24308/25-9	QPL	Figure 10
		5	D	MIL-DTL-24308/25-10	QPL	Figure 10
Female Screw Lock	0.312	All	All	D20418-2	ITT Cannon	Figure 11
				MIL-DTL-24308/26-1	QPL	Figure 11
	0.625	All	All	D20418-39	ITT Cannon	Figure 11
				MIL-DTL-24308/26-2	QPL	Figure 11



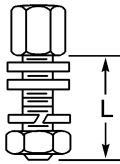
SINGLE CLIP MALE SCREW LOCK INSTALLATION HARDWARE
Figure 9

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D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



DOUBLE CLIP MALE SCREW LOCK INSTALLATION HARDWARE
Figure 10



FEMALE SCREW LOCK INSTALLATION HARDWARE
Figure 11

D. Slide Latch Installation Hardware Part Numbers

Table 6
SLIDE LATCH KITS

Kit	Shell Size		Part Number	Supplier	Reference
	M24308 Part Number	Supplier Part Number			
Slide Latch Kit	1	E	DE51224-1	ITT Cannon	Figure 12
	2	A	DA51220-1	ITT Cannon	Figure 12
	3	B	DB51221-1	ITT Cannon	Figure 12
	4	C	DC51222-1	ITT Cannon	Figure 12
	5	D	DD51223-1	ITT Cannon	Figure 12
Slide Lock Post Kit	All	All	D53018	ITT Cannon	Figure 13

Table 7
SLIDE LATCH KIT COMPONENTS

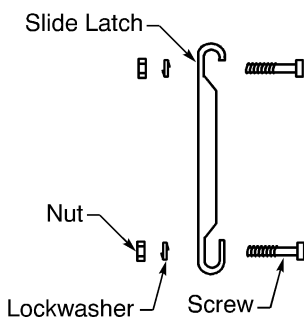
Kit	Kit Component	
	Description	Quantity
Slide Latch Kit	Lock Washer	2
	Nut	2
	Screw	2
	Slide Latch	1

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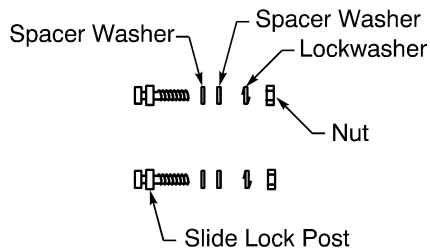
D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

Table 7 (continued)

Kit	Kit Component	
	Description	Quantity
Slide Lock Post Kit	Hex Nut	1
	Lock Washers	1
	Slide Lock Post	1
	Spacer Washers	2



SLIDE LATCH INSTALLATION HARDWARE
Figure 12



SLIDE LOCK POST INSTALLATION HARDWARE
Figure 13

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D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

E. Spring Latch Installation Hardware Part Numbers

**Table 8
SPRING LATCH KITS**

Kit	Shell Size		Part Number	Supplier	Reference
	M24308 Part Number	Supplier Part Number			
Spring Latch Plate Kit	1	E	D110278	ITT Cannon	Figure 14
	2	A	D110278	ITT Cannon	Figure 14
	3	B	D110278	ITT Cannon	Figure 14
	4	C	D110278	ITT Cannon	Figure 14
	5	D	D110279	ITT Cannon	Figure 14
Spring Plate Kit	1	E	D110277	ITT Cannon	Figure 15
	1	E	D110277-1	ITT Cannon	Figure 15
	2	A	D110277	ITT Cannon	Figure 15
	3	B	D110277	ITT Cannon	Figure 15
	4	C	D110277	ITT Cannon	Figure 15
Spring Plate and Spring Latch Plate Kit	1	E	17-529	Amphenol	Figure 14Figure 15
	1	E	17-529	WPI	Figure 14Figure 15
	2	A	17-529	Amphenol	Figure 14Figure 15
	2	A	17-529	WPI	Figure 14Figure 15
	3	B	17-529	Amphenol	Figure 14Figure 15
	3	B	17-529	WPI	Figure 14Figure 15
	4	C	17-529	Amphenol	Figure 14Figure 15
	4	C	17-529	WPI	Figure 14Figure 15
	5	D	17-770	Amphenol	Figure 14Figure 15
5	D	17-770	WPI	Figure 14Figure 15	

**Table 9
SPRING PLATE KIT SCREW DIMENSIONS**

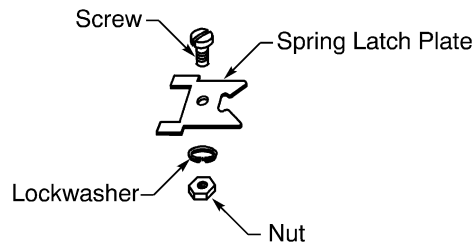
Kit	Screw Length (inch)
D110277	0.312
D110277-1	0.375

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D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

**Table 10
SPRING LATCH KIT COMPONENTS**

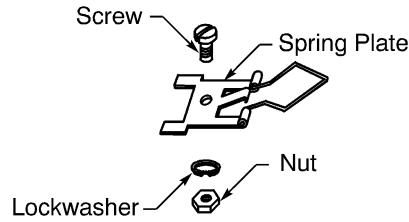
Kit		Kit Component	
Description	Part Number	Description	Quantity
Spring Latch Plate	D110278	Lockwasher	1
		Nut	1
		Screw	1
		Spring Latch Plate	1
Spring Plate	D110277	Lockwasher	1
		Nut	1
		Screw	1
		Spring Plate	1
Spring Latch Plate and Spring Plate	17-529	Spring Latch Plate	2
		Spring Plate	2
		Lockwasher	4
		Nut	4
		Screw	4
Spring Latch Plate and Spring Plate	17-770	Spring Latch Plate	2
		Spring Plate	2
		Lockwasher	4
		Nut	4
		Screw	4



**SPRING LATCH PLATE INSTALLATION HARDWARE
Figure 14**

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D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



SPRING PLATE INSTALLATION HARDWARE
Figure 15

F. Flat Washer Part Numbers

Table 11
FLAT WASHER PART NUMBERS

Part Number	Hole Size	Thickness (inch)	Material
NAS1149DN416J	4	0.16	Aluminum

G. Necessary Materials

Table 12
NECESSARY MATERIALS

Material	Part Number	Supplier
Tape	912-10X12	Arlon, Silicone Technologies Division
	P-440	Permacel
	Scotch 70	3M
	SG26-03	Saint-Gobain Performance Plastics
Thread Lock Compound	222	Loctite
	83	Loctite
	Product 081	Loctite

STANDARD WIRING PRACTICES MANUAL

D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

2. BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

A. Backshell Assembly and Connector Installation Configurations

Table 13

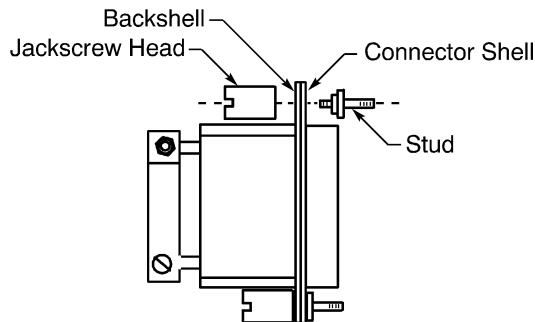
SELECTION OF A BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION CONFIGURATION

Applicable Conditions		Assembly Procedure
Connector Installation Configuration	Installation Hardware	
No Panel	Jackscrew	Paragraph 3.A.
	Jackpost	Paragraph 3.B.
	Male Screw Lock - Single Clip	Paragraph 4.A.
	Male Screw Lock - Double Clip	Paragraph 4.B.
	Female Screw Lock	Paragraph 4.C.
	Slide Latch	Paragraph 5.A.
	Slide Lock Posts	Paragraph 5.C.
	Spring Plate	Paragraph 6.A.
	Spring Latch Plate	Paragraph 6.A.
	Spring Plate and a DSB-() Backshell	Paragraph 6.B.
	Spring Latch Plate and a DSB-() Backshell	Paragraph 6.B.
Panel	Jackpost	Paragraph 3.C.
	Female Screw Lock	Paragraph 4.D.
	Slide Lock Posts	Paragraph 5.B.
	Spring Plate	Paragraph 6.C.

3. BACKSHELL ASSEMBLY - JACKSCREW AND JACKPOST INSTALLATION HARDWARE

A. Backshell Assembly with Jackscrew Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



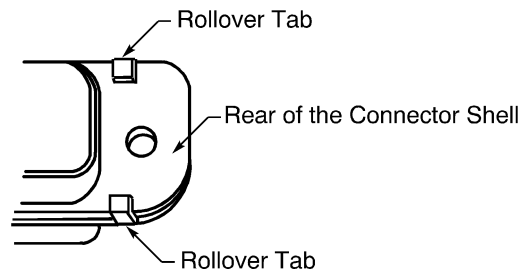
BACKSHELL ASSEMBLY
Figure 16

STANDARD WIRING PRACTICES MANUAL

D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

Refer to Figure 16.

- (1) Make a selection of a thread lock compound from Table 12.
- (2) Put the connector backshell on the wire harness.
Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (3) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (4) Put two hex nuts on the stud.
- (5) From the front of the connector, put a stud in the installation hole in the connector shell.
- (6) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 17.



ROLLOVER TABS OF THE CONNECTOR SHELL

Figure 17

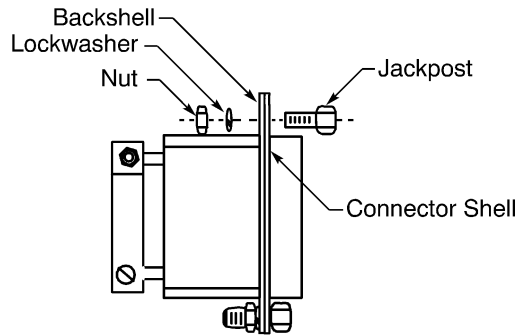
- (a) Make a selection of a flat washer from Table 11.
NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put the washer on the stud.
- (7) Hold the stud in its position and align the installation hole of the backshell with the stud.
- (8) Apply a drop of thread lock compound on the threads of the stud.
- (9) Put the jackscrew head on the stud.
- (10) Do Step (4) through Step (9) again to install a jackscrew in the other installation hole of the connector.
- (11) Fully tighten each jackscrew head.
- (12) Remove the two hex nuts from each stud.
- (13) Assemble the strain relief.
For a backshell that has:
 - A right angle configuration, refer to Paragraph 7.A.
 - A round cable clamp, refer to Paragraph 7.B.
 - Two cable clamp bars, refer to Paragraph 7.C.

B. Backshell Assembly with Jackpost Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

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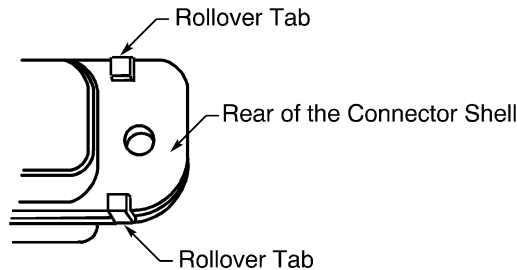
D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



BACKSHELL ASSEMBLY
Figure 18

Refer to Figure 18.

- (1) Put the connector backshell on the wire harness.
Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) From the front of the connector, put a jackpost in the installation hole in the connector shell.
- (4) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 19.



ROLLOVER TABS OF THE CONNECTOR SHELL
Figure 19

- (a) Make a selection of a flat washer from Table 11.
NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put the washer on the jackpost.
- (5) Hold the jackpost in its position and align the installation hole of the backshell with the jackpost.
- (6) If the backshell has a captive nut, put the jackpost in the nut.
Make sure that the jackpost is not fully tightened.
- (7) If the backshell does not have captive nut:
 - (a) Put a lockwasher on the jackpost.
 - (b) Put the nut on the jackpost.

STANDARD WIRING PRACTICES MANUAL**D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION**

Make sure that the jackpost is not fully tightened.

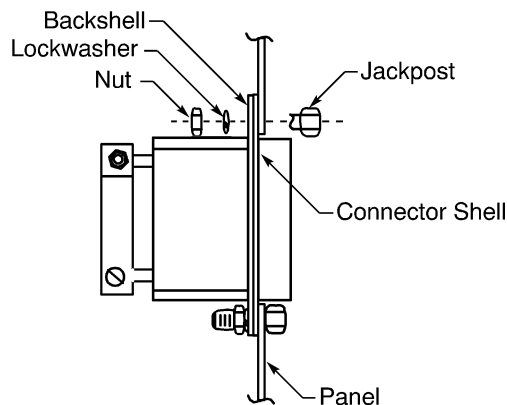
- (8) Do Step (3) through Step (7) again to install a jackpost in the other installation hole of the connector.
- (9) Fully tighten each jackpost.
- (10) Assemble the strain relief.

For a backshell that has:

- A right angle configuration, refer to Paragraph 7.A.
- A round cable clamp, refer to Paragraph 7.B.
- Two cable clamp bars, refer to Paragraph 7.C.

C. Backshell Assembly and Connector Installation in a Panel with Jackpost Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



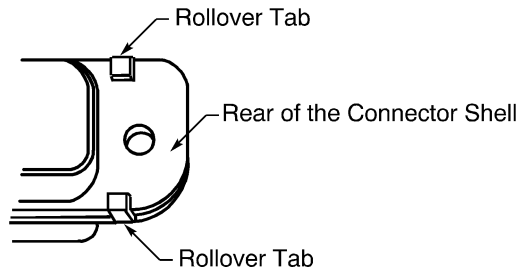
BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION
Figure 20

Refer to Figure 20.

- (1) Put the connector backshell on the wire harness.
Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) From the rear of the panel, put the connector in the hole in the panel.
- (4) Align the installation holes in the connector with the holes in the panel.
- (5) Put the jackpost in the hole in the panel and the connector shell.
- (6) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 21.

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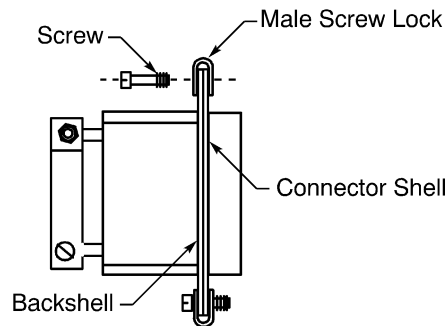
ROLLOVER TABS OF THE CONNECTOR SHELL
Figure 21

- (a) Make a selection of a washer from Table 11.
 - NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put a washer on the jackpost.
- (7) Hold the installation jackpost in its position and align the installation hole of the backshell with the jackpost.
- (8) If the backshell has a captive nut, put the jackpost in the nut.
 Make sure that the jackpost is not fully tightened.
- (9) If the backshell does not have captive nut:
 - (a) Put a lockwasher on the jackpost.
 - (b) Put the nut on the jackpost.
 Make sure that the jackpost is not fully tightened.
- (10) Do Step (5) through Step (9) again to install a jackpost in the other installation hole of the connector.
- (11) Fully tighten each jackpost.
 Make sure that the connector does not move in the panel.

4. BACKSHELL ASSEMBLY - MALE AND FEMALE SCREW LOCK INSTALLATION HARDWARE

A. Backshell Assembly with Single Clip Male Screw Lock Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



BACKSHELL ASSEMBLY
Figure 22

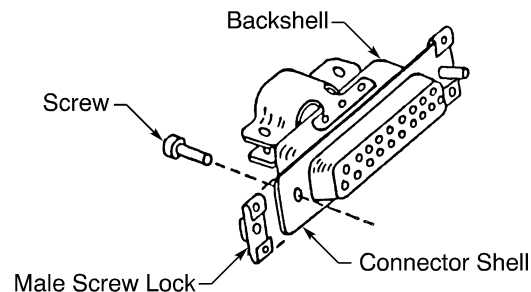
STANDARD WIRING PRACTICES MANUAL**D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION**

Refer to Figure 22.

- (1) Put the connector backshell on the wire harness.
Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) Align the backshell with the connector shell.
- (4) Put a male screw lock on one end of the connector shell and the backshell.
Make sure that the clip of the screw lock holds the connector shell flange and the backshell flange.
- (5) Align the hole in the screw lock with the hole in the backshell flange and the connector shell flange.
- (6) Put the screw in the screw lock.
- (7) Do Step (4) through Step (6) again to install a screw lock in the other installation hole of the connector.
- (8) Assemble the strain relief.
For a backshell that has:
 - A right angle configuration, refer to Paragraph 7.A.
 - A round cable clamp, refer to Paragraph 7.B.
 - Two cable clamp bars, refer to Paragraph 7.C.

B. Backshell Assembly with Double Clip Male Screw Lock Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



BACKSHELL ASSEMBLY
Figure 23

Refer to Figure 23.

- (1) Put the connector backshell on the wire harness.
Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) Align the backshell with the connector shell.
- (4) Put a male screw lock on one end of the connector shell and the backshell.
Make sure that the clips of the screw lock hold the connector shell flange and the backshell flange.

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D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

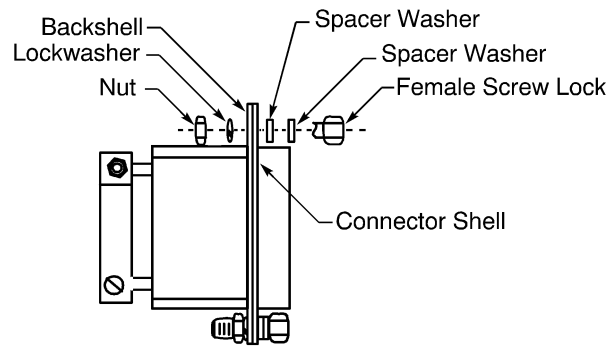
- (5) Align the installation hole of the backshell, the connector shell and the screw lock.
- (6) Put the screw in the screw lock.
- (7) Do Step (4) through Step (6) again to install a screw lock in the other installation hole of the connector.
- (8) Assemble the strain relief.

For a backshell that has:

- A right angle configuration, refer to Paragraph 7.A.
- A round cable clamp, refer to Paragraph 7.B.
- Two cable clamp bars, refer to Paragraph 7.C.

C. Backshell Assembly with Female Screw Lock Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



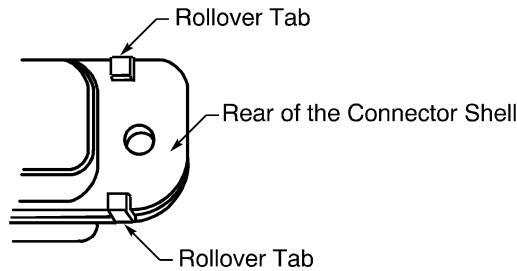
BACKSHELL ASSEMBLY
Figure 24

Refer to Figure 24.

- (1) Put the connector backshell on the wire harness.
Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) Put two spacer washers on a screw lock.
- (4) From the front of the connector, put the screw lock in installation hole in the connector shell.
- (5) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 25.

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D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



ROLLOVER TABS OF THE CONNECTOR SHELL

Figure 25

- (a) Make a selection of a flat washer from Table 11.

NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.

- (b) Put the washer on the screw lock.
- (6) Hold the screw lock in its position and align the installation hole of the backshell with the screw lock.
- (7) If the backshell has a captive nut, put the screw lock in the nut.
Make sure that the screw lock is not fully tightened.
- (8) If the backshell does not have captive nut:
- (a) Put a lockwasher on the screw lock.
- (b) Put a nut on the screw lock.
Make sure that the screw lock is not fully tightened.
- (9) Do Step (3) through Step (8) again to install a screw lock in the other installation hole of the connector.
- (10) Fully tighten each screw lock.
- (11) Assemble the strain relief.

For a backshell that has:

- A right angle configuration, refer to Paragraph 7.A.
- A round cable clamp, refer to Paragraph 7.B.
- Two cable clamp bars, refer to Paragraph 7.C.

D. Backshell Assembly and Connector Installation in a Panel with Female Screw Lock Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

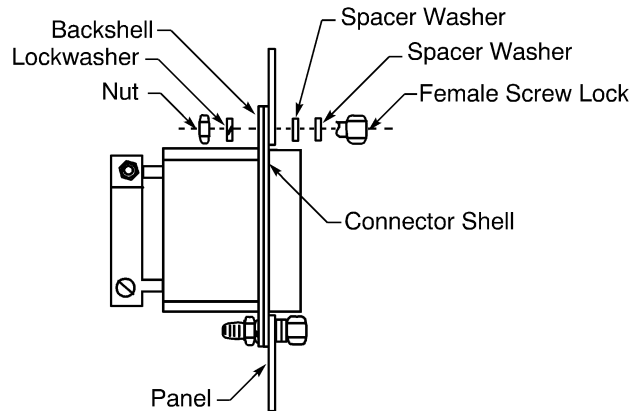
**Table 14
SPACER WASHERS FOR DIFFERENT PANEL THICKNESSES**

Panel Thickness (inch)		Necessary Number of Washers
Minimum	Maximum	
0.000	0.030	2
0.031	0.060	1
0.061	0.090	0

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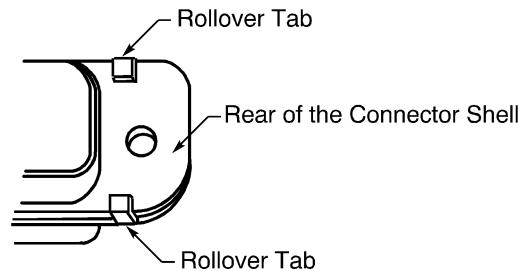
D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION
Figure 26

Refer to Figure 26.

- (1) Put the connector backshell on the wire harness.
 Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) Measure the thickness of the panel.
- (4) Find the number of washers that are necessary as spacers. Refer to Table 14.
- (5) If one or more washers are specified in Table 14, put the specified quantity of washers on the screw lock.
- (6) From the rear of the panel, put the connector in the hole in the panel.
- (7) Align the installation holes in the connector with the holes in the panel.
- (8) Put the screw lock in the hole in the panel and the connector shell.
- (9) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 27.



ROLLOVER TABS OF THE CONNECTOR SHELL
Figure 27

STANDARD WIRING PRACTICES MANUAL

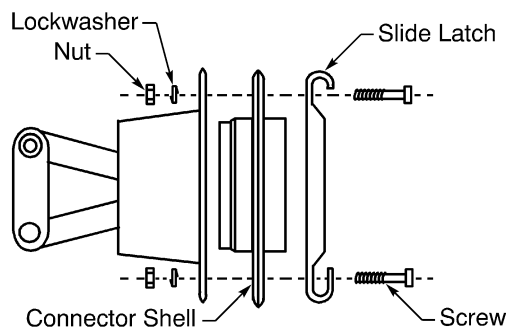
D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

- (a) Make a selection of a washer from Table 11.
 - NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put a washer on the screw lock.
- (10) Hold the installation screw lock in its position and align the installation hole of the backshell with the screw lock.
- (11) If the backshell has a captive nut, put the screw lock in the nut.
 - Make sure that the screw is not fully tightened.
- (12) If the backshell does not have captive nut:
 - (a) Put a lockwasher on the screw lock.
 - (b) Put the nut on the screw lock.
 - Make sure that the screw lock is not fully tightened.
- (13) Do Step (7) through Step (12) again to install a screw lock in the other installation hole of the connector.
- (14) Fully tighten each screw lock.
 - Make sure that the connector does not move in the panel.
- (15) Assemble the strain relief.
 - For a backshell that has:
 - A right angle configuration, refer to Paragraph 7.A.
 - A round cable clamp, refer to Paragraph 7.B.
 - Two cable clamp bars, refer to Paragraph 7.C.

5. BACKSHELL ASSEMBLY - SLIDE LATCH AND SLIDE LOCK POST INSTALLATION HARDWARE

A. Backshell Assembly with Slide Latch Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



BACKSHELL ASSEMBLY
Figure 28

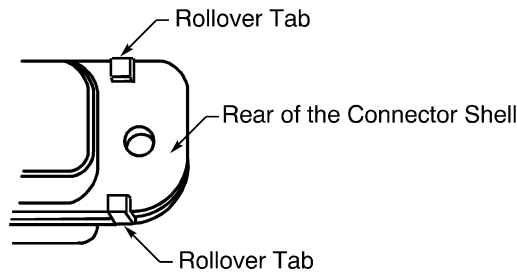
Refer to Figure 28.

- (1) Put the connector backshell on the wire harness.
 - Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.

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D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) Align the installation hole of the slide latch with the installation hole in the connector shell.
- (4) From the front of the connector, put a screw through the hole in the slide latch and the connector shell.
- (5) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 29.



ROLLOVER TABS OF THE CONNECTOR SHELL
Figure 29

- (a) Make a selection of a flat washer from Table 11.

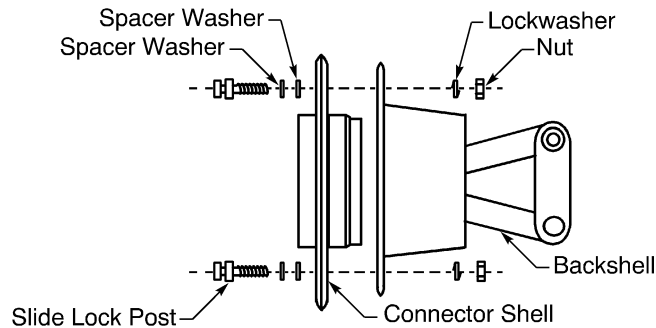
NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put the washer on the screw.
- (6) Hold the screw in its position and align the installation hole of the backshell with the screw.
- (7) If the backshell has a captive nut, put the screw in the nut.
 Make sure that the screw is not fully tightened.
- (8) If the backshell does not have captive nut:
 - (a) Put a lockwasher on the screw.
 - (b) Put the nut on the screw.
 Make sure that the screw is not fully tightened.
- (9) Do Step (3) through Step (8) again for the other installation hole of the connector.
- (10) Fully tighten each screw.
- (11) Assemble the strain relief.
 For a backshell that has:
 - A right angle configuration, refer to Paragraph 7.A.
 - A round cable clamp, refer to Paragraph 7.B.
 - Two cable clamp bars, refer to Paragraph 7.C.

B. Backshell Assembly with Slide Lock Post Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

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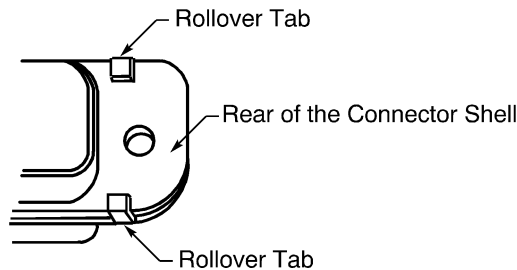
D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



BACKSHELL ASSEMBLY
Figure 30

Refer to Figure 30.

- (1) Put the connector backshell on the wire harness.
Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) Put two spacer washers on a slide latch post.
- (4) From the front of the connector, put the slide latch post through the installation hole of the connector shell.
- (5) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 31.



ROLLOVER TABS OF THE CONNECTOR SHELL
Figure 31

- (a) Make a selection of a flat washer from Table 11.
NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put the washer on the post.
- (6) Hold the post in its position and align the installation hole of the backshell with the post.
- (7) If the backshell has a captive nut, put the post in the nut.
Make sure that the post is not fully tightened.
- (8) If the backshell does not have captive nut:
 - (a) Put a lockwasher on the post.

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- (b) Put the nut on the post.
 Make sure that the post is not fully tightened.
- (9) Do Step (3) through Step (8) again to install a slide lock post in other installation hole of the connector.
- (10) Tighten each post.
- (11) Assemble the strain relief.

For a backshell that has:

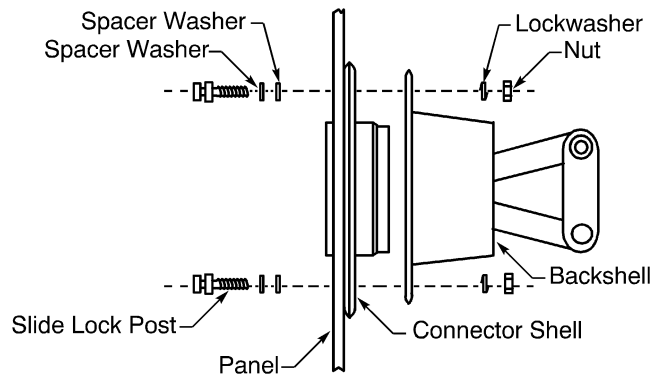
- A right angle configuration, refer to Paragraph 7.A.
- A round cable clamp, refer to Paragraph 7.B.
- Two cable clamp bars, refer to Paragraph 7.C.

C. Backshell Assembly and Connector Installation in a Panel with Slide Lock Post Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

**Table 15
SPACER WASHERS FOR DIFFERENT PANEL THICKNESSES**

Panel Thickness (inch)		Necessary Number of Washers
Minimum	Maximum	
0.000	0.030	2
0.031	0.060	1
0.061	0.090	0



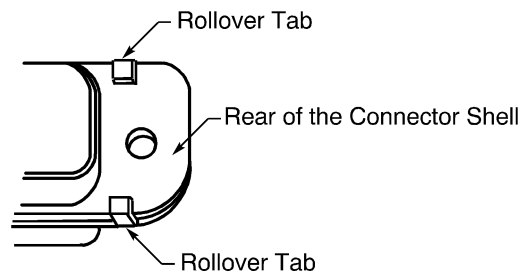
**BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION
Figure 32**

Refer to Figure 32.

- (1) Put the connector backshell on the wire harness.
 Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.

STANDARD WIRING PRACTICES MANUAL**D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION**

- (3) Measure the thickness of the panel.
- (4) Find the number of washers that are necessary as spacers. Refer to Table 15.
- (5) From the rear of the panel, put the connector in the hole in the panel.
- (6) If one or more washers are specified in Table 15, put the specified quantity of washers on the slide lock post.
- (7) Align the installation holes in the connector with the holes in the panel.
- (8) Put the slide lock post in the hole in the panel and the connector shell.
- (9) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 33.



ROLLOVER TABS OF THE CONNECTOR SHELL
Figure 33

- (a) Make a selection of a washer from Table 11.
NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put a washer on the slide lock post.
- (10) Hold the installation slide lock post in its position and align the installation hole of the backshell with the slide lock post.
- (11) If the backshell has a captive nut, put the slide lock post in the nut.
Make sure that the slide lock post is not fully tightened.
- (12) If the backshell does not have captive nut:
 - (a) Put a lockwasher on the slide lock post.
 - (b) Put the nut on the slide lock post.
Make sure that the slide lock post is not fully tightened.
- (13) Do Step (7) through Step (12) again to install a slide lock post in the other installation hole of the connector.
- (14) Fully tighten each slide lock post.
Make sure that the connector does not move in the panel.
- (15) Assemble the strain relief.

STANDARD WIRING PRACTICES MANUAL

D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

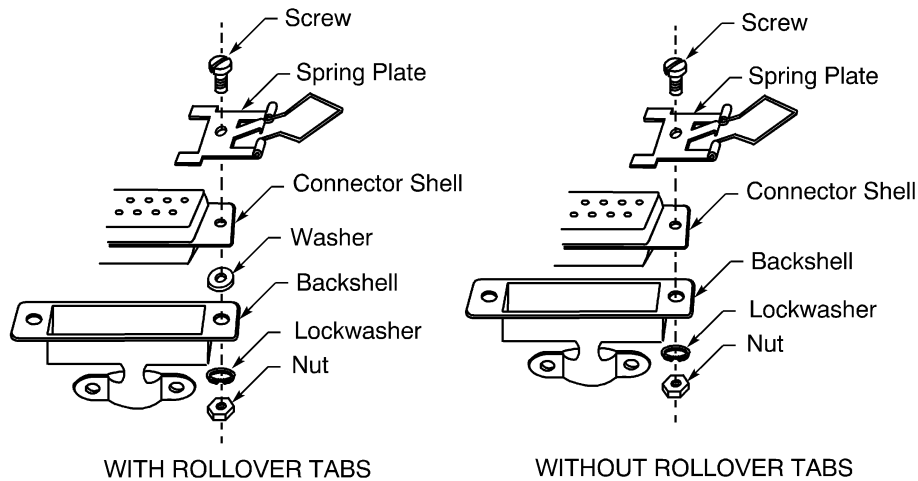
For a backshell that has:

- A right angle configuration, refer to Paragraph 7.A.
- A round cable clamp, refer to Paragraph 7.B.
- Two cable clamp bars, refer to Paragraph 7.C.

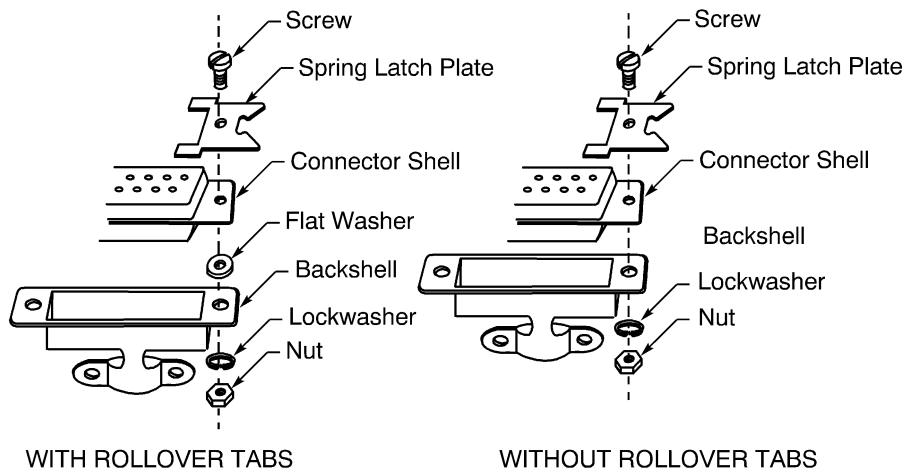
6. BACKSHELL ASSEMBLY - SPRING PLATE AND SPRING LATCH PLATE HARDWARE

A. Backshell Assembly with Spring Plate or Spring Latch Plate Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



BACKSHELL ASSEMBLY WITH SPRING PLATE HARDWARE
Figure 34



BACKSHELL ASSEMBLY WITH SPRING LATCH PLATE HARDWARE
Figure 35

Refer to Figure 35 and Figure 34.

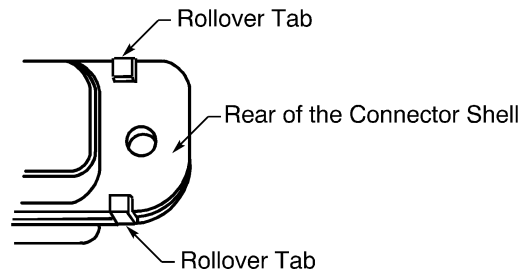
- (1) Put the connector backshell on the wire harness.

STANDARD WIRING PRACTICES MANUAL

D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.

- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) Align the installation hole of the spring latch plate or spring plate with the installation hole in the connector shell.
- (4) From the front of the connector, put a screw through the installation hole of the spring latch plate or spring plate and the connector shell.
- (5) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 36.



ROLLOVER TABS OF THE CONNECTOR SHELL

Figure 36

- (a) Make a selection of a flat washer from Table 11.
 - NOTE:** A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put the washer on the screw.
- (6) Hold the installation screw in its position and align the installation hole of the backshell with the screw.
- (7) If the backshell has a captive nut, put the screw in the nut.
 - Make sure that the screw is not fully tightened.
- (8) If the backshell does not have captive nut:
 - (a) Put a lockwasher on the screw.
 - (b) Put the nut on the screw.
 - Make sure that the screw is not fully tightened.
- (9) Do Step (3) through Step (8) again for the other installation hole of the connector.
- (10) Fully tighten each screw.
- (11) Assemble the strain relief.

For a backshell that has:

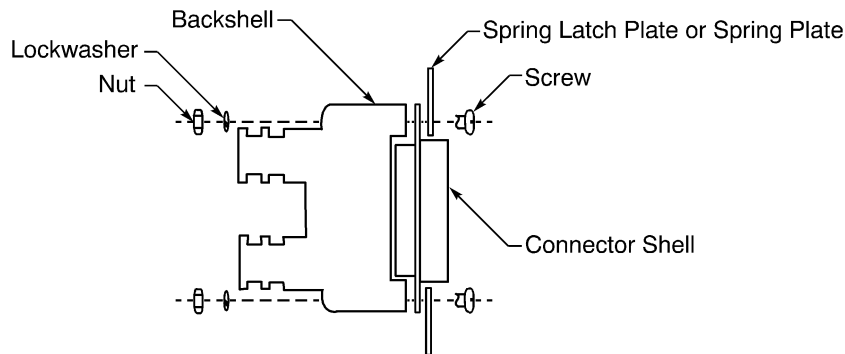
- A right angle configuration, refer to Paragraph 7.A.
- A round cable clamp, refer to Paragraph 7.B.
- Two cable clamp bars, refer to Paragraph 7.C.

B. DSB-() Backshell Assembly with Spring Plate or Spring Latch Plate Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.

STANDARD WIRING PRACTICES MANUAL

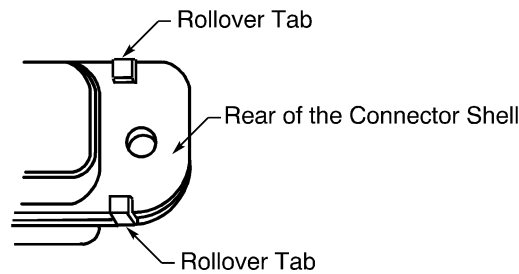
D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



BACKSHELL ASSEMBLY
Figure 37

Refer to Figure 37.

- (1) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (2) Make a selection of a tape from Table 12.
- (3) Align the installation hole of the spring latch plate or spring plate with the installation hole in the connector shell.
- (4) From the front of the connector, put a screw through the installation hole of the spring latch plate or spring plate and the connector shell.
- (5) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 38.



ROLLOVER TABS OF THE CONNECTOR SHELL
Figure 38

- (a) Make a selection of a flat washer from Table 11.

NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put the washer on the screw.
- (6) Hold the installation screw in its position and align the installation hole of the backshell with the screw.
- (7) Put a lockwasher on the screw.
- (8) Put the nut on the screw.

STANDARD WIRING PRACTICES MANUAL

D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

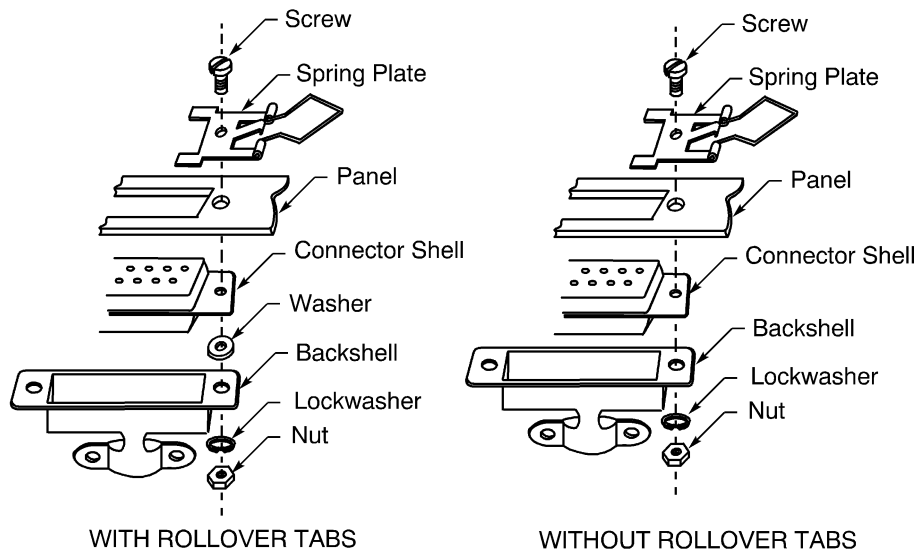
Make sure that the screw is not fully tightened.

- (9) Do Step (3) through Step (8) again for the other installation hole of the connector.
- (10) Fully tighten each screw.
- (11) Assemble the strain relief:
 - (a) Wind 2 layers of tape on the wire harness where the harness is against the tie tab.
 - (b) Assemble a wire harness tie on the wire harness and the tie tab.

Refer to Subject 20-10-11 for the assembly of a wire harness tie.

C. Backshell Assembly and Connector Installation in a Panel with Spring Plate Installation Hardware

For the conditions that are applicable for this procedure, refer to Paragraph 2.A.



BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION

Figure 39

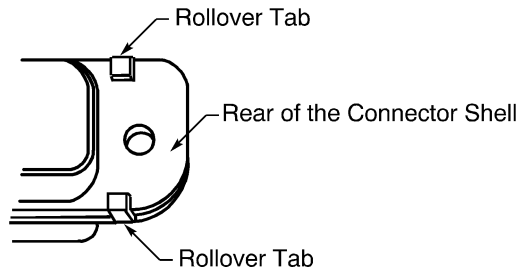
Refer to Figure 39.

- (1) Put the connector backshell on the wire harness.

Make sure that the end of the backshell that has the cable clamp is pointed rearward away from the end of the wire harness.
- (2) Install the contacts in the connector. Refer to the Subject that is applicable for the assembly of the connector.
- (3) From the rear of the panel, put the connector in the hole in the panel.
- (4) Put a screw in the installation hole of the spring plate.
- (5) Align the installation holes in the connector with the holes in the panel.
- (6) Put the screw in the hole in the panel and the connector shell.
- (7) If the connector shell has rollover tabs, install a washer as a spacer. Refer to Figure 40.

STANDARD WIRING PRACTICES MANUAL

D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION



ROLLOVER TABS OF THE CONNECTOR SHELL

Figure 40

- (a) Make a selection of a washer from Table 11.
 - NOTE: A washer that has the same material, thickness, and hole size is a satisfactory alternative.
- (b) Put the washer on the screw.
- (8) Hold the installation screw in its position and align the installation hole of the backshell with the screw.
- (9) If the backshell has a captive nut, put the screw in the nut.
 - Make sure that the screw is not fully tightened.
- (10) If the backshell does not have captive nut:
 - (a) Put the lockwasher on the screw.
 - (b) Put the nut on the screw.
 - Make sure that the screw is not fully tightened.
- (11) Do Step (4) through Step (10) again for the other installation hole of the connector.
- (12) Fully tighten each screw.
 - Make sure that the connector does not move in the panel.
- (13) Assemble the strain relief.
 - For a backshell that has:
 - A right angle configuration, refer to Paragraph 7.A.
 - A round cable clamp, refer to Paragraph 7.B.
 - Two cable clamp bars, refer to Paragraph 7.C.

7. STRAIN RELIEF ASSEMBLY

A. Strain Relief Assembly - Right Angle Backshell

- (1) Remove one of the screws that hold the saddle bar to the cable clamp.
- (2) Move the saddle bar to open the cable clamp.
- (3) Align the wire harness with the cable clamp.
 - Make sure that the wires or cables do not go across each other in the clamp.
- NOTE: This condition is not applicable for twisted wires.
- (4) Make a mark on the wire harness at the center of the saddle bar of the cable clamp.
- (5) Put the saddle bar that was removed against the other saddle bar in its original position.

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STANDARD WIRING PRACTICES MANUAL**D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION**

- (6) Push the saddle bars of the cable clamp together.
- (7) If the cable clamp does not hold the wire harness tightly, increase the diameter of the wire harness with tape.
 - (a) Make a selection of a tape from Table 12.
 - (b) Remove the saddle bar.
 - (c) Wind 2 or 3 layers of tape around the wire harness at the mark on the wire harness.

Make sure that:

- The center of the layers of tape is aligned with the mark on the wire harness
- Each edge of the tape is 0.06 inch minimum from the edge of the cable clamp
- The layers of tape make a 100 percent overlap.

- (8) Put the saddle bars in position.
- (9) Engage the threads of each cable clamp screw and the applicable screw hole.
- (10) Tighten the screws until the ends of the saddle bars are against each other.

Make sure that:

- The wires do not have unwanted tension that put strain on the contacts
- The wire harness is tight in the cable clamp
- The saddle bars do not crush or pinch the wire harness
- The cable clamp screws are tight.

B. Strain Relief Assembly - Round Cable Clamp

- (1) Remove the screws and nuts that hold the saddle bars together.
- (2) Align the wire harness with the cable clamp.

Make sure that the wires or cables do not go across each other in the clamp.

NOTE: This condition is not applicable for twisted wires.
- (3) Make a mark on the wire harness at the center of the saddle bars of the cable clamp.
- (4) Push the saddle bars of the cable clamp together.
- (5) If the cable clamp does not hold the wire harness tightly, increase the diameter of the wire harness with tape.
 - (a) Move the backshell rearward on the harness.
 - (b) Make a selection of a tape from Table 12.
 - (c) Wind 2 or 3 layers of tape around the wire harness at the mark on the wire harness.

Make sure that:

- The center of the layers of tape is aligned with the mark on the wire harness
- Each edge of the tape is 0.06 inch minimum from the edge of the cable clamp
- The layers of tape make a 100 percent overlap.

- (6) Put the backshell against the connector shell.
- (7) Engage the threads of each saddle bar screw and the applicable nut.
- (8) Tighten the screws until the ends of the saddle bars are against each other.

STANDARD WIRING PRACTICES MANUAL**D SUBMINIATURE CONNECTORS: BACKSHELL ASSEMBLY AND CONNECTOR INSTALLATION**

Make sure that:

- The wires do not have unwanted tension that put strain on the contacts
- The saddle bars do not crush or pinch the wire harness
- The wire harness is tight in the cable clamp
- The cable clamp screws are tight.

C. Strain Relief Assembly - Two Cable Clamp Bars

- (1) Remove the screws that hold the cable clamp bars on the wire harness.
- (2) Align the wire harness with the cable clamp.

Make sure that the wires or cables do not go across each other in the clamp.

NOTE: This condition is not applicable for twisted wires.

- (3) Make a mark on the wire harness at the center of the cable clamp bars.
- (4) Push the saddle bars of the cable clamp together.
- (5) If the cable clamp does not hold the wire harness tightly, increase the diameter of the wire harness with tape.
 - (a) Make a selection of a tape from Table 12.
 - (b) Remove the backshell from the connector.
 - (c) Wind 2 or 3 layers of tape around the wire harness at the mark on the wire harness.

Make sure that:

- The center of the layers of tape is aligned with the mark on the wire harness
 - Each edge of the tape is 0.06 inch minimum from the edge of the cable clamp
 - The layers of tape make a 100 percent overlap.
- (6) Put the backshell in its position.
 - (7) Engage the threads of each cable clamp screw and the applicable screw hole.
 - (8) Tighten the screws until the cable clamp bars are against each other.

Make sure that:

- The wires do not have unwanted tension that put strain on the contacts
- The wire harness is tight in the cable clamp
- The cable clamp bars do not crush or pinch the wire harness
- The cable clamp screws are tight.



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STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

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D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

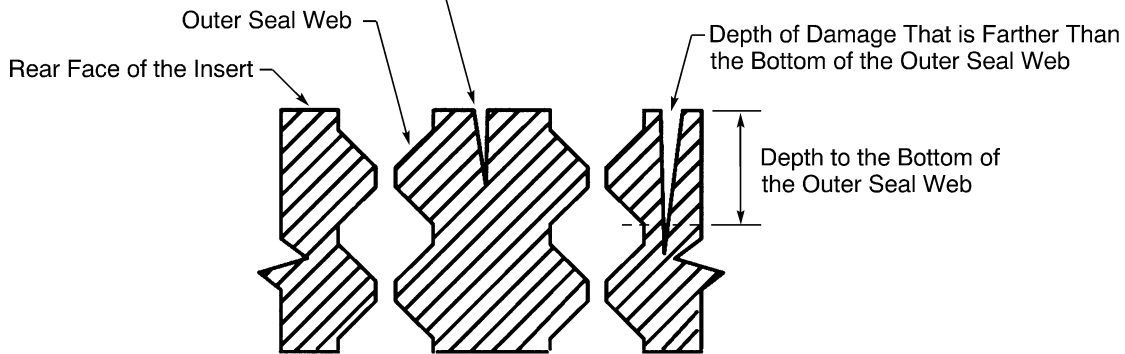
1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

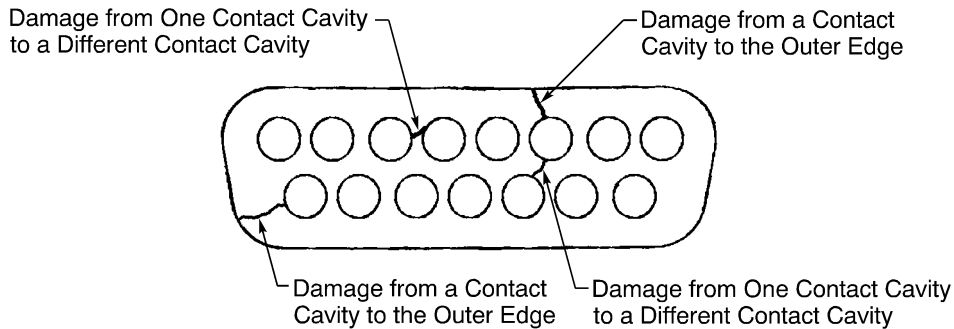
It is necessary to replace the connector if one or more of these conditions occur:

- If the connector has a grommet, the depth of the damage extends farther than the bottom of the outer seal web; refer to Figure 1
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 2
- The damage extends from one contact cavity to the outer edge of the insert; refer to Figure 2.

Depth of the Damage That is not Farther Than the Bottom of the Seal Web



REAR FACE OF THE ENVIRONMENTAL INSERT - DEPTH OF DAMAGE
Figure 1



REAR FACE OF THE INSERT - LENGTH OF DAMAGE
Figure 2

B. Damage Conditions - Front Face of the Insert

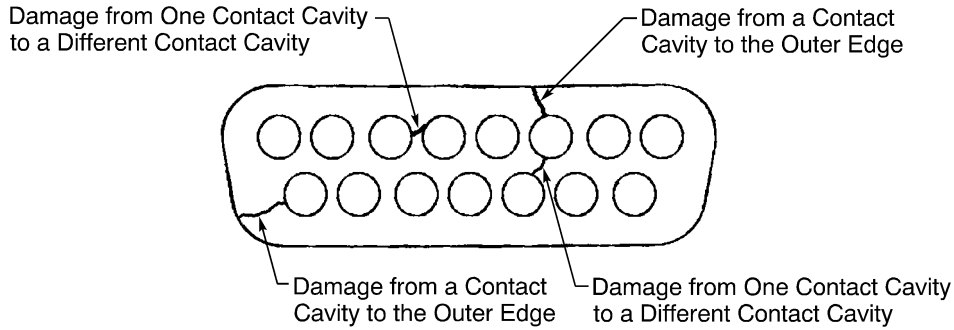
It is necessary to replace the connector if one of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS



FRONT FACE OF THE INSERT - LENGTH OF DAMAGE
Figure 3

2. PART NUMBERS AND DESCRIPTION

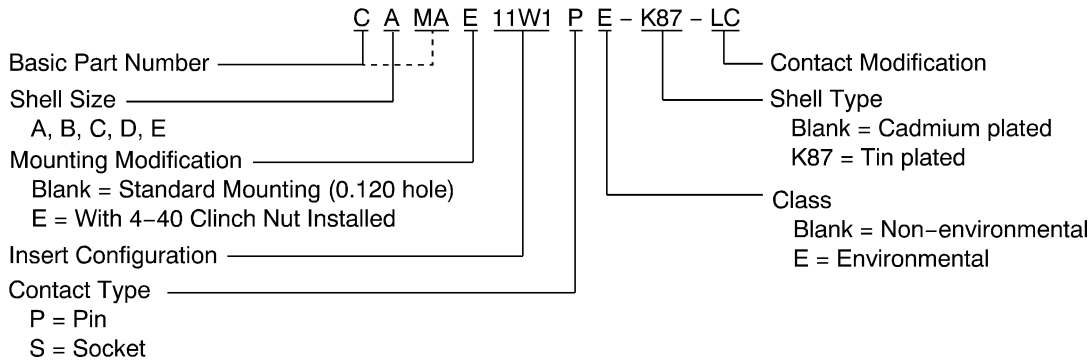
A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Supplier
CAMA()	Cory Components
CAMA()	Tri-Star
CBMA()	Cory Components
CBMA()	Tri-Star
CCMA()	Cory Components
CCMA()	Tri-Star
CDMA()	Cory Components
CDMA()	Tri-Star
CEMA()	Cory Components
CEMA()	Tri-Star

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS



TRI-STAR C()MA AND CORY C()MA SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 4

Table 2

OBSOLETE CONNECTOR PART NUMBERS

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
CAMA()	Cory Components	CAMA()	Tri-Star
CBMA()	Cory Components	CBMA()	Tri-Star
CCMA()	Cory Components	CCMA()	Tri-Star
CDMA()	Cory Components	CDMA()	Tri-Star
CEMA()	Cory Components	CEMA()	Tri-Star

Table 3

ALTERNATIVE CONNECTOR PART NUMBERS

Specified Connector	Alternative Connector		
	Part Number	Supplier	Applicable Subject
CAMA15P	17-20150-1	Amphenol	Subject 20-72-11
	17-20150-1	WPI	Subject 20-72-11
	17-303-1	Amphenol	Subject 20-72-11
	17-303-1	WPI	Subject 20-72-11
	DAMA15P	ITT Cannon	Subject 20-72-12
	M24308/4-2	QPL	Subject 20-72-13

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 3 (continued)

Specified Connector	Alternative Connector		
	Part Number	Supplier	Applicable Subject
CAMA15S	17-10150-1	Amphenol	Subject 20-72-11
	17-10150-1	WPI	Subject 20-72-11
	17-302-1	Amphenol	Subject 20-72-11
	17-302-1	WPI	Subject 20-72-11
	DAMA15S	ITT Cannon	Subject 20-72-12
	M24308/2-2	QPL	Subject 20-72-13
CBMA25P	17-20250-1	Amphenol	Subject 20-72-11
	17-20250-1	WPI	Subject 20-72-11
	17-305-1	Amphenol	Subject 20-72-11
	17-305-1	WPI	Subject 20-72-11
	DBMA25P	ITT Cannon	Subject 20-72-12
	M24308/4-3	QPL	Subject 20-72-13
CBMA25S	17-10250-1	Amphenol	Subject 20-72-11
	17-10250-1	WPI	Subject 20-72-11
	17-304-1	Amphenol	Subject 20-72-11
	17-304-1	WPI	Subject 20-72-11
	DBMA25S	ITT Cannon	Subject 20-72-12
	M24308/2-3	QPL	Subject 20-72-13
CCMA37P	17-20370-1	Amphenol	Subject 20-72-11
	17-20370-1	WPI	Subject 20-72-11
	17-307-1	Amphenol	Subject 20-72-11
	17-307-1	WPI	Subject 20-72-11
	DCMA37P	ITT Cannon	Subject 20-72-12
	M24308/4-4	QPL	Subject 20-72-13
CCMA37S	17-10370-1	Amphenol	Subject 20-72-11
	17-10370-1	WPI	Subject 20-72-11
	17-306-1	Amphenol	Subject 20-72-11
	17-306-1	WPI	Subject 20-72-11
	DCMA37S	ITT Cannon	Subject 20-72-12
	M24308/2-4	QPL	Subject 20-72-13

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 3 (continued)

Specified Connector	Alternative Connector		
	Part Number	Supplier	Applicable Subject
CDMA50P	17-20500-1	Amphenol	Subject 20-72-11
	17-20500-1	WPI	Subject 20-72-11
	17-309-1	Amphenol	Subject 20-72-11
	17-309-1	WPI	Subject 20-72-11
	DDMA50P	ITT Cannon	Subject 20-72-12
	M24308/4-5	QPL	Subject 20-72-13
CDMA50S	17-10500-1	Amphenol	Subject 20-72-11
	17-10500-1	WPI	Subject 20-72-11
	17-308-1	Amphenol	Subject 20-72-11
	17-308-1	WPI	Subject 20-72-11
	DDMA50S	ITT Cannon	Subject 20-72-12
	M24308/2-5	QPL	Subject 20-72-13
CDMA78P	DDMA78P	ITT Cannon	Subject 20-72-12
	M24308/4-15	QPL	Subject 20-72-13
CDMA78S	DDMA78S	ITT Cannon	Subject 20-72-12
	M24308/2-15	QPL	Subject 20-72-13
CEMA9P	17-20090-1	Amphenol	Subject 20-72-11
	17-20090-1	WPI	Subject 20-72-11
	17-301-1	Amphenol	Subject 20-72-11
	17-301-1	WPI	Subject 20-72-11
	DEMA9P	ITT Cannon	Subject 20-72-12
	M24308/4-1	QPL	Subject 20-72-13
CEMA9S	17-10090-1	Amphenol	Subject 20-72-11
	17-10090-1	WPI	Subject 20-72-11
	17-300-1	Amphenol	Subject 20-72-11
	17-300-1	WPI	Subject 20-72-11
	DEMA9S	ITT Cannon	Subject 20-72-12
	M24308/2-1	QPL	Subject 20-72-13

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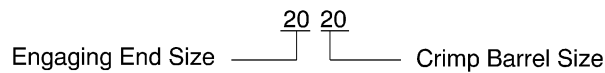
D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

B. Connector Description

The C()MA rectangular connectors have these properties:

- D subminiature rectangular configuration
- Metal shells
- Crimp type, rear release size 16 or size 20 pin contacts in the plug
- Crimp type, rear release size 16 or size 20 socket contacts in the receptacle
- Front release coax pin contacts in the plug
- Front release coax socket contacts in the receptacle
- Size 2018 special purpose contacts that cannot be removed.

C. Contact Part Numbers



EXAMPLE OF A STANDARD CONTACT SIZE
Figure 5

Table 4
STANDARD CONTACT PART NUMBERS

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	330-5291-000	ITT Cannon
			330-5291-037	ITT Cannon
			M39029/64-369	QPL
		Socket	031-1007-000	ITT Cannon
			031-1007-042	ITT Cannon
			M39029/63-368	QPL
16	16	Pin	M39029/58-364	QPL
		Socket	M39029/57-358	QPL

Table 5
STANDARD CONTACT COLOR CODES

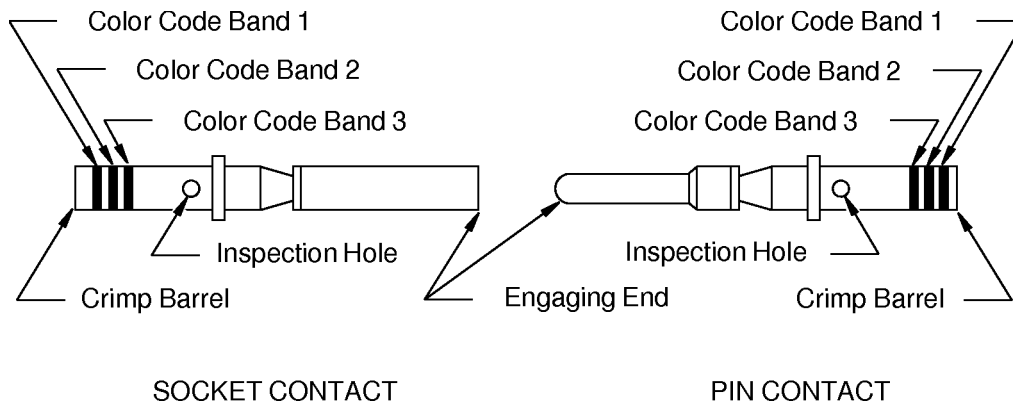
Contact	Color Code		
	Band 1	Band 2	Band 3
031-1007-000	-	-	-
031-1007-042	Orange	Blue	Gray
330-5291-000	-	-	-
330-5291-037	Orange	Blue	White
M39029/57-358	Orange	Green	Gray

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 5 (continued)

Contact	Color Code		
	Band 1	Band 2	Band 3
M39029/58-364	Orange	Blue	Yellow
M39029/63-368	Orange	Blue	Gray
M39029/64-369	Orange	Blue	White



STANDARD CONTACTS
Figure 6

Table 6
SPECIAL PURPOSE CONTACT PART NUMBERS

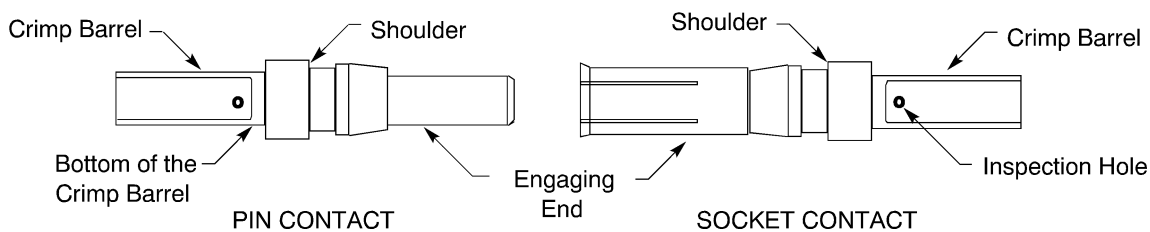
Contact Size		Contact Type	Part Number	Supplier	Conditions for Installation
Engaging End	Crimp Barrel				
20	18	Pin	CB008-5P	Cory Components	-
				Tri-Star	-
			330-5291-001	ITT Cannon	-
		Socket	CB005-5P	Cory Components	-
				Tri-Star	-
			CB009-5P	Cory Components	-
		Tri-Star	-		

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 6 (continued)

Contact Size		Contact Type	Part Number	Supplier	Conditions for Installation
Engaging End	Crimp Barrel				
08	16	Pin	CMP002-P103	Cory Components	Alignment Ring
			CMP002-P103	Tri-Star	Alignment Ring
		Socket	CMP002-S103	Cory Components	-
			CMP002-S103	Tri-Star	-
	12	Pin	CMP003-P103	Cory Components	Alignment Ring
			CMP003-P103	Tri-Star	Alignment Ring
		Socket	CMP003-S103	Cory Components	-
			CMP003-S103	Tri-Star	-
	08	Pin	CMP004-P103	Cory Components	Alignment Ring
			CMP004-P103	Tri-Star	Alignment Ring
		Socket	CMP004-S103	Cory Components	-
			CMP004-S103	Tri-Star	-



SPECIAL PURPOSE CONTACTS
Figure 7

Table 7
OBSOLETE SPECIAL PURPOSE CONTACT PART NUMBERS

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
CB008-5P	Cory Components	CB008-5P	Tri-Star
CB009-5P	Cory Components	CB009-5P	Tri-Star
CMP002-P103	Cory Components	CMP002-P103	Tri-Star
CMP002-S103	Cory Components	CMP002-S103	Tri-Star
CMP003-P103	Cory Components	CMP003-P103	Tri-Star
CMP003-S103	Cory Components	CMP003-S103	Tri-Star
CMP004-P103	Cory Components	CMP004-P103	Tri-Star

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 7 (continued)

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
CMP004-S103	Cory Components	CMP004-S103	Tri-Star

D. Coax Contact Part Numbers

Table 8
SIZE 8 COAX CONTACT PART NUMBERS

Configuration	Contact Type	Center Contact		Part Number	Applicable Coax Cable
		Type	Termination		
90 Degrees	Pin	Socket	Solder	CMX010-P502	BMS13-65 Type 0F
					S280W503-2
	Socket	Pin	Solder	CMX010-S502	BMS13-65 Type 0F
					S280W503-2
Straight	Pin	Socket	Solder	CMX006-P102	RG-174
					RG-188
					RG-316
	Socket	Pin	Solder	CMX006-S102E	RG-174
					RG-188
					RG-316
Straight	Pin	Socket	Crimp	CQMEM-200A	BMS13-65 Type 0F
					S280W503-2
	Socket	Pin	Crimp	CQMEF-200	BMS13-65 Type 0F
					S280W503-2
Straight	Pin	Socket	Crimp	CQMEM-316A	RG-316
					RG-179
	Socket	Pin	Crimp	CQMEF-316A	RG-316
					RG-179
Straight	Pin	Socket	Crimp	CQMEM-501D	BMS13-65 Type 0E
					S280W503-1
	Socket	Pin	Crimp	CQMEF-501D	BMS13-65 Type 0E
					S280W503-1

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 8 (continued)

Configuration	Contact Type	Center Contact		Part Number	Applicable Coax Cable
		Type	Termination		
Straight	Pin	Socket	Crimp	CQMEM-502	BMS13-65 Type 0F
	Socket	Pin	Crimp		CQMEF-502A
Straight	Pin	Socket	Crimp	CQMEM-503	BMS13-65 Type 0G
	Socket	Pin	Crimp		CQMEF-503

Table 9

SIZE 8 COAX CONTACT PART NUMBERS FOR SELECTED CONNECTORS

Connector	Contact			
	Type	Center Contact		Part Number
		Type	Termination	
CAMA11A1S	Pin	Socket	Solder	CMX006-P102
CAMA11Q1P	Pin	Socket	Crimp	CQMEM-501D
				CQMEM-502
CAMA11Q1S	Socket	Pin	Crimp	CQMEF-501D
				CQMEF-502A
CAMA11W1S-LF	Socket	Pin	Crimp	CQMEF-200
CAMA11W1S	Socket	Pin	Solder	CMX006-S102

Table 10

COAX CONTACT COLOR CODES

Contact	Color Code	
	Band 1	Band 2
CMX006-P102	-	-
CMX006-S102	-	-
CMX010-P202	-	-
CMX010-P502	-	-
CMX010-S202	-	-
CMX010-S502	-	-
CQMEF-200	Black	Black

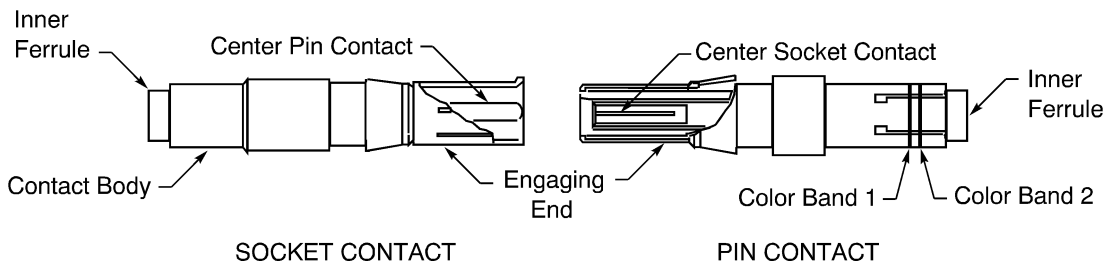
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STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 10 (continued)

Contact	Color Code	
	Band 1	Band 2
CQMEF-316A	-	-
CQMEF-501D	Brown	White
CQMEF-502A	White	White
CQMEF-503	-	-
CQMEM-200A	Black	Black
CQMEM-316A	-	-
CQMEM-501D	Brown	White
CQMEM-502	White	White
CQMEM-503	-	-



COAX CONTACTS
Figure 8

Table 11
OBsolete COAX CONTACT PART NUMBERS

Obsolete Coax Contact		Replacement Coax Contact	
Part Number	Supplier	Part Number	Supplier
CMX006-P102	Cory Components	CMX006-P102	Tri-Star
CMX006-S102	Cory Components	CMX006-S102E	Tri-Star
CMX010-P202	Cory Components	CMX010-P202	Tri-Star
CMX010-P502	Cory Components	CMX010-P502	Tri-Star
CMX010-S202	Cory Components	CMX010-S202	Tri-Star
CMX010-S502	Cory Components	CMX010-S502	Tri-Star
CQMEF-200	Cory Components	CQMEF-200	Tri-Star
CQMEF-316	Cory Components	CQMEF-316A	Tri-Star
CQMEF-501	Cory Components	CQMEF-501D	Tri-Star
CQMEF-502	Cory Components	CQMEF-502A	Tri-Star

20-72-10

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 11 (continued)

Obsolete Coax Contact		Replacement Coax Contact	
Part Number	Supplier	Part Number	Supplier
CQMEF-503	Cory Components	CQMEF-503	Tri-Star
CQMEM-200	Cory Components	CQMEM-200A	Tri-Star
CQMEM-316	Cory Components	CQMEM-316A	Tri-Star
CQMEM-501	Cory Components	CQMEM-501D	Tri-Star
CQMEM-502	Cory Components	CQMEM-502	Tri-Star
CQMEM-503	Cory Components	CQMEM-503	Tri-Star

E. Contact Alignment Ring Part Numbers

Table 12
CONTACT ALIGNMENT RING PART NUMBERS

Part Number	Supplier
CRA-1	Cory Components

Table 13
OBSOLETE CONTACT ALIGNMENT RING PART NUMBERS

Obsolete Alignment Ring		Replacement Alignment Ring	
Part Number	Supplier	Part Number	Supplier
CRA-1	Cory Components	CRA-1	Tri-Star

3. INSERT CONFIGURATIONS

A. Insert configurations for C()MA Connectors

NOTE: The contact cavity size that is specified in Table 14 is equivalent to the size of the engaging end of the contact.

NOTE: Figure 9 through Figure 24 show the rear face of an insert that has pin contacts. The view of the rear face of an insert that has socket contacts is the mirror image of this view.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

**Table 14
CONNECTOR INSERT CONFIGURATIONS**

Shell Size	Insert Configuration	Contact Cavity		Applicable Contact Type	Reference
		Count	Size		
A	11A1	10	20	Standard or Special Purpose	Figure 11
		1	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	
	11Q1	10	20	Standard or Special Purpose	Figure 11
		1	8	Special Purpose, CQME() Coax Except CQME()-200	
	11W1	10	20	Standard or Special Purpose	Figure 11
		1	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	
15	15	20	Standard or Special Purpose	Figure 12	
3W3	3	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	Figure 10	
B	15P5	10	20	Standard or Special Purpose	Figure 14
		5	16	Standard	
	21W1	20	20	Standard or Special Purpose	Figure 15
		1	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	
	25	25	20	Standard or Special Purpose	Figure 16
5W5	5	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	Figure 13	
C	17W5	12	20	Standard or Special Purpose	Figure 18
		5	8	Special Purpose or Coax	
	21WA4	17	20	Standard or Special Purpose	Figure 19
		4	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	
	25W3	22	20	Standard or Special Purpose	Figure 20
		3	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	
37	37	20	Standard or Special Purpose	Figure 21	
8W8	8	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	Figure 17	

STANDARD WIRING PRACTICES MANUAL

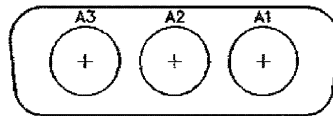
D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 14 (continued)

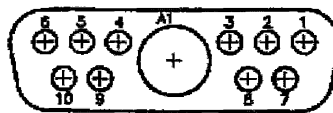
Shell Size	Insert Configuration	Contact Cavity		Applicable Contact Type	Reference
		Count	Size		
D	24W7	17	20	Standard or Special Purpose	Figure 22
		7	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	
	36W4	32	20	Standard or Special Purpose	Figure 23
		4	8	Special Purpose, CMX() Coax, or CQME()-200 Coax	
	50	50	20	Standard or Special Purpose	Figure 24
E	9	9	20	Standard or Special Purpose	Figure 9



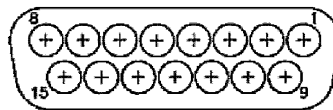
9 INSERT CONFIGURATION
Figure 9



3W3 INSERT CONFIGURATION
Figure 10



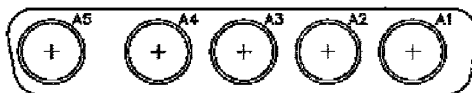
11A1, 11Q1 AND 11W1 INSERT CONFIGURATION
Figure 11



15 INSERT CONFIGURATION
Figure 12

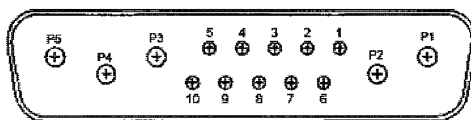
STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS



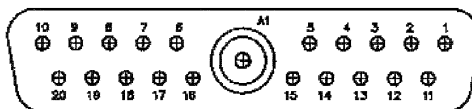
5W5 INSERT CONFIGURATION

Figure 13



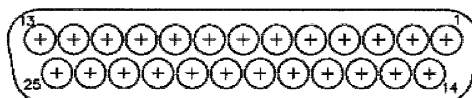
15P5 INSERT CONFIGURATION

Figure 14



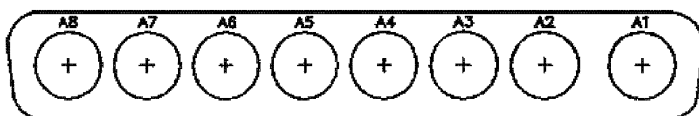
21W1 INSERT CONFIGURATION

Figure 15



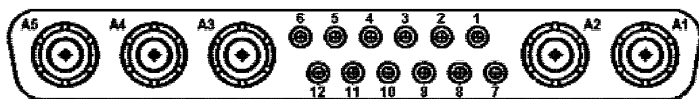
25 INSERT CONFIGURATION

Figure 16



8W8 INSERT CONFIGURATION

Figure 17

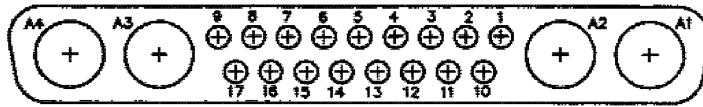


17W5 INSERT CONFIGURATION

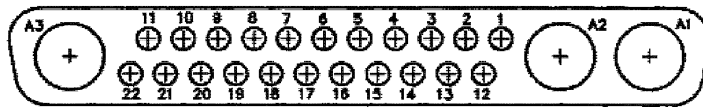
Figure 18

STANDARD WIRING PRACTICES MANUAL

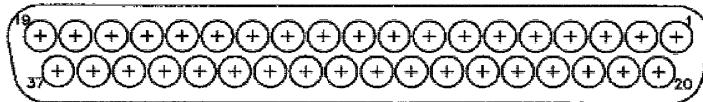
D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS



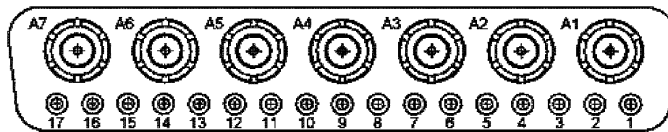
21WA4 INSERT CONFIGURATION
Figure 19



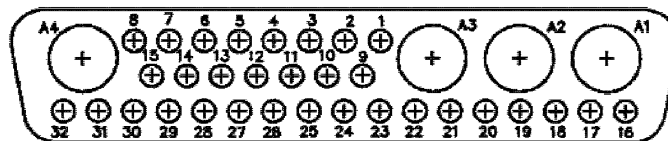
25W3 INSERT CONFIGURATION
Figure 20



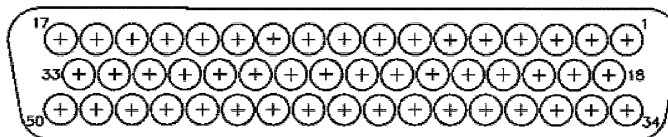
37 INSERT CONFIGURATION
Figure 21



24W7 INSERT CONFIGURATION
Figure 22



36W4 INSERT CONFIGURATION
Figure 23



50 INSERT CONFIGURATION
Figure 24

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

4. CONNECTOR DISASSEMBLY

A. Contact Removal

This paragraph gives the procedure to remove standard contacts.

For the procedure to remove coax contacts and special purpose contacts, refer to Paragraph 4.B..

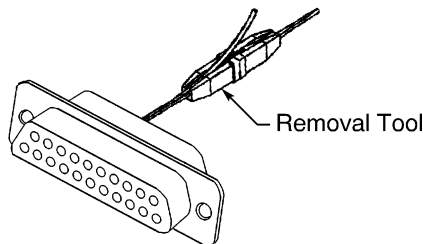
NOTE: Size 2018 special purpose contacts are not removable from the connector.

NOTE: The backshell must be removed from the connector before a contact can be removed.

**Table 15
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	
	Part Number	Color
20	6500-043-020-628	-
	6500-045-020	-
	CIET-20HD	White
	CET 20-11	-
	M24308/18-2	-
	M81969/1-02	-
	M81969/14-02	-
	MS18278-1	-
	MS27534-20	-
	NAS1664-20	-
16	M81969/14-03	-

- (1) Make a selection of a contact removal tool from Table 15.
- (2) Put the tip of the tool on the wire.
- (3) At the rear of the connector, axially align the tool and the contact cavity.
- (4) Carefully push the tool into the contact cavity until it stops. Refer to Figure 25.
Make sure that the tool stays aligned with the contact cavity.



POSITION OF THE REMOVAL TOOL IN THE CONTACT CAVITY

Figure 25

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Hold the wire against the tool.
- (6) Pull the tool and the wire out from the contact cavity at the same time.
Make sure that the tool stays aligned with the contact cavity.
- (7) If the contact is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (2) through Step (6) again.

B. Removal of Size 8 Special Purpose Contacts and Size 8 Coax Contacts

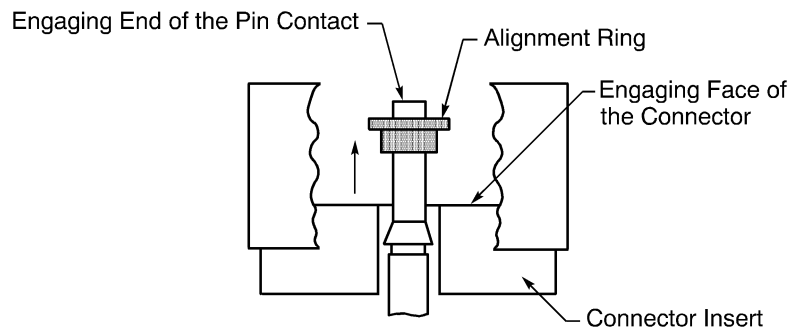
NOTE: Size 2018 special purpose contacts are not removable from the connector.

**Table 16
CONTACT REMOVAL TOOLS**

Contact Cavity Size	Removal Tool
08	DRK38

NOTE: The backshell must be removed from the connector before the contacts can be removed.

- (1) For a size 0808, 0812, 0816 pin contact, or a size 8 coax pin contact, remove the alignment ring from the contact at the front of the connector. Refer to Figure 26.

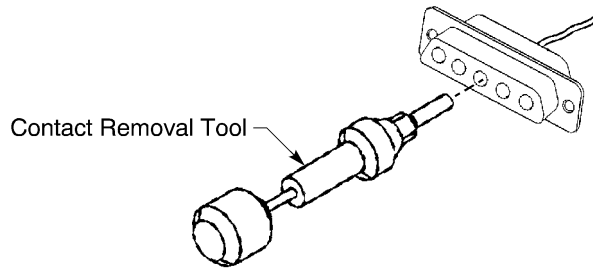


**REMOVAL OF THE ALIGNMENT RING
Figure 26**

- (2) Make a selection of a contact removal tool from Table 16.
- (3) At the front of the connector, axially align the tool with the engaging end of the contact. Refer to Figure 27.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

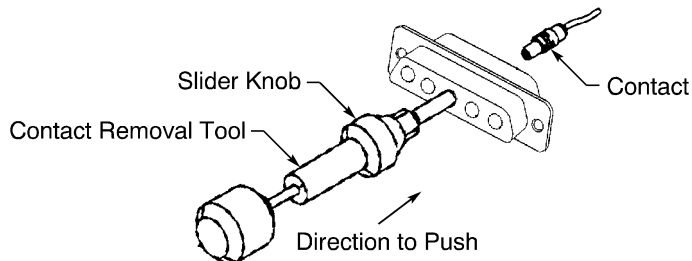


ALIGNMENT OF THE REMOVAL TOOL AND THE CONTACT
Figure 27

- (4) Put the tip of the tool on the contact.
- (5) Push the tool forward until the first mark on the tool is aligned with the front face of the connector.

CAUTION: IF THE REMOVAL TOOL IS PUSHED FARTHER THAN THE SPECIFIED MARK, DAMAGE TO THE RETENTION CLIPS OF THE CONTACT CAN OCCUR.

- (6) Hold the tool and the connector tightly in position.
- (7) Push the slider knob forward to release the contact. Refer to Figure 28.



OPERATION OF THE REMOVAL TOOL SLIDER KNOB
Figure 28

- (8) From the rear of the connector, carefully pull the cable or the contact crimp barrel.

5. CONTACT ASSEMBLY

A. Contact Assembly

This paragraph gives the procedure to assemble standard contacts.

For the procedure to assemble:

- Special purpose contacts, refer to Paragraph 5.B.
- Coax contacts, refer to Paragraph 5.C.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

**Table 17
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
26	20	0.40	± 0.03	Fold back conductor
24	20	0.20	± 0.03	-
22	20	0.20	± 0.03	-
20	20	0.20	± 0.03	-
16	16	0.20	± 0.03	-

**Table 18
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact		Crimp Tool		
	Crimp Barrel Size	Type	Basic Unit		Locator
			Part Number	Setting	
26	20	Pin	AFM 8	6	K41
				6	M22520/2-06
			M22520/2-01	6	K41
				6	M22520/2-06
			WA22	6	K41
				6	M22520/2-06
		WA22LC	6	K41	
			6	M22520/2-06	
		Socket	AFM 8	6	K41
				6	M22520/2-06
			M22520/2-01	6	K41
				6	M22520/2-06
			WA22	6	K41
				6	M22520/2-06
WA22LC	6		K41		
	6		M22520/2-06		

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 18 (continued)

Wire Size (AWG)	Contact		Crimp Tool		
	Crimp Barrel Size	Type	Basic Unit		Locator
			Part Number	Setting	
24	20	Pin	AFM 8	5	K13-1
				5	M22520/2-06
			M22520/2-01	5	K13-1
				5	M22520/2-06
			MS3191-1	-	P20-3191-1
			ST2220-1-Y	-	11697-1
				-	ST2220-1-43
			WA22	5	K13-1
				5	M22520/2-06
			WA22AP	5	KAP13-1
			WA22LC	5	K13-1
				5	M22520/2-06
		Socket	AFM 8	5	K13-1
				5	M22520/2-06
			M22520/2-01	5	K13-1
				5	M22520/2-06
			MS3191-1	-	P20-3191-1
			ST2220-1-Y	-	11697-1
				-	ST2220-1-43
			WA22	5	K13-1
				5	M22520/2-06
			WA22AP	5	KAP13-1
			WA22LC	5	K13-1
				5	M22520/2-06

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 18 (continued)

Wire Size (AWG)	Contact		Crimp Tool		
	Crimp Barrel Size	Type	Basic Unit		Locator
			Part Number	Setting	
22	20	Pin	AFM 8	6	K13-1
				6	M22520/2-06
			M22520/2-01	6	K13-1
				6	M22520/2-06
			MS3191-1	-	P20-3191-1
			ST2220-1-Y	-	11697-1
				-	ST2220-1-43
			WA22	6	K13-1
				6	M22520/2-06
			WA22AP	6	KAP13-1
			WA22LC	6	K13-1
				6	M22520/2-06
		Socket	AFM 8	6	K13-1
				6	M22520/2-06
			M22520/2-01	6	K13-1
				6	M22520/2-06
			MS3191-1	-	P20-3191-1
			ST2220-1-Y	-	11697-1
				-	ST2220-1-43
			WA22	6	K13-1
				6	M22520/2-06
			WA22AP	6	KAP13-1
			WA22LC	6	K13-1
				6	M22520/2-06

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 18 (continued)

Wire Size (AWG)	Contact		Crimp Tool			
	Crimp Barrel Size	Type	Basic Unit		Locator	
			Part Number	Setting		
20	20	Pin	AFM 8	7	K13-1	
				7	M22520/2-08	
			M22520/2-01	7	K13-1	
				7	M22520/2-08	
			MS3191-1	-	P20-3191-1	
			ST2220-1-Y	-	11697-1	
				-	ST2220-1-43	
			WA22	7	K13-1	
				7	M22520/2-08	
			WA22AP	7	KAP13-1	
			WA22LC	7	K13-1	
				7	M22520/2-08	
			Socket	AFM 8	7	K13-1
					7	M22520/2-08
	M22520/2-01	7		K13-1		
		7		M22520/2-08		
	MS3191-1	-		P20-3191-1		
	ST2220-1-Y	-		11697-1		
		-		ST2220-1-43		
	WA22	7		K13-1		
		7		M22520/2-08		
	WA22AP	7		KAP13-1		
	WA22LC	7	K13-1			
		7	M22520/2-08			
16	Pin	M22520/1-01	4	M22520/1-01		
		WA27F	4	M22520/1-01		
	Socket	M22520/1-01	4	M22520/1-01		
		WA27F	4	M22520/1-01		

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D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

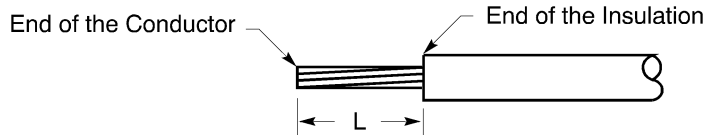
Table 18 (continued)

Wire Size (AWG)	Contact		Crimp Tool		
	Crimp Barrel Size	Type	Basic Unit		Locator
			Part Number	Setting	
18	16	Pin	M22520/1-01	5	M22520/1-01
			WA27F	5	M22520/1-01
		Socket	M22520/1-01	5	M22520/1-01
			WA27F	5	M22520/1-01
16	16	Pin	M22520/1-01	6	M22520/1-01
			WA27F	6	M22520/1-01
		Socket	M22520/1-01	6	M22520/1-01
			WA27F	6	M22520/1-01

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 29
- Table 17 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



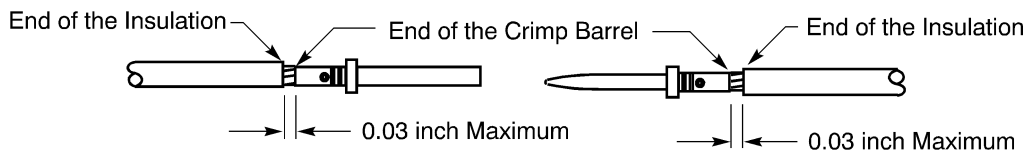
WIRE PREPARATION
Figure 29

(2) Make a selection of a crimp tool from Table 18.

(3) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the end of the crimp barrel. Refer to Figure 30.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 30

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D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

(4) Crimp the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

B. Special Purpose Contact Assembly

**Table 19
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
20	16	0.28	± 0.02
18	18	0.25	± 0.02
18	16	0.28	± 0.02
16	16	0.28	± 0.02
14	12	0.28	± 0.02
12	12	0.28	± 0.02
10	8	0.28	± 0.02
8	8	0.28	± 0.02

**Table 20
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
20	16	M309	1	TP884
18	18	M22520/2-01	8	K250
18	16	M309	2	TP884
16	16	M309	3	TP884
14	12	M309	3	TP884
12	12	M309	4	TP884
		WA27-309-EP	4	TP884
10	8	M309	5	TP884
8	8	M309	6	TP884
		WA27-309-EP	6	TP884

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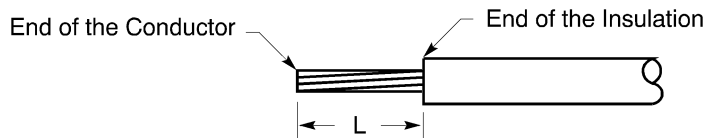
**Table 21
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem
	PLF 100	Plastronic

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 31
- Table 19 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



**WIRE PREPARATION
Figure 31**

(2) Make a selection of a crimp tool from Table 20.

(3) For a size 8 contact, make a selection of 0.5 to 0.75 inch length of heat shrinkable sleeve from Table 21.

NOTE: For equivalent heat shrinkable sleeves, refer to Subject 20-00-11.

(a) Put the sleeve on the wire.

(4) For a 330-5291-001 contact, make a selection of a 0.75 ± 0.12 inch length of heat shrinkable sleeve from Table 21.

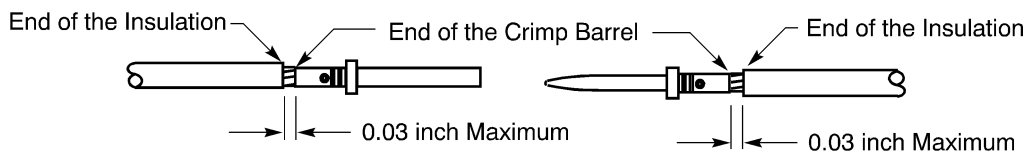
NOTE: For equivalent heat shrinkable sleeves, refer to Subject 20-00-11.

(a) Put the sleeve on the wire.

(5) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the end of the crimp barrel. Refer to Figure 32.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



**POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 32**

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STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

(6) Crimp the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

(7) For a size 8 contact, install the contact. Refer to Paragraph 6.B.

(a) Move the sleeve forward until the distance from the edge of the sleeve the edge of the connector is 0.06 inch.

(b) Shrink the sleeve into its position. Refer to Subject 20-10-14.

(8) For a 330-5291-001 contact, move the sleeve forward until the forward end of the sleeve is aligned with the forward end of the contact crimp barrel.

Make sure that the sleeve makes a 100 percent overlap with the contact crimp barrel.

(a) Shrink the sleeve into its position. Refer to Subject 20-10-14.

Make sure that the sleeve makes a 100 percent overlap with the contact crimp barrel.

(b) Install the contact in the connector. Refer to Paragraph 6.B.

NOTE: Size 2018 special purpose contacts are not removable from the connector.

C. Coax Contact Assembly

This paragraph gives the procedure to assemble these coax contacts:

- CQME()-200
- CQME()-316
- CQME()-501
- CQME()-502.

For the procedure to assemble:

- CMX006-() contacts, refer to Paragraph 5.D.
- CMX010-() contacts, refer to Paragraph 5.E.

**Table 22
COAX CONTACT CENTER CONTACT CRIMP TOOLS**

Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
CQMEF-200	M22520/2-01	5	M22520/2-14
	WA22	5	M22520/2-14
	WA22LC	5	M22520/2-14
CQMEF-200A	M22520/2-01	5	M22520/2-14
	WA22	5	M22520/2-14
	WA22LC	5	M22520/2-14

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 22 (continued)

Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
CQMEF-316	M22520/2-01	1	M22520/2-03
	WA22	1	M22520/2-03
	WA22LC	1	M22520/2-03
CQMEF-316A	M22520/2-01	1	M22520/2-03
	WA22	1	M22520/2-03
	WA22LC	1	M22520/2-03
CQMEF-501A	M22520/2-01	6	M22520/2-14
	WA22	6	M22520/2-14
	WA22LC	6	M22520/2-14
CQMEF-501B	M22520/2-01	6	M22520/2-14
	WA22	6	M22520/2-14
	WA22LC	6	M22520/2-14
CQMEF-501C	M22520/2-01	6	M22520/2-14
	WA22	6	M22520/2-14
	WA22LC	6	M22520/2-14
CQMEF-501D	M22520/2-01	6	M22520/2-14
	WA22	6	M22520/2-14
	WA22LC	6	M22520/2-14
CQMEF-502A	M22520/2-01	5	M22520/2-14
	WA22	5	M22520/2-14
	WA22LC	5	M22520/2-14
CQMEM-200	M22520/2-01	4	M22520/2-06
	WA22	4	M22520/2-06
	WA22LC	4	M22520/2-06
CQMEM-200A	M22520/2-01	4	M22520/2-06
	WA22	4	M22520/2-06
	WA22LC	4	M22520/2-06
CQMEM-316	M22520/2-01	1	M22520/2-03
	WA22	1	M22520/2-03
	WA22LC	1	M22520/2-03

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D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 22 (continued)

Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
CQMEM-316A	M22520/2-01	1	M22520/2-03
	WA22	1	M22520/2-03
	WA22LC	1	M22520/2-03
CQMEM-501	M22520/2-01	6	M22520/2-06
	WA22	6	M22520/2-06
CQMEM-501A	WA22	6	M22520/2-06
	WA22LC	6	M22520/2-06
CQMEM-501B	WA22	6	M22520/2-06
	WA22LC	6	M22520/2-06
CQMEM-501C	WA22	6	M22520/2-06
	WA22LC	6	M22520/2-06
CQMEM-501D	WA22	6	M22520/2-06
	WA22LC	6	M22520/2-06
CQMEM-502	M22520/2-01	6	M22520/2-06
	WA22	6	M22520/2-06
	WA22LC	6	M22520/2-06

**Table 23
COAX CONTACT BODY CRIMP TOOLS**

Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
CQMEF-200	M22520/5-01	M22520/5-41	B
CQMEF-200A	M22520/5-01	M22520/5-41	B
CQMEF-316	M22520/5-01	M22520/5-39	B
CQMEF-316A	M22520/5-01	M22520/5-41	B
CQMEF-501B	M22520/5-01	M22520/5-39	B
CQMEF-501C	M22520/5-01	M22520/5-39	B
CQMEF-501D	M22520/5-01	M22520/5-39	B
CQMEF-502A	M22520/5-01	M22520/5-41	B
CQMEM-200	M22520/5-01	M22520/5-41	B

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D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

Table 23 (continued)

Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
CQMEM-200A	M22520/5-01	M22520/5-41	B
CQMEM-316	M22520/5-01	M22520/5-39	B
CQMEM-316A	M22520/5-01	M22520/5-41	B
CQMEM-501	M22520/5-01	M22520/5-39	B
CQMEM-501A	M22520/5-01	M22520/5-39	B
CQMEM-501B	M22520/5-01	M22520/5-39	B
CQMEM-501C	M22520/5-01	M22520/5-39	B
CQMEM-501D	M22520/5-01	M22520/5-39	B
CQMEM-502	M22520/5-01	M22520/5-41	B

**Table 24
NECESSARY MATERIALS**

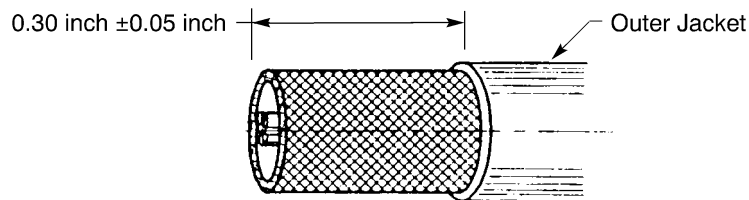
Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem
	PLF 100	Plastronic
	RW-175	Raychem

- (1) Make a selection of a center contact crimp tool from Table 22.
- (2) Make a selection of a contact body crimp tool from Table 23.
- (3) Make a selection of a 3/16 inch diameter heat shrinkable sleeve from Table 24.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (4) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
- (5) Put a 1.75 inch \pm 0.13 inch length of the heat shrinkable sleeve on the cable.
- (6) Remove 0.30 inch \pm 0.05 inch of the outer jacket from the end of the cable. Refer to Figure 33.

CAUTION: DAMAGE TO THE SHIELD, THE DIELECTRIC, OR THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

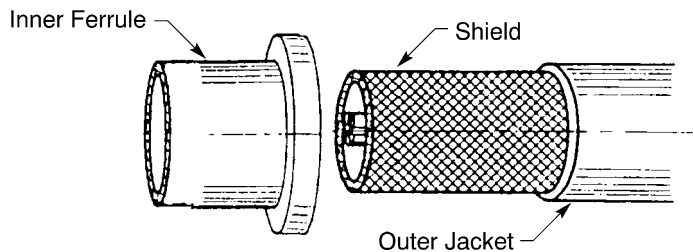


**OUTER JACKET REMOVAL LENGTH
Figure 33**

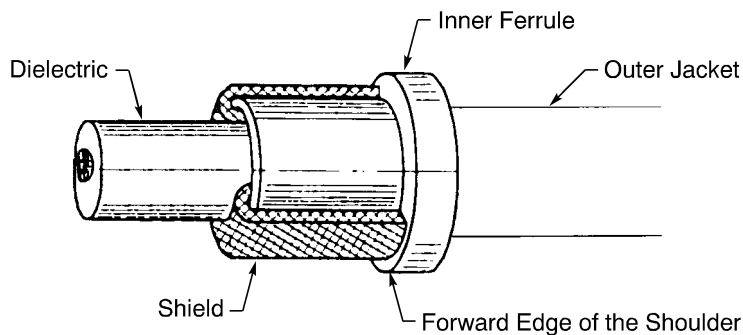
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STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS**

- (7) Align the inner ferrule and the end of the cable. Refer to Figure 34.

**ALIGNMENT OF THE INNER FERRULE AND THE END OF THE CABLE****Figure 34**

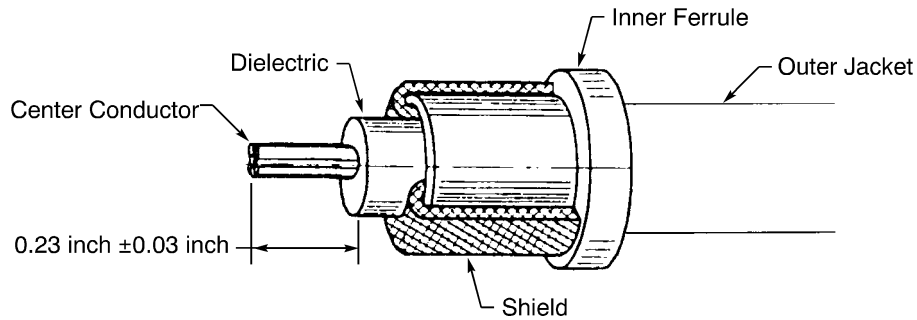
- (8) Push the inner ferrule rearward until the shoulder of the ferrule is against the end of the outer jacket.
- (9) If the cable has a flat conductor outer shield and a round conductor inner shield, cut the flat conductor shield at the forward edge of the inner ferrule.
- (10) Fold the shield back on the outer surface of the inner ferrule.
Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.
- (11) Cut the strands of the shield at the forward edge of the shoulder of the inner ferrule. Refer to Figure 35.

**POSITION OF THE SHIELD ON THE INNER FERRULE****Figure 35**

- (12) Remove 0.23 inch \pm 0.03 inch of the dielectric from the end of the cable. Refer to Figure 36.

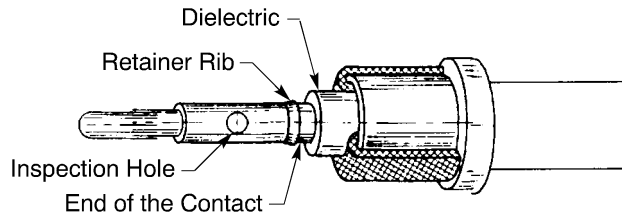
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DIELECTRIC REMOVAL
Figure 36

- (13) If all of the strands of the center conductor are not together, twist the strands together in their initial direction.
- (14) Push the center conductor into the crimp barrel of the center contact until the end of the dielectric is against the end of the center contact. Refer to Figure 37.
Make sure that the strands of the conductor can be seen in the inspection hole.

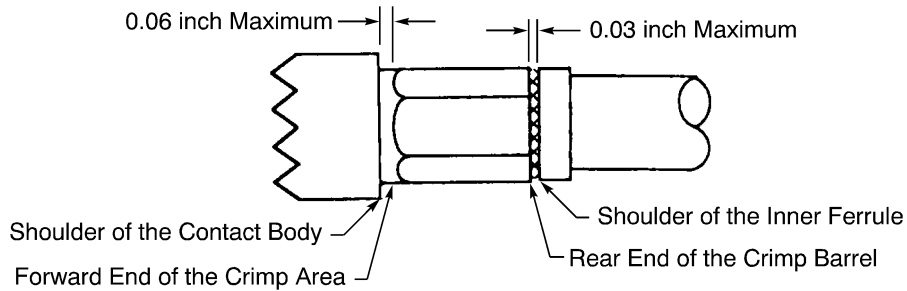


POSITION OF THE CENTER CONTACT ON THE CENTER CONDUCTOR
Figure 37

- (15) Crimp the center contact.
- (16) Put the contact body on the center contact.
- (17) Push the center contact into the contact body until the retainer rib of the center contact is locked in the contact body.
- (18) Lightly pull the cable to make sure that the center contact is locked in the contact body.
- (19) If the center contact is not locked in the contact body, do Step (17) and Step (18) again.
- (20) Put the contact in the crimp die.
Make sure that the rear end of the contact is aligned with the edge of the crimp die.
- (21) Crimp the contact body. Refer to Figure 38.
Make sure that the distance from:
 - The forward end of the crimp area to the shoulder of the contact body is not more than 0.06 inch
 - The rear end of the crimp barrel to the shoulder of the inner ferrule is not more than 0.03 inch.

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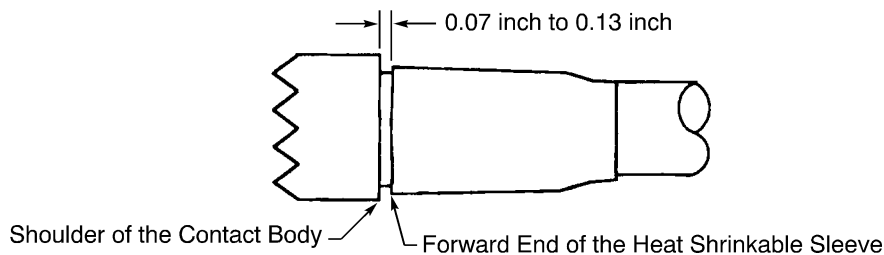
D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS



POSITION OF THE CONTACT BODY

Figure 38

- (22) Remove the unwanted length of the strands of the shield.
Make sure that the end of the shield is aligned with the rear end of the contact body.
- (23) Push the heat shrinkable sleeve forward until the forward end of the sleeve is 0.07 inch to 0.13 inch from the shoulder of the contact body. Refer to Figure 39.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONTACT ASSEMBLY

Figure 39

- (24) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. CMX006-() Coax Contact Assembly

**Table 25
COAX FERRULE CRIMP TOOLS**

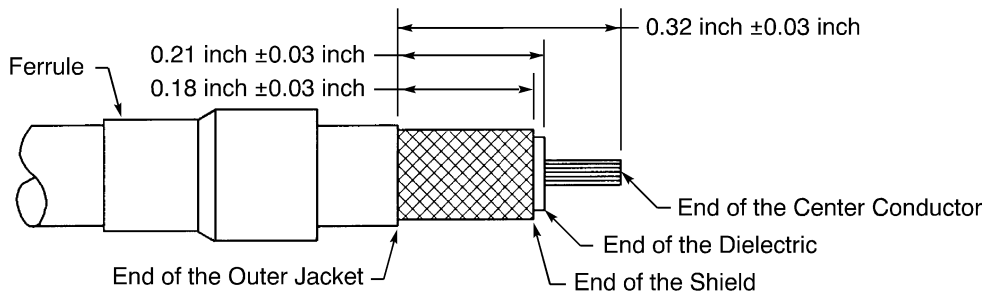
Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
CMX006-()	M22520/5-01	M22520/5-03	A
		M22520/5-08	-
		M22520/5-35	B
		Y119	B

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D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

**Table 26
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem
	PLF 100	Plastronic
	RW-175	Raychem



**COAX CABLE PREPARATION
Figure 40**

- (1) Make a selection of a contact body crimp tool from Table 25.
 - (2) Make a selection of a 3/16 inch diameter heat shrinkable sleeve from Table 26.
- NOTE:** For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (3) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (4) Put a 1.5 inch ±0.1 inch length of the heat shrinkable sleeve on the cable.
 - (5) Put the ferrule on the cable.
 - (6) Remove 0.32 inch ±0.03 inch of the outer jacket from the end of the cable. Refer to Figure 40.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.

- (7) Remove the necessary length of shield to make the distance from the end of the outer jacket to the end of the shield equal to 0.18 inch ±0.03 inch.

CAUTION: DO NOT MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (8) Remove the necessary length of dielectric to make the distance from the end of the outer jacket to the end of the dielectric equal to 0.21 inch ±0.03 inch.

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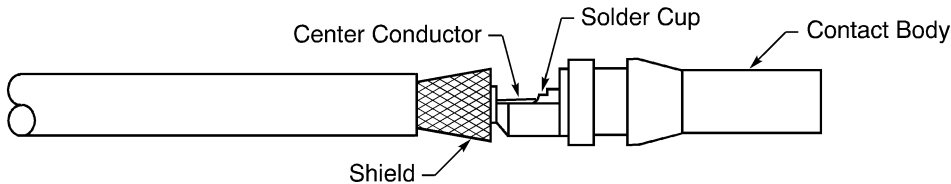
CAUTION: DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (9) Tin these components of the contact cavity:
 - The center conductor
 - The contact solder cup.
- (10) Open the end of the shield.

Make sure that the shield strands are not moved apart.
- (11) Push the contact body on the end of the wire until the dielectric is against the end of the solder cup. Refer to Figure 41.

Make sure that:

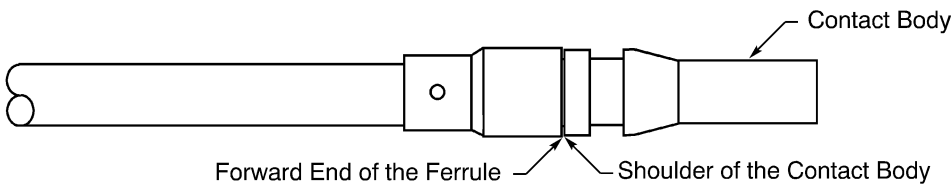
 - The crimp barrel is between the dielectric and the shield
 - All of the strands of the center conductor are in the center contact solder cup.



POSITION OF THE CENTER CONDUCTOR IN THE SOLDER CUP
Figure 41

- (12) Solder the end of the center conductor in the solder cup.
- (13) Push the shield against the crimp barrel.

Make sure that the strands of the shield are symmetrical around the circumference of the crimp barrel.
- (14) Push the ferrule forward on the shield until the forward end of the ferrule is against the shoulder of the contact body. Refer to Figure 42.



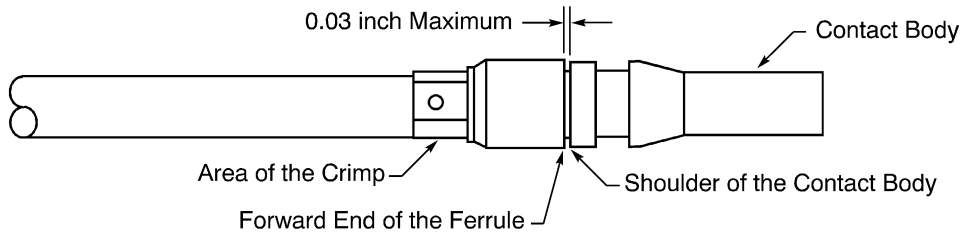
POSITION OF THE FERRULE AND THE CONTACT BODY
Figure 42

- (15) Crimp the ferrule. Refer to Figure 43.

Make sure that the distance from the forward end of the ferrule to the shoulder of the contact body is less than 0.03 inch.

STANDARD WIRING PRACTICES MANUAL

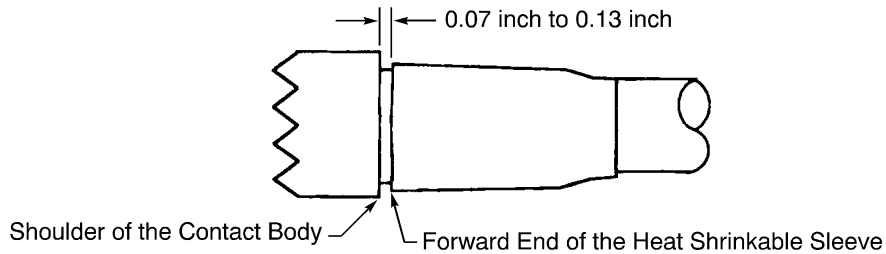
D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS



POSITION OF THE FERRULE CRIMP

Figure 43

- (16) Push the heat shrinkable sleeve forward until the forward end of the sleeve is 0.07 inch to 0.13 inch from the shoulder of the contact body. Refer to Figure 44.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONTACT ASSEMBLY

Figure 44

- (17) Shrink the sleeve into its position. Refer to Subject 20-10-14.

E. CMX010-() Coax Contact Assembly

**Table 27
COAX FERRULE CRIMP TOOLS**

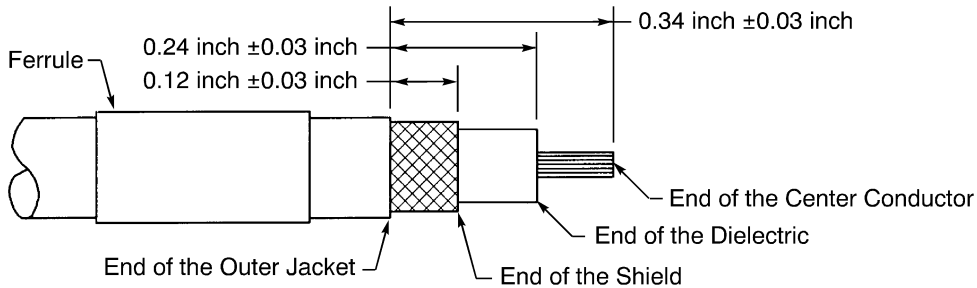
Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
CMX010-()	M22520/5-01	M22520/5-39	B
		Y139	B

**Table 28
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem
	PLF 100	Plastronic
	RW-175	Raychem

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C(M)A AND CORY C(M)A CONNECTORS



COAX CABLE PREPARATION
Figure 45

- (1) Make a selection of a contact body crimp tool from Table 27.
 - (2) Make a selection of a 3/16 inch diameter heat shrinkable sleeve from Table 28.
- NOTE:** For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (3) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
 - (4) Put the ferrule on the cable.
 - (5) Put a 1.5 inch \pm 0.1 inch length of the heat shrinkable sleeve on the cable.
 - (6) Remove 0.34 inch \pm 0.03 inch of the outer jacket from the end of the cable. Refer to Figure 45.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY CABLE PERFORMANCE OF THE CABLE.

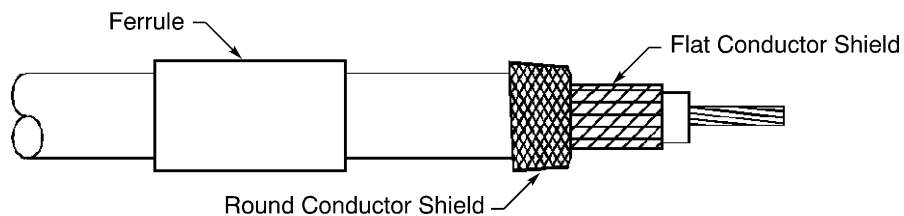
- (7) Remove the necessary length of shield to make the distance from the end of the outer jacket to the end of the shield equal to 0.12 inch \pm 0.03 inch.

CAUTION: DO NOT MAKE A NICK IN THE INNER DIELECTRIC. DAMAGE TO THE DIELECTRIC CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (8) Remove the necessary length of dielectric to make the distance from the end of the outer jacket to the end of the dielectric equal to 0.24 inch \pm 0.03 inch.

CAUTION: DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (9) Fold the round conductor shield back on the outer jacket. Refer to Figure 46.



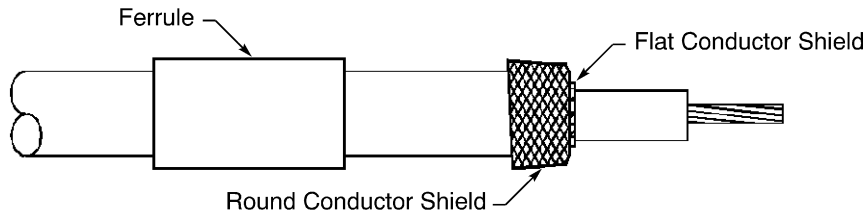
ROUND CONDUCTOR SHIELD FOLDED BACK
Figure 46

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

- (10) If the cable has two shields, remove the length of flat conductor shield that extends farther than the end of the folded back edge of the round conductor shield. Refer to Figure 47.

Make sure that the edge of the flat conductor shield is aligned with the folded back edge of the round shield.



FLAT CONDUCTOR SHIELD REMOVAL

Figure 47

- (11) Tin these components of the contact cavity:

- The center conductor
- The contact solder cup.

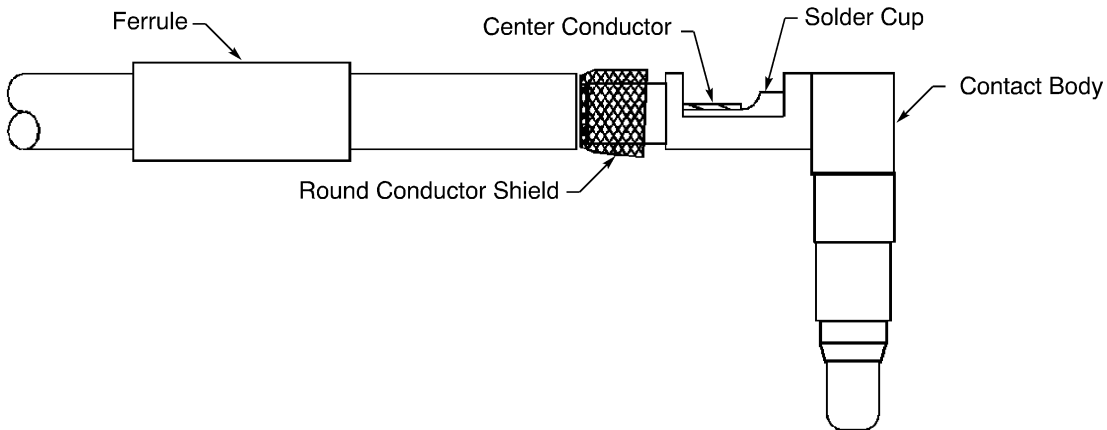
- (12) Open the end of the round conductor shield.

Make sure that the shield strands are not moved apart.

- (13) Push the contact body on the end of the wire until the dielectric is against the end of the solder cup. Refer to Figure 48.

Make sure that:

- The crimp barrel is between the dielectric and the shield
- All of the strands of the center conductor are in the center contact solder cup.



POSITION OF THE CENTER CONDUCTOR IN THE SOLDER CUP

Figure 48

- (14) Solder the end of the center conductor in the solder cup.

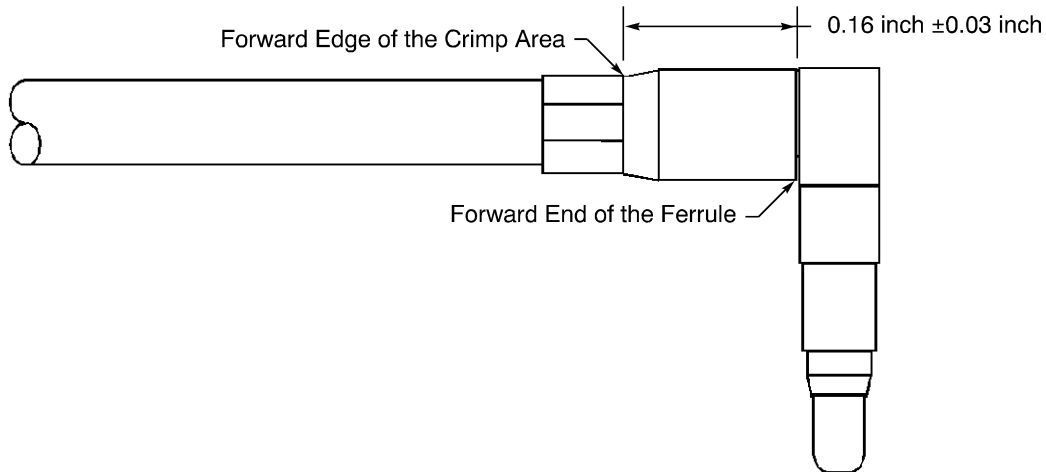
- (15) Push the shield against the crimp barrel.

Make sure that the strands of the shield are symmetrical around the circumference of the crimp barrel.

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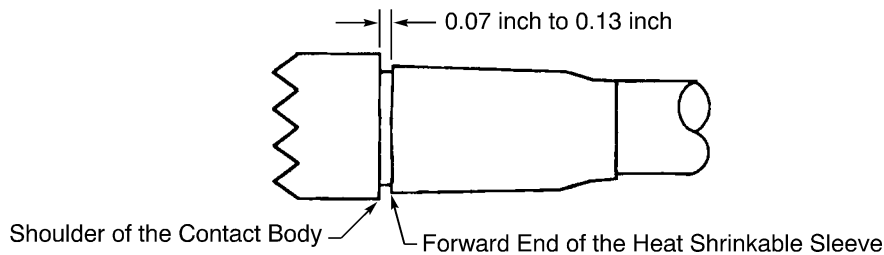
D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

- (16) Move the ferrule forward until the forward end of the ferrule is against the shoulder of the contact body.
- (17) Crimp the ferrule. Refer to Figure 49.
Make sure that the distance from the forward edge of the crimp area to the forward end of the ferrule is 0.16 inch \pm 0.03 inch.



POSITION OF THE FERRULE AND THE CONTACT BODY
Figure 49

- (18) Push the heat shrinkable sleeve forward until the forward end of the sleeve is 0.07 inch to 0.13 inch from the shoulder of the contact body. Refer to Figure 50.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONTACT ASSEMBLY
Figure 50

- (19) Shrink the sleeve into its position. Refer to Subject 20-10-14.

6. CONNECTOR ASSEMBLY

A. Contact Insertion

This paragraph gives the procedure to install standard contacts.

For the procedure to install coax contacts and special purpose contacts, refer to Paragraph 6.B..

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector. Refer to Paragraph 6.D.

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D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS

- (1) If a backshell is specified, put the backshell on the wire harness.
Make sure that the cable clamp points rearward on the wire harness.
- (2) Axially align the contact assembly and the contact cavity at the rear of the connector.
NOTE: A tool is not necessary for the insertion of a contact assembly.
- (3) Carefully push the contact assembly into the contact cavity until it stops.
- (4) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (5) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (1) through Step (3) again.

B. Insertion of Special Purpose Contacts and Coax Contacts

**Table 29
SPECIAL PURPOSE CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool
16	ST2220-2-4
12	ST2220-2-5
08	ST2220-2-5

**Table 30
COAX CONTACT INSERTION TOOLS**

Contact Size	Contact Type	Insertion Tool
8	Pin	ST2220-2-5
8	Socket	ST2220-2-5

**Table 31
CONTACT ALIGNMENT RING INSTALLATION TOOLS**

Contact Size	Contact Type	Installation Tool
8	Pin	M81969/14-04

STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS**

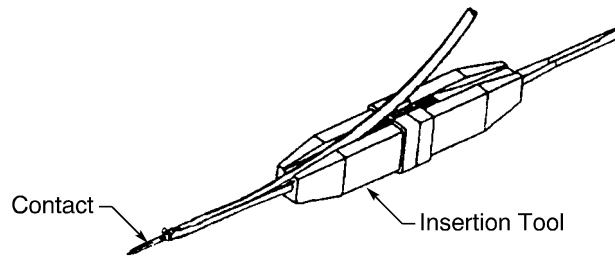
(1) Make a selection of a contact insertion tool from:

- Table 29 for a special purpose contact
- Table 30 for a coax contact.

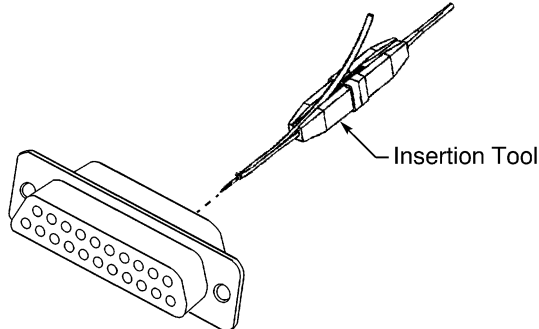
NOTE: A contact insertion tool is not necessary for the installation of:

- A size 8 coax contact assembly
- A size 8 contact assembly.

(2) Put the contact assembly in the insertion tool. Refer to Figure 51.

**POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL****Figure 51**

(3) At the rear of the connector, axially align the contact assembly, the insertion tool, and the contact cavity. Refer to Figure 52.

**ALIGNMENT OF THE CONTACT ASSEMBLY, THE INSERTION TOOL, AND THE CONTACT CAVITY****Figure 52**

(4) Carefully push the tool into the contact cavity until it stops.

If a tool is not used, carefully push the contact assembly into the contact cavity until it stops.

Make sure that the tool and the contact stay aligned with the contact cavity.

STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS**

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

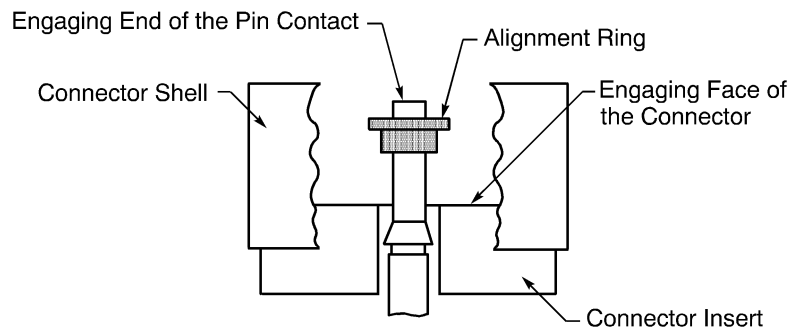
CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) If an installation tool is used, carefully pull the tool from the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

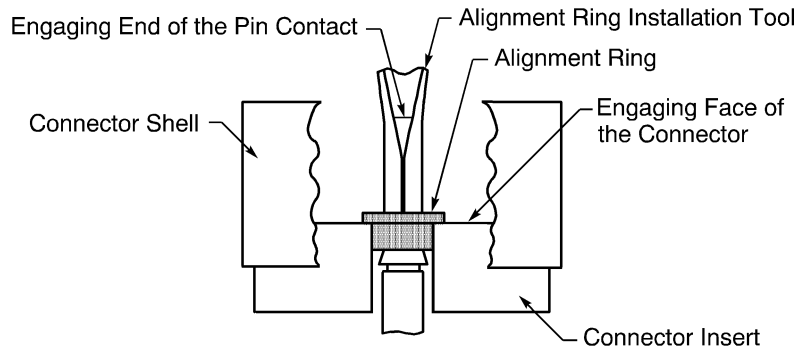
- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the cavity.
 - (b) Do Step (2) through Step (6) again.
- (8) For a size 8 coax pin contact or a size 8 pin contact:
 - (a) Make a selection of a contact alignment ring from Table 12.
 - (b) Make a selection of a contact alignment ring installation tool from Table 31.
 - (c) Put the alignment ring on the engaging end of the contact. Refer to Figure 53.

**INITIAL POSITION OF THE ALIGNMENT RING****Figure 53**

- (d) Put the end of the alignment ring installation tool on the engaging end of the contact.
- (e) Push the alignment ring forward to the engaging face of the connector. Refer to Figure 54.

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POSITION OF THE ALIGNMENT RING AGAINST THE FACE OF THE CONNECTOR
Figure 54

(f) Remove the tool from the engaging end of the contact.

C. Seal of an Empty Contact Cavity

For environmental connectors, an empty contact cavity must be sealed with a seal rod or a seal plug. Refer to Figure 4 and Subject 20-60-08.

D. Backshell Assembly

(1) If a backshell is specified, assemble the backshell. Refer to Subject 20-72-08.

E. Connector Installation Hardware Assembly

(1) If a backshell is not specified, assemble the connector installation hardware. Refer to Subject 20-72-07.

NOTE: If a backshell is specified, the connector installation hardware is assembled when the backshell is assembled. Refer to Paragraph 6.D.

7. CONNECTOR INSTALLATION

A. Connector Installation in a Panel

For installation of a connector:

- With a backshell, installation in a panel occurs when the backshell is assembled. Refer to Paragraph 6.D.
- Without a backshell, the installation in a panel occurs when the connector installation hardware is assembled. Refer to Paragraph 6.E.

B. Connection of the Plug and the Receptacle

Table 32
NECESSARY TOOLS

Tool	Type
Screwdriver	Flat Tip

(1) For connectors with jackscrew and jackpost installation hardware:

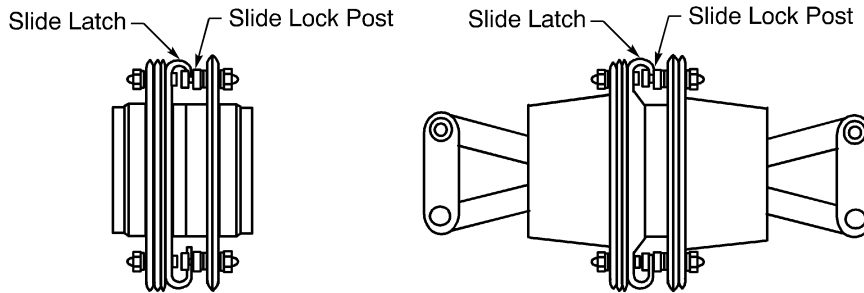
- (a) Make a selection of a tool from Table 32.
- (b) Align the engaging face of the plug with the engaging face of the receptacle.

STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: TRI-STAR C()MA AND CORY C()MA CONNECTORS**

- (c) Push the plug into the receptacle.
Make sure that connectors are fully engaged.
 - (d) Put each jackscrew in the applicable jackpost.
 - (e) Turn one jackscrew clockwise two or three turns.
 - (f) Turn the other jackscrew clockwise two or three turns.
 - (g) Do Step (e) and Step (f) again until the jackscrews are fully engaged.
 - (h) Tighten each jackscrew.
- (2) For connectors with male and female screw lock installation hardware:
- (a) Make a selection of a tool from Table 32.
 - (b) Align the engaging face of the plug with the engaging face of the receptacle.
 - (c) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (d) Put each screw in the applicable female screw lock.
 - (e) Turn one screw clockwise two or three turns.
 - (f) Turn the other screw clockwise two or three turns.
 - (g) Do Step (e) and Step (f) again until the screws are fully engaged.
 - (h) Tighten each jackscrew.
- (3) For connectors with spring plate and spring latch plate installation hardware:
- (a) Align the engaging face of the plug with the engaging face of the receptacle.
 - (b) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (c) Engage each spring with the applicable spring latch plate.
- (4) For connectors with slide latch and slide lock post installation hardware:
- (a) Align the engaging face of the plug with the engaging face of the receptacle.
Make sure that the slide latch is retracted to the open position.
 - (b) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (c) Engage the slot in the slide latch with the slide lock posts.
 - (d) Push the slide latch to the closed position. Refer to Figure 55.
Make sure the connectors are locked together.

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CONNECTION OF THE PLUG AND THE RECEPTACLE - SLIDE LATCH HARDWARE

Figure 55

8. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 33
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
6500-043-020-628	Daniels
6500-045-020	Daniels
CET 20-11	ITT Cannon
CIET-20HD	ITT Cannon
DRK38	Daniels
M24308/18-2	QPL
M81969/14-03	QPL
M81969/1-02	QPL
M81969/14-02	QPL
MS18278-1	QPL
MS27534-20	QPL
NAS1664-20	QPL

B. Contact Crimp Tools

**Table 34
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
11697-1	Buchanan
AFM 8	Daniels
K13-1	Daniels

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Table 34 (continued)

Crimp Tool	Supplier
K250	Daniels
K41	Daniels
KAP13-1	Daniels
M22520/1-01	QPL
M22520/2-01	QPL
M22520/2-03	QPL
M22520/2-06	QPL
M22520/2-14	QPL
M22520/5-01	QPL
M22520/5-03	QPL
M22520/5-08	QPL
M22520/5-35	QPL
M22520/5-39	QPL
M22520/5-41	QPL
M309	Daniels
MS3191-1	QPL
P20-3191-1	ITT Cannon
ST2220-1-43	Boeing
ST2220-1-Y	Boeing
TP884	Daniels
WA22	Daniels
WA22AP	Daniels
WA22LC	Daniels
WA27-309-EP	Daniels
WA27F	Daniels
Y119	Daniels
Y139	Daniels

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C. Contact Alignment Ring Installation Tools

Table 35

CONTACT ALIGNMENT RING INSTALLATION TOOL SUPPLIERS

Insertion Tool	Supplier
M81969/14-04	QPL

D. Contact Insertion Tools

Table 36

CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
ST2220-2-4	Boeing
ST2220-2-5	Boeing



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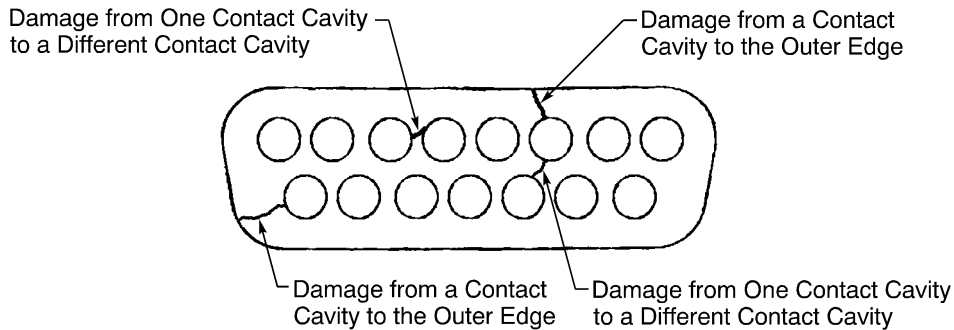
D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

It is necessary to replace the connector if one or more of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity; refer to Figure 1
- The damage extends from one contact cavity to the outer edge of the insert; refer to Figure 1.



REAR FACE OF THE INSERT - LENGTH OF DAMAGE

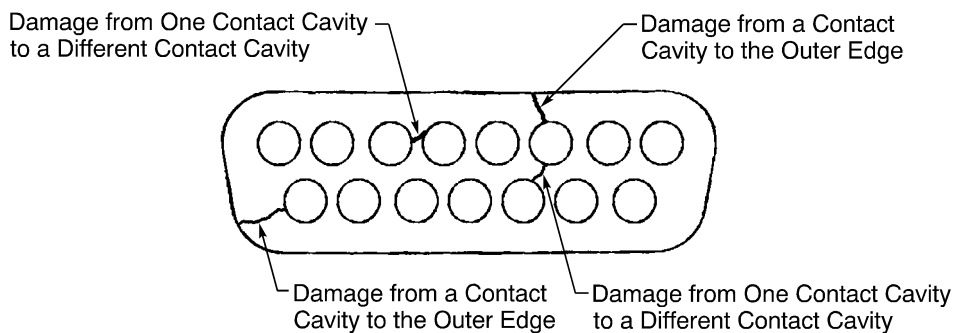
Figure 1

B. Damage Conditions - Front Face of the Insert

It is necessary to replace the connector if one of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 2.



FRONT FACE OF THE INSERT - LENGTH OF DAMAGE

Figure 2

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2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Shell Size	Insert Configuration	Contact Assembly	Supplier
17-10090	Receptacle	E	9	Solder	Amphenol
17-10090	Receptacle	E	9	Solder	WPI
17-10090-1	Receptacle	E	9	Crimp	Amphenol
17-10090-1	Receptacle	E	9	Crimp	WPI
17-10150	Receptacle	A	15	Solder	Amphenol
17-10150	Receptacle	A	15	Solder	WPI
17-10150-1	Receptacle	A	15	Crimp	Amphenol
17-10150-1	Receptacle	A	15	Crimp	WPI
17-10250	Receptacle	B	25	Solder	Amphenol
17-10250	Receptacle	B	25	Solder	WPI
17-10250-1	Receptacle	B	25	Crimp	Amphenol
17-10250-1	Receptacle	B	25	Crimp	WPI
17-10370	Receptacle	C	37	Solder	Amphenol
17-10370	Receptacle	C	37	Solder	WPI
17-10370-1	Receptacle	C	37	Crimp	Amphenol
17-10370-1	Receptacle	C	37	Crimp	WPI
17-10500	Receptacle	D	50	Solder	Amphenol
17-10500	Receptacle	D	50	Solder	WPI
17-10500-1	Receptacle	D	50	Crimp	Amphenol
17-10500-1	Receptacle	D	50	Crimp	WPI
17-20090	Plug	E	9	Solder	Amphenol
17-20090	Plug	E	9	Solder	WPI
17-20090-1	Plug	E	9	Crimp	Amphenol
17-20090-1	Plug	E	9	Crimp	WPI
17-20150	Plug	A	15	Solder	Amphenol
17-20150	Plug	A	15	Solder	WPI
17-20150-1	Plug	A	15	Crimp	Amphenol
17-20150-1	Plug	A	15	Crimp	WPI
17-20250	Plug	B	25	Solder	Amphenol

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Table 1 (continued)

Part Number	Type	Shell Size	Insert Configuration	Contact Assembly	Supplier
17-20250	Plug	B	25	Solder	WPI
17-20250-1	Plug	B	25	Crimp	Amphenol
17-20250-1	Plug	B	25	Crimp	WPI
17-20370	Plug	C	37	Solder	Amphenol
17-20370	Plug	C	37	Solder	WPI
17-20370-1	Plug	C	37	Crimp	Amphenol
17-20370-1	Plug	C	37	Crimp	WPI
17-20500	Plug	D	50	Solder	Amphenol
17-20500	Plug	D	50	Solder	WPI
17-20500-1	Plug	D	50	Crimp	Amphenol
17-20500-1	Plug	D	50	Crimp	WPI
17-300-1	Receptacle	E	9	Crimp	Amphenol
17-300-1	Receptacle	E	9	Crimp	WPI
17-301-1	Plug	E	9	Crimp	Amphenol
17-301-1	Plug	E	9	Crimp	WPI
17-302-1	Receptacle	A	15	Crimp	Amphenol
17-302-1	Receptacle	A	15	Crimp	WPI
17-303-1	Plug	A	15	Crimp	Amphenol
17-303-1	Plug	A	15	Crimp	WPI
17-304-1	Receptacle	B	25	Crimp	Amphenol
17-304-1	Receptacle	B	25	Crimp	WPI
17-305-1	Plug	B	25	Crimp	Amphenol
17-305-1	Plug	B	25	Crimp	WPI
17-306-1	Receptacle	C	37	Crimp	Amphenol
17-306-1	Receptacle	C	37	Crimp	WPI
17-307-1	Plug	C	37	Crimp	Amphenol
17-307-1	Plug	C	37	Crimp	WPI
17-308-1	Receptacle	D	50	Crimp	Amphenol
17-308-1	Receptacle	D	50	Crimp	WPI
17-309-1	Plug	D	50	Crimp	Amphenol
17-309-1	Plug	D	50	Crimp	WPI

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**Table 2
OBSOLETE CONNECTOR PART NUMBERS**

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
17-()	Amphenol	17-()	WPI

**Table 3
EQUIVALENT CONNECTOR PART NUMBERS**

Specified Connector		Equivalent Connector	
Part Number	Supplied	Part Number	Supplied
17-10090-1	With Crimp Contacts	17-10090	With Solder Contacts
		17-300-1	Without Contacts
17-10150-1	With Crimp Contacts	17-10150	With Solder Contacts
		17-302-1	Without Contacts
17-10250-1	With Crimp Contacts	17-10250	With Solder Contacts
		17-304-1	Without Contacts
17-10370-1	With Crimp Contacts	17-10370	With Solder Contacts
		17-306-1	Without Contacts
17-10500-1	With Crimp Contacts	17-10500	With Solder Contacts
		17-308-1	Without Contacts
17-20090-1	With Crimp Contacts	17-20090	With Solder Contacts
		17-301-1	Without Contacts
17-20150-1	With Crimp Contacts	17-20150	With Solder Contacts
		17-303-1	Without Contacts
17-20250-1	With Crimp Contacts	17-20250	With Solder Contacts
		17-305-1	Without Contacts
17-20370-1	With Crimp Contacts	17-20370	With Solder Contacts
		17-307-1	Without Contacts
17-20500-1	With Crimp Contacts	17-20500	With Solder Contacts
		17-309-1	Without Contacts

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**Table 4
ALTERNATIVE CONNECTOR PART NUMBERS**

Specified Connector	Alternative Connector		
	Part Number	Supplier	Assembly Procedure
17-10090-1	CEMA9S	Cory Components	Subject 20-72-10
	CEMA9S	Tri-Star	Subject 20-72-10
	DEMA9S	ITT Cannon	Subject 20-72-12
	DEMAM9S	ITT Cannon	Subject 20-72-12
	M24308/2-1	QPL	Subject 20-72-13
17-10150-1	CAMA15S	Cory Components	Subject 20-72-10
	CAMA15S	Tri-Star	Subject 20-72-10
	DAMA15S	ITT Cannon	Subject 20-72-12
	DAMAM15S	ITT Cannon	Subject 20-72-12
	M24308/2-2	QPL	Subject 20-72-13
17-10250-1	CBMA25S	Cory Components	Subject 20-72-10
	CBMA25S	Tri-Star	Subject 20-72-10
	DBMA25S	ITT Cannon	Subject 20-72-12
	DBMAM25S	ITT Cannon	Subject 20-72-12
	M24308/2-3	QPL	Subject 20-72-13
17-10370-1	CCMA37S	Cory Components	Subject 20-72-10
	CCMA37S	Tri-Star	Subject 20-72-10
	DCMA37S	ITT Cannon	Subject 20-72-12
	DCMAM37S	ITT Cannon	Subject 20-72-12
	M24308/2-4	QPL	Subject 20-72-13
17-10500-1	CDMA50S	Cory Components	Subject 20-72-10
	CDMA50S	Tri-Star	Subject 20-72-10
	DDMA50S	ITT Cannon	Subject 20-72-12
	DDMAM50S	ITT Cannon	Subject 20-72-12
	M24308/2-5	QPL	Subject 20-72-13
17-20090-1	CEMA9P	Cory Components	Subject 20-72-10
	CEMA9P	Tri-Star	Subject 20-72-10
	DEMA9P	ITT Cannon	Subject 20-72-12
	DEMAM9P	ITT Cannon	Subject 20-72-12
	M24308/4-1	QPL	Subject 20-72-13



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STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

Table 4 (continued)

Specified Connector	Alternative Connector		
	Part Number	Supplier	Assembly Procedure
17-20150-1	CAMA15P	Cory Components	Subject 20-72-10
	CAMA15P	Tri-Star	Subject 20-72-10
	DAMA15P	ITT Cannon	Subject 20-72-12
	DAMAM15P	ITT Cannon	Subject 20-72-12
	M24308/4-2	QPL	Subject 20-72-13
17-20250-1	CBMA25P	Cory Components	Subject 20-72-10
	CBMA25P	Tri-Star	Subject 20-72-10
	DBMA25P	ITT Cannon	Subject 20-72-12
	DBMAM25P	ITT Cannon	Subject 20-72-12
	M24308/4-3	QPL	Subject 20-72-13
17-20370-1	CCMA37P	Cory Components	Subject 20-72-10
	CCMA37P	Tri-Star	Subject 20-72-10
	DCMA37P	ITT Cannon	Subject 20-72-12
	DCMAM37P	ITT Cannon	Subject 20-72-12
	M24308/4-4	QPL	Subject 20-72-13
17-20500-1	CDMA50P	Cory Components	Subject 20-72-10
	CDMA50P	Tri-Star	Subject 20-72-10
	DDMA50P	ITT Cannon	Subject 20-72-12
	DDMAM50P	ITT Cannon	Subject 20-72-12
	M24308/4-5	QPL	Subject 20-72-13
17-300-1	CEMA9S	Cory Components	Subject 20-72-10
	CEMA9S	Tri-Star	Subject 20-72-10
	DEMA9S	ITT Cannon	Subject 20-72-12
	DEMAM9S	ITT Cannon	Subject 20-72-12
	M24308/2-1	QPL	Subject 20-72-13
17-301-1	CEMA9P	Cory Components	Subject 20-72-10
	CEMA9P	Tri-Star	Subject 20-72-10
	DEMA9P	ITT Cannon	Subject 20-72-12
	DEMAM9P	ITT Cannon	Subject 20-72-12
	M24308/4-1	QPL	Subject 20-72-13

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D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

Table 4 (continued)

Specified Connector	Alternative Connector		
	Part Number	Supplier	Assembly Procedure
17-302-1	CAMA15S	Cory Components	Subject 20-72-10
	CAMA15S	Tri-Star	Subject 20-72-10
	DAMA15S	ITT Cannon	Subject 20-72-12
	DAMAM15S	ITT Cannon	Subject 20-72-12
	M24308/2-2	QPL	Subject 20-72-13
17-303-1	CAMA15P	Cory Components	Subject 20-72-10
	CAMA15P	Tri-Star	Subject 20-72-10
	DAMA15P	ITT Cannon	Subject 20-72-12
	DAMAM15P	ITT Cannon	Subject 20-72-12
	M24308/4-2	QPL	Subject 20-72-13
17-304-1	CBMA25S	Cory Components	Subject 20-72-10
	CBMA25S	Tri-Star	Subject 20-72-10
	DBMA25S	ITT Cannon	Subject 20-72-12
	DBMAM25S	ITT Cannon	Subject 20-72-12
	M24308/2-3	QPL	Subject 20-72-13
17-305-1	CBMA25P	Cory Components	Subject 20-72-10
	CBMA25P	Tri-Star	Subject 20-72-10
	DBMA25P	ITT Cannon	Subject 20-72-12
	DBMAM25P	ITT Cannon	Subject 20-72-12
	M24308/4-3	QPL	Subject 20-72-13
17-306-1	CCMA37S	Cory Components	Subject 20-72-10
	CCMA37S	Tri-Star	Subject 20-72-10
	DCMA37S	ITT Cannon	Subject 20-72-12
	DCMAM37S	ITT Cannon	Subject 20-72-12
	M24308/2-4	QPL	Subject 20-72-13
17-307-1	CCMA37P	Cory Components	Subject 20-72-10
	CCMA37P	Tri-Star	Subject 20-72-10
	DCMA37P	ITT Cannon	Subject 20-72-12
	DCMAM37P	ITT Cannon	Subject 20-72-12
	M24308/4-4	QPL	Subject 20-72-13

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STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

Table 4 (continued)

Specified Connector	Alternative Connector		
	Part Number	Supplier	Assembly Procedure
17-308-1	CDMA50S	Cory Components	Subject 20-72-10
	CDMA50S	Tri-Star	Subject 20-72-10
	DDMA50S	ITT Cannon	Subject 20-72-12
	DDMAM50S	ITT Cannon	Subject 20-72-12
	M24308/2-5	QPL	Subject 20-72-13
17-309-1	CDMA50P	Cory Components	Subject 20-72-10
	CDMA50P	Tri-Star	Subject 20-72-10
	DDMA50P	ITT Cannon	Subject 20-72-12
	DDMAM50P	ITT Cannon	Subject 20-72-12
	M24308/4-5	QPL	Subject 20-72-13

B. Connector Description

The 17-() connectors have these properties:

- D subminiature rectangular configuration
- Metal shells
- Crimp type, and solder type, front release pin contacts in the plug
- Crimp type, and solder type, front release socket contacts in the receptacle
- Size 2020 and size 2016 crimp type contacts
- Size 2020 solder type contacts

C. Contact Part Numbers

**Table 5
CRIMP CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	17-766-2	Amphenol
			17-766-2	WPI
		Socket	17-763-2	Amphenol
			17-763-2	WPI
	16	Pin	17-1005	Amphenol
			17-1005	WPI
		Socket	17-1006	Amphenol
			17-1006	WPI

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

**Table 6
SOLDER CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Solder Barrel			
20	20	Pin	17-765-2	Amphenol
			17-765-2	WPI
		Socket	17-264-2	Amphenol
			17-264-2	WPI

**Table 7
OBSOLETE CONTACT PART NUMBERS**

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
17-1005	Amphenol	17-1005	WPI
17-1006	Amphenol	17-1006	WPI
17-763-2	Amphenol	17-763-2	WPI
17-764-2	Amphenol	17-764-2	WPI
17-765-2	Amphenol	17-765-2	WPI
17-766-2	Amphenol	17-766-2	WPI

3. INSERT CONFIGURATIONS

A. 17-() Connectors

NOTE: The contact cavity size that is specified in Table 8 is equivalent to the size of the engaging end of the contact.

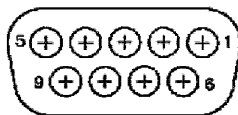
NOTE: Figure 3 through Figure 7 show the rear face of an insert that has pin contacts. The view of the rear face of an insert that has socket contacts is the mirror image of this view.

**Table 8
CONNECTOR INSERT CONFIGURATIONS**

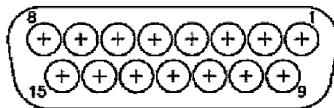
Insert Configuration	Contact Cavity		Reference
	Count	Size	
9	9	20	Figure 3
15	15	20	Figure 4
25	25	20	Figure 5
37	37	20	Figure 6
50	50	20	Figure 7

STANDARD WIRING PRACTICES MANUAL

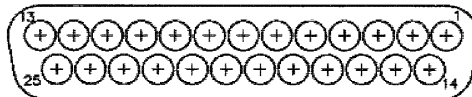
D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS



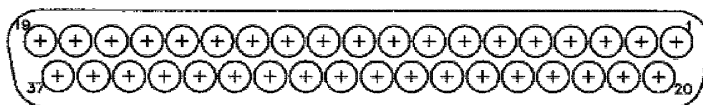
9 INSERT CONFIGURATION
Figure 3



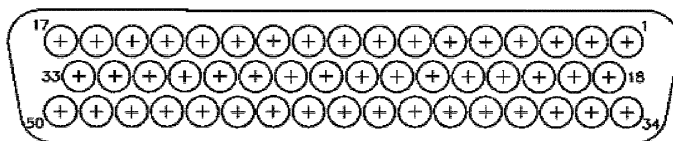
15 INSERT CONFIGURATION
Figure 4



25 INSERT CONFIGURATION
Figure 5



37 INSERT CONFIGURATION
Figure 6



50 INSERT CONFIGURATION
Figure 7

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

4. CONNECTOR DISASSEMBLY

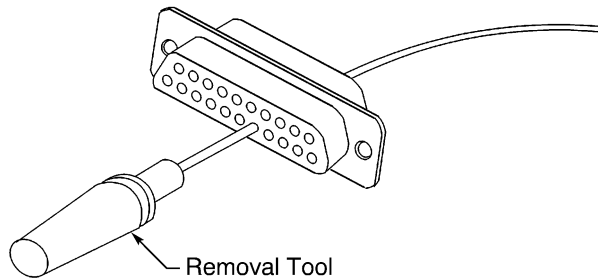
A. Contact Removal

**Table 9
CONTACT REMOVAL TOOLS**

Engaging End Size	Wire Barrel Size	Contact Type	Removal Tool	
			Handle	Bit
20	20	Pin	ATA 2040	-
			356-200	356-400-6
		Socket	ATA 2040	-
			356-200	356-400-5
	16	Pin	356-200	356-400-6
		Socket	356-200	356-400-5

NOTE: The backshell must be removed from the connector before the contacts can be removed.

- (1) Make a selection of a removal tool from Table 9.
- (2) Axially align the tool and the contact cavity at the front face of the connector.
- (3) Push the tool into the contact cavity until the contact moves out from the rear of the connector.
Make sure that the removal tool stays axially aligned with the contact cavity.



**POSITION OF THE REMOVAL TOOL IN THE CONTACT CAVITY
Figure 8**

- (4) Carefully remove the tool from the contact cavity.
- (5) Pull the contact out of the contact cavity from the rear of the connector.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

5. CONNECTOR ASSEMBLY

A. Crimp Contact Assembly

**Table 10
INSULATION REMOVAL LENGTH**

Wire Size	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
24	20	0.19	± 0.03
22	20	0.19	± 0.03
20	20	0.19	± 0.03
18	16	0.19	± 0.03
16	16	0.19	± 0.03

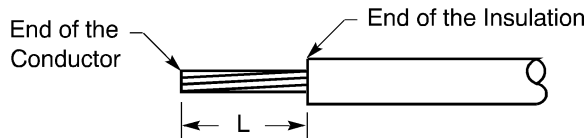
**Table 11
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
24	20	357-100	5	357-300-02
22	20	357-100	6	357-300-02
20	20	357-100	7	357-300-02
18	16	357-105	0.053 inch ± 0.003 inch	357-305-03
16	16	357-105	0.058 inch ± 0.003 inch	357-305-03

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 9
- Table 10 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.



**INSULATION REMOVAL LENGTH
Figure 9**

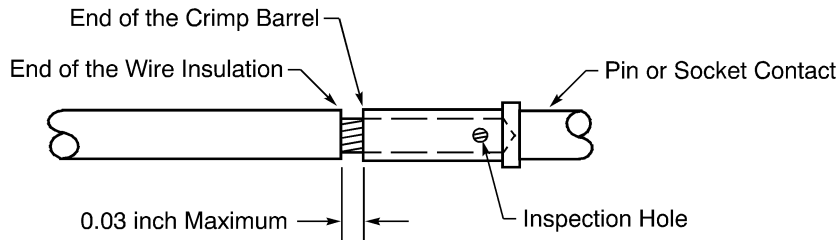
- (2) Make a selection of a crimp tool from Table 11.
 (3) Put the conductor in the crimp barrel of the contact.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

Make sure that:

- All the strands of the conductor are in the crimp barrel.
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 10

(4) Crimp the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel.
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

B. Solder Contact Assembly

CAUTION: THE CONDUCTOR MUST BE SOLDERED IN THE CONTACT BEFORE THE CONTACT IS INSTALLED IN THE CONNECTOR.

Table 12
INSULATION REMOVAL LENGTH

Wire Size	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
24	20	0.12	± 0.03
22	20	0.12	± 0.03
20	20	0.12	± 0.03

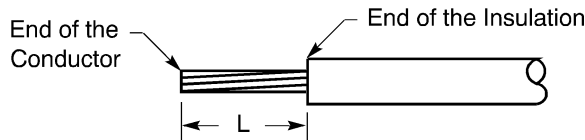
(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 11
- Table 12 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS



INSULATION REMOVAL LENGTH

Figure 11

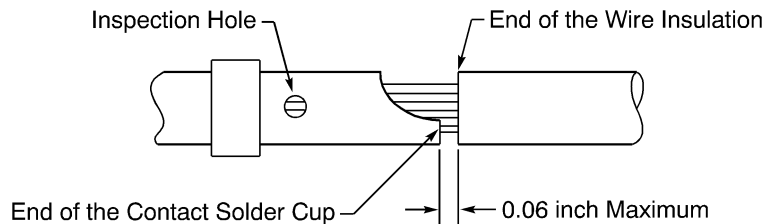
- (2) Solder the conductor in the contact.
 - (a) Tin these components of the contact assembly:
 - The wire
 - The contact solder cup.
 - (b) Solder the end of the wire in the solder cup. Refer to Figure 12.

Make sure that the distance from the forward end of the insulation to the end of the solder cup is not more than 0.06 inch.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT. DAMAGE TO THE CONTACT OR THE WIRE CAN OCCUR.

CAUTION: DO NOT LET THE STRANDS OF THE CONDUCTOR THAT ARE IN THE INSULATION OF THE WIRE ABSORB THE SOLDER. THE WIRE:

- CANNOT BEND AT THE NECESSARY LOCATION
- CAN BREAK AT THE END OF THE SOLDER.



POSITION OF THE WIRE IN THE CONTACT

Figure 12

C. Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector. Refer to Paragraph 5.E.

**Table 13
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool
20	356-400-1
	356-400-10
	ATA 1040
16	356-400-2

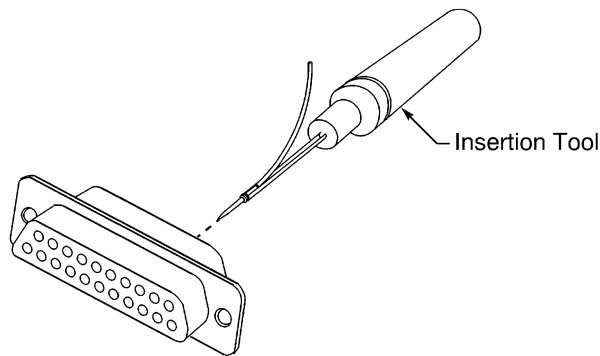
STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

**Table 14
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat shrinkable	MIL-LT	Raychem
Sleeve, Heat shrinkable	PLF 100	Plastronic

- (1) Make a selection of a heat shrinkable sleeve from Table 14.
Make sure that the sleeve has the smallest diameter that will move easily on the wire.
NOTE: An equivalent sleeve is a satisfactory alternative. Refer to Subject 20-00-11.
- (2) Make a selection of a contact insertion tool from Table 13.
- (3) Put a 0.75 inch to 1.0 inch length of the heat shrinkable sleeve on the wire.
- (4) Put the contact assembly in the insertion tool.
Make sure that the end of the insertion tool is against the contact shoulder.
- (5) At the rear of the connector, axially align the insertion tool and the contact cavity.



ALIGNMENT OF THE CONTACT ASSEMBLY, THE INSERTION TOOL, AND THE CONTACT CAVITY
Figure 13

- (6) Carefully push the insertion tool and the contact assembly into the contact cavity until it stops.
Make sure that the insertion tool stays axially aligned with the contact cavity.
- (7) Carefully pull the tool out of the contact cavity.
- (8) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (9) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (4) through Step (8) again.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

- (10) Move the heat shrinkable sleeve forward until it is against the rear of the connector.
Make sure that the distance from the rear of the connector to the forward end of the sleeve is less than 0.06 inch.
- (11) Shrink the sleeve into its position. Refer to Subject 20-10-14.
Make sure that the distance from the rear of the connector to the forward end of the sleeve is less than 0.06 inch.

NOTE: If more than one contact must be installed in the connector, all of the sleeves can be shrunk at the same time.

D. Seal of an Empty Contact Cavity

The seal of an empty contact cavity is not necessary.

E. Backshell Assembly

- (1) If a backshell is specified, assemble the backshell. Refer to Subject 20-72-08.

F. Connector Installation Hardware Assembly

- (1) If a backshell is not specified, assemble the connector installation hardware. Refer to Subject 20-72-07.

NOTE: If a backshell is specified, the connector installation hardware is assembled when the backshell is assembled. Refer to Paragraph 5.E.

6. CONNECTOR INSTALLATION

A. Connector Installation in a Panel

For installation of a connector:

- With a backshell, installation in a panel occurs when the backshell is assembled. Refer to Paragraph 5.E.
- Without a backshell, the installation in a panel occurs when the connector installation hardware is assembled. Refer to Paragraph 5.F.

B. Connection of the Plug and the Receptacle

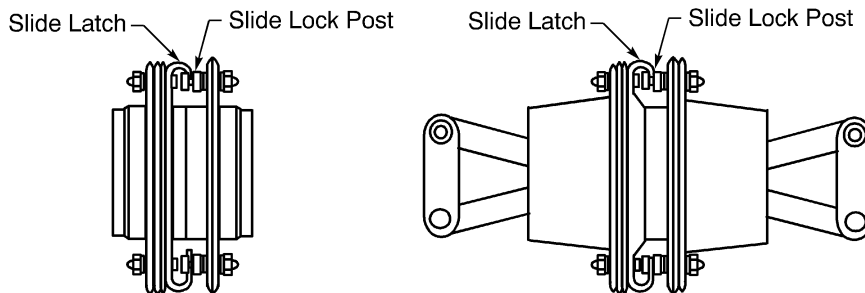
**Table 15
NECESSARY TOOLS**

Tool	Type
Screwdriver	Flat Tip

- (1) For connectors with jackscrew and jackpost installation hardware:
 - (a) Make a selection of a tool from Table 15.
 - (b) Align the engaging face of the plug with the engaging face of the receptacle.
 - (c) Push the plug into the receptacle.
Make sure that connectors are fully engaged.
 - (d) Put each jackscrew in the applicable jackpost.
 - (e) Turn one jackscrew clockwise two or three turns.
 - (f) Turn the other jackscrew clockwise two or three turns.

STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS**

- (g) Do Step (e) and Step (f) again until the jackscrews are fully engaged.
- (h) Tighten each jackscrew.
- (2) For connectors with male and female screw lock installation hardware:
 - (a) Make a selection of a tool from Table 15.
 - (b) Align the engaging face of the plug with the engaging face of the receptacle.
 - (c) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (d) Put each screw in the applicable female screw lock.
 - (e) Turn one screw clockwise two or three turns.
 - (f) Turn the other screw clockwise two or three turns.
 - (g) Do Step (e) and Step (f) again until the screws are fully engaged.
 - (h) Tighten each jackscrew.
- (3) For connectors with spring plate and spring latch plate installation hardware:
 - (a) Align the engaging face of the plug with the engaging face of the receptacle.
 - (b) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (c) Engage each spring with the applicable spring latch plate.
- (4) For connectors with slide latch and slide lock post installation hardware:
 - (a) Align the engaging face of the plug with the engaging face of the receptacle.
Make sure that the slide latch is retracted to the open position.
 - (b) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (c) Engage the slot in the slide latch with the slide lock posts.
 - (d) Push the slide latch to the closed position. Refer to Figure 14.
Make sure the connectors are locked together.



CONNECTION OF THE PLUG AND THE RECEPTACLE - SLIDE LATCH HARDWARE
Figure 14

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: WPI 17-() AND AMPHENOL 17-() CONNECTORS

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 16
CONTACT REMOVAL TOOL SUPPLIERS**

Tool	Supplier
356-200	WPI
356-400-5	WPI
356-400-6	WPI
ATA 2040	Astro

B. Contact Crimp Tools

**Table 17
CONTACT CRIMP TOOL SUPPLIERS**

Tool	Supplier
357-100	WPI
357-105	Amphenol
357-300-02	WPI
357-305-03	Amphenol

C. Contact Insertion Tools

**Table 18
CONTACT INSERTION TOOL SUPPLIERS**

Tool	Supplier
356-400-1	WPI
356-400-10	WPI
356-400-2	WPI
ATA 1040	Astro



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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

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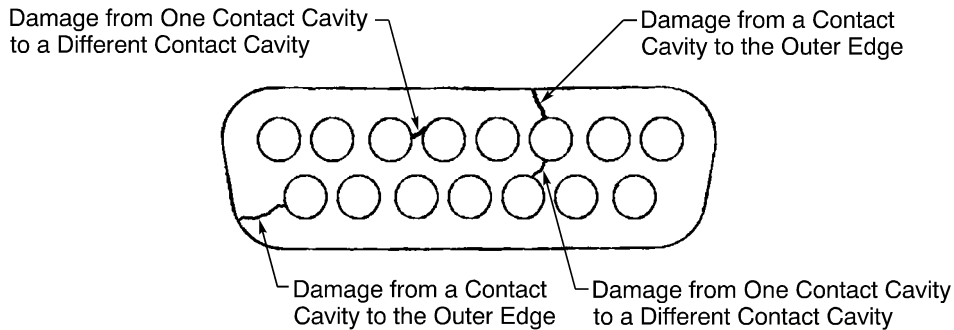
D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

It is necessary to replace the connector if one or more of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity; refer to Figure 1
- The damage extends from one contact cavity to the outer edge of the insert; refer to Figure 1.



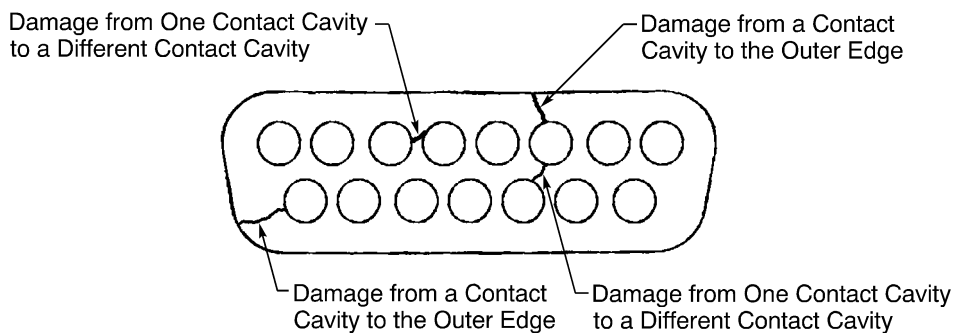
REAR FACE OF THE INSERT - LENGTH OF DAMAGE
Figure 1

B. Damage Conditions - Front Face of the Insert

It is necessary to replace the connector if one of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 2.



FRONT FACE OF THE INSERT - LENGTH OF DAMAGE
Figure 2

STANDARD WIRING PRACTICES MANUAL

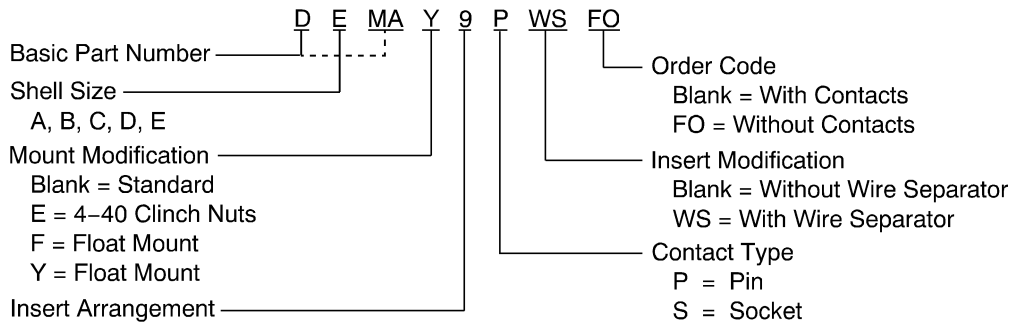
D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

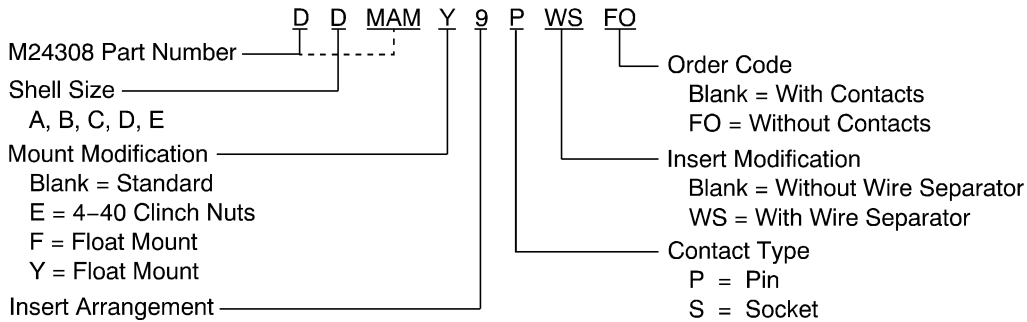
**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
DAMA()	ITT Cannon
DBMA()	ITT Cannon
DBMAM()	ITT Cannon
DCMA()	ITT Cannon
DDMA()	ITT Cannon
DDMAM()	ITT Cannon
DEMA()	ITT Cannon



ITT CANNON D()MA CONNECTOR PART NUMBER STRUCTURE

Figure 3



ITT CANNON D()MAM CONNECTOR PART NUMBER STRUCTURE

Figure 4



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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

**Table 2
OBSOLETE CONNECTOR PART NUMBERS**

Specified Connector	Insert Configuration	Replacement Connector
DAMA()	With Coax Contacts	-
DBMA()	With Coax Contacts	-
DCMA()	With Coax Contacts	-
DDMA()	With Coax Contacts	-
DEMA()	With Coax Contacts	-
DDMAF()	-	DDMAY()
DDMAMF()	-	DDMAMY()

**Table 3
ALTERNATIVE CONNECTOR PART NUMBERS**

Specified Connector	Alternative Connector		
	Part Number	Supplier	Assembly Procedure
DAMA11W1P	CAMA11W1P	Cory Components	Subject 20-72-10
	CAMA11W1P	Tri Star	Subject 20-72-10
DAMA11W1S	CAMA11W1S	Cory Components	Subject 20-72-10
	CAMA11W1S	Tri Star	Subject 20-72-10
DAMA15P	17-20150-1	WPI	Subject 20-72-11
	17-303-1	WPI	Subject 20-72-11
	CAMA15P	Cory Components	Subject 20-72-10
	CAMA15P	Tri Star	Subject 20-72-10
	DAMAM15P	ITT Cannon	Subject 20-72-12
	M24308/4-2	QPL	Subject 20-72-13
DAMA15S	17-10150-1	WPI	Subject 20-72-11
	17-302-1	WPI	Subject 20-72-11
	CAMA15S	Cory Components	Subject 20-72-10
	CAMA15S	Tri Star	Subject 20-72-10
	DAMAM15S	ITT Cannon	Subject 20-72-12
	M24308/2-2	QPL	Subject 20-72-13
DAMA3W3P	CAMA3W3P	Cory Components	Subject 20-72-10
	CAMA3W3P	Tri Star	Subject 20-72-10
DAMA3W3S	CAMA3W3S	Cory Components	Subject 20-72-10
	CAMA3W3S	Tri Star	Subject 20-72-10

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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 3 (continued)

Specified Connector	Alternative Connector		
	Part Number	Supplier	Assembly Procedure
DBMA21W1P	CBMA21W1P	Cory Components	Subject 20-72-10
	CBMA21W1P	Tri Star	Subject 20-72-10
DBMA21W1S	CBMA21W1S	Cory Components	Subject 20-72-10
	CBMA21W1S	Tri Star	Subject 20-72-10
DBMA25P	17-20250-1	WPI	Subject 20-72-11
	17-305-1	WPI	Subject 20-72-11
	CBMA25P	Cory Components	Subject 20-72-10
	CBMA25P	Tri Star	Subject 20-72-10
	DBMAM25P	ITT Cannon	Subject 20-72-12
	M24308/4-3	QPL	Subject 20-72-13
DBMA25S	17-10250-1	WPI	Subject 20-72-11
	17-304-1	WPI	Subject 20-72-11
	CBMA25S	Cory Components	Subject 20-72-10
	CBMA25S	Tri Star	Subject 20-72-10
	DBMAM25S	ITT Cannon	Subject 20-72-12
	M24308/2-3	QPL	Subject 20-72-13
DBMA5W5P	CBMA5W5P	Cory Components	Subject 20-72-10
	CBMA5W5P	Tri Star	Subject 20-72-10
DBMA5W5S	CBMA5W5S	Cory Components	Subject 20-72-10
	CBMA5W5S	Tri Star	Subject 20-72-10
DCMA17W5P	CCMA17W5P	Cory Components	Subject 20-72-10
	CCMA17W5P	Tri Star	Subject 20-72-10
DCMA17W5S	CCMA17W5S	Cory Components	Subject 20-72-10
	CCMA17W5S	Tri Star	Subject 20-72-10
DCMA21WA4P	CCMA21WA4P	Cory Components	Subject 20-72-10
	CCMA21WA4P	Tri Star	Subject 20-72-10
DCMA21WA4S	CCMA21WA4S	Cory Components	Subject 20-72-10
	CCMA21WA4S	Tri Star	Subject 20-72-10
DCMA25W3P	CCMA25W3P	Cory Components	Subject 20-72-10
	CCMA25W3P	Tri Star	Subject 20-72-10
DCMA25W3S	CCMA25W3S	Cory Components	Subject 20-72-10
	CCMA25W3S	Tri Star	Subject 20-72-10

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D-SUBMINIATURE CONNECTORS: ITT CANNON D(M)A CONNECTORS

Table 3 (continued)

Specified Connector	Alternative Connector		
	Part Number	Supplier	Assembly Procedure
DCMA37P	17-20370-1	WPI	Subject 20-72-11
	17-307-1	WPI	Subject 20-72-11
	CCMA37P	Cory Components	Subject 20-72-10
	CCMA37P	Tri Star	Subject 20-72-10
	DCMAM37P	ITT Cannon	Subject 20-72-12
	M24308/4-4	QPL	Subject 20-72-13
DCMA37S	17-10370-1	WPI	Subject 20-72-11
	17-306-1	WPI	Subject 20-72-11
	CCMA37S	Cory Components	Subject 20-72-10
	CCMA37S	Tri Star	Subject 20-72-10
	DCMAM37S	ITT Cannon	Subject 20-72-12
	M24308/2-4	QPL	Subject 20-72-13
DCMA8W8P	CCMA8W8P	Cory Components	Subject 20-72-10
	CCMA8W8P	Tri Star	Subject 20-72-10
DCMA8W8S	CCMA8W8S	Cory Components	Subject 20-72-10
	CCMA8W8S	Tri Star	Subject 20-72-10
DDMA24W7P	CDMA24W7P	Cory Components	Subject 20-72-10
	CDMA24W7P	Tri Star	Subject 20-72-10
DDMA24W7S	CDMA24W7S	Cory Components	Subject 20-72-10
	CDMA24W7S	Tri Star	Subject 20-72-10
DDMA36W4P	CDMA36W4P	Cory Components	Subject 20-72-10
	CDMA36W4P	Tri Star	Subject 20-72-10
DDMA36W4S	CDMA36W4S	Cory Components	Subject 20-72-10
	CDMA36W4S	Tri Star	Subject 20-72-10
DDMA50P	17-20500-1	WPI	Subject 20-72-11
	17-309-1	WPI	Subject 20-72-11
	CDMA50P	Cory Components	Subject 20-72-10
	CDMA50P	Tri Star	Subject 20-72-10
	DDMAM50P	ITT Cannon	Subject 20-72-12
	M24308/4-5	QPL	Subject 20-72-13



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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 3 (continued)

Specified Connector	Alternative Connector		
	Part Number	Supplier	Assembly Procedure
DDMA50S	17-10500-1	WPI	Subject 20-72-11
	17-308-1	WPI	Subject 20-72-11
	CDMA50S	Cory Components	Subject 20-72-10
	CDMA50S	Tri Star	Subject 20-72-10
	DDMAM50S	ITT Cannon	Subject 20-72-12
	M24308/2-5	QPL	Subject 20-72-13
DDMA78P	CDMA78P	Cory Components	Subject 20-72-10
	CDMA78P	Tri Star	Subject 20-72-10
	DDMAM78P	ITT Cannon	Subject 20-72-12
	M24308/4-15	QPL	Subject 20-72-13
DDMA78S	CDMA78S	Cory Components	Subject 20-72-10
	CDMA78S	Tri Star	Subject 20-72-10
	DDMAM78S	ITT Cannon	Subject 20-72-12
	M24308/2-15	QPL	Subject 20-72-13
DEMA9P	17-20090-1	WPI	Subject 20-72-11
	17-301-1	WPI	Subject 20-72-11
	CEMA9P	Cory Components	Subject 20-72-10
	CEMA9P	Tri Star	Subject 20-72-10
	DEMAM9P	ITT Cannon	Subject 20-72-12
	M24308/4-1	QPL	Subject 20-72-13
DEMA9S	17-10090-1	WPI	Subject 20-72-11
	17-300-1	WPI	Subject 20-72-11
	CEMA9S	Cory Components	Subject 20-72-10
	CEMA9S	Tri Star	Subject 20-72-10
	DEMAM9S	ITT Cannon	Subject 20-72-12
	M24308/2-1	QPL	Subject 20-72-13

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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

B. Connector Description

The D()MA() rectangular connectors have these properties:

- D subminiature rectangular configuration
- Metal shells
- Crimp type, rear release pin contacts in the plug
- Crimp type, rear release socket contacts in the receptacle
- Rear release coax pin contacts in the plug
- Rear release coax socket contacts in the receptacle.

C. Contact Part Numbers

**Table 4
STANDARD CONTACT PART NUMBERS**

Contact Size	Contact Engaging End Size	Contact Crimp Barrel Size	Contact Type	Part Number	Supplier
20	20	20	Pin	330-5291-000	ITT Cannon
				330-5291-037	ITT Cannon
				M39029/64-369	QPL
			Socket	031-1007-000	ITT Cannon
				031-1007-042	ITT Cannon
				M39029/63-368	QPL
22D	22	22	Pin	030-2042-000	ITT Cannon
				030-2042-002	ITT Cannon
				M39029/58-360	QPL
			Socket	031-1147-000	ITT Cannon
				031-1147-002	ITT Cannon
				M39029/57-354	QPL

**Table 5
STANDARD CONTACT COLOR CODES**

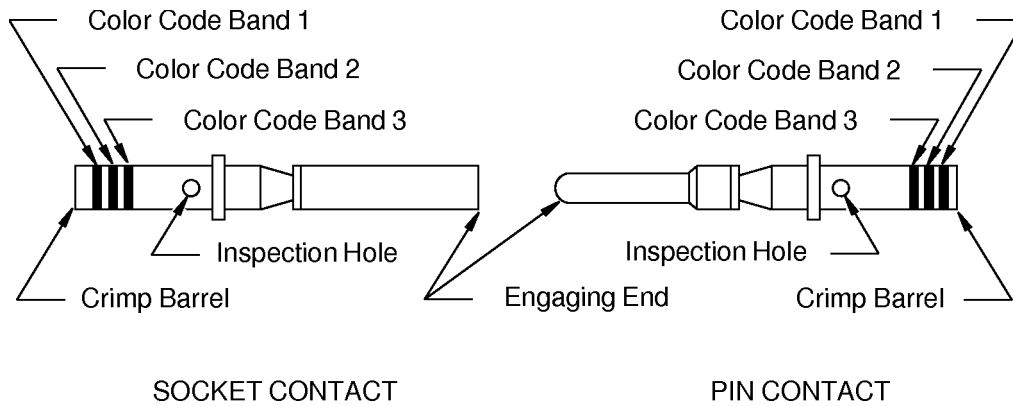
Contact	Color Code		
	Band 1	Band 2	Band 3
030-2042-000	Orange	Blue	Black
030-2042-002	-	-	-
031-1007-000	-	-	-
031-1007-042	Orange	Blue	Gray
031-1147-000	Orange	Green	Yellow
031-1147-002	-	-	-

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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 5 (continued)

Contact	Color Code		
	Band 1	Band 2	Band 3
330-5291-000	-	-	-
330-5291-037	Orange	Blue	White
M39029/57-354	Orange	Green	Yellow
M39029/58-360	Orange	Blue	Black
M39029/63-368	Orange	Blue	Gray
M39029/64-369	Orange	Blue	White



STANDARD CONTACTS
Figure 5

D. Coax Contact Part Numbers

Table 6
COAX CONTACT PART NUMBERS

Size	Type	Part Number	Supplier
08	Pin	DMA43717-6	ITT Cannon
		DMA43717-7	ITT Cannon
	Socket	DMA43716-6	ITT Cannon
		DMA43716-7	ITT Cannon

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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

**Table 7
COAX CONTACTS FOR SPECIFIED COAX CABLES**

Coax Cable	Coax Contact	
	Type	Part Number
5021K1011	Pin	DMA43717-7
	Socket	DMA43716-7
5024A1314	Pin	DMA43717-6
	Socket	DMA43716-6
RG-180	Pin	DMA43717-6
	Socket	DMA43716-6
RG-58	Pin	DMA43717-7
	Socket	DMA43716-7

3. INSERT CONFIGURATIONS

A. D()MA Series Connectors

NOTE: The contact cavity size that is specified in Table 8 is equivalent to the size of the engaging end of the contact.

NOTE: Figure 6 through Figure 21 show the rear face of an insert that has pin contacts. The view of the rear face of an insert that has socket contacts is the mirror image of this view.

**Table 8
CONNECTOR INSERT CONFIGURATIONS**

Shell Size	Insert Configuration	Contact Cavity		Contact Type	Reference
		Count	Size		
A	11W1	10	20	Standard	Figure 8
		1	8	Coax	
	15	15	20	Standard	Figure 9
	3W3	3	8	Coax	Figure 7
B	21W1	20	20	Standard	Figure 11
		1	8	Coax	
	25	25	20	Standard	Figure 12
	5W5	5	8	Coax	Figure 10

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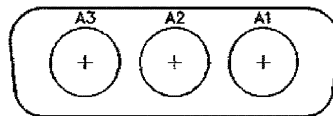
D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 8 (continued)

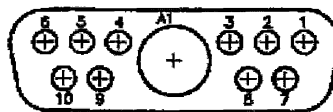
Shell Size	Insert Configuration	Contact Cavity		Contact Type	Reference
		Count	Size		
C	17W5	12	20	Standard	Figure 14
		5	8	Coax	
	21WA4	17	20	Standard	Figure 15
		4	8	Coax	
	25W3	22	20	Standard	Figure 16
		3	8	Coax	
37	37	20	Standard	Figure 17	
8W8	8	8	Coax	Figure 13	
D	24W7	17	20	Standard	Figure 18
		7	8	Coax	
	36W4	32	20	Standard	Figure 19
		4	8	Coax	
	50	50	20	Standard	Figure 20
	78	78	22D	Standard	Figure 21
E	9	9	20	Standard	Figure 6



9 INSERT CONFIGURATION
Figure 6



3W3 INSERT CONFIGURATION
Figure 7

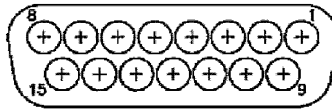


11W1 INSERT CONFIGURATION
Figure 8

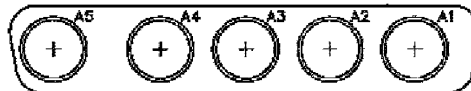
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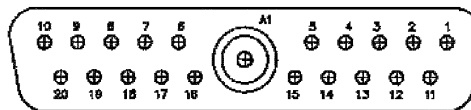
D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS



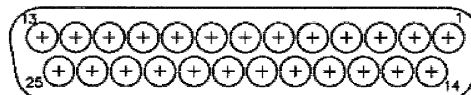
15 INSERT CONFIGURATION
Figure 9



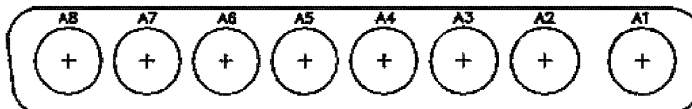
5W5 INSERT CONFIGURATION
Figure 10



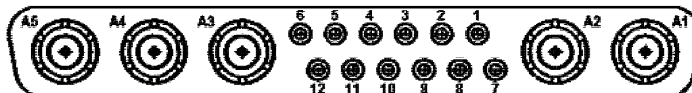
21W1 INSERT CONFIGURATION
Figure 11



25 INSERT CONFIGURATION
Figure 12



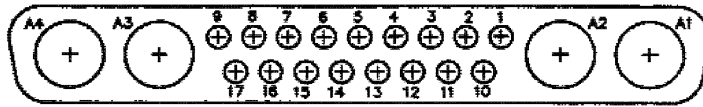
8W8 INSERT CONFIGURATION
Figure 13



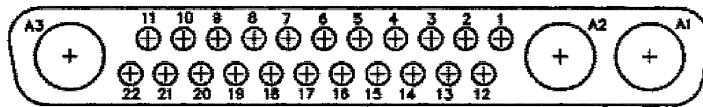
17W5 INSERT CONFIGURATION
Figure 14

STANDARD WIRING PRACTICES MANUAL

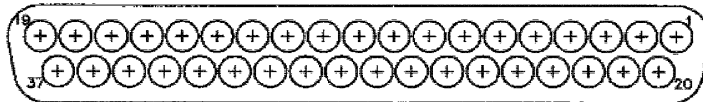
D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS



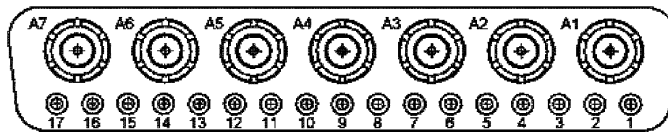
21WA4 INSERT CONFIGURATION
Figure 15



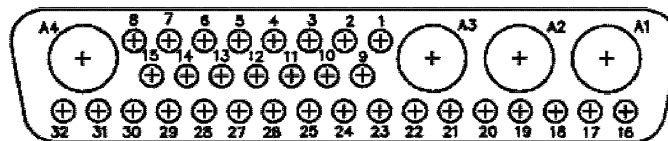
25W3 INSERT CONFIGURATION
Figure 16



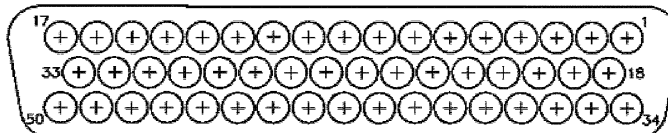
37 INSERT CONFIGURATION
Figure 17



24W7 INSERT CONFIGURATION
Figure 18



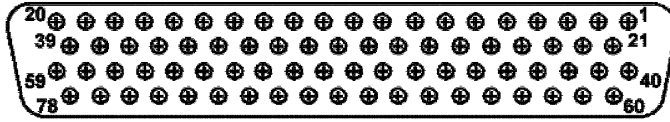
36W4 INSERT CONFIGURATION
Figure 19



50 INSERT CONFIGURATION
Figure 20

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS



78 INSERT CONFIGURATION
Figure 21

4. CONNECTOR DISASSEMBLY

A. Contact Removal

This paragraph gives the procedure to remove standard contacts. For the procedure to remove coax contacts, refer to Paragraph 4.B.

Table 9
CONTACT REMOVAL TOOLS

Contact Size	Removal Tool	
	Part Number	Color
22D	CIET-22D	White
	CIET-22MKJ	White
	DRK95-22M	-
	M81969/1-04	-
	M81969/14-01	-
	M24308/18-1	-
	MS27534-22D	-
20	6500-043-020-628	-
	6500-045-020	-
	CET 20-11	-
	CIET-20HD	-
	M24308/18-2	-
	M81969/1-02	-
	M81969/14-02	-
	MS18278-1	-
	MS27534-20	-
	NAS1664-20	-

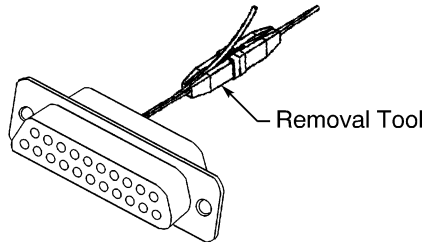
NOTE: The backshell must be removed from the connector before the contacts can be removed.

- (1) Make a selection of a contact removal tool from Table 9.
- (2) Put the tip of the tool on the wire.
- (3) At the rear of the connector, axially align the tool and the contact cavity at the rear of the connector.

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- (4) Carefully push the tool into the contact cavity until it stops. Refer to Figure 22. Make sure that the tool stays aligned with the contact cavity.

**POSITION OF THE REMOVAL TOOL IN THE CONTACT CAVITY****Figure 22**

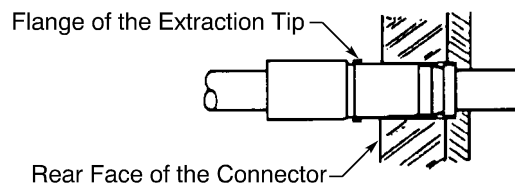
CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Hold the wire against the tool.
(6) Pull the tool and the wire out from the contact cavity at the same time. Make sure that the tool stays aligned with the contact cavity.
(7) If the contact is not released:
(a) Carefully remove the tool.
(b) Turn the tool approximately 90 degrees.
(c) Do Step (2) through Step (6) again.

B. Coax Contact Removal

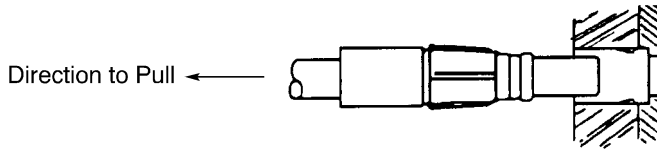
- (1) Push the flange of the extraction tip of the contact to the rear face of the connector. Refer to Figure 23.

**COAX CONTACT EXTRACTION TIP****Figure 23**

- (2) Carefully pull the coax contact assembly from the connector. Refer to Figure 24.

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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS



COAX CONTACT REMOVAL
Figure 24

5. CONNECTOR ASSEMBLY

A. Contact Assembly

This paragraph gives the procedure to assemble standard contacts with stranded wire. For the procedure to assemble:

- Standard contacts with solid conductor wire, refer to Paragraph 5.B.
- Coax contacts, refer to Paragraph 5.C.

Table 10
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
26	22	0.32	±0.01	Fold back the conductor
	20	0.40	±0.01	Fold back the conductor
24	22	0.16	±0.01	-
	20	0.20	±0.01	-
22	22	0.16	±0.01	-
	20	0.20	±0.01	-
20	20	0.20	±0.01	-

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**Table 11
CONTACT CRIMP TOOLS FOR STRANDED WIRE**

Contact Size	Contact Type	Wire Size (AWG)	Crimp Tool					
			Basic Unit			Locator		
			Part Number	Setting	Die Closure (inch)			
					Min			Max
22D	Socket	26	612118	-	-	-	612521	
			M22520/2-01	2	-	-	M22520/2-06	
			WA22	2	-	-	M22520/2-06	
			WA22LC	2	-	-	M22520/2-06	
		24	612118	-	-	-	612521	
			M22520/2-01	3	-	-	M22520/2-06	
			WA22	3	-	-	M22520/2-06	
			WA22LC	3	-	-	M22520/2-06	
		22	612118	-	-	-	612521	
			M22520/2-01	4	-	-	M22520/2-06	
			WA22	4	-	-	M22520/2-06	
			WA22LC	4	-	-	M22520/2-06	
	22D	Pin	26	612118	-	-	-	612521
				M22520/2-01	2	-	-	M22520/2-09
				WA22	2	-	-	M22520/2-09
				WA22LC	2	-	-	M22520/2-09
24			612118	-	-	-	612521	
			M22520/2-01	3	-	-	M22520/2-09	
			WA22	3	-	-	M22520/2-09	
			WA22LC	3	-	-	M22520/2-09	
22			612118	-	-	-	612521	
			M22520/2-01	4	-	-	M22520/2-09	
			WA22	4	-	-	M22520/2-09	
			WA22LC	4	-	-	M22520/2-09	

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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 11 (continued)

Contact Size	Contact Type	Wire Size (AWG)	Crimp Tool					
			Basic Unit			Locator		
			Part Number	Setting	Die Closure (inch)			
					Min			Max
20	Pin or Socket	26	612118	-	0.024	0.026	612513	
			AFM8	6	-	-	K13-1	
							M22520/2-08	
			M22520/2-01	6	-	-	K13-1	
							M22520/2-08	
			WA22	6	-	-	K13-1	
M22520/2-08								
WA22LC	6	-	-	K13-1				
				M22520/2-08				
20	Pin or Socket	24	612118	-	0.024	0.026	612513	
			AFM8	5	-	-	K13-1	
							M22520/2-08	
			M22520/2-01	5	-	-	K13-1	
							M22520/2-08	
			MS3191-1	-	-	-	P20-3191-1	
			ST2220-1	-	-	-	P20-3191-1	
							ST2220-1-43	
			ST2220-1-Y	-	-	-	11697-1	
							P20-3191-1	
							ST2220-1-43	
			WA22	5	-	-	K13-1	
M22520/2-08								
WA22AP	5	-	-	KAP13-1				
WA22LC	5	-	-	K13-1				
				M22520/2-08				

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 11 (continued)

Contact Size	Contact Type	Wire Size (AWG)	Crimp Tool					
			Basic Unit			Locator		
			Part Number	Setting	Die Closure (inch)			
					Min			Max
20	Pin or Socket	22	612118	-	0.024	0.026	612513	
			AFM8	6	-	-	K13-1	
							M22520/2-08	
			M22520/2-01	6	-	-	K13-1	
							M22520/2-08	
			MS3191-1	-	-	-	P20-3191-1	
			ST2220-1	-	-	-	P20-3191-1	
							ST2220-1-43	
			ST2220-1-Y	-	-	-	11697-1	
							P20-3191-1	
							ST2220-1-43	
			WA22	6	-	-	K13-1	
							M22520/2-08	
			WA22AP	6	-	-	KAP13-1	
WA22LC	6	-	-	K13-1				
				M22520/2-08				

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

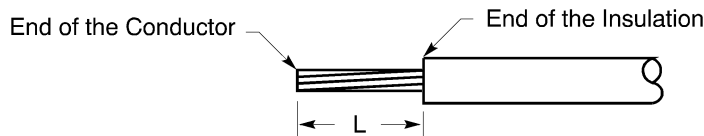
Table 11 (continued)

Contact Size	Contact Type	Wire Size (AWG)	Crimp Tool					
			Basic Unit			Locator		
			Part Number	Setting	Die Closure (inch)			
					Min			Max
20	Pin or Socket	20	612118	-	0.029	0.031	612513	
			AFM8	7	-	-	K13-1 M22520/2-08	
			M22520/2-01	7	-	-	K13-1 M22520/2-08	
			MS3191-1	-	-	-	P20-3191-1	
			ST2220-1	-	-	-	P20-3191-1 ST2220-1-43	
			ST2220-1-Y	-	-	-	11697-1 P20-3191-1 ST2220-1-43	
			WA22	7	-	-	K13-1 M22520/2-08	
			WA22AP	7	-	-	KAP13-1	
			WA22LC	7	-	-	K13-1 M22520/2-08	

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 25
- Table 10 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 25

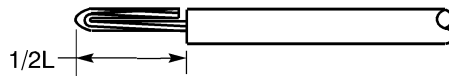
(2) If it is specified, fold the conductor back on itself.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Refer to:

- Table 10
- Figure 26.

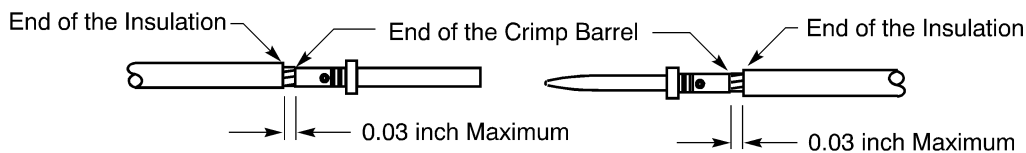


FOLDED BACK CONDUCTOR
Figure 26

- (3) Make a selection of a crimp tool from Table 11.
- (4) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the end of the crimp barrel. Refer to Figure 27.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 27

- (5) Crimp the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

B. Assembly of a Contact with Solid Conductor Wire

This paragraph gives the procedure to assemble contacts with solid conductor wire and stranded filler wire.

NOTE: Only stranded wire can be used for the filler wire.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

**Table 12
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
26	22	0.16	± 0.02
	20	0.20	± 0.02
24	22	0.16	± 0.02
	20	0.20	± 0.02
22	22	0.16	± 0.02
	20	0.20	± 0.02
20	20	0.20	± 0.02

**Table 13
CONTACT CRIMP TOOLS FOR SOLID CONDUCTOR WIRE**

Contact		Solid Wire Size (AWG)	Stranded Filler Wire Size (AWG)	Crimp Tool		
Size	Type			Basic Unit		Locator
		Part Number	Setting			
22D	Pin	30	24	AFM8	3	K41 M22520/2-06
				M22520/2-01	3	K41 M22520/2-06
				WA22	3	K41 M22520/2-06
				WA22LC	3	K41 M22520/2-06
		28	24	AFM8	3	K41 M22520/2-06
						M22520/2-01
				WA22	3	
						WA22LC

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 13 (continued)

Contact		Solid Wire Size (AWG)	Stranded Filler Wire Size (AWG)	Crimp Tool		
Size	Type			Basic Unit		Locator
				Part Number	Setting	
22D	Pin	26	24	AFM8	4	K41
						M22520/2-06
				M22520/2-01	4	K41
						M22520/2-06
		WA22	4	K41		
				M22520/2-06		
		WA22LC	4	K41		
				M22520/2-06		
24		26	AFM8	4	K41	
					M22520/2-06	
			M22520/2-01	4	K41	
					M22520/2-06	
WA22	4	K41				
		M22520/2-06				
WA22LC	4	K41				
		M22520/2-06				

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 13 (continued)

Contact		Solid Wire Size (AWG)	Stranded Filler Wire Size (AWG)	Crimp Tool		
Size	Type			Basic Unit		Locator
				Part Number	Setting	
20	Pin or Socket	30	22	AFM8	6	K13-1
						M22520/2-08
				M22520/2-01	6	K13-1
						M22520/2-08
				WA22	6	K13-1
						M22520/2-08
		WA22LC	6	K13-1		
				M22520/2-08		
		28	22	AFM8	6	K13-1
						M22520/2-08
				M22520/2-01	6	K13-1
						M22520/2-08
WA22	6			K13-1		
				M22520/2-08		
WA22LC	6	K13-1				
		M22520/2-08				

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 13 (continued)

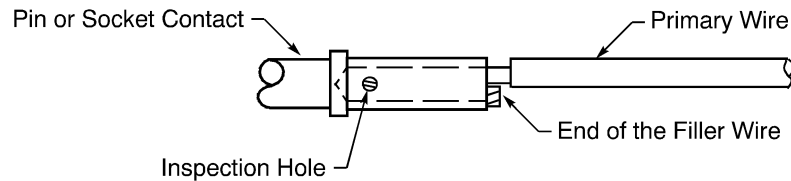
Contact		Solid Wire Size (AWG)	Stranded Filler Wire Size (AWG)	Crimp Tool		
				Basic Unit		Locator
Size	Type			Part Number	Setting	
20	Pin or Socket	26	22	AFM8	7	K13-1
						M22520/2-08
				M22520/2-01	7	K13-1
						M22520/2-08
		WA22	7	K13-1		
				M22520/2-08		
		24	22	AFM8	7	K13-1
						M22520/2-08
M22520/2-01	7			K13-1		
				M22520/2-08		
WA22	7	K13-1				
		M22520/2-08				
WA22LC	7	K13-1				
		M22520/2-08				

- (1) Make a selection of a crimp tool from Table 13.
- (2) Remove the necessary length of insulation from the end of the solid conductor wire.
Refer to:
 - Table 12 for the insulation removal length
 - Subject 20-00-15 for the insulation removal procedures.
- (3) Remove 0.5 inch of insulation from the end of the specified filler wire.
Refer to:
 - Table 13 for the size of the specified filler wire.
 - Subject 20-00-15 for the insulation removal procedures.
- (4) Put the end of the solid conductor wire and the filler wire in the crimp barrel of the contact.
Make sure that:
 - All of the strands of the filler wire and the solid conductor are in the crimp barrel of the contact
 - The strands of the conductors are visible in the inspection hole of the contact
 - The distance between the end of the crimp barrel and the insulation of the primary solid conductor wire is a maximum of 0.03 inch.
- (5) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

- (6) Carefully remove the unwanted length of the strands of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 28.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE
Figure 28

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR OF THE PRIMARY WIRE. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

C. Coax Contact Assembly

Table 14
COAX CONTACT FERRULE CRIMP TOOLS

Basic Unit	Locator	
	Part Number	Cavity
CCT-DM	Y322	A
HX4	Y322	A

Table 15
NECESSARY MATERIALS

Material	Part Number	Supplier
Heat Shrinkable Sleeve	RW-175	Raychem

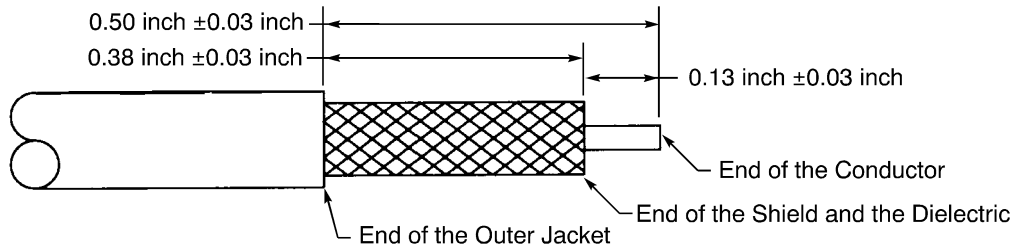
- (1) Make a selection of a ferrule crimp tool from Table 14.
- (2) Make a selection of a heat shrinkable sleeve from Table 15.
- (3) In this sequence, put these components on the cable:
 - The extraction tip
 - A 1.5 inch length of heat shrinkable sleeve
 - The ferrule
 - A 0.75 inch length of heat shrinkable sleeve
 - A 0.75 inch length of heat shrinkable sleeve.

Make sure that each sleeve that has the smallest diameter that can be moved easily on the cable.

- (4) Prepare the cable. Refer to Figure 29.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS



COAX CABLE PREPARATION

Figure 29

- (a) Remove 0.50 inch ±0.03 inch of the outer jacket from the end of the cable.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE SHIELD. DAMAGE TO THE SHIELD CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
- (b) Remove the necessary length of the shield to make the distance from the end of the outer jacket to the end of the shield to equal to 0.38 inch ±0.03 inch.
- (c) Remove the necessary length of the dielectric to make the distance from the end of the to outer jacket to the end of the dielectric equal to 0.38 inch ±0.03 inch.
 - CAUTION:** DO NOT CUT OR MAKE A NICK IN THE CENTER CONDUCTOR. DAMAGE TO THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.
- (d) Remove the necessary length of the conductor to make the distance from the end of the dielectric to the end of the conductor equal to 0.13 inch ±0.03 inch.
- (5) Align the forward edge of the first 0.75 inch length of heat shrinkable sleeve with the end of the outer jacket.
- (6) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (7) Align the forward edge of the second 0.75 inch length of heat shrinkable sleeve with the end of the outer jacket.
- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (9) Tin these components:
 - The center conductor
 - The solder cup of the contact.
- (10) Open the end of the shield.

Make sure that the strands of the shield are not moved apart.
- (11) Push the contact body on the end of the cable until the dielectric is against the end of the solder cup.

Make sure that:

 - The crimp barrel of the contact is between the dielectric and the shield
 - The center conductor is in the solder cup.
- (12) Solder the conductor to the solder cup.
- (13) Align the forward end of the ferrule with the shoulder of the contact body.

Make sure that the strands of the shield are symmetrical around the circumference of the contact body.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

- (14) Crimp the ferrule.
- (15) Remove the unwanted shield strands that extend farther than the forward end of the ferrule.
- (16) Align the forward end of the 1.5 inch length of sleeve with the shoulder of the contact body.
- (17) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (18) Push the extraction tip forward on the contact body until the flange of the extraction tip is against the shoulder of the contact body.

D. Contact Insertion

This paragraph gives the procedure to insert standard contacts. For the procedure to insert coax contacts, refer to Paragraph 5.E.

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector. Refer to Paragraph 5.G.

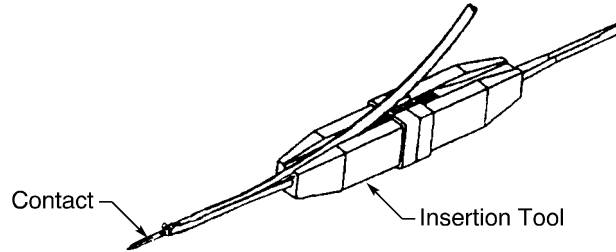
**Table 16
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool	
	Part Number	Color
22D	CIET-22D	Green
	CIET-22MKJ	Green
	DAK95-22M	-
	M81969/1-04	-
	M81969/14-01	-
	M24308/18-1	-
	MS27534-22D	-
20	6500-043-020-628	-
	6500-045-020	-
	CET 20-11	Red
	CIET-20HD	Red
	M24308/18-2	-
	M81969/1-02	-
	M81969/14-02	-
	MS18278-1	-
	MS27534-20	-
	NAS1664-20	-

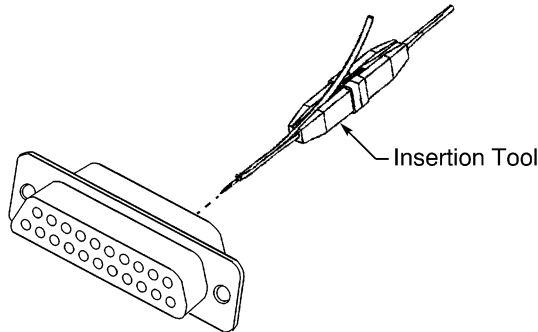
- (1) Make a selection of an insertion tool from Table 16.

NOTE: Contacts can be inserted by hand.

- (2) Put the contact assembly in the insertion tool. Refer to Figure 30.

STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS****POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL****Figure 30**

- (3) At the rear of the connector, axially align the contact assembly, the insertion tool, and the contact cavity. Refer to Figure 31.

**ALIGNMENT OF THE CONTACT ASSEMBLY, THE INSERTION TOOL, AND THE CONTACT CAVITY****Figure 31**

- (4) Push the tool into the contact cavity until it stops.

Make sure that the tool stays aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out of the contact cavity.

- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:

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STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS**

- (a) Pull the contact assembly out of the contact cavity.
- (b) Do Step (1) through Step (6) again.

E. Coax Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector. Refer to Paragraph 5.G.

- (1) Axially align the coax contact assembly and the contact cavity at the rear of the connector.

NOTE: A tool is not necessary for the insertion of a coax contact assembly.

- (2) Carefully push the coax contact assembly into the contact cavity until it stops.

NOTE: The retention clip in the connector engages with the shoulder of the contact when the contact is fully inserted.

- (3) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (4) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (1) through Step (3) again.

F. Seal of an Empty Contact Cavity

The seal of an empty contact cavity is not necessary.

G. Backshell Assembly

- (1) If a backshell is specified, assemble the backshell. Refer to Subject 20-72-08.

H. Connector Installation Hardware Assembly

- (1) If a backshell is not specified, assemble the connector installation hardware. Refer to Subject 20-72-07.

NOTE: If a backshell is specified, the connector installation hardware is assembled when the backshell is assembled. Refer to Paragraph 5.G.

6. CONNECTOR INSTALLATION**A. Connector Installation in a Panel**

For the installation of a connector:

- With a backshell, installation in a panel occurs when the backshell is assembled. Refer to Paragraph 5.G.
- Without a backshell, the installation in a panel occurs when the connector installation hardware is assembled. Refer to Paragraph 5.H.

STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS****B. Connection of the Plug and the Receptacle****Table 17
NECESSARY TOOLS**

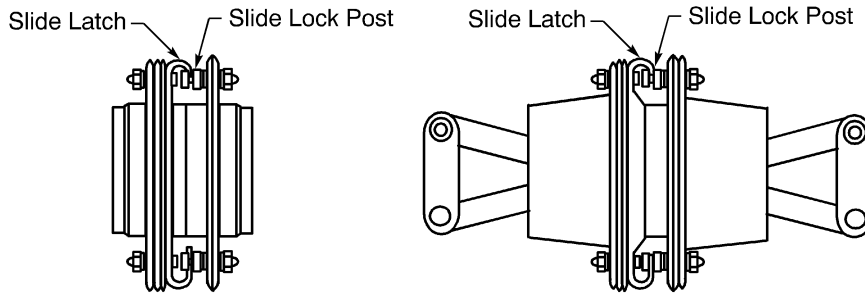
Tool	Type
Screwdriver	Flat tip

- (1) For connectors with jackscrew and jackpost installation hardware:
 - (a) Make a selection of a tool from Table 17.
 - (b) Align the engaging face of the plug with the engaging face of the receptacle.
 - (c) Push the plug into the receptacle.
Make sure that connectors are fully engaged.
 - (d) Put each jackscrew in the applicable jackpost.
 - (e) Turn one jackscrew clockwise two or three turns.
 - (f) Turn the other jackscrew clockwise two or three turns.
 - (g) Do Step (e) and Step (f) again until the jackscrews are fully engaged.
 - (h) Tighten each jackscrew.
- (2) For connectors with male and female screw lock installation hardware:
 - (a) Make a selection of a tool from Table 17.
 - (b) Align the engaging face of the plug with the engaging face of the receptacle.
 - (c) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (d) Put each screw in the applicable female screw lock.
 - (e) Turn one screw clockwise two or three turns.
 - (f) Turn the other screw clockwise two or three turns.
 - (g) Do Step (e) and Step (f) again until the screws are fully engaged.
 - (h) Tighten each jackscrew.
- (3) For connectors with spring plate and spring latch plate installation hardware:
 - (a) Align the engaging face of the plug with the engaging face of the receptacle.
 - (b) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (c) Engage each spring with the applicable spring latch plate.
- (4) For connectors with slide latch and slide lock post installation hardware:
 - (a) Align the engaging face of the plug with the engaging face of the receptacle.
Make sure that the slide latch is retracted to the open position.
 - (b) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (c) Engage the slot in the slide latch with the slide lock posts.
 - (d) Push the slide latch to the closed position. Refer to Figure 32.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Make sure the connectors are locked together.



CONNECTION OF THE PLUG AND THE RECEPTACLE - SLIDE LATCH HARDWARE
Figure 32

7. APPROVED TOOL SUPPLIERS

A. Contact Insertion Tools

Table 18
CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
6500-043-020-628	Daniels
6500-045-020	Daniels
CET 20-11	ITT Cannon
CIET-20HD	ITT Cannon
CIET-22D	ITT Cannon
CIET-22MKJ	ITT Cannon
DAK95-22M	Daniels
M24308/18-1	QPL
M24308/18-2	QPL
M81969/1-02	QPL
M81969/1-04	QPL
M81969/14-01	QPL
M81969/14-02	QPL
MS18278-1	QPL
MS27534-20	QPL
MS27534-22D	QPL
NAS1664-20	QPL

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

B. Contact Removal Tools

**Table 19
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
6500-043-020-628	Daniels
6500-045-020	Daniels
CET 20-11	ITT Cannon
CIET-20HD	ITT Cannon
CIET-22D	ITT Cannon
CIET-22MKJ	ITT Cannon
DRK95-22M	Daniels
M24308/18-1	QPL
M24308/18-2	QPL
M81969/1-02	QPL
M81969/1-04	QPL
M81969/14-01	QPL
M81969/14-02	QPL
MS18278-1	QPL
MS27534-20	QPL
MS27534-22D	QPL
NAS1664-20	QPL

C. Contact Crimp Tools

**Table 20
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
612118	Buchanan
612521	Buchanan
CCT-DM	ITT Cannon
HX4	Daniels
M22520/2-01	QPL
M22520/2-06	QPL
MS3191-1	QPL
P20-3191-1	ITT Cannon
ST2220-1	Boeing

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D-SUBMINIATURE CONNECTORS: ITT CANNON D()MA CONNECTORS

Table 20 (continued)

Crimp Tool	Supplier
ST2220-1-43	Boeing
ST2220-1-Y	Boeing
Y322	Daniels

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STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

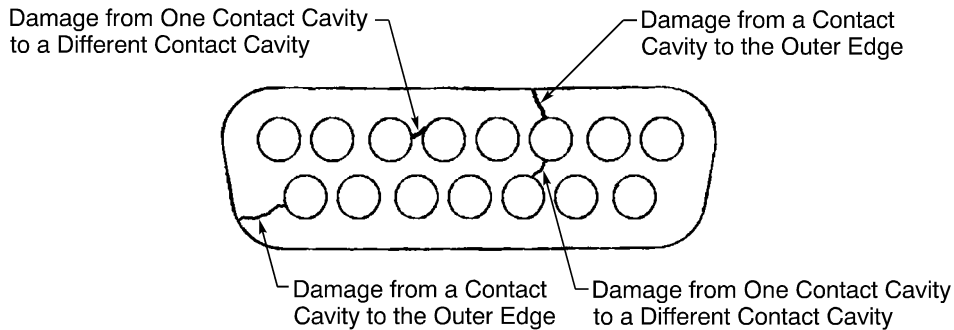
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STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS****1. GENERAL DATA****A. Damage Conditions - Rear Face of the Insert**

It is necessary to replace the connector if one or more of these conditions occur:

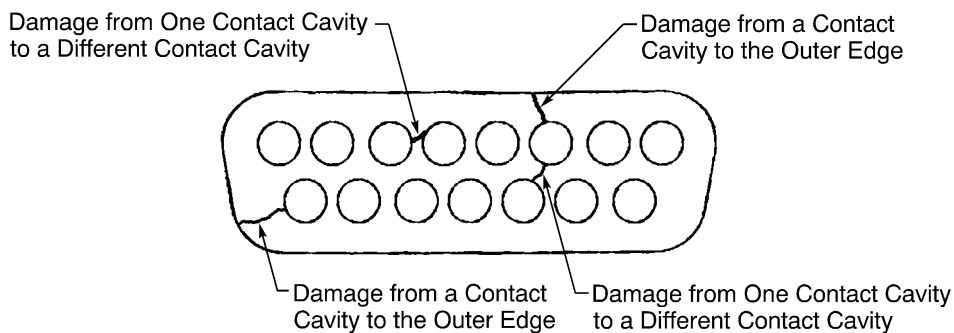
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 1
- The damage extends from one contact cavity to the outer edge of the insert; refer to Figure 1.

**REAR FACE OF THE INSERT - LENGTH OF DAMAGE****Figure 1****B. Damage Conditions - Front Face of the Insert**

It is necessary to replace the connector if one of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 2.

**FRONT FACE OF THE INSERT - LENGTH OF DAMAGE****Figure 2**

STANDARD WIRING PRACTICES MANUAL

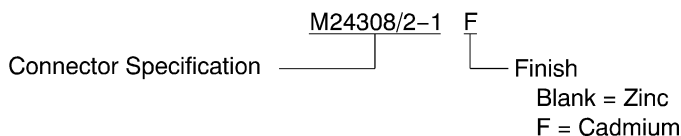
D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

2. PART NUMBERS AND DESCRIPTIONS

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Type	Shell Size	Insert Configuration	Contact Type	Supplier
M24308/2-1	Receptacle	1	A-1-1	Socket	QPL
M24308/2-2	Receptacle	2	A-2-1	Socket	QPL
M24308/2-3	Receptacle	3	A-3-1	Socket	QPL
M24308/2-4	Receptacle	4	A-4-1	Socket	QPL
M24308/2-5	Receptacle	5	A-5-1	Socket	QPL
M24308/2-11	Receptacle	1	A-1-2	Socket	QPL
M24308/2-13	Receptacle	3	A-3-2	Socket	QPL
M24308/2-15	Receptacle	5	A-5-2	Socket	QPL
M24308/2-32	Receptacle	5	A-5-2	Socket	QPL
M24308/4-1	Plug	1	A-1-1	Pin	QPL
M24308/4-2	Plug	2	A-2-1	Pin	QPL
M24308/4-3	Plug	3	A-3-1	Pin	QPL
M24308/4-4	Plug	4	A-4-1	Pin	QPL
M24308/4-5	Plug	5	A-5-1	Pin	QPL
M24308/4-11	Plug	1	A-1-2	Pin	QPL
M24308/4-12	Plug	2	A-2-2	Pin	QPL
M24308/4-15	Plug	5	A-5-2	Pin	QPL



**M24308/() CONNECTOR PART NUMBER STRUCTURE
Figure 3**

**Table 2
ALTERNATIVE CONNECTOR PART NUMBERS**

Part Number	Alternative Connector		
	Part Number	Supplier	Applicable Subject
M24308/2-1	17-10090-1	Amphenol	Subject 20-72-11
M24308/2-1	17-10090-1	WPI	Subject 20-72-11

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D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

Table 2 (continued)

Part Number	Alternative Connector		
	Part Number	Supplier	Applicable Subject
M24308/2-1	17-300-1	Amphenol	Subject 20-72-11
M24308/2-1	17-300-1	WPI	Subject 20-72-11
M24308/2-1	CEMA9S	Cory Components	Subject 20-72-10
M24308/2-1	CEMA9S	Tri-Star	Subject 20-72-10
M24308/2-1	DEMA9S	ITT Cannon	Subject 20-72-12
M24308/2-1	DEMAM9S	ITT Cannon	Subject 20-72-12
M24308/2-15	CDMA78S	Cory Components	Subject 20-72-10
	CDMA78S	Tri-Star	Subject 20-72-10
	DDMA78S	ITT Cannon	Subject 20-72-12
	DDMAM78S	ITT Cannon	Subject 20-72-12
M24308/2-2	17-10150-1	Amphenol	Subject 20-72-11
	17-10150-1	WPI	Subject 20-72-11
	17-302-1	Amphenol	Subject 20-72-11
	17-302-1	WPI	Subject 20-72-11
	CAMA15S	Cory Components	Subject 20-72-10
	CAMA15S	Tri-Star	Subject 20-72-10
	DAMA15S	ITT Cannon	Subject 20-72-12
	DAMAM15S	ITT Cannon	Subject 20-72-12
M24308/2-3	17-10250-1	Amphenol	Subject 20-72-11
	17-10250-1	WPI	Subject 20-72-11
	17-304-1	Amphenol	Subject 20-72-11
	17-304-1	WPI	Subject 20-72-11
	CBMA25S	Cory Components	Subject 20-72-10
	CBMA25S	Tri-Star	Subject 20-72-10
	DBMA25S	ITT Cannon	Subject 20-72-12
	DBMAM25S	ITT Cannon	Subject 20-72-12

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

Table 2 (continued)

Part Number	Alternative Connector		
	Part Number	Supplier	Applicable Subject
M24308/2-4	17-10370-1	Amphenol	Subject 20-72-11
	17-10370-1	WPI	Subject 20-72-11
	17-306-1	Amphenol	Subject 20-72-11
	17-306-1	WPI	Subject 20-72-11
	CCMA37S	Cory Components	Subject 20-72-10
	CCMA37S	Tri-Star	Subject 20-72-10
	DCMA37S	ITT Cannon	Subject 20-72-12
	DCMAM37S	ITT Cannon	Subject 20-72-12
M24308/2-5	17-10500-1	Amphenol	Subject 20-72-11
	17-10500-1	WPI	Subject 20-72-11
	17-308-1	Amphenol	Subject 20-72-11
	17-308-1	WPI	Subject 20-72-11
	CDMA50S	Cory Components	Subject 20-72-10
	CDMA50S	Tri-Star	Subject 20-72-10
	DDMA50S	ITT Cannon	Subject 20-72-12
	DDMAM50S	ITT Cannon	Subject 20-72-12
M24308/4-1	17-20090-1	Amphenol	Subject 20-72-11
	17-20090-1	WPI	Subject 20-72-11
	17-301-1	Amphenol	Subject 20-72-11
	17-301-1	WPI	Subject 20-72-11
	CEMA9P	Cory Components	Subject 20-72-10
	CEMA9P	Tri-Star	Subject 20-72-10
	DEMA9P	ITT Cannon	Subject 20-72-12
	DEMAM9P	ITT Cannon	Subject 20-72-12
M24308/4-15	CDMA78P	Cory Components	Subject 20-72-10
	CDMA78P	Tri-Star	Subject 20-72-10
	DDMA78P	ITT Cannon	Subject 20-72-12
	DDMAM78P	ITT Cannon	Subject 20-72-12

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D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

Table 2 (continued)

Part Number	Alternative Connector		
	Part Number	Supplier	Applicable Subject
M24308/4-2	17-20150-1	Amphenol	Subject 20-72-11
	17-20150-1	WPI	Subject 20-72-11
	17-303-1	Amphenol	Subject 20-72-11
	17-303-1	WPI	Subject 20-72-11
	CAMA15P	Cory Components	Subject 20-72-10
	CAMA15P	Tri-Star	Subject 20-72-10
	DAMA15P	ITT Cannon	Subject 20-72-12
	DAMAM15P	ITT Cannon	Subject 20-72-12
M24308/4-3	17-20250-1	Amphenol	Subject 20-72-11
	17-20250-1	WPI	Subject 20-72-11
	17-305-1	Amphenol	Subject 20-72-11
	17-305-1	WPI	Subject 20-72-11
	CBMA25P	Cory Components	Subject 20-72-10
	CBMA25P	Tri-Star	Subject 20-72-10
	DBMA25P	ITT Cannon	Subject 20-72-12
	DBMAM25P	ITT Cannon	Subject 20-72-12
M24308/4-4	17-20370-1	Amphenol	Subject 20-72-11
	17-20370-1	WPI	Subject 20-72-11
	17-307-1	Amphenol	Subject 20-72-11
	17-307-1	WPI	Subject 20-72-11
	CCMA37P	Cory Components	Subject 20-72-10
	CCMA37P	Tri-Star	Subject 20-72-10
	DCMA37P	ITT Cannon	Subject 20-72-12
	DCMAM37P	ITT Cannon	Subject 20-72-12
M24308/4-5	17-20500-1	Amphenol	Subject 20-72-11
	17-20500-1	WPI	Subject 20-72-11
	17-309-1	Amphenol	Subject 20-72-11
	17-309-1	WPI	Subject 20-72-11
	CDMA50P	Cory Components	Subject 20-72-10
	CDMA50P	Tri-Star	Subject 20-72-10
	DDMA50P	ITT Cannon	Subject 20-72-12
	DDMAM50P	ITT Cannon	Subject 20-72-12

20-72-13

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

B. Connector Description

The M24308 series connectors have these properties:

- D subminiature rectangular configuration
- Metal shells
- Crimp type, rear release pin contacts in the plug
- Crimp type, rear release socket contacts in the receptacle

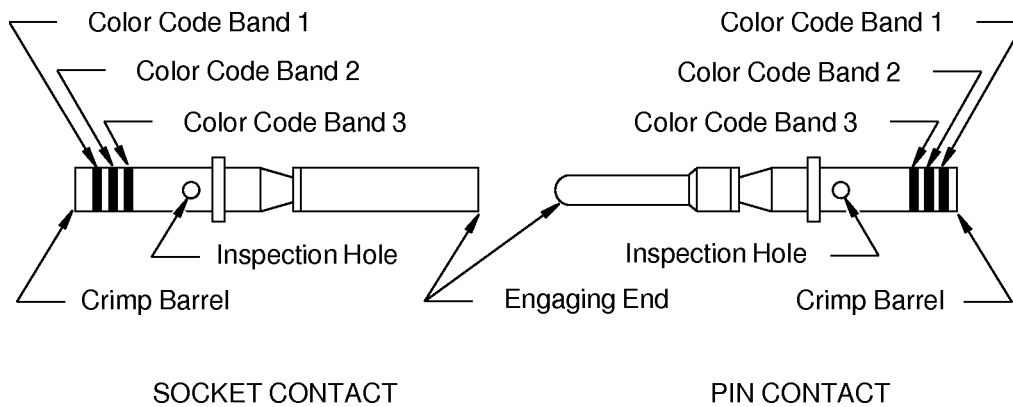
C. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

Contact Size	Contact Engaging End Size	Contact Crimp Barrel Size	Contact Type	Part Number	Supplier
22D	22	22	Pin	M39029/58-360	QPL
			Socket	M39029/57-354	QPL
20	20	20	Pin	M39029/64-369	QPL
			Socket	M39029/63-368	QPL

**Table 4
CONTACT COLOR CODES**

Contact	Color Code		
	Band 1	Band 2	Band 3
M39029/57-354	Orange	Green	Yellow
M39029/58-360	Orange	Blue	Black
M39029/63-368	Orange	Blue	Gray
M39029/64-369	Orange	Blue	White



**STANDARD CONTACTS
Figure 4**

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

3. INSERT CONFIGURATIONS

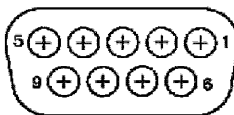
A. M24308 Series Connectors

NOTE: The contact cavity size that is specified in Table 5 is equivalent to the size of the engaging end of the contact.

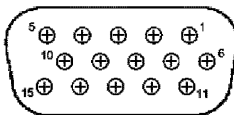
NOTE: Figure 5 through Figure 13 show the rear face of an insert that has pin contacts. The view of the rear face of an insert that has socket contacts is the mirror image of this view.

**Table 5
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
A-1-1	9	20	Figure 5
A-1-2	15	22D	Figure 6
A-2-1	15	20	Figure 7
A-2-2	26	22D	Figure 8
A-3-1	25	20	Figure 9
A-3-2	44	22D	Figure 10
A-4-1	37	20	Figure 11
A-5-1	50	20	Figure 12
A-5-2	78	22D	Figure 13



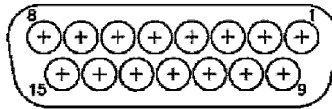
**A-1-1 INSERT CONFIGURATION
Figure 5**



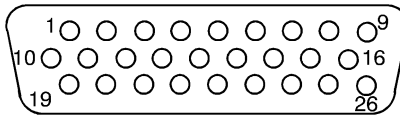
**A-1-2 INSERT CONFIGURATION
Figure 6**

STANDARD WIRING PRACTICES MANUAL

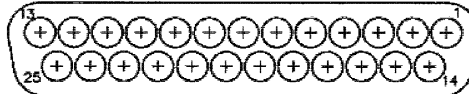
D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS



A-2-1 INSERT CONFIGURATION
Figure 7



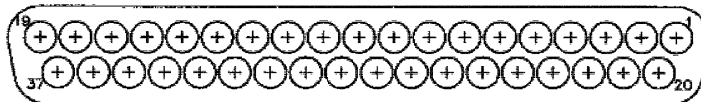
A-2-2 INSERT CONFIGURATION
Figure 8



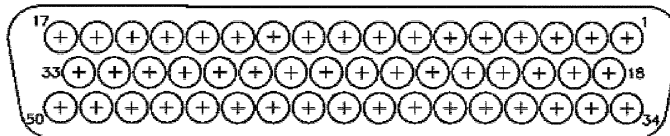
A-3-1 INSERT CONFIGURATION
Figure 9



A-3-2 INSERT CONFIGURATION
Figure 10



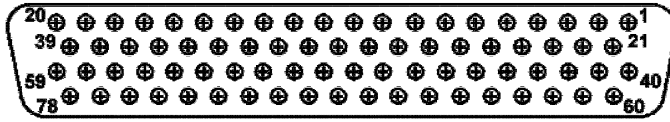
A-4-1 INSERT CONFIGURATION
Figure 11



A-5-1 INSERT CONFIGURATION
Figure 12

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D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS



A-5-2 INSERT CONFIGURATION
Figure 13

4. CONNECTOR DISASSEMBLY

A. Contact Removal

Table 6
CONTACT REMOVAL TOOLS

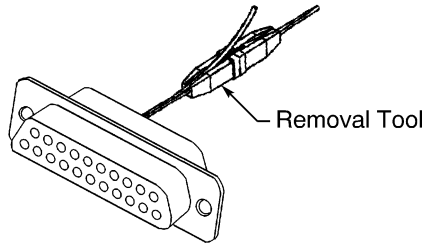
Contact Size	Removal Tool	
	Part Number	Color
22D	CIET-22D	White
	CIET-22MKJ	White
	DRK95-22M	-
	M81969/1-04	-
	M81969/14-01	-
	M24308/18-1	-
	MS27534-22D	-
20	6500-043-020-628	-
	6500-045-020	-
	CET 20-11	-
	CIET-20HD	-
	M24308/18-2	-
	M81969/1-02	-
	M81969/14-02	-
	MS18278-1	-
	MS27534-20	-
	NAS1664-20	-

NOTE: The backshell must be removed from the connector before the contacts can be removed.

- (1) Make a selection of a contact removal tool from Table 6.
- (2) Put the tip of the tool on the wire.
- (3) At the rear of the connector, axially align the tool and the contact cavity.
- (4) Carefully push the tool into the contact cavity until it stops. Refer to Figure 14.
Make sure that the tool stays aligned with the contact cavity.

STANDARD WIRING PRACTICES MANUAL

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POSITION OF THE REMOVAL TOOL IN THE CONTACT CAVITY

Figure 14

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Hold the wire against the tool.
- (6) Pull the tool and the wire out of the contact cavity at the same time.
Make sure that the tool stays aligned with the contact cavity.
- (7) If the contact is not released:
 - (a) Carefully pull the tool out of the contact cavity.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (2) through Step (6) again.

5. CONNECTOR ASSEMBLY

A. Contact Assembly

This paragraph gives the procedure to assemble standard contacts with stranded wire. For the procedure to assemble Standard contacts with solid conductor wire, refer to Paragraph 5.B.:

**Table 7
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
26	22	0.32	± 0.01	Fold back the conductor
	20	0.40	± 0.02	Fold back the conductor
24	22	0.16	± 0.01	-
	20	0.20	± 0.01	-
22	22	0.16	± 0.01	-
	20	0.20	± 0.01	-

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Table 7 (continued)

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
20	20	0.20	± 0.01	-

Table 8
CONTACT CRIMP TOOLS FOR STRANDED WIRE

Contact		Wire Size (AWG)	Crimp Tool				Locator
Size	Type		Basic Unit			Die Closure (inch)	
			Part Number	Setting	Min		
22D	Socket	26	612118	-	-	-	612521
			M22520/2-01	2	-	-	M22520/2-06
			WA22	2	-	-	M22520/2-06
			WA22LC	2	-	-	M22520/2-06
		24	612118	-	-	-	612521
			M22520/2-01	3	-	-	M22520/2-06
			WA22	3	-	-	M22520/2-06
			WA22LC	3	-	-	M22520/2-06
		22	612118	-	-	-	612521
			M22520/2-01	4	-	-	M22520/2-06
			WA22	4	-	-	M22520/2-06
			WA22LC	4	-	-	M22520/2-06

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D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

Table 8 (continued)

Contact		Wire Size (AWG)	Crimp Tool				
			Basic Unit			Locator	
Size	Type		Part Number	Setting	Die Closure (inch)		
		Min			Max		
22D	Pin	26	612118	-	-	-	612521
			M22520/2-01	2	-	-	M22520/2-09
			WA22	2	-	-	M22520/2-09
			WA22LC	2	-	-	M22520/2-09
		24	612118	-	-	-	612521
			M22520/2-01	3	-	-	M22520/2-09
			WA22	3	-	-	M22520/2-09
			WA22LC	3	-	-	M22520/2-09
		22	612118	-	-	-	612521
			M22520/2-01	4	-	-	M22520/2-09
			WA22	4	-	-	M22520/2-09
			WA22LC	4	-	-	M22520/2-09
20	Pin or Socket	26	612118	-	0.024	0.026	612513
			AFM8	6	-	-	K13-1
							M22520/2-08
			M22520/2-01	6	-	-	K13-1
							M22520/2-08
			WA22	6	-	-	K13-1
							M22520/2-08
			WA22LC	6	-	-	K13-1
M22520/2-08							



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D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

Table 8 (continued)

Contact		Wire Size (AWG)	Crimp Tool				Locator
Size	Type		Basic Unit				
			Part Number	Setting	Die Closure (inch)		
		Min			Max		
20	Pin or Socket	24	612118	-	0.024	0.026	612513
			AFM8	5	-	-	K13-1 M22520/2-08
			M22520/2-01	5	-	-	K13-1 M22520/2-08
			MS3191-1	-	-	-	P20-3191-1
			ST2220-1	-	-	-	P20-3191-1 ST2220-1-43
			ST2220-1-Y	-	-	-	11697-1 P20-3191-1 ST2220-1-43
			WA22	5	-	-	K13-1 M22520/2-08
			WA22AP	5	-	-	KAP13-1
			WA22LC	5	-	-	K13-1 M22520/2-08

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Table 8 (continued)

Contact		Wire Size (AWG)	Crimp Tool				Locator
Size	Type		Basic Unit				
			Part Number	Setting	Die Closure (inch)		
		Min			Max		
20	Pin or Socket	22	612118	-	0.024	0.026	612513
			AFM8	6	-	-	K13-1 M22520/2-08
			M22520/2-01	6	-	-	K13-1 M22520/2-08
			MS3191-1	-	-	-	P20-3191-1
			ST2220-1	-	-	-	P20-3191-1 ST2220-1-43
			ST2220-1-Y	-	-	-	11697-1 P20-3191-1 ST2220-1-43
			WA22	6	-	-	K13-1 M22520/2-08
			WA22AP	6	-	-	KAP13-1
			WA22LC	6	-	-	K13-1 M22520/2-08

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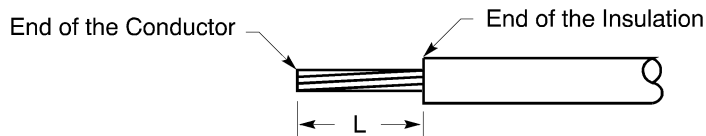
Table 8 (continued)

Contact		Wire Size (AWG)	Crimp Tool				Locator
			Basic Unit			Die Closure (inch)	
Size	Type		Part Number	Setting	Die Closure (inch)		
		Min			Max		
20	Pin or Socket	20	612118	-	0.029	0.031	612513
			AFM8	7	-	-	K13-1 M22520/2-08
			M22520/2-01	7	-	-	K13-1 M22520/2-08
			MS3191-1	-	-	-	P20-3191-1
			ST2220-1	-	-	-	P20-3191-1 ST2220-1-43
			ST2220-1-Y	-	-	-	11697-1 P20-3191-1 ST2220-1-43
			WA22	7	-	-	K13-1 M22520/2-08
			WA22AP	7	-	-	KAP13-1
			WA22LC	7	-	-	K13-1 M22520/2-08

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 15
- Table 7 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 15

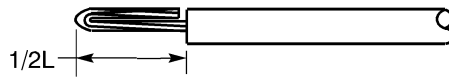
(2) If it is necessary, fold the conductor back on itself.

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Refer to:

- Table 7
- Figure 16.

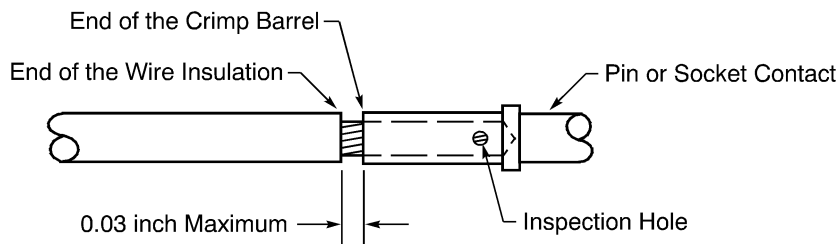


FOLDED BACK CONDUCTOR
Figure 16

- (3) Make a selection of a crimp tool from Table 8.
- (4) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the end of the crimp barrel. Refer to Figure 17.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 17

- (5) Crimp the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

B. Assembly of a Contact with Solid Conductor Wire

This paragraph gives the procedure to assemble contacts with solid conductor wire and stranded filler wire.

NOTE: Only stranded wire can be used for the filler wire.

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**Table 9
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
26	22	0.16	± 0.02
	20	0.20	± 0.02
24	22	0.16	± 0.02
	20	0.20	± 0.02
22	22	0.16	± 0.02
	20	0.20	± 0.02
20	20	0.20	± 0.02

**Table 10
CONTACT CRIMP TOOLS FOR SOLID CONDUCTOR WIRE**

Contact		Solid Wire Size (AWG)	Stranded Filler Wire Size (AWG)	Crimp Tool		
Size	Type			Basic Unit		Locator
		Part Number	Setting			
22D	Pin	30	24	AFM8	3	K41 M22520/2-06
				M22520/2-01	3	K41 M22520/2-06
				WA22	3	K41 M22520/2-06
				WA22LC	3	K41 M22520/2-06
				AFM8	3	K41 M22520/2-06
				M22520/2-01	3	K41 M22520/2-06
		WA22	3	K41 M22520/2-06		
		WA22LC	3	K41 M22520/2-06		

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D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

Table 10 (continued)

Contact		Solid Wire Size (AWG)	Stranded Filler Wire Size (AWG)	Crimp Tool			
Size	Type			Basic Unit		Locator	
				Part Number	Setting		
22D	Pin	26	24	AFM8	4	K41	
						M22520/2-06	
				M22520/2-01	4	K41	
						M22520/2-06	
				WA22	4	K41	
						M22520/2-06	
		WA22LC	4	K41			
				M22520/2-06			
		24		26	AFM8	4	K41
							M22520/2-06
					M22520/2-01	4	K41
							M22520/2-06
WA22	4				K41		
					M22520/2-06		
WA22LC	4	K41					
		M22520/2-06					

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

Table 10 (continued)

Contact		Solid Wire Size (AWG)	Stranded Filler Wire Size (AWG)	Crimp Tool		
Size	Type			Basic Unit		Locator
				Part Number	Setting	
20	Pin or Socket	30	22	AFM8	6	K13-1
						M22520/2-08
				M22520/2-01	6	K13-1
						M22520/2-08
				WA22	6	K13-1
						M22520/2-08
		WA22LC	6	K13-1		
				M22520/2-08		
		28	22	AFM8	6	K13-1
						M22520/2-08
				M22520/2-01	6	K13-1
						M22520/2-08
WA22	6			K13-1		
				M22520/2-08		
WA22LC	6	K13-1				
		M22520/2-08				

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

Table 10 (continued)

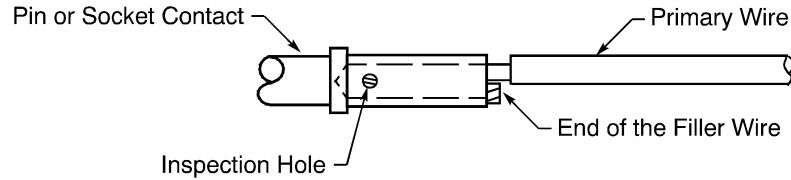
Contact		Solid Wire Size (AWG)	Stranded Filler Wire Size (AWG)	Crimp Tool		
				Basic Unit		Locator
Size	Type			Part Number	Setting	
20	Pin or Socket	26	22	AFM8	7	K13-1
						M22520/2-08
				M22520/2-01	7	K13-1
						M22520/2-08
				WA22	7	K13-1
						M22520/2-08
		WA22LC	7	K13-1		
				M22520/2-08		
		24	22	AFM8	7	K13-1
						M22520/2-08
				M22520/2-01	7	K13-1
						M22520/2-08
WA22	7			K13-1		
				M22520/2-08		
WA22LC	7	K13-1				
		M22520/2-08				

- (1) Make a selection of a crimp tool from Table 7.
- (2) Remove the necessary length of insulation from the end of the solid conductor wire.
Refer to:
 - Table 9 for the insulation removal length
 - Subject 20-00-15 for the insulation removal procedures.
- (3) Remove 0.5 inch of insulation from the end of the specified filler wire.
Refer to:
 - Table 7 for the size of the specified filler wire.
 - Subject 20-00-15 for the insulation removal procedures.
- (4) Put the end of the solid conductor wire and the filler wire in the crimp barrel of the contact.
Make sure that:
 - All of the strands of the filler wire and the solid conductor are in the crimp barrel of the contact
 - The strands of the conductors are visible in the inspection hole of the contact
 - The distance between the end of the crimp barrel and the insulation of the primary solid conductor wire is a maximum of 0.03 inch.
- (5) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

- (6) Carefully remove the unwanted length of the strands of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 18.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE
Figure 18

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR OF THE PRIMARY WIRE. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

C. Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be installed on the wire harness before the insertion of the contacts into the connector. Refer to Paragraph 5.E.

Table 11
CONTACT INSERTION TOOLS

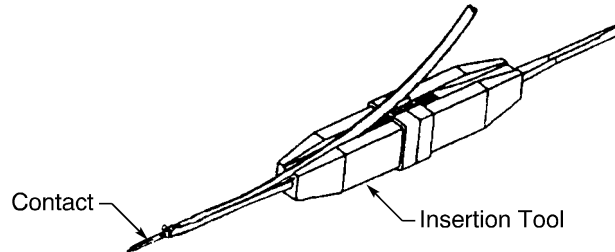
Contact Size	Insertion Tool	
	Part Number	Color
22D	CIET-22D	Green
	CIET-22MKJ	Green
	DAK95-22M	-
	M81969/1-04	-
	M81969/14-01	-
	M24308/18-1	-
	MS27534-22D	-
20	6500-043-020-628	-
	6500-045-020	-
	CET 20-11	Red
	CIET-20HD	Red
	M24308/18-2	-
	M81969/1-02	-
	M81969/14-02	-
	MS18278-1	-
	MS27534-20	-
	NAS1664-20	-

STANDARD WIRING PRACTICES MANUAL**D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS**

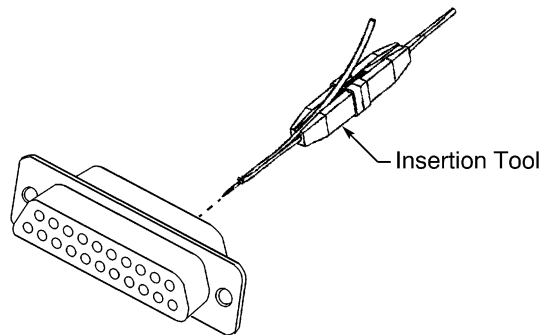
- (1) Make a selection of the contact insertion tool from Table 11.

NOTE: Contacts can be inserted by hand.

- (2) Put the contact assembly in the insertion tool. Refer to Figure 19.

**POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL****Figure 19**

- (3) At the rear of the connector, axially align the contact assembly, the insertion tool, and the contact cavity. Refer to Figure 20.

**ALIGNMENT OF THE CONTACT ASSEMBLY, THE INSERTION TOOL, AND THE CONTACT CAVITY****Figure 20**

- (4) Push the tool into the contact cavity until it stops.

Make sure that the tool stays aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool from the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

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D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the cavity.
 - (b) Do Step (3) through Step (6) again.

D. Seal of an Empty Contact Cavity

The seal of an empty contact cavity is not necessary.

E. Backshell Assembly

- (1) If a backshell is specified, assemble the backshell. Refer to Subject 20-72-08.

F. Connector Installation Hardware Assembly

- (1) If a backshell is not specified, assemble the connector installation hardware. Refer to Subject 20-72-07.

NOTE: If a backshell is specified, the connector installation hardware is assembled when the backshell is assembled. Refer to Paragraph 5.E.

6. CONNECTOR INSTALLATION

A. Connector Installation in a Panel

For the installation of a connector:

- With a backshell, installation in a panel occurs when the backshell is assembled. Refer to Paragraph 5.E.
- Without a backshell, the installation in a panel occurs when the connector installation hardware is assembled. Refer to Paragraph 5.F.

B. Connection of the Plug and the Receptacle

**Table 12
NECESSARY TOOLS**

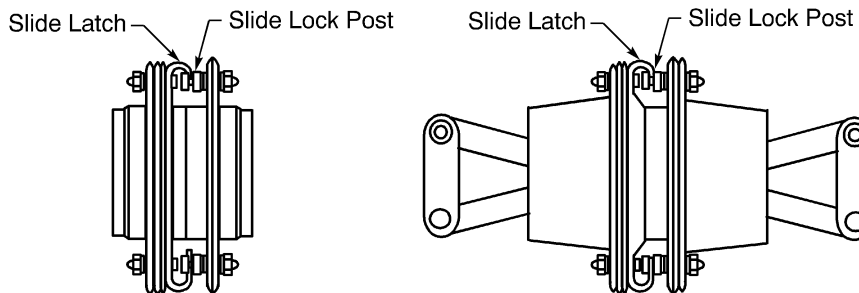
Tool	Type
Screwdriver	Flat tip

- (1) For connectors with jackscrew and jackpost installation hardware:
 - (a) Make a selection of a tool from Table 12.
 - (b) Align the engaging face of the plug with the engaging face of the receptacle.
 - (c) Push the plug into the receptacle.
Make sure that connectors are fully engaged.
 - (d) Put each jackscrew in the applicable jackpost.
 - (e) Turn one jackscrew clockwise two or three turns.
 - (f) Turn the other jackscrew clockwise two or three turns.

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D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

- (g) Do Step (e) and Step (f) again until the jackscrews are fully engaged.
- (h) Tighten each jackscrew.
- (2) For connectors with male and female screw lock installation hardware:
 - (a) Make a selection of a tool from Table 12.
 - (b) Align the engaging face of the plug with the engaging face of the receptacle.
 - (c) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (d) Put each screw in the applicable female screw lock.
 - (e) Turn one screw clockwise two or three turns.
 - (f) Turn the other screw clockwise two or three turns.
 - (g) Do Step (e) and Step (f) again until the screws are fully engaged.
 - (h) Tighten each jackscrew.
- (3) For connectors with spring plate and spring latch plate installation hardware:
 - (a) Align the engaging face of the plug with the engaging face of the receptacle.
 - (b) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (c) Engage each spring with the applicable spring latch plate.
- (4) For connectors with slide latch and slide lock post installation hardware:
 - (a) Align the engaging face of the plug with the engaging face of the receptacle.
Make sure that the slide latch is retracted to the open position.
 - (b) Push the plug into the receptacle.
Make sure that the connectors are fully engaged.
 - (c) Engage the slot in the slide latch with the slide lock posts.
 - (d) Push the slide latch to the closed position. Refer to Figure 21.
Make sure the connectors are locked together.



CONNECTION OF THE PLUG AND THE RECEPTACLE - SLIDE LATCH HARDWARE
Figure 21

STANDARD WIRING PRACTICES MANUAL

D-SUBMINIATURE CONNECTORS: M24308 SERIES CONNECTORS

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 13
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
6500-043-020-628	Daniels
6500-045-020	Daniels
CET 20-11	ITT Cannon
CIET-20HD	ITT Cannon
CIET-22D	ITT Cannon
CIET-22MKJ	ITT Cannon
DRK95-22M	Daniels
M24308/18-1	QPL
M24308/18-2	QPL
M81969/1-02	QPL
M81969/1-04	QPL
M81969/14-01	QPL
M81969/14-02	QPL
MS18278-1	QPL
MS27534-20	QPL
MS27534-22D	QPL
NAS1664-20	QPL

B. Contact Crimp Tools

**Table 14
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/2-01	QPL
M22520/2-06	QPL
M22520/2-08	QPL
M22520/2-09	QPL



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C. Contact Insertion Tools

Table 15
CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
6500-043-020-628	Daniels
6500-045-020	Daniels
CET 20-11	ITT Cannon
CIET-20HD	ITT Cannon
CIET-22D	ITT Cannon
CIET-22MKJ	ITT Cannon
DAK95-22M	Daniels
M24308/18-1	QPL
M24308/18-2	QPL
M81969/1-02	QPL
M81969/1-04	QPL
M81969/14-01	QPL
M81969/14-02	QPL
MS18278-1	QPL
MS27534-20	QPL
MS27534-22D	QPL
NAS1664-20	QPL

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ASSEMBLY OF ITT CANNON D(U) D SUBMINIATURE CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ITT CANNON D(U) D SUBMINIATURE CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
D SUBMINIATURE CONNECTOR PART NUMBERS**

Part Number	Supplier
D(U)	ITT Cannon

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Type	Part Number	Supplier
Pin	030-1952-000	ITT Cannon
Socket	030-1953-000	ITT Cannon

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Removal Tool	Color	Supplier
CIET-20HD	White	ITT Cannon

- (1) Push the removal tool over the wired contact.
- (2) Push the tool into the rear of the connector until it hits the bottom.
- (3) Hold the wire against the tool and pull the tool and the contact out of the contact cavity at the same time.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Basic Unit	Supplier	Locator	Supplier
M22520/1-01	QPL	TH 185	Daniels

- (1) Remove 5/32 inch to 3/16 inch of wire insulation.
- (2) Make a selection of a crimp tool from Table 4.
- (3) Put the wire in the contact crimp barrel.
Make sure that the wire is completely in the crimp barrel.
- (4) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ITT CANNON D(U) D SUBMINIATURE CONNECTORS

B. Contact Insertion

Table 5
CONTACT INSERTION TOOLS

Insertion Tool	Color	Supplier
CIET-20HD	Red	ITT Cannon

- (1) Make a selection of the insertion tool from Table 5.

NOTE: Contacts may be inserted by hand.

- (2) Examine the contact.

Make sure that the contact is straight.

- (3) Put the contact assembly in the insertion tool.

- (4) At the rear of the connector, axially align the insertion tool, the contact assembly, and the contact cavity.

Make sure that the insertion tool is perpendicular to the rear face of the insert

- (5) Carefully push the contact assembly into the contact cavity until it stops.

Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the insertion tool out of the contact cavity.

- (7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:

(a) Pull the contact assembly out of the contact cavity.

(b) Do Step (3) through Step (7) again.



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ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

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ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

1. GENERAL DATA

A. Conditions for Repair and Replacement of a Wire Wrap Pin

If the post of a wire wrap pin is bent, it is permitted to make the post straight.

A wire wrap pin that has any of these types of damage must be replaced:

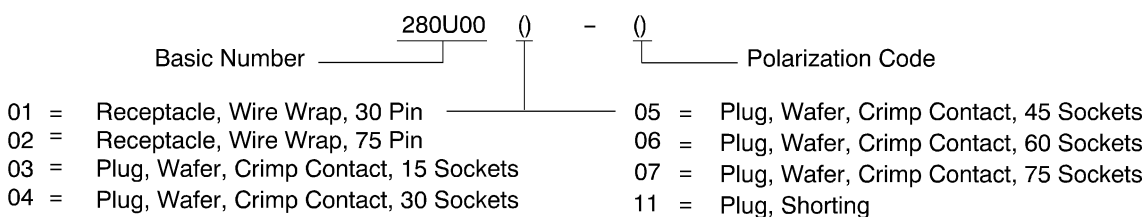
- The post is broken
- The engaging end is broken
- The post is bent so that it is not possible to make it straight again
- The engaging end is bent so that it is not possible to make it straight again.

If it is necessary to replace the same wire wrap pin more than three times, the wafer must be replaced.

CAUTION: IF THE SAME WIRE WRAP PIN MUST IS REPLACED MORE THAN THREE TIMES. THE STRENGTH OF THE CONTACT RETENTION OF THE WAFER CAN BE DECREASED SO THAT IT IS NOT SUFFICIENT TO HOLD THE WIRE WRAP PIN IN POSITION.

2. PART NUMBERS AND DESCRIPTION

A. 280U00()-() Connector Part Numbers



BOEING 280U00()-() CONNECTOR PART NUMBER STRUCTURE

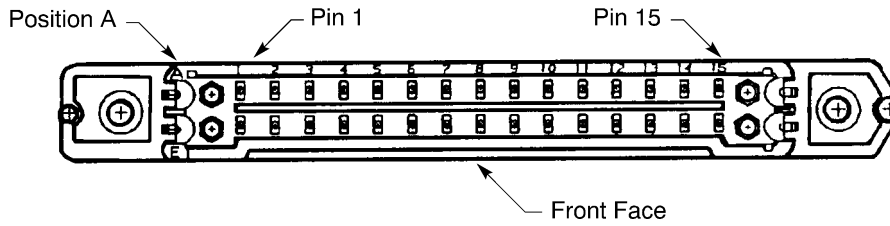
Figure 1

Table 1
BOEING 280U00()-() CONNECTOR PART NUMBERS

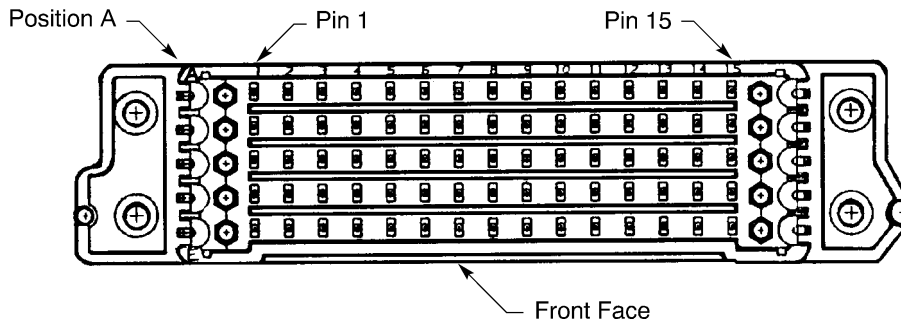
Boeing Specification	Part Number	Supplier	Configuration	Contact Configuration	
				Type	Quantity
280U0001-()	213395-1	AMP	Receptacle	Wire Wrap Pin	30
280U0002-()	213396-1	AMP	Receptacle	Wire Wrap Pin	75
280U0003-()	-	QPL	Plug	Crimp Socket	15
280U0004-()	-	QPL	Plug	Crimp Socket	30
280U0005-()	-	QPL	Plug	Crimp Socket	45
280U0006-()	-	QPL	Plug	Crimp Socket	60
280U0007-()	-	QPL	Plug	Crimp Socket	75
280U0011-()	-	QPL	Shorting Plug	-	-

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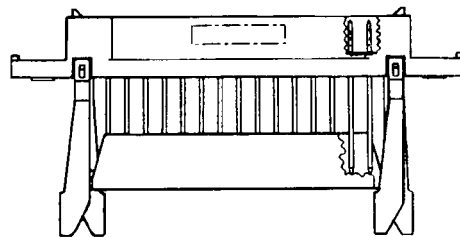
ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS



BOEING 280U001(-) RECEPTACLE
Figure 2



BOEING 280U002(-) RECEPTACLE
Figure 3



RECEPTACLE HOUSING
Figure 4

Table 2
CONNECTOR COMPONENT PART NUMBERS

Component	Part Number	Supplier
Wafer	213408-1	AMP

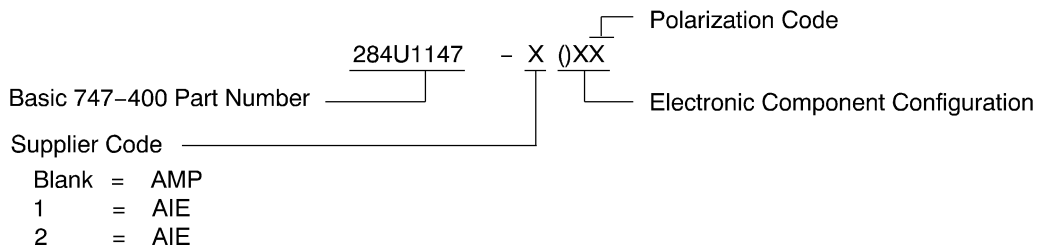
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

B. 284U1147()-() Connector Part Numbers

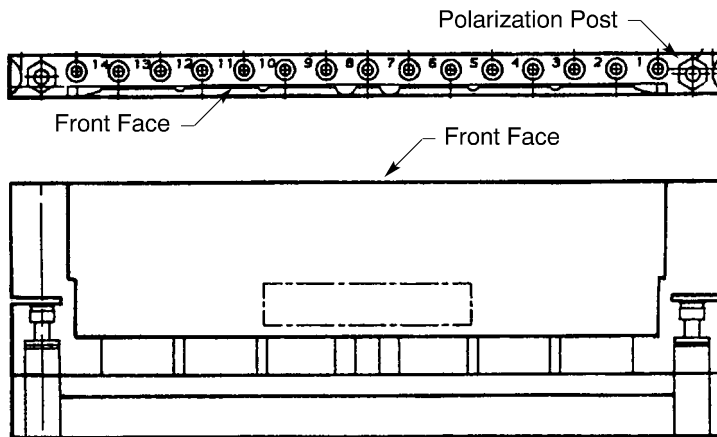
The 284U1147()-() assembly is made with one or more of these components:

- A plug module wafer
- A capacitor
- A diode
- A resistor.



BOEING 284U1147()-() CONNECTOR PART NUMBER STRUCTURE

Figure 5



AMP 213389()-() WAFER

Figure 6



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

**Table 3
BOEING 284U1147()-() CONNECTOR PART NUMBERS**

Number of Wafers	Part Number	Component Configuration			Supplier
		Component	Quantity	Polarity	
1	284U1147-()	Diode	3	Same	AMP
	284U1147-1()	Diode	3	Same	
	284U1147-2()	Resistor	2	-	
	284U1147-3()	Resistor	3	-	
	284U1147-4()	Resistor	3	-	
	284U1147-6()	Diode	3	Different	
	284U1147-7()	Resistor	2	-	
	284U1147-8()	Resistor	2	-	
	284U1147-72	Resistor	2	-	
	284U1147-10()	Diode	3	Same	
	284U1147-11()	Diode	3	Same	
	284U1147-12()	Resistor	2	-	
	284U1147-13()	Resistor	3	-	
	284U1147-14()	Resistor	3	-	
	284U1147-16()	Diode	3	Different	
	284U1147-17()	Resistor	2	-	
	284U1147-18()	Resistor	2	-	
	284U1147-1072	Resistor	2	-	
	284U1147-1166	Resistor	3	-	
	284U1147-1919	Resistor	3	-	
284U1147-2001	Resistor	3	-		
2	284U1147-2()	Resistor	1	-	AMP
	284U1147-3()	Resistor	1	-	
	284U1147-4()	Resistor	1	-	
	284U1147-6()	Resistor	1	-	
	284U1147-12()	Resistor	1	-	AIE
	284U1147-13()	Resistor	1	-	
	284U1147-14()	Resistor	1	-	
	284U1147-16()	Resistor	1	-	
	284U1147-1824	Resistor	1	-	
	284U1147-1826	Resistor	1	-	

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ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Table 3 (continued)

Number of Wafers	Part Number	Component Configuration			Supplier
		Component	Quantity	Polarity	
3	284U1147-831	Capacitor	1	-	AMP
	284U1147-834	Capacitor	1	-	
	284U1147-837	Capacitor	1	-	
	284U1147-840	Capacitor	1	-	
	284U1147-1831	Capacitor	1	-	AIE
	284U1147-1834	Capacitor	1	-	
	284U1147-1837	Capacitor	1	-	
	284U1147-1840	Capacitor	1	-	

Table 4

CONNECTOR ASSEMBLY COMPONENT PART NUMBERS

Component	Part Number	Supplier
Polarization Post	213384-1	AMP
Plug Latch	213388-1	AMP
	213388-2	AMP
	213388-3	AMP
	213388-3	AMP
Wafer, Middle	213408-2	AMP
Wafer, Single	213389-1	AMP
Wafer, Side	213389-2	AMP
	213389-3	AMP

C. Contact Part Numbers

Table 5

CONTACT PART NUMBERS

Contact Type	Contact Size	Contact Engaging End Size	Contact Crimp Barrel Size	Boeing Standard	Part Number	Supplier
Wire Wrap Pin	20	20	-	-	213400-3	AMP
Crimp Socket	2020HD	20	20	BACC47EG2	-	QPL

NOTE: The wire wrap pin has a pin contact engaging end and a wire wrap post at the rear.

NOTE: In these connectors, the size 20 wire wrap pin contacts and the size 2020HD socket contacts have the same center-to-center contact spacing.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

D. Wafer Latch Part Numbers

The AMP 213388()- wafer plug latch or AIE AL00LH()- latch hook hold:

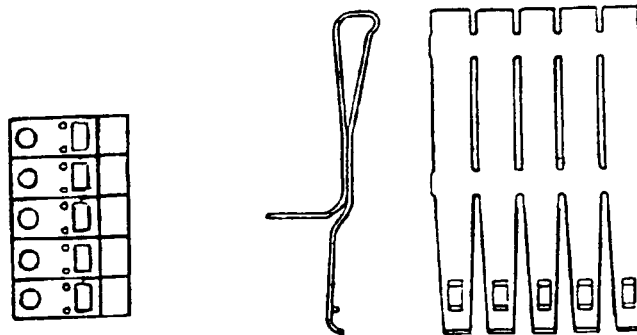
- The plug module in position
- The plug and receptacle in position.

Refer to:

- Figure 7 for the plug latch
- Figure 8 for the latch hook.

**Table 6
WAFER LATCH PART NUMBERS**

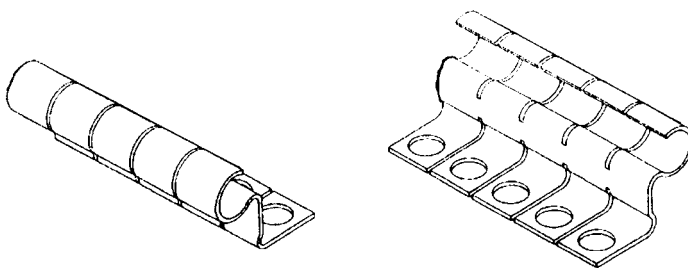
Number of Wafers	Plug Latch		
	Part Number	Type	Supplier
1	213388-1	Plug Latch	AMP
	AL00LH01	Latch Hook	AIE
2	213388-2	Plug Latch	AMP
	AL00LH02	Latch Hook	AIE
3	213388-3	Plug Latch	AMP
	AL00LH03	Latch Hook	AIE
4	213388-4	Plug Latch	AMP
	AL00LH04	Latch Hook	AIE
5	213388-5	Plug Latch	AMP
	AL00LH05	Latch Hook	AIE



**AMP WAFER PLUG LATCH
Figure 7**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS



AIE LATCH HOOK
Figure 8

E. Wire Wrap Connector Lifter Latch System Part Numbers

Table 7
LIFTER LATCH SYSTEM PART NUMBERS

Component	Part Number	Supplier
End Block	AL10EB()	AIE
Hinge Pin	AL00LA()	AIE
Jack Nut	AL00LA()	AIE
Jack Screw	AL00LA()	AIE
Lifter Block	AL00LA()	AIE
Latch Hook	AL00LH()	AIE
Latch Rail	AL10LR()	AIE
Receptacle	280U00()-()	QPL
Rod Assembly	AL10RA()	AIE
Spacer	AL10SI()	AIE
Wafer Plug Module	280U00()-1()	QPL

3. CONNECTOR POLARIZATION

A. 280U00()-() Connector Polarization

Table 8
280U00()-() CONNECTOR POLARIZATION

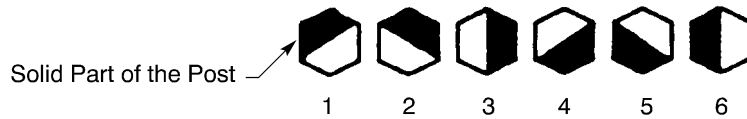
Connector	Reference
280U0001()-()	Figure 10
280U0002()-()	Figure 10
280U0003()-()	Figure 11
280U0004()-()	Figure 12
280U0005()-()	Figure 13

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS

Table 8 (continued)

Connector	Reference
280U0006(-)	Figure 14
280U0007(-)	Figure 15
280U0011(-)	Figure 16
	Figure 17



POLARIZATION POST POSITIONS
Figure 9

Table 9
CONNECTOR POLARIZATION - POST POSITION

Plug Post			Receptacle Post		
Polarization Code	Left	Right	Polarization Code	Left	Right
01	2	2	01	4	4
02	3	2	02	4	3
03	4	2	03	4	2
04	5	2	04	4	1
05	6	2	05	4	6
06	1	2	06	4	5
07	2	1	07	5	4
08	3	1	08	5	3
09	4	1	09	5	2
10	5	1	10	5	1
11	6	1	11	5	6
12	1	1	12	5	5
13	2	6	13	6	4
14	3	6	14	6	3
15	4	6	15	6	2
16	5	6	16	6	1
17	6	6	17	6	6
18	1	6	18	6	5
19	2	5	19	1	4

20-72-17



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

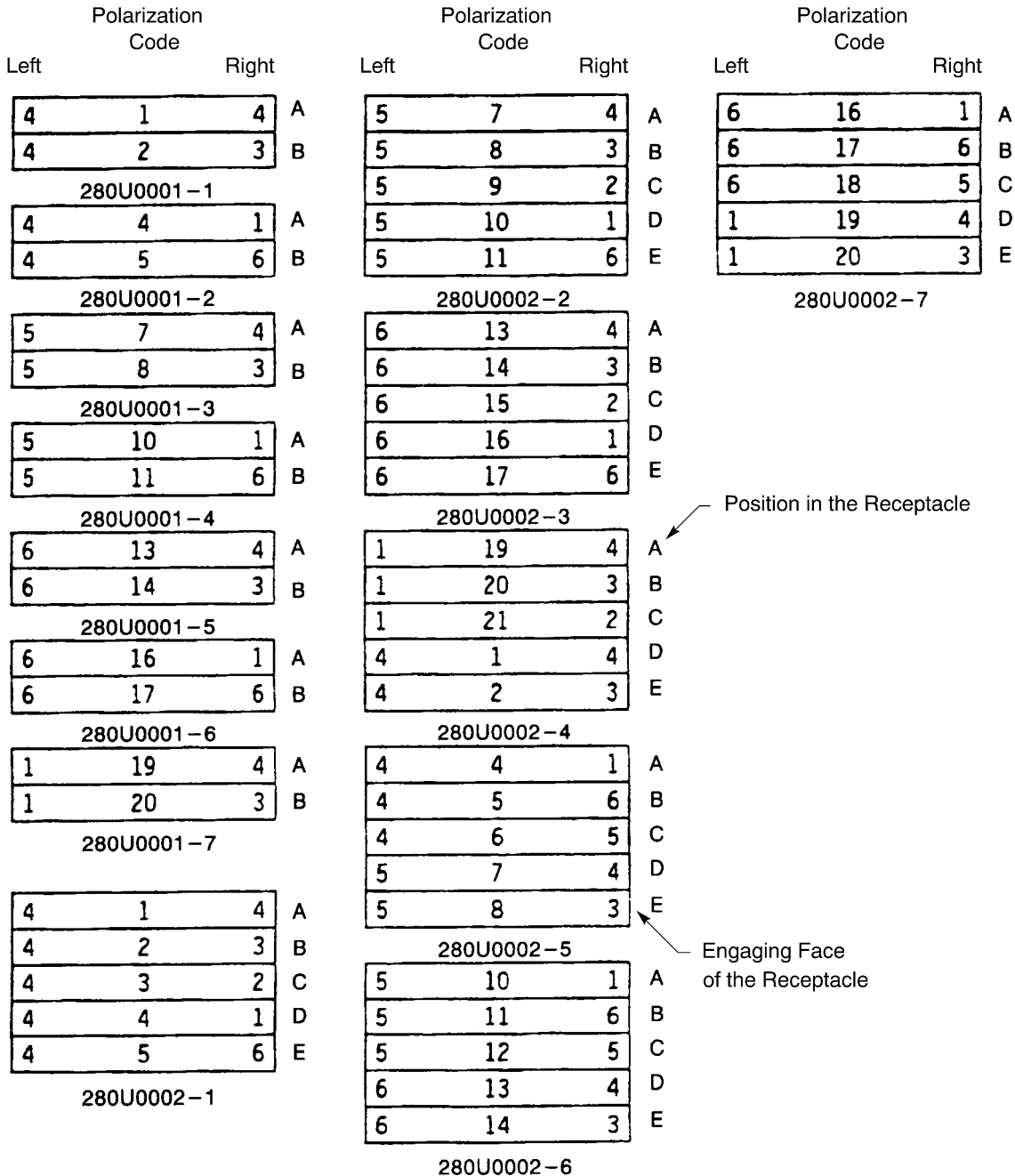
Table 9 (continued)

Plug Post			Receptacle Post		
Polarization Code	Left	Right	Polarization Code	Left	Right
20	3	5	20	1	3
21	4	5	21	1	2
22	5	5	22	1	1
23	6	5	23	1	6
24	1	5	24	1	5
25	2	4	25	2	4
26	3	4	26	2	3
27	4	4	27	2	2
28	5	4	28	2	1
29	6	4	29	2	6
30	1	4	30	2	5
31	2	3	31	3	4
32	3	3	32	3	3
33	4	3	33	3	2
34	5	3	34	3	1
35	6	3	35	3	6
36	1	3	36	3	5

20-72-17

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U000(-) AND 284U1147(-) CONNECTORS



280U0001(-) AND 280U0002(-) POLARIZATION POST POSITIONS
Figure 10

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U000(-) AND 284U1147(-) CONNECTORS

Left	Polarization Code	Right		Left	Polarization Code	Right	
2	1	2	A	3	2	2	E
280U0003-1 / -101				280U0003-20 / -120			
3	2	2	B	5	4	2	A
280U0003-2 / -102				280U0003-21 / -121			
4	3	2	C	6	5	2	B
280U0003-3 / -103				280U0003-22 / -122			
5	4	2	D	1	6	2	C
280U0003-4 / -104				280U0003-23 / -123			
6	5	2	E	2	7	1	D
280U0003-5 / -105				280U0003-24 / -124			
2	7	1	A	3	8	1	E
280U0003-6 / -106				280U0003-25 / -125			
3	8	1	B	5	10	1	A
280U0003-7 / -107				280U0003-26 / -126			
4	9	1	C	6	11	1	B
280U0003-8 / -108				280U0003-27 / -127			
5	10	1	D	1	12	1	C
280U0003-9 / -109				280U0003-28 / -128			
6	11	1	E	2	13	6	D
280U0003-10 / -110				280U0003-29 / -129			
2	13	6	A	3	14	6	E
280U0003-11 / -111				280U0003-30 / -130			
3	14	6	B	5	16	6	A
280U0003-12 / -112				280U0003-31 / -131			
4	15	6	C	6	17	6	B
280U0003-13 / -113				280U0003-32 / -132			
5	16	6	D	1	18	6	C
280U0003-14 / -114				280U0003-33 / -133			
6	17	6	E	2	19	5	D
280U0003-15 / -115				280U0003-34 / -134			
2	19	5	A	3	20	5	E
280U0003-16 / -116				280U0003-35 / -135			
3	20	5	B				
280U0003-17 / -117							
4	21	5	C				
280U0003-18 / -118							
2	1	2	D				
280U0003-19 / -119							

Position in the Receptacle

Engaging Face of the Receptacle

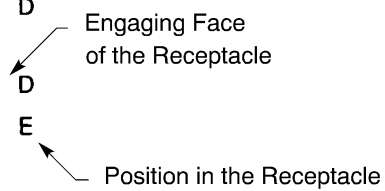
280U0003(-) POLARIZATION POST POSITIONS

Figure 11

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS

Polarization Code				Polarization Code				Polarization Code			
Left		Right		Left		Right		Left		Right	
2	1	2	A	4	15	6	C	5	10	1	A
3	2	2	B	5	16	6	D	6	11	1	B
280U004-1 / -101				280U004-11 / -111				280U004-21 / -121			
3	2	2	B	5	16	6	D	6	11	1	B
4	3	2	C	6	17	6	E	1	12	1	C
280U004-2 / -102				280U004-12 / -112				280U004-22 / -122			
4	3	2	C	2	19	5	A	1	12	1	C
5	4	2	D	3	20	5	B	2	13	6	D
280U004-3 / -103				280U004-13 / -113				280U004-23 / -123			
5	4	2	D	3	20	5	B	2	13	6	D
6	5	2	E	4	21	5	C	3	14	6	E
280U004-4 / -104				280U004-14 / -114				280U004-24 / -124			
2	7	1	A	4	21	5	C	5	16	6	A
3	8	1	B	2	1	2	D	6	17	6	B
280U004-5 / -105				280U004-15 / -115				280U004-25 / -125			
3	8	1	B	2	1	2	D	6	17	6	B
4	9	1	C	3	2	2	E	1	18	6	C
280U004-6 / -106				280U004-16 / -116				280U004-26 / -126			
4	9	1	C	5	4	2	A	1	18	6	C
5	10	1	D	6	5	2	B	2	19	5	D
280U004-7 / -107				280U004-17 / -117				280U004-27 / -127			
5	10	1	D	6	5	2	B	2	19	5	D
6	11	1	E	1	6	2	C	3	20	5	E
280U004-8 / -108				280U004-18 / -118				280U004-28 / -128			
2	13	6	A	1	6	2	C				
3	14	6	B	2	7	1	D				
280U004-9 / -109				280U004-19 / -119							
3	14	6	B	2	7	1	D				
4	15	6	C	3	8	1	E				
280U004-10 / -110				280U004-20 / -120							

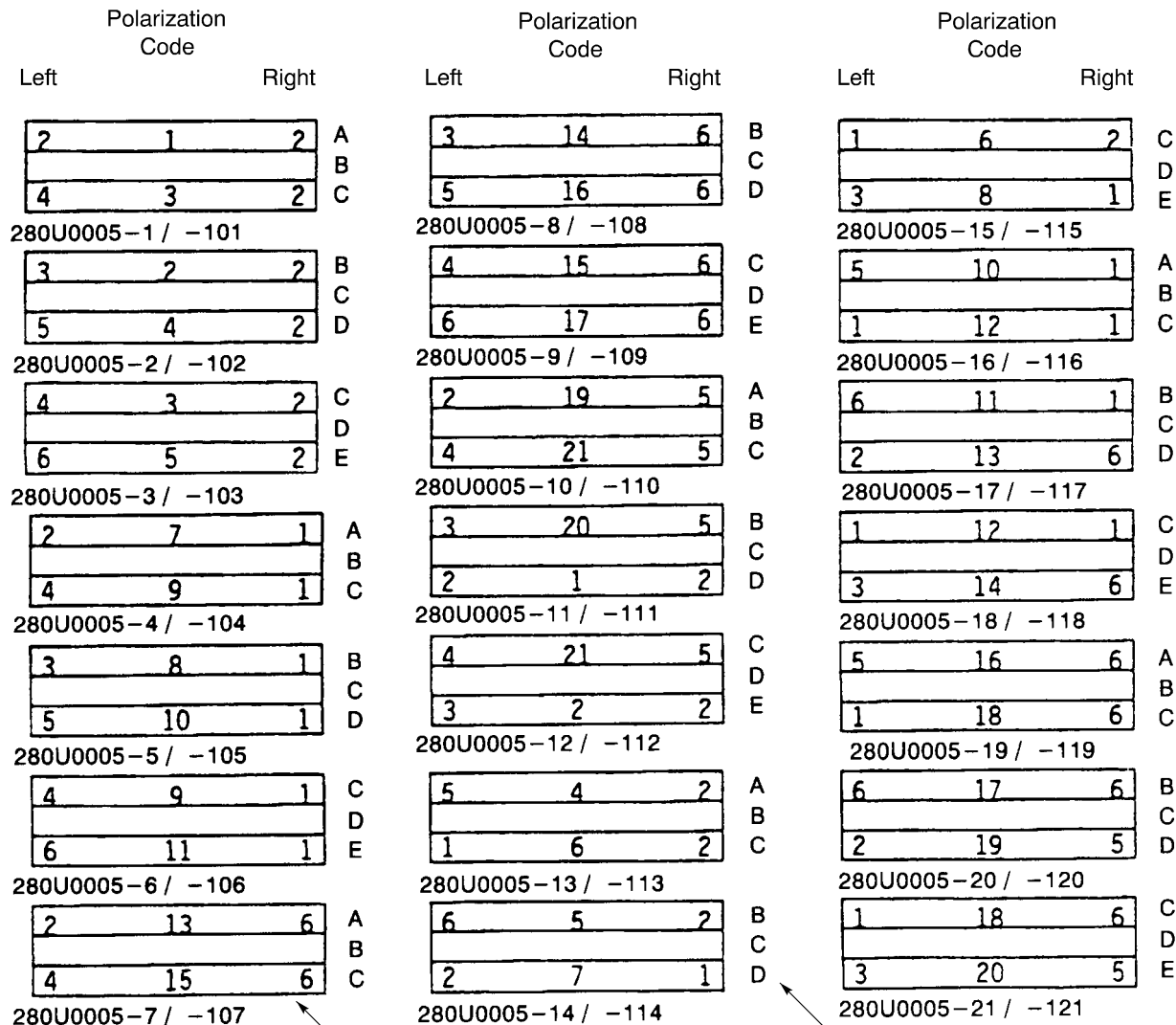


280U004(-) POLARIZATION POST POSITIONS

Figure 12

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS



Engaging Face of the Receptacle

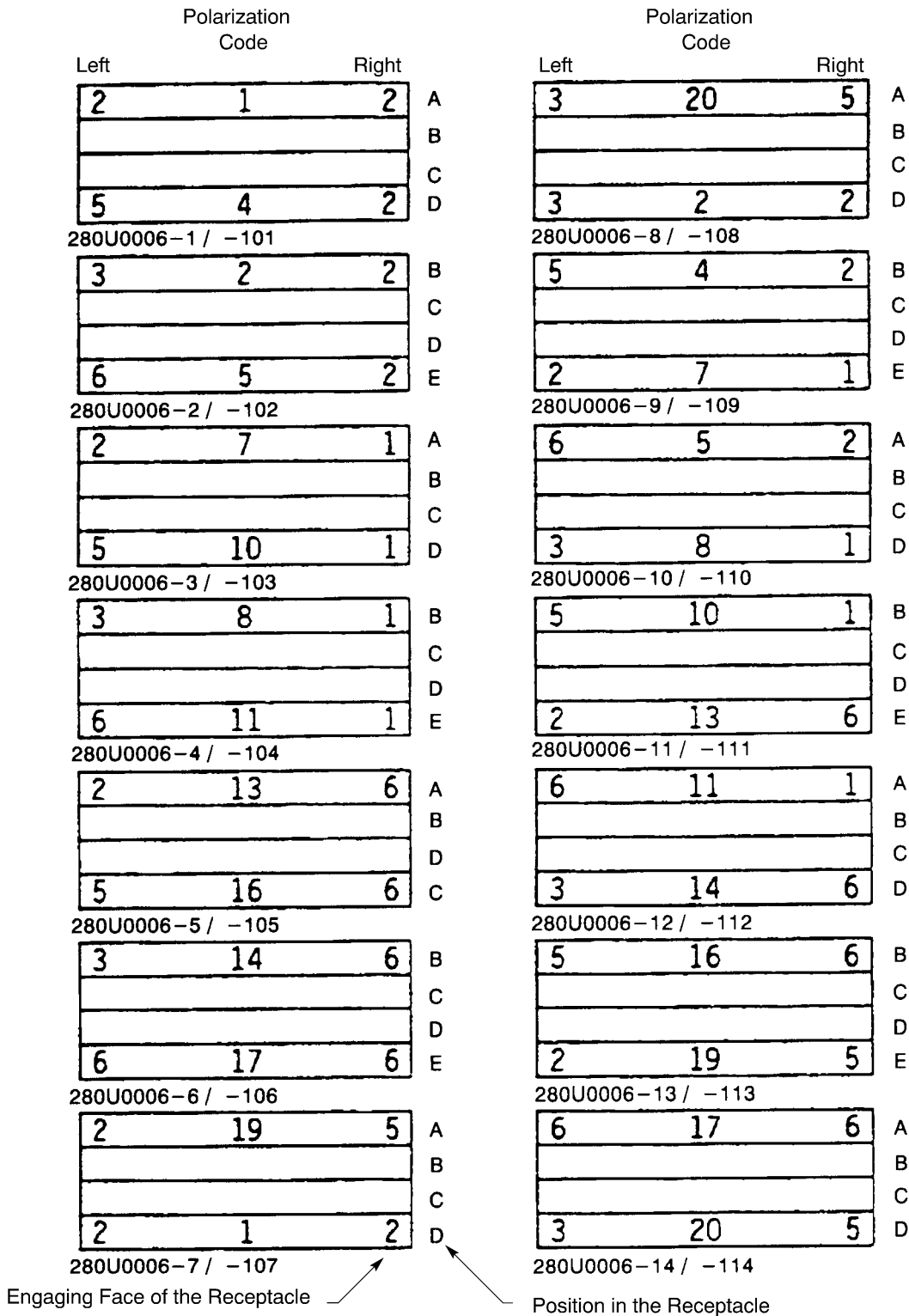
Position in the Receptacle

280U0005(-) POLARIZATION POST POSITIONS

Figure 13

STANDARD WIRING PRACTICES MANUAL

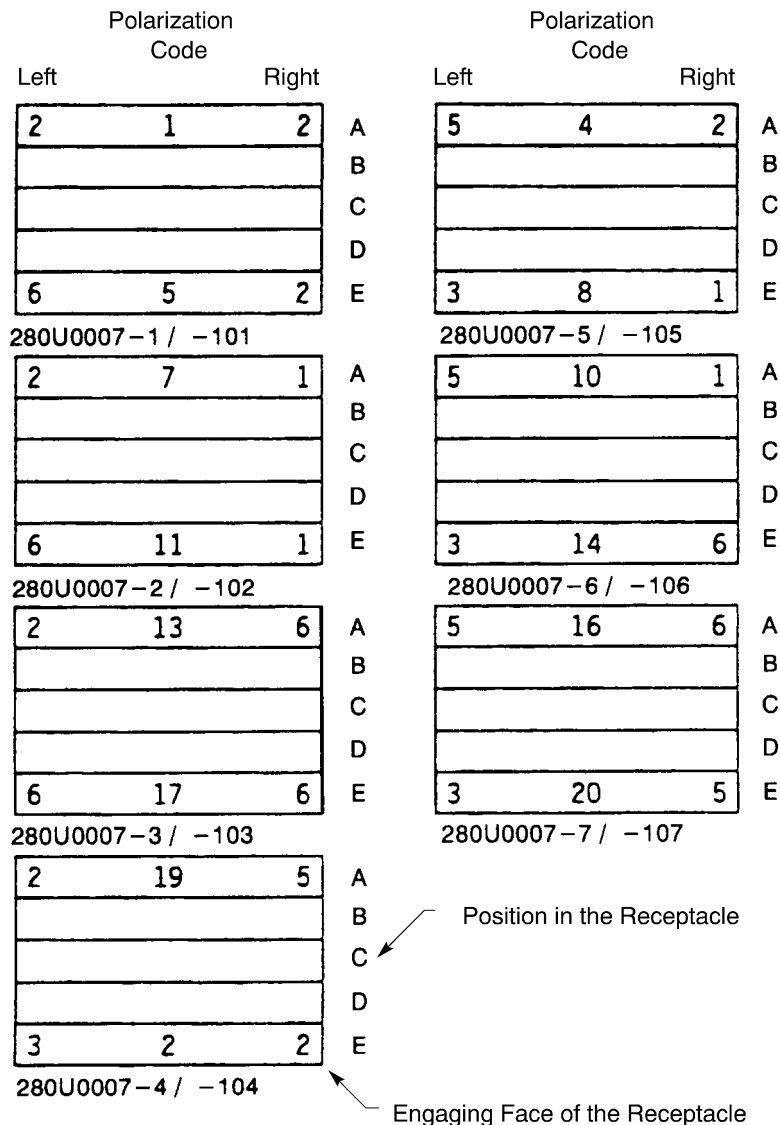
ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS



280U0006(-) POLARIZATION POST POSITIONS
Figure 14

STANDARD WIRING PRACTICES MANUAL

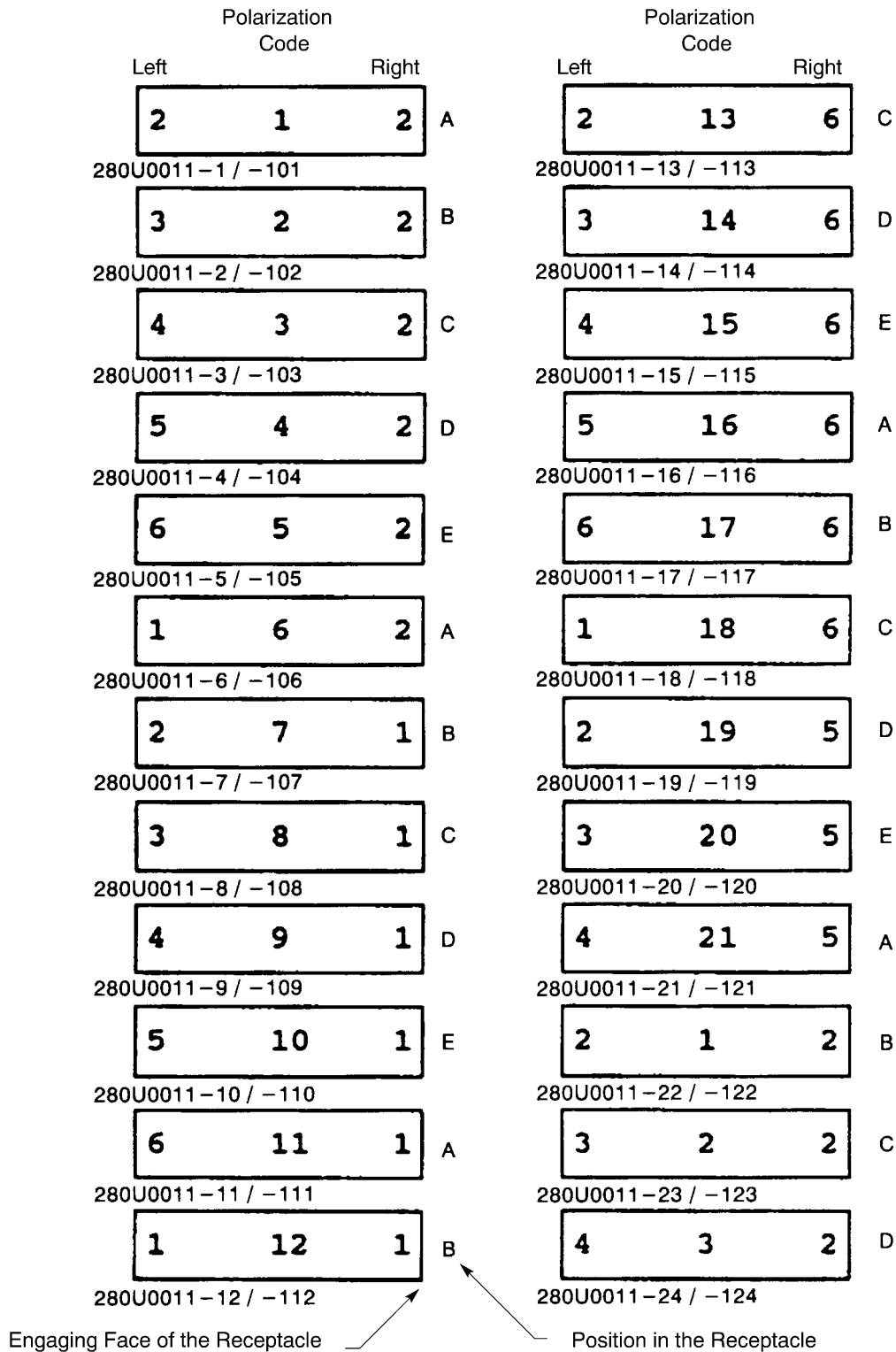
ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS



280U0007(-) POLARIZATION POST POSITIONS
Figure 15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS

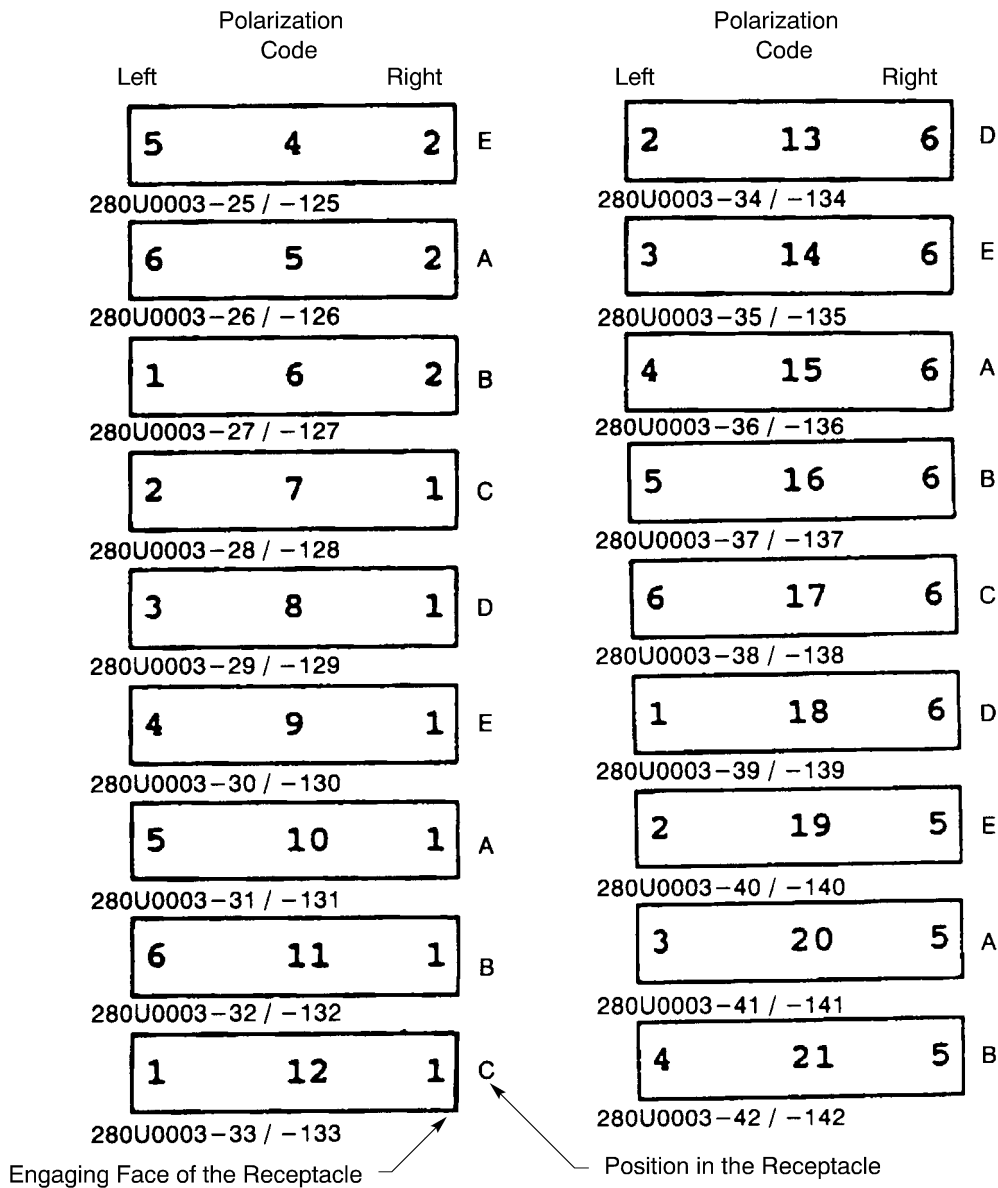


280U0011(-) POLARIZATION POST POSITIONS

Figure 16

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS



280U0011(-) POLARIZATION POST POSITIONS (CONTINUED)

Figure 17

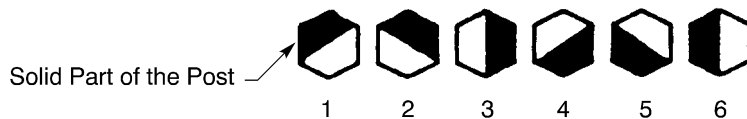
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

B. 284U1147()-() Connector Polarization

Table 10
284U1147()-() CONNECTOR POLARIZATION

Connector	Number of Wafers	Reference
284U1147()-()	1	Figure 19
	2	Figure 20
	3	Figure 21



POLARIZATION POST POSITIONS
Figure 18

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS

Wafer	Polarization			Polarization			Wafer
	Left	Code	Right	Left	Code	Right	
213389-1	2	01	2	2	13	6	213389-1
213389-1	3	02	2	3	14	6	213389-1
213389-1	4	03	2	4	15	6	213389-1
213389-1	5	04	2	5	16	6	213389-1
213389-1	6	05	2	6	17	6	213389-1
213389-1	1	06	2	1	18	6	213389-1
213389-1	2	07	1	2	19	5	213389-1
213389-1	3	08	1	3	20	5	213389-1
213389-1	4	09	1	4	21	5	213389-1
213389-1	5	10	1	1	66	2	213389-1
213389-1	6	11	1	1	72	1	213389-1
213389-1	1	12	1	Engaging Face of the Plug is Shown			

284U1147(-) POLARIZATION POST POSITIONS FOR ONE WAFER MODULES

Figure 19

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Wafer	Left	Polarization Code	Right	Left	Polarization Code	Right	Wafer
213389-2	6	24	2	6	40	1	213389-2
213389-3	5		2	5		1	213389-3
213389-2	2	26	1	1	41	1	213389-2
213389-3	1		2	6		1	213389-3
213389-2	3	31	2	2	42	6	213389-2
213389-3	2		2	1		1	213389-3
213389-2	4	32	2	3	43	6	213389-2
213389-3	3		2	2		6	213389-3
213389-2	5	33	2	4	44	6	213389-2
213389-3	4		2	3		6	213389-3
213389-2	6	34	2	5	45	6	213389-2
213389-3	5		2	4		6	213389-3
213389-2	1	35	2	6	46	6	213389-2
213389-3	6		2	5		6	213389-3
213389-2	2	36	1	1	47	6	213389-2
213389-3	1		2	6		6	213389-3
213389-2	3	37	1	2	48	5	213389-2
213389-3	2		1	1		6	213389-3
213389-2	4	38	1	3	49	5	213389-2
213389-3	3		1	2		5	213389-3
213389-2	5	39	1	4	50	5	213389-2
213389-3	4		1	3		5	213389-3
				2	51	2	213389-2
				4		5	213389-3

Engaging Face of
the Plug is Shown

284U1147()-() POLARIZATION POST POSITIONS FOR TWO WAFER MODULES

Figure 20

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Wafer	Polarization Code		Wafer
	Left	Right	
213389-3	2	2	213389-3
213408-2	31		213408-2
213389-2	4	2	213389-2
213389-3	2	1	213389-3
213408-2	34		213408-2
213389-2	4	1	213389-2

Wafer	Polarization Code		Wafer
	Left	Right	
213389-3	2	6	213389-3
213408-2	37		213408-2
213389-2	4	6	213389-2
213389-3	2	5	213389-3
213408-2	40		213408-2
213389-2	4	5	213389-2

Engaging Face of the Plug is Shown

284U1147()-() POLARIZATION POST POSITIONS FOR THREE WAFER MODULES
Figure 21

4. CONNECTOR DISASSEMBLY

This paragraph gives the procedures to disassemble both the 280U00()-() and the 284U1147()-() connector plug modules.

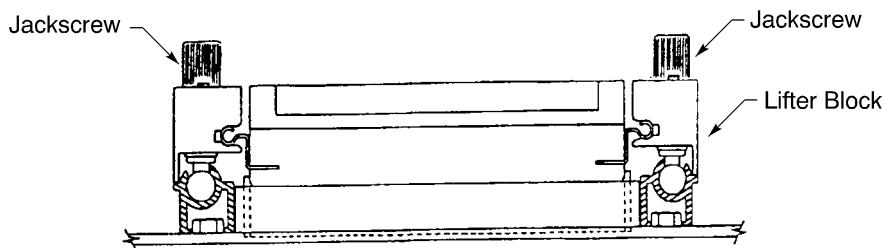
A. Separation of the Plug from the Receptacle

- (1) Turn off all power to the Wire Integration Unit (WIU). Refer to the decal on the WIU cover.

WARNING: IF THE POWER IS NOT TURNED OFF, PHYSICAL HARM TO PERSONNEL CAN OCCUR.

CAUTION: IF THE POWER IS NOT TURNED OFF, DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (2) Remove the protective cover from the back of the WIU.
- (3) Pull the AIE rod assembly from both end blocks on both sides of the connector plug. Refer to Figure 45.
- (4) Loosen the jackscrews of the lifter blocks on both sides of the connector plug at the same time. Refer to Figure 22.

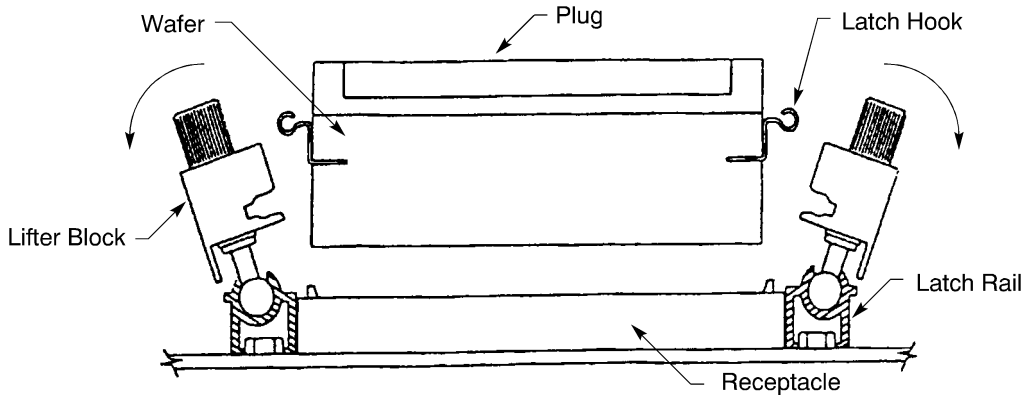


LOCATION OF THE LIFTER BLOCK JACKSCREWS
Figure 22

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

(5) Move the lifter blocks away from the connector plug. Refer to Figure 23.



LATCH HOOKS RELEASED FROM THE LIFTER BLOCKS
Figure 23

(6) Pull the plug from the receptacle.

B. Disassembly of a Plug with More Than One Wafer

- (1) Remove each polarization post.
- (2) Remove each wafer plug latch or latch hook.

Refer to:

- Figure 29 for a plug assembly with plug latches
- Figure 31 for a plug assembly with latch hooks.

C. Contact Removal

This paragraph gives the procedure to remove crimp contacts. Refer to Paragraph 4.D. for the procedure to remove wire wrap pin contacts.

Table 11
CONTACT REMOVAL TOOLS

Contact Size	Removal Tool
2020HD	282-891
	910066-4
	CIET-20HDL
	DRK145
	M81969/1-02
	MS3156-20

- (1) Make a selection of a removal tool from Table 11.
- (2) Put the wide part of the tool on the wire.
- (3) Push the wire into the narrow part of the tool.
- (4) Axially align the tool with the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

- (5) If the removal tool has an indicating ring, push the tool into the contact cavity until the indicating ring is aligned with the surface of the grommet.
- (6) If the removal tool does not have an indicating ring, carefully push the tool into the contact cavity until the retention mechanism is released.
- (7) Pull the wire and the removal tool from the contact cavity at the same time.
- (8) If the contact does not release:
 - (a) Remove the tool from the contact cavity and the wire.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (2) through Step (7) again.

D. Wire Wrap Post Removal

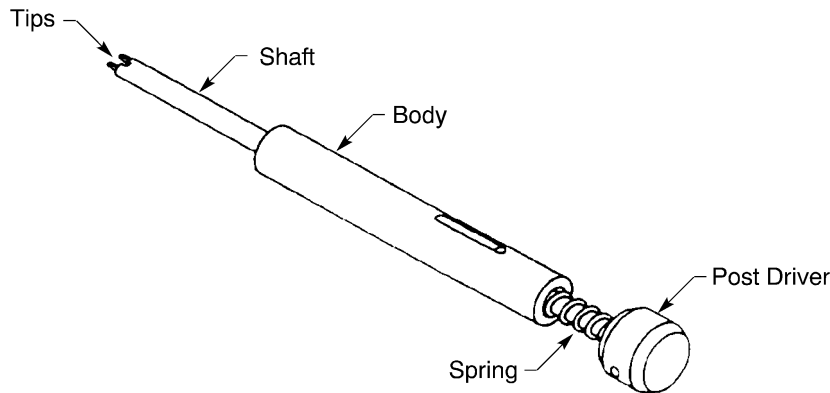
The wire wrap post is:

- Released from the rear of the receptacle
- Removed from the front of the receptacle.

**Table 12
WIRE WRAP POST REMOVAL TOOLS**

Contact Size	Removal Tool
20	58324-1-0
	DRK347

- (1) Remove the protective cover from the receptacle.
- (2) Remove all of the wire from the wire wrap post. Refer to Subject 20-72-18.
- (3) Make a selection of a post removal tool from Table 12. Refer to Figure 24.

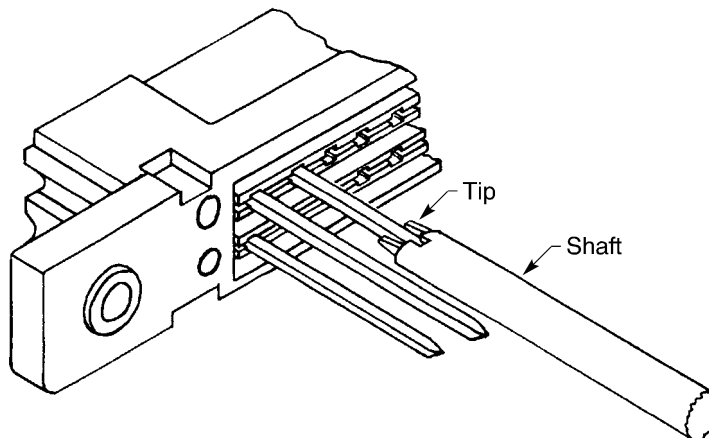


**WIRE WRAP POST REMOVAL TOOL
Figure 24**

- (4) Carefully put the tool tip on the post so that the tool is axially aligned with the post. Refer to Figure 25.

STANDARD WIRING PRACTICES MANUAL

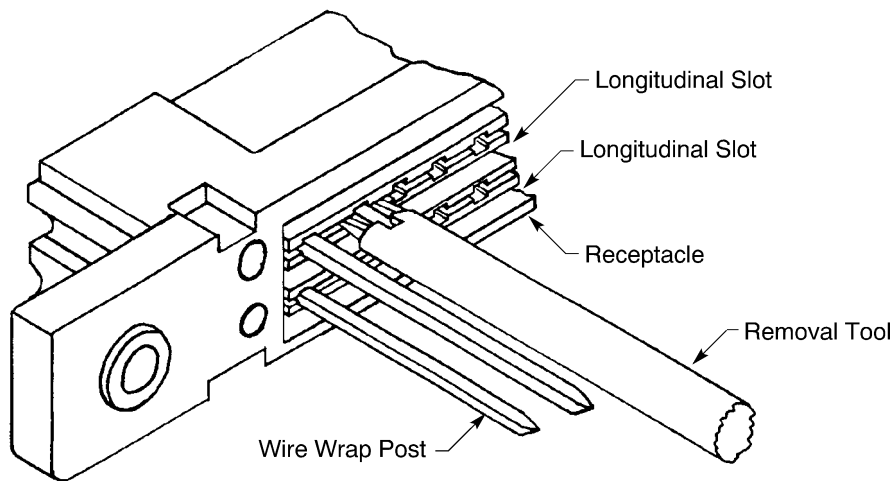
ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS



ALIGNMENT OF THE REMOVAL TOOL AND THE POST
Figure 25

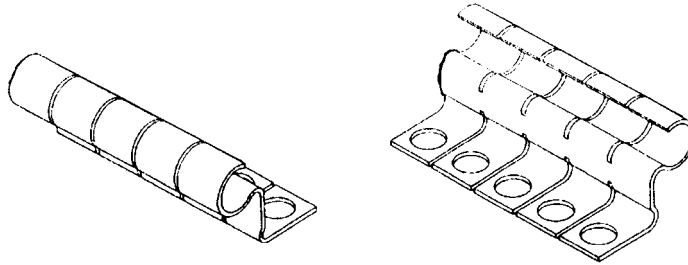
- (5) Push the tool onto the post until the tips of the tool are in the slots that are adjacent to the sides of the post. Refer to Figure 26.

CAUTION: IF THE REMOVAL TOOL DOES NOT STAY AXIALLY ALIGNED WITH THE POST, DAMAGE TO THE RECEPTACLE CAN OCCUR.

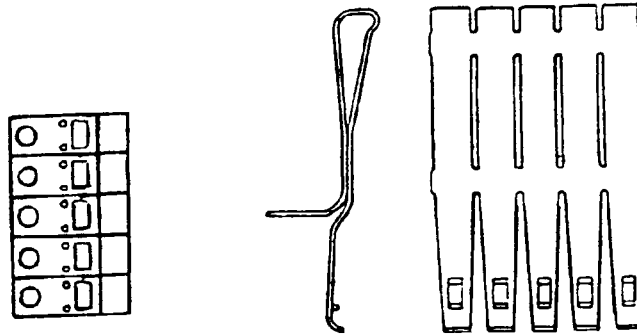


POSITION OF THE TIPS OF THE REMOVAL TOOL IN THE LONGITUDINAL SLOT
Figure 26

- (6) Hold the tool in position against the receptacle.
- (7) Push the post driver of the tool until the pin is released from the contact retention mechanism.
- (8) Remove the wire wrap pin from the front of the receptacle.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS****5. ASSEMBLY OF THE PLUG MODULE****A. Wafer Assembly**

AIE LATCH HOOK
Figure 27



AMP PLUG LATCH
Figure 28

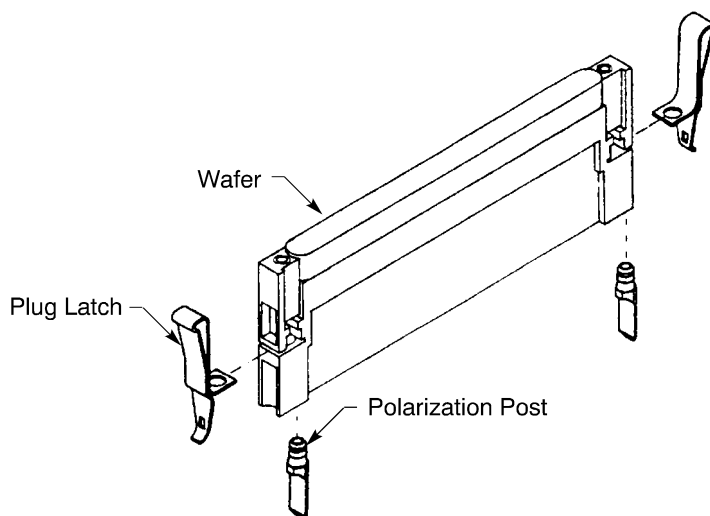
- (1) Make a selection of plug latches or latch hooks from Table 6. Refer to Figure 27 and Figure 28.
Make sure that the selection agrees with the connector installation retention mechanism of the lifter latch system. Refer to Paragraph 8.A.
- (2) If the connector has more than one wafer, put the wafers together so that:
 - The sides of the wafers are against each other
 - The ends of the wafers are aligned.
- (3) Install the wafer latches or the latch hooks in both lower slots of each wafer.

Refer to:

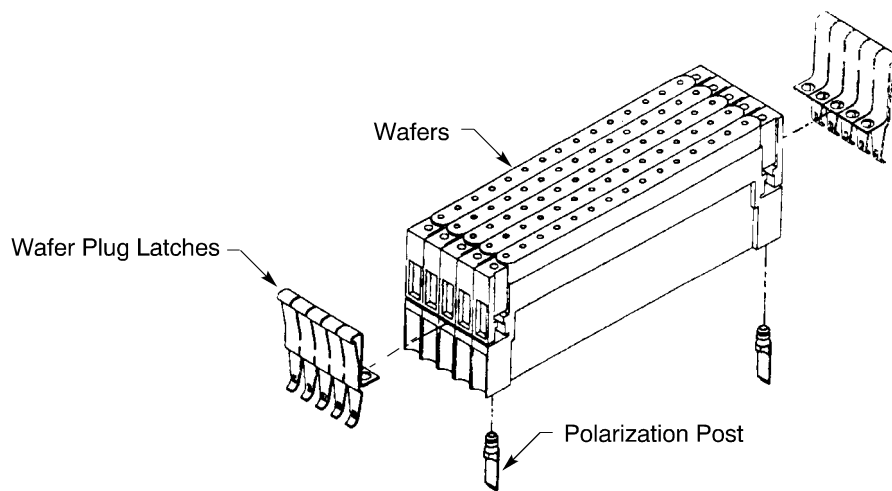
- Figure 29 and Figure 30 for a wafer assembly with plug latches
- Figure 31 and Figure 32 for a wafer assembly with latch hooks.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS



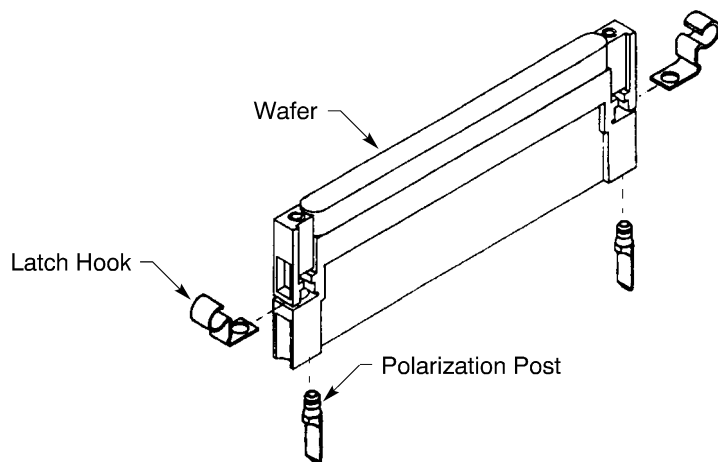
SINGLE WAFER WITH PLUG LATCHES
Figure 29



FIVE WAFERS WITH PLUG LATCHES
Figure 30

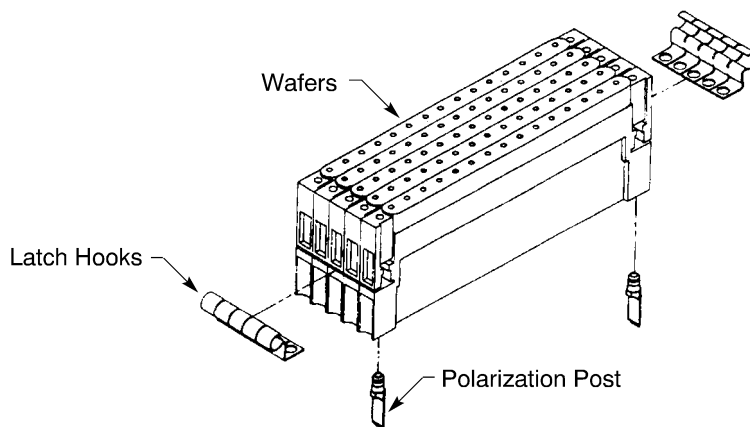
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS



SINGLE WAFER WITH LATCH HOOKS

Figure 31



FIVE WAFERS WITH LATCH HOOKS

Figure 32

- (4) Put the polarization post into the plug module so that:
- The polarization post is in the correct position
 - The plug latches or the latch hooks stay in position.

Refer to Table 9 for the post polarization codes.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Refer to:

- Figure 19 for a one wafer module
- Figure 20 for a two wafer module
- Figure 21 for a three wafer module.

6. 280U00()-() CONNECTOR ASSEMBLY

A. Wafer Assembly

Refer to Paragraph 5.

B. Contact Assembly

**Table 13
CONTACT CRIMP TOOLS**

Contact Size	Wire Size (AWG)	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
2020HD	24	AFM8	5	K13-1
		M22520/2-01		M22520/2-08
	22	AFM8	6	K13-1
		M22520/2-01		M22520/2-08
	20	AFM8	7	K13-1
		M22520/2-01		M22520/2-08

- (1) Make a selection of a contact crimp tool from Table 13.
- (2) Remove a 0.16 inch ±0.03 inch length of insulation from the end of the wire.
- (3) Put the wire in the crimp barrel of the contact.

Make sure that:

- The end of the conductor is against the bottom of the crimp barrel
- All of the conductor strands are in the crimp barrel
- The conductor strands can be seen in the inspection hole.

- (4) Crimp the contact.

Make sure that the distance from the end of the wire insulation to the end of the crimp barrel is not more than 0.06 inch.

C. Contact Insertion

This paragraph gives the procedure to install crimp contacts. Refer to Paragraph 6.D. for the procedure to install wire wrap pin contacts.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

**Table 14
CONTACT INSERTION TOOLS**

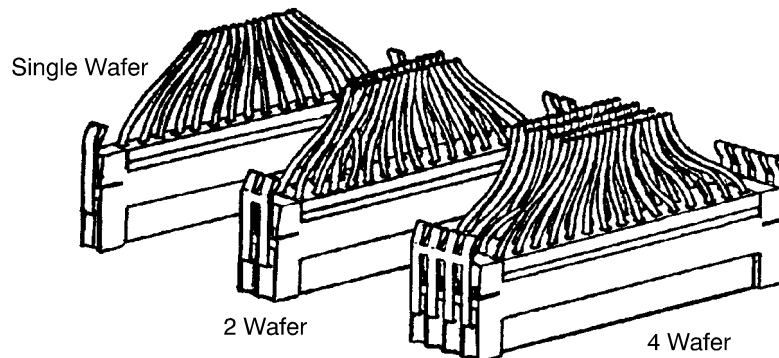
Contact Size	-
2020HD	282881
	91066-4
	ATC1072
	CIET-20HDL
	DAK145J
	M81969/1-02
	MS3156-20

- (1) Make a selection of an insertion tool from Table 14.
- (2) Put the insertion tool on the contact.
- (3) Axially align the contact with the contact cavity.
- (4) Push the contact into the contact cavity until it stops.
- (5) Carefully pull the insertion tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact out of the contact cavity.
 - (b) Do Step (2) through Step (6) again.



WIRED WAFER ASSEMBLIES

Figure 33

STANDARD WIRING PRACTICES MANUAL

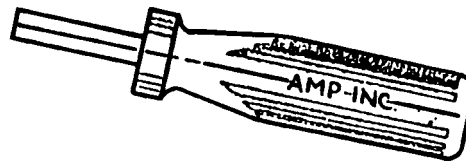
ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

D. Wire Wrap Pin Insertion

**Table 15
WIRE WRAP PIN INSERTION TOOLS**

Contact Size	Insertion Tool
20	58347
20	DAK346

(1) Make a selection of a wire wrap pin insertion tool from Table 15. Refer to Figure 34.



**AMP WIRE WRAP PIN INSERTION TOOL
Figure 34**

- (2) Put the wire wrap pin into the front of the receptacle so that:
 - The pin end points toward the contact cavity
 - The pin is axially aligned with the contact cavity.
- (3) Align the center of the tool tip hole with the end of the wire wrap pin.
- (4) Put the shaft of the tool over the wire wrap pin.
- (5) Push the tool until the tip is against the shoulder of the wire wrap pin.
- (6) Carefully push the tool into the contact cavity until the tip of the tool is against the front face of the receptacle.

CAUTION: THE INSERTION TOOL MUST STAY PERPENDICULAR TO THE FRONT FACE OF THE RECEPTACLE. DAMAGE TO THE RECEPTACLE CAN OCCUR.

7. 284U1147()-() CONNECTOR ASSEMBLY

A. Wafer Assembly

Refer to Paragraph 5.

B. Configuration of Contact Assembly Components

**Table 16
284U1147()-() COMPONENT CONFIGURATION**

Connector	Wafers	Component Configuration			
		Component	Specification	Position	Reference
284U1147()-()	1	Diode	JANTX1N5618	1	Figure 39
				2	
				3	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00(-) AND 284U1147(-) CONNECTORS

Table 16 (continued)

Connector	Wafers	Component Configuration			
		Component	Specification	Position	Reference
284U1147-1()	1	Diode	JANTX1N5552	1	Figure 39
				2	
				3	
284U1147-10()	1	Diode	JANTX1N5618	1	Figure 39
				2	
				3	
284U1147-1072	1	Resistor	RLR05C4221F	1	Figure 41
			RLR05C2001F	2	
284U1147-11()	1	Diode	JANTX1N5552	1	Figure 39
				2	
				3	
284U1147-1166	1	Resistor	RLR07C1211F	1	Figure 42
				2	
				3	
284U1147-12()	1	Resistor	RLR05C4871F	1	Figure 41
			RLR05C1211F	2	
284U1147-13()	1	Resistor	RLR07C4701G	1	Figure 42
				2	
				3	
284U1147-14()	1	Resistor	RLR07C4992F	1	Figure 42
				2	
				3	
284U1147-16()	1	Diode	JANTX1N5618	1	Figure 40
				2	
				3	
284U1147-17()	1	Resistor	RLR05C4321F	1	Figure 41
			RLR05C1691F	2	
284U1147-18()	1	Resistor	RLR05C4221F	1	Figure 41
			RLR05C1821F	2	
284U1147-1919	1	Resistor	RLR07C2000F	1	Figure 42
				2	
				3	

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Table 16 (continued)

Connector	Wafers	Component Configuration			
		Component	Specification	Position	Reference
284U1147-2()	1	Resistor	RLR05C4871F	1	Figure 41
			RLR05C1211F	2	
284U1147-2001	1	Resistor	RLR20C6200G	1	Figure 42
				2	
				3	
284U1147-3()	1	Resistor	RLR07C4701G	1	Figure 42
				2	
				3	
284U1147-4()	1	Resistor	RLR07C4992F	1	Figure 42
				2	
				3	
284U1147-6()	1	Diode	JANTX1N5618	1	Figure 40
				2	
				3	
284U1147-7()	1	Resistor	RLR05C4321F	1	Figure 41
			RLR05C1691F	2	
284U1147-72	1	Resistor	RLR05C4221F	1	Figure 41
			RLR05C2001F	2	
284U1147-8()	1	Resistor	RLR05C4221F	1	Figure 41
			RLR05C1821F	2	
284U1147-12()	2	Resistor	RWR84S1R00FR	1	Figure 43
284U1147-13()	2	Resistor	RWR84S1400FR	1	Figure 43
284U1147-14()	2	Resistor	RWR84S5490FR	1	Figure 43
284U1147-16()	2	Resistor	RCR32C10R0FR	1	Figure 43
284U1147-1824	2	Resistor	RWR89S1001FR	1	Figure 43
284U1147-1826	2	Resistor	RWR89S1001FR	1	Figure 43
284U1147-2()	2	Resistor	RWR84S1R00FR	1	Figure 43
284U1147-3()	2	Resistor	RWR84S1400FR	1	Figure 43
284U1147-4()	2	Resistor	RWR84S5490FR	1	Figure 43
284U1147-6()	2	Resistor	RCR32C10R0FR	1	Figure 43
284U1147-1831	3	Capacitor	M39022-01-1413	1	Figure 44
284U1147-1834	3	Capacitor	M39022-01-1413	1	Figure 44

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Table 16 (continued)

Connector	Wafers	Component Configuration			
		Component	Specification	Position	Reference
284U1147-1837	3	Capacitor	M39022-01-1413	1	Figure 44
284U1147-1840	3	Capacitor	M39022-01-1413	1	Figure 44
284U1559-831	3	Capacitor	M39022-01-1413	1	Figure 44
284U1559-834	3	Capacitor	M39022-01-1413	1	Figure 44
284U1559-837	3	Capacitor	M39022-01-1413	1	Figure 44
284U1559-840	3	Capacitor	M39022-01-1413	1	Figure 44

**Table 17
ALTERNATE RESISTOR PART NUMBER SERIES**

Number of Wafers	Resistor			Alternative Resistor		
	Part Number Series	Resistance Tolerance (percent)	Failures per 1000 hours (percent)	Part Number Series	Resistance Tolerance (percent)	Failures per 1000 hours (percent)
1	R()FR	1	0.01	R()GR	2	0.01
	R()FS	1	0.001	R()FR	1	0.01
				R()GR	2	0.01
R()GS	2	0.001	R()GR	2	0.01	
2	R()FR	1	0.01	R()GR	2	0.01
	R()FS	1	0.001	R()FR	1	0.01
				R()GR	2	0.01
R()GS	2	0.001	R()GR	2	0.01	

**Table 18
COMPONENT CONDUCTOR CONFIGURATION DIMENSIONS**

Component	Configuration Dimension		
	Dimension	Target (inch)	Tolerance (inch)
JANTX1N5552	D	0.50	± 0.10
	L	0.67	± 0.10
	R	0.03	-0
	S	1.00	± 0.10
	T	0.03	-0

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Table 18 (continued)

Component	Configuration Dimension		
	Dimension	Target (inch)	Tolerance (inch)
JANTX1N5618	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
M39022-01-1413	D	1.30	±0.10
	L	1.47	±0.10
	R	0.03	-0
	S	3.00	±0.10
	T	0.03	-0
RCR32C10R0FS	D	1.35	±0.10
	L	1.52	±0.10
	R	0.03	-0
	S	3.00	±0.10
	T	0.03	-0
RLR05C1211FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR05C2001FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR05C4221FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Table 18 (continued)

Component	Configuration Dimension		
	Dimension	Target (inch)	Tolerance (inch)
RLR05C4321FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR05C4871FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR07C1211FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR07C2000FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR07C4701GS	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR07C4992FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Table 18 (continued)

Component	Configuration Dimension		
	Dimension	Target (inch)	Tolerance (inch)
RLR20C6200G	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR05C1691FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RLR05C1821FR	D	0.50	±0.10
	L	0.67	±0.10
	R	0.03	-0
	S	1.00	±0.10
	T	0.03	-0
RWR84S1400FR	D	1.35	±0.10
	L	1.52	±0.10
	R	0.03	-0
	S	3.00	±0.10
	T	0.03	-0
RWR84S1R00FR	D	1.35	±0.10
	L	1.52	±0.10
	R	0.03	-0
	S	3.00	±0.10
	T	0.03	-0
RWR84S5490FS	D	1.35	±0.10
	L	1.52	±0.10
	R	0.03	-0
	S	3.00	±0.10
	T	0.03	-0

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Table 18 (continued)

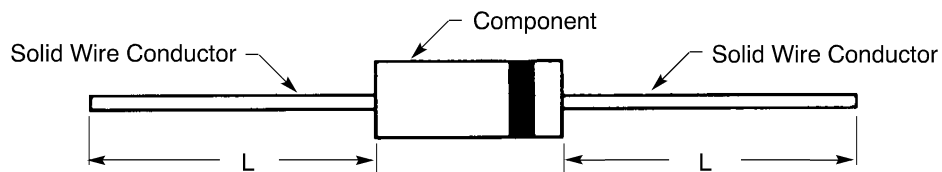
Component	Configuration Dimension		
	Dimension	Target (inch)	Tolerance (inch)
RWR89S1001FR	D	1.35	± 0.10
	L	1.52	± 0.10
	R	0.03	-0
	S	3.00	± 0.10
	T	0.03	-0

Table 19

COMPONENT CONDUCTOR CONFIGURATION REFERENCES

Dimension	Reference
D	Figure 36
L	Figure 35
R	Figure 37
S	Figure 37
T	Figure 37

- (1) Make a selection of a wafer from Table 4.
- (2) Make a selection of the necessary components from Table 16.
NOTE: For the satisfactory alternatives to the resistors in Table 16, refer to Table 17.
- (3) Remove the necessary length of the solid wire conductor so that the distance from the end of the component to the end of the solid wire conductor is dimension L.
Refer to Table 18 and Table 19.



SOLID WIRE CONDUCTOR TRIM DIMENSION
Figure 35

- (4) Install a contact on each component conductor.
 - (a) Make a selection of:
 - A Sn63 solder
 - A RMA Flux.
Refer to Subject 20-00-11.
 - (b) Put 0.2 inch of the end of the conductor into RMA flux momentarily.

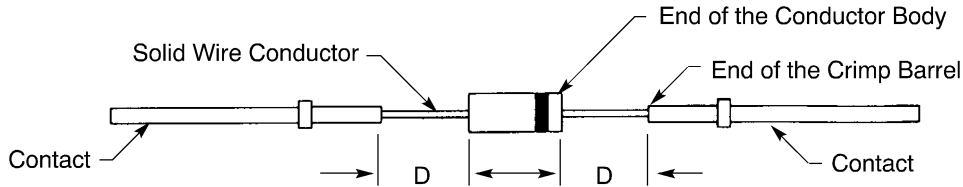
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

- (c) Put the crimp barrel of the contact into RMA flux momentarily.
Make sure that no flux touches the front socket area of the contact.
- (d) Put the conductor into the crimp barrel so that the distance from the end of the crimp barrel to the component body is dimension D.

Refer to:

- Table 18
- Table 19.



POSITION OF THE CONTACT ON THE COMPONENT CONDUCTOR
Figure 36

- (e) Apply heat to the crimp barrel of the contact so that contact is soldered to the conductor.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT FOR LONGER THAN THE NECESSARY AMOUNT OF TIME TO MELT THE SOLDER.

CAUTION: DO NOT PUT SOLDER ON THE OUTSIDE OF THE CRIMP BARREL. SOLDER ON THE OUTSIDE OF THE CONTACT CAN PREVENT THE INSERTION OF THE CONTACT INTO THE CONTACT CAVITY.

- (f) Remove the flux from the component conductor and contact.

C. Contact Insertion

- (1) Bend each conductor so that:
 - The contacts are parallel with each other
 - The distance between the axial center of the contacts is dimension S
 - The minimum length of the straight axial conductor from the component to the first bend is dimension T
 - The minimum bend radius of the conductor is dimension R.

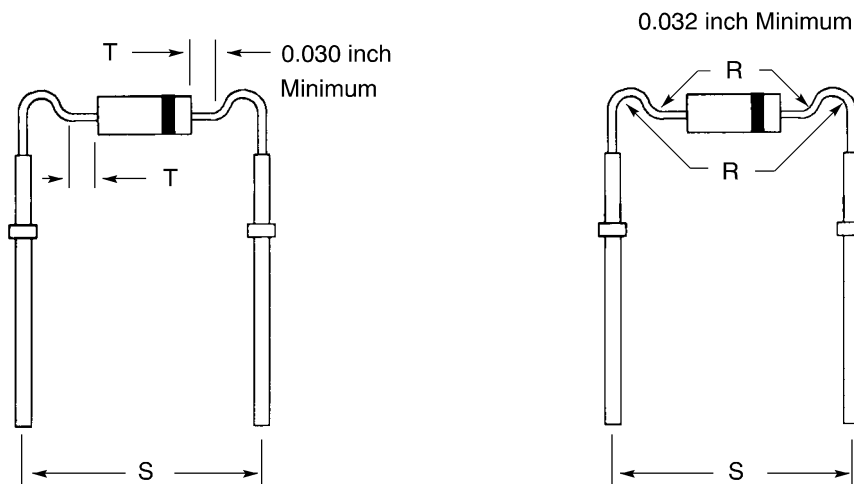
Refer to:

- Table 18 for the dimensions
- Table 19 for the Figures that show the dimensions.

NOTE: For a satisfactory alternative configuration of the components, refer to Figure 38.

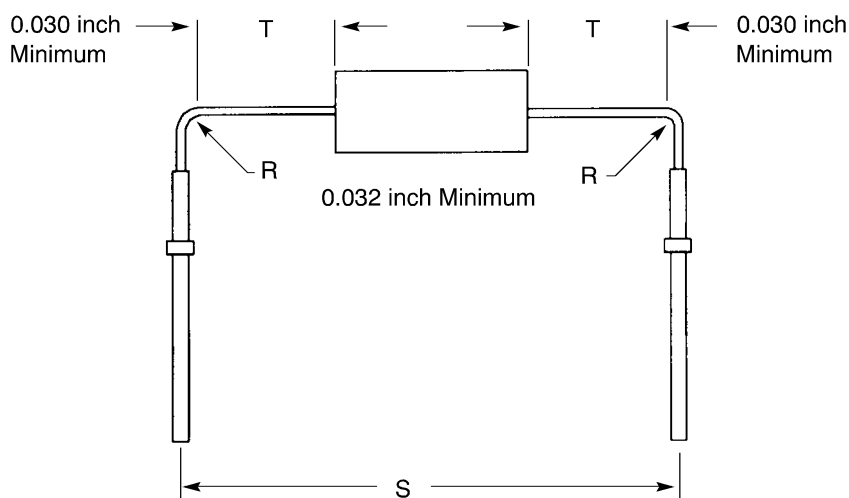
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS



RECOMMENDED COMPONENT CONFIGURATION

Figure 37



ALTERNATIVE COMPONENT CONFIGURATION

Figure 38

(2) Push the two contacts into the correct cavities of the wafer at the same time.

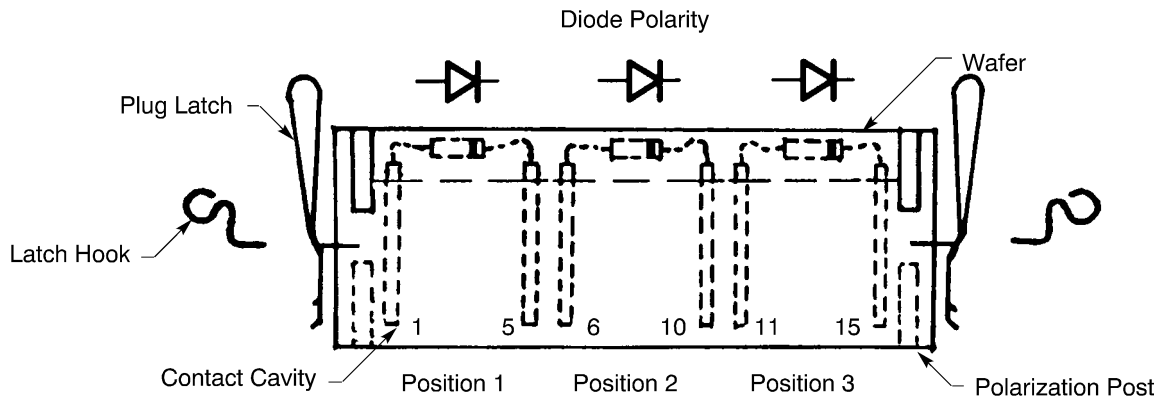
Make sure that:

- Each component has the correct polarization
- Each contact is fully installed.

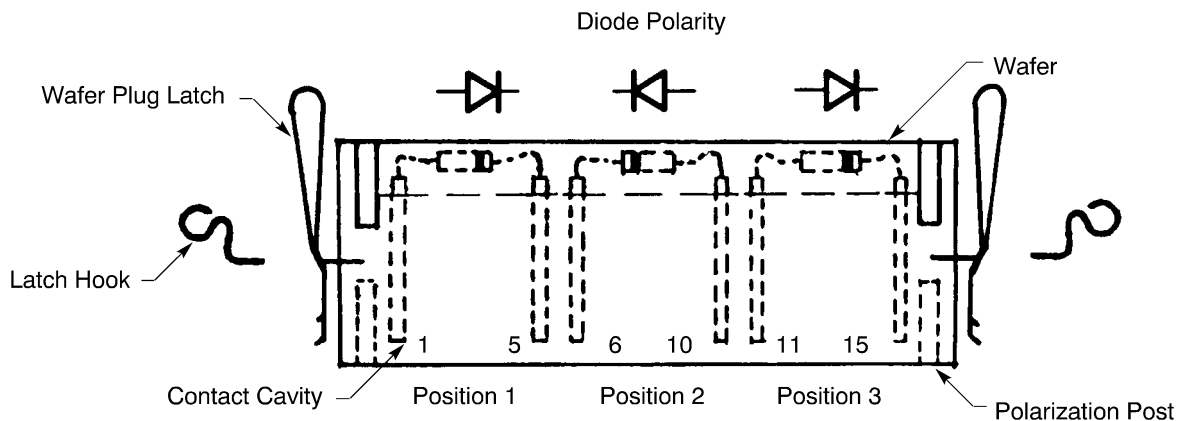
NOTE: The black band on the diode identifies the cathode.

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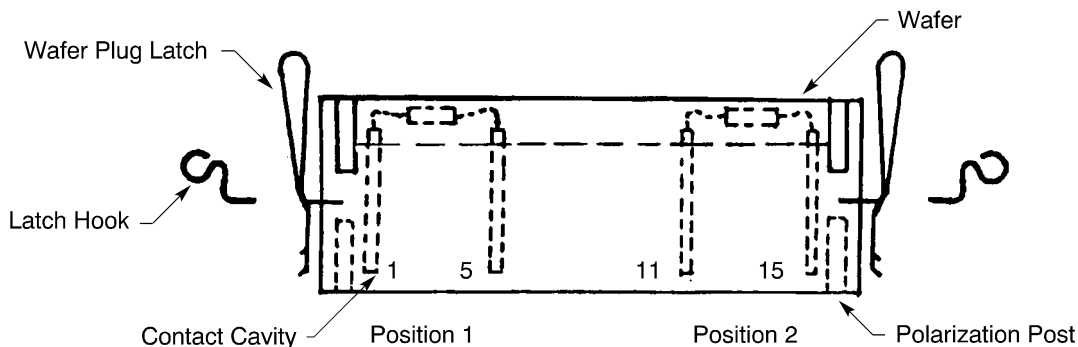
ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS



ONE WAFER PLUG WITH THREE DIODES THAT HAVE THE SAME POLARITY
Figure 39



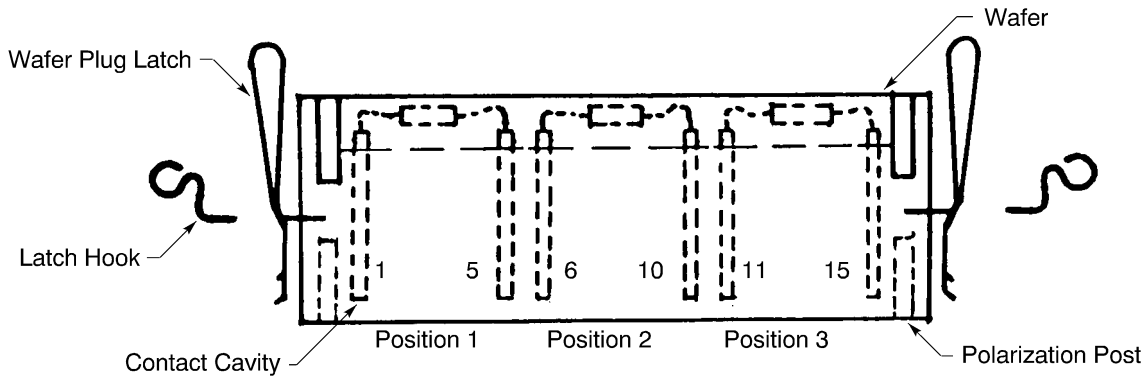
ONE WAFER PLUG WITH THREE DIODES WITH DIFFERENT POLARITY
Figure 40



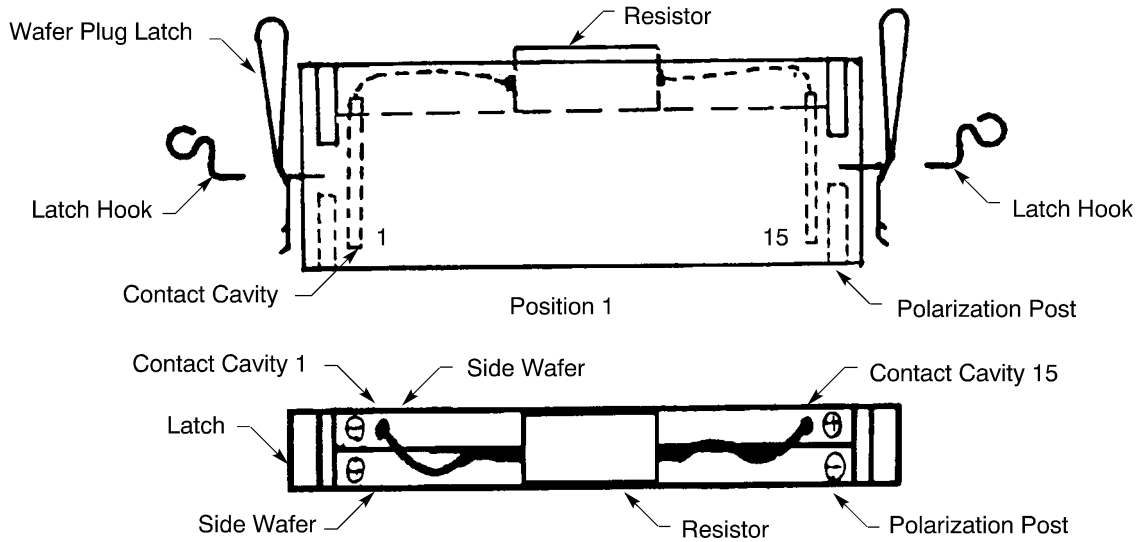
ONE WAFER PLUG WITH TWO RESISTORS
Figure 41

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS



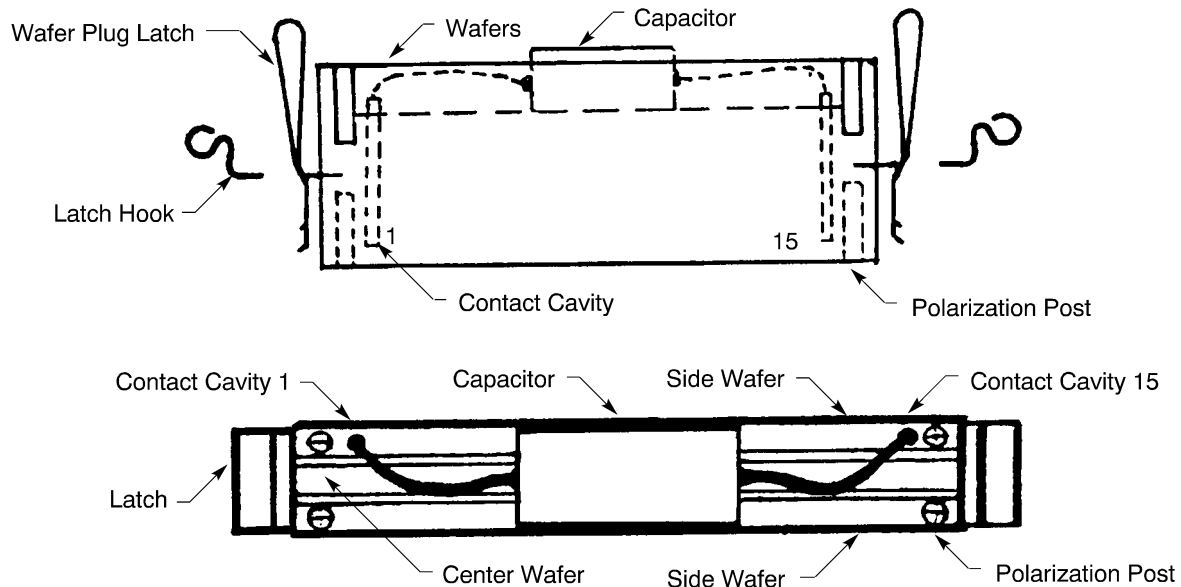
ONE WAFER PLUG WITH THREE RESISTORS
Figure 42



TWO WAFER PLUG MODULE WITH ONE RESISTOR
Figure 43

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS



THREE WAFER PLUG MODULE WITH ONE CAPACITOR
Figure 44

8. CONNECTOR INSTALLATION

A. General Conditions

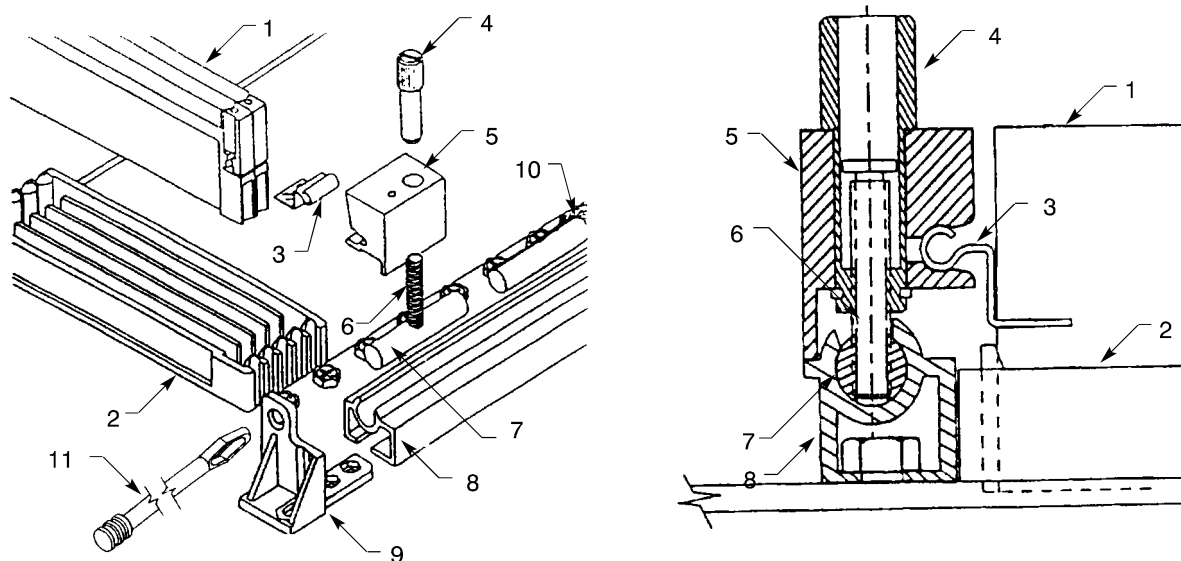
These conditions are applicable:

- A plug module that is assembled with latch hooks must be installed in a receptacle assembly that has a lifter latch system with lifter blocks
- If a lifter latch system does not have any lifter blocks, a plug module that is assembled with latch hooks can be assembled again with plug latches
- A plug module that is assembled with plug latches can be installed in a lifter latch system that does or does not have lifter blocks.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

B. Assembly of the Lifter Latch System with Lifter Blocks

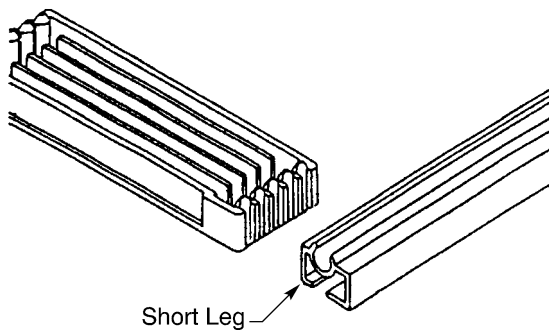


- | | | |
|----------------|-----------------|------------------|
| 1. Plug Module | 4. Jack Nut | 8. Latch Rail |
| 2. Receptacle | 5. Lifter Block | 9. End Block |
| 3. Latch Hook | 6. Jack Screw | 10. Spacer |
| | 7. Hinge Pin | 11. Rod Assembly |

AIE LIFTER LATCH SYSTEM WITH LIFTER BLOCKS
Figure 45

Refer to Figure 45.

(1) Put the rail in the correct position. Refer to Figure 46.



POSITION OF THE LATCH RAIL IN RELATION TO THE RECEPTACLE
Figure 46

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

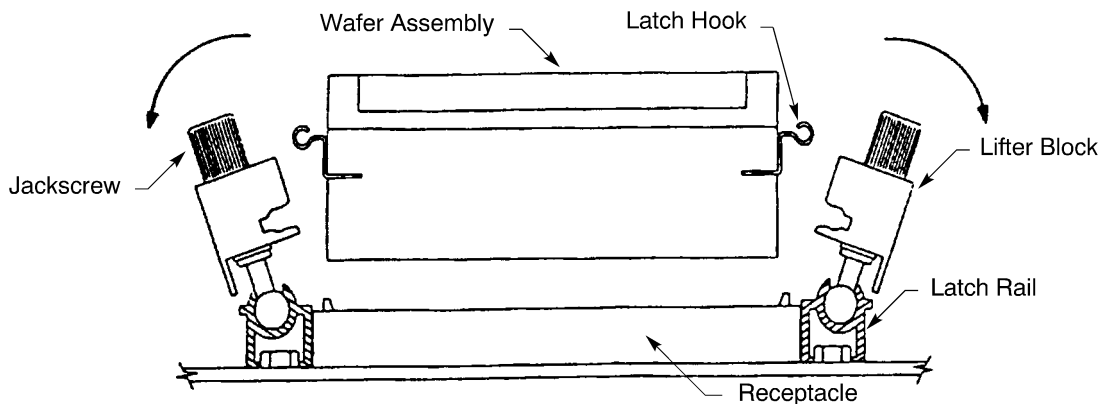
- (2) Put each of these components on the rail:
 - The spacers
 - The receptacle
 - The lifter blocks.
- (3) Install the mounting hardware on the end blocks.
- (4) Put the end blocks into the rails.
Make sure that the end blocks have the correct polarization.
- (5) Put the mounting hardware through the mounting holes.
- (6) Tighten the mounting hardware.

C. Installation of the Plug

- (1) If the plug is assembled with plug latches, push the plug into the receptacle until the plug latches are locked in the internal latch mechanism of the receptacle.

CAUTION: IF THE PLUG LATCHES ARE NOT LOCKED IN POSITION, UNSATISFACTORY PERFORMANCE CAN OCCUR.

- (2) If the plug is assembled with latch hooks:
 - (a) If it is necessary, loosen the jackscrews of the lifter blocks on both sides of the receptacle.
 - (b) Push both lifter blocks away from the receptacle. Refer to Figure 47.



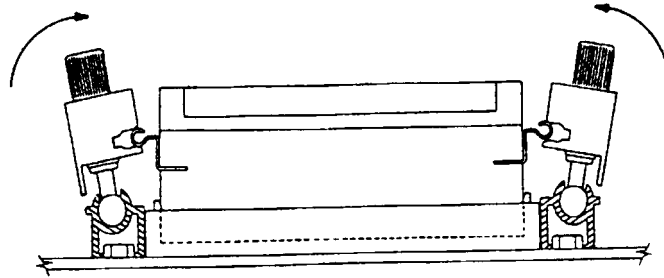
LIFTER BLOCKS IN THE OPEN POSITION

Figure 47

- (c) Push the plug into the receptacle.
- (d) Push both lifter blocks toward the plug so that the latch hooks go into the lifter blocks. Refer to Figure 48.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

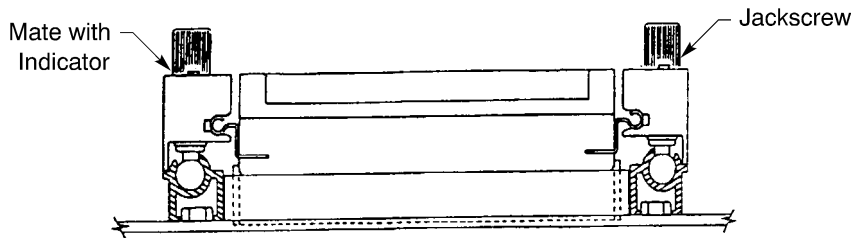


DIRECTION TO MOVE THE LIFTER BLOCK
Figure 48

- (e) Tighten each jackscrew at the same time until:
- The plug is fully installed in the receptacle
 - The latch hooks are locked in position
 - The mate with indicator can be seen.

Refer to Figure 49.

CAUTION: IF THE LATCH HOOKS ARE NOT LOCK IN POSITION, UNSATISFACTORY PERFORMANCE CAN OCCUR.



POSITION OF THE LIFTER BLOCKS AND LATCH HOOKS
Figure 49

- (3) If the lifter latch system has lifter blocks, install the rod assembly so that:
- The rod goes through the hole in one end block
 - The rod goes through the hole in the other end block
 - The shoulder of the rod assembly touches the first end block.

9. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

Table 20
REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
282-891	Radiall
58324-1-0	AMP
91066-4	AMP

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ASSEMBLY OF BOEING 280U00()-() AND 284U1147()-() CONNECTORS

Table 20 (continued)

Removal Tool	Supplier
CIET-20HDL	ITT Cannon
DRK145	Daniels
DRK347	Daniels
M81969/1-02	QPL
MS3156-20	QPL

B. Contact Crimp Tools

**Table 21
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
AFM8	Daniels
K13-1	Daniels
M22520/2-01	QPL
M22520/2-08	QPL

C. Contact Insertion Tools

**Table 22
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
282-881	Radiall
58347	AMP
91066-4	AMP
ATC1072	Astro
CIET-20HDL	ITT Cannon
DAK145J	Daniels
DAK346	Daniels
M81969/1-02	QPL
MS3156-20	QPL



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WIRE WRAP CONNECTIONS

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STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS

1. GENERAL DATA

A. Definitions

A wire wrap connection is a continuous, solid, and uninsulated wire that is tightly wrapped around a terminal post without any overlaps to make a mechanically and electrically stable connection.

**Table 1
DEFINITIONS**

Term	Definition
End Tail	The end of the last turn of uninsulated wire
End Turn	The last or top turn of a wire wrap connection
Gas Tight Area	The area where the wire touches the terminal post and where no gas fumes are permitted when the wire wrap connection is correct
High Turn	A turn of wire raised off the post by interference with an adjacent turn of wire; a condition that can be caused by more than the necessary pressure applied to the tool
Insulation Removal	The removal of insulation from the end of the wire
Lead Turn	The first or lowest turn of the wire on the post
Manual Wire Wrap	A wire wrap connection that is made with a manual tool
Overwrap	A wire turn on top of a another wire turn in the same wire wrap connection
Strip Force	The force that is necessary to move the entire wrapped connection the length of one connection
Terminal Post	A rigid, metallic post with a rectangular or square cross section on which a solid round wire is wrapped
Turn	Refer to Wire Turn
Unwrap Tool	A tool used to unwrap the wire turns in order to remove a wire wrap connection
Wire Dress	The direction or position of the wiring between the connections of the assembly
Wire Routing	The physical location and position of the wiring
Wire Turn	One full turn of the wire around the terminal post so that the wire touches all of the corners of the post; to count turns, count the number of times the wire goes across the corner of the post above the first corner touched by the wire
Wrap Tool	A tool that has a bit and a sleeve assembly and is used to wrap a solid conductor wire around a terminal post
Wrap Level	The area of the terminal post that has the wire wrap connection; the 1st level is at the base of the post; the 2nd level is at the middle post; the 3rd level is at the top of the post

B. General Conditions for Assembly and Installation

For the protection of all personnel, it is necessary that the power to all applicable circuits in the Wire Integration Unit (WIU) is set to the OFF position before and during the work that is done on the WIU.

STANDARD WIRING PRACTICES MANUAL**WIRE WRAP CONNECTIONS**

For the protection of the equipment and any circuit that is connected to the equipment, it is necessary that:

- The power to all applicable circuits in the WIU is set to the OFF position
- A connector cover is on a connector set while no work is done on the set
- The cover is on the WIU at all times while no work is done on the WIU
- Damage from Electrostatic Discharge is prevented; refer to Subject 20-41-01.

C. Process Control for the Assembly of Wire Wrap Connections

Some tests can and should be done to make sure that the wire wrap process, that is the procedures and the tools, has results that are serviceable. These tests include:

- The Resistance Test to measure the resistance between the terminal post and the conductor: refer to Paragraph 9.B.
- The Terminal Strip Force Test to measure the force that is necessary to axially move a wrapped wire along the terminal post; refer to Paragraph 9.C.
- The Unwrap Test to find a broken conductor after the wire has been wrapped; refer to Paragraph 9.D.
- The Gas Tight Test to make sure that there is a gas tight joint between the terminal post and the conductor; refer to Paragraph 9.E.

NOTE: It is recommended that the tests are done on prepared samples and not on the aircraft hardware.

These tests are recommended as standard practices:

- The Resistance Test
- The Terminal Strip Force Test.

The aircraft operator can make the decision to do these tests:

- The Unwrap Test
- The Gas Tight Test.

D. General Conditions of the Wire Wrap Tests

These conditions are applicable for the test samples:

- 24 samples for initial tests
- 6 samples for regular schedule tests
- 2 wrap levels on each post with some space between the levels
- Sufficient space between the first level and the terminal base for an insulation removal tool; refer to Figure 23.

E. Initial Tests

The initial tests are done:

- On new tools
- On tools that have been repaired, adjusted, or modified
- On tools that have not had an initial test for a six month period
- Every ten working days on tools that are constantly used.

These tests are done in sequence on 12 of the samples:

- The Resistance Test
- The Terminal Strip Force Test
- The Unwrap Test.

The Gas Tight Test is done on the remaining 12 samples.

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WIRE WRAP CONNECTIONS

F. Regular Schedule Tests

The regular schedule tests are done:

- On the tools that are constantly used
- After any tool bit, sleeve, or wrapper is changed
- On a tool that has been dropped or has not been handled correctly so that it is possible that the operation of the tool is not satisfactory.

These tests are done in sequence on the 6 samples:

- The Terminal Strip Force Test
- The Unwrap Test.

2. PART NUMBERS AND DESCRIPTION

A. Wire Wrap Connector Part Numbers

**Table 2
WIRE WRAP CONNECTOR PART NUMBERS**

Part Number	Supplier	Cover Configuration	
		Quantity	Cover
AM1R57P6031	AMP	1	285T0631-1
BACC65T114	QPL	2	285T0625-2
BACC65T66	QPL	1	285T0625-1
BACC66E	QPL	2	285T0626-1
BACC66G	QPL	4	285T0626-1
BACC66J	QPL	8	285T0626-1
DBMM25P-F179A	ITT Cannon	1	285T0632-1
DBMM37P-F179A	ITT Cannon	1	285T0632-3
DBMM50P-F179A	ITT Cannon	1	285T0632-2
HPF052UFZL0320-BEC	SI-TAC	2	285U0173-2
HPF160UFZL0320-BEC	SI-TAC	2	285U0173-1

B. Connector Cover Part Numbers

**Table 3
CONNECTOR COVER PART NUMBERS**

Part Number	Supplier
285T0625-1	QPL
285T0625-2	QPL
285T0626-1	QPL
285T0631-1	QPL
285T0632-1	QPL

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WIRE WRAP CONNECTIONS

Table 3 (continued)

Part Number	Supplier
285T0632-2	QPL
285T0632-3	QPL
285U0173-1	QPL
285U0173-2	QPL

3. NECESSARY TOOLS

A. Insulation Removal Tools

**Table 4
INSULATION REMOVAL TOOLS**

Wire Size (AWG)	Insulation Removal Tool	
	Part Number	Supplier
26	ST550	OK Industries
	45-145	Ideal Industries
	990732	The Cooper Group
24	ST550	OK Industries
	45-145	Ideal Industries
	990732	The Cooper Group
22	ST550	OK Industries
	45-145	Ideal Industries
	990732	The Cooper Group
20	ST550	OK Industries
	45-145	Ideal Industries
	990732	The Cooper Group
18	ST550	OK Industries
	45-145	Ideal Industries
	990732	The Cooper Group

**Table 5
REPLACEMENT BLADES FOR THE IDEAL STRIPMASTER MODEL 45-145**

Wire Size (AWG)	Replacement Blade			
	Part Number	Size	Cutting Diameter (inch)	Counterbore Diameter (inch)
26	45-1696-1	26	0.018	0.028
24	45-1594-1	26	0.023	0.033

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WIRE WRAP CONNECTIONS

Table 5 (continued)

Wire Size (AWG)	Replacement Blade			
	Part Number	Size	Cutting Diameter (inch)	Counterbore Diameter (inch)
22	45-1594-1	24	0.028	0.040
20	45-1594-1	22	0.034	0.046
18	45-1594-1	20	0.043	0.055

B. Wire Wrap Tool Kits

**Table 6
WIRE WRAP TOOL KITS**

Part Number	Description	Supplier
B-WWK-1	-	OK Industries
B-WWK-2	Hand wrap tools for AWG 26 through AWG 20 wires	OK Industries
SPBK-1	-	Standard Pneumatic
SPBK-2	Hand wrap tools for AWG 26 through AWG 20 wires	Standard Pneumatic
WBC747-400	-	The Cooper Group

C. Wire Wrap Tools

**Table 7
MANUAL WIRE WRAP TOOLS**

Wire Size (AWG)	Wrap Tool		
	Basic Unit	Sleeve	Supplier
26	G100/R3278	-	OK Industries
	SP42621	-	Standard Pneumatic
24	G100/R3278	-	OK Industries
	SP42422	-	Standard Pneumatic
22	G100/R3278	-	OK Industries
	SP42222	-	Standard Pneumatic
20	517219	990715	Cooper Tools
	990713	990715	Cooper Tools
	G100/R3278	-	OK Industries
	SP42020	-	Standard Pneumatic

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS

Table 7 (continued)

Wire Size (AWG)	Wrap Tool		
	Basic Unit	Sleeve	Supplier
18	517219	990716	Cooper Tools
	990713	990716	Cooper Tools
	SP41810	-	Standard Pneumatic

**Table 8
SEMI-AUTOMATIC WIRE WRAP TOOLS**

Wire Size (AWG)	Wrap Tool		
	Bit	Sleeve	Supplier
26	502118	512056	Cooper Tools
	502118	990722	Cooper Tools
	990717	990722	Cooper Tools
	WB26M	P2224	OK Industries
	52621	60200	Standard Pneumatic
24	504155	18840	Cooper Tools
	504155	990723	Cooper Tools
	990718	990723	Cooper Tools
	WB24DH	P2224	OK Industries
	52420	60200	Standard Pneumatic
22	504939	507939	Cooper Tools
	504939	990724	Cooper Tools
	990719	990724	Cooper Tools
	WB22MLD	P212	OK Industries
	WB2275M	P2224	OK Industries
	52222	60100	Standard Pneumatic
20	990720	990725	Cooper Tools
	WB20M	P194LN	OK Industries
	52020	60000	Standard Pneumatic
18	504222	18285	Cooper Tools
	504222	990726	Cooper Tools
	990721	990726	Cooper Tools
	KB18	P194	OK Industries
	51820	60000	Standard Pneumatic

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D. Wire Wrap and Unwrap Tools

**Table 9
WIRE WRAP AND UNWRAP TOOLS**

Wire Size (AWG)	Wrap and Unwrap Tool		
	Part Number	Wrap Type	Supplier
26	HW-UW-26	Regular	OK Industries
	HW-UW-26SM	Modified	OK Industries
24	HW-UW-224-1	Regular	OK Industries
22	HW-UW-224-1	Regular	OK Industries
	HW-UW-22	Regular	OK Industries
20	HW-UW-20	Regular	OK Industries
18	HW-UW-18-19	Regular	OK Industries

E. Wire Unwrap Tools

**Table 10
WIRE UNWRAP TOOLS**

Wire Size (AWG)	Wire Wrap Post Size (inch)	Unwrap Tool		
		Type	Part Number	Supplier
26	0.025 x 0.025	Power	505084	Cooper Tools
			505244	Cooper Tools
			518921	Cooper Tools
			681	Cooper Tools
	0.045 x 0.045	Manual	515716	Cooper Tools
			SP690	Standard Pneumatic
			UW1	OK Industries
			Power	504769
A31478	Cooper Tools			
24	0.025 x 0.025	Power	505084	Cooper Tools
			505244	Cooper Tools
	0.045 x 0.045	Manual	515716	Cooper Tools
			SP690	Standard Pneumatic
			UW1	OK Industries
		Power	504769	Cooper Tools
	A31478		Cooper Tools	

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS

Table 10 (continued)

Wire Size (AWG)	Wire Wrap Post Size (inch)	Unwrap Tool		
		Type	Part Number	Supplier
22	0.045 x 0.045	Manual	515716	Cooper Tools
			SP690	Standard Pneumatic
			UW1	OK Industries
		Power	504769	Cooper Tools
			A31478	Cooper Tools
20	0.045 x 0.045	Manual	515716	Cooper Tools
			SP690	Standard Pneumatic
			UW1	OK Industries
		Power	504769	Cooper Tools
			A31478	Cooper Tools
18	0.045 x 0.045	Manual	A25195L	Cooper Tools

4. GENERAL CONDITIONS FOR THE WIRE ROUTING

This paragraph gives the necessary conditions for the wire routing in the Wire Integration Unit (WIU).

A. Effect of Wire Routing on the Tension of the Wires

The tension that the wire routing puts on the wires must not:

- Move the wires away from the wire wrap post
- Cause the number of corners of the wire wrap post that the one turn of insulated wire is against to fall below the limit that is specified in Table 11
- Put any force on the wire wrap post
- Put any force on the area where the wire is attached to the wire wrap post.

B. Directions of the Wire Routing

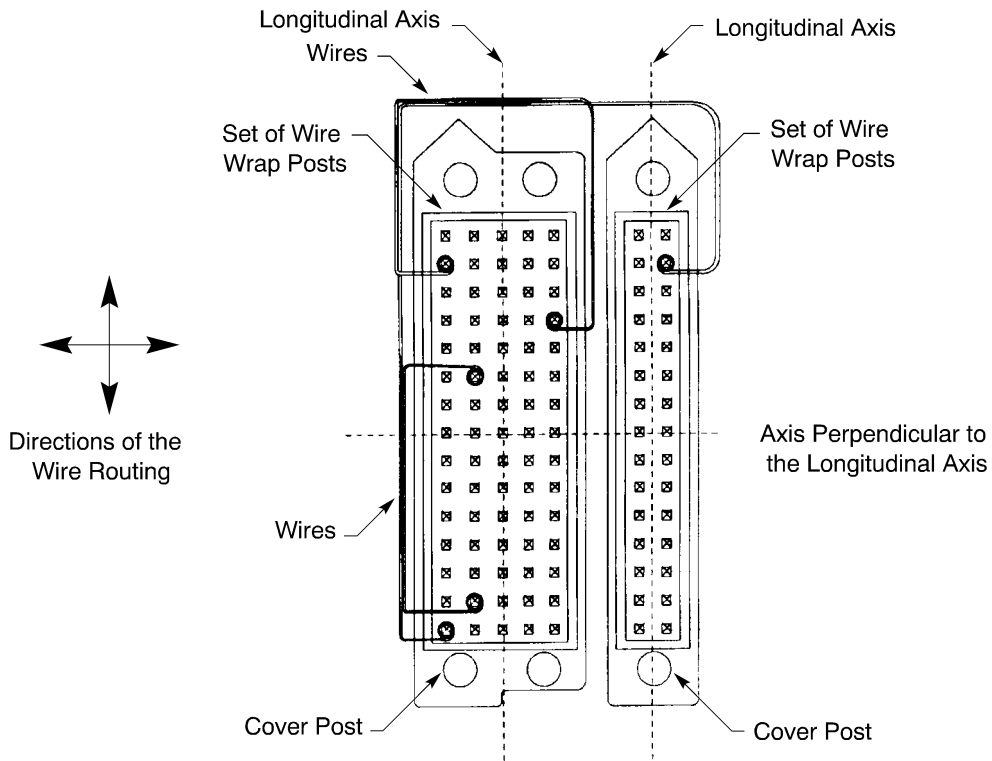
Refer to Figure 1 and Figure 2.

The direction of the wire routing from one wire wrap post to another wire wrap post in a set of wire wrap posts is:

- Parallel to the longitudinal axis of the set of wire wrap posts
- Parallel to the axis that is perpendicular to the longitudinal axis.

STANDARD WIRING PRACTICES MANUAL

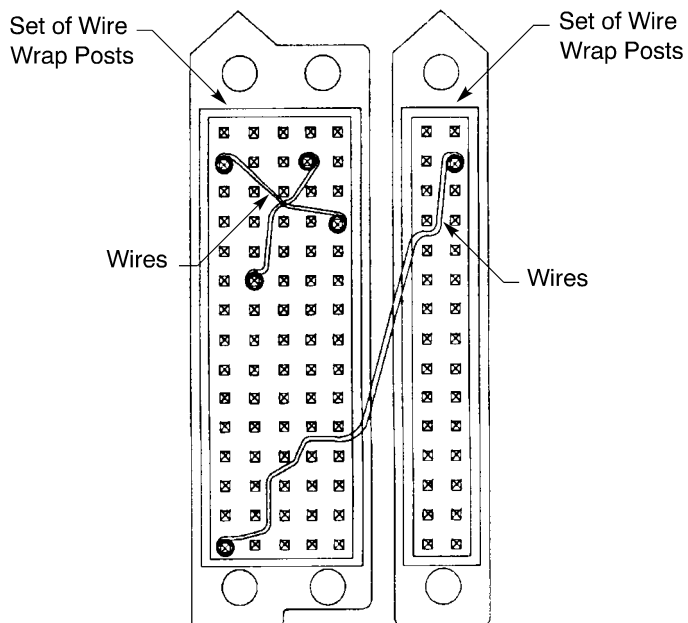
WIRE WRAP CONNECTIONS



SATISFACTORY DIRECTION OF THE WIRE ROUTING
Figure 1

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS



UNSATISFACTORY DIRECTION OF THE WIRE ROUTING

Figure 2

C. Wire Routing in the Same Set of Wire Wrap Posts

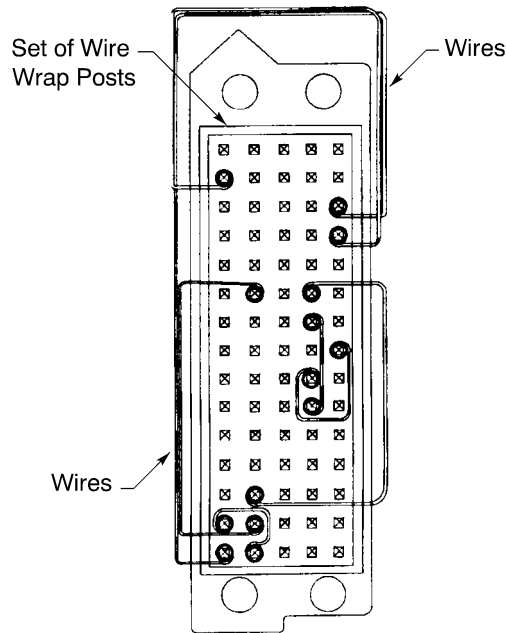
The wire routing in the same set of wire wrap posts goes from one wire wrap post to another wire wrap post:

- Between the wire wrap posts
- Around the outside of the perimeter of the wire wrap posts and the cover posts.

Refer to Figure 3 and Figure 4.

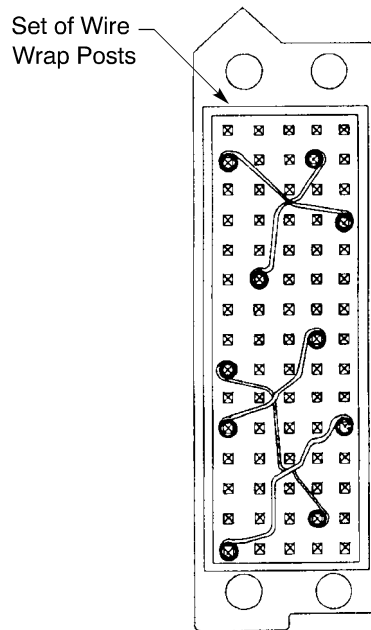
STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS



SATISFACTORY WIRE ROUTING IN THE SAME SET OF WIRE WRAP POSTS

Figure 3



UNSATISFACTORY WIRE ROUTING IN THE SAME SET OF WIRE WRAP POSTS

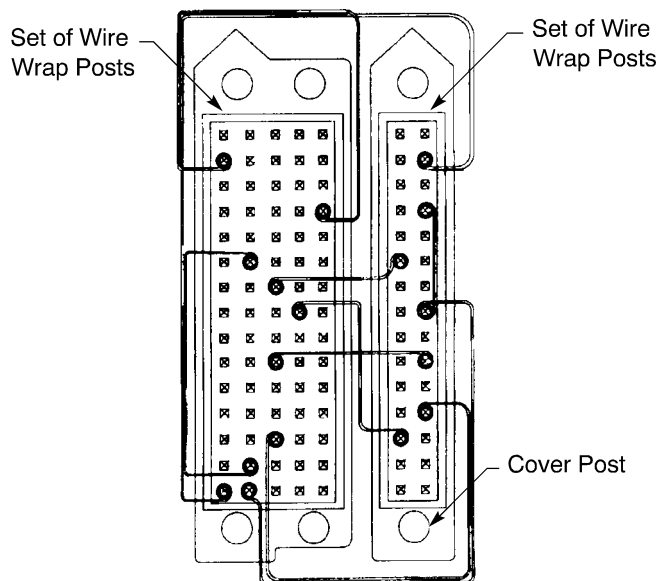
Figure 4

STANDARD WIRING PRACTICES MANUAL**WIRE WRAP CONNECTIONS****D. Wire Routing Between Adjacent Sets of Wire Wrap Posts**

The wire routing between adjacent sets of wire wrap posts goes from a post in one set to a post in the adjacent set:

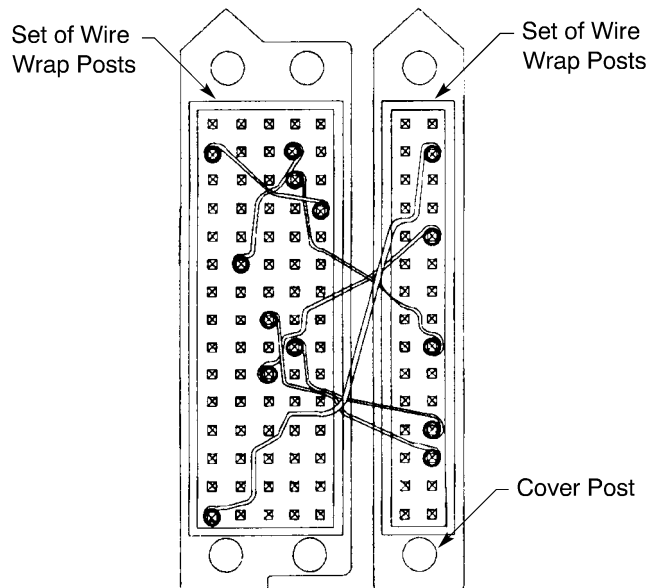
- Between the posts
- Around the outer of the perimeter of the wire wrap posts and the cover posts.

Refer to Figure 5 and Figure 6.

**SATISFACTORY WIRE ROUTING BETWEEN ADJACENT SETS OF WIRE WRAP POSTS****Figure 5**

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS



UNSATISFACTORY WIRE ROUTING BETWEEN ADJACENT SETS OF WIRE WRAP POSTS

Figure 6

E. Wire Routing Between Sets of Wire Wrap Posts That Are Not Adjacent

The wire routing:

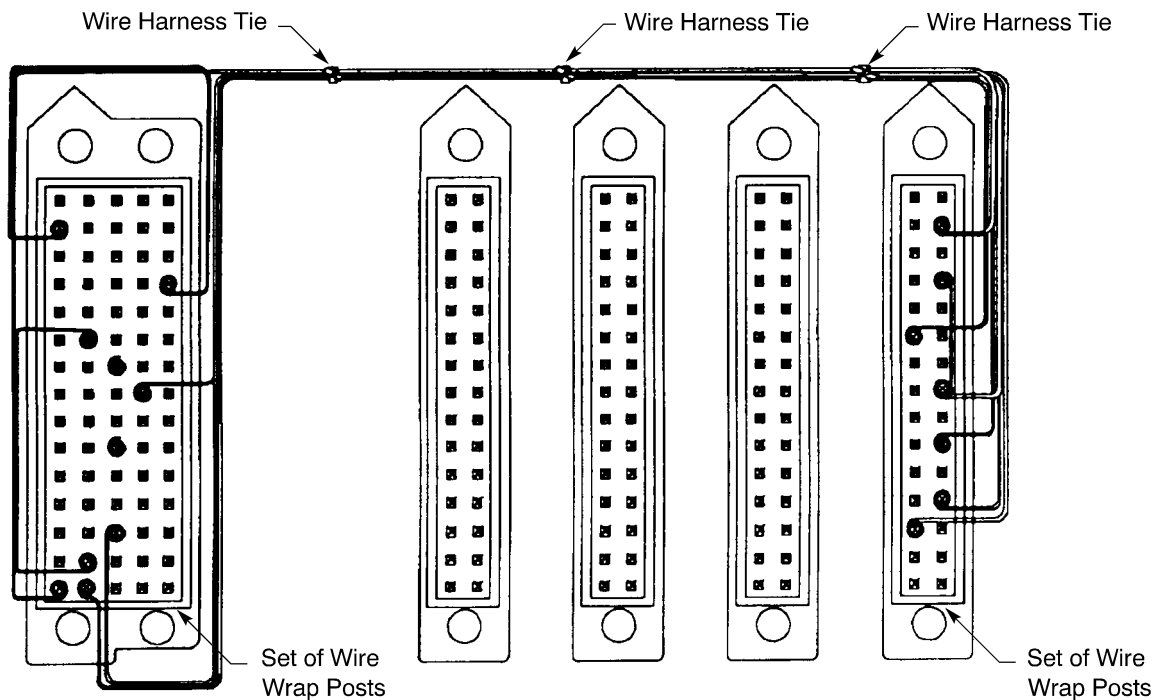
- Between the sets of wire wrap posts that are not adjacent goes from a post in one set to a post in another set around the outside of the perimeter of the wire wrap posts and the cover posts
- Keeps wires that are not in the same separation category apart.

A wire harness tie is assembled on the wires that have the same separation category.

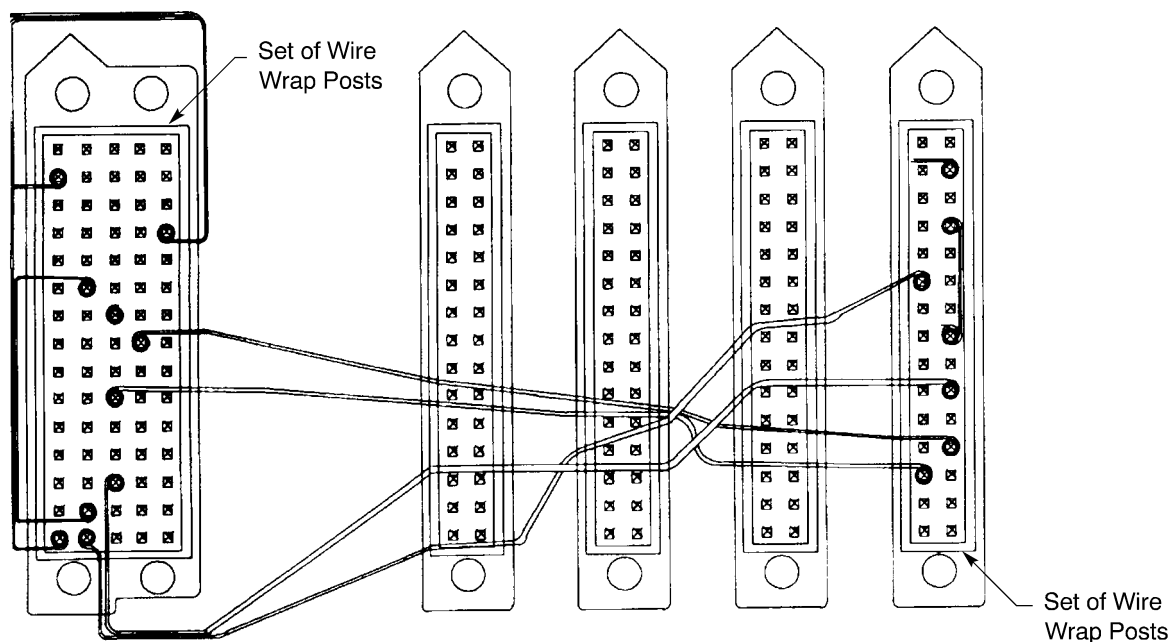
Refer to Figure 7 and Figure 8.

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS



SATISFACTORY WIRE ROUTING BETWEEN SETS OF WIRE WRAP POSTS THAT ARE NOT ADJACENT
Figure 7



UNSATISFACTORY WIRE ROUTING BETWEEN SETS OF WIRE WRAP POSTS THAT ARE NOT ADJACENT
Figure 8

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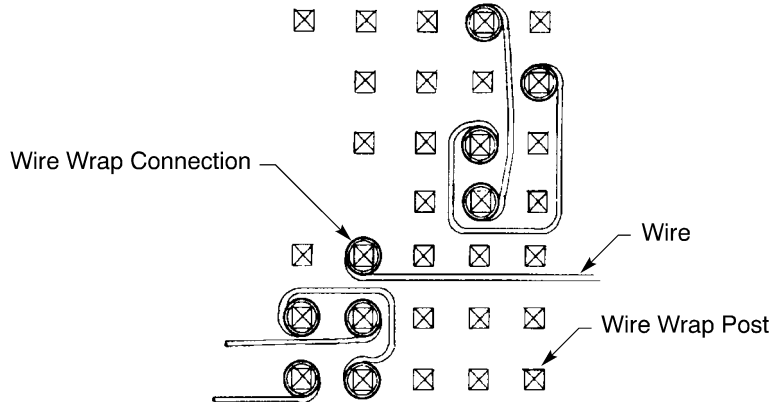
STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS

F. Position of the Wires in Relation to the Wire Wrap Posts

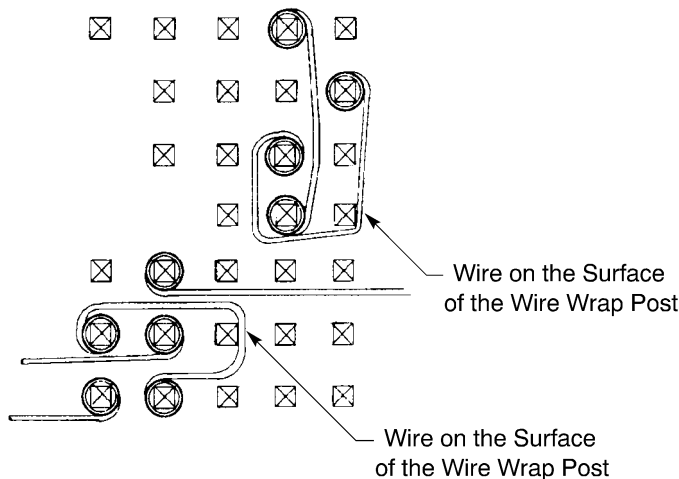
The wires that go between the wire wrap posts:

- Do not touch the posts; refer to Figure 9 and Figure 10.
- Can touch the wires that are already installed on the wire wrap posts; refer to Figure 11 and Figure 12.



SATISFACTORY WIRE ROUTING BETWEEN THE WIRE WRAP POSTS

Figure 9

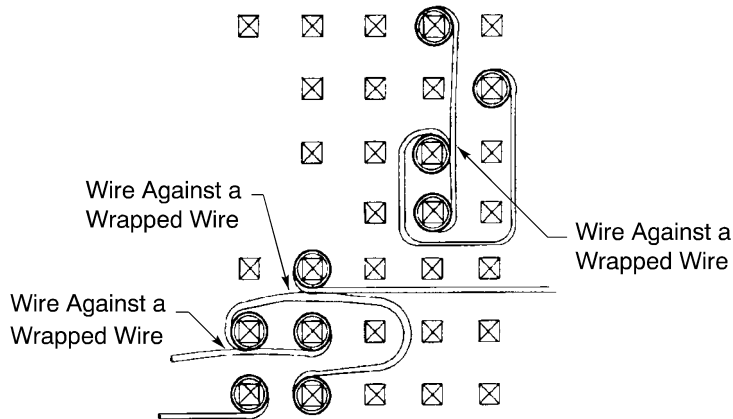


UNSATISFACTORY WIRE ROUTING BETWEEN THE WIRE WRAP POSTS

Figure 10

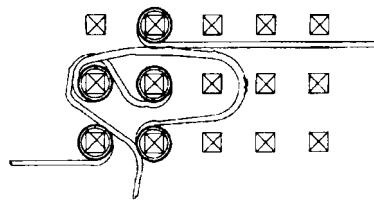
STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS



SATISFACTORY WIRE ROUTING BETWEEN WIRE WRAP POSTS WITH WRAPPED WIRE

Figure 11



UNSATISFACTORY WIRE ROUTING BETWEEN WIRE WRAP POSTS WITH WRAPPED WIRE

Figure 12

5. APPLICABLE CONDITIONS FOR A WIRE WRAP CONNECTION

A. Conditions for Repair of Damage

A wire wrap post must be replaced if it has damage that:

- Shows the primary metal of the post
- Can be seen with 5X magnification.

Refer to Paragraph 6.A.

If the conductor cannot be seen, these types of damage to the wire insulation of the wire turns are permitted:

- The insulation has cut
- The insulation is torn
- The insulation has a gouge
- The insulation is crushed.

B. Approved Tools

The wire wrap connections must be made only with the approved wire wrap tools. Refer to Paragraph 3.

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WIRE WRAP CONNECTIONS

C. General Conditions for a Wire Turn on a Wire Wrap Post

These conditions are applicable:

- The connection must have one turn of an insulated length of wire at the start of the connection near the rear face of the connector or board, or the end of the last level of the wrap on the post; refer to Figure 13
- The insulation of the one turn of the length of the insulated wire must touch a specified number of the corners of the wire wrap post; refer to Table 11.
- The length of the uninsulated wire, that starts at the end of the one turn of the length of the insulated wire and goes up the post to the end of the wire, must make a specified number of turns; refer to Table 11

**Table 11
NECESSARY NUMBER OF WIRE TURNS**

Wire Size (AWG)	Terminal Post Size (inch)	Number of Post Corners For the Turn of the Insulated Length of Wire		Number of Turns of the Uninsulated Length of Wire	
		Minimum	Maximum	Minimum	Maximum
26	0.025 x 0.025	3	9	6	7
	0.045 x 0.045	4	9	6	7
24	0.025 x 0.025	3	9	5	6
	0.045 x 0.045	4	9	5	6
22	0.045 x 0.045	4	9	5	6
20	0.045 x 0.045	4	9	4	5
18	0.045 x 0.045	4	9	4	5

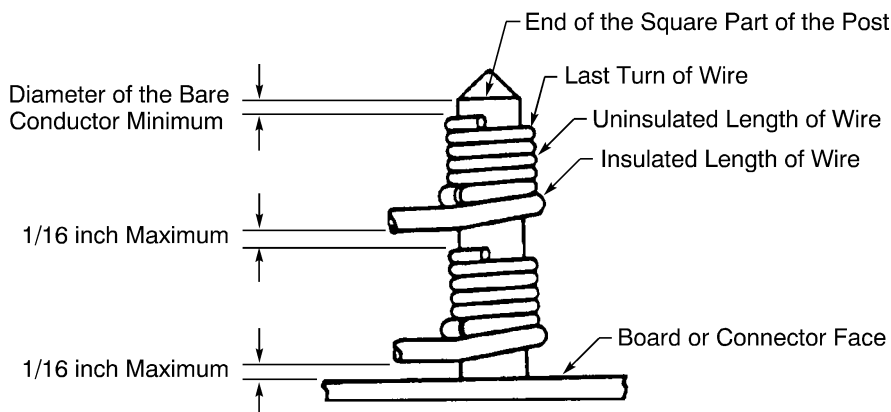
D. Configuration of the Wire Turns on the Wire Wrap Post

These conditions are applicable:

- The maximum distance between the start of the first wire turn and the rear face of the connector or board is 1/16 inch; refer to Figure 13
- The maximum distance between one wrap level and an adjacent wrap level on the same post is 1/16 inch; refer to Figure 13
- The minimum distance between the end turn of the last wrap level and the end of the square part of the post is the diameter of the bare conductor; refer to Figure 13
- A wrap level can have a maximum of 3 turns that are not against an adjacent turn; refer to Figure 17
- The maximum distance between adjacent turns is 1/2 the diameter of the wire; refer to Figure 17.

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS

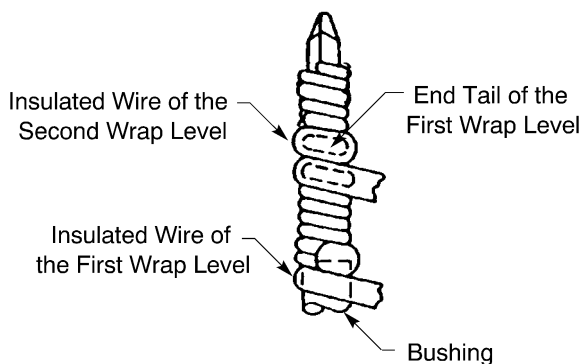


POSITION OF THE WRAP LEVELS ON THE WIRE WRAP POST
Figure 13

These positions of the wires are satisfactory alternatives:

- On the first wrap level, the first turn of the insulated wire can make an overlap with the terminal bushing
- On the second or third wrap levels, the first turn of the insulated wire can make an overlap with the uninsulated, end wire turns of the wrap level that is already installed.

Refer to Figure 14.



ALTERNATIVE POSITIONS OF THE WRAP LEVELS ON THE WIRE WRAP POST
Figure 14

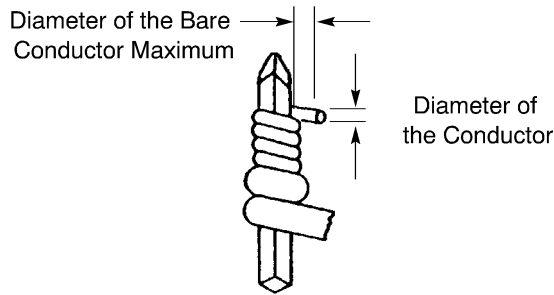
E. Length of a Free End Tail

The maximum length of the end tail that is not against the wire wrap post is the diameter of the bare conductor.

Refer to Figure 15.

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS



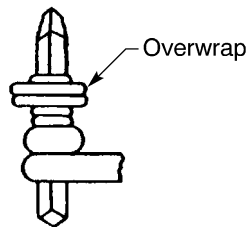
MAXIMUM LENGTH OF A FREE END TAIL

Figure 15

F. Unsatisfactory Wire Wrap Connections

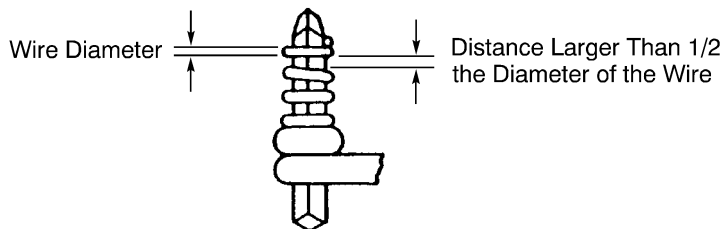
These wire wrap connections are not satisfactory:

- An overlap of the wire turns in the same wrap level; refer to Figure 16
- Too much distance between adjacent wire turns; refer to Figure 17
- A wire turn that has a larger outer diameter than the other turns in the wrap level; refer to Figure 18.



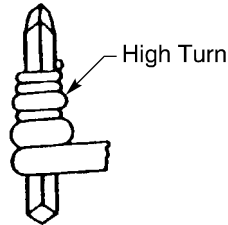
OVERLAP OF WIRE TURNS IN THE SAME WRAP LEVEL

Figure 16



TOO MUCH DISTANCE BETWEEN ADJACENT WIRE TURNS

Figure 17

STANDARD WIRING PRACTICES MANUAL**WIRE WRAP CONNECTIONS****WRAP LEVEL WITH A HIGH TURN****Figure 18****6. CHANGES TO WIRE INTEGRATION UNIT**

Usually, the changes to Wire Integration Unit (WIU) are:

- The removal of a wire
- The replacement of a wire
- The installation of a new circuit.

CAUTION: TO GIVE THE NECESSARY PROTECTION TO PERSONNEL AND THE EQUIPMENT:

- THE ELECTRICAL POWER TO THE WIU MUST BE SET TO THE OFF POSITION BEFORE THE REMOVAL OF THE WIU COVER
- THE INSTRUCTIONS ON THE DECAL ON THE WIU COVER MUST BE READ AND FOLLOWED.

A. Replacement of a Damaged Wire Wrap Post

- (1) Remove and replace the damaged wire wrap post. Refer to Subject 20-72-17.

B. Repair of a Bent Ground Bus Post

- (1) If the ground bus post is bent, make it straight.

NOTE: The ground bus post cannot be removed; it is permanently installed.

C. Removal of a Wire

- (1) Make a selection of a removal tool from Table 9 or Table 10.
- (2) Find the cover of the applicable connector or connectors.
- (3) Remove the necessary covers.
- (4) Find the ends of the wire.
- (5) Unwrap the wire from the wire wrap post at one end of the wire.
- (6) Unwrap the wire from the wire wrap post at the other end of the wire.
- (7) Remove any unwanted material from the area.
- (8) If there is no more work:
 - (a) Install the connector covers that were removed.
 - (b) Install the WIU cover.

D. Replacement of a Wire

- (1) Remove the applicable wire from the WIU. Refer to Paragraph 6.C.
- (2) Make a selection of the replacement wire.

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STANDARD WIRING PRACTICES MANUAL**WIRE WRAP CONNECTIONS**

These properties are used to make the selection:

- The wire routing
 - The wire type
 - The wire size.
- (a) If the replacement wire has a wire routing that is the same as the routing of the wire that is removed, use the same type and size of wire.
- (b) If the replacement wire has a wire routing that is different from the routing of the wire that is removed, use a wire that has:
- A solid copper conductor
 - A shield
 - A jacket on the shield
 - The same size as the wire that is removed.

NOTE: For example, the BMS13-46 Type 4 Class 1 wire is a satisfactory selection.

The reasons for this selection are:

- It is necessary to keep the correct wire separation categories
 - It is necessary that wires with different wire separation categories are not put together
 - The replacement wire routing, that is different from the routing of the wire that is replaced, can touch or be near the wire routing that has a different separation category than the category of the replacement wire routing
 - The shield of the replacement wire automatically gives, without a more careful analysis, the mechanical protection for wires that must have mechanical separation
 - The shield of the replacement wire automatically gives, without a more careful analysis, the EMI protection for wires that must have EMI separation.
- (3) Install the replacement wire. Refer to Paragraph 6.E.

E. Installation of a New Wire

- (1) Make a selection of the new wire.

These properties are used to make the selection:

- A solid copper conductor
- A shield
- A jacket on the shield
- A maximum size AWG 22 for 0.045 x 0.045 wire wrap posts.

NOTE: For example, the BMS13-46 Type 4 Class 1 wire is a satisfactory selection.

Shielded wire is used to keep the correct wire separation categories.

- (2) Prepare each end of the wire:
- (a) Remove 2.0 inches ± 0.1 inch of the jacket from the end of the wire.
- (b) Remove 1.6 inches ± 0.1 inch of the shield.
- (c) Fold the remaining shield back over the cable jacket.
- (3) Install a heat shrinkable sleeve on each end of the wire.

NOTE: A layer of insulation tape is a satisfactory alternative to the heat shrinkable sleeve.

- (a) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
Make sure that the sleeve has the smallest diameter that can move easily on the wire.

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STANDARD WIRING PRACTICES MANUAL**WIRE WRAP CONNECTIONS**

- (b) Push a length of the sleeve on the shield.
Make sure that the end of the sleeve is aligned with the end of the shield.
- (c) Shrink the sleeve in position. Refer to Subject 20-10-14.
- (4) Remove 1.4 inches \pm 0.1 inch of the dielectric from the end of the conductor.
- (5) Remove the cover from the WIU.
- (6) Find the cover of the applicable connector or connectors.
- (7) Remove the necessary covers.
- (8) Wrap one end of the wire on the applicable wire wrap post.
- (9) Put the wire in the correct routing. Refer to Paragraph 4.
- (10) Wrap the other end of the wire on the applicable wire wrap post.
- (11) Do a continuity test.

7. CONNECTOR DISASSEMBLY**A. General Conditions for the Removal of a Wire from the Wire Wrap Post**

These conditions are applicable:

- The wire must be unwrapped only with the approved tools. Refer to Paragraph 3.
- The wire of the wire turn of an unwrapped wire must not be used again.

B. Removal of an Epoxied Connector Cover

- (1) Make a selection of a hot air gun. Refer to Subject 20-00-11.

CAUTION: MAKE SURE TO OBEY ALL THE RECOMMENDED SAFETY PRECAUTIONS FOR THE USE OF HEAT GUNS AND HOT AIR GUNS ON AIRPLANES THAT ARE IN SERVICE. REFER TO SUBJECT 20-00-10.

- (2) Find the cover of the applicable connector or connectors.
- (3) Remove the printed circuit board (PCB) assembly that is attached to the connector.
- (4) Remove any other assemblies that are necessary to get access to the connector.
- (5) Hold the heat gun one inch from the cover.
- (6) Apply heat to the cover until the adhesive becomes soft. This usually occurs in 10 to 15 seconds.

WARNING: DO NOT APPLY THE HEAT TO ANY ONE AREA FOR MORE THAN 20 SECONDS SO THAT DAMAGE TO THE WIRES DOES NOT OCCUR.

- (7) Apply an even, upward force on the cover to remove the cover.
- (8) Examine the wire wrap to make sure that no damage has occurred.
- (9) Discard the used cover.

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS

8. CONNECTOR ASSEMBLY

A. Insulation Removal

**Table 12
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Wire	Wire Wrap Post Size (inch)	Removal Length (inch)	
			Target	Tolerance
26	BMS 13-46 Type 1	0.045 x 0.045	1.4	±0.10
		0.025 x 0.025	1.0	±0.10
	BMS 13-46 Type 7	0.045 x 0.045	1.4	±0.10
		0.025 x 0.025	1.0	±0.10
	BMS 13-46 Type 3	0.045 x 0.045	1.4	±0.10
		0.025 x 0.025	1.0	±0.10
24	BMS 13-46 Type 1	0.045 x 0.045	1.4	±0.10
		0.025 x 0.025	1.0	±0.10
	BMS 13-46 Type 7	0.045 x 0.045	1.4	±0.10
		0.025 x 0.025	1.0	±0.10
	BMS 13-46 Type 3	0.045 x 0.045	1.4	±0.10
		0.025 x 0.025	1.0	±0.10
22	BMS 13-46 Type 1	0.045 x 0.045	1.4	±0.10
	BMS 13-46 Type 7	0.045 x 0.045	1.4	±0.10
	BMS 13-46 Type 3	0.045 x 0.045	1.4	±0.10
20	BMS 13-46 Type 1	0.045 x 0.045	1.4	±0.10
	BMS 13-46 Type 7	0.045 x 0.045	1.4	±0.10
	BMS 13-46 Type 3	0.045 x 0.045	1.4	±0.10
18	BMS 13-46 Type 1	0.045 x 0.045	1.4	±0.10
	BMS 13-46 Type 7	0.045 x 0.045	1.4	±0.10
	BMS 13-46 Type 3	0.045 x 0.045	1.4	±0.10

- (1) Make a selection of an insulation removal tool from Table 4.
- (2) Remove the necessary length of insulation from the end of the wire. Refer to Table 12.

CAUTION: MAKE SURE THAT DAMAGE TO THE CONDUCTOR DOES NOT OCCUR. IF THE BASE METAL OF THE CONDUCTOR CAN BE SEEN, THE CONDUCTOR CAN GIVE UNSATISFACTORY PERFORMANCE.

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS

B. Assembly of a Wire Wrap Connection with Stranded Wire and a TermaPost Solder Sleeve

This paragraph gives the procedure to attach one or two stranded conductors to a 0.025 inch x 0.025 inch wire wrap post with a Raychem TermaPost solder sleeve.

NOTE: If it is necessary to assemble the connection with two wires, the wires must be the same size.

CAUTION: THIS PROCEDURE PUTS SOLDER ON THE WIRE WRAP POST. IT IS NOT POSSIBLE TO WRAP A WIRE WITH A SOLID CONDUCTOR DIRECTLY ON A WIRE WRAP POST THAT HAS SOLDER ON THE CORNERS OF THE POST. THE SOLDER ON THE POST CAN CAUSE UNSATISFACTORY PERFORMANCE OF A WIRE WRAP CONNECTION.

**Table 13
TERMAPOST SOLDER SLEEVE PART NUMBERS**

Wires Size (AWG)	Number of Wires	Solder Sleeve		
		Part Number	Color of Dot	Supplier
30	1	D-141-0111	Red	Raychem
	2			
28	1	D-141-0111	Red	Raychem
	2	D-141-0112	Blue	Raychem
26	1	D-141-0111	Red	Raychem
	2	D-141-0112	Blue	Raychem
24	1	D-141-0112	Blue	Raychem
	2	D-141-0113	Yellow	Raychem
22	1	D-141-0112	Blue	Raychem
	2	D-141-0114	Green	Raychem
20	1	D-141-0113	Yellow	Raychem
18	1	D-141-0114	Green	Raychem

**Table 14
TERMAPOST INSTALLATION TOOLS**

Wire Size (AWG)	Number of Wires	Installation Tool		
		Part Number	Color of Dots	Supplier
30	1	AD-1545	Red and Blue	Raychem
	2			
28	1	AD-1545	Red and Blue	Raychem
	2			
26	1	AD-1545	Red and Blue	Raychem
	2			
24	1	AD-1545	Red and Blue	Raychem
	2	AD-1546	Yellow and Green	Raychem

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Table 14 (continued)

Wire Size (AWG)	Number of Wires	Installation Tool		
		Part Number	Color of Dots	Supplier
22	1	AD-1545	Red and Blue	Raychem
	2	AD-1546	Yellow and Green	Raychem
20	1	AD-1546	Yellow and Green	Raychem
18	1	AD-1546	Yellow and Green	Raychem

**Table 15
NECESSARY TOOLS**

Tool	Description	Supplier
RH-3900	Resistance Heater, 115V	Raychem

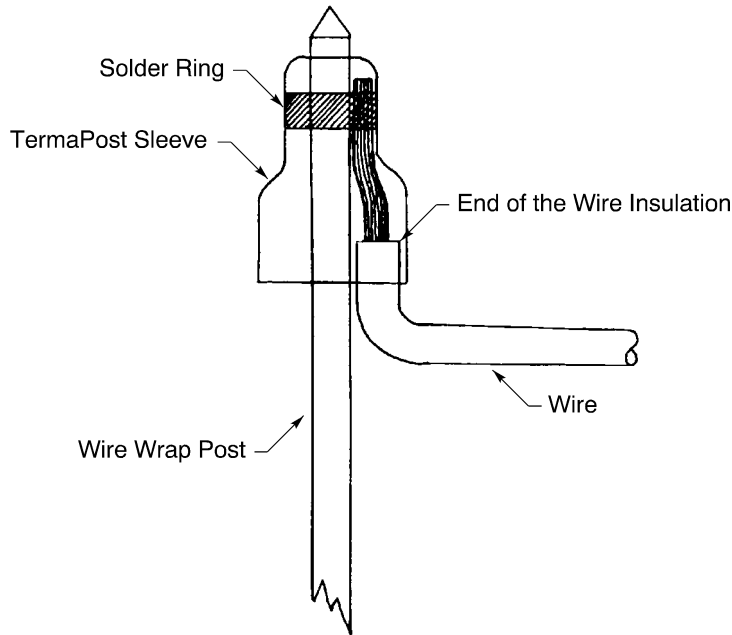
- (1) Make a selection of the solder sleeve from Table 13.
- (2) Make a selection:
 - An insulation removal tool from Table 4
 - An installation tool from Table 14
 - A resistance heater from Table 15.
- (3) Put the small end of the sleeve into the end of the installation tool with the spring clip.
- (4) Prepare the wire:
 - (a) Remove 0.15 inch \pm 0.015 inch of insulation from the end of each wire.
 - (b) Put the conductor in the hole in the other end of the tool.
 - (c) Carefully push the conductor into the hole until the end of the conductor is against the bottom of the hole in the tool.
 - (d) Bend the conductor at the edge of the hole in the tool so that the conductor makes an angle of 90 degrees \pm 10 degrees.
 - (e) Remove the bent conductor from the tool.
 - (f) If it is necessary to assemble the connection with two wires, do Step (b) through Step (e) for the second wire.
- (5) Push each bent conductor into the sleeve on the other end of the tool until it stops.
- (6) Axially align the tool and the wire wrap post.
- (7) Push the tool, the sleeve, and each conductor down the wire wrap post until the end of the post:
 - Goes through the hole in the top of the sleeve
 - Is against the end of the hole inside the tool.

Make sure that the tool and the post stay axially aligned.
- (8) Remove the tool from the wire wrap post.

Make sure that the end of the insulation of each wire is inside the insulation of the sleeve. Refer to Figure 19.

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POSITION OF THE TERMAPOST SOLDER SLEEVE ON THE WIRE WRAP POST
Figure 19

- (9) Solder the sleeve and the conductor or conductors to the post:
 - (a) Set the control of the resistance heater on 90.
 - (b) Hold the heater against the top of the wire wrap post above the sleeve so that the two electrodes are against the post.

NOTE: The temperature of the post is not increased if both electrodes do not touch the post.

- (c) Apply heat to the post until the solder ring melts and a fillet is made between the post and each conductor.

This condition usually occurs in 3 seconds to 5 seconds.

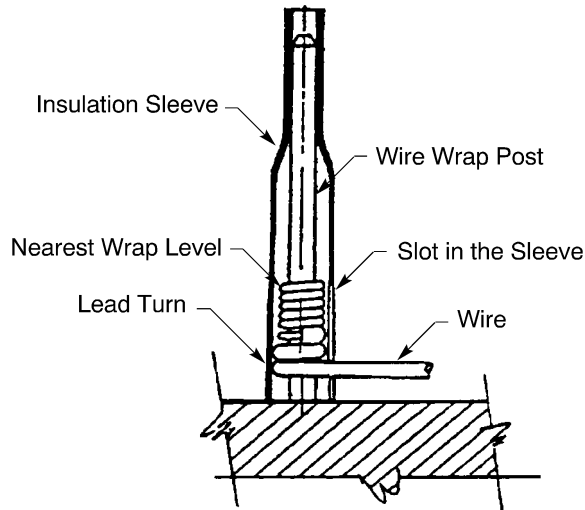
C. Installation of an Insulation Sleeve on a Wire Wrap Post

Table 16
INSULATION SLEEVE PART NUMBERS

Part Number	Supplier
T-Fit 063-2	Raychem

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS



POSITION OF THE INSULATION SLEEVE ON A POST WITH ONE WRAP LEVEL
Figure 20

- (1) Make a selection of an insulation sleeve from Table 16.
- (2) Axially align the sleeve with the wire wrap post so that the slot of the sleeve is above the wire at the start of the lead turn of the nearest wrap level. Refer to Figure 20.
- (3) Push the sleeve down on the post until the bottom of the sleeve is against either of these objects:
 - The face of the receptacle or board
 - The wire at the start of the lead turn of the first wrap level if the wire is in a different position than the position of the wire in the slot.

Make sure that:

- At least one wire is in the slot of sleeve
- The friction between the sleeve and the post holds the sleeve in position.

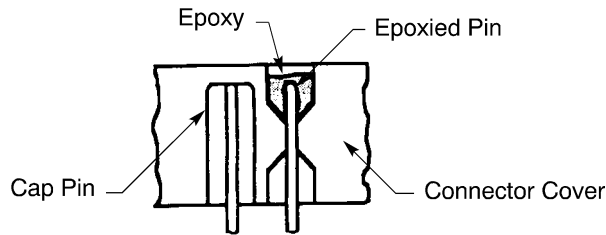
D. Installation of an Epoxied Connector Cover

Table 17
EPOXY ADHESIVES

Epoxy		Primer		Cure Time (Hours)
Part Number	Supplier	Part Number	Supplier	
BMS 5-92 Type I	QPL	-	-	24
BMS 5-92 Type III	QPL	-	-	24
BMS 5-105 Type I	QPL	BMS 10-83 Type I	QPL	6
DP-100	3M Scotch	-	-	24

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POSITION OF THE CONNECTOR COVER ON THE CONNECTOR
Figure 21

Refer to Figure 21.

- (1) Make a selection of a cover for the connector from Table 2.
- (2) Make a selection of an adhesive from Table 17.
- (3) Push the cover, with equal pressure, down on the connector until the cover is fully installed on the cap pins. Refer to Figure 21.

Make sure that the cover is fully installed or, as a minimum, has direct contact with the second wrap level.

- (4) Apply the adhesive in the upper half of the pin groove until the pin is under the adhesive.

9. TEST PROCEDURES FOR WIRE WRAP CONNECTIONS

A. Test Failure Conditions

If any of the wire wrap connections do not pass the necessary test, these conditions are applicable:

- The tool must be adjusted or repaired, if it is possible
- Another set of tests must be done.
- It is possible that the wire wrap connections, made with the tool before the test, are unsatisfactory and should be examined.

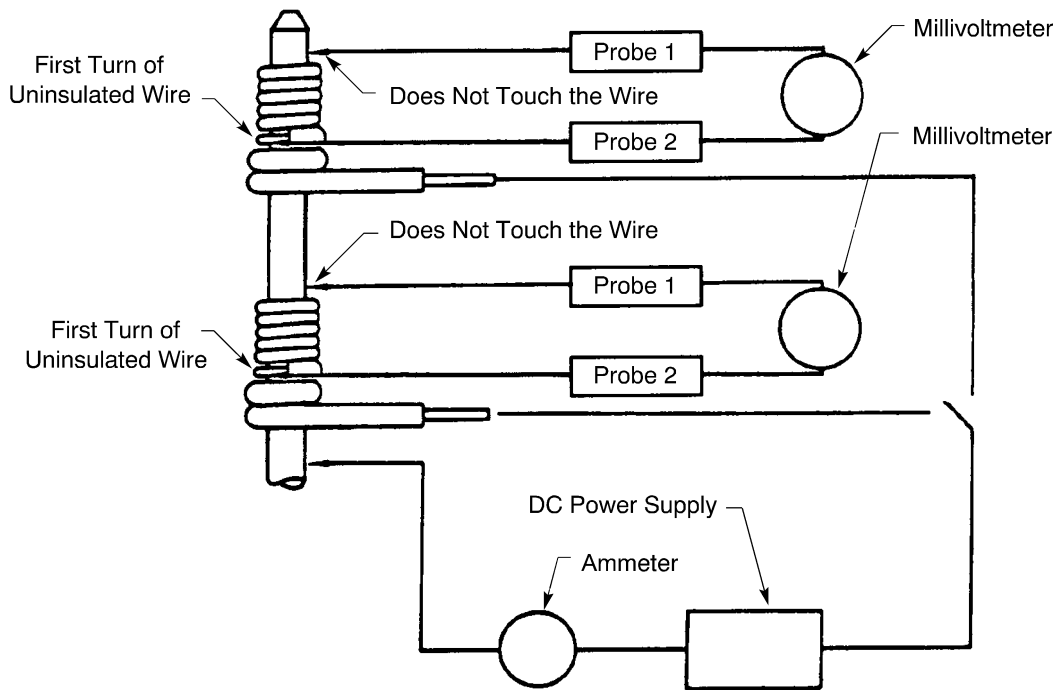
B. Resistance Test

Table 18
WIRE WRAP RESISTANCE TEST VALUES

Wire Size (AWG)	DC Current	
	Target (ampere)	Tolerance (percent)
30	1.0	± 2
28	2.0	± 2
26	2.4	± 2

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WIRE WRAP CONNECTIONS



CONFIGURATION OF THE WIRE WRAP RESISTANCE TEST
Figure 22

- (1) Set the power supply on zero.
- (2) Make the necessary wire wrap connections. Refer to Figure 22.
- (3) Slowly increase the voltage until the ammeter shows the specified value for the size of wire. Refer to Table 18.
- (4) Read the millivoltmeter.

If the millivoltmeter shows more than 4 millivolts, the electrical connection is not satisfactory.

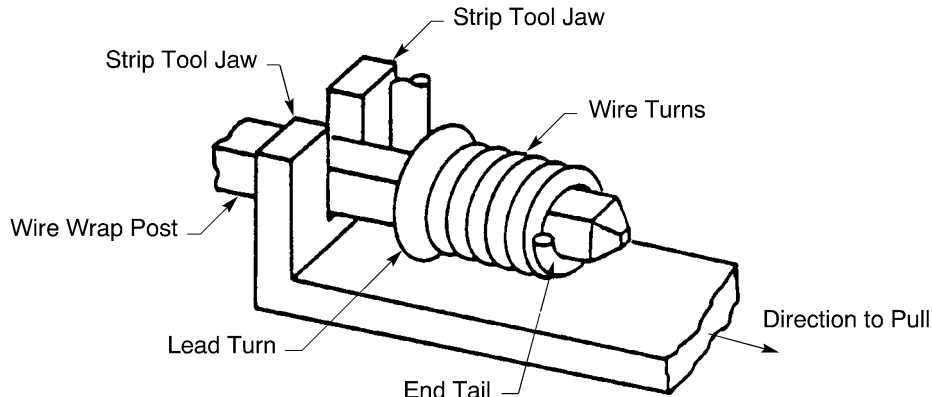
C. Terminal Strip Force Test

Table 19
TERMINAL STRIP FORCE

Wire Size (AWG)	Strip Force (pounds)
30	3
28	4
26	6
24	7
22	8
20	9
18	15

STANDARD WIRING PRACTICES MANUAL

WIRE WRAP CONNECTIONS



CONFIGURATION OF THE TERMINAL STRIP FORCE TEST

Figure 23

Refer to Figure 23.

- (1) Put the jaws of the strip tool on the post so that the longitudinal axis of the post is at an angle of 90 degrees \pm 10 degrees from the surface of the jaws.

Make sure that:

- The surfaces of both jaws of the strip tool are aligned so that those surfaces touch the lead turn at the same time
- There is a minimum clearance between the jaws of the strip tool and the post so that there is no interference
- The total clearance between the post and the jaws of the strip tool is not greater than 70 percent of the diameter of the uninsulated wire.

- (2) Slowly pull the jaws of the strip tool against the lead turn in the direction toward the end of the post. If the wrap level moves before the force is equal to the specified value in Table 19, the electrical connection is not satisfactory.

D. Unwrap Test

- (1) Put the unwrap tool on the terminal post.
- (2) Engage the tool with the end turn of the wrap level.
- (3) Turn the tool counterclockwise until either of these conditions occur:
 - All of the wire is transferred to the tool
 - The wrap level becomes loose and is removed from post.
- (4) If the wire is not transferred to the tool, put a cylinder or rod that can go into the center of the unwrapped wire for support.
- (5) Hold the insulated part of the wire tightly.
- (6) Turn the tool or the rod to straighten the wire.

NOTE: It is not necessary for the wire to be fully straight.

If the wire breaks when it is straightened, the electrical connection is not satisfactory.

STANDARD WIRING PRACTICES MANUAL**WIRE WRAP CONNECTIONS****E. Gas Tight Test**

In the gas tight test, the wire wrap connection has exposure to aqua regia fumes first, and then to ammonium sulfide gas.

Make sure that test solutions do not touch the connection during the test.

- (1) Put 1 milliliter to 2 milliliters of aqua regia solution, made of a 1:1 concentrated hydrochloric and nitric acid mixture, in a 16 x 15 milliliter test tube.
- (2) Put 1 milliliter of concentrated ammonium sulfide solution in another test tube.
- (3) Hang the wire wrap connection in the test tube with the aqua regia solution.
- (4) Put a cork on the end of the test tube.
- (5) Let the connection have exposure to the fumes for 10 minutes minimum.
- (6) Put the connection in the other test tube with the concentrated ammonium sulfide solution.
- (7) Put a cork on the end of the test tube.
- (8) Let the connection have exposure to the fumes until the wire becomes dark.
The color of the dark area should be copper or gold sulfide.
- (9) Remove connection from the test tube.
- (10) Let the connection dry.
- (11) Unwrap the connection with a tool that does not put any scratches on the post.
- (12) Examine the post.

NOTE: The gas tight area should be light in color when it is compared to the dark post.

If the wire wrap is not gas tight on 75 percent of the corners that touch the uninsulated wire, except for the lead turn and the end turn, the electrical connection is not satisfactory.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ARIZONA INTEGRATED ELECTRONICS APC() SERIES CONNECTORS

<u>Paragraph</u>		<u>Page</u>
1.	<u>PART NUMBERS AND DESCRIPTION</u>	1
	A. Connector Part Numbers	1
	B. Contact Part Numbers	1
2.	<u>INSERT CONFIGURATIONS AND POLARIZATION</u>	2
	A. Connector Insert Configurations	2
	B. Polarization Position	2
	C. Polarization Code Change	4
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ARIZONA INTEGRATED ELECTRONICS APC() SERIES CONNECTORS

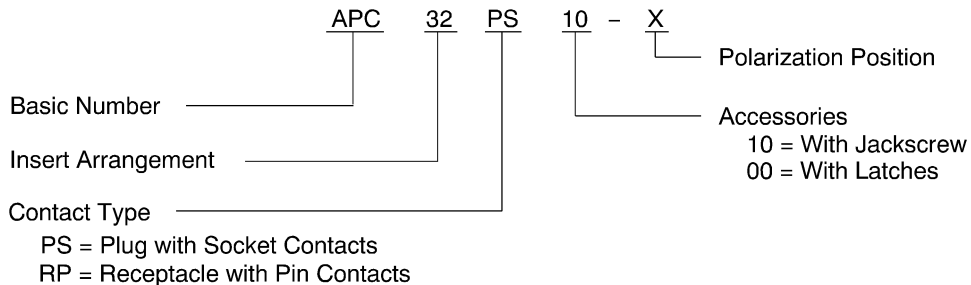
This Subject gives the procedures to disassemble and assemble the Arizona Integrated Electronics (AIE) APC() series connectors.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Configuration	Supplier
APC32PS()	Plug	Arizona Integrated Electronics
APC32RP()	Receptacle	Arizona Integrated Electronics
APC60PS()	Plug	Arizona Integrated Electronics
APC60RP()	Receptacle	Arizona Integrated Electronics



**AIE APC() SERIES CONNECTOR PART NUMBER STRUCTURE
Figure 1**

**Table 2
CONNECTOR COMPONENT KIT PART NUMBERS**

Part Number	Description	Insert Configuration
APC32PC10	Protective Cover Kit	32 Position Receptacle
APC32SR10	Strain Relief Kit	32 Position Plug
APC60PC10	Protective Cover Kit	60 Position Receptacle
APC60SR10	Strain Relief Kit	60 Position Plug

B. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

Wire Size (AWG)	Contact Size		Contact Type	Boeing Standard	Supplier
	Engaging End	Crimp Barrel			
20	20	20	Socket	BACC47EG2	Boeing

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ARIZONA INTEGRATED ELECTRONICS APC() SERIES CONNECTORS

Table 3 (continued)

Wire Size (AWG)	Contact Size		Contact Type	Boeing Standard	Supplier
	Engaging End	Crimp Barrel			
16	16	16	Socket	BACC47EG3	Boeing

Table 4

WIRE WRAP CONTACT PART NUMBERS

Engaging End Size	Contact Type	Part Number	Supplier
20	Pin	APC20T00	Arizona Integrated Electronics
16	Pin	APC16T00	Arizona Integrated Electronics

2. INSERT CONFIGURATIONS AND POLARIZATION

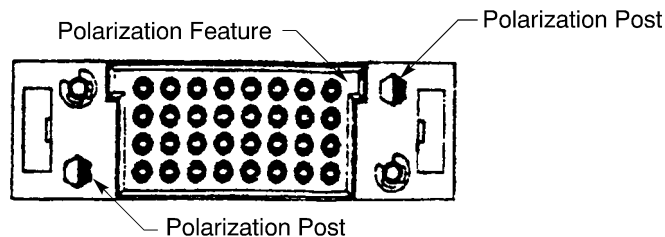
A. Connector Insert Configurations

Table 5

INSERT CONFIGURATIONS

Insert Configuration	Contact	
	Count	Size
32 Position	8	16
	24	20
60 Position	16	16
	44	20

B. Polarization Position

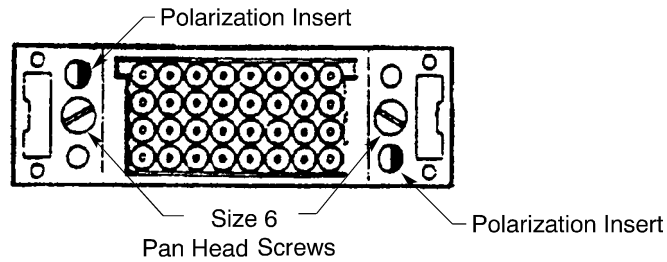


PLUG POLARIZATION POSTS

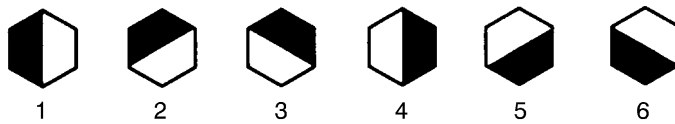
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ARIZONA INTEGRATED ELECTRONICS APC() SERIES CONNECTORS



RECEPTACLE POLARIZATION INSERTS
Figure 3



Dark Area Shows Solid Portion Of Post or Insert

POLARIZATION POSITIONS
Figure 4

Table 6
POST POLARIZATION POSITIONS

Plug			Receptacle		
Position	Left Post	Right Post	Position	Left Post	Right Post
01	1	1	01	1	1
02	2	1	02	1	6
03	3	1	03	1	5
04	4	1	04	1	4
05	5	1	05	1	3
06	6	1	06	1	2
07	1	2	07	6	1
08	2	2	08	6	6
09	3	2	09	6	5
10	4	2	10	6	4
11	5	2	11	6	3
12	6	2	12	6	2
13	1	3	13	5	1
14	2	3	14	5	6
15	3	3	15	5	5
16	4	3	16	5	4

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ARIZONA INTEGRATED ELECTRONICS APC() SERIES CONNECTORS

Table 6 (continued)

Plug			Receptacle		
Position	Left Post	Right Post	Position	Left Post	Right Post
17	5	3	17	5	3
18	6	3	18	5	2
19	1	4	19	4	1
20	2	4	20	4	6
21	3	4	21	4	5
22	4	4	22	4	4
23	5	4	23	4	3
24	6	4	24	4	2
25	1	5	25	3	1
26	2	5	26	3	6
27	3	5	27	3	5
28	4	5	28	3	4
29	5	5	29	3	3
30	6	5	30	3	2
31	1	6	31	2	1
32	2	6	32	2	6
33	3	6	33	2	5
34	4	6	34	2	4
35	5	6	35	2	3
36	6	6	36	2	2

- (1) For plugs, install the polarization posts. Refer to Figure 5, Figure 4, and Table 6.
Make sure to tighten the polarization post screws.
- (2) For receptacles, install the polarization inserts. Refer to Figure 7, Figure 4, and Table 6.
- (3) If the polarization post or the insert position is changed, the polarization code on the connector must be changed. Refer to Paragraph 2.C.

NOTE: A portion of the connector part number has the polarization post code.

C. Polarization Code Change

- (1) If the polarization code is stamped on the connector:
 - (a) Erase the old polarization code numbers.
 - (b) Use a steel stamp to stamp the new code adjacent to the original number.
Make sure that the stamp is the same size as the original connector part number.
- (2) If the code is printed in ink on the connector:

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ARIZONA INTEGRATED ELECTRONICS APC() SERIES CONNECTORS

- (a) Put Independent 73X NW black ink on the old polarization code.
- (b) Put the new code on the connector with Independent 73X NW Opaque ink.
Make sure to add the new numbers adjacent to the original number.
- (c) After the ink dries, apply a layer of Akzo 683-3-2 or 3M EC-776 coating over the ink mark.

3. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 7
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	
	Part Number	Supplier
20	ATMS2078	Astro
16	ATR2112	Astro

- (1) Make a selection of a contact removal tool from Table 7.
- (2) Remove the contact.

4. CONNECTOR PLUG ASSEMBLY

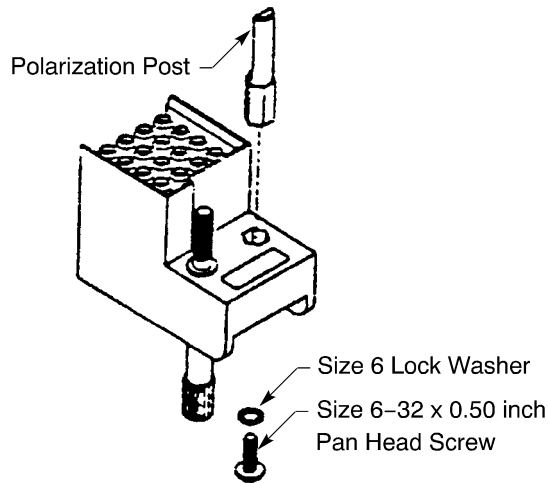
A. Plug Assembly

Refer to Figure 5 and Subject 20-71-14.

Make sure to use the tools in Table 8 to insert the contacts.

**Table 8
CONTACT INSERTION TOOLS**

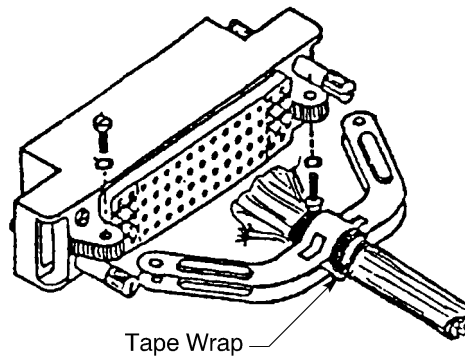
Crimp Barrel Size	Insertion Tool	
	Part Number	Supplier
20	ATR1079	Astro
16	ATR1106	Astro

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF ARIZONA INTEGRATED ELECTRONICS APC() SERIES CONNECTORS**

PLUG ASSEMBLY
Figure 5

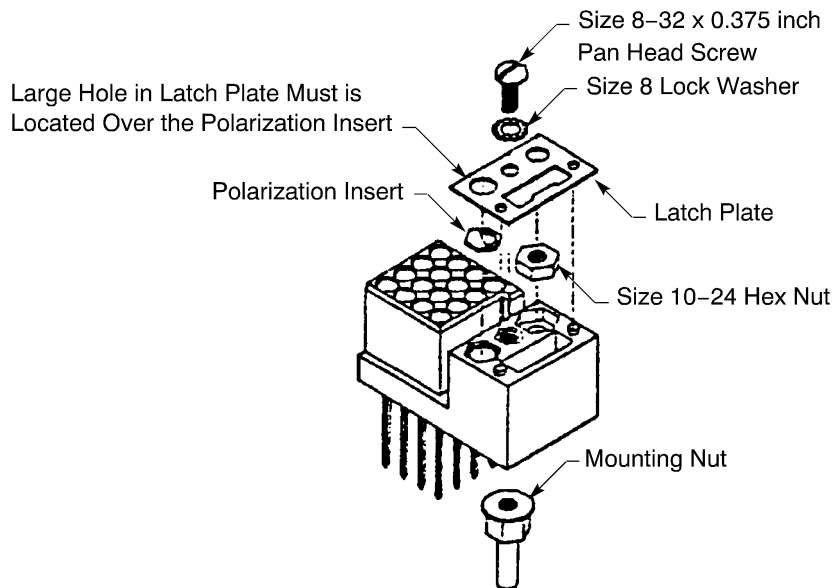
B. Strain Relief Clamp Installation

Refer to Figure 6 and Subject 21-61-00.



STRAIN RELIEF CLAMP
Figure 6

- (1) Form and hold the wires with a string or plastic tie.
- (2) Make a selection of a strain relief clamp from Table 2.
- (3) Put the strain relief clamp on the wires and align the clamp holes with the holes on the connector.
- (4) Put a layer of insulation tape around the wires where the clamp touches the wires.
- (5) Apply an additional 1, 2, or 3 layers of these tapes:
 - Strip-n-Stick 220A silicone sponge rubber adhesive tape
 - 3M Scotch 70 silicone rubber tape.
- (6) Tighten the clamp screws.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF ARIZONA INTEGRATED ELECTRONICS APC() SERIES CONNECTORS****5. CONNECTOR RECEPTACLE ASSEMBLY****A. Receptacle Assembly****RECEPTACLE ASSEMBLY****Figure 7**

- (1) Wrap the wires onto the wire wrap posts. Refer to Subject 20-72-18.
- (2) Install the latch plate. Refer to Figure 7.
- (3) Make a selection of a protective cover from Table 2.
- (4) Install the protective cover.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ITT CANNON SGA(), SOURIAU 30-00053-() AND 30-00054-() AND TRI-STAR C-06BC-01()-1112 RACK AND PANEL CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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	B. ITT Cannon Part Numbers	1
	C. Souriau Part Numbers	1
	D. Tri-Star Part Numbers	2
	E. Contact Part Numbers	2
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ASSEMBLY OF ITT CANNON SGA(), SOURIAU 30-00053-() AND 30-00054-() AND TRI-STAR C-06BC-01()-1112 RACK AND PANEL CONNECTORS

1. PART NUMBERS AND DESCRIPTION

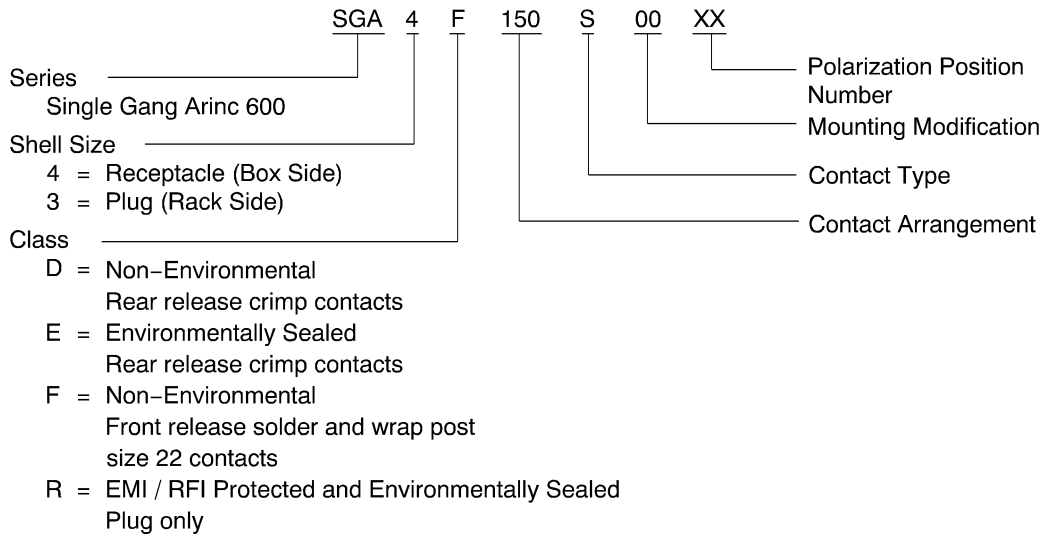
These connectors are similar to ARINC 600 connectors, but have only one 150-contact insert which is the same insert as insert A of the standard size 2 ARINC 600 connector.

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Part Number	Supplier
SGA()	ITT Cannon
30-00053-()	Souriau
30-00054-()	Souriau
C-06BC-01()-1112	Tri-Star

B. ITT Cannon Part Numbers



**ITT CANNON SGA() CONNECTOR PART NUMBER STRUCTURE
Figure 1**

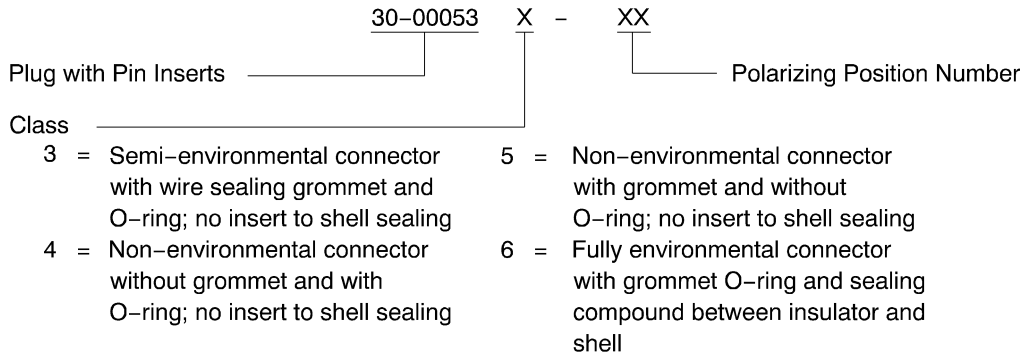
C. Souriau Part Numbers

CAUTION: DO NOT USE CLASS 3 AND 4 CONNECTORS. THE O-RING CAN PREVENT THE SHELLS TO INCORRECTLY CONNECT.

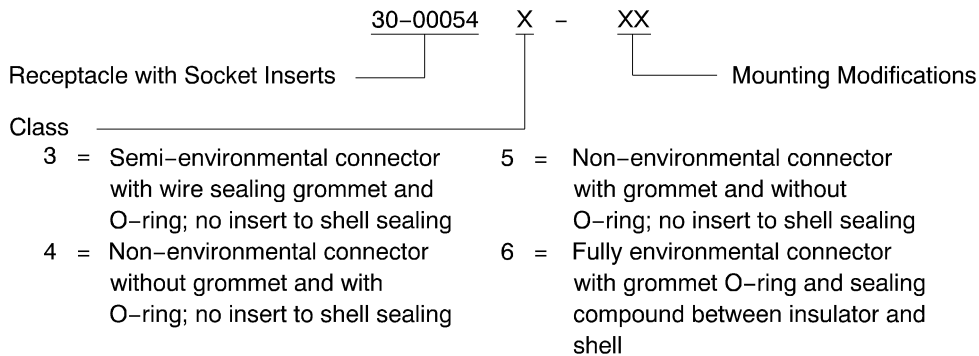
NOTE: To convert a Class 3 connector to a Class 5 connector, remove and discard the 0-ring.

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ASSEMBLY OF ITT CANNON SGA(), SOURIAU 30-00053(-) AND 30-00054(-) AND TRI-STAR C-06BC-01()-1112 RACK AND PANEL CONNECTORS

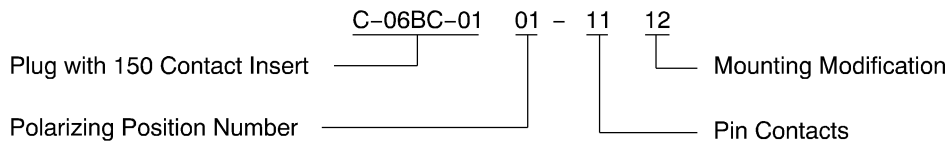


SOURIAU 30-00053() CONNECTOR PART NUMBER STRUCTURE
Figure 2



SOURIAU 30-00054() CONNECTOR PART NUMBER STRUCTURE
Figure 3

D. Tri-Star Part Numbers



TRI-STAR C-06BC-01() CONNECTOR PART NUMBER STRUCTURE
Figure 4

E. Contact Part Numbers

Table 2
CONTACT PART NUMBERS

Contact Size		Boeing Standard	Contact Type
Engaging End	Crimp Barrel		
22	22	BACC47EF1	Pin
22	22	BACC47EG1	Socket

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ITT CANNON SGA(), SOURIAU 30-00053-() AND 30-00054-() AND TRI-STAR C-06BC-01()-1112 RACK AND PANEL CONNECTORS

2. CONNECTOR POLARIZATION

A. General

Connectors are polarized:

- Vertically by post and key at the bottom and the top of a connector shell; refer to Figure 5
- Horizontally by post and key at the left side and the right side of a connector shell; refer to Figure 7.

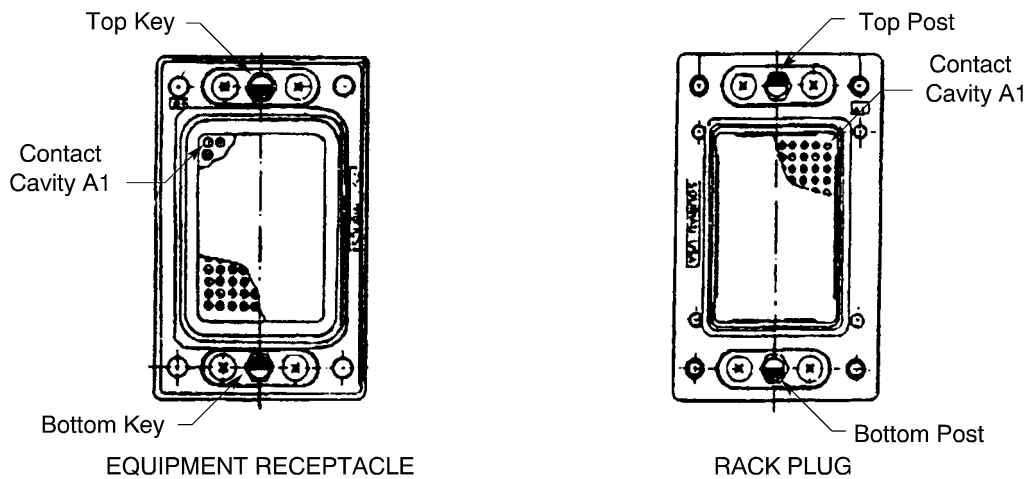
These components are supplied with each connector:

- Polarization posts
- Polarization keys
- Retaining plates
- Screws.

The components can be installed in or changed to any of the 36 combinations in:

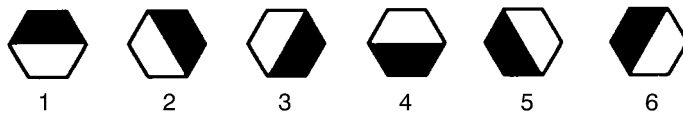
- Table 3; refer to Figure 6
- Table 4; refer to Figure 8.

B. Vertical Installation



POLARIZATION POST POSITION 19 - VERTICAL INSTALLATION

Figure 5



The Dark Area Shows Extended Part of Post in the Plug

The Light Area Shows the Key Hole in the Receptacle

POST POSITIONS FOR VERTICAL INSTALLATION

Figure 6



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ASSEMBLY OF ITT CANNON SGA(), SOURIAU 30-00053(-) AND 30-00054(-) AND TRI-STAR C-06BC-01()-1112 RACK AND PANEL CONNECTORS

**Table 3
POLARIZATION POST POSITION FOR VERTICAL INSTALLATION**

Post Position	Equipment Receptacle Key		Rack Plug Key	
	Top	Bottom	Top	Bottom
01	1	1	4	4
02	3	4	2	1
03	2	4	3	1
04	1	4	4	1
05	6	4	5	1
06	5	4	6	1
07	4	5	1	6
08	3	5	2	6
09	2	5	3	6
10	1	5	4	6
11	6	5	5	6
12	5	5	6	6
13	4	6	1	5
14	3	6	2	5
15	2	6	3	5
16	1	6	4	5
17	6	6	5	5
18	5	6	6	5
19	4	1	1	4
20	3	1	2	4
21	2	1	3	4
22	4	4	1	1
23	6	1	5	4
24	5	1	6	4
25	4	2	1	3
26	3	2	2	3
27	2	2	3	3
28	1	2	4	3
29	6	2	5	3
30	5	2	6	3
31	4	3	1	2

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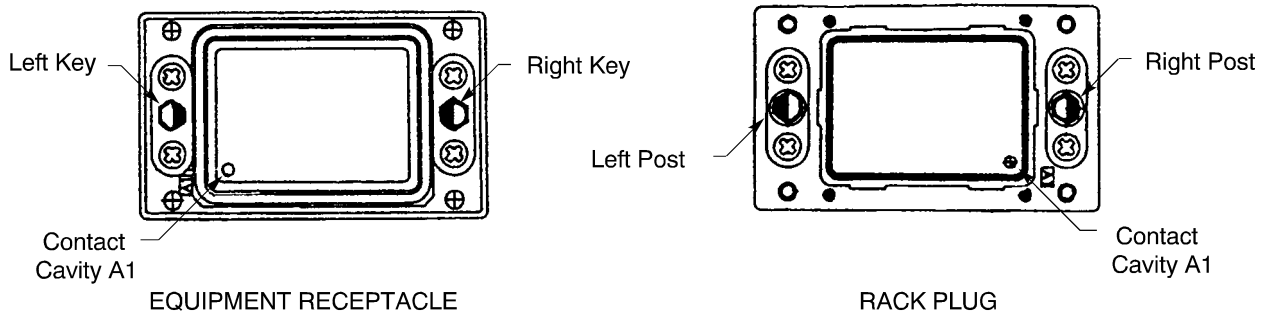
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ITT CANNON SGA(), SOURIAU 30-00053-() AND 30-00054-() AND TRI-STAR C-06BC-01()-1112 RACK AND PANEL CONNECTORS

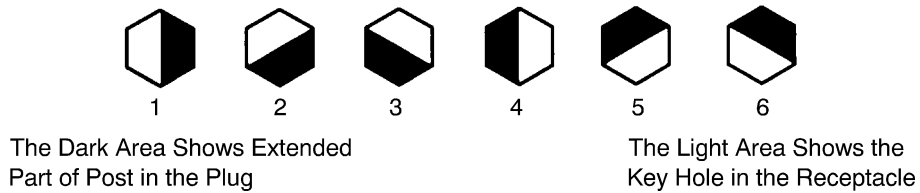
Table 3 (continued)

Post Position	Equipment Receptacle Key		Rack Plug Key	
	Top	Bottom	Top	Bottom
32	3	3	2	2
33	2	3	3	2
34	1	3	4	2
35	6	3	5	2
36	5	3	6	2

C. Horizontal Installation



POLARIZATION POST POSITION 19 - HORIZONTAL INSTALLATION
Figure 7



POST POSITIONS FOR HORIZONTAL INSTALLATION
Figure 8

Table 4
POLARIZATION POST POSITION FOR HORIZONTAL INSTALLATION

Post Position	Equipment Receptacle Key		Rack Plug Key	
	Left	Right	Left	Right
01	1	1	4	4
02	3	4	2	1
03	2	4	3	1
04	1	4	4	1

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ASSEMBLY OF ITT CANNON SGA(), SOURIAU 30-00053-() AND 30-00054-() AND TRI-STAR C-06BC-01()-1112 RACK AND PANEL CONNECTORS

Table 4 (continued)

Post Position	Equipment Receptacle Key		Rack Plug Key	
	Left	Right	Left	Right
05	6	4	5	1
06	5	4	6	1
07	4	5	1	6
08	3	5	2	6
09	2	5	3	6
10	1	5	4	6
11	6	5	5	6
12	5	5	6	6
13	4	6	1	5
14	3	6	2	5
15	2	6	3	5
16	1	6	4	5
17	6	6	5	5
18	5	6	6	5
19	4	1	1	4
20	3	1	2	4
21	2	1	3	4
22	4	4	1	1
23	6	1	5	4
24	5	1	6	4
25	4	2	1	3
26	3	2	2	3
27	2	2	3	3
28	1	2	4	3
29	6	2	5	3
30	5	2	6	3
31	4	3	1	2
32	3	3	2	2
33	2	3	3	2
34	1	3	4	2
35	6	3	5	2
36	5	3	6	2

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF ITT CANNON SGA(), SOURIAU 30-00053-() AND 30-00054-() AND TRI-STAR C-06BC-01()-1112 RACK
AND PANEL CONNECTORS

3. CONNECTOR ASSEMBLY

A. Contact Assembly

Refer to Subject 20-71-14.

B. Connector Assembly

NOTE: The maximum wire size for contact assembly is AWG 22.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

1. GENERAL DATA

A. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

Contact Cavity Size	Minimum Wire O.D. (inch)
20	0.040
16	0.068

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

Connector		Contact			Supplier
Part Number	Type	Type	Termination	Retention	
1167060	Receptacle	Pin	Solder	Not Removable	Hughes Aircraft
1167061	Receptacle	Socket	Solder	Not Removable	Hughes Aircraft
1167062-1	Plug	Pin	Crimp	Rear Release	Hughes Aircraft
1167062-2	Plug	Pin	Crimp	Rear Release	Hughes Aircraft
1167062-3	Plug	Pin	Crimp	Rear Release	Hughes Aircraft
1167063-1	Plug	Socket	Crimp	Rear Release	Hughes Aircraft
1167063-2	Receptacle	Socket	Crimp	Rear Release	Hughes Aircraft
1167063-3	Plug	Socket	Crimp	Rear Release	Hughes Aircraft
CB02-15P	Receptacle	Pin	Solder	Not Removable	Cory Components
CB02-15P	Receptacle	Pin	Solder	Not Removable	Tri-Star
CB02-15S	Receptacle	Socket	Solder	Not Removable	Cory Components
CB02-15S	Receptacle	Socket	Solder	Not Removable	Tri-Star
CB02C-15P	Receptacle	Pin	Crimp	Rear Release	Cory Components
CB02C-15P	Receptacle	Pin	Crimp	Rear Release	Tri-Star
CB02C-15S	Receptacle	Socket	Crimp	Rear Release	Cory Components
CB02C-15S	Receptacle	Socket	Crimp	Rear Release	Tri-Star
CB05-15P	Plug	Pin	Crimp	Rear Release	Cory Components

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB(-), CORY CB(-), AND HUGHES 116706(-) SERIES CONNECTORS

Table 2 (continued)

Connector		Contact			Supplier
Part Number	Type	Type	Termination	Retention	
CB05-15P	Plug	Pin	Crimp	Rear Release	Tri-Star
CB05-15S	Plug	Socket	Crimp	Rear Release	Cory Components
CB05-15S	Plug	Socket	Crimp	Rear Release	Tri-Star
CB06-15P	Plug	Pin	Crimp	Rear Release	Cory Components
CB06-15P	Plug	Pin	Crimp	Rear Release	Tri-Star
CB06-15S	Plug	Socket	Crimp	Rear Release	Cory Components
CB06-15S	Plug	Socket	Crimp	Rear Release	Tri-Star
CB08-15P	Plug	Pin	Crimp	Rear Release	Cory Components
CB08-15P	Plug	Pin	Crimp	Rear Release	Tri-Star
CB08-15S	Receptacle	Socket	Crimp	Rear Release	Cory Components
CB08-15S	Receptacle	Socket	Crimp	Rear Release	Tri-Star
CB08T-15P	Plug	Pin	Crimp	Rear Release	Cory Components
CB08T-15P	Plug	Pin	Crimp	Rear Release	Tri-Star
CB08T-15S	Plug	Socket	Crimp	Rear Release	Cory Components
CB08T-15S	Plug	Socket	Crimp	Rear Release	Tri-Star
CB24P-4	Plug	Socket	Crimp	Front Release	Cory Components
CB24P-4	Plug	Socket	Crimp	Front Release	Tri-Star
CBCX12R-1	Receptacle	Socket	Crimp	Front Release	Cory Components
CBCX12R-1	Receptacle	Socket	Crimp	Front Release	Tri-Star
CBME05-15S	Plug	Socket	Crimp	Rear Release	Cory Components
CBME05-15S	Plug	Socket	Crimp	Rear Release	Tri-Star
CBRE02-15P-1	Shorting Receptacle	Pin	-	Not Removable	Cory Components
CBRE02-15P-1	Shorting Receptacle	Pin	-	Not Removable	Tri-Star
CBRE02C-15P	Receptacle	Pin	Crimp	Rear Release	Cory Components
CBRE02C-15P	Receptacle	Pin	Crimp	Rear Release	Tri-Star
CBX12PM-1A	Plug	Pin	Crimp	Front Release	Cory Components
CBX12PM-1A	Plug	Pin	Crimp	Front Release	Tri-Star

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

**Table 3
OBSOLETE CONNECTOR PART NUMBERS**

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
1167060	Hughes Aircraft	CB02-15P	Tri-Star
1167061	Hughes Aircraft	CB02-15S	Tri-Star
1167062-1	Hughes Aircraft	CB06-15P	Tri-Star
1167062-2	Hughes Aircraft	CB08-15P	Tri-Star
1167062-3	Hughes Aircraft	CB08T-15P	Tri-Star
1167063-1	Hughes Aircraft	CB06-15S	Tri-Star
1167063-2	Hughes Aircraft	CB08-15S	Tri-Star
1167063-3	Hughes Aircraft	CB08T-15S	Tri-Star
CB02-15P	Cory Components	CB02-15P	Tri-Star
CB02-15S	Cory Components	CB02-15S	Tri-Star
CB02C-15P	Cory Components	CB02C-15P	Tri-Star
CB02C-15S	Cory Components	CB02C-15S	Tri-Star
CB05-15P	Cory Components	CB05-15P	Tri-Star
CB05-15S	Cory Components	CB05-15S	Tri-Star
CB06-15P	Cory Components	CB06-15P	Tri-Star
CB06-15S	Cory Components	CB06-15S	Tri-Star
CB08-15P	Cory Components	CB08-15P	Tri-Star
CB08-15S	Cory Components	CB08-15S	Tri-Star
CB08T-15P	Cory Components	CB08T-15P	Tri-Star
CB08T-15S	Cory Components	CB08T-15S	Tri-Star
CB24P-4	Cory Components	CB24P-4	Tri-Star
CBCX12R-1	Cory Components	CBCX12R-1	Tri-Star
CBME05-15S	Cory Components	CBME05-15S	Tri-Star
CBRE02-15P-1	Cory Components	CBRE02-15P-1	Tri-Star
CBRE02C-15P	Cory Components	CBRE02C-15P	Tri-Star
CBX12PM-1A	Cory Components	CBX12PM-1A	Tri-Star

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS**

Table 4
ALTERNATIVE CONNECTORS

Specified Connector	Alternative Connector
CB05-15S	CBME05-15S
CB02C-15P	CBRE02C-15P

B. Connector Description

The Tri-Star CB(), Cory CB(), and Hughes 116706()-() Series connectors have these features:

- Plastic shells with a keyhole shape
- Wire seal grommets in the environmental CBME() and CBRE() connectors
- Solder tail contacts in the 1167060, 1167061, CB02-15P, and CB02-15S connectors

The connectors with solder tail contacts:

- Are usually used as a component in electronic equipment
- Can be used as a connector on the end of a wire harness
- Are assembled with crimp type socket contacts that are soldered on the solder tails at the rear of the connector; refer to Paragraph 6.

For the configuration of:

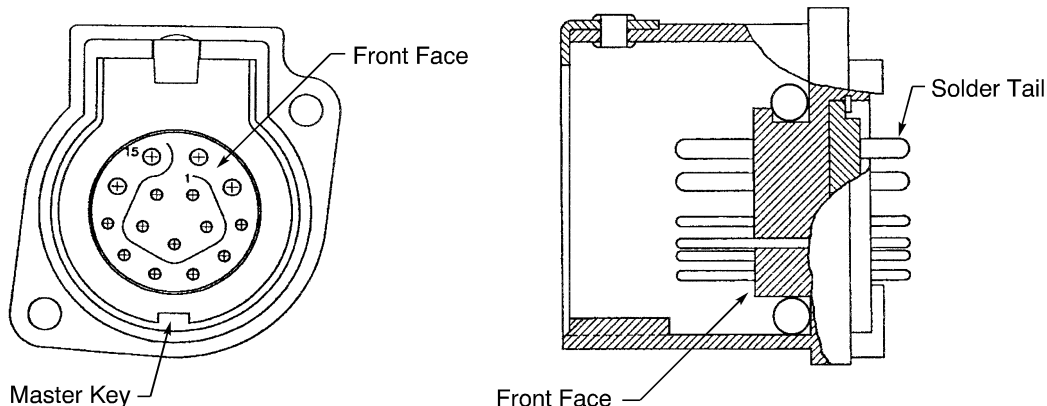
- The CB02-15P receptacle, refer to Figure 1
- The CB02C-15P receptacle, refer to Figure 2
- The CB05-15S plug, refer to Figure 3
- The CB06-15S plug, refer to Figure 4
- The CB08-15P plug, refer to Figure 5
- The CB08T-15P plug, refer to Figure 5
- The CB24P-4 plug, refer to Figure 6
- The CBCX12R-1 receptacle, refer to Figure 7
- The CBME05-15S plug, refer to Figure 8
- The CBRE02-15P-1 shorting receptacle, refer to Figure 9
- The CBRE02C-15P receptacle, refer to Figure 10
- The CBX12PM-1A plug, refer to Figure 11.

The shell of:

- The CB02-15S receptacle is the same as the CB02-15P receptacle; refer to Figure 1
- The CB02C-15S receptacle is the same as the CB02C-15P receptacle; refer to Figure 2
- The CB05-15P plug is the same as the CB05-15S plug; refer to Figure 3
- The CB06-15P plug is the same as the CB06-15S plug; refer to Figure 4
- The CB08-15S plug is the same as the CB08-15P plug; refer to Figure 5
- The CB08T-15S plug is the same as the CB08T-15P plug; refer to Figure 5.

STANDARD WIRING PRACTICES MANUAL

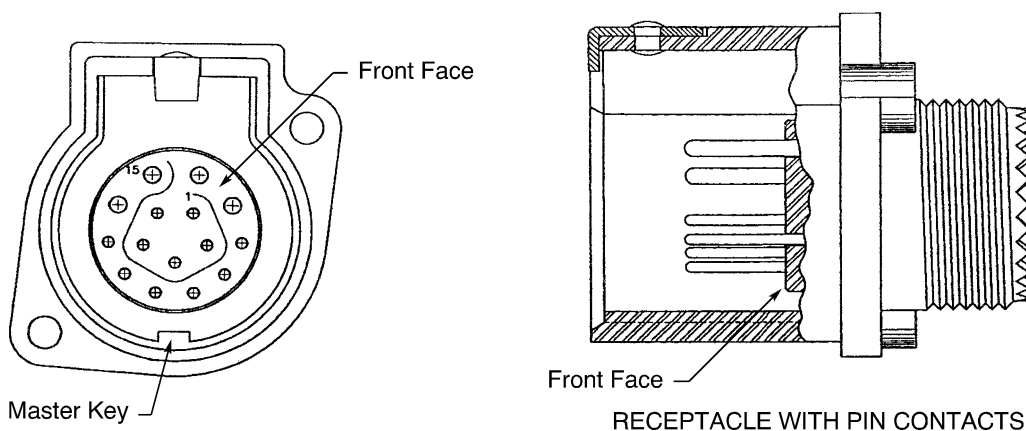
ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS



RECEPTACLE WITH SOLDER TAIL PIN CONTACTS

CONFIGURATION OF THE CB02-15P RECEPTACLE CONNECTOR

Figure 1



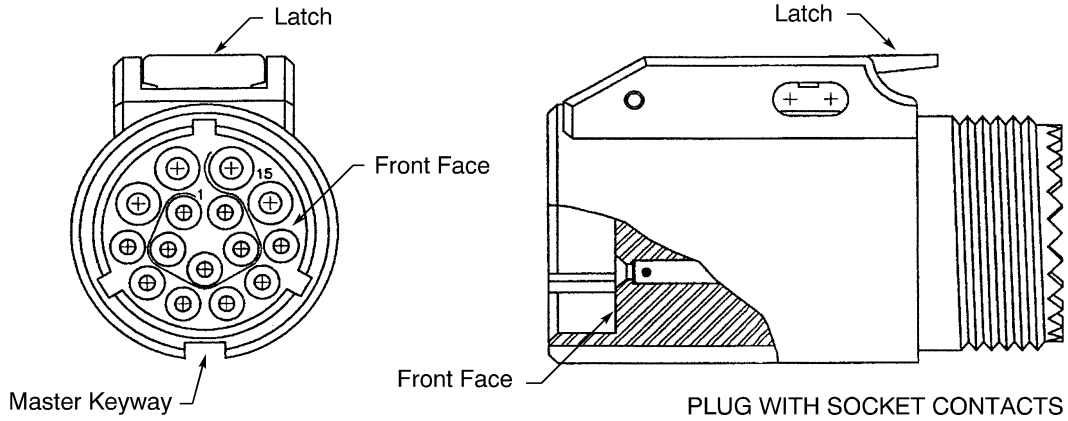
RECEPTACLE WITH PIN CONTACTS

CONFIGURATION OF THE CB02C-15P RECEPTACLE CONNECTOR

Figure 2

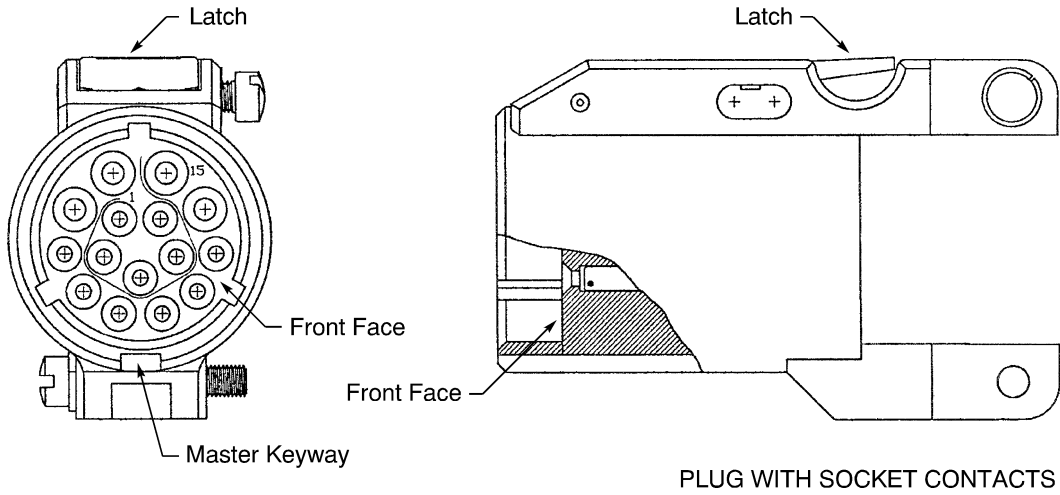
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS



CONFIGURATION OF THE CB05-15S PLUG CONNECTOR

Figure 3

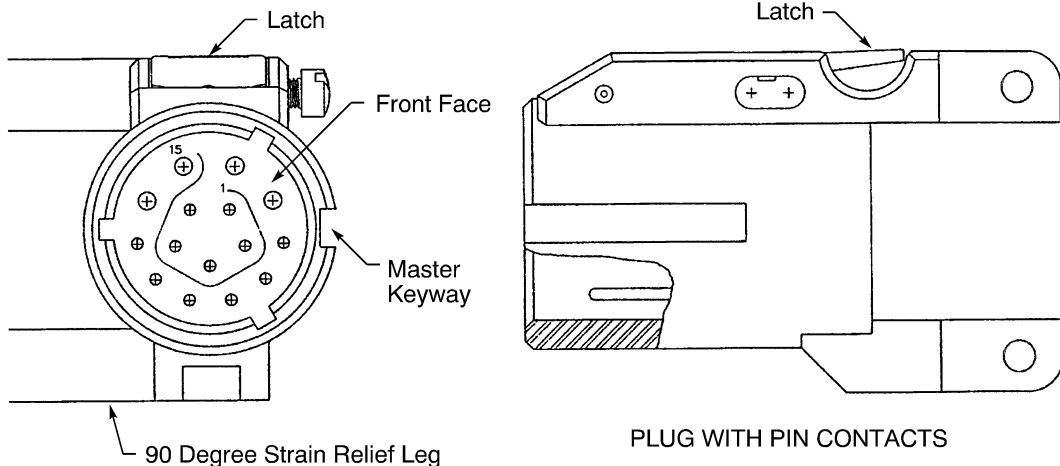


CONFIGURATION OF THE CB06-15S PLUG CONNECTOR

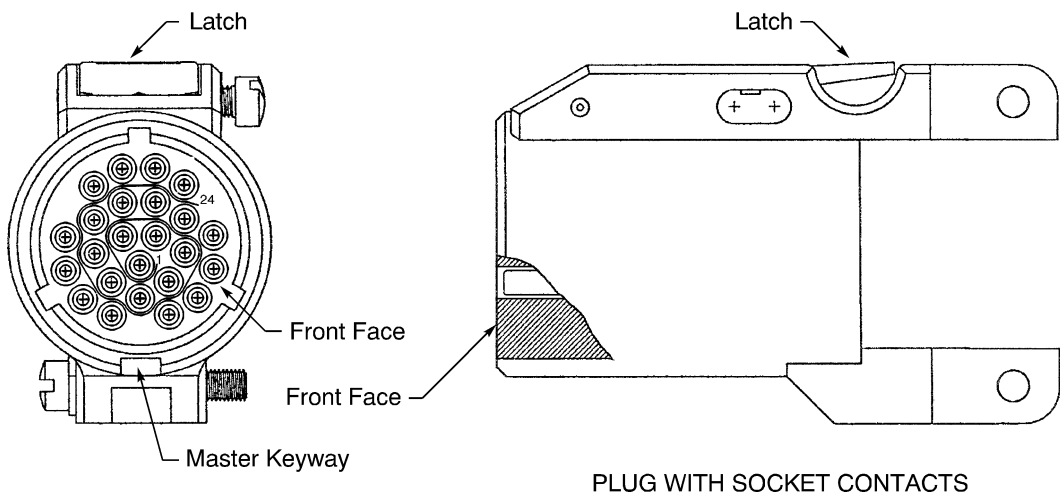
Figure 4

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS



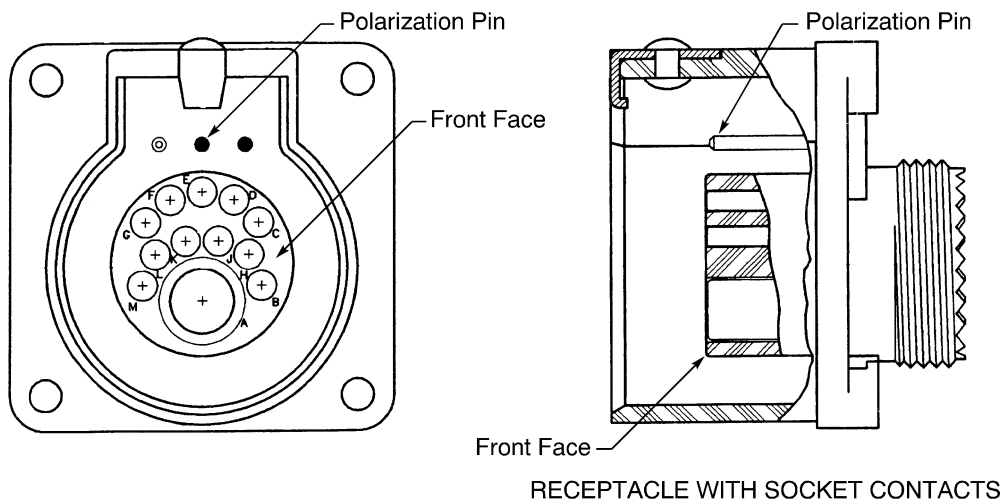
CONFIGURATION OF THE CB08-15P AND CB08T-15P PLUG CONNECTORS
Figure 5



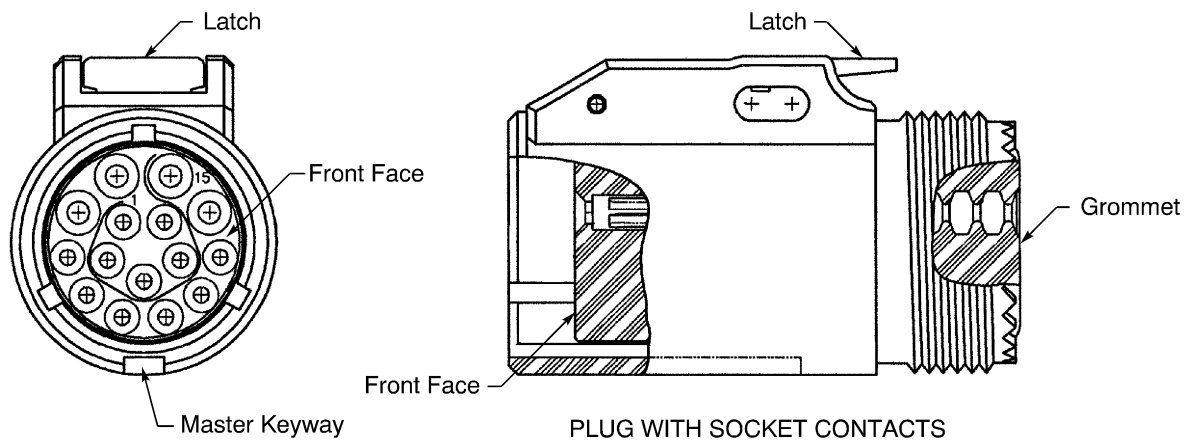
CONFIGURATION OF THE CB24P-4 PLUG CONNECTOR
Figure 6

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS



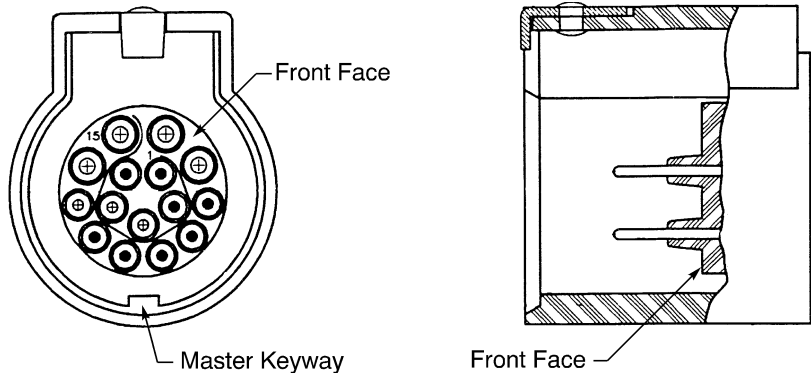
CONFIGURATION OF THE CBCX12R-1 RECEPTACLE CONNECTOR
Figure 7



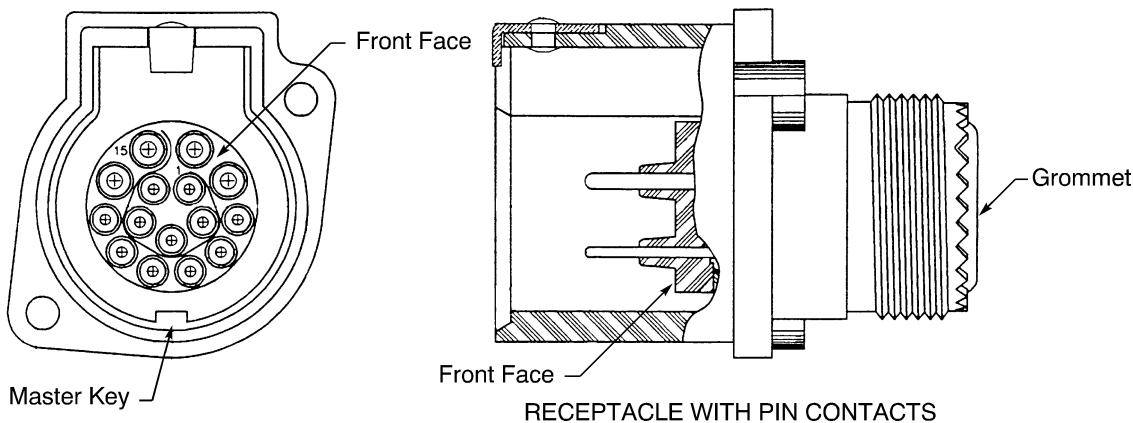
CONFIGURATION OF THE CBME05-15S PLUG CONNECTOR
Figure 8

STANDARD WIRING PRACTICES MANUAL

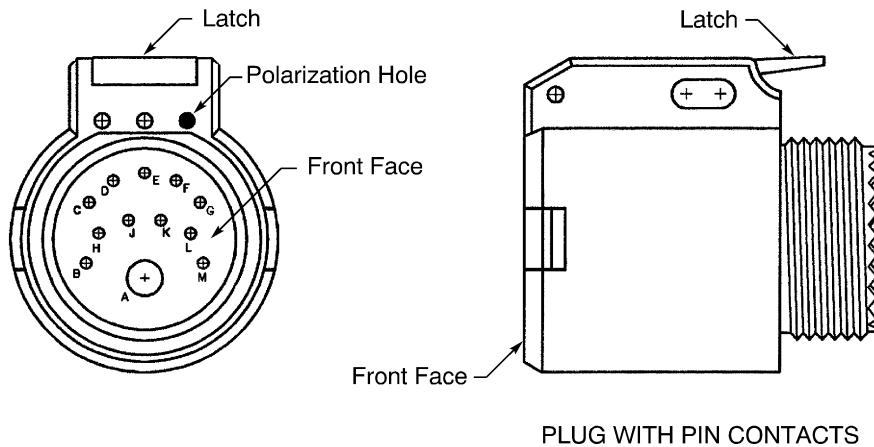
ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS



CONFIGURATION OF THE CBRE02-15P-1 SHORTING RECEPTACLE
Figure 9



CONFIGURATION OF THE CBRE02C-15P RECEPTACLE CONNECTOR
Figure 10



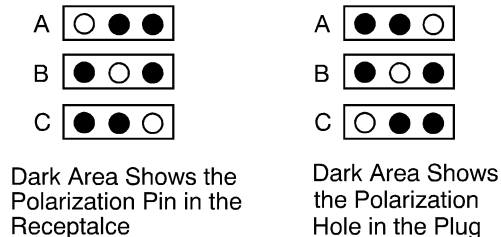
CONFIGURATION OF THE CBX12PM-1A PLUG CONNECTOR
Figure 11

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STANDARD WIRING PRACTICES MANUAL

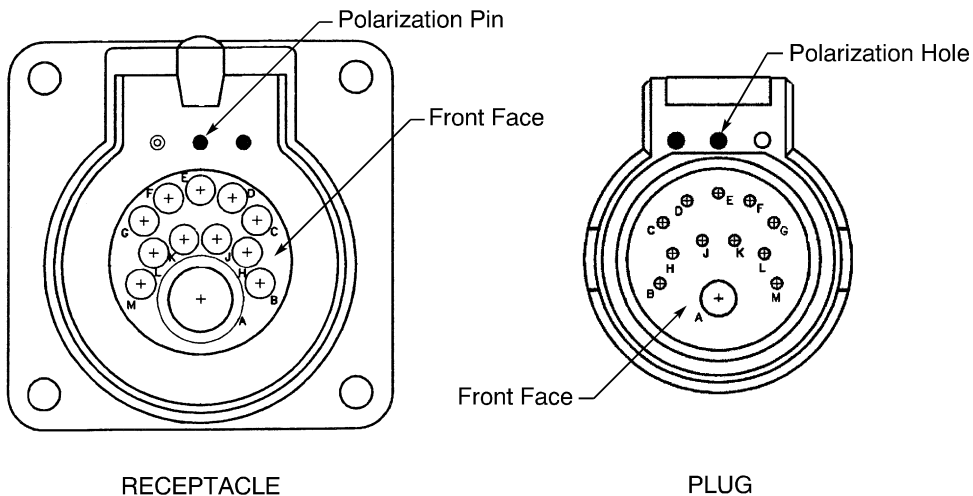
ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

C. CBCX12R-1 Connector Polarization



CBCX12R POLARIZATION POSITIONS
Figure 12

NOTE: The polarization of the CBCX12R connector cannot be changed.



CBCX12R CONNECTOR POLARIZATION
Figure 13

D. Strain Relief Configurations

Table 5
STRAIN RELIEF CONFIGURATIONS

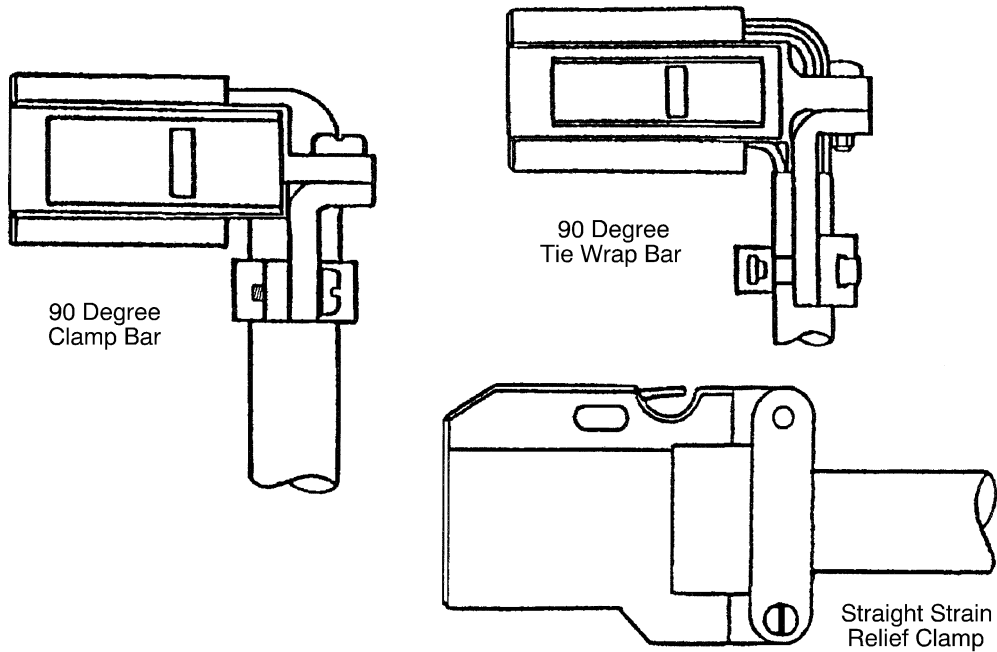
Connector	Strain Relief	Reference
CB02-15P	Potting boot and sealant	Figure 34
CB02-15S	Potting boot and sealant	Figure 34
CB02C-15P	Backshell; refer to Table 13	Figure 15
CB02C-15S	Backshell; refer to Table 13	Figure 15
CB05-15P	Backshell; refer to Table 13	Figure 15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 5 (continued)

Connector	Strain Relief	Reference
CB05-15S	Backshell; refer to Table 13	Figure 15
CB06-15P	Integral Straight Clamp	Figure 14
CB06-15S	Integral Straight Clamp	Figure 14
CB08-15P	Integral 90 Degree Clamp	Figure 14
CB08-15S	Integral 90 Degree Clamp	Figure 14
CB08T-15P	Integral 90 Degree Tie Wrap Bar	Figure 14
CB08T-15S	Integral 90 Degree Tie Wrap Bar	Figure 14
CB24P-4	Integral Straight Clamp	Figure 14
CBCX12R-1	Backshell; refer to Table 13	Figure 15
CBME05-15S	Backshell; refer to Table 14	Figure 16
CBRE02C-15P	Backshell; refer to Table 14	Figure 16
CBX12PM-1	Backshell; refer to Table 13	Figure 15



INTEGRAL STRAIN RELIEF CONFIGURATIONS

Figure 14



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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

E. Contact Part Numbers

**Table 6
CONTACT SELECTION**

Connector	Applicable Contact	
	Type	Part Numbers
1167062-1	Standard Rear Release Pin	Table 8
1167062-2	Standard Rear Release Pin	Table 8
1167062-3	Standard Rear Release Pin	Table 8
1167063-1	Standard Rear Release Socket	Table 8
1167063-2	Standard Rear Release Socket	Table 8
1167063-3	Standard Rear Release Socket	Table 8
CB02C-15P	Tri-Star Rear Release Pin	Table 10
CB02C-15S	Tri-Star Rear Release Socket	Table 10
CB05-15P	Tri-Star Rear Release Pin	Table 10
CB05-15S	Tri-Star Rear Release Socket	Table 10
CB06-15P	Standard Rear Release Pin	Table 8
CB06-15S	Standard Rear Release Socket	Table 8
CB08-15P	Standard Rear Release Pin	Table 8
CB08-15S	Standard Rear Release Socket	Table 8
CB08T-15P	Standard Rear Release Pin	Table 8
CB08T-15S	Standard Rear Release Socket	Table 8
CB24P-4	Standard Front Release Socket	Table 7
CBCX12R-1	Standard Front Release Socket	Table 7
	Coax Socket	Table 12
CBME05-15S	Tri-Star Rear Release Socket	Table 10
CBRE02C-15P	Tri-Star Rear Release Pin	Table 10
CBX12PM-1A	Standard Front Release Pin	Table 7
	Coax Pin	Table 12

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**Table 7
STANDARD FRONT RELEASE CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	BACC47CN1	Boeing
			CRC20W-3	Tri-Star
		Socket	BACC47CP1	Boeing
			CRM20W-3P	Tri-Star
			M39029/32-260	QPL
	18	Pin	31A-2016-035	Tri-Star
		Socket	CRC20W-18	Tri-Star
	P-209541-D		Pyle-National	
	16	Pin	CRM20W-4P	Tri-Star
Socket		318-2016-035	Tri-Star	
	CRC20W-4	Tri-Star		

**Table 8
STANDARD REAR RELEASE CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	BACC47ES1	Boeing
			M39029/4-110	QPL
		Socket	BACC47ET1	Boeing
			M39029/5-115	QPL
16	16	Pin	BACC47ES2	Boeing
			M39029/4-111	QPL
		Socket	BACC47ET2	Boeing
			M39029/5-116	QPL

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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

**Table 9
APPROVED SUPPLIERS OF BOEING STANDARD CONTACTS**

Contact	Supplier
BACC47CN	Amphenol
	Framatome Connectors
	Labinal
	Pyle-National
	Tri-Star
BACC47CP	Amphenol
	Framatome Connectors
	Pyle-National
	Tri-Star
BACC47ES	Amphenol
	Tri-Star
BACC47ET	Amphenol
	Tri-Star

**Table 10
TRI-STAR REAR RELEASE CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier
Engaging End	Crimp Barrel			
20	20	Pin	K4004-0001-2005	Cory Components
			K4004-0001-2005	Tri-Star
		Socket	K3004-0001-2005	Cory Components
			K3004-0001-2005	Tri-Star
16	16	Pin	K4004-0002-1605	Cory Components
			K4004-0002-1605	Tri-Star
		Socket	K3004-0002-1605	Cory Components
			K3004-0002-1605	Tri-Star

**Table 11
OBSOLETE CONTACT PART NUMBERS**

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
K4004-0001-2005	Cory Components	K4004-0001-2005	Tri-Star
K3004-0001-2005	Cory Components	K3004-0001-2005	Tri-Star

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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 11 (continued)

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
K4004-0002-1605	Cory Components	K4004-0002-1605	Tri-Star
K3004-0002-1605	Cory Components	K3004-0002-1605	Tri-Star

**Table 12
COAX CONTACT PART NUMBERS**

Contact Size	Contact Type	Part Number	Supplier	Coax Cable
8	Pin	CRMEM-501	Tri-Star	BMS 13-65 Type OE S280W503-1
		CRMEM-501A	Tri-Star	BMS 13-65 Type OE S280W503-1
		CRMEM-501C	Tri-Star	BMS 13-65 Type OE S280W503-1
		CRMEM-502	Tri-Star	BMS 13-65 Type OF S280W503-2
8	Socket	CRMEF-501	Tri-Star	BMS 13-65 Type OE S280W503-1
		CRMEF-501A	Tri-Star	BMS 13-65 Type OE S280W503-1
		CRMEF-501C	Tri-Star	BMS 13-65 Type OE S280W503-1
		CRMEF-502	Tri-Star	BMS 13-65 Type OF S280W503-2
		CRMEF-502A	Tri-Star	BMS 13-65 Type OF S280W503-2

F. Backshell Part Numbers

**Table 13
BACKSHELL PART NUMBERS FOR NON-ENVIRONMENTAL CONNECTORS**

Configuration	Backshell	Supplier
Straight	CT-14S	Cory Components
	CT-14S	Tri-Star

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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 13 (continued)

Configuration	Backshell	Supplier
45 Degrees	CTF-14S	Cory Components
	CTF-14S	Tri-Star
90 Degrees	CTR-14S	Cory Components
	CTR-14S	Tri-Star

Table 14

BACKSHELL PART NUMBERS FOR ENVIRONMENTAL CONNECTORS

Configuration	Backshell	Supplier
45 Degrees	CTF-16	Cory Components
	CTF-16	Tri-Star
90 Degrees	CTR-16	Cory Components
	CTR-16	Tri-Star
Straight	CTS-16	Cory Components
	CTS-16	Tri-Star

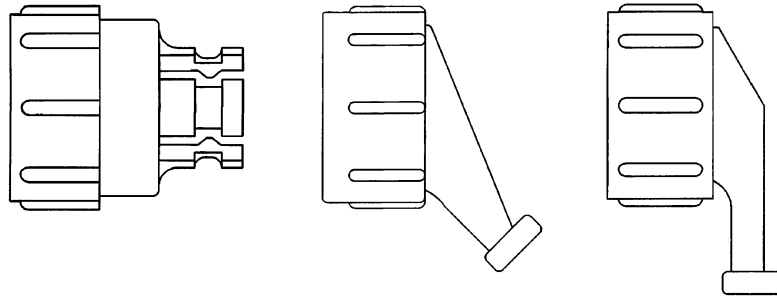
Table 15

OBSOLETE BACKSHELL PART NUMBERS

Obsolete Backshell		Replacement Backshell	
Part Number	Supplier	Part Number	Supplier
CT-14S	Cory Components	CT-14S	Tri-Star
CTF-14S	Cory Components	CTF-14S	Tri-Star
CTF-16	Cory Components	CTF-16	Tri-Star
CTR-14S	Cory Components	CTR-14S	Tri-Star
CTR-16	Cory Components	CTR-16	Tri-Star
CTS-16	Cory Components	CTS-16	Tri-Star

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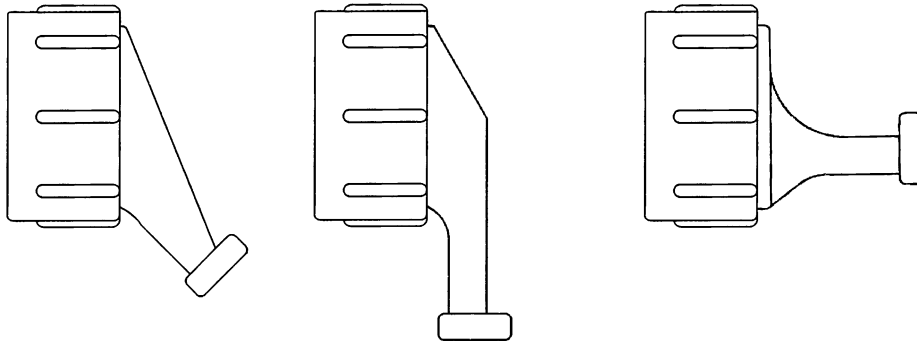
CT-14S

CTF-14S

CTR-14S

BACKSHELL CONFIGURATIONS FOR NON-ENVIRONMENTAL CONNECTORS

Figure 15



CTF-16

CTR-16

CTS-16

BACKSHELL CONFIGURATIONS FOR ENVIRONMENTAL CONNECTORS

Figure 16

3. INSERT CONFIGURATIONS

A. CB()-() and 116706()-() Series Connectors

NOTE: The contact cavity size specified in Table 16 is equivalent to the engaging end size of the contact.

**Table 16
INSERT CONFIGURATIONS - CONNECTORS WITH CRIMP CONTACTS**

Connector	Contact Cavity		Reference
	Quantity	Size	
1167062-1	11	20	Figure 18
	4	16	
1167062-2	11	20	Figure 18
	4	16	



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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 16 (continued)

Connector	Contact Cavity		Reference
	Quantity	Size	
1167062-3	11	20	Figure 18
	4	16	
1167063-1	11	20	Figure 18
	4	16	
1167063-2	11	20	Figure 18
	4	16	
1167063-3	11	20	Figure 18
	4	16	
CB02C-15P	11	20	Figure 18
	4	16	
CB02C-15S	11	20	Figure 18
	4	16	
CB05-15P	11	20	Figure 18
	4	16	
CB05-15S	11	20	Figure 18
	4	16	
CB06-15P	11	20	Figure 18
	4	16	
CB06-15S	11	20	Figure 18
	4	16	
CB08-15P	11	20	Figure 18
	4	16	
CB08-15S	11	20	Figure 18
	4	16	
CB08T-15P	11	20	Figure 18
	4	16	
CB08T-15S	11	20	Figure 18
	4	16	
CB24P-4	24	20	Figure 19
CBCX12R-1	11	20	Figure 17
	1	8	

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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 16 (continued)

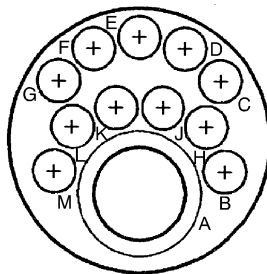
Connector	Contact Cavity		Reference
	Quantity	Size	
CBME05-15S	11	20	Figure 18
	4	16	
CBRE02C-15P	11	20	Figure 18
	4	16	
CBX12PM-1A	11	20	Figure 17
	1	8	

Table 17

INSERT CONFIGURATIONS - CONNECTORS WITH SOLDER TYPE CONTACTS

Connector	Contact		Reference
	Quantity	Size	
1167060	11	20	Figure 18
	4	16	
1167061	11	20	Figure 18
	4	16	
CB02-15P	11	20	Figure 18
	4	16	
CB02-15S	11	20	Figure 18
	4	16	

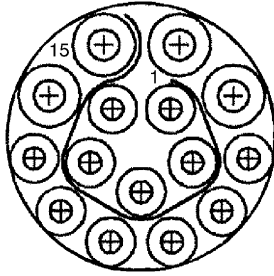
NOTE: Figure 17, Figure 18, and Figure 19 show the rear face of the plug connector. The rear face of the receptacle connector is the opposite view.



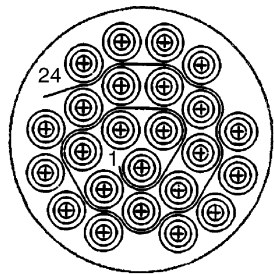
12 POSITION CONFIGURATION
Figure 17

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS



15 POSITION CONFIGURATION
Figure 18



24 POSITION CONFIGURATION
Figure 19

4. CONNECTOR DISASSEMBLY

A. Integral Strain Relief Removal

Refer to Figure 14 for the configurations of the integral strain relief cable clamps.

- (1) If the connector has an integral straight strain relief with a clamp bar, or an integral 90 degree strain relief with a clamp bar:
 - (a) Disengage the screws that hold the clamp bar to the strain relief legs of the connector.
 - (b) Remove the screws.
 - (c) Remove the clamp bar from the wire harness.
- (2) If the connector has an integral 90 degree tie wrap bar:
 - (a) Cut the plastic tie strap or wire harness tie that holds the wire harness to the tie wrap bar.

CAUTION: DO NOT CUT THE INSULATION OF THE WIRES IN THE WIRE HARNESS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (b) Disengage the screws that hold the tie wrap bar to the strain relief legs of the connector.
- (c) Remove the screws.
- (d) Remove the tie wrap bar.

B. Backshell Removal

Refer to Figure 15 and Figure 16 for the configurations of the backshells.

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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

- (1) Cut the plastic tie strap or wire harness tie that holds the wire harness on the backshell.

CAUTION: DO NOT CUT THE INSULATION OF THE WIRES IN THE WIRE HARNESS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (2) If the wire harness has a layer of tape or a sleeve at the strain relief, remove the tape or the sleeve from the harness.
- (3) Disengage the threads of the backshell and the connector.
- (4) Push the backshell rearward away from the connector.

C. Contact Removal - Front Release Contact

**Table 18
CONTACT REMOVAL TOOLS**

Engaging End Size	Removal Tool
20	M81969/19-07

NOTE: The deadface of the CBX12PM-1 connector must be removed before the contacts can be removed.

- (1) If it is necessary, remove the strain relief or the backshell from the connector.

Refer to:

- Paragraph 4.A. for the removal of the integral strain relief
- Paragraph 4.B. for the removal of the backshell.

- (2) If the connector has a deadface, remove the deadface. Refer to Paragraph 4.F.

- (3) Make a selection of a contact removal tool from Table 18.

- (4) Axially align the tool and the contact cavity at the front face of the connector.

Make sure that the plunger of the removal tool is fully retracted.

- (5) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Push the plunger of the tool until the contact starts to come out of the contact cavity.

- (7) Carefully pull the tool out of the contact cavity.

Make sure that the removal tools stays axially aligned with the contact cavity.

- (8) Pull the contact out of the contact cavity from the rear of the connector.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

D. Contact Removal - Rear Release Contact

**Table 19
CONTACT REMOVAL TOOLS - STANDARD CONTACTS**

Contact Engaging End Size	Removal Tool	
	Part Number	Color
20	6500-001-20	-
	CET20-24	Red
	CIET-20	-
	M81969/14-02	White
16	6500-001-16	-
	CET16-21	Blue
	CIET-16	-
	M81969/14-03	White

**Table 20
CONTACT REMOVAL TOOLS - TRI-STAR CONTACTS**

Contact Engaging End Size	Removal Tool	
	Part Number	Color
20	M81969/8-06	-
	M81969/14-02	White
16	M81969/8-08	-
	M81969/14-03	White

- (1) If it is necessary, remove the strain relief or the backshell from the connector.

Refer to:

- Paragraph 4.A. for the removal of the integral strain relief
- Paragraph 4.B. for the removal of the backshell.

- (2) Make a selection of a contact removal tool from Table 19 or Table 20.
- (3) Axially align the tool and the contact cavity at the rear face of the connector.
- (4) Push the tool into the contact cavity until it stops.

Make sure that the tool is not turned in the contact cavity.

CAUTION: IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CONTACT CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (5) Carefully pull the wire and the tool from the contact cavity at the same time.
Make sure that the removal tool stays axially aligned with the contact cavity.
- (6) If the contact is not released:
 - (a) Carefully remove the tool.

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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

- (b) Turn the tool approximately 90 degrees.
- (c) Do Step (3) through Step (5) again.

E. Contact Removal - Coax Contact

**Table 21
COAX CONTACT REMOVAL TOOLS**

Contact Cavity Size	Removal Tool
8	M81969/19-03

NOTE: The deadface of the CBX12PM-1 connector must be removed before the contacts can be removed.

- (1) If it is necessary, remove the strain relief or the backshell from the connector.

Refer to:

- Paragraph 4.A. for the removal of the integral strain relief
- Paragraph 4.B. for the removal of the backshell.

- (2) If the connector has a deadface, remove the deadface. Refer to Paragraph 4.F.
- (3) Make a selection of a contact removal tool from or Table 21.
- (4) Axially align the tool and the contact cavity at the front face of the connector.
Make sure that the plunger of the removal tool is fully retracted.
- (5) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Push the plunger of the tool until the contact starts to come out of the contact cavity.
- (7) Carefully pull the tool out of the contact cavity.
Make sure that the removal tools stays axially aligned with the contact cavity.
- (8) Pull the contact out of the contact cavity from the rear of the connector.

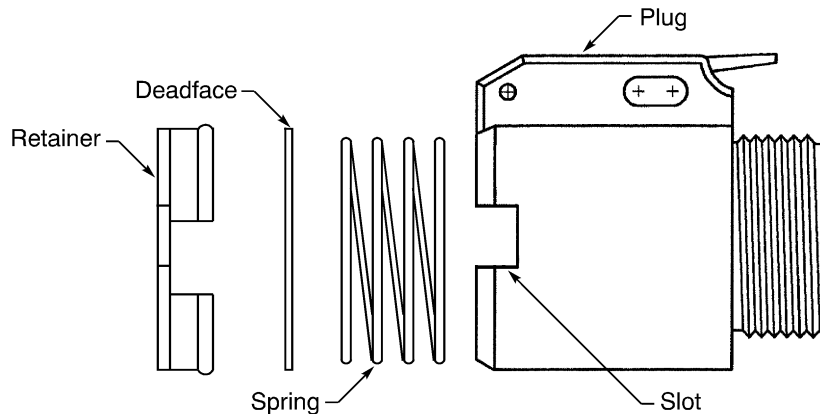
F. Deadface Removal

**Table 22
NECESSARY TOOLS**

Tool	Type	Tip Size (inch)
Screwdriver	Flat Blade	1/4

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CBX12PM-1 CONNECTOR DEADFACE COMPONENTS
Figure 20

Refer to Figure 20.

- (1) Make a selection of a flat blade screwdriver from Table 22.
- (2) Push the deadface in and hold it away from the front face of the connector.
- (3) Continue to hold the deadface and put the tip of the screwdriver in one of the slots on the side of the connector near the front face.
- (4) Continue to hold the deadface and twist the screwdriver until the side of the retainer moves away from the connector.
- (5) Do Step (3) and Step (4) again for the slot on the other side of the connector.
- (6) Remove the retainer, the deadface, and the spring.

5. ASSEMBLY OF A CONNECTOR WITH CRIMP TYPE CONTACTS

A. Wire Preparation

The Paragraph gives the procedure to prepare a wire for the assembly of a front release or a rear release contact.

Table 23
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
26	20	0.19	± 0.03	-
24	20	0.19	± 0.03	-
	16	0.50	± 0.03	Fold the conductor back on itself
22	20	0.19	± 0.03	-
	16	0.25	± 0.03	Use a Y6015C eyelet; refer to Subject 20-60-00
		0.50	± 0.03	Fold the conductor back on itself

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 23 (continued)

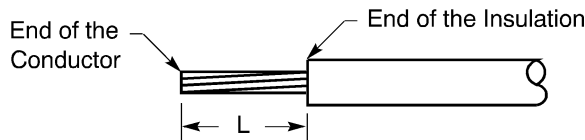
Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
20	20	0.19	± 0.03	-
	16	0.25	± 0.03	-
18	16	0.25	± 0.03	-
16	16	0.25	± 0.03	-

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 21
- Table 23 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.

NOTE: If the wire size and a larger crimp barrel size are not specified in Table 23, the size of the conductor must be increased. Refer to Subject 20-60-00.

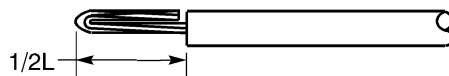


INSULATION REMOVAL
Figure 21

(2) For CBME and CBRE connectors:

- (a) Measure the O.D. of the wire.
- (b) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.A.

(3) If it is specified, fold the conductor back. Refer to Figure 22.



FOLDED BACK CONDUCTOR
Figure 22

B. Contact Assembly

This paragraph gives the procedure to assemble:

- A standard front release contact
- A standard rear release contact
- A Tri-Star rear release contact.

For the procedure to assemble a coax contact, refer to Paragraph 5.C.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

**Table 24
STANDARD FRONT RELEASE CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Size		Crimp Tool				
	Engaging End	Crimp Barrel	Basic Unit			Locator	
			Part Number	Setting	Die Set	Part Number	Color
24	20	20	85-220	5	-	M22520/2-02	-
			85-550	2	-	M22520/1-02	Red
			M10S	-	S-5	SL-3	-
			M22520/1-01	2	-	M22520/1-02	Red
			M22520/2-01	5	-	M22520/2-02	-
			WA22	5	-	M22520/2-02	-
			WA22LC	5	-	M22520/2-02	-
			WA27F	2	-	M22520/1-02	Red
	16	16	85-550	4	-	M22520/1-02	Blue
			M22520/1-01	4	-	M22520/1-02	Blue
			WA27F	4	-	M22520/1-02	Blue
22	20	20	85-220	6	-	M22520/2-02	-
			M10S	-	S-6	SL-3	-
			M22520/1-01	3	-	M22520/1-02	Red
			M22520/2-01	6	-	M22520/2-02	-
			ST2220-1-Y	-	-	ST2220-1-1	-
			WA22	6	-	M22520/2-02	-
			WA22LC	6	-	M22520/2-02	-
			WA27F	3	-	M22520/1-02	Red
	16	16	85-550	5	-	M22520/1-02	Blue
			M22520/1-01	5	-	M22520/1-02	Blue
			WA27F	5	-	M22520/1-02	Blue

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB(-), CORY CB(-), AND HUGHES 116706(-) SERIES CONNECTORS

Table 24 (continued)

Wire Size (AWG)	Contact Size		Crimp Tool				
	Engaging End	Crimp Barrel	Basic Unit			Locator	
			Part Number	Setting	Die Set	Part Number	Color
20	20	20	85-220	7	-	M22520/2-02	-
			85-550	4	-	M22520/1-02	Red
			M10S	-	S-6	SL-3	-
			M22520/1-01	4	-	M22520/1-02	Red
			M22520/2-01	7	-	M22520/2-02	-
			ST2220-1-Y	-	-	ST2220-1-1	-
			WA22	7	-	M22520/2-02	-
			WA22LC	7	-	M22520/2-02	-
			WA27F	4	-	M22520/1-02	Red
	16	16	85-550	4	-	M22520/1-02	Blue
			M10S	-	S-7	SL-2	-
			M22520/1-01	4	-	M22520/1-02	Blue
			ST2220-1-Y	-	-	ST2220-1-2	-
			WA27F	4	-	M22520/1-02	Blue
18	20	18	M22520/1-01	5	-	M22520/1-02	Red
			M22520/2-01	8	-	M22520/2-02	-
			WA22	8	-	M22520/2-02	-
			WA27F	5	-	M22520/1-02	Red
	16	16	85-550	5	-	M22520/1-02	Blue
			M10S	-	S-7	SL-2	-
			M22520/1-01	5	-	M22520/1-02	Blue
			ST2220-1-Y	-	-	ST2220-1-2	-
			WA27F	5	-	M22520/1-02	Blue

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 24 (continued)

Wire Size (AWG)	Contact Size		Crimp Tool				
	Engaging End	Crimp Barrel	Basic Unit			Locator	
			Part Number	Setting	Die Set	Part Number	Color
16	20	16	M22520/1-01	6	-	M22520/1-02	Red
			M22520/2-01	8	-	K977	-
			M22520/2-01	8	-	M22520/2-02	-
			ST2220-1-Y	-	-	ST2220-1-45	-
	16	16	85-550	6	-	M22520/1-02	Blue
			M10S	-	S-7	SL-3	-
			M22520/1-01	6	-	M22520/1-02	Blue
			ST2220-1-Y	-	-	ST2220-1-2	-
			WA27F	6	-	M22520/1-02	Blue

Table 25

STANDARD REAR RELEASE CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool					
		Basic Unit		Locator			
		Part Number	Setting	Part Number	Color	Block	
26	20	85-220	4	M22520/2-02	-	-	
		M22520/1-01	1	M22520/1-02	Red	-	
		M22520/2-01	4	M22520/2-02	-	-	
		WA22	4	K1S	-	-	
		WA22LC	4	K1S	-	-	
		WA27F	1	TH1A	-	-	
24	20	612916	-	-	Yellow	Black	
		85-220	5	M22520/2-02	-	-	
		M22520/1-01	2	M22520/1-02	Red	-	
		M22520/2-01	5	M22520/2-02	-	-	
		WA22	5	K1S	-	-	
		WA22LC	5	K1S	-	-	
		WA27F	2	TH1A	-	-	
	16	16	M22520/1-01	4	M22520/1-02	Blue	-
			WA27F	4	TH1A	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 25 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	Block
22	20	11148	-	-	Red	Black
		85-220	6	M22520/2-02	-	-
		M22520/1-01	3	M22520/1-02	Red	-
		M22520/2-01	6	M22520/2-02	-	-
		MS3191-1	-	MS3191-20A	-	-
		ST2220-1-Y	-	ST2220-1-1	-	-
		WA22	6	K1S	-	-
		WA22LC	6	K1S	-	-
	WA27F	3	TH1A	-	-	
		16	M22520/1-01	5	M22520/1-02	Blue
WA27F	5		TH1A	-	-	
20	20	11148	-	-	Red	Black
		85-220	7	M22520/2-02	-	-
		M22520/1-01	4	M22520/1-02	Red	-
		M22520/2-01	7	M22520/2-02	-	-
		MS3191-1	-	MS3191-20A	-	-
		ST2220-1-Y	-	ST2220-1-1	-	-
		WA22	7	K1S	-	-
		WA22LC	7	K1S	-	-
	WA27F	4	TH1A	-	-	
		16	M22520/1-01	4	M22520/1-02	Blue
WA27F	4		TH1A	-	-	
18	16	M22520/1-01	5	M22520/1-02	Blue	-
		WA27F	5	TH1A	-	-
16	16	M22520/1-01	6	M22520/1-02	Blue	-
		MS3191-1	-	MS3191-16A	-	-
		ST2220-1-Y	-	ST2220-1-2	-	-
		WA27F	6	TH1A	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB(-), CORY CB(-), AND HUGHES 116706(-) SERIES CONNECTORS

**Table 26
TRI-STAR REAR RELEASE CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-02	-
22	20	M22520/1-01	3	M22520/1-02	Red
		M22520/2-01	6	M22520/2-02	-
		MS3191-1	-	MS3191-20A	-
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-02	-
		MS3191-1	-	MS3191-20A	-
	16	M22520/1-01	4	M22520/1-02	Blue
18	16	M22520/1-01	5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
		MS3191-1	-	MS3191-16A	-

- (1) Make a selection of a crimp tool from:
 - Table 24 for a standard front release contact
 - Table 25 for a standard rear release contact
 - Table 26 for a Tri-Star rear release contact.
- (2) Put the end of the wire in the crimp barrel of the contact.
 Make sure that:
 - All of the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole
 - The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.
- (3) Crimp the contact.
 Make sure that:
 - All of the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole
 - The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

C. Coax Contact Assembly

**Table 27
COAX CONTACT CENTER CONTACT CRIMP TOOLS**

Contact	Center Contact	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
CQMEF-501A	Pin	M22520/2-01	6	M22520/2-14
		WA22	6	M22520/2-14
		WA22LC	6	M22520/2-14
CQMEF-501C	Pin	M22520/2-01	6	M22520/2-14
CQMEF-502A	Pin	M22520/2-01	5	M22520/2-14
		WA22	5	M22520/2-14
		WA22LC	5	M22520/2-14
CQMEM-501	Socket	M22520/2-01	6	M22520/2-06
		WA22	6	M22520/2-06
		WA22LC	6	M22520/2-06
CQMEM-501C	Socket	M22520/2-01	6	M22520/2-06
CQMEM-502	Socket	M22520/2-01	6	M22520/2-06
		WA22	6	M22520/2-06
		WA22LC	6	M22520/2-06
CRMEF-501	Socket	M22520/2-01	6	M22520/2-06
CRMEF-502	Socket	M22520/2-01	6	M22520/2-06
CRMEM-501A	Socket	M22520/2-01	3	M22520/2-06
CRMEM-502	Socket	M22520/2-01	6	M22520/2-06

**Table 28
COAX CONTACT BODY CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
CQMEF-501A	M22520/5-01	M22520/5-39	B
CQMEF-501C	M22520/5-01	M22520/5-41	B
CQMEF-502A	M22520/5-01	M22520/5-41	B
CQMEM-501	M22520/5-01	M22520/5-39	B
CQMEM-501C	M22520/5-01	M22520/5-41	B

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 28 (continued)

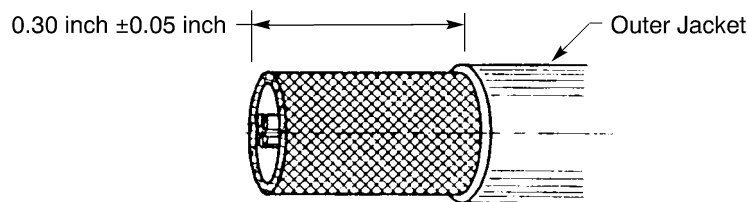
Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
CQMEM-502	M22520/5-01	M22520/5-41	B
CRMEF-501	M22520/5-01	M22520/5-39	B
CRMEF-502	M22520/5-01	M22520/5-05	B
CRMEM-501A	M22520/5-01	Y475	.163 HEX
CRMEM-502	M22520/5-01	M22520/5-41	B

**Table 29
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	AMS-DTL-23053/8	Available source
	RW-175	Raychem

- (1) Make a selection of a center contact crimp tool from Table 27.
 - (2) Make a selection of a contact body crimp tool from Table 28.
 - (3) Make a selection of a heat shrinkable sleeve from Table 29.
- NOTE:** For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (4) Put a 1.75 inch \pm 0.13 inch length of 3/16 inch diameter heat shrinkable sleeve on the cable.
 - (5) Remove 0.30 inch \pm 0.05 inch of the outer jacket from the end of the cable. Refer to Figure 23.

CAUTION: DAMAGE TO THE SHIELDS, THE DIELECTRIC, OR THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

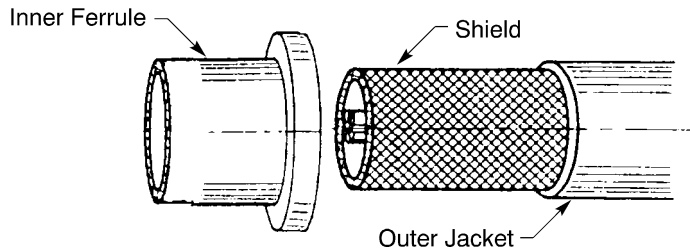


**OUTER JACKET REMOVAL LENGTH
Figure 23**

- (6) Put the inner ferrule on the cable. Refer to Figure 24.
- Make sure that:
- The end of the ferrule with the shoulder is put on the cable first
 - The inner shoulder of the ferrule is against the end of the outer jacket.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

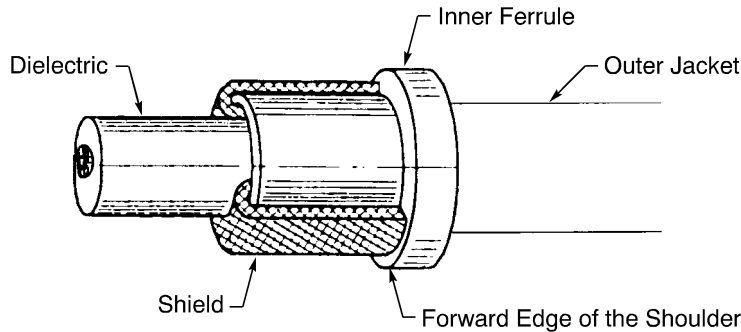


ALIGNMENT OF THE INNER FERRULE AND THE CABLE
Figure 24

- (7) Fold the outer round conductor shield back on the inner ferrule.
 Make sure that the strands of the shield are equal and symmetrical around the circumference of the ferrule.
- (8) Remove the inner flat conductor shield at the forward edge of the inner ferrule.

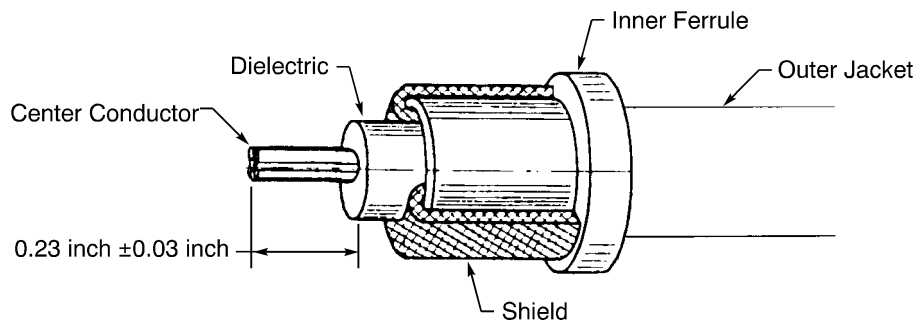
CAUTION: DAMAGE TO THE OUTER SHIELD, THE DIELECTRIC, OR THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (9) Cut the strands of the outer shield at the forward edge of the shoulder of the inner ferrule. Refer to Figure 25.



POSITION OF THE OUTER SHIELD ON THE INNER FERRULE
Figure 25

- (10) Remove 0.23 inch \pm 0.03 inch of the dielectric from the end of the cable. Refer to Figure 26.

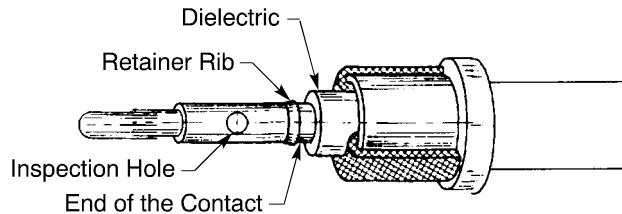


DIELECTRIC REMOVAL
Figure 26

20-72-22

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS**

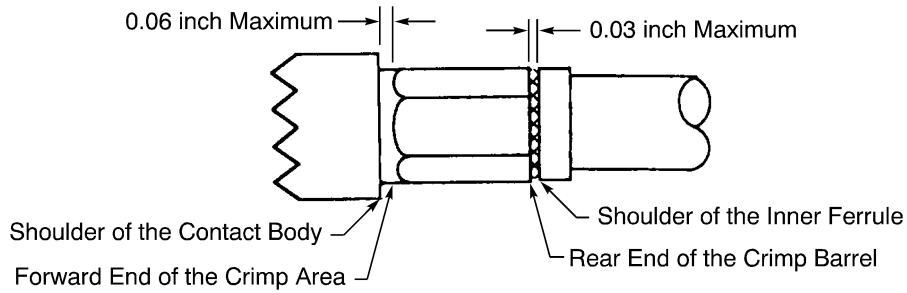
- (11) If all of the strands of the center conductor are not together, twist the strands together in their initial direction.
- (12) Put the center conductor in the crimp barrel of the center contact. Refer to Figure 27.
- Make sure that:
- The end of the dielectric is against the end of the center contact
 - The strands of the conductor can be seen in the inspection hole.

**POSITION OF THE CENTER CONTACT ON THE CENTER CONDUCTOR****Figure 27**

- (13) Crimp the center contact.
- (14) Put the contact body on the center contact.
- Make sure that the retainer rib of the center contact is locked in the contact body.
- (15) Lightly pull the cable to make sure that the center contact is locked in the body assembly.
- (16) If the center contact is not locked in the contact body, do Step (14) and Step (15) again.
- (17) Put the contact body in the die of the contact body crimp tool.
- Make sure that the distance from:
- The forward edge of the crimp tool die to the shoulder of the contact body is not more than 0.06 inch
 - The rear end of the crimp barrel to the forward edge of the shoulder of the inner ferrule is not more than 0.035 inch.
- (18) Crimp the contact body. Refer to Figure 28.
- Make sure that the distance from:
- The forward end of the crimp area to the shoulder of the contact body is not more than 0.06 inch
 - The rear end of the crimp barrel to the forward edge of the shoulder of the inner ferrule is not more than 0.035 inch.

STANDARD WIRING PRACTICES MANUAL

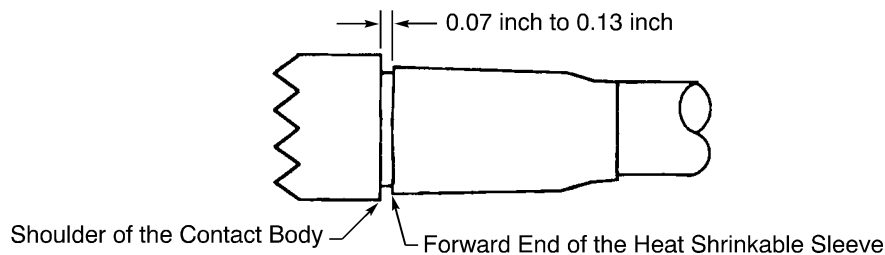
ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS



POSITION OF THE CONTACT BODY ON THE INNER FERRULE

Figure 28

- (19) Remove the unwanted length of the strands of the shield from the end of the contact body to the end of the shield.
- (20) Push the heat shrinkable sleeve forward until the forward end of the sleeve is 0.035 inch maximum from the rear edge of the shoulder of the contact body. Refer to Figure 29.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONTACT BODY

Figure 29

- (21) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Contact Insertion

This paragraph gives the procedure to install:

- A standard front release contact
- A standard rear release contact
- A Tri-Star rear release contact.

For the procedure to install a coax contact, refer to Paragraph 5.E.

**Table 30
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
20	6500-001-20	-
	CIET-20	Red
	M81969/14-02	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 30 (continued)

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
16	6500-001-16	-
	CIET-16	Blue
	M81969/14-03	-

- (1) Make a selection of an insertion tool from Table 30.
- (2) Put the necessary backshell components on the wire harness.
Make sure that the strain relief end of the backshell is pointed away from the end of the wire harness.
- (3) Put the contact assembly in the insertion tool.
Make sure that the end of the tool is against the rear shoulder of the contact.
- (4) Axially align the insertion tool and the contact cavity at the rear of the connector.
- (5) Carefully push the insertion tool and the contact assembly in the contact cavity until it stops.
Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT TURN THE INSERTION TOOL IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the tool out of the contact cavity.
- (7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (3) through Step (7) again.

E. Coax Contact Insertion

- (1) If the connector has a backshell, put the backshell on the wire harness.
Make sure that the strain relief end of the backshell is pointed away from the end of the wire harness.
- (2) Axially align the coax contact assembly with the contact cavity.
- (3) Carefully push the contact into the contact cavity until it stops.
- (4) Lightly pull the cable to make sure that the contact is locked in the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONEACT.

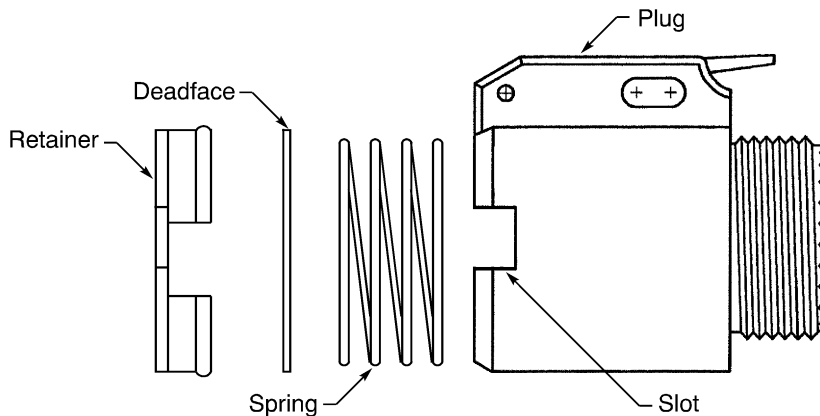
CAUTION: DO NOT MAKE A DENT IN THE CABLE JACKET WITH THE FINGERNAILS. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (5) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (2) through Step (4) again.

F. Seal of an Empty Contact Cavity

If the connector has a rear grommet, all empty contact cavities must be sealed. Refer to Subject 20-60-08.

G. Deadface Installation



CBX12PM-1 CONNECTOR DEADFACE COMPONENTS
Figure 30

Refer to Figure 30.

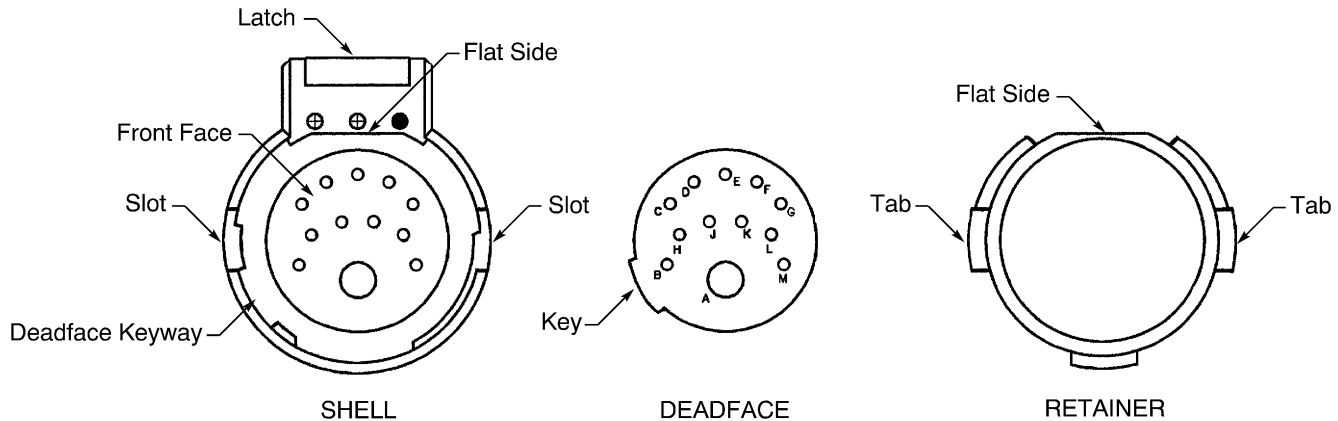
- (1) Put the spring in the front face of the connector.
- (2) Put the deadface on the spring. Refer to Figure 31.

Make sure that:

- The side of the deadface with the contact cavity identification is to the front.
- The key of the deadface is aligned with the keyway in the connector shell.
- The contact holes in the deadface are aligned with the contacts or contact cavities in the connector.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS



ALIGNMENT OF THE CONNECTOR SHELL, THE DEADFACE, AND THE RETAINER

Figure 31

- (3) Align the flat side of the retainer with flat side of the connector. Refer to Figure 31. Make sure that the deadface stays aligned with the connector.
- (4) Push the retainer into the connector shell until it makes a click.

H. Integral Strain Relief Assembly

Refer to Figure 14 for the configurations the integral strain relief cable clamps.

- (1) If the connector has a straight strain relief clamp with a clamp bar, or a 90 degree strain relief with a clamp bar:
 - (a) Put the clamp bar on the wire harness.
 - (b) Align the holes of the clamp bar with the holes in the strain relief legs of the connector.
 - (c) Install the clamp screws.
- (2) If the connector has a 90 degree tie wrap bar:
 - (a) Attach the legs of the tie wrap bar to the strain relief legs of the connector.
 - (b) Install a plastic tie strap or assemble a wire harness tie to hold the wire harness in its position.

Refer to:

- Subject 20-10-11 for procedure to install a plastic tie strap
- Subject 20-10-11 for the procedure to assemble a wire harness tie.

I. Backshell Assembly

Refer to:

- Figure 15 for the configurations of backshells for non-environmental connectors
- Figure 16 for the configurations of backshells for environmental connectors.

- (1) If the connector has a CT-14S backshell:
 - (a) Fully engage the threads of the backshell and the connector.
 - (b) Make a mark on the wire harness or the wires at the end of the backshell.

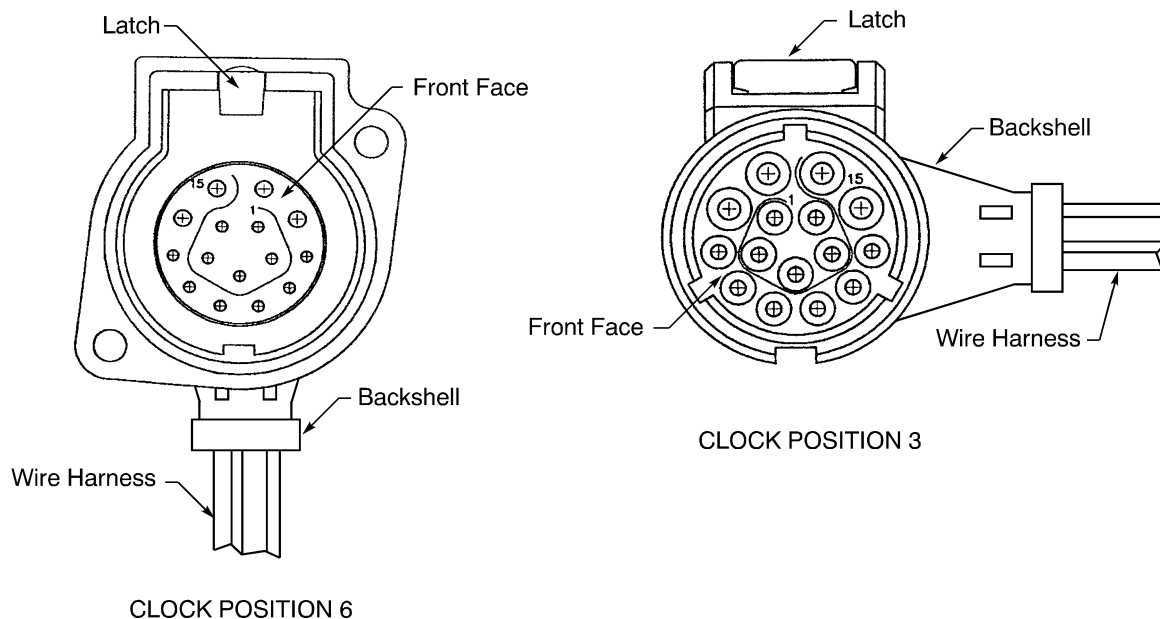
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS**

CAUTION: MAKE SURE THAT THE MARK DOES NOT CAUSE DAMAGE TO THE WIRE INSULATION. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (c) Disengage the threads of the backshell and the connector.
 - (d) Put the necessary layers of protective tape or the necessary quantity of heat shrinkable sleeves on the wire harness to make a tight fit in the rear hole of the backshell.
Refer to Subject 20-00-11 for the protective tape or heat shrinkable sleeve.
 - (e) Fully engage the threads of the backshell and the connector.
 - (f) Install a plastic tie strap or assemble a wire harness tie on the wire harness and the strain relief of the backshell.
Refer to:
 - Subject 20-10-11 for procedure to install a plastic tie strap
 - Subject 20-10-11 for the procedure to assemble a wire harness tie.
- (2) If the connector has a CTS-16 backshell:
- (a) Fully engage the threads of the backshell and connector.
 - (b) Install a plastic tie strap or assemble a wire harness tie on the wire harness and the strain relief of the backshell.
Refer to:
 - Subject 20-10-11 for procedure to install a plastic tie strap
 - Subject 20-10-11 for the procedure to assemble a wire harness tie.
- (3) If the connector has a CTF-14S, a CTR-14S, a CTF-16, or a CTR-16 backshell:
- (a) Engage the threads of the backshell and connector.
 - (b) Put the backshell in the specified clock position. Refer to Figure 32 for examples of clock positions.

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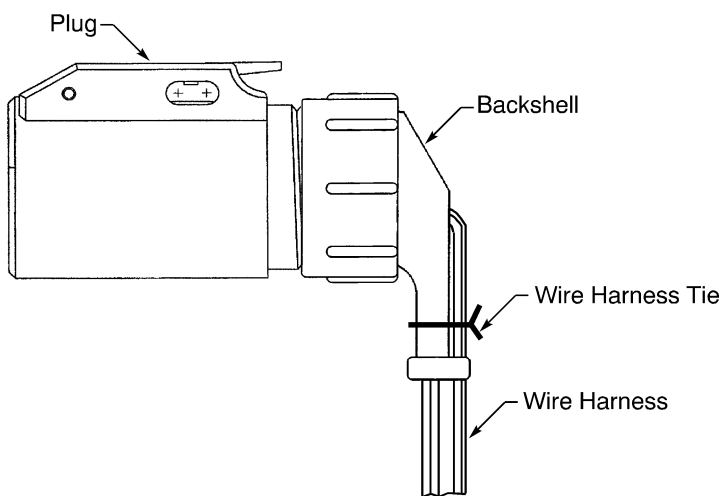
BACKSHELL CLOCK POSITION 6 AND CLOCK POSITION 3

Figure 32

- (c) Fully tighten the threads of the backshell on the connector.
- (d) Install a plastic tie strap or assemble a wire harness tie on the wire harness and the strain relief of the backshell.

Refer to:

- Figure 33
- Subject 20-10-11 for procedure to install a plastic tie strap
- Subject 20-10-11 for the procedure to assemble a wire harness tie.



BACKSHELL ASSEMBLY

Figure 33



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6. ASSEMBLY OF A CONNECTOR WITH SOLDER TYPE CONTACTS

This Paragraph gives the procedures to assemble the connectors that have solder tail contacts.

Refer to Figure 1 for the configuration of the CB02-15() connector.

A. Necessary Parts and Materials

**Table 31
NECESSARY MATERIALS**

Material	Part Number or Specification	Description	Supplier
Sealant	BMS5-37	Standard Cure	Boeing
	BMS5-95 Class B	Standard Cure	Boeing
	PR-1826 Class B	Fast Cure	Courtaulds Aerospace
	PR-1828 Class B	Fast Cure	Courtaulds Aerospace
	Pro-Seal 870 B-1/2	Standard Cure	Courtaulds Aerospace
	Pro-Seal 870 B-2	Standard Cure	Courtaulds Aerospace
Sleeve, Heat Shrinkable	AMS-DTL-23053/5 Class 1	-	Available source
	AMS-DTL-23053/5 Class 3	-	Available source
	MIL-LT	-	Raychem
	PLF 100	-	Plastronic

**Table 32
APPROVED SUPPLIERS OF BOEING STANDARD SEALANTS**

Boeing Standard	Supplier
BMS5-37	PRC-DeSoto International
BMS5-95 Class B	Le Joint Francais
BMS5-95 Class B	PRC-DeSoto International
BMS5-95 Class B	Yokohama Rubber

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**Table 33
SOCKET CONTACT PART NUMBERS**

Solder Tail Contact Size	Socket Contact			
	Contact Size		Part Number	Supplier
	Engaging End	Crimp Barrel		
20	22	22	031-1287-000	ITT Cannon
			208264-2	AMP
			318-2222-301	Tri-Star
			620300	Radiall-Sogie
			8660-206	Souriau
			BACC47EG1	Boeing
16	16	16	BACC47CP2A	Boeing
			BACC47CP2T	Boeing
			BACC47ET2	Boeing
			M39029/32-248	QPL
			M39029/5-116	QPL
			MS24255-16S	QPL

**Table 34
POTTING BOOTS**

Part Number	Supplier
M85049/74-12-1	QPL
M85049/75-12-1	QPL

B. Wire Preparation

**Table 35
LOCATION OF SOCKET CONTACT ASSEMBLY PROCEDURES**

Socket Contact	Crimp Barrel Size	Reference
031-1287-000	22	Subject 20-71-14
208264-2	22	Subject 20-71-14
318-2222-301	22	Subject 20-71-14
620300	22	Subject 20-71-14
8660-206	22	Subject 20-71-14
BACC47CP2A	16	Subject 20-61-11
BACC47CP2T	16	Subject 20-61-11

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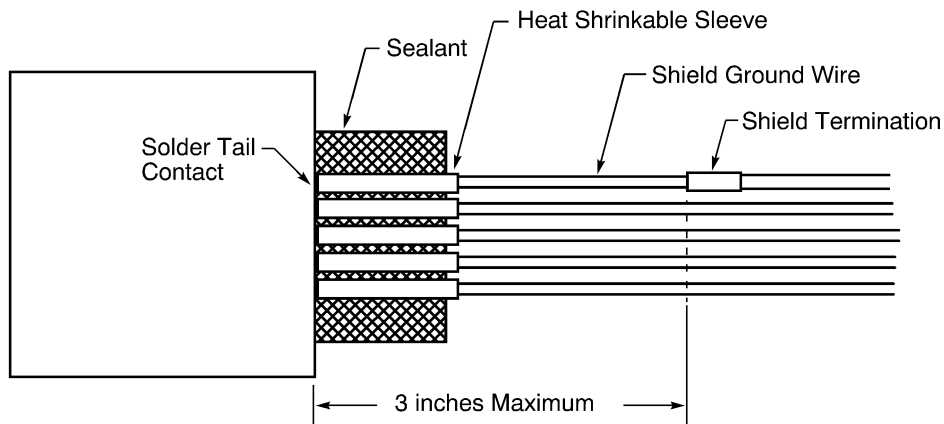
ASSEMBLY OF TRI-STAR CB(-), CORY CB(-), AND HUGHES 116706(-) SERIES CONNECTORS

Table 35 (continued)

Socket Contact	Crimp Barrel Size	Reference
BACC47EG1	22	Subject 20-71-14
BACC47ET2	16	Paragraph 5.B.
M39029/32-248	16	Subject 20-61-11
M39029/5-116	16	Paragraph 5.B.
MS24255-16S	16	Subject 20-61-11

- (1) If it is specified, assemble a shield ground wire. Refer to Subject 20-10-15.
Make sure that the maximum distance from the shield termination on the wire harness to the rear face of the connector is 3.0 inches. Refer to Figure 34.
- (2) Make a selection of a contact from Table 33.
- (3) Make a selection of a heat shrinkable sleeve from Table 31.
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (4) Put a 1.5 inch ± 0.25 inch length of heat shrinkable sleeve on the wire.
- (5) Assemble the contact. Refer to Table 35.

C. Contact Assembly



FULLY ASSEMBLED TRI-STAR CB02-15() RECEPTACLE CONNECTOR
Figure 34

- (1) Make a selection of a potting boot from Table 34.
NOTE: A satisfactory alternative to a boot is a plastic connector dust cap that has:
 - An outer diameter less than or equal to 0.925 inch
 - An inner diameter more than or equal to 0.70 inch
 - The closed end removed.
- (2) Make a selection of a sealant from Table 31.
- (3) Put the boot or the cap on the wire harness.

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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

- (4) Put a 0.06 inch to 0.1 inch length of solder in the engaging end of the socket contact on the end of the wire.
- (5) Start to engage the socket contact and the solder tail.
- (6) Apply heat to the contact and at the same time push it forward until the end of the contact is against the rear face of the connector.

CAUTION: MAKE SURE TO REMOVE THE SOLDER OR SOLDER FLUX THAT MAKES A BRIDGE BETWEEN ADJACENT CONTACTS.

- (7) Push the heat shrinkable sleeve forward until the end of the sleeve is against the rear face of the connector. Refer to Figure 34.
- (8) Shrink the sleeve into its position. Refer to Subject 20-10-14.

CAUTION: MAKE SURE TO USE ONLY THE MINIMUM AMOUNT OF HEAT THAT IS NECESSARY TO SHRINK THE SLEEVE. IF TOO MUCH HEAT IS APPLIED, DAMAGE TO SOLDER JOINT OCCURS.

- (9) Point the front face of the connector down.
- (10) Push the boot down until the forward end of the boot is against the body of the connector.
- (11) Fill the boot fully with sealant.
- (12) Let the sealant cure the necessary amount of time.
- (13) If the potting boot is a connector dust cap, remove it.

NOTE: It is not necessary to remove a potting boot that is specified in Table 34.

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 36
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
6500-001-16	Matrix
6500-001-20	Matrix
CET16-21	ITT Cannon
CET20-24	ITT Cannon
CIET-16	ITT Cannon
CIET-20	ITT Cannon
M81969/8-06	QPL
M81969/8-08	QPL
M81969/14-02	QPL
M81969/14-03	QPL
M81969/19-03	QPL
M81969/19-07	QPL



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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

B. Contact Crimp Tools

Table 37
CONTACT CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
11148	Buchanan
612916	Buchanan
85-220	Daniels
85-550	Daniels
K1S	Daniels
K977	Daniels
M10S	Burndy
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL
M22520/2-06	QPL
M22520/2-14	QPL
M22520/5-01	QPL
M22520/5-39	QPL
M22520/5-41	QPL
MS3191-1	QPL
MS3191-16A	QPL
MS3191-20A	QPL
S-5	Burndy
S-6	Burndy
S-7	Burndy
SL-2	Burndy
SL-3	Burndy
ST2220-1-1	Boeing
ST2220-1-2	Boeing
ST2220-1-45	Boeing
ST2220-1-Y	Boeing
TH1A	Daniels
WA22	Daniels
WA27F	Daniels

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ASSEMBLY OF TRI-STAR CB()-(), CORY CB()-(), AND HUGHES 116706()-() SERIES CONNECTORS

Table 37 (continued)

Crimp Tool	Supplier
WA22LC	Daniels

C. Contact Insertion Tools

Table 38
CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
6500-001-16	Matrix
6500-001-20	Matrix
CIET-16	ITT Cannon
CIET-20	ITT Cannon
M81969/14-02	QPL
M81969/14-03	QPL

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

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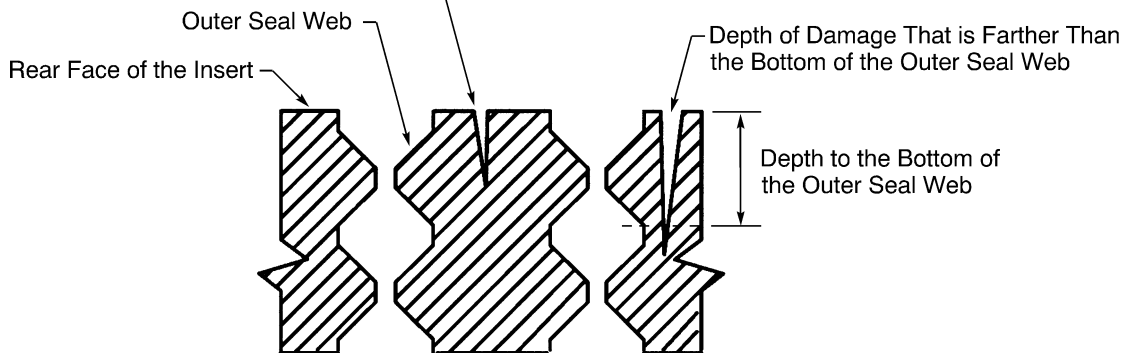
1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

It is necessary to replace the connector if one or more of these conditions occur:

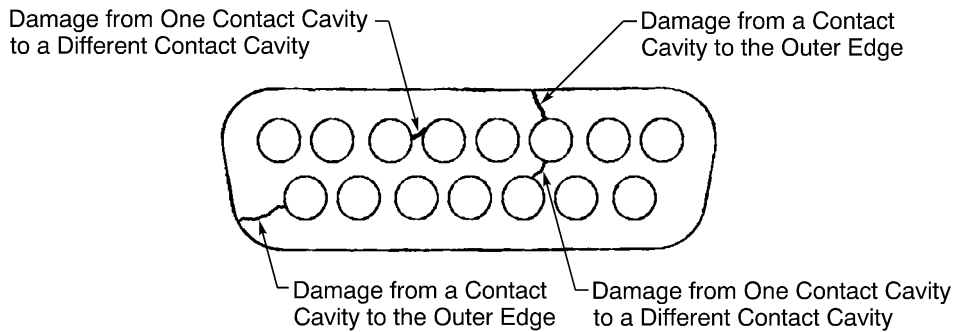
- The depth of the damage extends farther than the bottom of the outer seal web; refer to Figure 1
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 2
- The damage extends from one contact cavity to the outer edge of the insert; refer to Figure 2.

Depth of the Damage That is not Farther Than the Bottom of the Seal Web



REAR FACE OF THE INSERT - DEPTH OF DAMAGE

Figure 1



REAR FACE OF THE INSERT - LENGTH OF DAMAGE

Figure 2

B. Damage Conditions - Front Face of the Insert

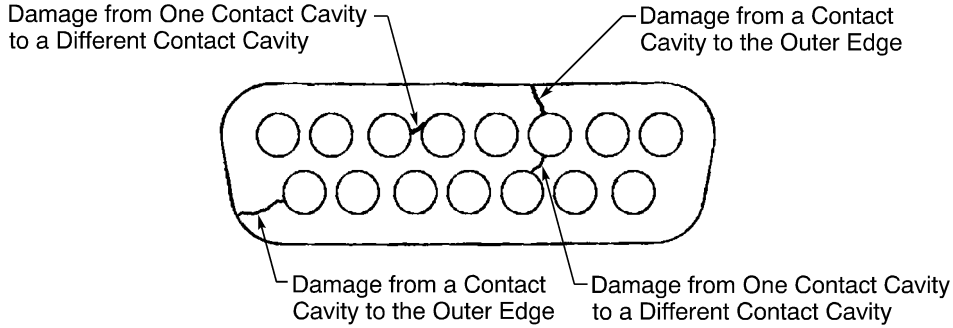
It is necessary to replace the connector if one of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 3.

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



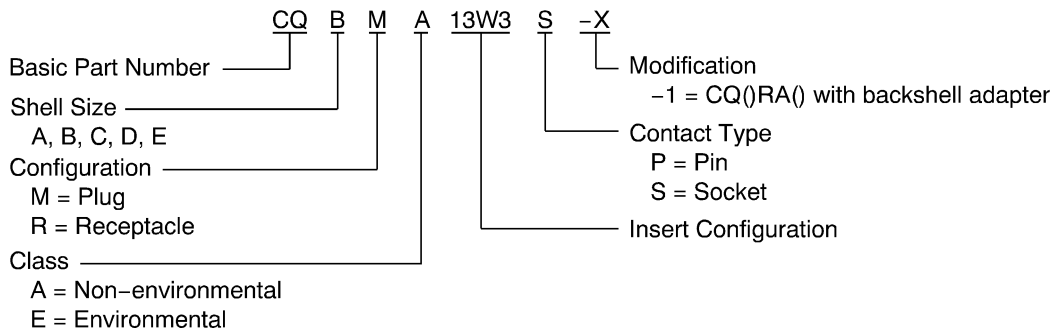
FRONT FACE OF THE INSERT - LENGTH OF DAMAGE
Figure 3

2. CONNECTOR PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Type	Supplier
CQ()MA()	Plug	Cory Components
CQ()MA()	Plug	Tri-Star
CQ()ME()	Plug	Cory Components
CQ()ME()	Plug	Tri-Star
CQ()RA()	Receptacle	Cory Components
CQ()RA()	Receptacle	Tri-Star
CQ()RE()	Receptacle	Cory Components
CQ()RE()	Receptacle	Tri-Star



TRI-STAR CQ() AND CORY CQ() CONNECTOR PART NUMBER STRUCTURE
Figure 4

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

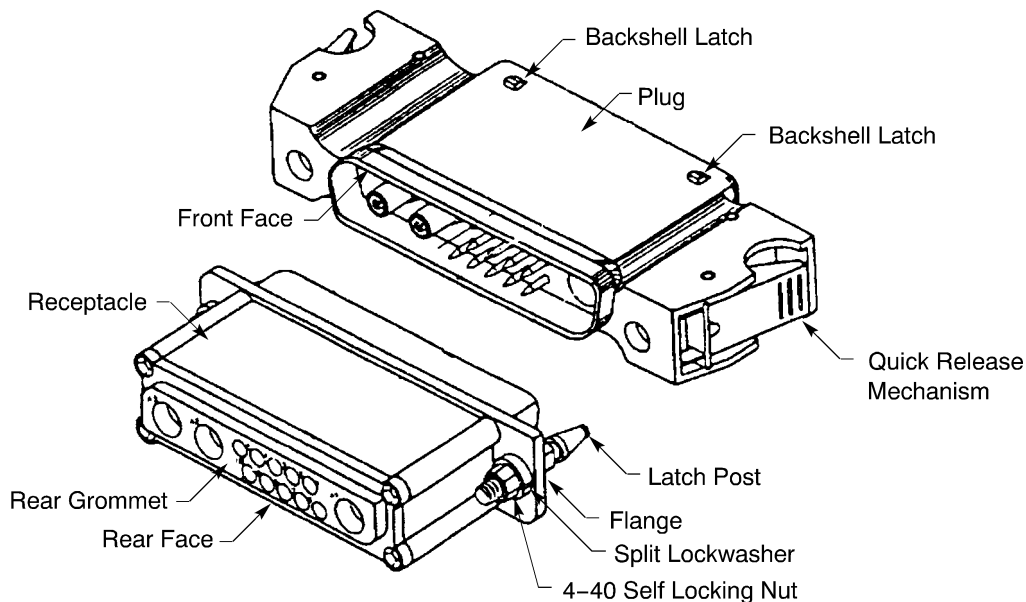
**Table 2
OBSOLETE CONNECTOR PART NUMBERS**

Obsolete Connector		Replacement Connector	
Part Number	Supplier	Part Number	Supplier
CQ()MA()	Cory Components	CQ()MA()	Tri-Star
CQ()ME()	Cory Components	CQ()ME()	Tri-Star
CQ()RA()	Cory Components	CQ()RA()	Tri-Star
CQ()RE()	Cory Components	CQ()RE()	Tri-Star

B. Connector Description

The CQ() rectangular connectors have these properties:

- A D subminiature rectangular configuration
- A plastic shell for the plug
- A quick release latch mechanism
- Crimp type contacts
- Rear release, rear removable standard contacts
- Front release, rear removable size 08 coax contacts
- Front release, rear removable special purpose contacts
- Non-removable size 2018 special purpose contacts
- A removable, snap-on, plastic backshell with a cable tie strain relief.

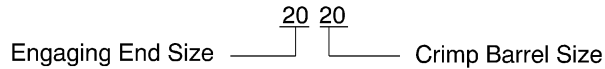


**CQ() PLUG AND RECEPTACLE CONNECTORS
Figure 5**

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

C. Contact Part Numbers



EXAMPLE OF A CONTACT SIZE
Figure 6

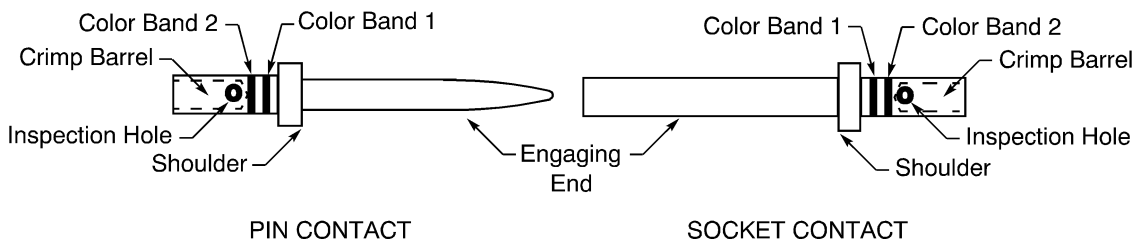
NOTE: The size 2020HD contact has a size 20 engaging end and a size 20 crimp barrel.

Table 3
STANDARD CONTACT PART NUMBERS

Contact Size	Engaging End Size	Crimp Barrel Size	Contact Type	Boeing Standard	Color Code	
					Band	Color
2020HD	20	20	Pin	BACC47EF2	1	Orange
					2	Red
			Socket	BACC47EG2	1	Orange
					2	Red

Table 4
STANDARD CONTACT COLOR CODES

Contact	Color Code	
	Band 1	Band 2
BACC47EF2	Orange	Red
BACC47EG2	Orange	Red



STANDARD CONTACTS
Figure 7

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

**Table 5
SPECIAL PURPOSE CONTACT PART NUMBERS**

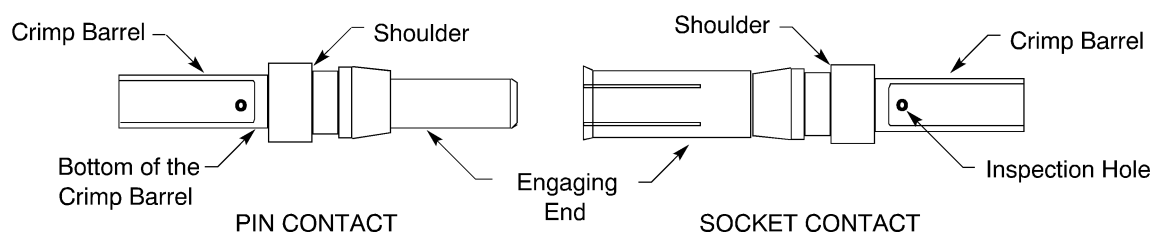
Contact Size		Contact Type	Contact		Conditions for Installation
Engaging End	Crimp Barrel		Part Number	Supplier	
20	18	Pin	CB008-5P	Cory Components	-
			CB008-5P	Tri-Star	-
		Socket	CB009-5P	Cory Components	-
			CB009-5P	Tri-Star	-
08	16	Pin	CMP002-P103	Cory Components	Alignment Ring
			CMP002-P103	Tri-Star	Alignment Ring
		Socket	CMP002-S103	Cory Components	-
			CMP002-S103	Tri-Star	-
	12	Pin	CMP003-P103	Cory Components	Alignment Ring
			CMP003-P103	Tri-Star	Alignment Ring
		Socket	CMP003-S103	Cory Components	-
			CMP003-S103	Tri-Star	-
	08	Pin	CMP004-P103	Cory Components	Alignment Ring
			CMP004-P103	Tri-Star	Alignment Ring
		Socket	CMP004-S103	Cory Components	-
			CMP004-S103	Tri-Star	-

**Table 6
OBSOLETE SPECIAL PURPOSE CONTACT PART NUMBERS**

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
CB008-5P	Cory Components	CB008-5P	Tri-Star
CB009-5P	Cory Components	CB009-5P	Tri-Star
CMP002-P103	Cory Components	CMP002-P103	Tri-Star
CMP002-S103	Cory Components	CMP002-S103	Tri-Star
CMP003-P103	Cory Components	CMP003-P103	Tri-Star
CMP003-S103	Cory Components	CMP003-S103	Tri-Star
CMP004-P103	Cory Components	CMP004-P103	Tri-Star
CMP004-S103	Cory Components	CMP004-S103	Tri-Star

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



SPECIAL PURPOSE CONTACTS
Figure 8

Table 7
COAX CONTACT PART NUMBERS

Part Number	Contact Type	Size	Center Contact Type	Supplier	Conditions for Installation
CQMEF-316	Socket	08	Pin	Cory Components	-
CQMEF-316A	Socket	08	Pin	Cory Components	-
CQMEF-316A	Socket	08	Pin	Tri-Star	-
CQMEF-501A	Socket	08	Pin	Cory Components	-
CQMEF-501B	Socket	08	Pin	Cory Components	-
CQMEF-501C	Socket	08	Pin	Cory Components	-
CQMEF-501D	Socket	08	Pin	Cory Components	-
CQMEF-501D	Socket	08	Pin	Tri-Star	-
CQMEF-502A	Socket	08	Pin	Cory Components	-
CQMEF-502A	Socket	08	Pin	Tri-Star	-
CQMEF-503	Socket	08	Pin	Cory Components	-
CQMEF-503	Socket	08	Pin	Tri-Star	-
CQMEM-316	Pin	08	Socket	Cory Components	Alignment Ring
CQMEM-316A	Pin	08	Socket	Cory Components	Alignment Ring
CQMEM-316A	Pin	08	Socket	Tri-Star	Alignment Ring
CQMEM-501	Pin	08	Socket	Cory Components	Alignment Ring
CQMEM-501A	Pin	08	Socket	Cory Components	Alignment Ring
CQMEM-501B	Pin	08	Socket	Cory Components	Alignment Ring
CQMEM-501C	Pin	08	Socket	Cory Components	Alignment Ring
CQMEM-501D	Pin	08	Socket	Cory Components	Alignment Ring
CQMEM-501D	Pin	08	Socket	Tri-Star	Alignment Ring
CQMEM-502	Pin	08	Socket	Cory Components	Alignment Ring
CQMEM-502	Pin	08	Socket	Tri-Star	Alignment Ring
CQMEM-503	Pin	08	Socket	Cory Components	Alignment Ring

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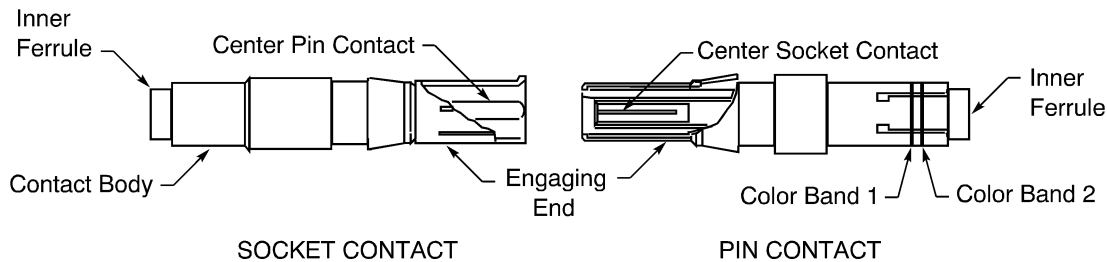
TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

Table 7 (continued)

Part Number	Contact Type	Size	Center Contact Type	Supplier	Conditions for Installation
CQMEM-503	Pin	08	Socket	Tri-Star	Alignment Ring

Table 8
COAX CONTACT COLOR CODES

Contact	Color Code	
	Band 1	Band 2
CQMEF-316	-	-
CQMEF-316A	-	-
CQMEF-501C	Brown	White
CQMEF-501D	Brown	White
CQMEF-502A	White	White
CQMEF-503	-	-
CQMEM-316	-	-
CQMEM-316A	-	-
CQMEM-501C	Brown	White
CQMEM-501D	Brown	White
CQMEM-502	White	White
CQMEM-503	-	-



COAX CONTACTS
Figure 9

Table 9
OBSOLETE COAX CONTACT PART NUMBERS

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
CQMEF-316	Cory Components	CQMEF-316A	Tri-Star

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

Table 9 (continued)

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
CQMEF-316A	Cory Components	CQMEF-316A	Tri-Star
CQMEF-501A	Cory Components	CQMEF-501D	Tri-Star
CQMEF-501B	Cory Components	CQMEF-501D	Tri-Star
CQMEF-501C	Cory Components	CQMEF-501D	Tri-Star
CQMEF-501D	Cory Components	CQMEF-501D	Tri-Star
CQMEF-502A	Cory Components	CQMEF-502A	Tri-Star
CQMEF-503	Cory Components	CQMEF-503	Tri-Star
CQMEM-316	Cory Components	CQMEM-316A	Tri-Star
CQMEM-316A	Cory Components	CQMEM-316A	Tri-Star
CQMEM-501	Cory Components	CQMEM-501D	Tri-Star
CQMEM-501A	Cory Components	CQMEM-501D	Tri-Star
CQMEM-501B	Cory Components	CQMEM-501D	Tri-Star
CQMEM-501C	Cory Components	CQMEM-501D	Tri-Star
CQMEM-501D	Cory Components	CQMEM-501D	Tri-Star
CQMEM-502	Cory Components	CQMEM-502	Tri-Star
CQMEM-503	Cory Components	CQMEM-503	Tri-Star

Table 10

COAX CONTACTS FOR SPECIFIED COAX CABLES

Coax Cable	Contact Type	Part Number
BMS13-65 Type 0E	Pin	CQMEM-501
		CQMEM-501A
		CQMEM-501B
		CQMEM-501C
		CQMEM-501D
	Socket	CQMEF-501A
		CQMEF-501B
		CQMEF-501C
		CQMEF-501D
BMS13-65 Type 0F	Pin	CQMEM-502
	Socket	CQMEF-502A

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

Table 10 (continued)

Coax Cable	Contact Type	Part Number
BMS13-65 Type 0G	Pin	CQMEM-503
	Socket	CQMEF-503
RG-316	Pin	CQMEM-316
		CQMEM-316A
	Socket	CQMEF-316
		CQMEF-316A
S280W503-1	Pin	CQMEM-501
		CQMEM-501A
		CQMEM-501B
		CQMEM-501C
	Socket	CQMEM-501D
		CQMEF-501A
		CQMEF-501B
		CQMEF-501C
S280W503-2	Pin	CQMEM-502
	Socket	CQMEF-502A
S280W503-3	Pin	CQMEM-503
	Socket	CQMEF-503

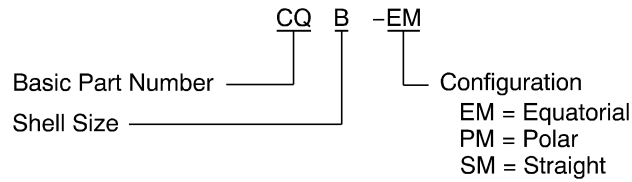
D. Backshell Part Numbers

**Table 11
BACKSHELL PART NUMBERS**

Part Number	Configuration	Reference	Supplier
CQ()-EM	Equatorial	Figure 11	Cory Components
CQ()-EM	Equatorial	Figure 11	Tri-Star
CQ()-PM	Polar	Figure 12	Cory Components
CQ()-PM	Polar	Figure 12	Tri-Star
CQ()-SM	Straight	Figure 13	Cory Components
CQ()-SM	Straight	Figure 13	Tri-Star

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



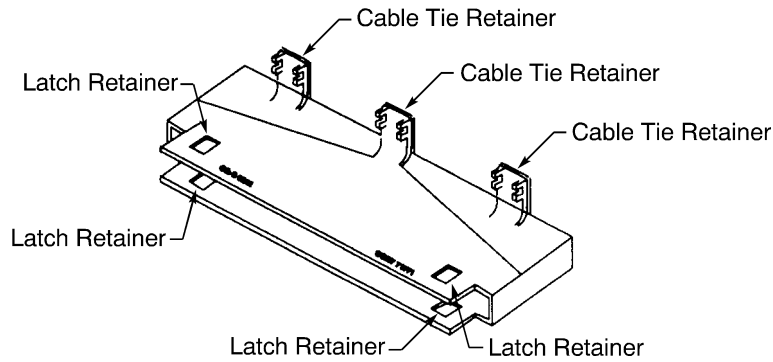
BACKSHELL PART NUMBER STRUCTURE

Figure 10

Table 12

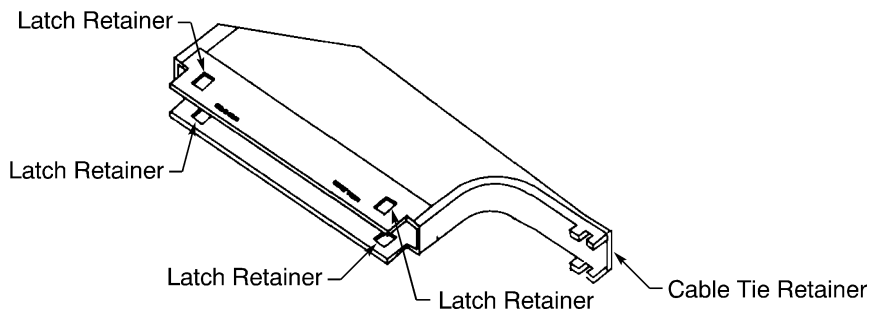
OBSOLETE BACKSHELL PART NUMBERS

Obsolete Backshell		Replacement Backshell	
Part Number	Supplier	Part Number	Supplier
CQ()-EM	Cory Components	CQ()-EM	Tri-Star
CQ()-PM	Cory Components	CQ()-PM	Tri-Star
CQ()-SM	Cory Components	CQ()-SM	Tri-Star



EQUATORIAL BACKSHELL

Figure 11

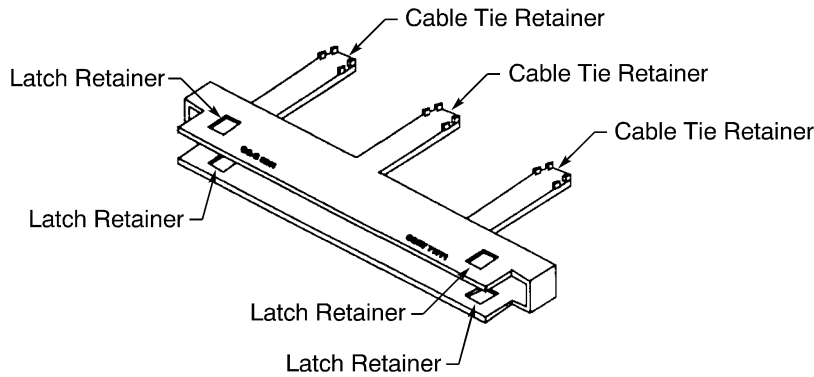


POLAR BACKSHELL

Figure 12

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



STRAIGHT BACKSHELL

Figure 13

E. Contact Alignment Ring Part Numbers

Table 13

CONTACT ALIGNMENT RING PART NUMBERS

Part Number	Supplier
CRA-1	Cory Components
CRA-1	Tri-Star

Table 14

OBSOLETE CONTACT ALIGNMENT RING PART NUMBERS

Obsolete Alignment Ring		Replacement Alignment Ring	
Part Number	Supplier	Part Number	Supplier
CRA-1	Cory Components	CRA-1	Tri-Star

3. INSERT CONFIGURATIONS

A. CQ() Connectors

NOTE: The contact cavity size that is specified in Table 15 is equivalent to the size of the engaging end of the contact.

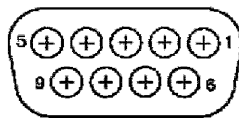
NOTE: Figure 14 through Figure 26 show the rear face of an insert that has pin contacts. The view of the rear face of an insert that has socket contacts is the mirror image of this view.

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

**Table 15
CONNECTOR INSERT CONFIGURATIONS**

Shell Size	Insert Configuration	Contact Cavity		Contact Type	Reference
		Count	Size		
A	11W1	10	20	Standard	Figure 15
		1	8	Coax or Special Purpose	
	15	15	20	Standard	Figure 16
B	13W3	3	8	Coax or Special Purpose	Figure 17
		10	20	Standard	
	17W2	15	20	Standard	Figure 18
		5	8	Coax or Special Purpose	
	25	25	20	Standard	Figure 21
C	21WA4	17	20	Standard	Figure 19
		4	8	Coax or Special Purpose	
	25W3	22	20	Standard	Figure 22
		3	8	Coax or Special Purpose	
	37	37	20	Standard	Figure 24
D	24W7	17	20	Standard	Figure 20
		7	8	Coax or Special Purpose	
	36W4	32	20	Standard	Figure 23
		4	8	Coax or Special Purpose	
	47W1	46	20	Standard	Figure 25
		1	8	Coax or Special Purpose	
	50	50	20	Standard	Figure 26
E	9	9	20	Standard	Figure 14

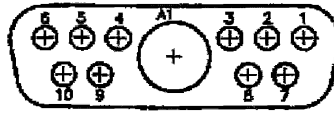


**9 INSERT CONFIGURATION
Figure 14**

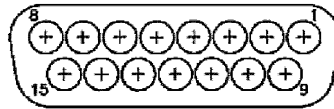
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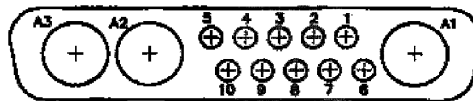
TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



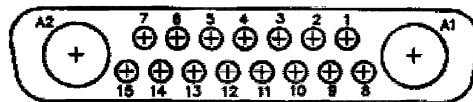
11W1 INSERT CONFIGURATION
Figure 15



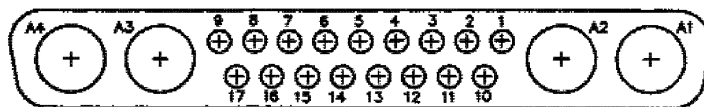
15 INSERT CONFIGURATION
Figure 16



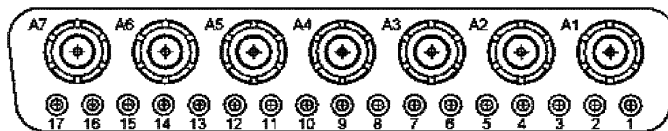
13W3 INSERT CONFIGURATION
Figure 17



17W2 INSERT CONFIGURATION
Figure 18



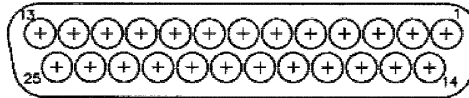
21WA4 INSERT CONFIGURATION
Figure 19



24W7 INSERT CONFIGURATION
Figure 20

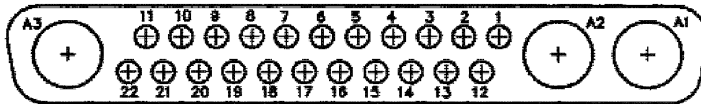
STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



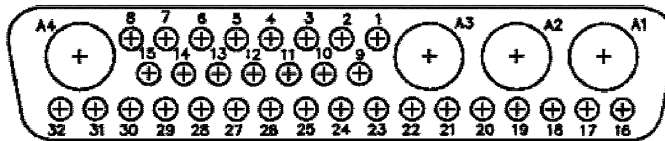
25 INSERT CONFIGURATION

Figure 21



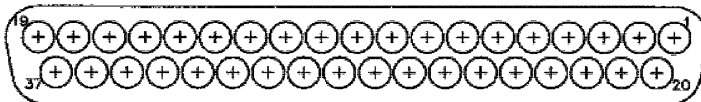
25W3 INSERT CONFIGURATION

Figure 22



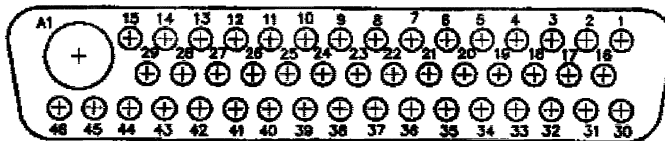
36W4 INSERT CONFIGURATION

Figure 23



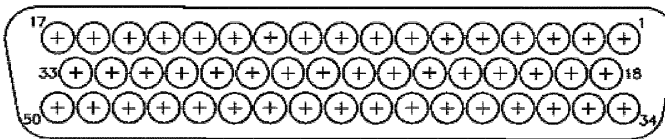
37 INSERT CONFIGURATION

Figure 24



47W1 INSERT CONFIGURATION

Figure 25



50 INSERT CONFIGURATION

Figure 26

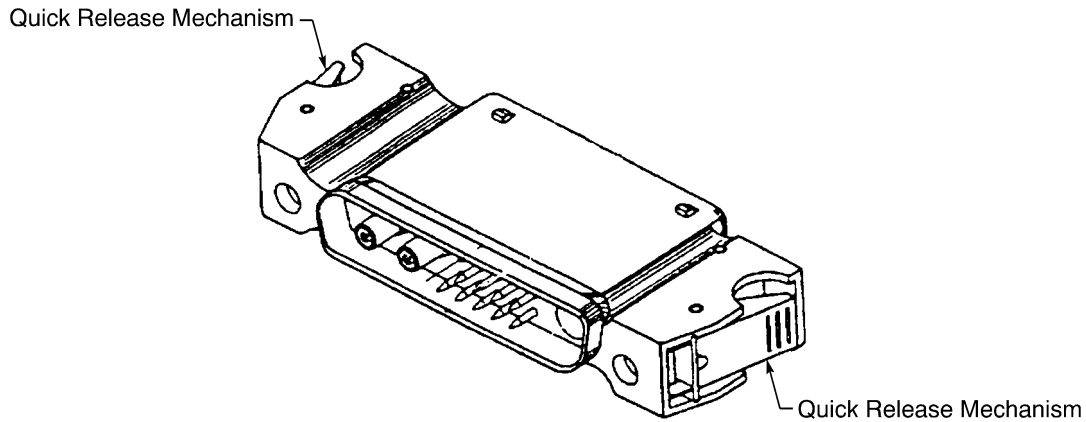
STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

4. CONNECTOR DISASSEMBLY

A. Separation of the Plug and the Receptacle

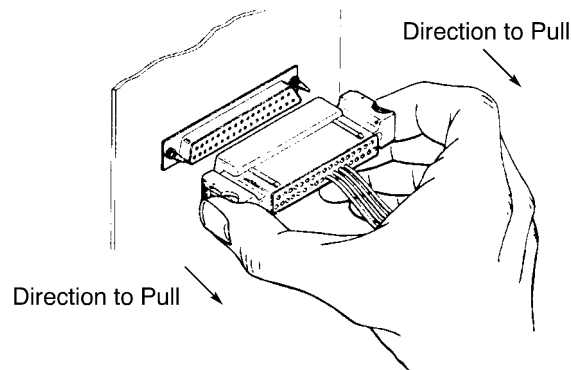
- (1) Push and hold the quick release mechanism on each side of the plug at the same time. Refer to Figure 27.



LOCATION OF THE QUICK RELEASE MECHANISM ON THE PLUG

Figure 27

- (2) Pull the plug from the receptacle. Refer to Figure 28.



SEPARATION OF THE PLUG FROM THE RECEPTACLE

Figure 28

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

B. Removal of the Receptacle from a Panel

**Table 16
NECESSARY TOOLS**

Tool	Size (inch)
Nut Driver	3/16
Wrench	3/16

- (1) Make a selection of a tool from Table 16.
- (2) Remove the 4-40 self locking nuts at the rear of the receptacle.

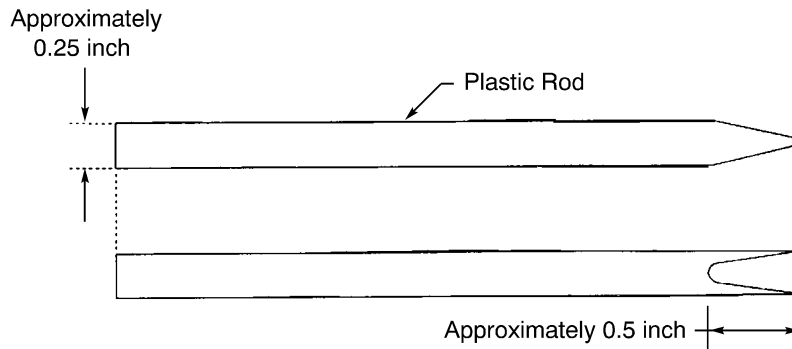
NOTE: Make sure to keep the nuts in a safe location; they are necessary to install the receptacle in the panel again.

- (3) Remove the receptacle from the panel.

C. Backshell Removal

**Table 17
NECESSARY TOOLS**

Tool	Diameter (inch)	Reference
Awl, Plastic	0.25	Figure 29



**DIMENSIONS OF THE PLASTIC AWL
Figure 29**

- (1) Make a selection of an awl from Table 17.
- (2) Put the tip of the awl between the backshell and the connector at one of the four backshell latches. Refer to Figure 5 for the location of the backshell latches on the connector.

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

For the location of the backshell latch retainers on a connector that has:

- An equatorial backshell, refer to Figure 11
 - A polar backshell, refer to Figure 12
 - A straight backshell, refer to Figure 13.
- (3) Lift the latch retainer of the backshell away from the plug shell.
 - (4) Do Step (2) and Step (3) again for each remaining latch.
 - (5) Remove the backshell from the connector.

D. Contact Removal

This paragraph gives the procedure to remove standard contacts.

For the procedure to remove:

- Special purpose contacts, refer to Paragraph 4.E.
- Coax contacts, refer to Paragraph 4.F.

**Table 18
CONTACT REMOVAL TOOLS**

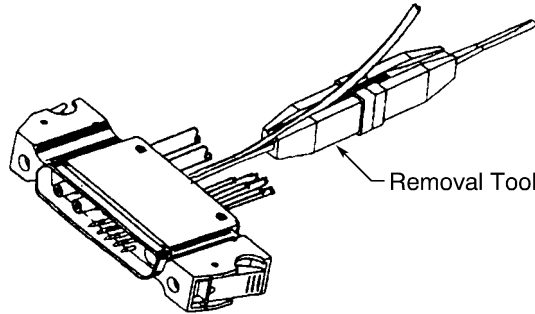
Contact Size	Removal Tool
2020HD	282-891
	91066-4
	CIET-20HDL
	DAK125
	M81969/1-02
	MS3156-20

NOTE: The backshell must be removed from the connector before the contacts can be removed. Refer to Paragraph 4.C.

- (1) Make a selection of a contact removal tool from Table 18.
- (2) Put the tip of the tool on the wire.
- (3) At the rear of the connector, axially align the tool and the contact cavity.
- (4) Carefully push the tool into the contact cavity until it stops. Refer to Figure 30.
Make sure that the tool stays aligned with the contact cavity.

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



POSITION OF THE REMOVAL TOOL IN THE CONTACT CAVITY
Figure 30

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Hold the wire against the tool.
- (6) Pull the tool and the wire out of the contact cavity at the same time.
 Make sure that the tool stays aligned with the contact cavity.
- (7) If the contact is not released:
 - (a) Carefully pull the tool out of the contact cavity.
 - (b) Turn the tool approximately 90 degrees.
 - (c) Do Step (2) through Step (6) again.

E. Special Purpose Contact Removal

NOTE: Size 2018 special purpose contacts cannot be removed from the connector.

Table 19
CONTACT REMOVAL TOOLS

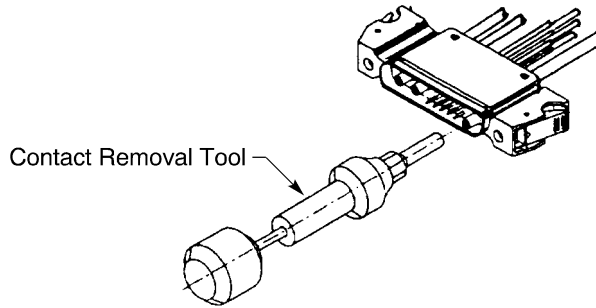
Contact Cavity Size	Removal Tool
08	DRK38

NOTE: The backshell must be removed from the connector before the contacts can be removed. Refer to Paragraph 4.C.

- (1) For a pin contact, remove the alignment ring from the contact at the front of the connector.
- (2) Make a selection of a contact removal tool from Table 19.
- (3) At the front of the connector, axially align the tool with the engaging end of the contact. Refer to Figure 31.

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

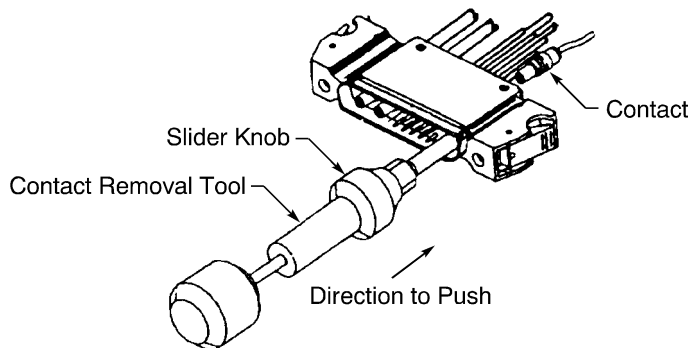


ALIGNMENT OF THE REMOVAL TOOL AND THE CONTACT
Figure 31

- (4) Put the tip of the tool on the contact.
- (5) Push the tool forward until the first mark on the tool is aligned with the front face of the connector.

CAUTION: IF THE REMOVAL TOOL IS PUSHED FARTHER THAN THE SPECIFIED MARK, DAMAGE TO THE RETENTION CLIPS OF THE CONTACT CAN OCCUR.

- (6) Hold the tool and the connector tightly in position.
- (7) Push the slider knob forward to release the contact. Refer to Figure 32.



OPERATION OF THE REMOVAL TOOL SLIDER KNOB
Figure 32

- (8) From the rear of the connector, carefully pull the cable or the contact crimp barrel.

F. Coax Contact Removal

The procedure to remove coax contacts is the same as the procedure to remove special purpose contacts. Refer to Paragraph 4.E.

5. CONNECTOR ASSEMBLY

A. Contact Assembly

This paragraph gives the procedure to assemble standard and special purpose contacts.

For the procedure to assemble:

- The CQME()-316, CQME()-501, and CQME()-502 coax contacts, refer to Paragraph 5.B.
- The CQME()-503 coax contacts, refer to Paragraph 5.C.

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

**Table 20
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
24	20HD	0.17	± 0.01
22	20HD	0.17	± 0.01
20	20HD	0.17	± 0.01
	16	0.28	± 0.02
18	18	0.17	± 0.01
	16	0.28	± 0.02
16	16	0.28	± 0.02
14	12	0.28	± 0.02
12	12	0.28	± 0.02
10	08	0.28	± 0.02
8	08	0.28	± 0.02

**Table 21
STANDARD CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
24	20HD	GVF-101	5	-
		M22520/2-01	5	M22520/2-08
		ST2220-1-Y	-	ST2220-1-43
		WA22	5	M22520/2-08
		WA22LC	5	M22520/2-08
22	20HD	GVF-101	5	-
		M22520/2-01	6	M22520/2-08
		ST2220-1-Y	-	ST2220-1-43
		WA22	6	M22520/2-08
		WA22LC	6	M22520/2-08

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

Table 21 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
20	20HD	GVF-101	5	-
		M22520/2-01	7	M22520/2-08
		ST2220-1-Y	-	ST2220-1-43
		WA22	7	M22520/2-08
		WA22LC	7	M22520/2-08

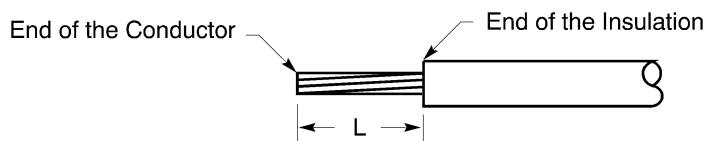
Table 22
SPECIAL PURPOSE CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
20	16	M309	1	TP884
18	18	M22520/2-01	8	M22520/2-08
	16	M309	2	TP884
16	16	M309	3	TP884
14	12	M309	3	TP884
12	12	M309	4	TP884
10	08	M309	5	TP884
08	08	M309	6	TP884

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 33
- Table 20 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 33

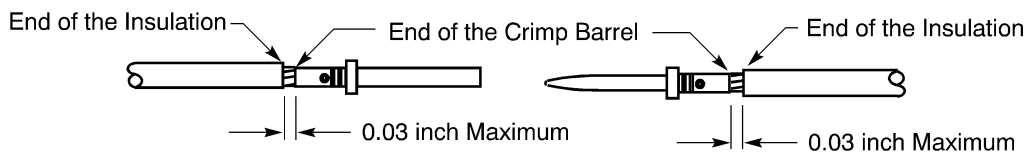
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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

- (2) Make a selection of a crimp tool from:
 - Table 21 for standard contacts
 - Table 22 for special purpose contacts.
- (3) Push the conductor into the crimp barrel of the contact until the end of the conductor is against the end of the crimp barrel. Refer to Figure 34.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT

Figure 34

- (4) Crimp the contact.

Make sure that:

 - All the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole
 - The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

B. Coax Contact Assembly

This paragraph gives the procedure to assemble these coax contacts:

- CQME()-316
- CQME()-501
- CQME()-502.

For the procedure to assemble a CQME()-503 coax contact, refer to Paragraph 5.C.

**Table 23
COAX CONTACT CENTER CONTACT CRIMP TOOLS**

Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
CQMEF-316	M22520/2-01	1	M22520/2-03
CQMEF-316	WA22	1	M22520/2-03
CQMEF-316	WA22LC	1	M22520/2-03
CQMEF-316A	M22520/2-01	1	M22520/2-03
CQMEF-316A	WA22	1	M22520/2-03



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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

Table 23 (continued)

Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
CQMEF-316A	WA22LC	1	M22520/2-03
CQMEF-501A	M22520/2-01	6	M22520/2-14
CQMEF-501A	WA22	6	M22520/2-14
CQMEF-501A	WA22LC	6	M22520/2-14
CQMEF-501B	M22520/2-01	6	M22520/2-14
CQMEF-501B	WA22	6	M22520/2-14
CQMEF-501B	WA22LC	6	M22520/2-14
CQMEF-501C	M22520/2-01	6	M22520/2-14
CQMEF-501C	WA22	6	M22520/2-14
CQMEF-501C	WA22LC	6	M22520/2-14
CQMEF-501D	M22520/2-01	6	M22520/2-14
CQMEF-501D	WA22	6	M22520/2-14
CQMEF-501D	WA22LC	6	M22520/2-14
CQMEF-502A	M22520/2-01	5	M22520/2-14
CQMEF-502A	WA22	5	M22520/2-14
CQMEF-502A	WA22LC	5	M22520/2-14
CQMEM-316	M22520/2-01	1	M22520/2-03
CQMEM-316	WA22	1	M22520/2-03
CQMEM-316	WA22LC	1	M22520/2-03
CQMEM-316A	M22520/2-01	1	M22520/2-03
CQMEM-316A	WA22	1	M22520/2-03
CQMEM-316A	WA22LC	1	M22520/2-03
CQMEM-501	M22520/2-01	6	M22520/2-06
CQMEM-501	WA22	6	M22520/2-06
CQMEM-501A	WA22	6	M22520/2-06
CQMEM-501A	WA22LC	6	M22520/2-06
CQMEM-501B	WA22	6	M22520/2-06
CQMEM-501B	WA22LC	6	M22520/2-06
CQMEM-501C	WA22	6	M22520/2-06
CQMEM-501C	WA22LC	6	M22520/2-06
CQMEM-501D	M22520/2-01	3	M22520/2-06

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

Table 23 (continued)

Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
CQMEM-501D	WA22	6	M22520/2-06
CQMEM-501D	WA22LC	6	M22520/2-06
CQMEM-502	M22520/2-01	4	M22520/2-06
CQMEM-502	WA22	6	M22520/2-06
CQMEM-502	WA22LC	6	M22520/2-06

**Table 24
COAX CONTACT BODY CRIMP TOOLS**

Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
CQMEF-316	M22520/5-01	M22520/5-39	B
CQMEF-316A	M22520/5-01	M22520/5-41	B
CQMEF-501B	M22520/5-01	M22520/5-39	B
CQMEF-501C	M22520/5-01	M22520/5-39	B
CQMEF-501D	M22520/5-01	M22520/5-41	B
CQMEF-502A	M22520/5-01	M22520/5-41	B
CQMEM-316	M22520/5-01	M22520/5-39	B
CQMEM-316A	M22520/5-01	M22520/5-41	B
CQMEM-501	M22520/5-01	M22520/5-39	B
CQMEM-501A	M22520/5-01	M22520/5-39	B
CQMEM-501B	M22520/5-01	M22520/5-39	B
CQMEM-501C	M22520/5-01	M22520/5-39	B
CQMEM-501D	M22520/5-01	M22520/5-41	B
CQMEM-502	M22520/5-01	M22520/5-41	B

**Table 25
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem
	PLF 100	Plastronic
	RW-175	Raychem

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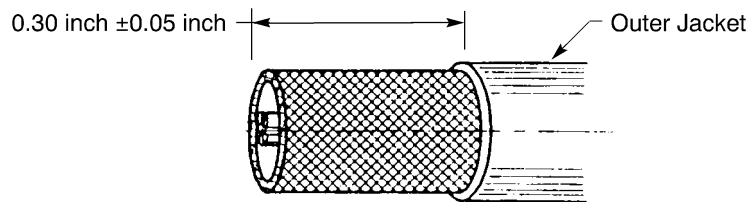
TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

- (1) Make a selection of a center contact crimp tool from Table 23.
- (2) Make a selection of a contact body crimp tool from Table 24.
- (3) Make a selection of a 3/16 inch diameter heat shrinkable sleeve from Table 25.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (4) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
- (5) Put a 1.75 inch \pm 0.13 inch length of the heat shrinkable sleeve on the cable.
- (6) Remove 0.30 inch \pm 0.05 inch of the outer jacket from the end of the cable. Refer to Figure 35.

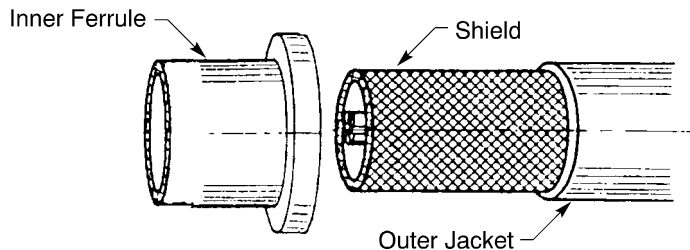
CAUTION: DAMAGE TO THE SHIELD, THE DIELECTRIC, OR THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.



OUTER JACKET REMOVAL LENGTH

Figure 35

- (7) Align the inner ferrule and the end of the cable. Refer to Figure 36.



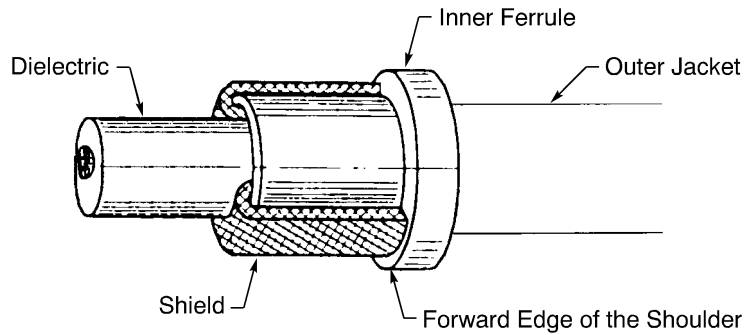
ALIGNMENT OF THE INNER FERRULE AND THE END OF THE CABLE

Figure 36

- (8) Push the inner ferrule rearward until the shoulder of the ferrule is against the end of the outer jacket.
- (9) If the cable has a flat conductor outer shield and a round conductor inner shield, cut the flat conductor shield at the forward edge of the inner ferrule.
- (10) Fold the shield back on the outer surface of the inner ferrule.
Make sure that the strands of the shield are symmetrical around the circumference of the ferrule.
- (11) Cut the strands of the shield at the forward edge of the shoulder of the inner ferrule. Refer to Figure 37.

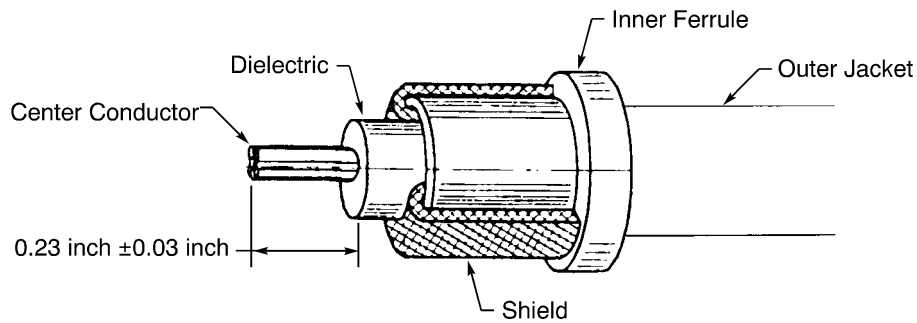
STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



POSITION OF THE SHIELD ON THE INNER FERRULE
Figure 37

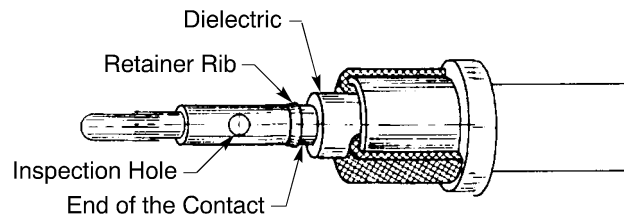
- (12) Remove 0.23 inch \pm 0.03 inch of the dielectric from the end of the cable. Refer to Figure 38.



DIELECTRIC REMOVAL
Figure 38

- (13) If all of the strands of the center conductor are not together, twist the strands together in their initial direction.
- (14) Push the center conductor into the crimp barrel of the center contact until the end of the dielectric is against the end of the center contact. Refer to Figure 39.

Make sure that the strands of the conductor can be seen in the inspection hole.



POSITION OF THE CENTER CONTACT ON THE CENTER CONDUCTOR
Figure 39

- (15) Crimp the center contact.
- (16) Put the contact body on the center contact.

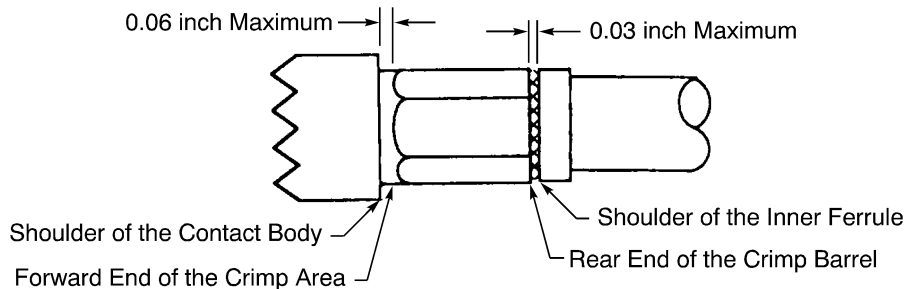
STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

- (17) Push the center contact into the contact body until the retainer rib of the center contact is locked in the contact body.
- (18) Lightly pull the cable to make sure that the center contact is locked in the contact body.
- (19) If the center contact is not locked in the contact body, do Step (17) and Step (18) again.
- (20) Put the contact in the crimp die.
Make sure that the rear end of the contact is aligned with the edge of the crimp die.
- (21) Crimp the contact body. Refer to Figure 40.

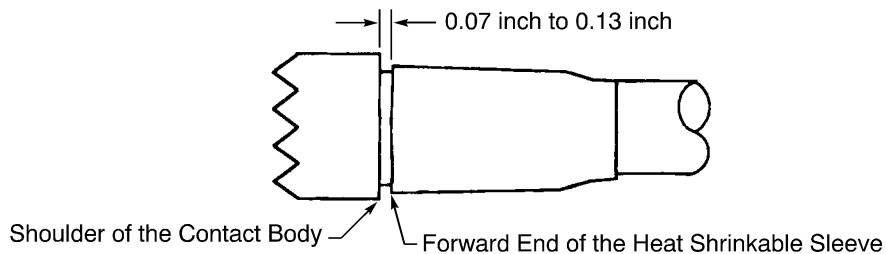
Make sure that the distance from:

- The forward end of the crimp area to the shoulder of the contact body is not more than 0.06 inch
- The rear end of the crimp barrel to the shoulder of the inner ferrule is not more than 0.03 inch.



POSITION OF THE CONTACT BODY
Figure 40

- (22) Remove the unwanted length of the strands of the shield.
Make sure that the end of the shield is aligned with the rear end of the contact body.
- (23) Push the heat shrinkable sleeve forward until the forward end of the sleeve is 0.07 inch to 0.13 inch from the shoulder of the contact body. Refer to Figure 41.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONTACT ASSEMBLY
Figure 41

- (24) Shrink the sleeve into its position. Refer to Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

C. CQME()-503 Coax Contact Assembly

**Table 26
COAX CONTACT CENTER CONTACT CRIMP TOOLS**

Basic Unit		Locator
Part Number	Setting	
M22520/2-01	6	M22520/2-14
		K709

**Table 27
COAX CONTACT OUTER FERRULE CRIMP TOOLS**

Basic Unit	Die	
	Part Number	Cavity
M22520/5-01	Y248	B

**Table 28
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem
	PLF 100	Plastronic
	RW-175	Raychem

- (1) Make a selection of a coax center contact crimp tool from Table 26.
- (2) Make a selection of a coax outer ferrule crimp tool from Table 27.
- (3) Make a selection of a 1/4 inch diameter heat shrinkable sleeve from Table 28.

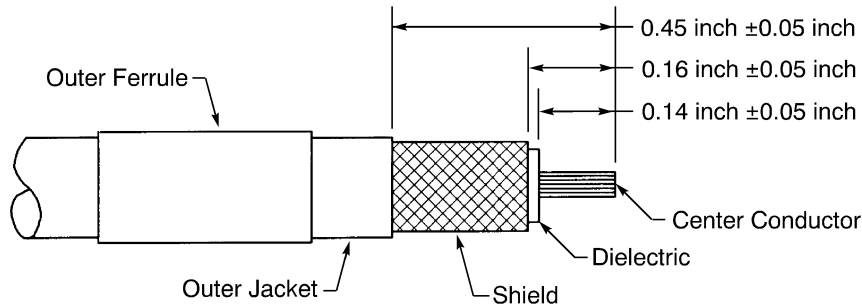
NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (4) Put a 1.50 inch ± 0.13 inch length of heat shrinkable sleeve on the cable.
- (5) Put the outer ferrule on the cable.
- (6) Prepare the cable. Refer to Figure 42.

CAUTION: DAMAGE TO THE SHIELD, THE DIELECTRIC, OR THE CENTER CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

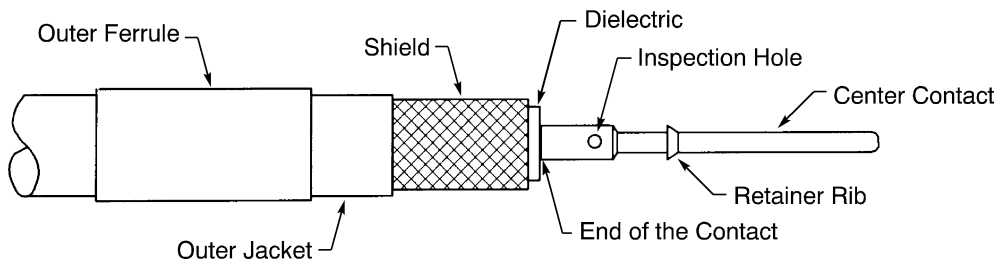


COAX CABLE PREPARATION

Figure 42

- (a) Remove 0.45 inch \pm 0.05 inch of the outer jacket.
- (b) Remove 0.16 inch \pm 0.05 inch of the shield.
- (c) Remove 0.14 inch \pm 0.05 inch of the dielectric.
- (7) If all of the strands of the center conductor are not together, twist the strands together in their initial direction.
- (8) Push the center conductor into the crimp barrel of the center contact until the end of the center contact is against the end of the dielectric. Refer to Figure 43.

Make sure that the strands of the conductor can be seen in the inspection hole.



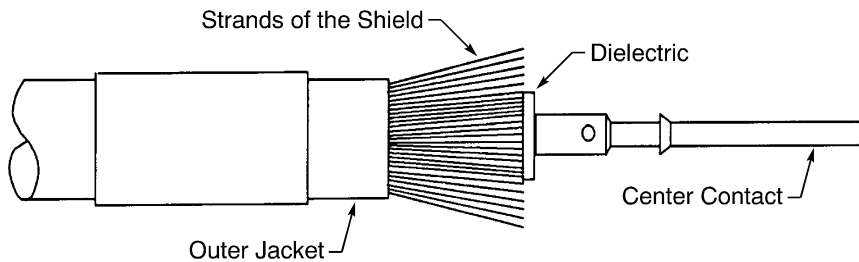
POSITION OF THE CENTER CONTACT ON THE CENTER CONDUCTOR

Figure 43

- (9) Crimp the center contact.
- (10) Move the strands of the shield apart.
- (11) Align the strands of the shield with the longitudinal axis of the cable. Refer to Figure 44.

STANDARD WIRING PRACTICES MANUAL

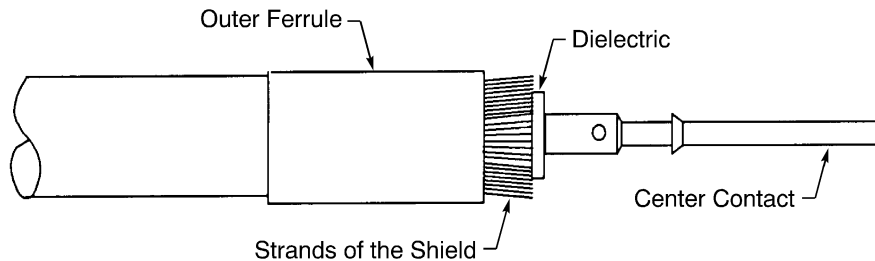
TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



ALIGNMENT OF THE STRANDS OF THE SHIELD

Figure 44

- (12) Push the outer ferrule forward until the ferrule makes an approximate 75 percent overlap with the strands of the shield. Refer to Figure 45.

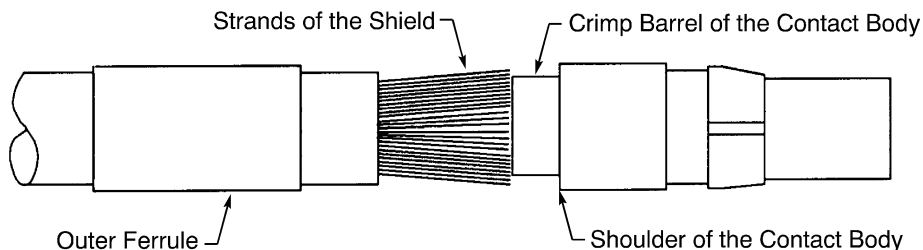


POSITION OF THE OUTER FERRULE ON THE SHIELD

Figure 45

- (13) Move the outer ferrule rearward away from the end of the cable jacket.
- (14) Push the center contact assembly into the contact body until the retainer rib of the center contact is locked in the contact body. Refer to Figure 46.

Make sure that the crimp barrel of the contact body is between the dielectric and all of the strands of the shield.



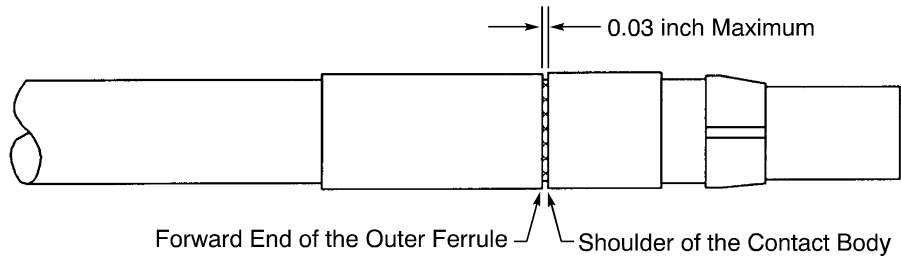
POSITION OF THE CONTACT BODY

Figure 46

- (15) Lightly pull the cable to make sure that the center contact is locked in the contact body.
- (16) If the center contact is not locked in the contact body, do Step (14) and Step (15) again.
- (17) Push the outer ferrule forward until the forward edge of the ferrule is 0.35 inch maximum from the shoulder of the contact body. Refer to Figure 47.

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



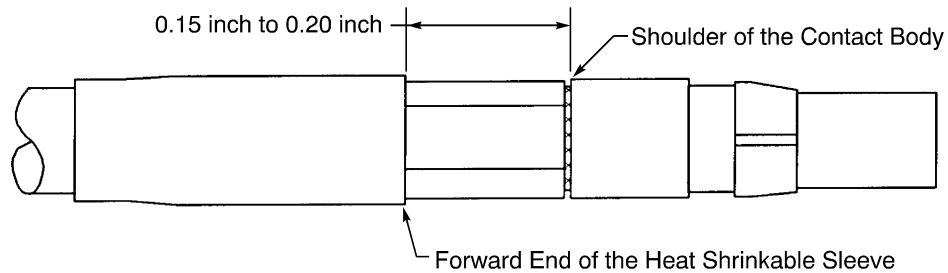
POSITION OF THE OUTER FERRULE ON THE CONTACT BODY
Figure 47

- (18) Crimp the outer ferrule.

Make sure that the distance from the forward end of the outer ferrule to the shoulder of the contact body is 0.035 inch maximum.

- (19) Cut the unwanted strands of the shield at the forward edge of the outer ferrule. Refer to Figure 47.

- (20) Push the heat shrinkable sleeve forward until the forward end of the sleeve is 0.15 inch to 0.20 inch from the shoulder of the contact body. Refer to Figure 48.



POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CONTACT ASSEMBLY
Figure 48

- (21) Shrink the sleeve into its position. Refer to Subject 20-10-14.

D. Contact Insertion

This paragraph gives the procedure to install:

- Standard contacts
- Size 2018 special purpose contacts.

For the procedure to install:

- Other special purpose contacts, refer to Paragraph 5.E.
- Coax contacts, refer to Paragraph 5.E.

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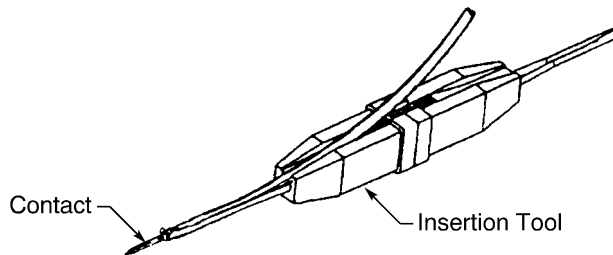
TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

**Table 29
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
2020HD	282-881
	91066-4
	ATC1072
	CIET-20HDL
	DAK145J
	M81969/1-02
	MS3156-22
2018	282-881
	91066-4
	ATC1072
	CIET-20HDL
	DAK145J
	M81969/1-02
	MS3156-22

NOTE: A size 2018 special purpose contact cannot be removed after it is inserted.

- (1) If a backshell is specified, put the backshell on the wire harness.
Make sure that the end of the backshell with the latch retainers is pointed forward to the end of the wire harness.
- (2) Make a selection of the contact insertion tool from Table 29.
- (3) If it is necessary to install an unwired contact in an empty contact cavity, install each unwired contact. Refer to Paragraph 5.F.
- (4) Put the contact assembly in the insertion tool. Refer to Figure 49.

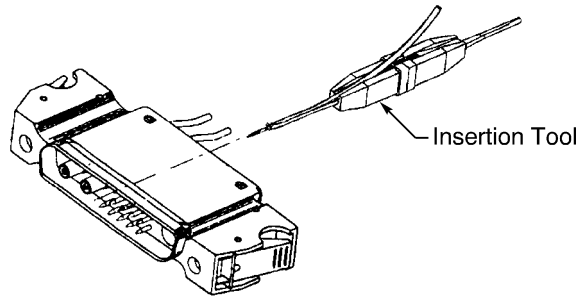


POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL
Figure 49

- (5) At the rear of the connector, axially align the contact assembly, the insertion tool, and the contact cavity. Refer to Figure 50.

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



ALIGNMENT OF THE CONTACT ASSEMBLY, THE INSERTION TOOL, AND THE CONTACT CAVITY
Figure 50

- (6) Push the tool into the contact cavity until it stops.

Make sure that the tool stays aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (7) Carefully pull the tool from the contact cavity.

- (8) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (9) If the contact is not locked in the contact cavity:

- (a) Pull the contact assembly out of the cavity.
- (b) Do Step (4) through Step (8) again.

E. Insertion of Special Purpose and Coax Contacts

For the conditions that are applicable for this procedure, refer to Paragraph 5.D.

Table 30
SPECIAL PURPOSE CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool
16	ST2220-2-4
12	ST2220-2-5
08	ST2220-2-5

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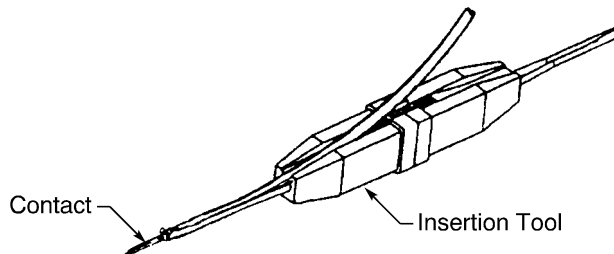
**Table 31
COAX CONTACT INSERTION TOOLS**

Contact Type	Insertion Tool
Pin	ST2220-2-5
Socket	ST2220-2-5

**Table 32
CONTACT ALIGNMENT RING INSTALLATION TOOLS**

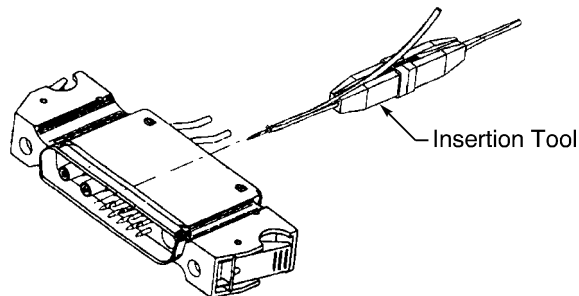
Contact Type	Installation Tool
Pin	M81969/14-04

- (1) Make a selection of a contact insertion tool from:
 - Table 30 for a special purpose contact
 - Table 31 for a coax contact.
- (2) If it is necessary to install an unwired contact in an empty contact cavity, install each unwired contact. Refer to Paragraph 5.F.
- (3) Put the contact assembly in the insertion tool. Refer to Figure 51.



**POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL
Figure 51**

- (4) At the rear of the connector, axially align the contact assembly, the insertion tool, and the contact cavity. Refer to Figure 52.



**ALIGNMENT OF THE CONTACT ASSEMBLY, THE INSERTION TOOL, AND THE CONTACT CAVITY
Figure 52**

STANDARD WIRING PRACTICES MANUAL**TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS**

- (5) Push the tool into the contact cavity until it stops.

Make sure that the tool stays aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the tool from the contact cavity.

- (7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:

(a) Pull the contact assembly out of the cavity.

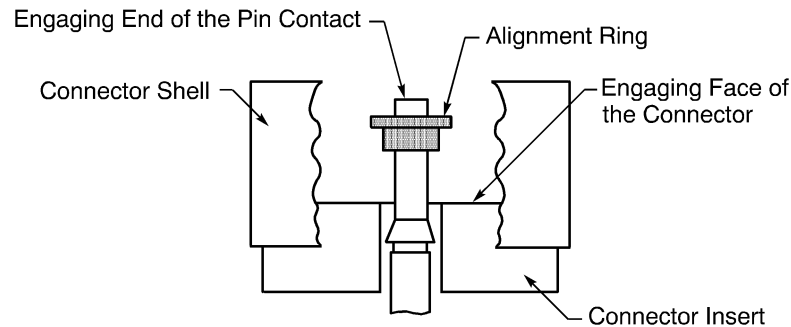
(b) Do Step (3) through Step (7) again.

- (9) For a pin contact:

(a) Make a selection of a contact alignment ring from Table 13.

(b) Make a selection of an alignment ring installation tool from Table 32.

(c) Put the alignment ring on the engaging end of the contact. Refer to Figure 53.



INITIAL POSITION OF THE ALIGNMENT RING

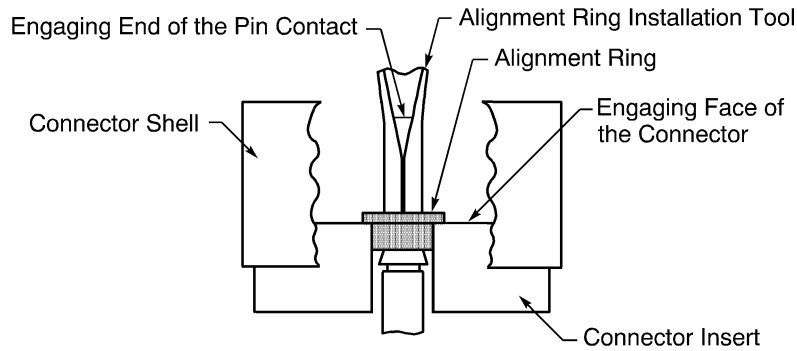
Figure 53

- (d) Put the end of the tool on the engaging end of the contact.

- (e) Push the alignment ring forward to the engaging face of the connector. Refer to Figure 54.

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



POSITION OF THE ALIGNMENT RING AGAINST THE FACE OF THE CONNECTOR
Figure 54

(f) Remove the tool from the engaging end of the contact.

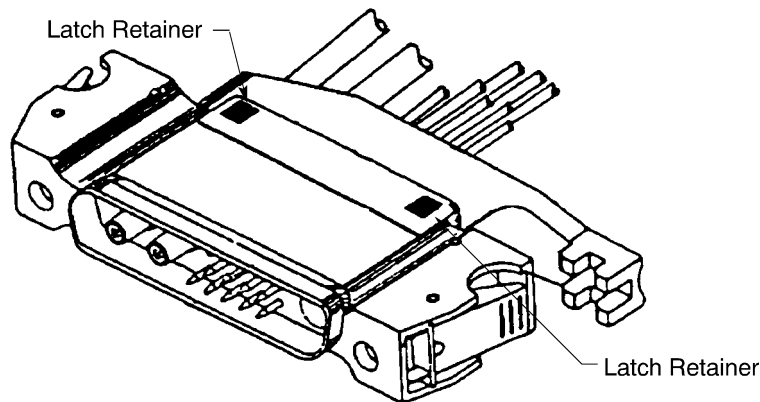
F. Seal of an Empty Contact Cavity

For environmental connectors, an empty contact cavity must be sealed with a seal rod or a seal plug. Refer to Figure 4 and Subject 20-60-08.

G. Backshell Installation

- (1) Align the forward end of the backshell with the rear end of the connector.
- (2) Engage the four latches on the connector with the latch retainers on the backshell. Refer to Figure 55.

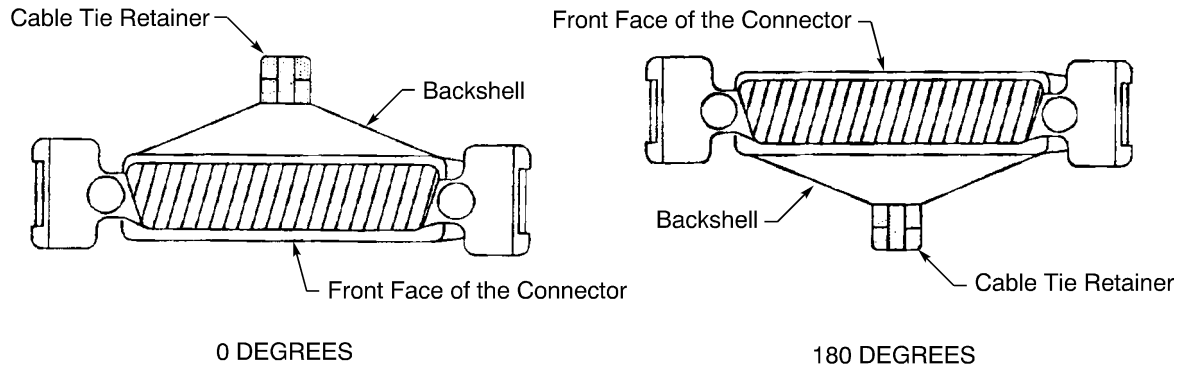
If the backshell is an equatorial backshell or a polar backshell, make sure that the backshell is in the correct clock position. Refer to Figure 56 and Figure 57.



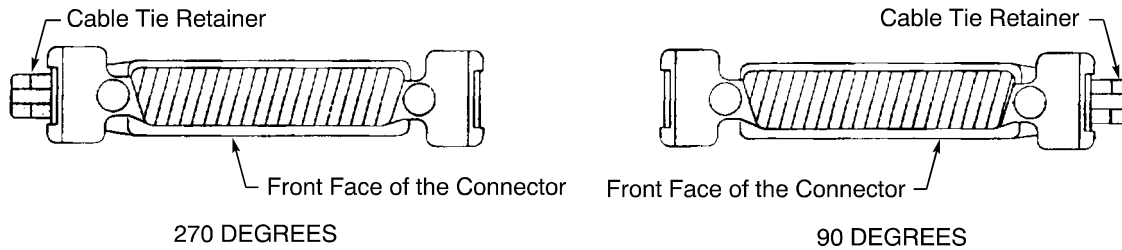
POSITION OF THE LATCH RETAINERS AND THE LATCHES
Figure 55

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CLOCK POSITIONS OF THE EQUATORIAL BACKSHELLS
Figure 56



CLOCK POSITIONS OF THE POLAR BACKSHELLS
Figure 57

(3) Assemble the strain relief.

For the assembly of the strain relief of a wire harness that:

- Does not have a coax cable, refer to Paragraph 5.H.
- Has a coax cable, refer to Paragraph 5.I.

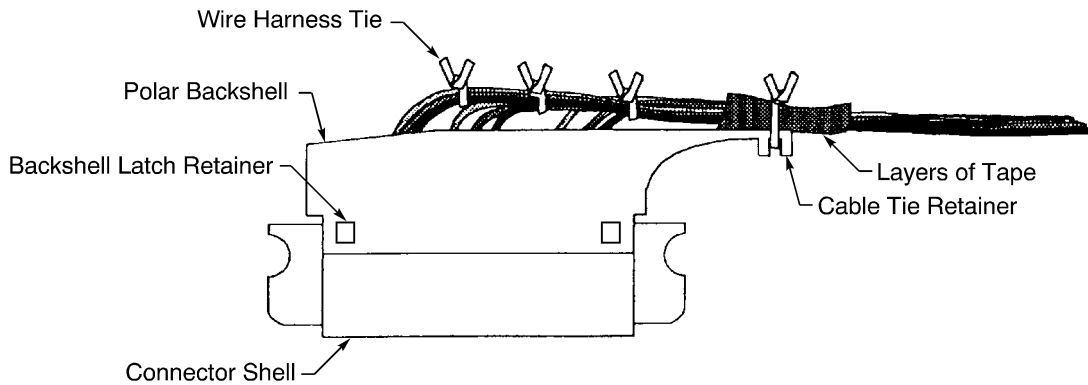
H. Strain Relief Assembly

This paragraph gives the procedure to assemble the strain relief for a wire harness that does not have a coax cable.

For the procedure to assemble the strain relief for a wire harness that has a coax cable, refer to Paragraph 5.I.

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CONFIGURATION OF THE WIRE HARNESS TIES OF THE STRAIN RELIEF
Figure 58

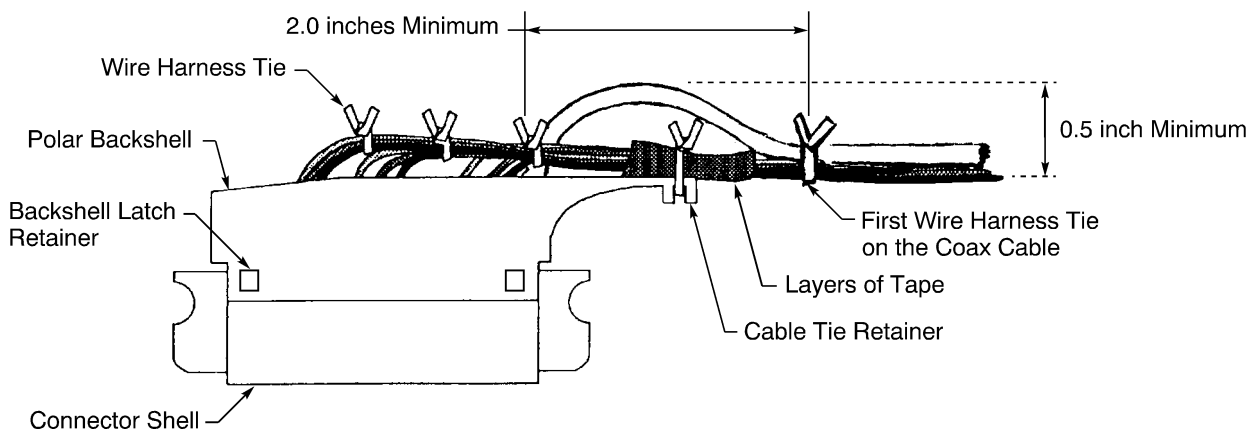
Refer to Figure 58.

- (1) Make a selection of a silicone tape. Refer to Subject 20-10-11.
- (2) Put a minimum of two layers of the tape around the wire harness at the location that is adjacent to the cable tie retainer of the backshell.
- (3) Assemble the wire harness ties around:
 - The wires and cables of the wire harness
 - The wire harness and the cable tie retainer.

Refer to Subject 20-10-11.

NOTE: A plastic tie strap is an acceptable alternative to a wire harness tie. Refer to Subject 20-10-11.

I. Strain Relief Assembly for a Wire Harness with a Coax Cable



CONFIGURATION OF THE WIRE HARNESS TIES OF THE STRAIN RELIEF
Figure 59

Refer to Figure 59.

- (1) Make a selection of a silicone tape. Refer to Subject 20-10-11.

STANDARD WIRING PRACTICES MANUAL**TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS**

- (2) At the location that is adjacent to the cable tie retainer of the backshell, put a minimum of two layers of the tape around:
- The wires of the harness
 - The cables of the wire harness that are not coax cables.
- (3) If the connector has a straight backshell, assemble a wire harness tie around:
- The wires and cables of the wire harness
 - The cable tie retainer.

Refer to Subject 20-10-11.

NOTE: A plastic tie strap is an acceptable alternative to a wire harness tie. Refer to Subject 20-10-11.

- (4) If the connector has a polar or an equatorial backshell and the distance from the rear end of the coax contact to the cable tie retainer is equal to or more than 2.0 inches, assemble a wire harness tie around:
- The wires and cables of the wire harness
 - The cable tie retainer.

Refer to Subject 20-10-11.

Make sure that the radius of the curve of the coax cable is not less than the minimum bend radius for coax cable. Refer to Subject 20-10-11.

CAUTION: IF THE COAX CABLE IS ATTACHED TO THE CABLE TIE RETAINER WHEN THE DISTANCE FROM THE COAX CONTACT TO THE CABLE TIE RETAINER IS LESS THAN 2.0 INCHES, DAMAGE TO THE COAX CONTACT OR THE COAX CABLE CAN OCCUR.

NOTE: A plastic tie strap is an acceptable alternative to a wire harness tie. Refer to Subject 20-10-11.

- (5) If the connector has a polar or an equatorial backshell and the distance from the rear end of the coax contact to the cable tie retainer is less than 2.0 inches:
- (a) Assemble a wire harness tie around:
- The wires of the harness
 - The cables of the wire harness that are not coax cables
 - The cable tie retainer.

Refer to Subject 20-10-11.

NOTE: A plastic tie strap is an acceptable alternative to a wire harness tie. Refer to Subject 20-10-11.

- (b) At a location that is equal to or more than 2.0 inches from the rear end of the coax contact, assemble a wire harness tie around:
- The coax cable
 - The wire harness.

Refer to Subject 20-10-11.

Make sure that the radius of the curve of the coax cable is not less than the minimum bend radius for coax cable. Refer to Subject 20-10-11.

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

CAUTION: IF THE COAX CABLE IS ATTACHED TO THE WIRE HARNESS AT A LOCATION THAT IS LESS THAN 2.0 INCHES, DAMAGE TO THE COAX CONTACT OR THE COAX CABLE CAN OCCUR.

NOTE: A plastic tie strap is an acceptable alternative to a wire harness tie. Refer to Subject 20-10-11.

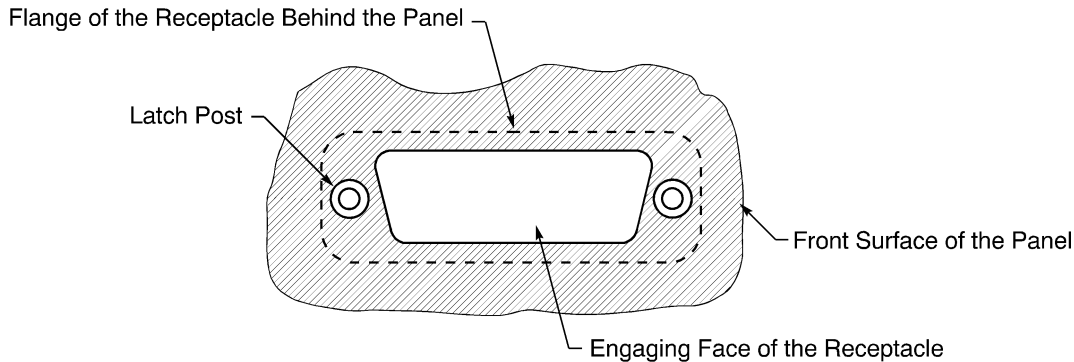
6. CONNECTOR INSTALLATION

A. Installation of a Receptacle in a Panel

**Table 33
NECESSARY TOOLS**

Tool	Size (inch)
Hex Nut Driver	3/16
Wrench	3/16

- (1) Make a selection of a tool from Table 33.
- (2) Remove these components from the flanges of the receptacle:
 - The two latch posts
 - The lockwashers
 - The 4-40 self-locking nuts.
- (3) From the front of the panel, align the receptacle with the hole in the panel. Refer to Figure 60. Make sure that the top of the receptacle is in the correct position in relation to the top of the hole.

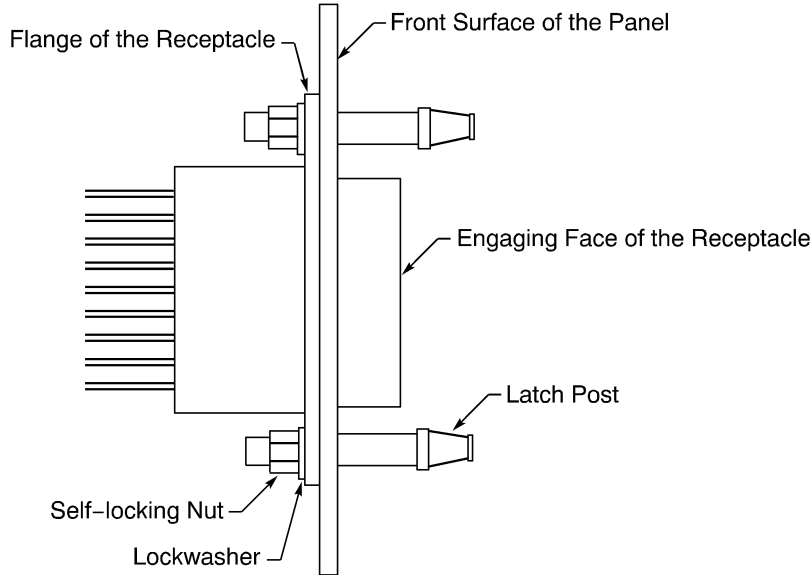


**POSITION OF THE RECEPTACLE IN THE PANEL
Figure 60**

- (4) Push the front of the receptacle through the hole until the front surface of the receptacle is against the rear surface of the panel.
- (5) Align the holes on the flange of the receptacle with the holes in the panel.
- (6) From the front of the panel, push a latch post through the each hole until the shoulder of the latch post is against the front of the flange. Refer to Figure 61.

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TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS



CONFIGURATION OF THE LATCH POST ASSEMBLIES
Figure 61

- (7) From the rear of the panel, put a lockwasher on each latch post.
 - (8) Put a self-locking nut on each latch post.
 - (9) Tighten the nuts.
- Make sure that the receptacle does not move in the panel.

B. Connection of a Plug and a Receptacle

- (1) Align the front face of the plug with the front face of the receptacle.
- (2) Push the plug into the receptacle until it makes a click.
- (3) Lightly pull the plug to make sure that the plug is locked in the receptacle.

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

Table 34
CONTACT REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
282-891	Radiall
91066-4	AMP
CIET-20HDL	ITT Cannon
DAK125	Daniels
DRK38	Daniels
M81969/1-02	QPL
MS3156-20	QPL

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

B. Contact Crimp Tools

**Table 35
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
GVF-101	Gaard
K709	Daniels
M22520/2-01	QPL
M22520/2-03	QPL
M22520/2-06	QPL
M22520/2-08	QPL
M22520/2-14	QPL
M22520/5-01	QPL
M22520/5-39	QPL
M22520/5-41	QPL
M309	Daniels
ST2220-1-43	Boeing
ST2220-1-Y	Boeing
TP884	Daniels
WA22	Daniels
WA22LC	Daniels
Y248	Daniels

C. Contact Insertion Tools

**Table 36
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
282-881	Sogie/Radiall
91066-4	AMP
ATC1072	Astro
CIET-20HDL	ITT Cannon
DAK145J	Daniels
M81969/1-02	QPL
M81969/14-04	QPL
MS3156-22	QPL
ST2220-2-4	Boeing



707, 727-787

STANDARD WIRING PRACTICES MANUAL

TRI-STAR CQ() AND CORY CQ() RECTANGULAR CONNECTORS

Table 36 (continued)

Insertion Tool	Supplier
ST2220-2-5	Boeing

20-72-23



707, 727-787

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ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

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ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

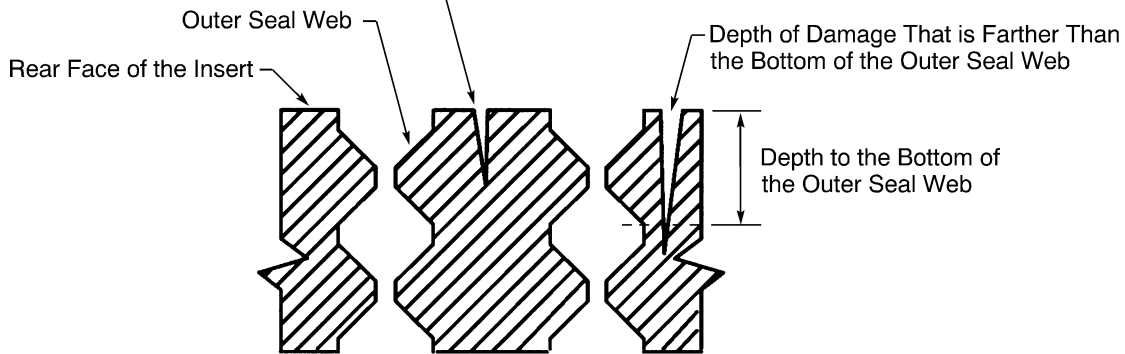
1. GENERAL DATA

A. Damage Conditions - Rear Face of the Connector

The connector must be replaced when one or more of these conditions occur:

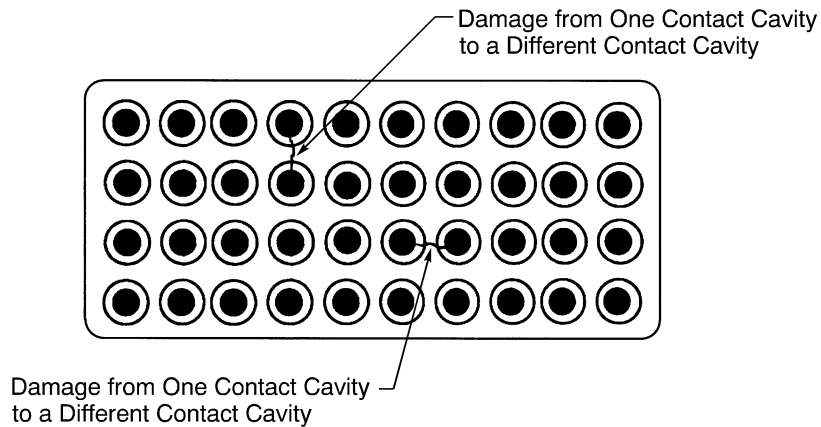
- The depth of the damage extends farther than the bottom of the outer seal web; refer to Figure 1
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 2.

Depth of the Damage That is not Farther Than the Bottom of the Seal Web



REAR FACE OF THE CONNECTOR - DEPTH OF DAMAGE

Figure 1



REAR FACE OF THE CONNECTOR - LENGTH OF DAMAGE

Figure 2

B. Damage Conditions - Front Face of the Connector

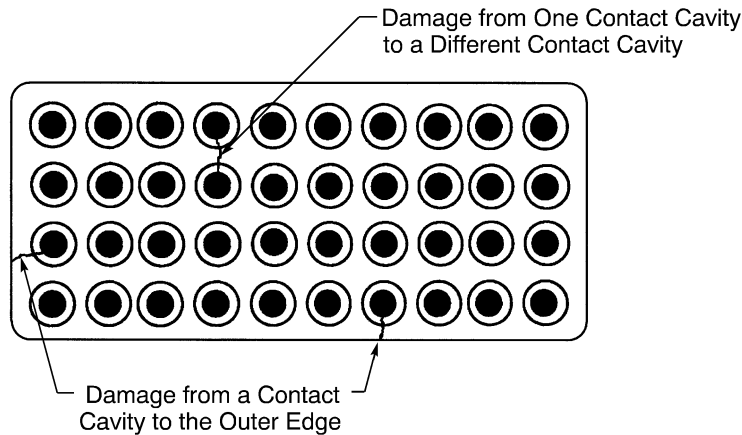
The connector must be replaced when one or more of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS



FRONT FACE OF THE CONNECTOR - LENGTH OF DAMAGE

Figure 3

C. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. for a satisfactory seal of a contact cavity
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

Connector	Contact Cavity Size	Minimum Wire O.D. (inch)
BACC65AJ	20	0.033
	16	0.068
BACC65AK	20	0.033
	16	0.068
S280W557-1	22	0.033
	20	0.033
	16	0.068
S280W557-2	22	0.033
	20	0.033
	16	0.068

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

2. PART NUMBERS AND DESCRIPTION

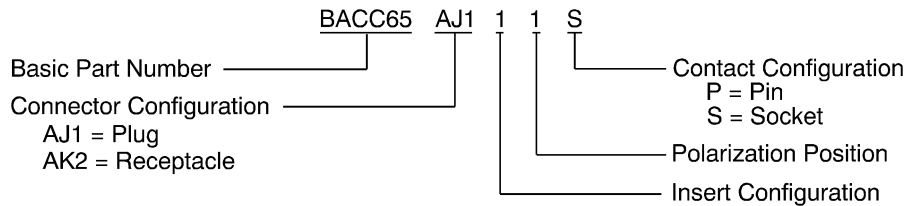
A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

Boeing Standard	Configuration	Supplier
BACC65AJ()	Plug	Viking Electronics
BACC65AK()	Receptacle	Viking Electronics
S280W557-1()	Plug	Viking Electronics
S280W557-2()	Receptacle	Viking Electronics

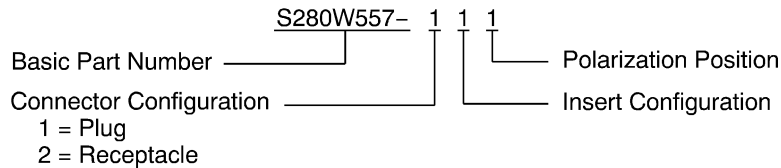
**Table 3
ALTERNATIVE CONNECTOR PART NUMBERS**

Specified Connector	Alternative Connector
S280W557-1()	BACC65AJ1()S
S280W557-2()	BACC65AK2()P



BACC65AJ() AND BACC65AK() CONNECTOR PART NUMBER STRUCTURE

Figure 4



S280W557-() CONNECTOR PART NUMBER STRUCTURE

Figure 5

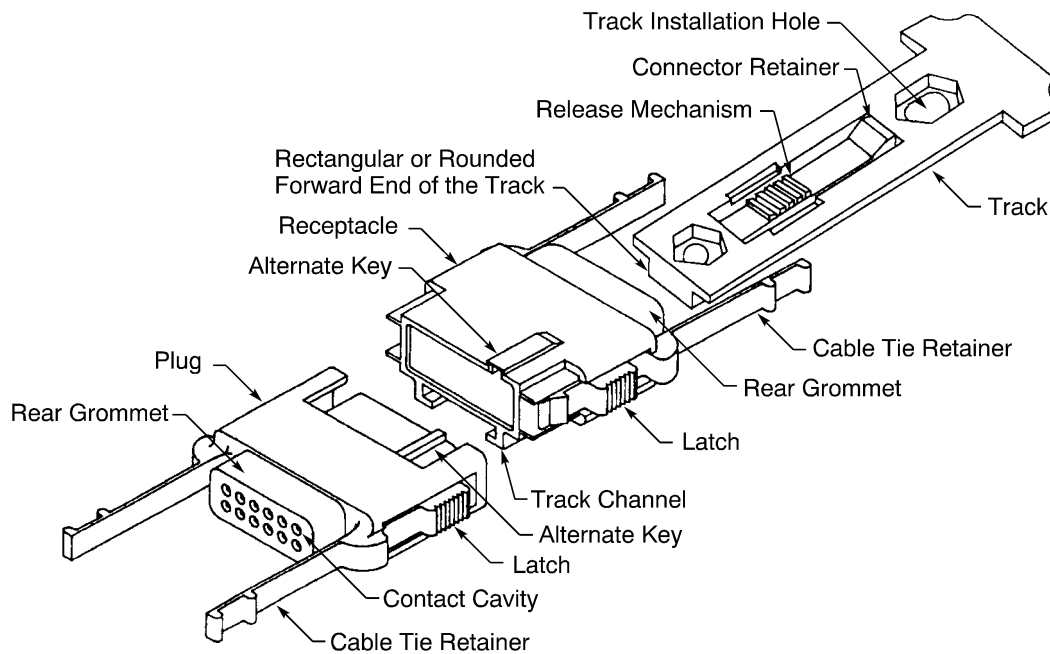
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

B. Connector Description

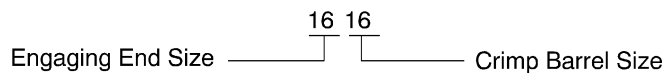
The connectors have these technical features:

- A plastic, rectangular shell
- A rectangular insert configuration
- An environmental seal
- A cable tie retainer
- Rear release, rear removable contacts
- A plug with socket contacts
- A receptacle with pin contacts
- An integral track channel for installation on a track
- A separate installation track
- A polarization key position
- A latch for quick disconnection of the plug and receptacle
- The BACC65AJ() plug can be connected to the S280W557-2() receptacle
- The S280W557-1() plug can be connected to the BACC65AK() receptacle.



BACC65AJ AND BACC65AK CONNECTORS
Figure 6

C. Contact Part Numbers



EXAMPLE OF CONTACT SIZE
Figure 7

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

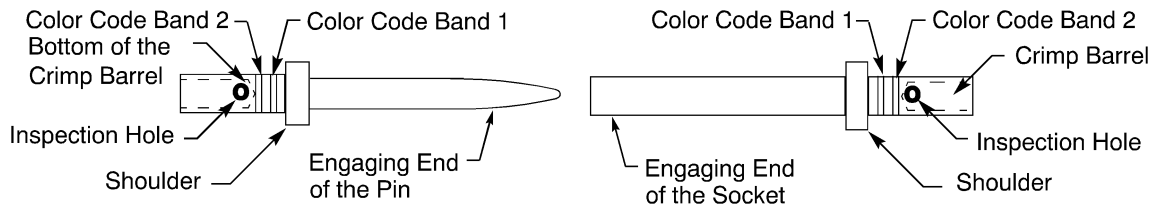
NOTE: The size 2020HD contact has a size 20 engaging end and a size 20 crimp barrel.

**Table 4
CONTACT PART NUMBERS**

Contact Size	Engaging End Size	Crimp Barrel Size	Contact Type	Boeing Standard	Color Code	
					Band	Color
2020HD	20	20	Pin	BACC47EF2	1	Orange
					2	Red
			Socket	BACC47EG2	1	Orange
					2	Red
1616	16	16	Pin	BACC47EF3	1	Orange
					2	Blue
			Socket	BACC47EG3	1	Orange
					2	Blue

**Table 5
APPROVED SUPPLIERS OF BOEING STANDARD CONTACTS**

Contact	Supplier
BACC47EF()	AMP
	ITT Cannon
	Radiall
	Souriau
	Tri-Star
BACC47EG()	AMP
	ITT Cannon
	Radiall
	Souriau
	Tri-Star



**CONTACTS
Figure 8**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

D. Track Part Numbers

**Table 6
TRACK PART NUMBERS**

Boeing Standard	Configuration	Supplier
BACT44E1S	Straight	Viking Electronics
S280W557-1	Straight	Viking Electronics

**Table 7
ALTERNATIVE TRACK PART NUMBERS**

Specified Track	Alternative Track
BACT44E1S	S280W557-1
S280W557-1	BACT44E1S

3. INSERT CONFIGURATIONS

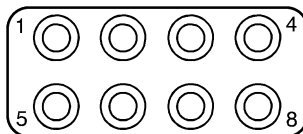
A. BACC65AJ, BACC65AK, S280W557-1, and S280W557-2 Connectors

NOTE: The contact cavity size that is specified in Table 8 is equivalent to the size of the engaging end of the contact.

**Table 8
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
1	8	16	Figure 9
2	8	20	Figure 10
3	4	20	Figure 11
	8	16	
4	12	20	Figure 12
5	16	16	Figure 13
6	18	20	Figure 14
7	24	20	Figure 15

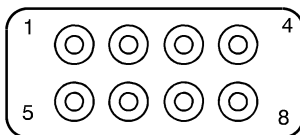
NOTE: Figure 9 through Figure 15 show the rear side of an insert that has pin contacts. The view of the rear side of an insert that has socket contacts is a mirror image of this view.



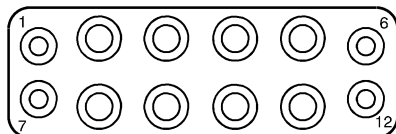
**INSERT CONFIGURATION 1
Figure 9**

STANDARD WIRING PRACTICES MANUAL

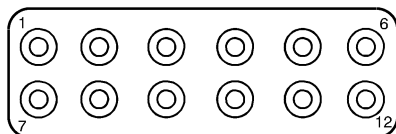
ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS



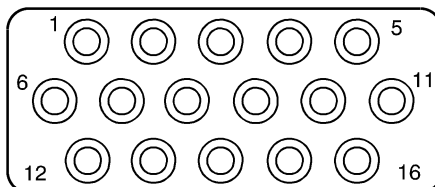
INSERT CONFIGURATION 2
Figure 10



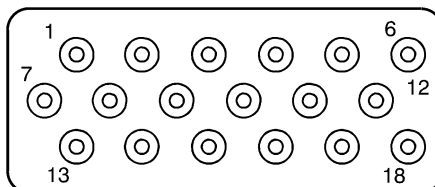
INSERT CONFIGURATION 3
Figure 11



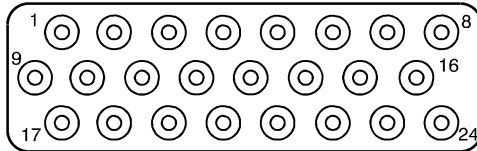
INSERT CONFIGURATION 4
Figure 12



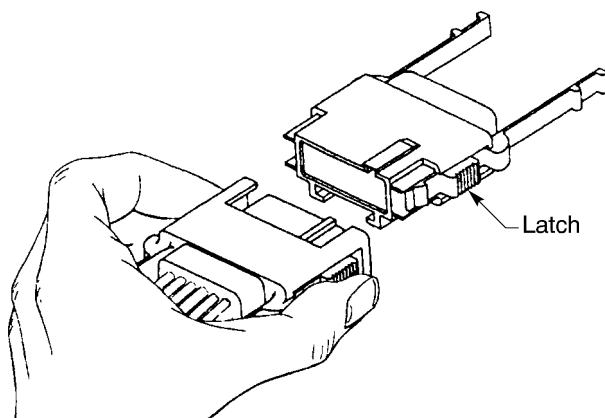
INSERT CONFIGURATION 5
Figure 13



INSERT CONFIGURATION 6
Figure 14

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS**

INSERT CONFIGURATION 7
Figure 15

4. CONNECTOR DISASSEMBLY**A. Connector Separation**

CONNECTOR SEPARATION
Figure 16

Refer to Figure 16.

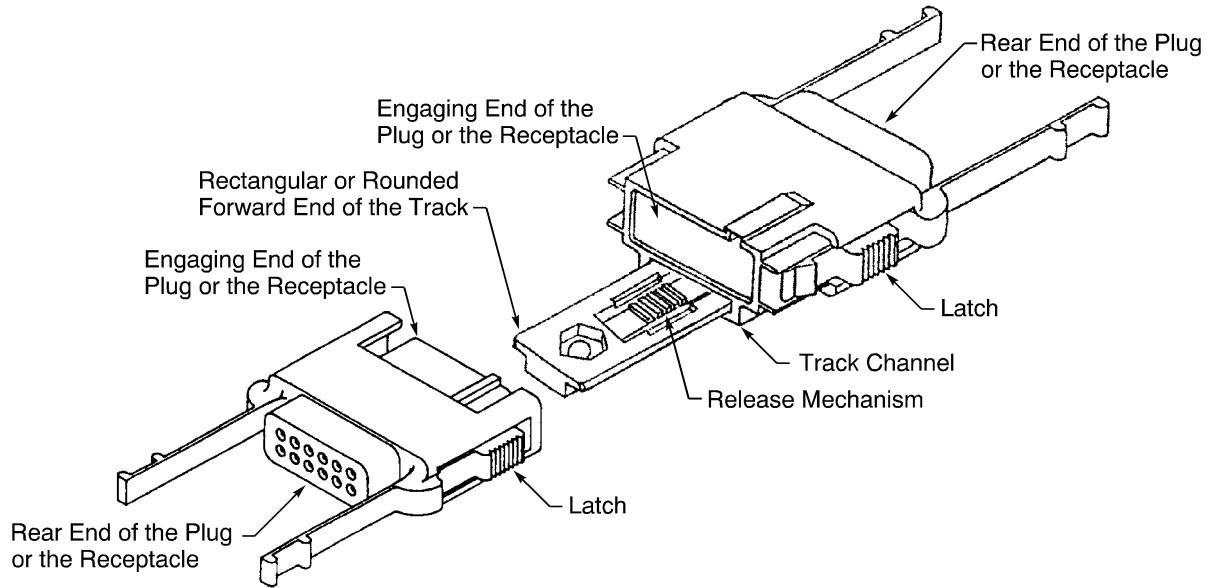
- (1) Push the latches on each side of one of the connectors.
- (2) Pull one connector away from the mating connector.

B. Removal of a Connector from a Track

- (1) Push the connector release mechanism down. Refer to Figure 17.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS



LOCATION OF THE RELEASE MECHANISM ON THE TRACK
Figure 17

- (2) Hold the mechanism down.
- (3) Move the connector forward until the edge of the front face of the connector makes an overlap with the edge of the release mechanism.
- (4) Release the mechanism.
- (5) Push the connector forward until it comes off the track.

C. Contact Removal

Table 9
CONTACT REMOVAL TOOLS

Contact Size	Removal Tool
2020HD	282-891
	91066-4
	CIET-20HDL
	DAK125
	M81969/1-02
	MS3156-20

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

Table 9 (continued)

Contact Size	Removal Tool
1616	282-892
	91066-3
	CET-16-15
	DRK83-16
	M81969/1-03
	MS3156-16

- (1) Make a selection of a contact removal tool from Table 9.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK. DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS CAN OCCUR.

WARNING: A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK CAN CAUSE INJURY TO PERSONNEL.

- (2) If it is necessary, carefully cut the plastic tie strap or the wire harness tie that holds the wire harness to the cable tie retainer.
- (3) Put the wire into the slot of the tool.
- (4) At the rear of the connector, axially align the removal tool and the contact cavity.
- (5) Carefully push the tool into the contact cavity until it stops.
- (6) If the O.D. of the wire is too large for the removal tool to go into the contact cavity, replace the contact. Refer to Subject 20-63-00.
- (7) Carefully pull the wire and the tool out of the contact cavity at the same time.

CAUTION: DO NOT PULL THE WIRE AND THE REMOVAL TOOL WITH TOO MUCH FORCE. DAMAGE TO THE CONTACT RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (8) If the removal tool does not release the contact from the contact cavity, do these steps a maximum of 3 times:
 - (a) Carefully pull the tool out of the contact cavity.
 - (b) Turn the tool approximately 90 degrees.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (c) Do Step (3) through Step (7) again.
- (9) If the contact cannot be removed, replace the contact. Refer to Subject 20-63-00.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

D. Seal Plug and Seal Rod Removal

**Table 10
NECESSARY TOOLS**

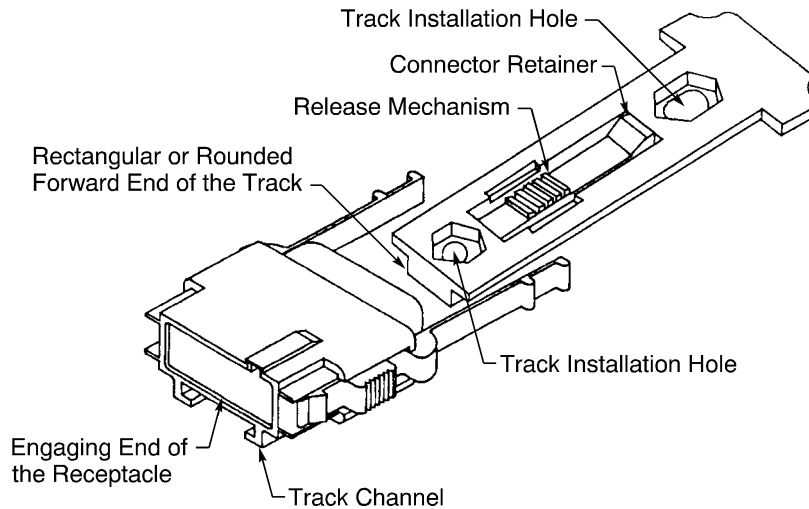
Tool	Type
Pliers	Needle Nose

- (1) Make a selection of pliers from Table 10.

CAUTION: MAKE SURE THAT THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, carefully cut the plastic tie strap or the wire harness tie that holds the wire harness to the cable tie retainer.
- (3) Tightly hold the end of the seal plug or the seal rod in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod out of the contact cavity.

E. Removal of a Track from the Structure



**TRACK REMOVAL
Figure 18**

Refer to Figure 18.

- (1) Remove the two installation screws that hold the track on the structure or the stringer clip.

NOTE: The stringer clip has an insert with threads for the installation screw.

- (2) Put the screws and the washers in a safe area because they are necessary when the track is installed again.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

5. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 11
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	20HD	0.28	± 0.03	-
	16	0.56	± 0.03	Fold the conductor back
22	20HD	0.28	± 0.03	-
	16	0.56	± 0.03	Fold the conductor back
20	20HD	0.28	± 0.03	-
	16	0.28	± 0.03	-
18	16	0.28	± 0.03	-
16	16	0.28	± 0.03	-

**Table 12
CONTACT CRIMP TOOLS**

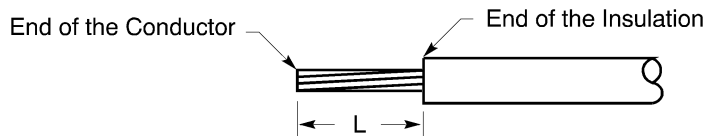
Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20HD	GVF-101	5	-	-
		M22520/2-01	5	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	5	M22520/2-08	-
		WA22LC	5	M22520/2-08	-
22	20HD	GVF-101	5	-	-
		M22520/2-01	6	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	6	M22520/2-08	-
		WA22LC	6	M22520/2-08	-
	16	M22520/1-01	4	M22520/1-02	Blue

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

Table 12 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
20	20HD	GVF-101	5	-	-
		M22520/2-01	7	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	7	M22520/2-08	-
		WA22LC	7	M22520/2-08	-
	16	M22520/1-01	4	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	4	M22520/1-02	Blue
	18	16	M22520/1-01	5	M22520/1-02
ST2220-1-Y			-	ST2220-1-2	-
WA27F			5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	6	M22520/1-02	Blue



WIRE PREPARATION
Figure 19

- (1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 19
- Table 11 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.

NOTE: If the wire size and a larger crimp barrel size are not given in Table 11, refer to Subject 20-60-00.

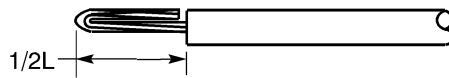
- (2) Measure the O.D. of the wire.
- (3) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.C.

Make sure that a Raychem RT-850 heat shrinkable sleeve is used to increase the O.D. of a 24 AWG wire installed in a size 20 contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

(4) If it is specified, fold the conductor back. Refer to Figure 20.



FOLDED BACK CONDUCTOR

Figure 20

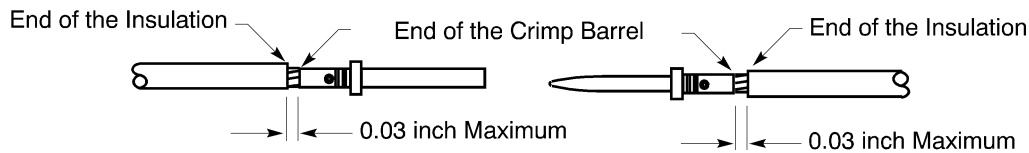
NOTE: As an alternative, the conductor size can be increased with filler wires or an eyelet. Refer to Subject 20-60-00.

(5) Make a selection of a crimp tool from Table 12.

(6) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 21.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT

Figure 21

(7) Crimp the contact.

(8) Examine the contact assembly for these types of damage:

- A crack in the crimp barrel
- Broken strands of the conductor
- Base metal can be seen on the strands of the conductor.

B. Contact Insertion

**Table 13
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
2020HD	282-881
	91066-4
	ATC1072
	CIET-20HDL
	DAK145J
	M81969/1-02
	MS3156-20

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

Table 13 (continued)

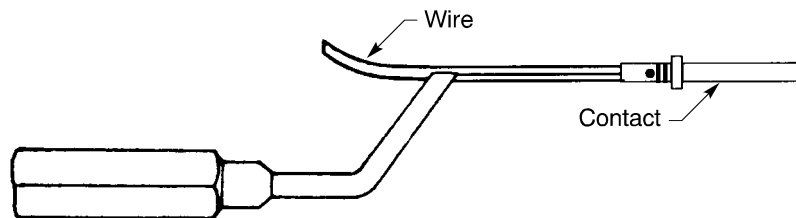
Contact Size	Insertion Tool
1616	282-892
	282-929
	91066-3
	ATR1106
	DAK55-16
	M81969/1-03
	MS3156-16

- (1) Make a selection of a contact insertion tool from Table 13.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK. DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS CAN OCCUR.

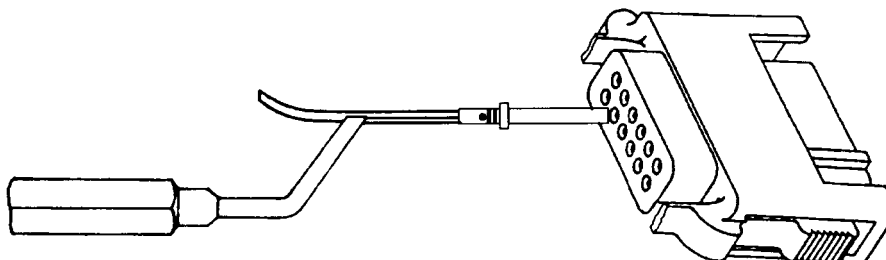
WARNING: A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK CAN CAUSE INJURY TO PERSONNEL.

- (2) Put the contact assembly in the end of the insertion tool. Refer to Figure 22.



POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL
Figure 22

- (3) At the rear of the connector, axially align the contact, the tool, and the correct contact cavity. Refer to Figure 23.



ALIGNMENT OF THE CONTACT, THE INSERTION TOOL, AND THE CONTACT CAVITY
Figure 23

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS**

- (4) Carefully push the tool into the contact cavity until it stops.
- (5) Carefully pull the tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL ON THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the cavity.
 - (b) Do Step (2) through Step (6) again.
- (8) Examine the rear grommet for damage. Refer to Paragraph 1.A.

C. Unwired Contact Installation

Refer to Subject 20-60-08.

If it is necessary to install unwired contacts:

- (1) Make a selection of a contact insertion tool from Table 13.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK. DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS CAN OCCUR.

WARNING: A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK CAN CAUSE INJURY TO PERSONNEL.

- (2) Put the contact in the contact cavity.
- (3) Axially align the contact and the tool with the correct contact cavity.
- (4) Carefully push the tool into the contact cavity until it stops.
- (5) Carefully pull the tool out of the contact cavity.

D. Seal of an Empty Contact Cavity

Empty contact cavities in these connectors must be sealed with an unwired pin contact and a seal plug or a seal rod:

- BACC65AK
- S280W557-2().

For all other connectors, empty contact cavities must be sealed with a seal plug or a seal rod.

Refer to Subject 20-60-08.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

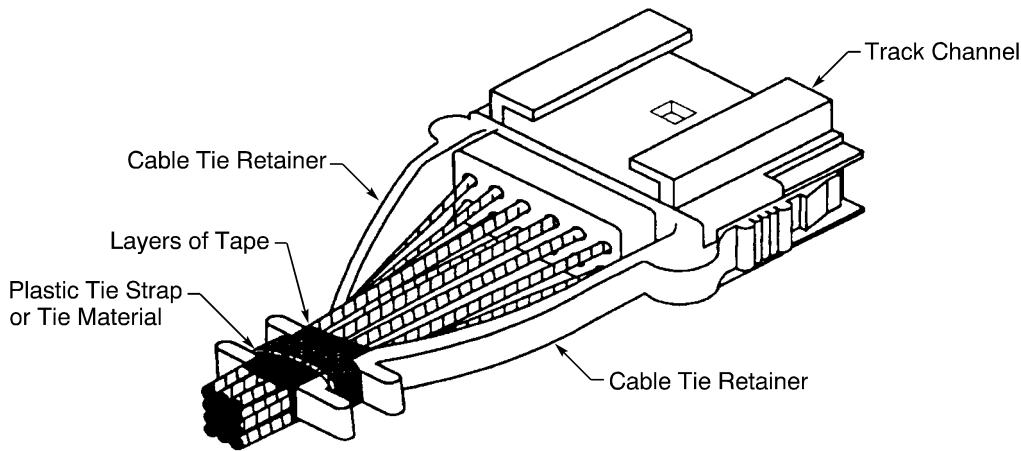
E. Assembly of a Wire Harness Strain Relief

**Table 14
NECESSARY MATERIALS**

Material	Boeing Standard	Part Number	Supplier
Tape	Douglas Material Specification, DMS 2186, Type 1	-	QPL
Tape	-	Scotch 70	3M

**Table 15
NECESSARY PARTS**

Part	Boeing Standard	Part Number	Supplier
Plastic Tie Strap	BACS38K1	-	Panduit
		-	Tyton
	-	M23190/3-1	QPL



POSITION OF THE PLASTIC TIE STRAP OR TIE MATERIAL

Figure 24

- (1) If it is not necessary to assemble the wire harness strain relief, cut each cable tie retainer as near the connector as possible.
Make sure that the remaining length of each retainer:
 - Has no sharp edges
 - Is not more than 0.20 inch.
- (2) Make a selection of a tape from Table 14.
- (3) Put a minimum of 2 layers of the tape around the wire bundle at the location adjacent to the cable tie retainer when the retainer is in the correct position.
- (4) Attach the wire bundle to the cable tie retainer with a wire harness tie.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS**

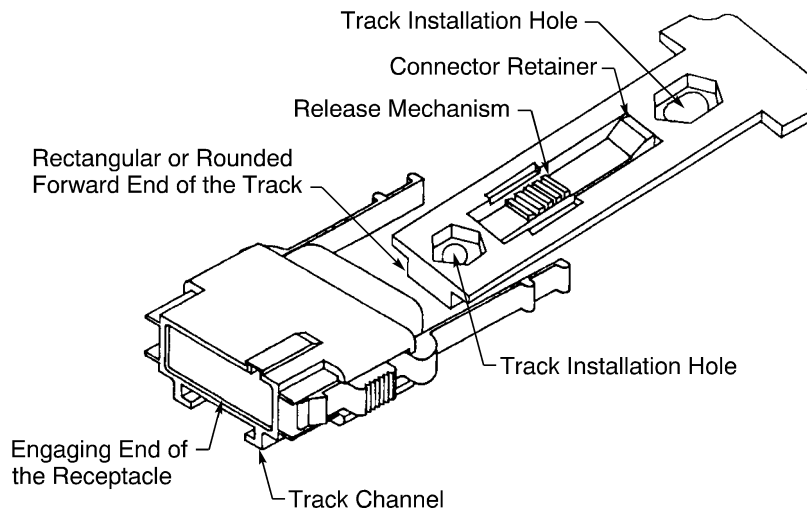
Refer to:

- Figure 24
- Subject 20-10-11 for the assembly of a wire harness tie.

(5) Examine each cable tie retainer.

Make sure that the retainer:

- Is not broken
- Does not have a crack.

6. CONNECTOR INSTALLATION**A. Installation of a Track****TRACK INSTALLATION****Figure 25**

Refer to Figure 25.

- (1) Align the installation holes in the track and the holes in the structure.
- (2) Install the track to the structure with the necessary installation screws and washers.

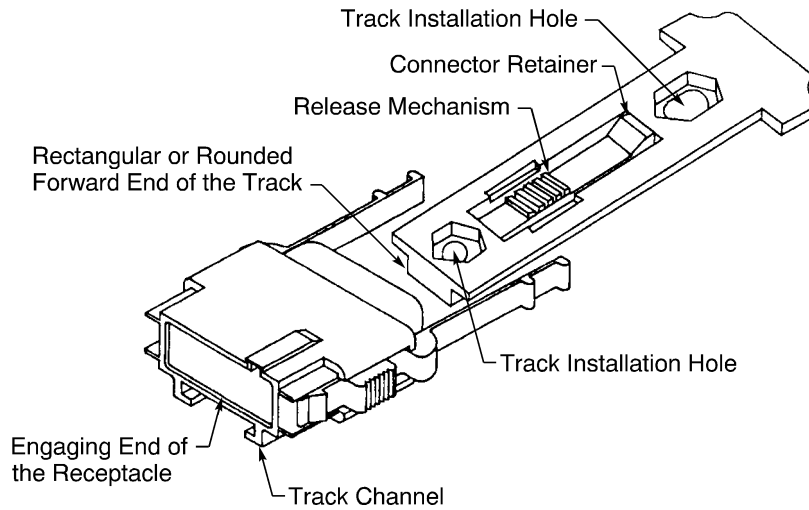
Make sure that:

- The forward end of the track is pointed in the same direction as the engaging end of the connector
- The screws are tight.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

B. Installation of a Connector on a Track



CONNECTOR INSTALLATION ON A TRACK
Figure 26

Refer to Figure 26.

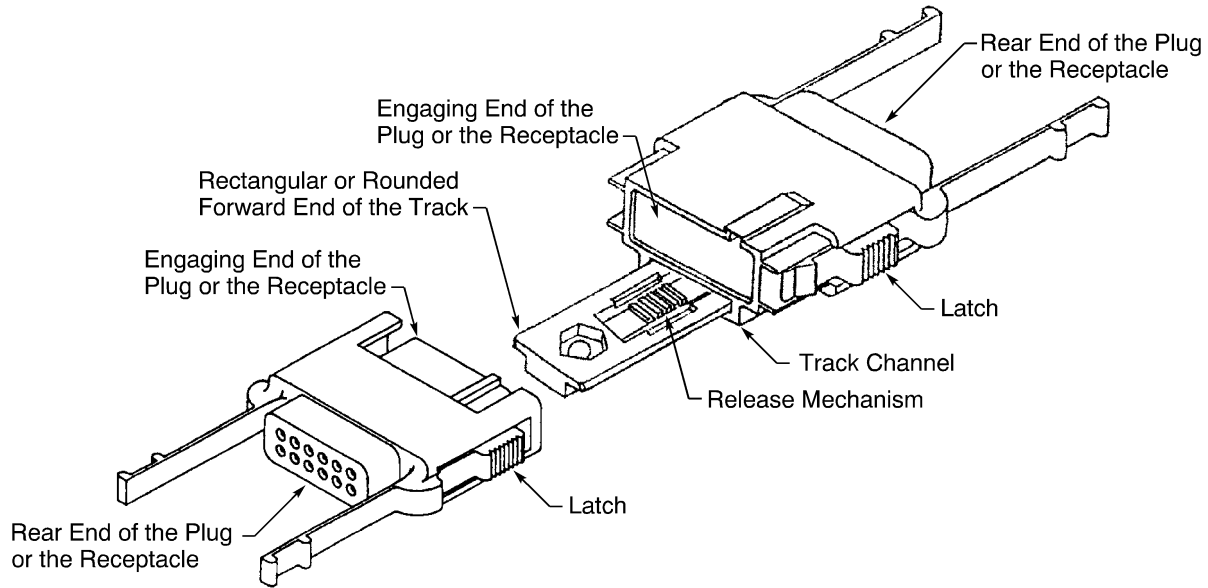
- (1) Put the track channel at the rear end of the connector on the forward end of the track.
- (2) Push the connector to the rear end of the track until it makes a click.
- (3) Lightly pull the connector forward to make sure that it is locked in the track.

C. Plug and Receptacle Connection

This paragraph gives the procedure to connect a plug or a receptacle, with a mating plug or a mating receptacle installed on a track.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS



PLUG AND RECEPTACLE CONNECTION

Figure 27

Refer to Figure 27.

- (1) Put the track channel at the engaging end of the connector on the forward end of the track.
- (2) Push the connector to the rear end of the track until the latches on each side of the plug and the receptacle are locked.
- (3) Lightly pull back on the connector to make sure that it locks to the connector on the track.

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 16
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
282-891	Radiall-Sogie
282-892	Radiall-Sogie
91066-3	AMP
91066-4	AMP
CET-16-15	ITT Cannon
CIET-20HDL	ITT Cannon
DAK125	Daniels
DRK83-16	Daniels
M81969/1-02	QPL
M81969/1-03	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

Table 16 (continued)

Removal Tool	Supplier
MS3156-16	QPL
MS3156-20	QPL

B. Contact Crimp Tools

**Table 17
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
GVF-101	Gaard
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-08	QPL
ST2220-1-2	Boeing
ST2220-1-43	Boeing
ST2220-1-Y	Boeing
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels

C. Contact Insertion Tools

**Table 18
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
282-881	Radiall-Sogie
282-892	Radiall-Sogie
282-929	Radiall-Sogie
91066-3	AMP
91066-4	AMP
ATC1072	Astro
ATR1106	Astro
CIET-20HDL	ITT Cannon
DAK145J	Daniels



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AJ, BACC65AK, S280W557-1, AND S280W557-2 CONNECTORS

Table 18 (continued)

Insertion Tool	Supplier
DAK55-16	Daniels
M81969/1-02	QPL
M81969/1-03	QPL
MS3156-16	QPL
MS3156-20	QPL

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ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

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	C. Minimum Wire O.D. for an Environmentally Sealed Connector	2
2.	<u>PART NUMBERS AND DESCRIPTION</u>	3
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ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

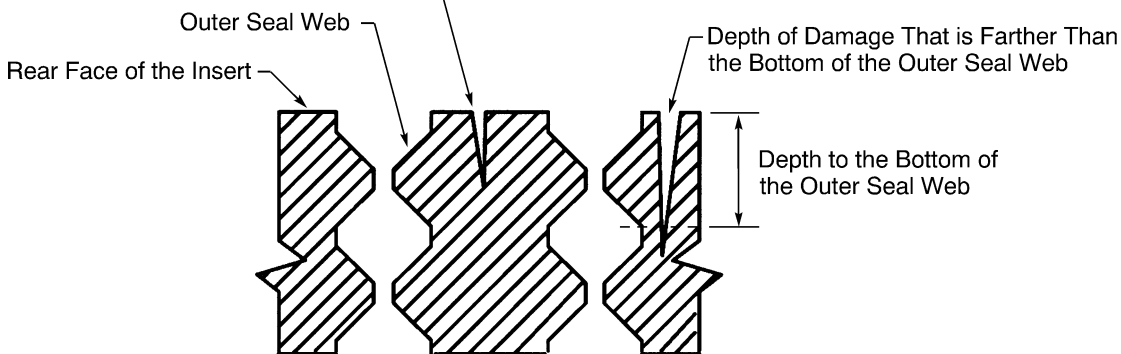
1. GENERAL DATA

A. Damage Conditions - Rear Face of the Connector

The connector must be replaced when one or more of these conditions occur:

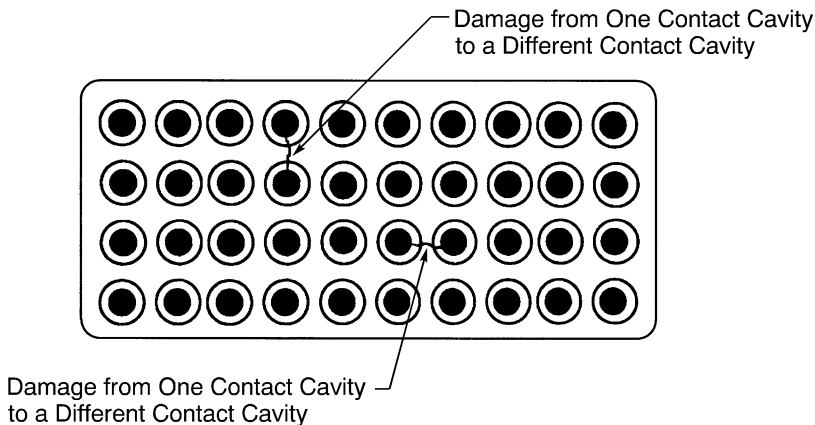
- The depth of the damage extends farther than the bottom of the outer seal web; refer to Figure 1
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 2.

Depth of the Damage That is not Farther Than the Bottom of the Seal Web



REAR FACE OF THE CONNECTOR - DEPTH OF DAMAGE

Figure 1



REAR FACE OF THE CONNECTOR - LENGTH OF DAMAGE

Figure 2

B. Damage Conditions - Front Face of the Connector

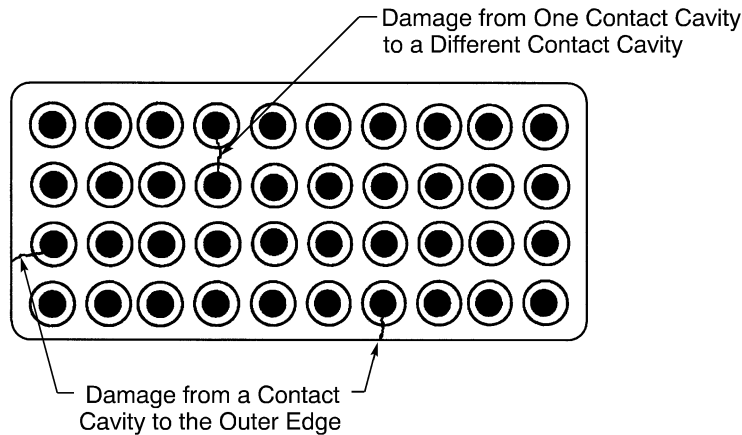
The connector must be replaced when one or more of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL

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FRONT FACE OF THE CONNECTOR - LENGTH OF DAMAGE
Figure 3

C. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
BACC65AL	Rear release, rear removal contacts	20	0.033
		16	0.068
002368-0802	Rear release, rear removal contacts	20	0.033
		16	0.068
S280W557-801	Rear release, rear removal contacts	20	0.033
		16	0.068
S280W557-802	Rear release, rear removal contacts	20	0.033
		16	0.068

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

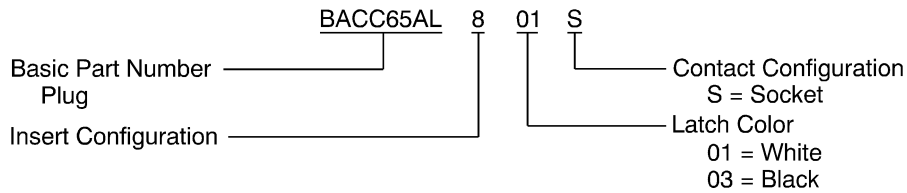
Part Number	Configuration	Supplier
BACC65AL()	Plug	Boeing
002368-0802	Receptacle	Viking Electronics
S280W557-801	Plug	Boeing
S280W557-802	Receptacle	Boeing

**Table 3
APPROVED SUPPLIER OF BOEING STANDARD CONNECTORS**

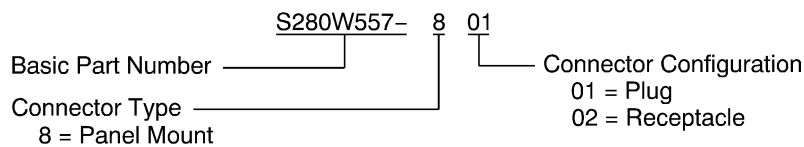
Connector	Supplier
BACC65AL()	Viking Electronics
S280W557-801	Viking Electronics
S280W557-802	Viking Electronics

**Table 4
ALTERNATIVE CONNECTOR PART NUMBERS**

Specified Connector	Mating Connector	Alternative Connector
S280W557-801	LC2R20640	BACC65AL801S
	S280W557-802	BACC65AL803S
S280W557-802	S280W557-801	002368-0802



**BACC65AL() CONNECTOR PART NUMBER STRUCTURE
Figure 4**



**S280W557-8() CONNECTOR PART NUMBER STRUCTURE
Figure 5**

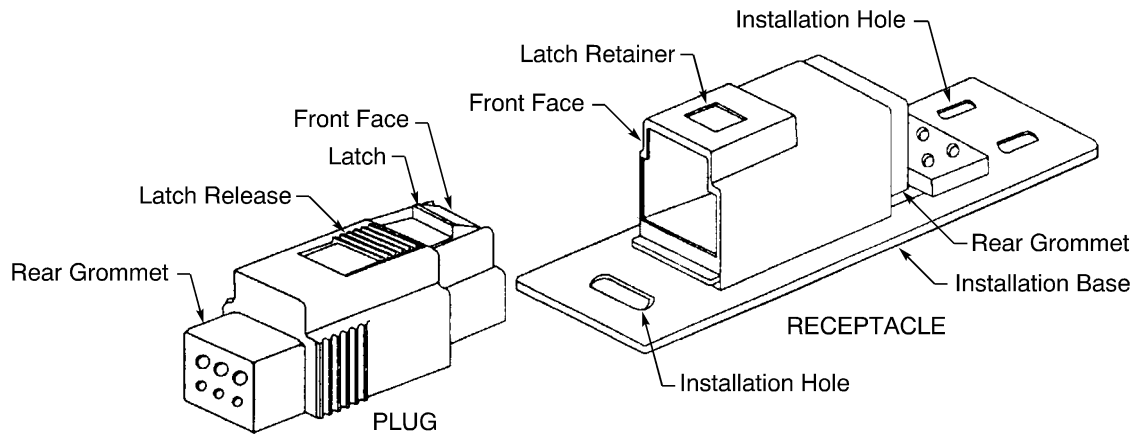
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ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

B. Connector Description

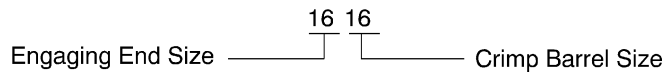
The connectors have these technical features:

- A plastic, rectangular shell
- A rectangular insert configuration
- An environmental seal
- Rear release, rear removable contacts
- A plug with socket contacts
- A receptacle with pin contacts
- An integral installation base on the receptacle
- A latch for quick disconnection of the plug and receptacle.



002368-0802, BACC65AL, AND S280W557-8() CONNECTORS
Figure 6

C. Contact Part Numbers



EXAMPLE OF CONTACT SIZE
Figure 7

NOTE: The size 2020HD contact has a size 20 engaging end and a size 20 crimp barrel.

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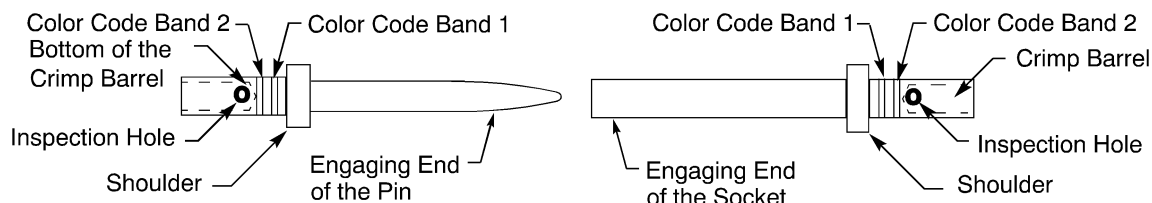
ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

**Table 5
CONTACT PART NUMBERS**

Contact Size	Engaging End Size	Crimp Barrel Size	Contact Type	Boeing Standard	Color Code	
					Band	Color
2020HD	20	20	Pin	BACC47EF2	1	Orange
					2	Red
			Socket	BACC47EG2	1	Orange
					2	Red
1616	16	16	Pin	BACC47EF3	1	Orange
					2	Blue
			Socket	BACC47EG3	1	Orange
					2	Blue

**Table 6
APPROVED SUPPLIERS OF BOEING STANDARD CONTACTS**

Contact	Supplier
BACC47EF()	AMP
	ITT Cannon
	Radiall
	Souriau
	Tri-Star
BACC47EG()	AMP
	ITT Cannon
	Radiall
	Souriau
	Tri-Star



**CONTACTS
Figure 8**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

3. INSERT CONFIGURATIONS AND POLARIZATION

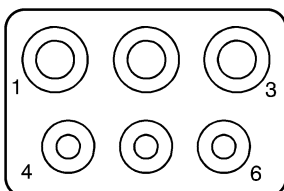
A. 002368-0802, BACC65AL, and S280W557-8 Connectors

NOTE: The contact cavity size that is specified in Table 7 is equivalent to the size of the engaging end of the contact.

**Table 7
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
8	3	20	Figure 9
	3	16	

NOTE: Figure 9 shows the rear side of an insert that has pin contacts. The view of the rear side of an insert that has socket contacts is a mirror image of this view.

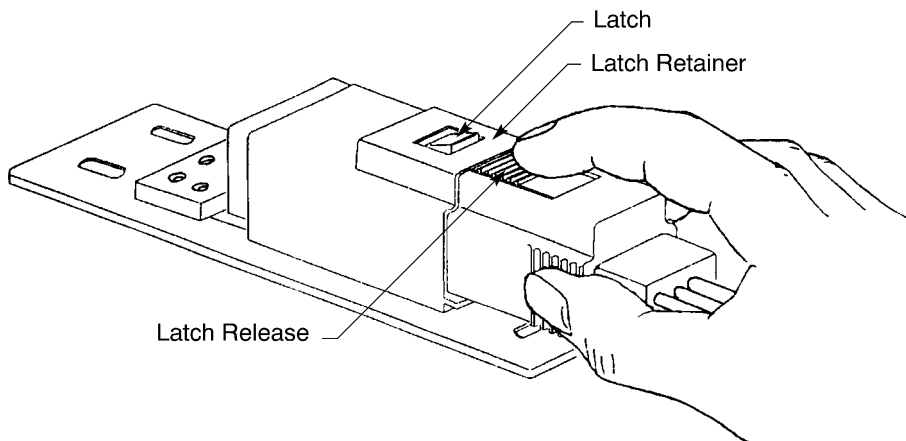


**INSERT CONFIGURATION 8
Figure 9**

4. CONNECTOR DISASSEMBLY

A. Connector Separation

(1) Put the hand in the correct position on the plug. Refer to Figure 10.

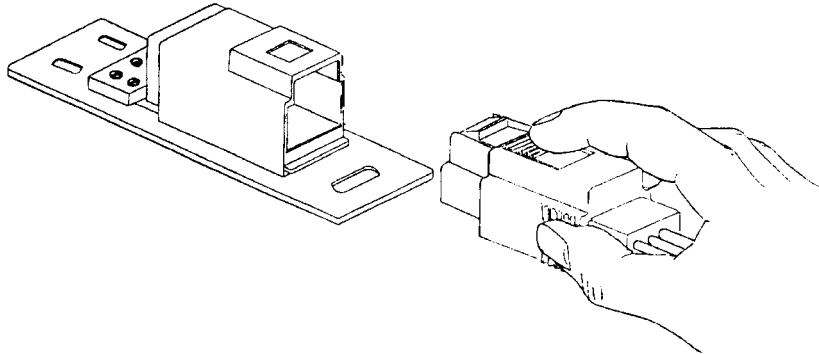


**POSITION OF THE HAND ON THE PLUG
Figure 10**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

- (2) Push and hold down the latch release.
Make sure that the latch moves below the latch retainer of the receptacle.
- (3) Pull the plug away from the receptacle. Refer to Figure 11.



CONNECTOR SEPARATION
Figure 11

B. Contact Removal

Table 8
CONTACT REMOVAL TOOLS

Contact Size	Removal Tool
2020HD	282-891
	91066-4
	CIET-20HDL
	DAK125
	M81969/1-02
	MS3156-20
1616	282-892
	91066-3
	CET-16-15
	DRK83-16
	M81969/1-03
	MS3156-16

- (1) Make a selection of a contact removal tool from Table 8.

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ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK. DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS CAN OCCUR.

WARNING: A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK CAN CAUSE INJURY TO PERSONNEL.

- (2) If it is necessary, carefully cut the plastic tie strap or the wire harness tie near the end of the wire harness.
- (3) Put the wire into the slot of the tool.
- (4) At the rear of the connector, axially align the removal tool and the contact cavity.
- (5) Carefully push the tool into the contact cavity until it stops.
- (6) If the O.D. of the wire is too large for the removal tool to go into the contact cavity, replace the contact. Refer to Subject 20-63-00.
- (7) Carefully pull the wire and the tool out of the contact cavity at the same time.

CAUTION: DO NOT PULL THE WIRE AND THE REMOVAL TOOL WITH TOO MUCH FORCE. DAMAGE TO THE CONTACT RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (8) If the removal tool does not release the contact from the contact cavity, do these steps a maximum of 3 times:
 - (a) Carefully pull the tool out of the contact cavity.
 - (b) Turn the tool approximately 90 degrees.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (c) Do Step (3) through Step (7) again.
- (9) If the contact cannot be removed, replace the contact. Refer to Subject 20-63-00.

C. Seal Plug and Seal Rod Removal

**Table 9
NECESSARY TOOLS**

Tool	Type
Pliers	Needle Nose

- (1) Make a selection of pliers from Table 9.

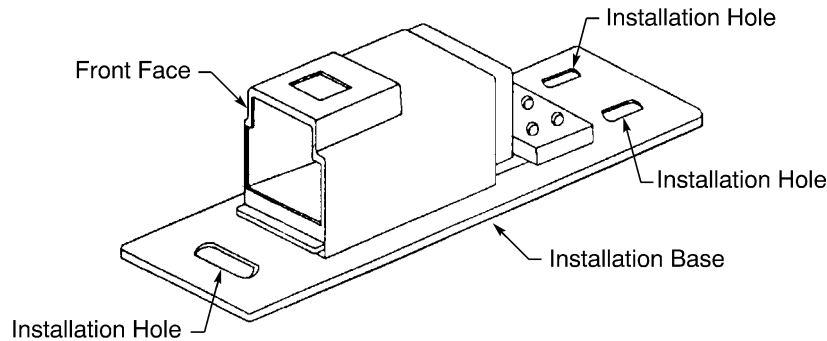
CAUTION: MAKE SURE THAT THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, carefully cut the plastic tie strap or the wire harness tie near the end of the wire harness.
- (3) Tightly hold the end of the seal plug or the seal rod in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod out of the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

D. Removal of the Receptacle from the Structure



RECEPTACLE REMOVAL
Figure 12

Refer to Figure 12.

- (1) Remove the installation screws that hold the installation base on the structure.
- (2) Put the screws and the washers in a safe area because they are necessary when the receptacle is installed again.

5. CONNECTOR ASSEMBLY

A. Contact Assembly

Table 10
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	20HD	0.28	± 0.03	-
	16	0.56	± 0.03	Fold the conductor back
22	20HD	0.28	± 0.03	-
	16	0.56	± 0.03	Fold the conductor back
20	20HD	0.28	± 0.03	-
	16	0.28	± 0.03	-
18	16	0.28	± 0.03	-
16	16	0.28	± 0.03	-



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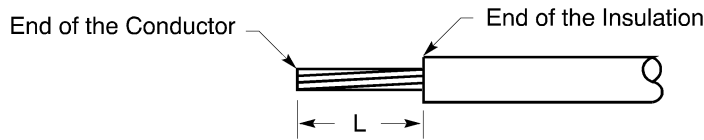
**Table 11
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20HD	GVF-101	5	-	-
		M22520/2-01	5	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	5	M22520/2-08	-
		WA22LC	5	M22520/2-08	-
22	20HD	GVF-101	5	-	-
		M22520/2-01	6	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	6	M22520/2-08	-
	WA22LC	6	M22520/2-08	-	
	16	M22520/1-01	4	M22520/1-02	Blue
20	20HD	GVF-101	5	-	-
		M22520/2-01	7	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	7	M22520/2-08	-
		WA22LC	7	M22520/2-08	-
	16	M22520/1-01	4	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	4	M22520/1-02	Blue
18	16	M22520/1-01	5	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	6	M22520/1-02	Blue

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ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS



WIRE PREPARATION
Figure 13

- (1) Remove the necessary length of insulation from the end of the wire.

Refer to:

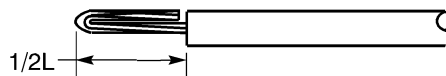
- Figure 13
- Table 10 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.

NOTE: If the wire size and a larger crimp barrel size are not given in Table 10, refer to Subject 20-60-00.

- (2) Measure the O.D. of the wire.
- (3) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.C.

Make sure that a Raychem RT-850 heat shrinkable sleeve is used to increase the O.D. of a 24 AWG wire installed in a size 20 contact cavity.

- (4) If it is specified, fold the conductor back. Refer to Figure 14.



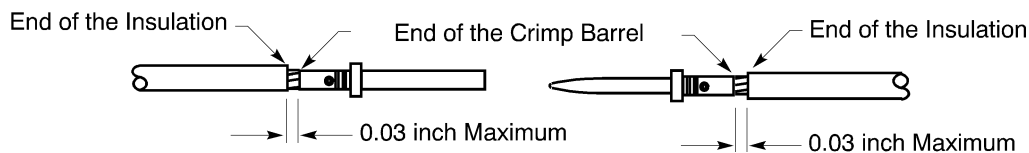
FOLDED BACK CONDUCTOR
Figure 14

NOTE: As an alternative, the conductor size can be increased with filler wires or an eyelet. Refer to Subject 20-60-00.

- (5) Make a selection of a crimp tool from Table 11.
- (6) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 15.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 15

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ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS

- (7) Crimp the contact.
- (8) Examine the contact assembly for these types of damage:
 - A crack in the crimp barrel
 - Broken strands of the conductor
 - Base metal can be seen on the strands of the conductor.

B. Contact Insertion

**Table 12
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
2020HD	282-881
	91066-4
	ATC1072
	CIET-20HDL
	DAK145J
	M81969/1-02
	MS3156-20
1616	282-892
	282-929
	91066-3
	ATR1106
	DAK55-16
	M81969/1-03
	MS3156-16

- (1) Make a selection of a contact insertion tool from Table 12.

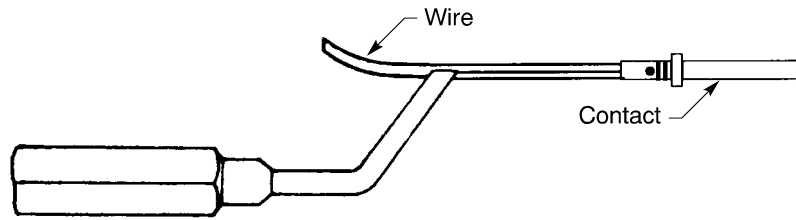
CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK. DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS CAN OCCUR.

WARNING: A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK CAN CAUSE INJURY TO PERSONNEL.

- (2) Put the contact assembly in the end of the insertion tool. Refer to Figure 16.

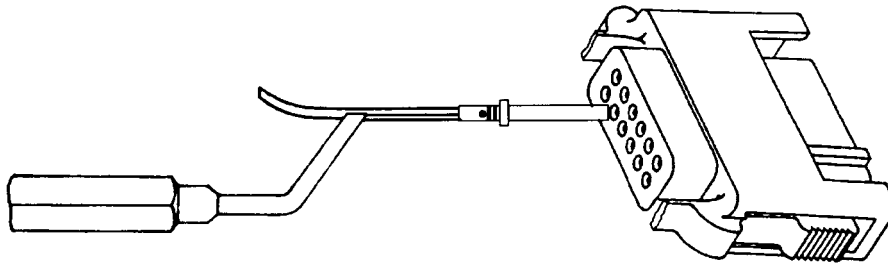
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS



POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL
Figure 16

- (3) At the rear of the connector, axially align the contact, the tool, and the correct contact cavity. Refer to Figure 17.



ALIGNMENT OF THE CONTACT, THE INSERTION TOOL, AND THE CONTACT CAVITY
Figure 17

- (4) Carefully push the tool into the contact cavity until it stops.
- (5) Carefully pull the tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL ON THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the cavity.
 - (b) Do Step (2) through Step (6) again.
- (8) Examine the rear grommet for damage. Refer to Paragraph 1.A.

C. Unwired Contact Installation

Refer to Subject 20-60-08.

If it is necessary to install unwired contacts:

- (1) Make a selection of a contact insertion tool from Table 12.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS**

CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK. DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS CAN OCCUR.

WARNING: A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK CAN CAUSE INJURY TO PERSONNEL.

- (2) Put the contact in the contact cavity.
- (3) Axially align the contact, the tool, and the correct contact cavity.
- (4) Carefully push the tool into the contact cavity until it stops.
- (5) Carefully pull the tool out of the contact cavity.

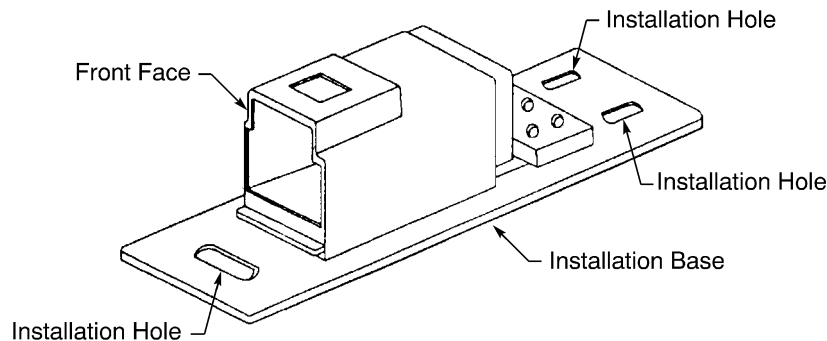
D. Seal of an Empty Contact Cavity

Empty contact cavities in these connectors must be sealed with an unwired pin contact and a seal plug or a seal rod:

- 002368-0802
- S280W557-802.

For all other connectors, empty contact cavities must be sealed with a seal plug or a seal rod.

Refer to Subject 20-60-08.

6. CONNECTOR INSTALLATION**A. Installation of a Receptacle**

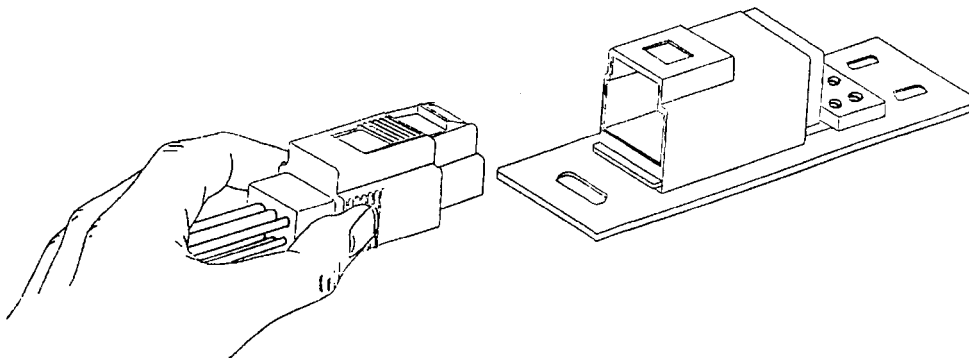
RECEPTACLE INSTALLATION
Figure 18

Refer to Figure 18.

- (1) Align the installation holes and the holes in the structure.
- (2) Install the receptacle to the structure with the necessary installation screws and washers.
Make sure that the screws are tight.

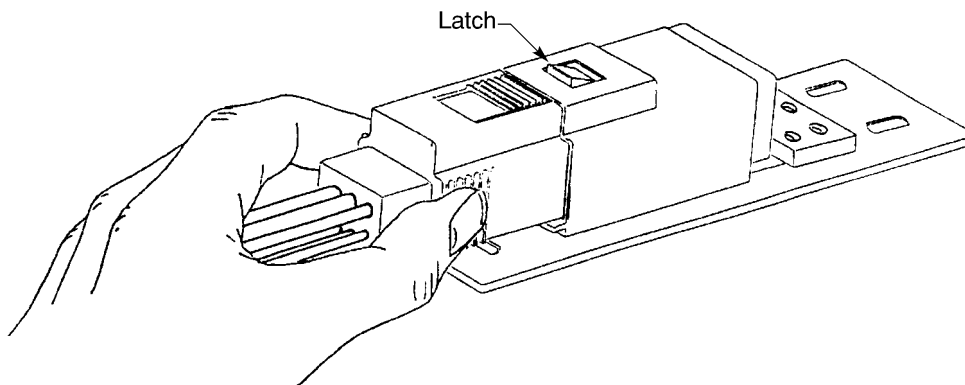
B. Plug and Receptacle Connection

- (1) Align the plug with the receptacle. Refer to Figure 19.
Make sure that the latch is aligned with the latch retainer.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF 002368-0802, BACC65AL, AND S280W557-8 CONNECTORS****ALIGNMENT OF THE PLUG AND THE RECEPTACLE****Figure 19**

- (2) Push the plug into the receptacle until:
- The plug stops
 - The latch engages the latch retainer.

Refer to Figure 20.

**PLUG AND RECEPTACLE CONNECTION****Figure 20**

- (3) Lightly pull back on the plug to make sure that it locks to the receptacle.
- (4) If the plug is not locked in the receptacle:
- (a) Remove the plug from the receptacle.
 - (b) Do Step (1) through Step (3) again.

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7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 13
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
282-891	Radiall-Sogie
282-892	Radiall-Sogie
91066-3	AMP
91066-4	AMP
CET-16-15	ITT Cannon
CIET-20HDL	ITT Cannon
DAK125	Daniels
DRK83-16	Daniels
M81969/1-02	QPL
M81969/1-03	QPL
MS3156-16	QPL
MS3156-20	QPL

B. Contact Crimp Tools

**Table 14
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
GVF-101	Gaard
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-08	QPL
ST2220-1-2	Boeing
ST2220-1-43	Boeing
ST2220-1-Y	Boeing
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels



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C. Contact Insertion Tools

Table 15
CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
282-881	Radiall-Sogie
282-892	Radiall-Sogie
282-929	Radiall-Sogie
91066-3	AMP
91066-4	AMP
CIET-20HDL	ITT Cannon
ATC1072	Astro
ATR1106	Astro
DAK145J	Daniels
DAK55-16	Daniels
M81969/1-02	QPL
M81969/1-03	QPL
MS3156-16	QPL
MS3156-20	QPL

20-72-25



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	B. Damage Conditions - Front Face of the Connector	1
2.	<u>PART NUMBERS AND DESCRIPTION</u>	2
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	B. Connector Description	3
	C. Contact Part Numbers	3
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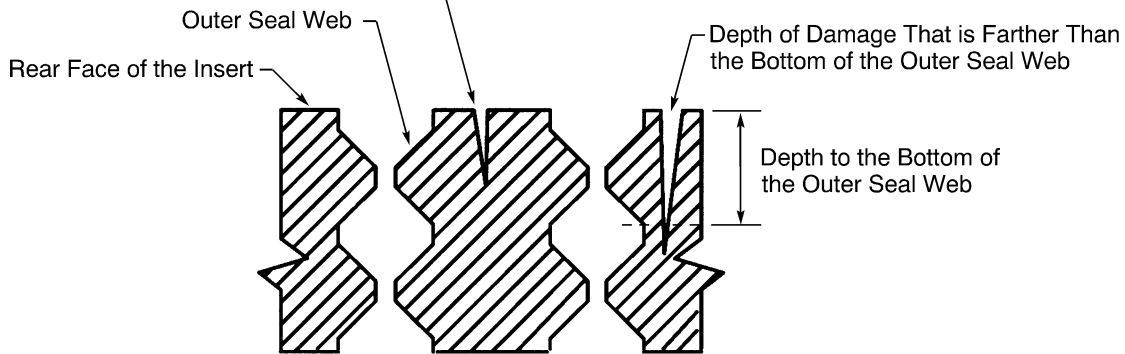
1. GENERAL DATA

A. Damage Conditions - Rear Face of the Connector

The connector must be replaced when one or more of these conditions occur:

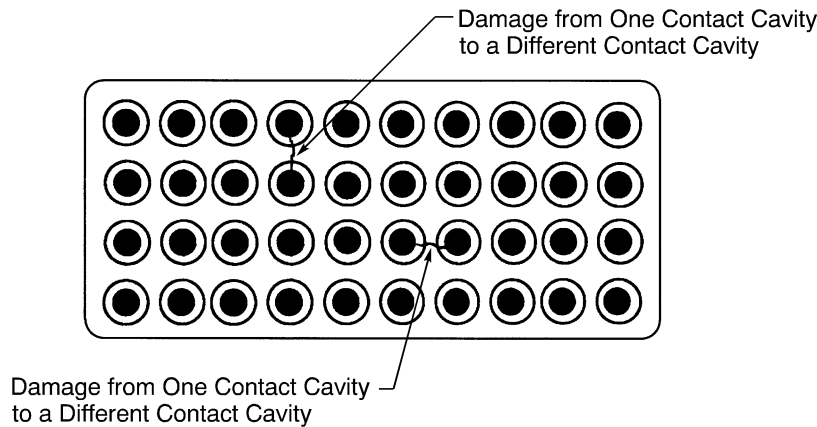
- The depth of the damage extends farther than the bottom of the outer seal web; refer to Figure 1
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 2.

Depth of the Damage That is not Farther Than the Bottom of the Seal Web



REAR FACE OF THE CONNECTOR - DEPTH OF DAMAGE

Figure 1



REAR FACE OF THE CONNECTOR - LENGTH OF DAMAGE

Figure 2

B. Damage Conditions - Front Face of the Connector

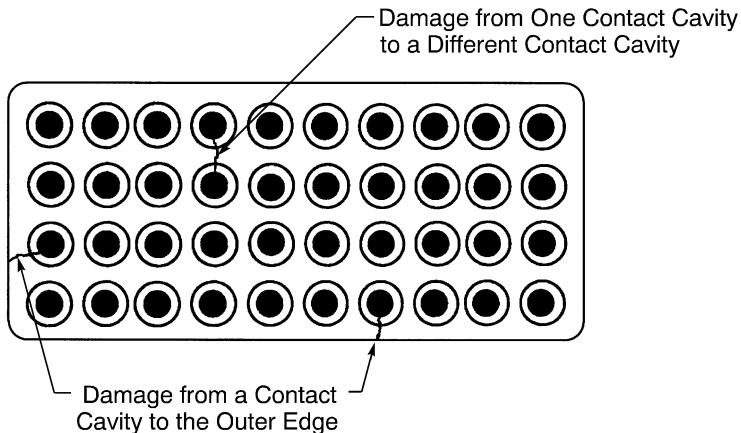
The connector must be replaced when one or more of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL

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FRONT FACE OF THE CONNECTOR - LENGTH OF DAMAGE
Figure 3

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

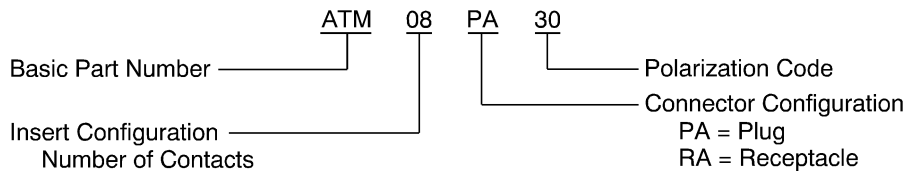
Part Number	Configuration	Supplier
ATM08PA30	Plug	Viking Electronics
ATM08PA50	Plug	Viking Electronics
ATM08RA30	Receptacle	Viking Electronics
ATM08RA50	Receptacle	Viking Electronics
ATM12PA00	Plug	Viking Electronics
ATM12PA10	Plug	Viking Electronics
ATM12PA30	Plug	Viking Electronics
ATM12RA00	Receptacle	Viking Electronics
ATM12RA10	Receptacle	Viking Electronics

Table 2
ALTERNATIVE CONNECTOR PART NUMBERS

Specified Connector	Alternative Connector
ATM12PA00	ATM12PA10
ATM12PA10	ATM12PA00

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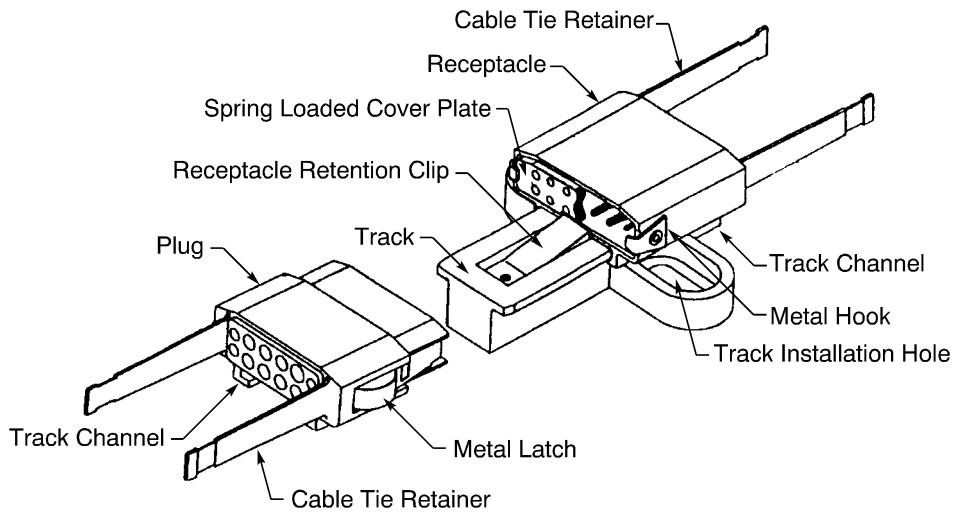
CONNECTOR PART NUMBER STRUCTURE

Figure 4

B. Connector Description

The connectors have these technical features:

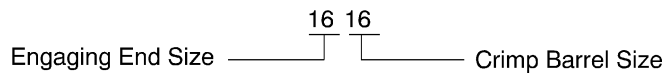
- A plastic, rectangular shell
- A rectangular insert configuration
- A cable tie retainer
- Rear release, rear removable contacts
- A plug with socket contacts
- A receptacle with pin contacts
- An integral track channel for installation on a track
- A separate installation track
- A latch for quick disconnection of the plug and receptacle.



ATM() CONNECTOR

Figure 5

C. Contact Part Numbers



EXAMPLE OF CONTACT SIZE

Figure 6

STANDARD WIRING PRACTICES MANUAL

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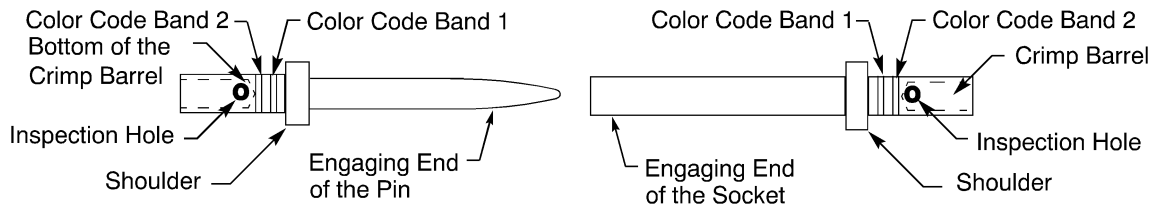
NOTE: The size 2020HD contact has a size 20 engaging end and a size 20 crimp barrel.

**Table 3
CONTACT PART NUMBERS**

Contact Size	Engaging End Size	Crimp Barrel Size	Contact Type	Boeing Standard	Color Code	
					Band	Color
2020HD	20	20	Pin	BACC47EF2	1	Orange
					2	Red
			Socket	BACC47EG2	1	Orange
					2	Red
1616	16	16	Pin	BACC47EF3	1	Orange
					2	Blue
			Socket	BACC47EG3	1	Orange
					2	Blue

**Table 4
APPROVED SUPPLIERS OF BOEING STANDARD CONTACTS**

Contact	Supplier
BACC47EF()	AMP
	ITT Cannon
	Radiall
	Souriau
	Tri-Star
BACC47EG()	AMP
	ITT Cannon
	Radiall
	Souriau
	Tri-Star



**CONTACTS
Figure 7**

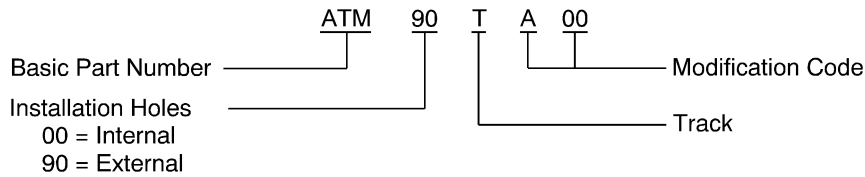
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS

D. Track Part Numbers

**Table 5
TRACK PART NUMBERS**

Part Number	Configuration	Supplier
ATM00TA00	Internal Installation Holes	Viking Electronics
ATM90TA00	External Installation Holes	Viking Electronics



**TRACK PART NUMBER STRUCTURE
Figure 8**

3. INSERT CONFIGURATIONS

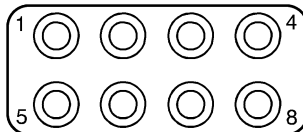
A. ATM() Connectors

NOTE: The contact cavity size that is specified in Table 6 is equivalent to the size of the engaging end of the contact.

**Table 6
CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Cavity		Reference
	Count	Size	
08	8	16	Figure 9
12	4	20	Figure 10
	8	16	

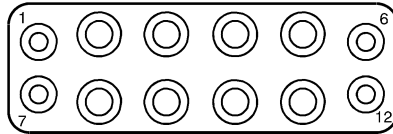
NOTE: Figure 9 through Figure 10 show the rear side of an insert that has pin contacts. The view of the rear side of an insert that has socket contacts is a mirror image of this view.



**INSERT CONFIGURATION 08
Figure 9**

STANDARD WIRING PRACTICES MANUAL

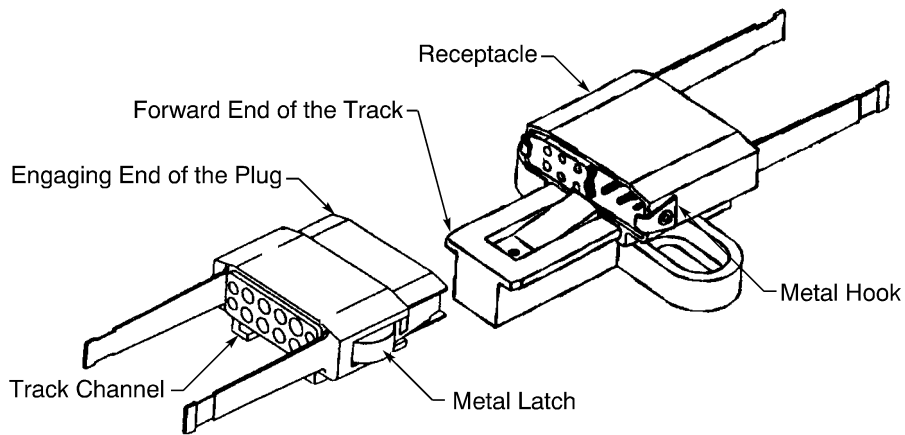
ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS



INSERT CONFIGURATION 12
Figure 10

4. CONNECTOR DISASSEMBLY

A. Connector Separation

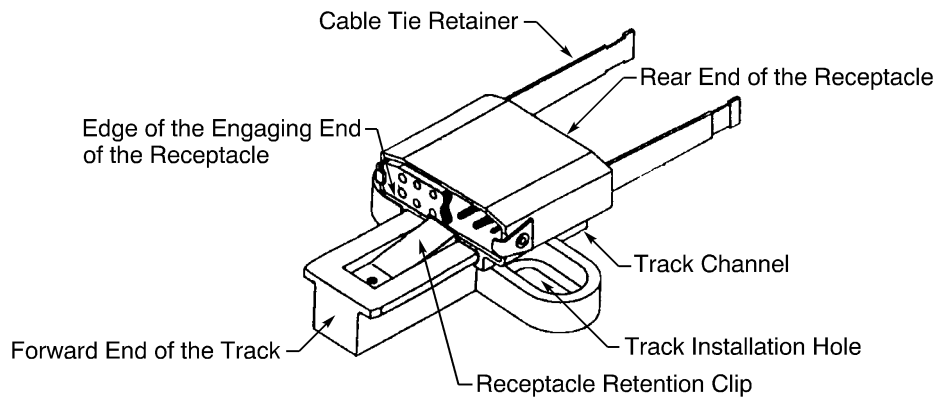


CONNECTOR SEPARATION
Figure 11

Refer to Figure 11.

- (1) Push the latches on each side of the plug.
- (2) Pull the plug away from the receptacle.

B. Removal of a Receptacle from a Track



RECEPTACLE REMOVAL FROM THE TRACK
Figure 12

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS

Refer to Figure 12.

- (1) Push the receptacle retention clip down.
- (2) Hold the clip down.
- (3) Move the receptacle forward.

Make sure that:

- The edge of the engaging end of the receptacle makes an overlap with the edge of the clip.
- The clip is held down.

- (4) Release the clip.
- (5) Push the receptacle forward until it comes off the track.

C. Contact Removal

**Table 7
CONTACT REMOVAL TOOLS**

Contact Size	Removal Tool
2020HD	282-891
	91066-4
	CIET-20HDL
	DAK125
	M81969/1-02
	MS3156-20
1616	282-892
	91066-3
	CET-16-15
	DRK83-16
	M81969/1-03
	MS3156-16

- (1) Make a selection of a contact removal tool from Table 7.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK. DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS CAN OCCUR.

WARNING: A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK CAN CAUSE INJURY TO PERSONNEL.

- (2) If it is necessary, carefully cut the plastic tie strap or the wire harness tie that holds the wire harness to the cable tie retainer.
- (3) Put the wire into the slot of the tool.
- (4) At the rear of the connector, axially align the removal tool and the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS

- (5) Carefully push the tool into the contact cavity until it stops.
- (6) If the O.D. of the wire is too large for the removal tool to go into the contact cavity, replace the contact. Refer to Subject 20-63-00.
- (7) Carefully pull the wire and the tool out of the contact cavity at the same time.

CAUTION: DO NOT PULL THE WIRE AND THE REMOVAL TOOL WITH TOO MUCH FORCE. DAMAGE TO THE CONTACT RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (8) If the removal tool does not release the contact from the contact cavity, do these steps a maximum of 3 times:
 - (a) Carefully pull the tool out of the contact cavity.
 - (b) Turn the tool approximately 90 degrees.

CAUTION: DO NOT TURN THE REMOVAL TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE RETENTION CLIPS IN THE CONTACT CAVITY CAN OCCUR.

- (c) Do Step (3) through Step (7) again.
- (9) If the contact cannot be removed, replace the contact. Refer to Subject 20-63-00.

D. Seal Plug and Seal Rod Removal

**Table 8
NECESSARY TOOLS**

Tool	Type
Pliers	Needle Nose

- (1) Make a selection of pliers from Table 8.

CAUTION: MAKE SURE THAT THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary, carefully cut the plastic tie strap or the wire harness tie that holds the wire harness to the cable tie retainer.
- (3) Tightly hold the end of the seal plug or the seal rod in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod out of the contact cavity.

E. Removal of a Track from the Structure

- (1) Remove the two installation screws that hold the track on the structure or the stringer clip.

NOTE: The stringer clip has an insert with threads for the installation screw.

- (2) Put the screws and the washers in a safe area because they are necessary when the track is installed again.

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ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS

5. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 9
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	20HD	0.28	± 0.03	-
	16	0.56	± 0.03	Fold the conductor back
22	20HD	0.28	± 0.03	-
	16	0.56	± 0.03	Fold the conductor back
20	20HD	0.28	± 0.03	-
	16	0.28	± 0.03	-
18	16	0.28	± 0.03	-
16	16	0.28	± 0.03	-

**Table 10
CONTACT CRIMP TOOLS**

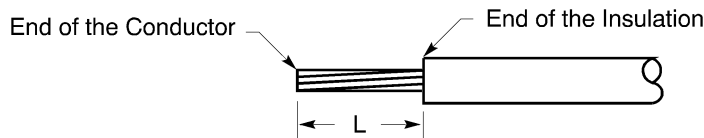
Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20HD	GVF-101	5	-	-
		M22520/2-01	5	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	5	M22520/2-08	-
		WA22LC	5	M22520/2-08	-
22	20HD	GVF-101	5	-	-
		M22520/2-01	6	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	6	M22520/2-08	-
		WA22LC	6	M22520/2-08	-
	16	M22520/1-01	4	M22520/1-02	Blue

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Table 10 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
20	20HD	GVF-101	5	-	-
		M22520/2-01	7	M22520/2-08	-
		ST2220-1-Y	-	ST2220-1-43	-
		WA22	7	M22520/2-08	-
		WA22LC	7	M22520/2-08	-
	16	M22520/1-01	4	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	4	M22520/1-02	Blue
	18	16	M22520/1-01	5	M22520/1-02
ST2220-1-Y			-	ST2220-1-2	-
WA27F			5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	6	M22520/1-02	Blue



WIRE PREPARATION
Figure 13

- (1) Remove the necessary length of insulation from the end of the wire.

Refer to:

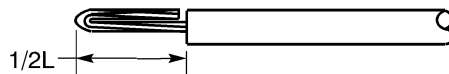
- Figure 13
- Table 9 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedure.

NOTE: If the wire size and a larger crimp barrel size are not given in Table 9, refer to Subject 20-60-00.

- (2) If the O.D. of the wire is less than the minimum seal diameter of the grommet holes, increase the O.D. of the wire. Refer to Subject 20-60-08.
- (3) If it is specified, fold the conductor back. Refer to Figure 14.

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FOLDED BACK CONDUCTOR

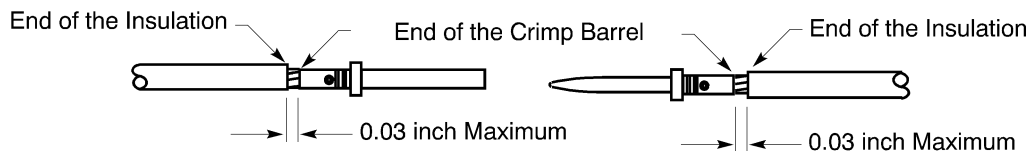
Figure 14

NOTE: As an alternative, the conductor size can be increased with filler wires or an eyelet. Refer to Subject 20-60-00.

- (4) Make a selection of a crimp tool from Table 10.
- (5) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 15.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF WIRE IN THE CRIMP BARREL OF THE CONTACT

Figure 15

- (6) Crimp the contact.
- (7) Examine the contact assembly for these types of damage:
 - A crack in the crimp barrel
 - Broken strands of the conductor
 - Base metal can be seen on the strands of the conductor.

B. Contact Insertion

**Table 11
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
2020HD	282-881
	91066-4
	ATC1072
	CIET-20HDL
	DAK145J
	M81969/1-02
	MS3156-20

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Table 11 (continued)

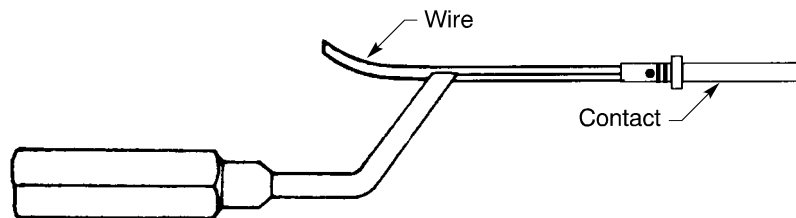
Contact Size	Insertion Tool
1616	282-892
	282-929
	91066-3
	ATR1106
	DAK55-16
	M81969/1-03
	MS3156-16

- (1) Make a selection of a contact insertion tool from Table 11.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK. DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS CAN OCCUR.

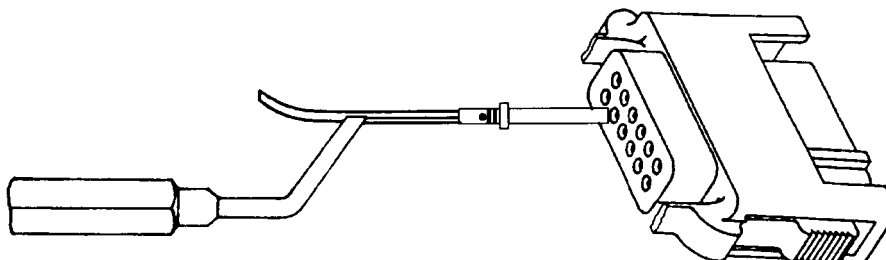
WARNING: A TOOL WITH A TIP THAT IS BENT, BROKEN, OR HAS A CRACK CAN CAUSE INJURY TO PERSONNEL.

- (2) Put the contact assembly in the end of the insertion tool. Refer to Figure 16.



POSITION OF THE CONTACT ASSEMBLY IN THE INSERTION TOOL
Figure 16

- (3) At the rear of the connector, axially align the contact, the tool, and the correct contact cavity. Refer to Figure 17.



ALIGNMENT OF THE CONTACT, THE INSERTION TOOL, AND THE CONTACT CAVITY
Figure 17

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS

- (4) Carefully push the tool into the contact cavity until it stops.
- (5) Carefully pull the tool out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL ON THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the cavity.
 - (b) Do Step (2) through Step (6) again.
- (8) Examine the rear grommet for damage. Refer to Paragraph 1.A.

C. Seal of an Empty Contact Cavity

Empty contact cavities must be sealed. Refer to Subject 20-60-08.

D. Assembly of a Wire Harness Strain Relief

**Table 12
NECESSARY MATERIALS**

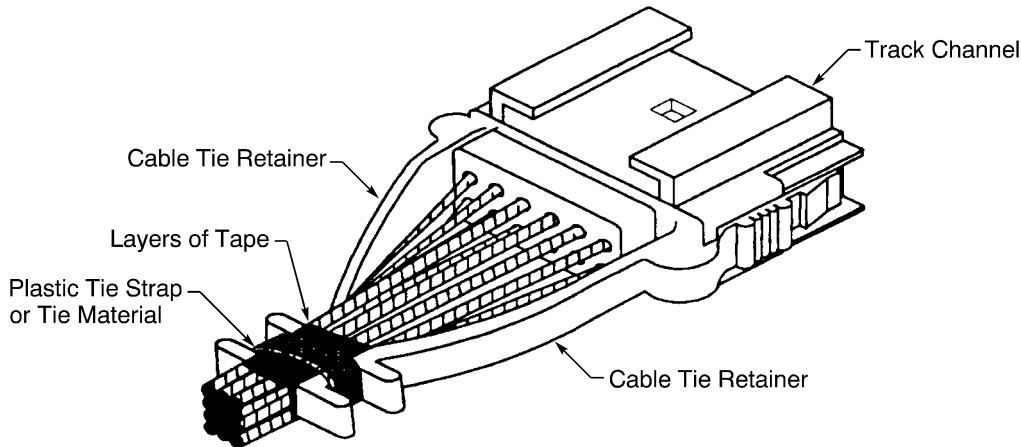
Material	Boeing Standard	Part Number	Supplier
Tape	DMS 2186, Type 1	-	Moxness Products
		-	RM Engineered Products
	-	Scotch 70	3M

**Table 13
NECESSARY PARTS**

Part	Boeing Standard	Part Number	Supplier
Plastic Tie Strap	BACS38K1	-	Panduit
		-	Tyton
	-	M23190/3-1	QPL

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ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS



POSITION OF THE PLASTIC TIE STRAP OR TIE MATERIAL
Figure 18

- (1) If it is not necessary to assemble the wire harness strain relief, cut each cable tie retainer as near the connector as possible.

Make sure that the remaining length of each retainer:

- Has no sharp edges
- Is not more than 0.20 inch.

- (2) Make a selection of a tape from Table 12.
- (3) Put a minimum of 2 layers of the tape around the wire bundle at the location adjacent to the cable tie retainer when the retainer is in the correct position.
- (4) Attach the wire bundle to the cable tie retainer with a wire harness tie.

Refer to:

- Figure 18
- Subject 20-10-11 for the assembly of a wire harness tie.

- (5) Examine each cable tie retainer.

Make sure that the retainer:

- Is not broken
- Does not have a crack.

6. CONNECTOR INSTALLATION

A. Installation of a Track

- (1) Align the installation holes in the track and the holes in the structure.
- (2) Install the track to the structure with the necessary installation screws and washers.

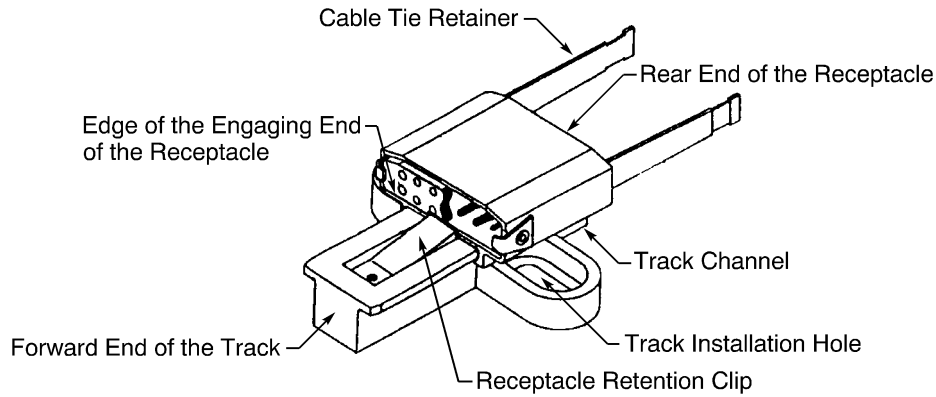
Make sure that:

- The forward end of the track is pointed in the same direction as the front face of the receptacle
- The screws are tight.

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ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS

B. Installation of a Receptacle on a Track



RECEPTACLE INSTALLATION ON A TRACK

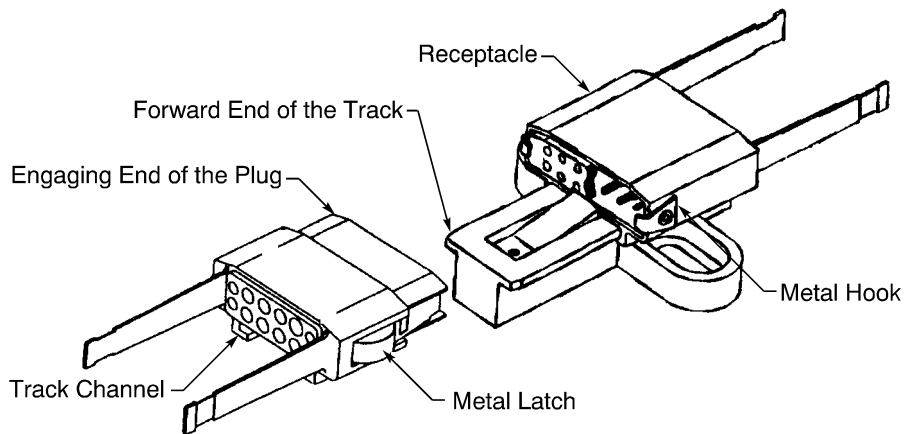
Figure 19

Refer to Figure 19.

- (1) Put the track channel at the rear end of the receptacle on the forward end of the track.
- (2) Push the receptacle to the rear end of the track until it makes a click.
- (3) Lightly pull the receptacle forward to make sure that it is locked in the track.

C. Plug and Receptacle Connection

This paragraph gives the procedure to connect a plug and receptacle installed on a track.



PLUG AND RECEPTACLE CONNECTION

Figure 20

Refer to Figure 20.

- (1) Put the track channel at the engaging end of the plug on the forward end of the track.
- (2) Push the plug to the rear end of the track until the latch and the hook on each side of the plug and the receptacle are locked.

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ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS

(3) Lightly pull back on the plug to make sure that it locks to the receptacle.

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 14
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
282-891	Radiall-Sogie
282-892	Radiall-Sogie
91066-3	AMP
91066-4	AMP
CET-16-15	ITT Cannon
CIET-20HDL	ITT Cannon
DAK125	Daniels
DRK83-16	Daniels
M81969/1-02	QPL
M81969/1-03	QPL
MS3156-16	QPL
MS3156-20	QPL

B. Contact Crimp Tools

**Table 15
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
GVF-101	Gaard
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-08	QPL
ST2220-1-2	Boeing
ST2220-1-43	Boeing
ST2220-1-Y	Boeing
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels



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ASSEMBLY OF VIKING ELECTRONICS ATM() CONNECTORS

C. Contact Insertion Tools

Table 16
CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
282-881	Radiall-Sogie
282-892	Radiall-Sogie
282-929	Radiall-Sogie
91066-3	AMP
91066-4	AMP
ATC1072	Astro
ATR1106	Astro
CIET-20HDL	ITT Cannon
DAK145J	Daniels
DAK55-16	Daniels
M81969/1-02	QPL
M81969/1-03	QPL
MS3156-16	QPL
MS3156-20	QPL

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STANDARD WIRING PRACTICES MANUAL

REPAIR OF FLAT CABLE CONNECTOR ASSEMBLIES

<u>Paragraph</u>		<u>Page</u>
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	B. Conditions for Flat Conductor Cable Assembly and Repair	1
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3.	<u>REPAIR OF THE FLAT CABLE ASSEMBLY</u>	2
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STANDARD WIRING PRACTICES MANUAL

REPAIR OF FLAT CABLE CONNECTOR ASSEMBLIES

1. GENERAL DATA

A. Flat Cable Connector Assemblies

Flat cable connectors are used to assemble wire harnesses with either of these types of cable:

- Flat conductor cable
- Round conductor wires that are put in a flat configuration with each wire parallel to the other.

B. Conditions for Flat Conductor Cable Assembly and Repair

This Subject does not give the procedures to assemble wire harnesses that have either of these configurations:

- A BACS52H multiple termination splice that connects a flat conductor cable to a round conductor cable
- A flat cable connector that is assembled with a flat conductor.

NOTE: Special tools are necessary to assemble the flat cable connector or the multiple termination splice with the flat conductor cable.

This Subject does give the procedures to repair flat conductor cable assemblies when the conditions for repair are applicable. Refer to Subject 20-10-13.

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

Boeing Standard	Description
BACC65M()	Plug, Flat Cable
BACC65N()	Receptacle, Flat Cable
BACC65P()	Plug, Flat Cable
BACC65R()	Receptacle, Flat Cable

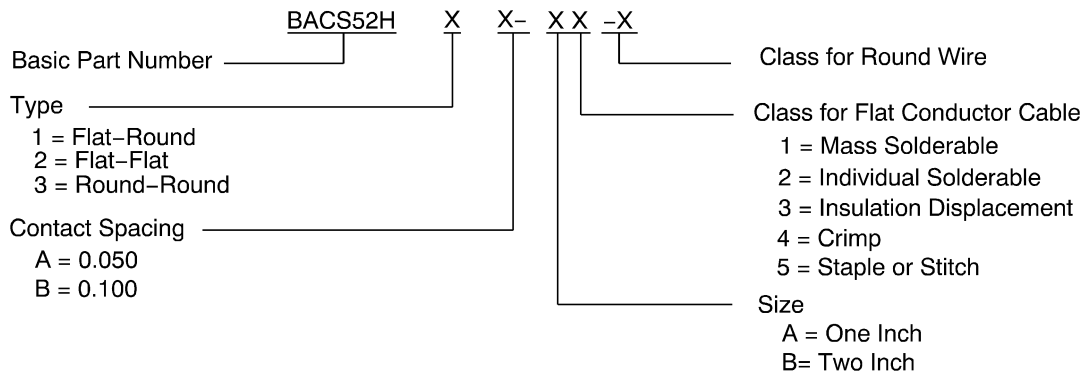
B. BACS52H() Splice Part Numbers

**Table 2
BACS52H() SPLICE PART NUMBERS**

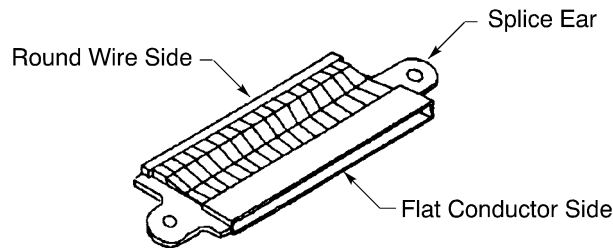
Boeing Standard	Description	Supplier Kit	
		Part Number	Supplier
BACS52H1B-B1-1	Splice, multiple termination, flat conductor to round conductor	CTM-1001	Raychem

STANDARD WIRING PRACTICES MANUAL

REPAIR OF FLAT CABLE CONNECTOR ASSEMBLIES



BACS52H() SERIES SPLICE PART NUMBER STRUCTURE
Figure 1



BACS52H MULTIPLE TERMINATION SPLICE
Figure 2

3. REPAIR OF THE FLAT CABLE ASSEMBLY

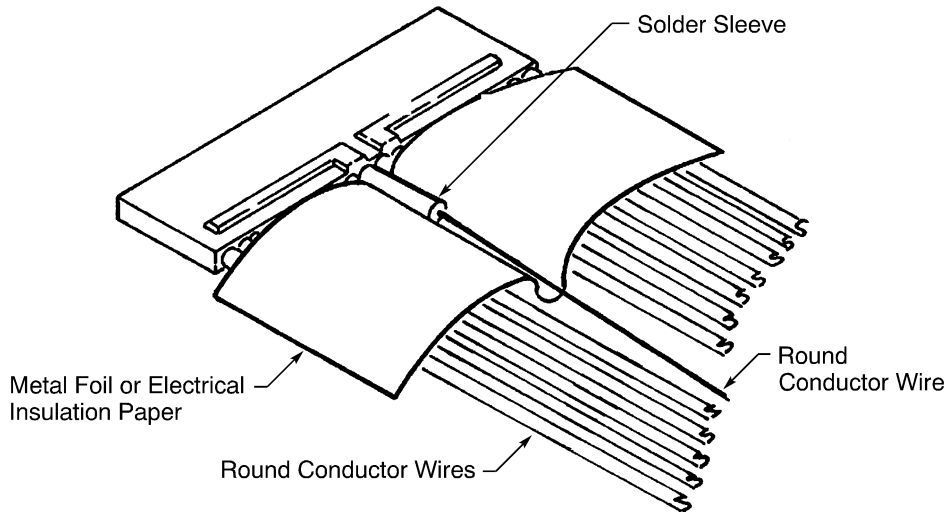
A. Connector Disassembly

Refer to Subject 20-73-01.

B. Removal of the Round Conductor Wire from the Connector Wafer

(1) Isolate the wire from the other wires with a heat shield. Refer to Figure 3.

NOTE: Metal foil or MIL-I-695 electrical insulation paper can be used as a heat shield.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF FLAT CABLE CONNECTOR ASSEMBLIES****ISOLATED WIRE AND SOLDER SLEEVE****Figure 3**

- (2) Make a selection of a hot air gun. Refer to Subject 20-10-13.

WARNING: THE OPERATION OF A HOT AIR GUN CAN CAUSE AN EXPLOSION. REFER TO THE SAFETY PRACTICES IN SUBJECT 20-00-10 FOR THE NECESSARY PRECAUTIONS TO AVOID:

- DAMAGE TO THE EQUIPMENT
- INJURY TO THE PERSON.

- (3) Remove the solder sleeve:

- (a) Cut the solder sleeve with a sharp knife.
- (b) Apply hot air on the solder joint until the solder melts. Refer to Subject 20-10-13 for the procedure to use the hot air gun.

Make sure that heat is not applied to the adjacent wires or the adjacent solder sleeves that are installed.

- (c) With a pair of tweezers, pull the wire straight out the wafer contact terminal.

- (4) Remove any unwanted solder sleeve material from the wire.

If it is necessary, apply hot air again:

- To make the plastic of the sleeve soft
- To melt any unwanted solder.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT TO REMOVE THE UNWANTED SOLDER SLEEVE MATERIAL. MORE THAN THE NECESSARY AMOUNT OF HEAT CAN CAUSE DAMAGE TO THE INSULATION OF THE WIRE OR THE CONNECTOR DIELECTRIC, OR BOTH.

STANDARD WIRING PRACTICES MANUAL

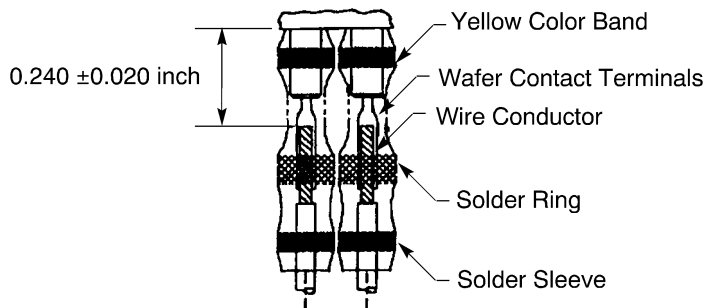
REPAIR OF FLAT CABLE CONNECTOR ASSEMBLIES

C. Installation of a Solder Sleeve

Table 3
SOLDER SLEEVE PART NUMBERS FOR FLAT CONDUCTOR CABLE

Part Number	Description	Supplier
CTA 0036	Solder Sleeve, Standard	Raychem
CTA 0070	Solder Sleeve, Large Wire Entry	Raychem

- (1) If it is necessary to replace the wire:
 - (a) Remove 0.15 inch \pm 0.03 inch of the insulation from the end of the wire.
 - (b) Twist the strands of the conductor in their initial direction.
 - (c) Make the end of the wire straight.
- (2) Make a selection of a solder sleeve from Table 3.
- (3) Put the new sleeve on the wire.
- (4) Put the wire on the wafer contact terminal.
- (5) Push the sleeve over the terminal until the yellow insert touches the wafer.
- (6) Put the sleeve and the wire on the terminal. Refer to Figure 4.



POSITION OF THE SOLDER SLEEVE, THE WIRE, AND THE TERMINAL
Figure 4

- (7) Make a selection of a hot air gun. Refer to Subject 20-10-13.
Make sure that the hot air gun is ready for operation. Refer to Subject 20-10-13.

WARNING: THE OPERATION OF A HOT AIR GUN CAN CAUSE AN EXPLOSION. REFER TO THE SAFETY PRACTICES IN SUBJECT 20-00-10 FOR THE NECESSARY PRECAUTIONS TO AVOID:

- DAMAGE TO THE EQUIPMENT
- INJURY TO THE PERSON.

- (8) Turn the knob in a clockwise direction to adjust the air pressure to 50 psi.

The air from the nozzle should be:

- Hot within 30 seconds
- At a stable temperature within 1 minute.

STANDARD WIRING PRACTICES MANUAL**REPAIR OF FLAT CABLE CONNECTOR ASSEMBLIES**

CAUTION: DO NOT POINT THE HOT AIR STREAM AT:

- THE UNIT HOSE
- THE POWER CORD
- THE OPERATOR.

- (9) Point the hot air gun at the middle of the solder sleeve to shrink the sleeve in position.

Make sure that:

- The conductor is in the correct position on the contact terminal of the wafer
- The sleeve is fully formed and in the correct position
- A solder fillet is formed between the conductor and the contact terminal of the wafer.

Make sure that the necessary amount of heat is applied to the solder sleeve. A sleeve with applied heat that is not sufficient shows:

- The solder has not flowed
- The solder sleeve is not fully formed in position.

Make sure that only the necessary amount of heat is applied to the solder sleeve. A sleeve with too much heat applied shows any of these conditions:

- The insulation of the sleeve is not transparent
- The sleeve has a hole
- The insulation of the sleeve is very dark.

- (10) If the solder sleeve is not installed correctly:

- (a) Remove the solder sleeve. Refer to Paragraph 3.B.
- (b) Do the installation procedure again from Step (2).

D. Connector Assembly

Refer to Subject 20-73-01.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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	B. BACC65() Pin and Socket Wafers	3
2.	<u>CONNECTOR POLARIZATION</u>	3
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
BACC65() CONNECTOR PART NUMBERS**

Boeing Standard	Type	Supplier Kits	
		Part Number	Supplier
BACC65M()	Plug	-	QPL
BACC65N()	Receptacle	-	QPL
BACC65P22244A()	Plug	MTC100-KT2-0023	Raychem
BACC65R22211A()	Receptacle	MTC100-KT2-0036	Raychem

**Table 2
BACC65() CONNECTOR SUPPLIER KITS**

Supplier Kit	Kit Contents		
	Part Number	Contents	Supplier
MTC100-KT2-0036	MTC100-EA2-P12	Pin Wafer, A Position, Flat Conductor Cable AWG 22 and AWG 24	Raychem
	MTC100-EB2-P12	Pin Wafer, B Position, Flat Conductor Cable AWG 22 and AWG 24	Raychem
	MTC100-JH2-R12	Receptacle Shell	Raychem
MTC100-KT2-0023	MTC100-JA2-S11-T14	Socket Wafer, A Position, Round Wire	Raychem
	MTC100-JB2-S11-T16	Socket Wafer, B Position, Round Wire	Raychem
	MTC100-JH2-P12	Plug Shell	Raychem

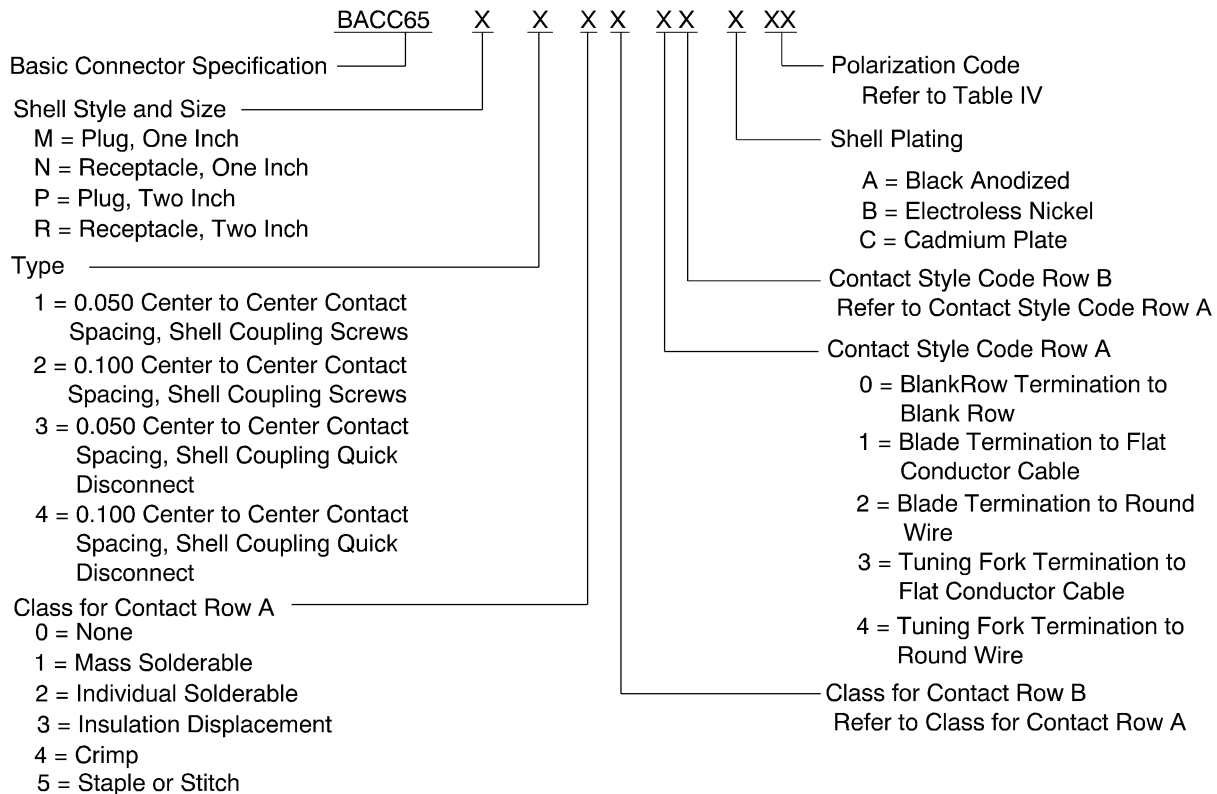
**Table 3
OBSOLETE WAFER PART NUMBERS**

Obsolete Wafer		New Part Number
Part Number	Supplier	
MTC100-JA2-P12	Raychem	MTC100-EA2-P12
MTC100-JB2-P12	Raychem	MTC100-EB2-P12

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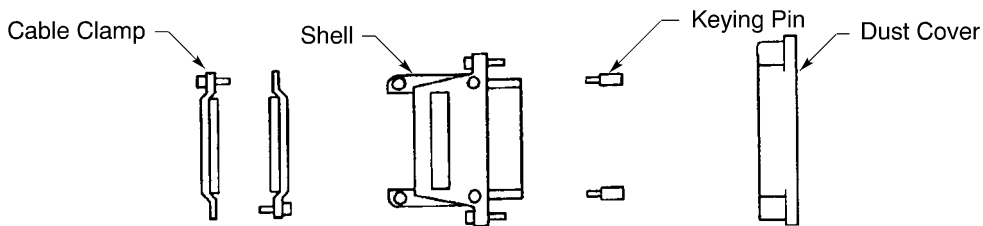
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS



BACC65() SERIES CONNECTOR PART NUMBER STRUCTURE

Figure 1

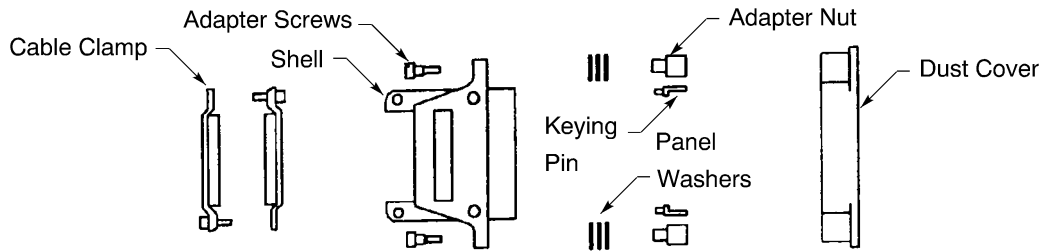


BACC65M AND BACC65P PLUGS

Figure 2

STANDARD WIRING PRACTICES MANUAL

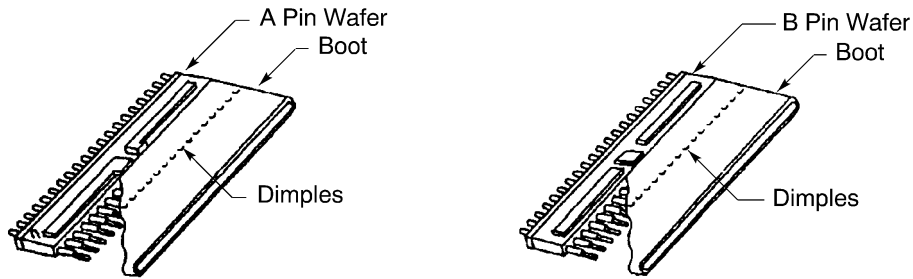
ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS



BACC65N AND BACC65R RECEPTACLES

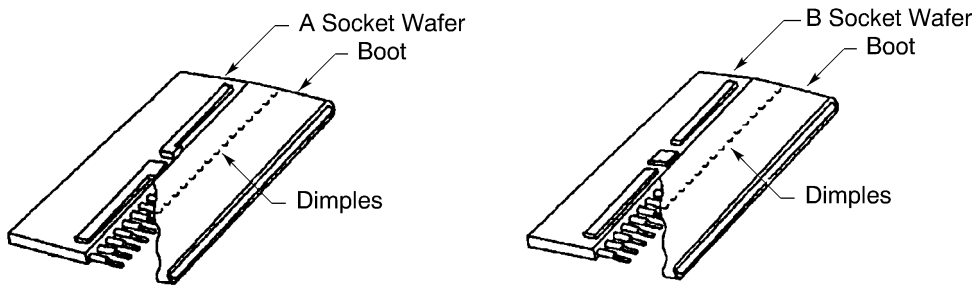
Figure 3

B. BACC65() Pin and Socket Wafers



PIN WAFERS

Figure 4



SOCKET WAFERS

Figure 5

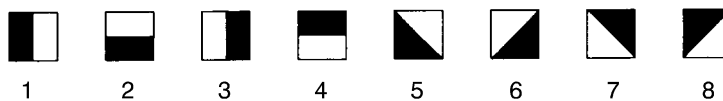
2. CONNECTOR POLARIZATION

A. BACC65() Series Connectors

Alpha-numeric codes for connector keying are superseded by numeric codes.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS



KEYING PIN POLARIZATION POSITIONS

Figure 6

**Table 4
POLARIZATION CODES**

Polarization Code		Receptacle Key		Plug Key	
Numeric	Alpha- Numeric	Left	Right	Left	Right
01	AA	1	1	1	1
02	AB	1	2	4	1
03	AC	1	3	3	1
04	AD	1	4	2	1
05	BA	2	1	1	4
06	BB	2	2	4	4
07	BC	2	3	3	4
08	BD	2	4	2	4
09	CA	3	1	1	3
10	CB	3	2	4	3
11	CC	3	3	3	3
12	CD	3	4	2	3
13	DA	4	1	1	2
14	DB	4	2	4	2
15	DC	4	3	3	2
16	DD	4	4	2	2
17	A1	1	5	8	1
18	A2	1	6	7	1
19	A3	1	7	6	1
20	A4	1	8	5	1
21	B1	2	5	8	4
22	B2	2	6	7	4
23	B3	2	7	6	4
24	B4	2	8	5	4
25	C1	3	5	8	3
26	C2	3	6	7	3

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS

Table 4 (continued)

Polarization Code		Receptacle Key		Plug Key	
Numeric	Alpha- Numeric	Left	Right	Left	Right
27	C3	3	7	6	3
28	C4	3	8	5	3
29	D1	4	5	8	2
30	D2	4	6	7	2
31	D3	4	7	6	2
32	D4	4	8	5	2
33	1A	5	1	1	8
34	1B	5	2	4	8
35	1C	5	3	3	8
36	1D	5	4	2	8
37	2A	6	1	1	7
38	2B	6	2	4	7
39	2C	6	3	3	7
40	2D	6	4	2	7
41	3A	7	1	1	6
42	3B	7	2	4	6
43	3C	7	3	3	6
44	3D	7	4	2	6
45	4A	8	1	1	5
46	4B	8	2	4	5
47	4C	8	3	3	5
48	4D	8	4	2	5

B. Keying Pin Insertion

- (1) Put the keying pins straight into the square holes of the shell. Refer to Figure 6 and Table 4.

CAUTION: DO NOT USE DAMAGED KEYING PINS.

C. Keying Pin Removal

- (1) Hold the keying pin and pull it straight back.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS

CAUTION: IF THE KEYING PIN HAS DAMAGE AFTER IT IS REMOVED, IT MUST BE DISCARDED.

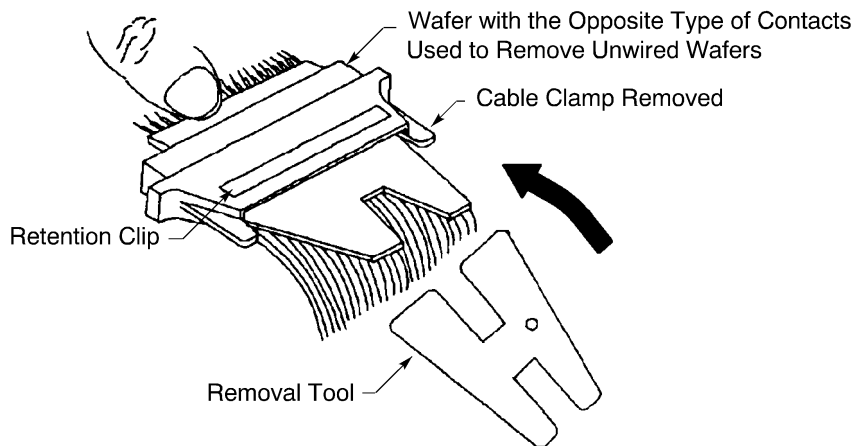
3. CONNECTOR DISASSEMBLY

A. Wired Wafer Removal

**Table 5
WAFER REMOVAL TOOLS**

Removal Tool	Type	Supplier
CE-1201900	Metal	Raychem
CE-1202400	Metal, Right Angle	Raychem
D-659-0001	Plastic	Raychem

NOTE: The Raychem tools in Table 5 are used for both wafer insertion and wafer removal.



**WAFER REMOVAL
Figure 7**

- (1) Remove the cable clamp.
Make sure that the shell is not connected.
- (2) Make a selection of a removal tool from Table 5.
- (3) Put the tool into the rear of the connector shell on either the A side or B side. Refer to Figure 7.
- (4) Push the tool in until it passes the retention clip and hits the bottom inside the connector shell.
- (5) Pull firmly on the cable or wires of the wafer next to the tool.
- (6) After one wafer has been removed, the other wafer can be removed by hand.

B. Unwired Wafer Removal

- (1) Make a selection of a removal tool from Table 5.
- (2) Push the removal tool into the rear of the connector shell on either the A side or the B side.
- (3) Push the wafer out of the shell with a wafer that has the opposite type of contacts. Refer to Figure 7.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS

4. CONNECTOR ASSEMBLY

A. Mating Hardware Installation

Mating hardware can be installed on the receptacle shells either before or after the wafers are inserted.

- (1) On each side of the shell, install:
 - One or more panel washers
 - One adapter nut
 - One adapter screw.

Make sure to use only the hardware supplied with the connector.

Refer to Figure 2 and Figure 3.

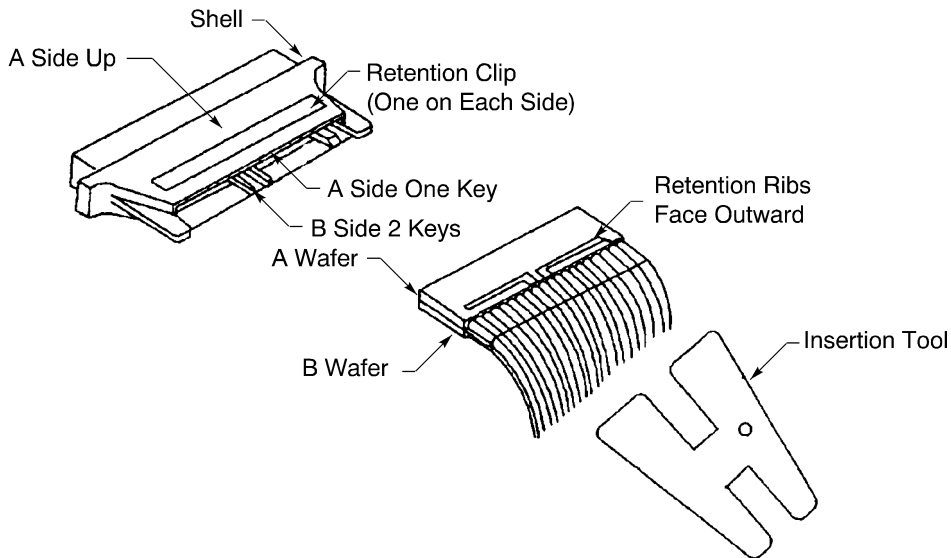
- (2) Hold the adapter nut and tighten the adapter screw.

B. Wafer Insertion

**Table 6
WAFER INSERTION TOOLS**

Insertion Tool	Type	Supplier
CE-1201900	Metal	Raychem
CE-1202400	Metal, Right Angle	Raychem
D-659-0001	Plastic	Raychem

NOTE: The Raychem tools in Table 6 are used for both wafer insertion and wafer removal.



**WAFER INSERTION
Figure 8**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS

For correct assembly:

- A wafers are inserted into the A side of the shell
- B wafers are inserted into the B side of the shell
- Wafers are inserted into shells that are not connected
- A wafers and B wafers are inserted as a pair.

Make sure to use only the allowable combinations of A wafers and B wafers. Refer to Table 7.

**Table 7
WAFER COMBINATIONS**

Position A	Position B
Pin	Pin
Pin	Socket
Pin	Blank
Socket	Socket
Socket	Pin
Socket	Blank
Blank	Pin
Blank	Socket

- (1) Put the two wafers together so that the retention ribs face outward. Refer to Figure 8.
- (2) Turn the A wafer toward the A side of the shell and B wafer toward B side of shell.
- (3) If any of the wafers are unwired or if the wires are not rigid enough to push the wafer into position:
 - (a) Make a selection of an insertion tool from Table 6.
 - (b) Put the tool against the edge of the wafer.
- (4) Push the wafers into the connector shell until the retention clips make a click.
Make sure that the wafers are locked in position.

C. Cable Clamp Installation

Refer to Figure 2 and Figure 3.

- (1) If a cable clamp is required:
 - (a) Put the clamp on the cable.
 - (b) Dress any round wires evenly across the clamp.
 - (c) Tighten the clamp.
 - (d) If a cable shield is required, terminate the shield under the cable clamp.
Make sure to use only the components that are supplied with the connector.

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ASSEMBLY OF BACC65() FLAT CABLE CONNECTORS

D. Installation of a Connector Receptacle in a Panel

**Table 8
NECESSARY PANEL WASHERS**

Panel Thickness (inch)		Number of Washers
Minimum	Maximum	
0.073	0.103	0
0.042	0.072	1
0.011	0.041	2
0	0.010	3

- (1) Measure the panel thickness.
- (2) Make a selection of the number of washers that are required from Table 8.
- (3) Put the receptacle and the washers, if any, on the panel.
- (4) Hold the adapter nut and tighten the screw.

Make sure that the adapter nut is within 0 inch +0.020 inch, -0.010 inch with the front surface of the connector shell.



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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

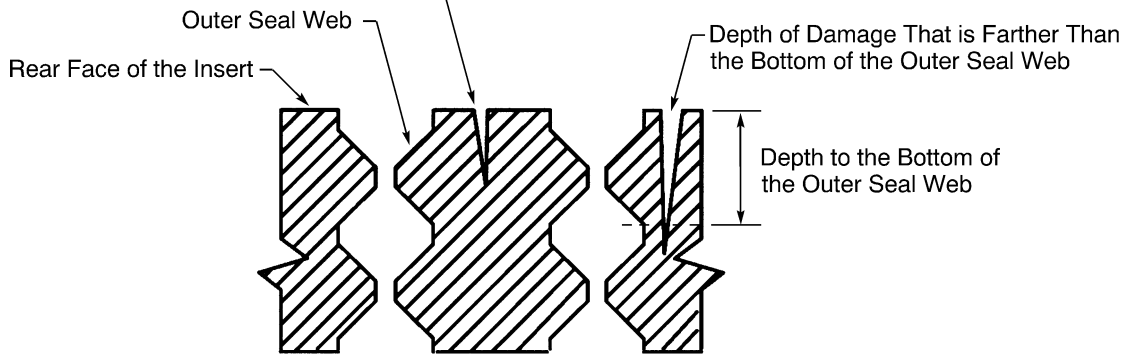
1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

The insert must be replaced when one or more of these conditions occur:

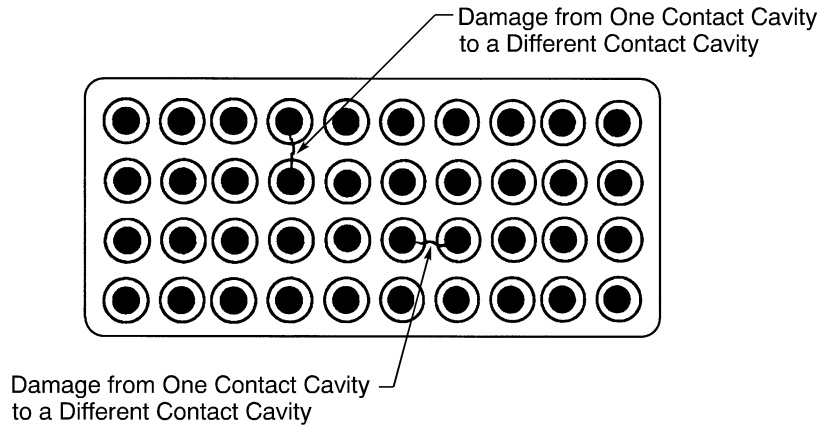
- The depth of the damage extends farther than the bottom of the outer seal web; refer to Figure 1
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 2.

Depth of the Damage That is not Farther Than the Bottom of the Seal Web



REAR FACE OF THE INSERT - DEPTH OF DAMAGE

Figure 1



REAR FACE OF THE INSERT - LENGTH OF DAMAGE

Figure 2

B. Damage Conditions - Front Face of the Insert

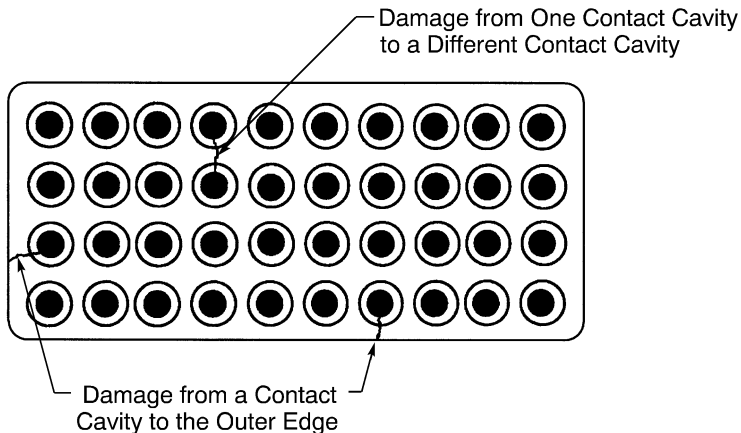
Refer to Figure 3.

The insert for pin contacts must be replaced when one or more of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

STANDARD WIRING PRACTICES MANUAL

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FRONT FACE OF THE INSERT - LENGTH OF DAMAGE
Figure 3

C. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL

Connector Insert	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
BACI10AL	Rear release, rear removal contacts	20	0.040
		16	0.068
		12	0.097
BACI10AM	Rear release, rear removal contacts	20	0.040
		16	0.068
		12	0.097
BACI10AP	Rear release, rear removal contacts	20	0.040
		16	0.068
		12	0.097

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACI10AL, BACI10AM, AND BACI10AP RECTANGULAR CONNECTOR INSERTS

2. PART NUMBERS AND DESCRIPTION

A. Connector Insert Part Numbers

**Table 2
CONNECTOR INSERT PART NUMBERS**

Boeing Standard	Shell Size	Configuration
BACI10AL()A()	2	Standard
BACI10AL00-N	2	Blank
BACI10AM()AP	2	Bussed
BACI10AP()A()	1	Standard
BACI10AP00-N	1	Blank

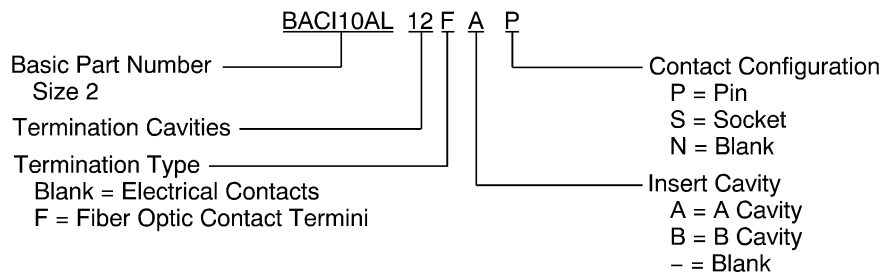


Figure 4

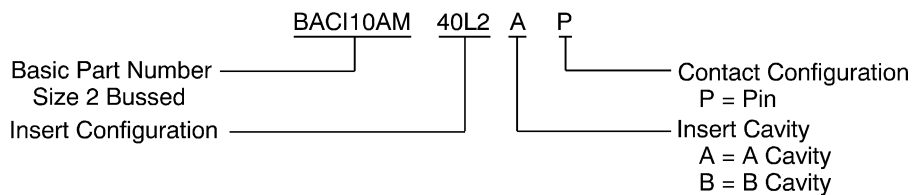


Figure 5

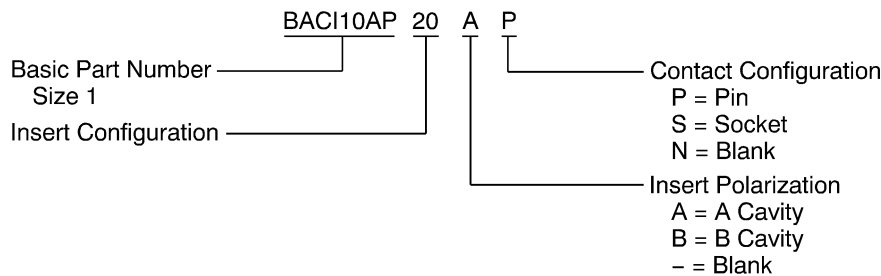


Figure 6



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ASSEMBLY OF BACI10AL, BACI10AM, AND BACI10AP RECTANGULAR CONNECTOR INSERTS

**Table 3
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTOR INSERTS**

Insert	Supplier
BACI10AL()	Radiall
	Jerrick
BACI10AM()	Radiall
	Jerrick
BACI10AP()	Radiall
	Jerrick

B. Size 2222, 2020, 1616, 1212, 0808, and 0508 Contact Part Numbers

**Table 4
STANDARD CONTACTS FOR BACI10AL, BACI10AM, AND BACI10AP INSERTS**

Size	Engaging End Size	Crimp Barrel Size	Type	Color Code		Boeing Standard			
				Color	Band				
2222	22	22	Pin	Green	1	BACC47FJ1A			
						BACC47FJ1S			
			Socket			BACC47FK1A			
						BACC47FK1S			
2020	20	20	Pin	Red	1	BACC47FJ2A			
						BACC47FJ2S			
						Socket	1	BACC47FK2A	
								BACC47FK2S	
			Pin		Blue			1	BACC47FJ3A
									BACC47FJ3S
			Socket			BACC47FK3A			
						BACC47FK3S			
1212	12	12	Pin	Yellow	1	BACC47FJ4A			
						BACC47FJ4S			
						Socket	BACC47FK4A		
							BACC47FK4S		

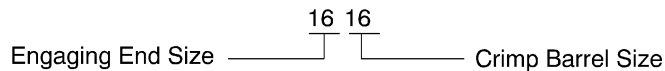
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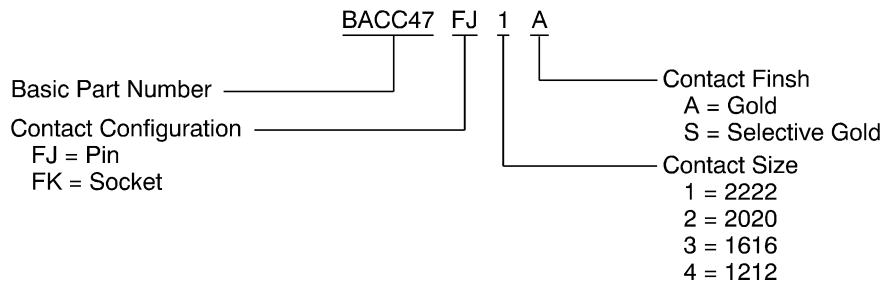
ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

**Table 5
POWER CONTACTS FOR BAC10AL, BAC10AM, AND BAC10AP INSERTS**

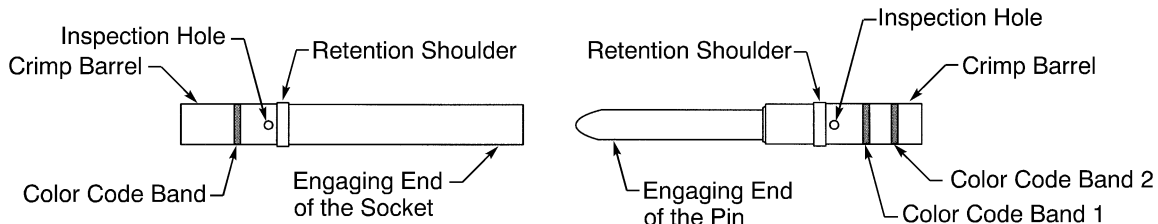
Size	Engaging End Size	Crimp Barrel Size	Type	Part Number	Supplier
0808	08	08	Socket	617391002	Radiall
0508	05	08	Pin	617280001	Radiall
			Socket	617380001	Radiall



**EXAMPLE OF CONTACT SIZE
Figure 7**



**BACC47FJ and BACC47FK CONTACT PART NUMBER STRUCTURE
Figure 8**



**INSERT CONTACTS
Figure 9**

**Table 6
SUPPLIER PART NUMBERS FOR BOEING STANDARD CONTACTS**

Specified Contact	Alternative Contact	
	Part Number	Supplier
BACC47FJ1A	617200002	Radiall
BACC47FK1A	617300002	Radiall

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

Table 6 (continued)

Specified Contact	Alternative Contact	
	Part Number	Supplier
BACC47FJ2A	617221001	Radiall
BACC47FK2A	617320001	Radiall
BACC47FJ3A	617240001	Radiall
BACC47FK3A	617340001	Radiall
BACC47FJ4A	617250001	Radiall
BACC47FK4A	617350001	Radiall

Table 7

APPROVED SUPPLIERS OF BOEING STANDARD CONTACTS

Contact	Supplier
BACC47FJ()	Radiall
	Jerrick
BACC47FK()	Radiall
	Jerrick

C. Size 5 and Size 8 Coax Contact Part Numbers

Table 8

COAX CONTACT PART NUMBERS

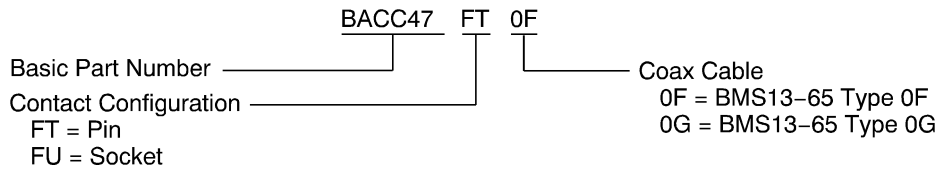
Coax Contact			Coax Cable
Size	Type	Boeing Standard or Part Number	
5	Pin	BACC47FT0F	BMS 13-65 Type 0F
		BACC47FT0G	BMS 13-65 Type 0G
	Socket	BACC47FU0F	BMS 13-65 Type 0F
		BACC47FU0G	BMS 13-65 Type 0G
8	Pin	1757624-1	BMS 13-65 Type 0F
	Socket	1883369-2	BMS 13-65 Type 0F
		S280W554-111	S280W503-1
			BMS 13-65 Type 0E
		S280W554-113	S280W503-2
	BMS 13-65 Type 0F		

NOTE: The coax pin contact has an outer pin contact and an inner socket contact.

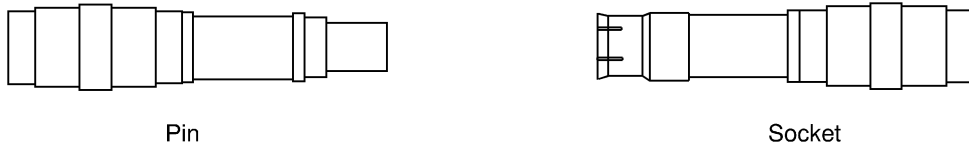
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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

NOTE: The coax socket contact has an outer socket contact and an inner pin contact.



SIZE 5 COAX CONTACT PART NUMBER STRUCTURE
Figure 10



SIZE 5 COAX CONTACTS
Figure 11

Table 9
APPROVED SUPPLIERS OF BOEING STANDARD COAX CONTACTS

Coax Contact	Supplier
BACC47FT()	Radiall
	Jerrik
BACC47FU()	Radiall
	Jerrik
S280W554-111	ITT Cannon
S280W554-113	ITT Cannon
1757624-1	Tyco
1883369-2	Tyco

Table 10
ALTERNATIVE PART NUMBERS FOR SIZE 8 COAX CONTACTS

Boeing Standard	Contact	
	Part Number	Supplier
S280W554-111	349-1087-003	ITT Cannon
S280W554-113	349-1087-004	ITT Cannon

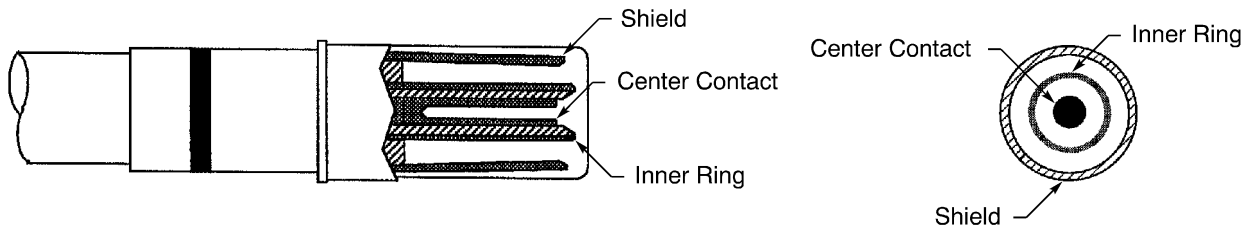
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

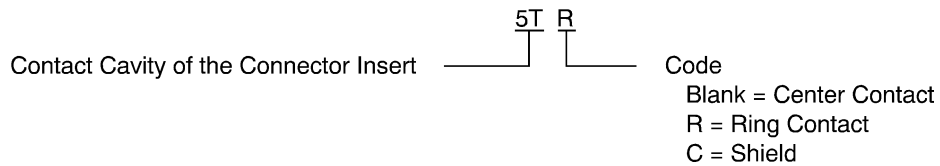
D. Size 8 Twinax Contact Part Numbers

**Table 11
BOEING STANDARD SIZE 8 TWINAX CONTACTS**

Contact Size	Type	Retention	Boeing Standard	Color Code	
				Band	Color
8	Socket	Rear Release, Rear Removal	S280W552-105	1	Blue
				2	-
			S280W552-205	1	Blue
				2	Blue



**TWINAX CONTACT ELECTRICAL COMPONENTS
Figure 12**



**TWINAX CONTACT TERMINATION IDENTIFICATION
Figure 13**

**Table 12
SIZE 8 TWINAX CONTACT TERMINATION IDENTIFICATION**

Twinax Cable Component	Twinax Contact Termination Component	Code	Reference
Blue Wire	Center Contact	Blank	Figure 12
			Figure 13
White Wire	Inner Ring	R	Figure 12
			Figure 13
Shield	Outer Contact Body	C	Figure 12
			Figure 13

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

Table 13
OBSOLETE PART NUMBERS FOR SIZE 8 TWINAX CONTACTS

Obsolete Contact	Replacement Contact
S280W552-105	S280W552-205

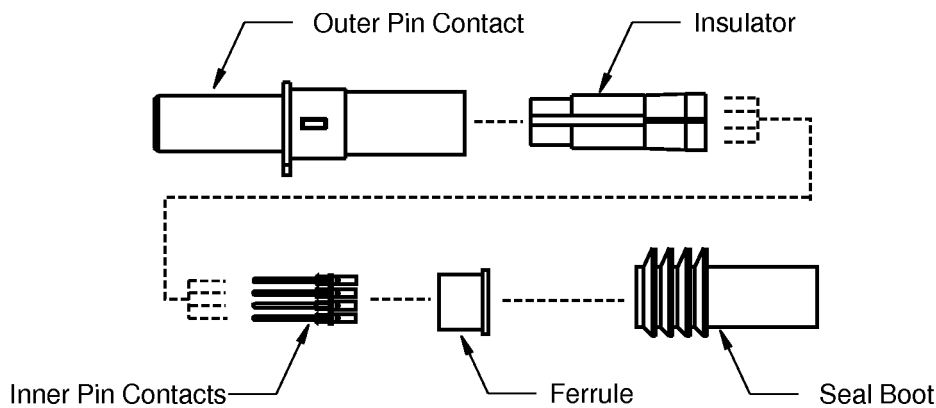
Table 14
SUPPLIER PART NUMBERS FOR BOEING STANDARD SIZE 8 TWINAX CONTACTS

Boeing Standard	Alternative Contact	
	Part Number	Supplier
S280W552-205	349-1081-001	ITT Cannon
	318-L8T2-614	Tri-Star

E. Size 8 Quadrax Contacts

Table 15
BOEING STANDARD SIZE 8 QUADRAX CONTACTS

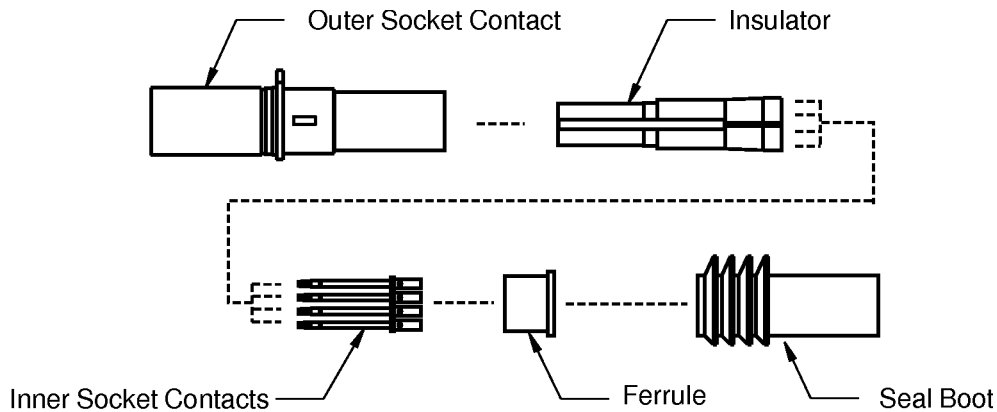
Contact Size	Type	Boeing Standard	Reference
8	Pin	BACC47GA1	Figure 14
8	Socket	BACC47GB1	Figure 15



COMPONENTS SUPPLIED WITH THE BACC47GA QUADRAX PIN CONTACT
Figure 14

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COMPONENTS SUPPLIED WITH THE BACC47GB QUADRAX SOCKET CONTACT
Figure 15

Table 16
QUADRAX CONTACT SEAL BOOT PART NUMBERS

Description	Part Number	Supplier	Reference
Seal Boot	1877626-1	Tyco	Figure 16

NOTE: The Tyco 1877626-1 seal boot is necessary for the installation of these quadrax contacts in the BAC10AL insert.



TYCO 1877626-1 SEAL BOOT
Figure 16

Table 17
SUPPLIER PART NUMBERS FOR BOEING STANDARD SIZE 8 QUADRAX CONTACTS

Boeing Standard	Alternative Contact	
	Part Number	Supplier
BACC47GA1	1445692-4	Tyco
BACC47GB1	1445693-4	Tyco

F. Fiber Optic Contact Terminus Part Numbers

NOTE: The BACT64A() fiber optic terminus is part of the fiber optic cable assembly and cannot be removed. If it is necessary to replace a terminus, the fiber optic cable assembly must be replaced.

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

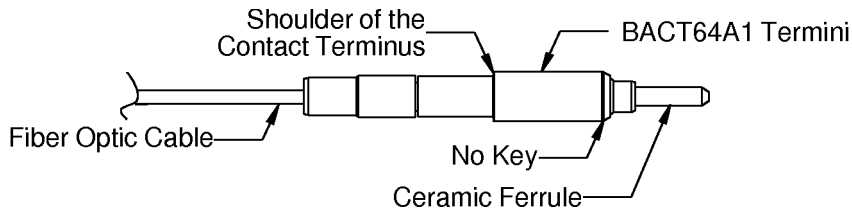
Refer to Subject 20-12-20 for:

- The inspection and cleaning procedures for fiber optic termini
- The fiber optic cable assembly part numbers.

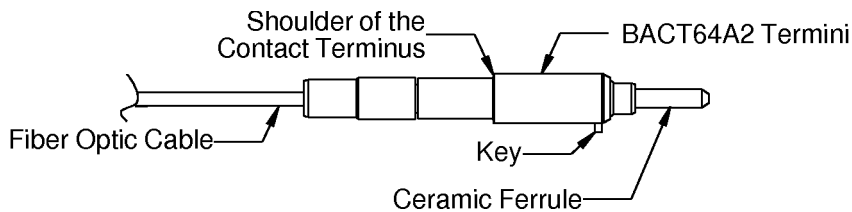
**Table 18
FIBER OPTIC CONTACT TERMINUS PART NUMBERS**

Cable Assembly Part Number	Contact Terminus					Reference
	Type		Size	Part Number		
	End 1	End 2		End 1	End 2	
BACC69()AA	A (Non-keyed)	A (Non-keyed)	16	BACT64A1	BACT64A1	Figure 17
BACC69()CC	C (Keyed)	C (Keyed)	16	BACT64A2	BACT64A2	Figure 18
BACC69()AC	A (Non-keyed)	C (Keyed)	16	BACT64A1	BACT64A2	-

NOTE: A contact terminus that has a key can only be installed in a contact terminus cavity that has a keyway.



**NON-KEYED FIBER OPTIC CONTACT TERMINUS
Figure 17**



**KEYED FIBER OPTIC CONTACT TERMINUS
Figure 18**

G. Fiber Optic Alignment Sleeve Insert Part Numbers

**Table 19
ALIGNMENT SLEEVE INSERT PART NUMBERS**

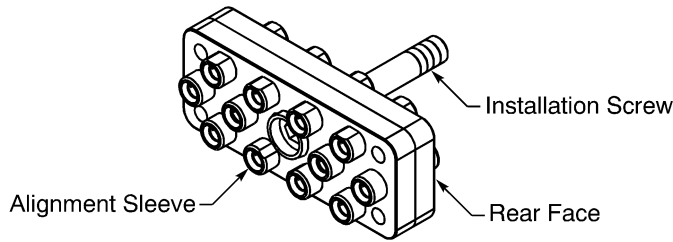
Boeing Standard	Configuration
BAC10AU12R	Rectangular

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ASSEMBLY OF BACI10AL, BACI10AM, AND BACI10AP RECTANGULAR CONNECTOR INSERTS

Table 20
APPROVED SUPPLIERS OF BOEING STANDARD ALIGNMENT SLEEVE INSERTS

Alignment Sleeve Insert	Supplier
BACI10AU12R	Radiall



ALIGNMENT SLEEVE INSERT
Figure 19

3. INSERT CONFIGURATIONS

A. BACI10AL Inserts

Table 21
BACI10AL INSERT CONFIGURATIONS

Insert Configuration	Contact Cavity				Reference
	Count	Size	Type	Identification	
BACI10AL00-N	0	-	-	-	Figure 20
BACI10AL3Q3	3	8	Quadrax, Twinax, Coax, or Power	1, 2, and 3	Figure 21
BACI10AL03	3	5	Coax or Power	A, B, and C	Figure 22
BACI10AL03P	3	5	Coax or Power	1, 2, and 3	Figure 23
BACI10AL06	6	12	Standard	1 thru 6	Figure 24
BACI10AL10Q2	8	20	Standard	3 thru 10	Figure 25
	2	8	Quadrax, Twinax, Coax, or Power	1 and 2	
BACI10AL12F	12	16	Fiber Optic Terminus, Non Keyed	1 thru 12	Figure 26
BACI10AL12FK	12	16	Fiber Optic Terminus, Keyed	1 thru 12	Figure 27
BACI10AL13C1	6	20	Standard	1 thru 4, 7, and 8	Figure 28
	4	16	Standard	9 thru 12	
	2	12	Standard	5 and 6	
	1	5	Coax or Power	A1	

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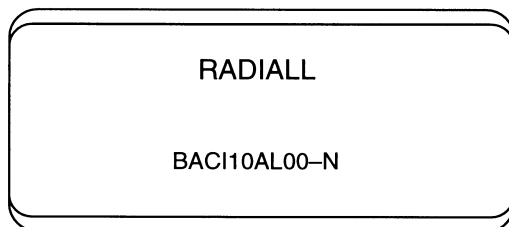
Table 21 (continued)

Insert Configuration	Contact Cavity				Reference
	Count	Size	Type	Identification	
BACI10AL13P1	6	20	Standard	1 thru 4, 7, and 8	Figure 29
	4	16	Standard	9 thru 12	
	2	12	Standard	5 and 6	
	1	5	Coax or Power	A1	
BACI10AL14	14	16	Standard	1 thru 14	Figure 30
BACI10AL17	14	20	Standard	1 thru 4, 6, 7, 9, and 11 thru 17	Figure 31
	3	12	Standard	5, 8, and 10	
BACI10AL20C1	19	20	Standard	1 thru 19	Figure 32
	1	5	Coax or Power	20	
BACI10AL22	6	16	Standard	1 thru 8, and 15 thru 22	Figure 33
	16	20	Standard	9 thru 14	
BACI10AL22V1	6	16	Standard	1 thru 6	Figure 34
	16	20	Standard	7 thru 22	
BACI10AL25P1	1	8	Quadrax, Twinax, Coax, or Power	1	Figure 35
	24	22	Standard	2 thru 25	
BACI10AL25Q1	24	22	Standard	1 thru 24	Figure 36
	1	8	Quadrax, Twinax, Coax, or Power	25	
BACI10AL28	22	22	Standard	1 thru 22	Figure 37
	6	16	Standard	A thru F	
BACI10AL30	30	20	Standard	1 thru 30	Figure 38
BACI10AL34	18	22	Standard	9 thru 17, and 26 thru 34	Figure 39
	16	20	Standard	1 thru 8, and 18 thru 25	
BACI10AL40	40	22	Standard	A1 thru D10	Figure 40

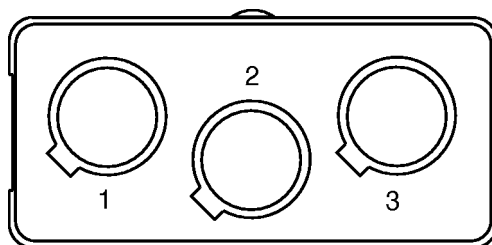
NOTE: Figure 20 through Figure 40 show the rear side of shell size 2 inserts for pin contacts. The view of a BACI10AL insert for socket contacts is a mirror image of this view.

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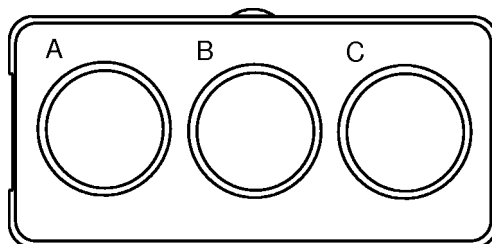
ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS



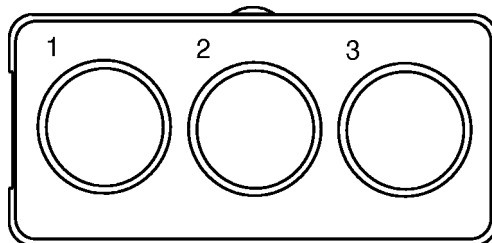
BAC110AL00-N INSERT
Figure 20



BAC110AL3Q3 INSERT
Figure 21



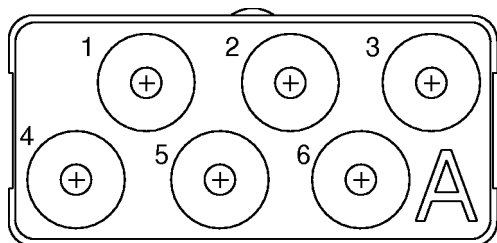
BAC110AL03 INSERT
Figure 22



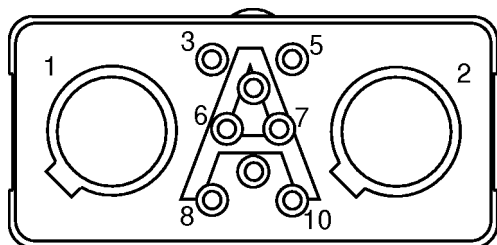
BAC110AL03P INSERT
Figure 23

STANDARD WIRING PRACTICES MANUAL

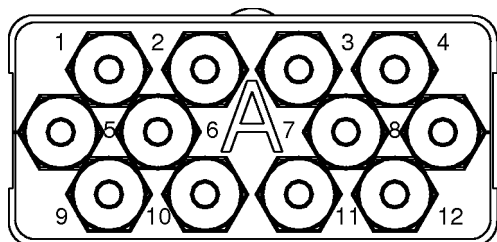
ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS



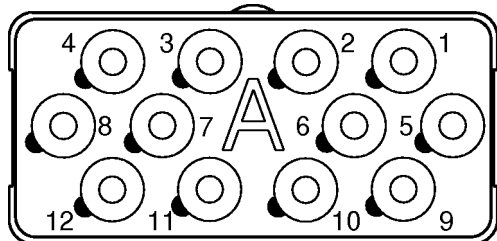
BAC110AL06 INSERT
Figure 24



BAC110AL10Q2 INSERT
Figure 25



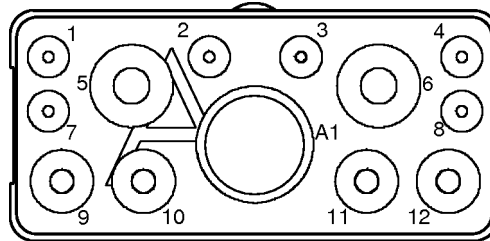
BAC110AL12F INSERT
Figure 26



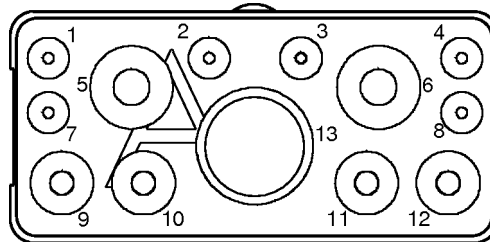
BAC110AL12FK INSERT
Figure 27

STANDARD WIRING PRACTICES MANUAL

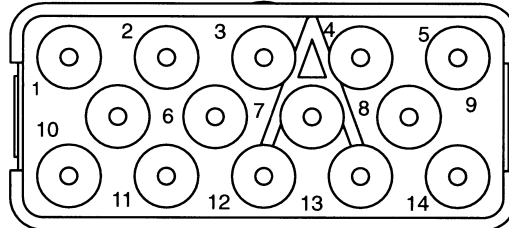
ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



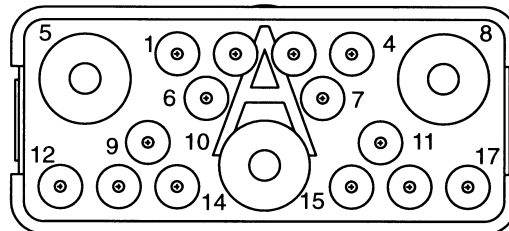
BAC10AL13C1 INSERT
Figure 28



BAC10AL13P1 INSERT
Figure 29



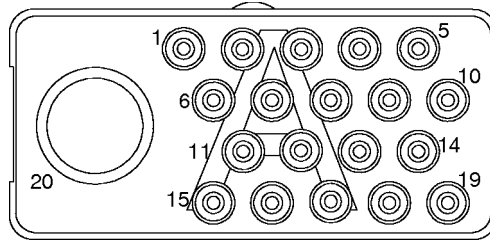
BAC10AL14 INSERT
Figure 30



BAC10AL17 INSERT
Figure 31

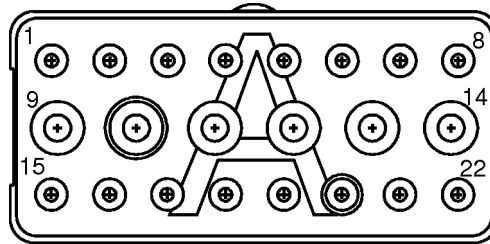
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS



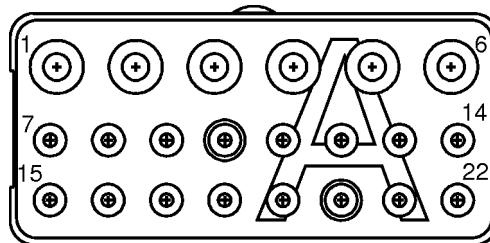
BAC110AL20C1 INSERT

Figure 32



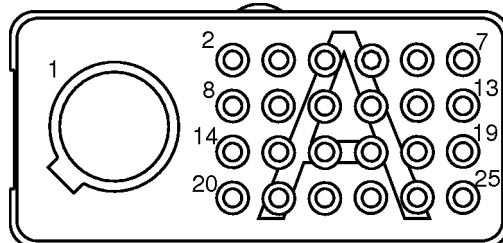
BAC110AL22 INSERT

Figure 33



BAC110AL22V1 INSERT

Figure 34

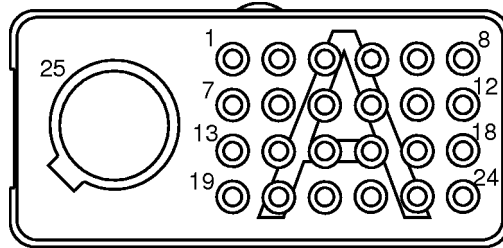


BAC110AL25P1 INSERT

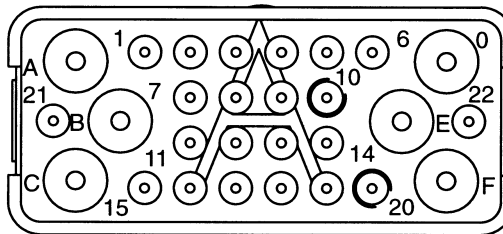
Figure 35

STANDARD WIRING PRACTICES MANUAL

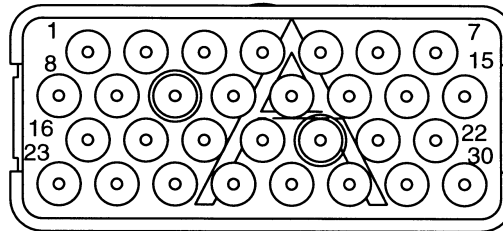
ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS



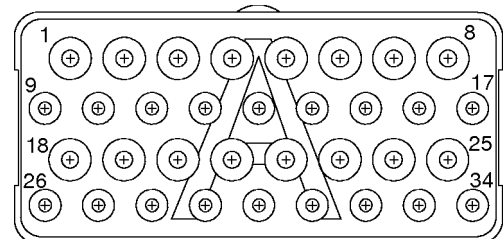
BAC110AL25Q1 INSERT
Figure 36



BAC110AL28 INSERT
Figure 37



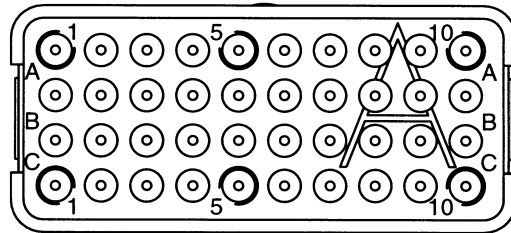
BAC110AL30 INSERT
Figure 38



BAC110AL34 INSERT
Figure 39

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS



BAC110AL40 INSERT
Figure 40

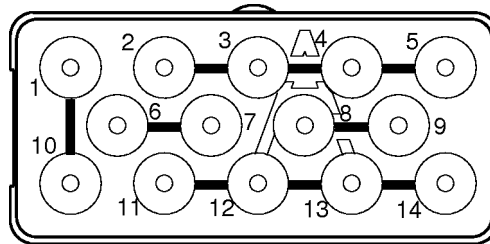
B. BAC110AM Inserts

Table 22
BAC110AM BUSSED INSERT CONFIGURATIONS

Insert Configuration	Contact		Cavity	Reference
	Count	Size		
BAC110AM14L1AP	14	16	1 through 14	Figure 41
BAC110AM30L2AP	30	20	1 through 30	Figure 42
BAC110AM40L2AP	40	22	A1 through D10	Figure 43

NOTE: These inserts have contact cavities that are electrically connected together. The thick black lines in Figure 41 through Figure 43 show the internal connections

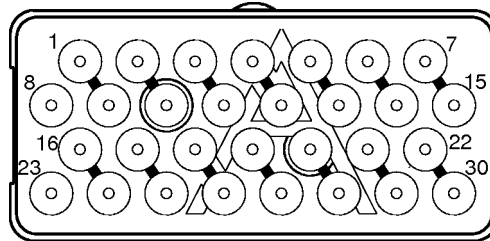
NOTE: Figure 41 through Figure 43 show the rear side of shell size 2 busbed inserts that have pin contacts. Busbed inserts do not have socket contacts.



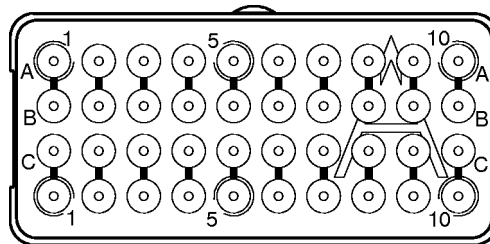
BAC110AM14L1AP INSERT
Figure 41

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACI10AL, BACI10AM, AND BACI10AP RECTANGULAR CONNECTOR INSERTS



BACI10AM30L2AP INSERT
Figure 42



BACI10AM40L2AP INSERT
Figure 43

C. BACI10AP Inserts

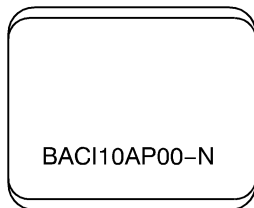
Table 23
BACI10AP INSERT CONFIGURATIONS

Insert Configuration	Contact		Cavity	Reference
	Count	Size		
BACI10AP00-N	0	-	-	Figure 44
BACI10AP01W1	1	5	1	Figure 45
BACI10AP04	2	16	2, 3	Figure 46
	2	12	1, 4	
BACI10AP09	3	20	3, 4, 9	Figure 47
	6	16	1, 2, 5, 6, 7, 8	
BACI10AP14	14	20	1 through 14	Figure 48
BACI10AP14M	8	22	1, 2, 5, 6, 9, 10, 11, 12	Figure 49
	3	20	3, 8, 13	
	3	16	4, 7, 14	
BACI10AP17	12	22	4, 7 through 17	Figure 50
	5	20	1, 2, 3, 5, 6	
BACI10AP20	20	22	A1 through D5	Figure 51

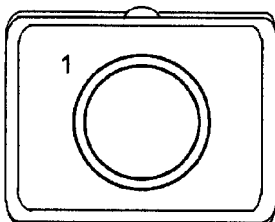
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

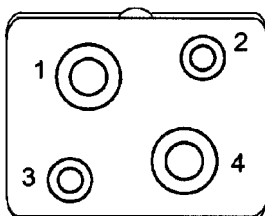
NOTE: Figure 44 through Figure 51 show the rear side of the shell size 1 inserts for pin contacts. The view of a BAC10AP insert for socket contacts is a mirror image of this view.



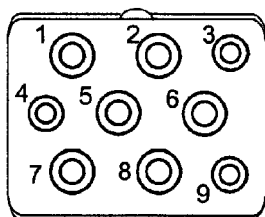
BAC10AP00-N INSERT
Figure 44



BAC10AP01W1 INSERT
Figure 45



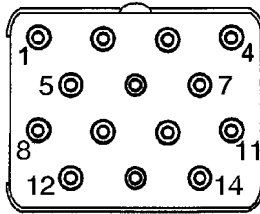
BAC10AP04 INSERT
Figure 46



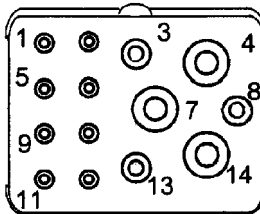
BAC10AP09 INSERT
Figure 47

STANDARD WIRING PRACTICES MANUAL

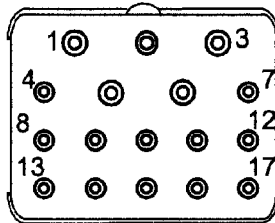
ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS



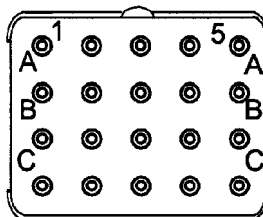
BAC110AP14 INSERT
Figure 48



BAC110AP14M INSERT
Figure 49



BAC110AP17 INSERT
Figure 50



BAC110AP20 INSERT
Figure 51

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

4. CONNECTOR INSERT DISASSEMBLY

A. Seal Plug and Seal Rod Removal

**Table 24
NECESSARY TOOLS**

Tool	Type
Pliers	Needle Nose

(1) Make a selection of a pair of pliers from Table 24.

CAUTION: MAKE SURE THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) If it is necessary to get access to the rear of the insert, remove the plastic tie straps or the wire harness ties that are less than 6 inches from the connector.
- (3) Tightly hold the end of the seal plug or the seal rod in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod straight out of the contact cavity.

B. Contact Removal

This paragraph gives the procedure to remove size 2222, 2020, 1616, 1212, size 8 coax, twinax and quadrax, and size 0808 power contacts from the connector insert.

For the procedure to remove these contacts from the insert, refer to:

- Paragraph 4.C. for size 5 coax and size 0508 power contacts
- Paragraph 4.D. for fiber optic contact termini.

For the procedure to remove ground block contacts from the connector ground block, refer to:

- Subject 20-74-12 for BACC65AA and BACC65AB connectors
- Subject 20-74-13 for BACC65AN, BACC65AP, BACC65AV and BACC65AW connectors
- Subject 20-74-14 for BACC65BJ and BACC65BK connectors.

**Table 25
REMOVAL TOOLS FOR SIZE 2222, 2020, 1616, AND 1212 CONTACTS**

Contact Size	Contact Engaging End Size	Contact Cavity Size	Removal Tool	
			Part Number	Color
2222	22	22	M81969/1-01	White
			DRK266J	-
2020	20	20	M81969/39-01	White
			CIET-20HDL	-
1616	16	16	M81969/14-03	White
			CIET-16	-
1212	12	12	M81969/14-04	White
			CET-12-4	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

Table 26
REMOVAL TOOLS FOR SIZE 8 COAX, TWINAX, QUADRAX, AND SIZE 0808 POWER CONTACTS

Contact Cavity Size	Removal Tool	
	Part Number	
8	1738894-1	

- (1) Make a selection of a contact removal tool from:
 - Table 25 for size 2222, 2020, 1616 and 1212 contacts
 - Table 26 for size 8 coax, size 8 twinax, size 8 quadrax and size 0808 power contacts.

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

- (2) If the contact is a size 8 coax, size 8 twinax, size 8 quadrax or a size 0808 power contact, pull the seal boot out of the contact cavity and back away from the grommet.
- (3) Put the tip of the removal tool on the wire near the rear of the insert.
- (4) Axially align the removal tool and the contact cavity.
Make sure that the removal tool is perpendicular to the face of the insert.
- (5) Carefully push the removal tool into the contact cavity until it stops.
Make sure that:
 - The tool stays aligned with the cavity
 - The tool is not turned in the cavity.

CAUTION: IF THE TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (6) Carefully pull the wire and the removal tool out of the contact cavity at the same time.
- (7) If the contact is not released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (3) through Step (6) again.

C. Removal of Size 5 Coax and Size 0508 Power Contacts

This paragraph gives the procedure to remove size 5 coax contacts and size 0508 power contacts from the connector insert.

Table 27
REMOVAL TOOLS FOR SIZE 5 COAX AND SIZE 0508 POWER CONTACTS

Contact Cavity Size	Removal Tool	
	Part Number	Color
5	MS3178-001	White
	CET-C8	-

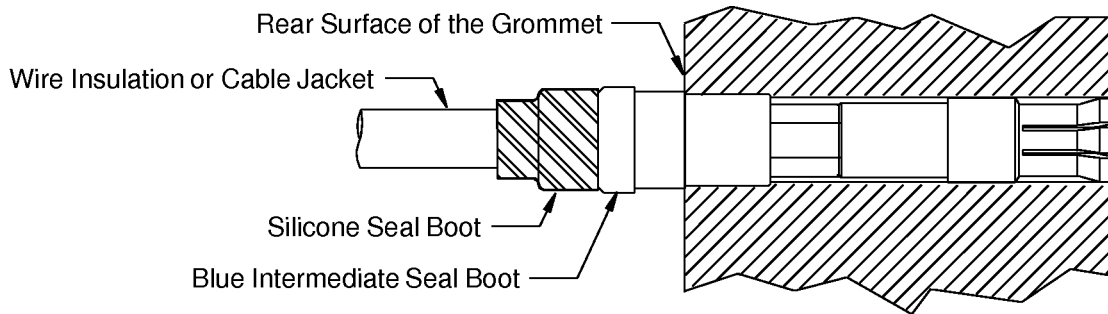
- (1) Make a selection of a contact removal tool from Table 27.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

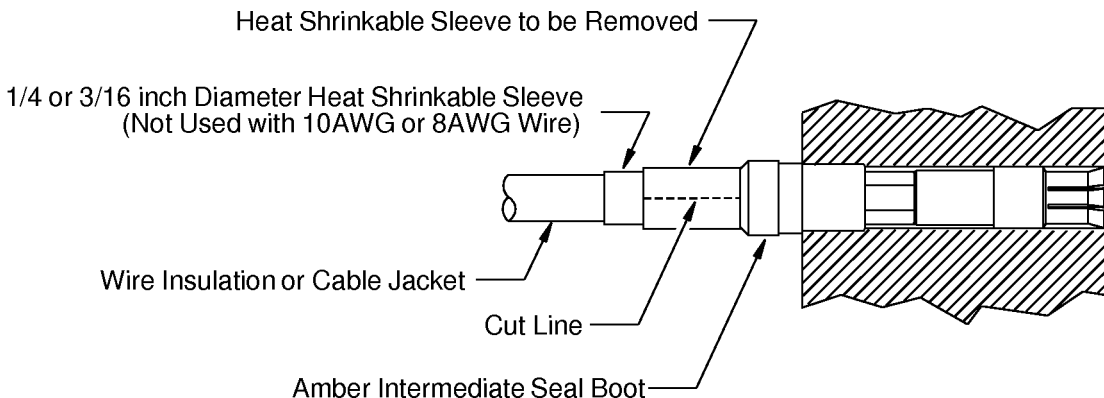
CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

- (2) If the contact has a blue intermediate seal boot, pull the silicone seal boot and the blue intermediate seal boot out of the contact cavity and back away from the insert. Refer to Figure 52.



REMOVAL OF THE SILICONE SEAL BOOT AND THE BLUE INTERMEDIATE SEAL BOOT
Figure 52

- (3) If the contact has an amber intermediate seal boot:
 - (a) Carefully cut the heat shrinkable sleeve longitudinally to remove it from the cable. Refer to Figure 53.



REMOVAL OF THE HEAT SHRINKABLE SLEEVE AND THE AMBER INTERMEDIATE SEAL BOOT
Figure 53

CAUTION: DO NOT CUT ALL THE WAY THROUGH THE HEAT SHRINKABLE SLEEVE. DAMAGE TO THE INSULATION OF THE WIRE OR CABLE CAN OCCUR.

- (b) Pull or tear the heat shrinkable sleeve until it is not attached.
- (c) Pull the amber intermediate seal boot out of the contact cavity and back away from the insert.
- (4) Put the tip of the removal tool on the wire near the rear of the insert.
- (5) Axially align the removal tool and the contact cavity.
 Make sure that the removal tool is perpendicular to the rear face of the insert.
- (6) Carefully push the removal tool into the contact cavity until it stops.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

Make sure that:

- The removal tool stays perpendicular to the rear face of the insert
- The removal tool is not turned in the cavity.

CAUTION: IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (7) Carefully pull the wire and the removal tool out of the contact cavity at the same time.
- (8) If the contact is not released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (5) through Step (7) again.

D. Removal of Fiber Optic Contact Termini

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A SEALED CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**Table 28
CONTACT TERMINUS REMOVAL TOOLS**

Terminus Size	Cavity Size	Removal Tool	
		Part Number	Color
16	16	M81969/14-03	White
		DRK83-16	-

- (1) Make a selection of a contact terminus removal tool from Table 28.

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) Remove the plastic tie straps on the wire harness ties that are less than 6 inches from the connector.
- (3) At the rear of the connector, put the tip of the removal tool on the cable.
- (4) Axially align the removal tool and contact terminus cavity.
- (5) Push the removal tool into the contact terminus cavity until it stops.

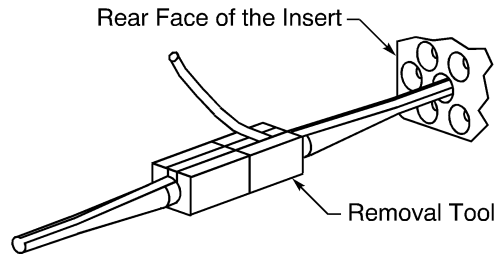
Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS



POSITION OF THE REMOVAL TOOL IN THE CONTACT TERMINUS CAVITY

Figure 54

- (6) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out of the cavity.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (7) If the contact terminus is not released:
- (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees on the cable assembly.
 - (c) Do Step (3) through Step (6) again.
- (8) If it is necessary, examine the contact terminus. Refer to Subject 20-12-20.
- (9) If the inspection is not necessary, put a clean protection cap on the contact terminus. Refer to Subject 20-12-20 for the protection cap part numbers.

NOTE: A clean plastic bag is a satisfactory alternative for the protection cap.

E. Removal of the Fiber Optic Alignment Sleeve Insert

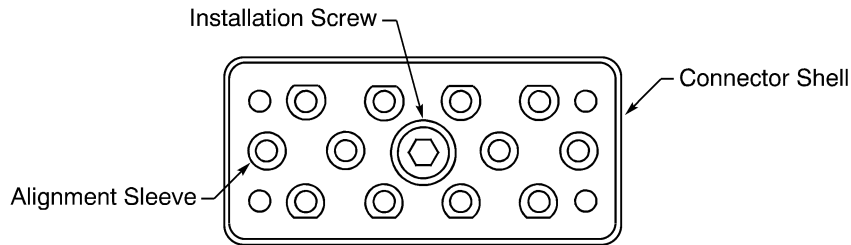
CAUTION: DO NOT PULL, SHAKE, OR TWIST THE ALIGNMENT SLEEVE INSERT FROM THE CONNECTOR INSERT. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

**Table 29
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



ALIGNMENT SLEEVE INSERT INSTALLATION SCREW

Figure 55

- (1) Make a selection of a driver from Table 29.

NOTE: The driver can have a ball type end.

- (2) Turn the installation screw in a counterclockwise direction until the screw is disengaged from the face of the insert.

CAUTION: DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT TO REMOVE IT FROM THE CONNECTOR INSERT. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

- (3) Put the alignment sleeve insert in a clean plastic bag.

CAUTION: KEEP THE ALIGNMENT SLEEVE INSERT IN A CLEAN PLASTIC BAG UNTIL IT IS INSTALLED IN THE CONNECTOR INSERT. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR INSERT.

5. CONNECTOR INSERT ASSEMBLY

A. Contact Assembly

This paragraph gives the procedure to assemble size 2222, 2020, 1616, 1212, and 0808 contacts that are intended for installation in the connector insert.

For the procedure to assemble these insert contacts, refer to:

- Paragraph 5.I. for size 0508 power contacts
- Paragraph 5.C. for size 5 coax contacts
- Paragraph 5.D. for S280W554-111 and S280W554-113 size 8 coax contacts
- Paragraph 5.E. for Tyco 1757624-1 and Tyco 1883369-2 size 8 coax contacts
- Paragraph 5.F. for size 8 twinax contacts
- Paragraph 5.G. for size 8 quadrax contacts

For the procedure to assemble the connector ground block contacts, refer to the Subject for the connector:

**Table 30
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
26	2222	0.15	±0.02	-

20-74-02

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

Table 30 (continued)

Wire Size (AWG)	Contact Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	2222	0.15	± 0.02	-
	2020	0.17	± 0.03	-
	1616	0.56	± 0.03	Fold the conductor back
	1212	0.56	± 0.03	Fold the conductor back and put the folded back conductor in an IEI Y9015C or a Circon CE66FC contact filler.
22	2222	0.15	± 0.02	-
	2020	0.17	± 0.03	-
	1616	0.56	± 0.03	Fold the conductor back
	1212	0.56	± 0.03	Fold the conductor back and put the folded back conductor in an IEI Y9015C or a Circon CE66FC contact filler.
20	2020	0.17	± 0.03	-
	1616	0.28	± 0.03	-
	1212	0.56	± 0.03	Fold the conductor back
18	1616	0.28	± 0.03	-
	1212	0.56	± 0.03	Fold the conductor back
16	1616	0.28	± 0.03	-
	1212	0.28	± 0.03	-
14	1212	0.28	± 0.03	-
12	1212	0.28	± 0.03	-
10	0808	0.51	± 0.03	-
8	0808	0.51	± 0.03	-

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

**Table 31
CONTACT CRIMP TOOLS**

Contact Size	Wire Size (AWG)	Crimp Tool				
		Basic Unit		Die	Locator	
		Part Number	Setting		Part Number	Color
2222	26	M22520/2-01	3	-	M22520/2-23	-
		WA22	3	-	M22520/2-23	-
		WA22LC	3	-	M22520/2-23	-
	24	M22520/2-01	3	-	M22520/2-23	-
		WA22	3	-	M22520/2-23	-
		WA22LC	3	-	M22520/2-23	-
	22	M22520/2-01	4	-	M22520/2-23	-
		WA22	4	-	M22520/2-23	-
		WA22LC	4	-	M22520/2-23	-
2020	24	M22520/2-01	5	-	M22520/2-08	-
		WA22	5	-	M22520/2-08	-
		WA22LC	5	-	M22520/2-08	-
	22	M22520/2-01	6	-	M22520/2-08	-
		WA22	6	-	M22520/2-08	-
		WA22LC	6	-	M22520/2-08	-
	20	M22520/2-01	7	-	M22520/2-08	-
		WA22	7	-	M22520/2-08	-
		WA22LC	7	-	M22520/2-08	-
1616	24	M22520/1-01	4	-	M22520/1-02	Blue
		WA27F	4	-	M22520/1-02	Blue
	22	M22520/1-01	4	-	M22520/1-02	Blue
		WA27F	4	-	M22520/1-02	Blue
	20	M22520/1-01	4	-	M22520/1-02	Blue
		WA27F	4	-	M22520/1-02	Blue
	18	M22520/1-01	5	-	M22520/1-02	Blue
		WA27F	5	-	M22520/1-02	Blue
	16	M22520/1-01	6	-	M22520/1-02	Blue
WA27F		6	-	M22520/1-02	Blue	

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

Table 31 (continued)

Contact Size	Wire Size (AWG)	Crimp Tool					
		Basic Unit		Die	Locator		
		Part Number	Setting		Part Number	Color	
1212	24	M22520/1-01	7	-	M22520/1-02	Yellow	
		WA27F	7	-	M22520/1-02	Yellow	
	22	M22520/1-01	7	-	M22520/1-02	Yellow	
		WA27F	7	-	M22520/1-02	Yellow	
	20	M22520/1-01	7	-	M22520/1-02	Yellow	
		WA27F	7	-	M22520/1-02	Yellow	
	18	M22520/1-01	7	-	M22520/1-02	Yellow	
		WA27F	7	-	M22520/1-02	Yellow	
	16	M22520/1-01	7	-	M22520/1-02	Yellow	
		WA27F	7	-	M22520/1-02	Yellow	
	14	M22520/1-01	7	-	M22520/1-02	Yellow	
		M22520/1-01	7	-	M22520/1-11	-	
		WA27F	7	-	M22520/1-02	Yellow	
		WA27F	7	-	M22520/1-11	-	
	12	M22520/1-01	8	-	M22520/1-02	Yellow	
		M22520/1-01	8	-	M22520/1-11	-	
		WA27F	8	-	M22520/1-02	Yellow	
		WA27F	8	-	M22520/1-11	-	
	0808	10	M22520/23-01	-	M22520/23-02	282588	-
			PICO400B	-	414DA-8N	282588	-
8		M22520/23-01	-	M22520/23-02	282588	-	
		PICO400B	-	414DA-8N	282588	-	

- (1) Make a selection of a crimp tool from Table 31.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

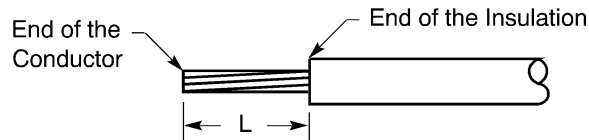
- Figure 56
- Table 30 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

NOTE: Refer to Subject 20-60-00:

- If the wire size and a larger crimp barrel size are not given in Table 30
- For the alternative to the assembly of a contact with a conductor that is folded back.

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INSULATION REMOVAL LENGTH

Figure 56

- (3) For size 20 and larger contact cavities:
 - (a) Measure the O.D. of the wire.
 - (b) If the O.D. of the wire is less than the minimum seal diameter of the grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.C.
- (4) If it is specified, fold the conductor back. Refer to Figure 57.



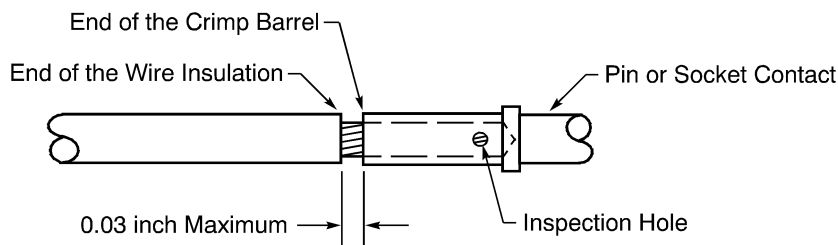
FOLDED BACK CONDUCTOR

Figure 57

- (5) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 58.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT

Figure 58

- (6) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

B. Assembly of Size 0508 Power Contacts

**Table 32
CONTACT CRIMP TOOLS AND NECESSARY FILLER WIRE**

Contact Size	Primary Wire Size (AWG)	Filler Wire		Crimp Tool		
		Size (AWG)	Quantity	Basic Unit	Die	Locator
0508	16	12	2	M22520/23-01	M22520/23-02	282557020
				PICO400B	414DA-8N	282557020 4046A
	14	10	1	M22520/23-01	M22520/23-02	282557020
				PICO400B	414DA-8N	282557020 4046A
	12	12	1	M22520/23-01	M22520/23-02	282557020
				PICO400B	414DA-8N	282557020 4046A
0508	10	-	0	M22520/23-01	M22520/23-02	282557020
				PICO400B	414DA-8N	282557020 4046A
	8	-	0	M22520/23-01	M22520/23-02	282557020
				PICO400B	414DA-8N	282557020 4046A

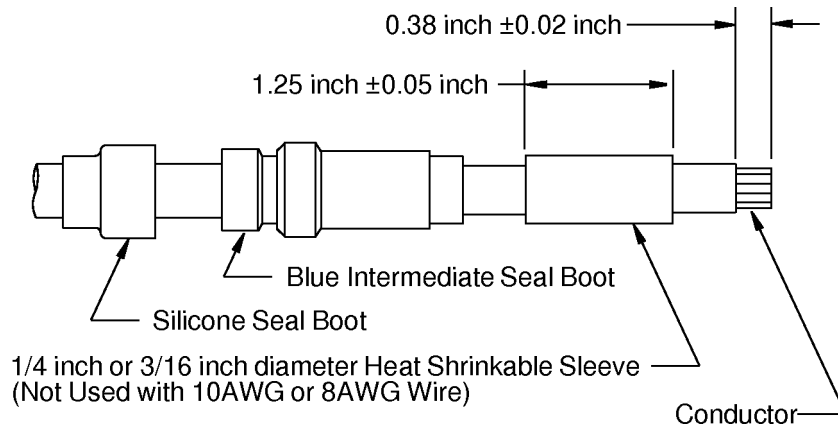
**Table 33
HEAT SHRINKABLE SLEEVE**

Wire Size (AWG)	Sleeve			Material
	Diameter (inch)	Length (inch)		
		Target	Tolerance	
8	None	-	-	Grade B, Class 1 Heat Shrinkable Sleeve from Subject 20-00-11
10				
12	1/4	1.25	± 0.05	
14				
16	3/16	1.25	± 0.05	

- (1) Cut the end of the wire perpendicular to the longitudinal axis of the wire.
- (2) If the contact is supplied with a blue intermediate seal boot:
Refer to Figure 59.

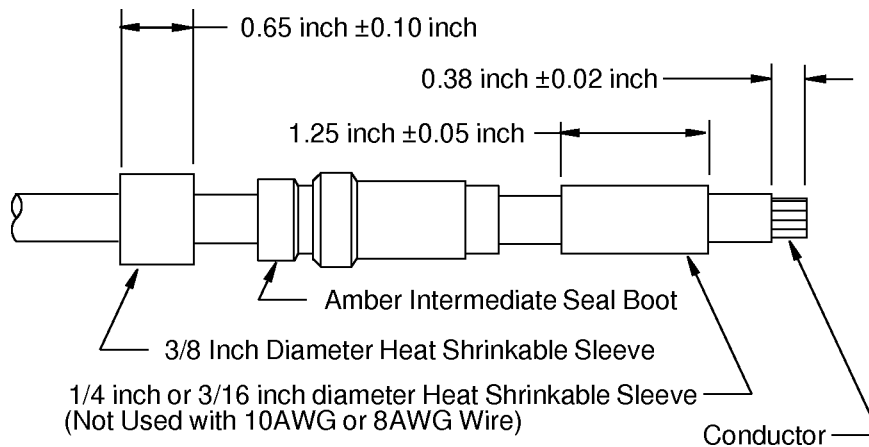
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



WIRE PREPARATION - BLUE INTERMEDIATE SEAL BOOT
Figure 59

- (a) Put the flexible silicone seal boot on the cable.
 Make sure that the larger end of the silicone seal boot points forward toward the end of the wire. Refer to Figure 59
- (b) Put the blue intermediate seal boot on the wire.
 Make sure that the longer end of the intermediate seal boot points forward toward the end of the wire. Refer to Figure 59
- (3) If the contact is supplied with an amber intermediate seal boot:
 Refer to Figure 60.



WIRE PREPARATION - AMBER INTERMEDIATE SEAL BOOT
Figure 60

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

- (a) Keep these parts from the contact kit:
 - The contact
 - The intermediate seal boot.
- (b) Discard the flexible silicone seal boot.
- (c) Make a selection of a 3/8 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (d) Put a 0.65 inch \pm 0.10 inch length of the 3/8 inch diameter sleeve on the wire.
- (e) Put the amber intermediate seal boot on the wire.

Make sure that the longer end of the amber seal boot points forward toward the end of the wire. Refer to Figure 60

- (4) If the wire size is AWG 12 or 14, make a selection of a 1/4 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11
- (5) If the wire size is AWG 12 or 14 put a 1.25 inch \pm 0.05 inch length of the 1/4 inch diameter sleeve on the wire. Refer to Table 32.
- (6) If the wire size is AWG 16, make a selection of a 3/16 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (7) If the wire size is AWG 16, put a 1.25 inch \pm 0.05 inch length of the 3/16 inch diameter sleeve on the wire. Refer to Table 32.
- (8) Remove 0.38 inch \pm 0.02 inch of the insulation from the end of the wire.

Refer to:

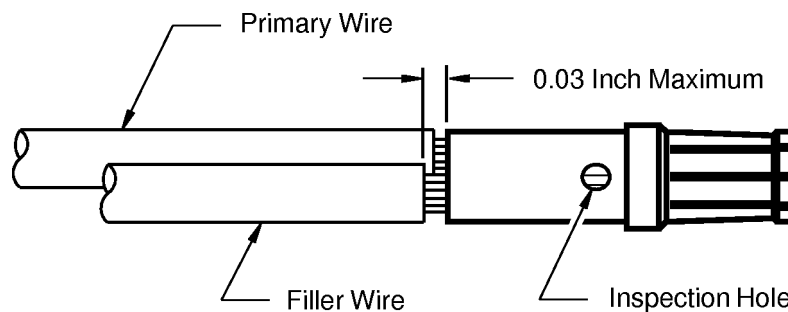
- Figure 59 if the contact is supplied with a blue intermediate seal boot
- Figure 60 if the contact is supplied with an amber intermediate seal boot
- Subject 20-00-15 for the insulation removal procedure..

- (9) Make a selection of a crimp tool from Table 32.
- (10) Put the wire and the necessary filler wire in the contact crimp barrel of the contact. Refer to Figure 61.

Make sure that:

- You can see the conductor strands in the inspection hole
- The maximum distance from the end of the wire insulation to the end of the contact is 0.03 inch.

NOTE: The filler wire must be the same wire type as the primary wire.



THE PRIMARY WIRE AND THE FILLER WIRE IN THE CRIMP BARREL
Figure 61

STANDARD WIRING PRACTICES MANUAL

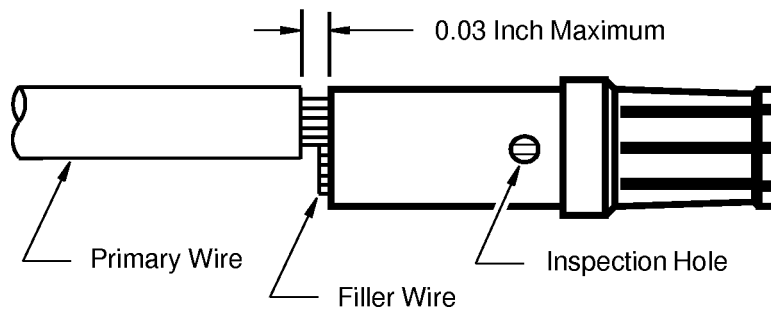
ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

(11) Crimp the contact.

NOTE: Deformation of the inspection hole is permitted if you can see the conductor strands in the hole.

(12) If the contact has a filler wire, carefully remove the unwanted length of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 62.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE STRANDS OF THE PRIMARY WIRE. DAMAGE TO THE CONDUCTOR CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.



UNWANTED LENGTH OF THE FILLER WIRE REMOVED
Figure 62

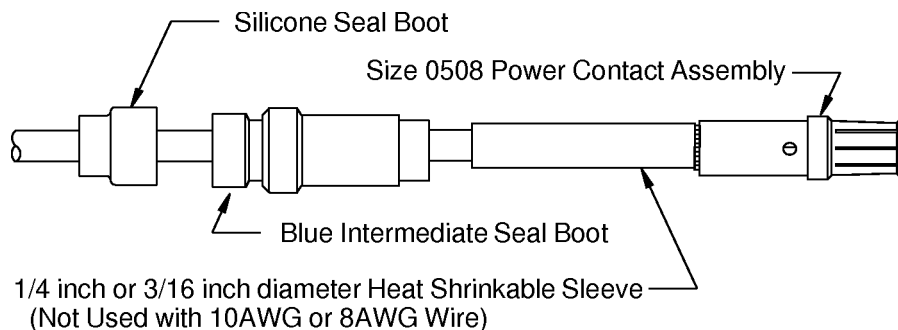
(13) If the primary wire size is AWG 12, 14, or 16, push the 1/4 or 3/16 inch diameter sleeve forward, as close as possible to the crimp barrel of the contact.

(14) Shrink the sleeve into its position.

Refer to:

- Figure 63.
- Subject 20-10-14.

(15) If the contact has a silicone seal boot and a blue intermediate seal boot, Let the silicone seal boot and the blue intermediate seal boot stay on the wire, away from the contact, until the contact is installed in a connector insert. Refer to Figure 63.



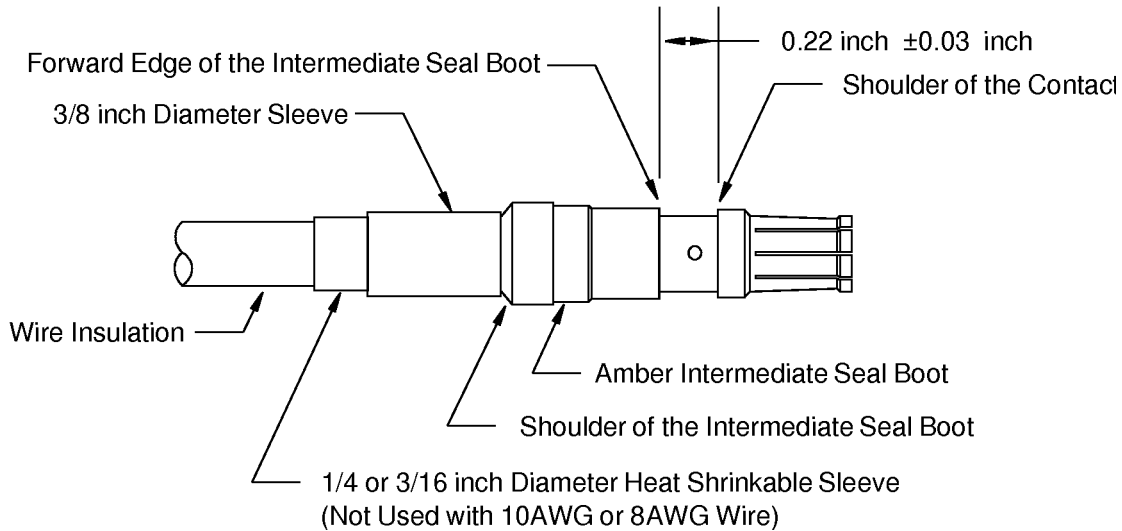
POSITION OF THE BLUE INTERMEDIATE SEAL BOOT
Figure 63

(16) If the contact has an amber intermediate seal boot:

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

- (a) Push the amber seal boot forward onto the contact body until the forward edge of the seal boot is 0.22 inch \pm 0.03 inch from the rear edge of the shoulder of the contact. Refer to Figure 64..
- (b) Push the 3/8 inch diameter sleeve forward on the intermediate seal boot. Refer to Figure 64.
Make sure that the forward edge of the 3/8 inch diameter sleeve is against the shoulder of the intermediate seal boot.



POSITION OF THE AMBER INTERMEDIATE SEAL BOOT AND THE HEAT SHRINKABLE SLEEVES
Figure 64

- (c) Shrink the 3/8 inch diameter sleeve into its position.
Refer to:
 - Figure 64.
 - Subject 20-10-14.

C. Assembly of Size 5 Coax Contacts

Table 34
COAX CONTACT CENTER CONTACT CRIMP TOOLS

Basic Unit		Locator
Part Number	Setting	
M22520/2-01	7	282 581 008

Table 35
COAX CONTACT FERRULE CRIMP TOOLS

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACT47FT0F	M22520/5-01	M22520/5-05	B

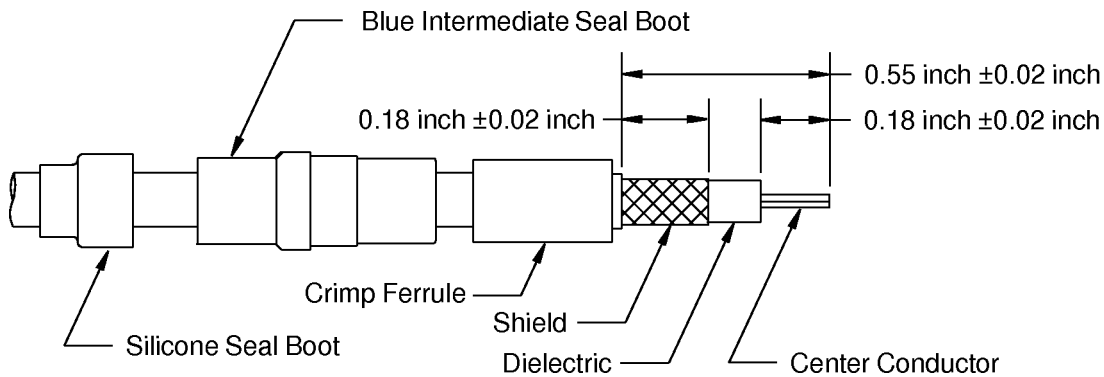
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

Table 35 (continued)

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACC47FT0G	M22520/5-01	M22520/5-45	B
BACC47FU0F	M22520/5-01	M22520/5-05	B
BACC47FU0G	M22520/5-01	M22520/5-45	B

- (1) Make a selection of a center contact crimp tool from Table 34.
- (2) Make a selection of a ferrule crimp tool from Table 35.
- (3) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
- (4) If the contact is supplied with a blue intermediate seal boot, prepare the cable. Refer to Figure 65.

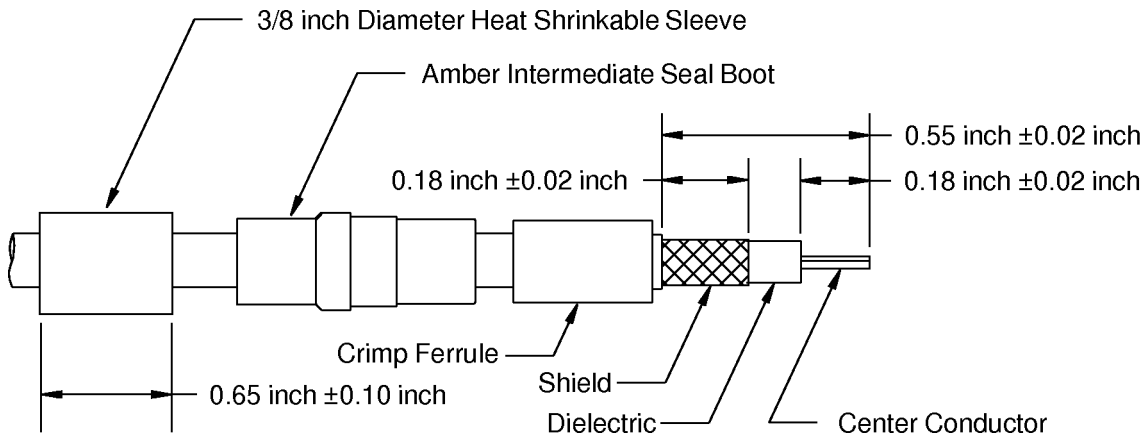


CABLE PREPARATION - BLUE INTERMEDIATE SEAL BOOT
Figure 65

- (a) Put these components on the cable:
 - The silicone sealing boot
 - The blue intermediate seal boot
 - The crimp ferrule.
 - (b) Remove 0.55 inch \pm 0.02 inch of cable jacket from the end of the cable.
 - (c) Remove the necessary length of shield to make the distance from the end of the shield to the end of the cable jacket equal to 0.18 inch \pm 0.02 inch.
 - (d) Remove the necessary length of dielectric to make the distance from the end of the center conductor to the end of the dielectric equal to 0.18 inch \pm 0.02 inch.
- (5) If the contact is supplied with an amber intermediate seal boot, prepare the cable. Refer to Figure 66.

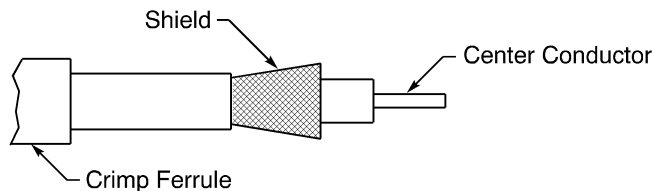
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



CABLE PREPARATION - AMBER INTERMEDIATE SEAL BOOT
Figure 66

- (a) Make a selection of a Grade B, Class 1 Heat Shrinkable Sleeve from Subject 20-00-11.
- (b) Put these components on the cable:
 - A 0.65 inch \pm 0.10 inch length of 3/8 inch diameter heat shrinkable sleeve
 - The amber intermediate seal boot
 - The crimp ferrule.
- (c) Remove 0.55 inch \pm 0.02 inch of cable jacket from the end of the cable.
- (d) Remove the necessary length of shield to make the distance from the end of the shield to the end of the cable jacket equal to 0.18 inch \pm 0.02 inch.
- (e) Remove the necessary length of dielectric to make the distance from the end of the center conductor to the end of the dielectric equal to 0.18 inch \pm 0.02 inch.
- (6) Prepare the shield. Refer to Figure 67.



SHIELD PREPARATION
Figure 67

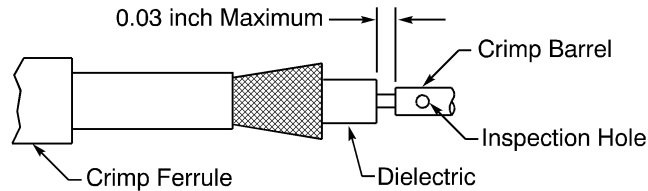
- (a) Move the strands of the round conductor shield apart.
- (b) Move the strands of the flat conductor shield apart.
- (7) Put the center conductor into the crimp barrel of the center contact. Refer to Figure 68.

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

Make sure that:

- All of the strands are in the crimp barrel of the center contact.
- The strands of the center conductor can be seen in the inspection hole
- The distance between the dielectric and end of the crimp barrel is not more than 0.03 inch



POSITION OF THE CENTER CONDUCTOR IN THE CRIMP BARREL
Figure 68

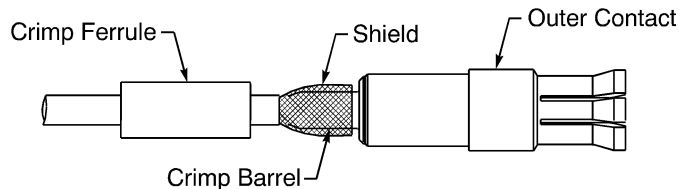
(8) Crimp the contact.

Make sure that:

- All of the strands are in the crimp barrel of the center contact.
- The strands of the center conductor can be seen in the inspection hole
- The distance between the dielectric and end of the crimp barrel is not more than 0.03 inch

(9) Push the outer contact onto the center contact assembly. Refer to Figure 69.

Make sure that the strands of the shield stay on the outer surface of the crimp barrel until the rear end of the crimp barrel is tight against the end of the jacket.



POSITION OF THE OUTER CONTACT
Figure 69

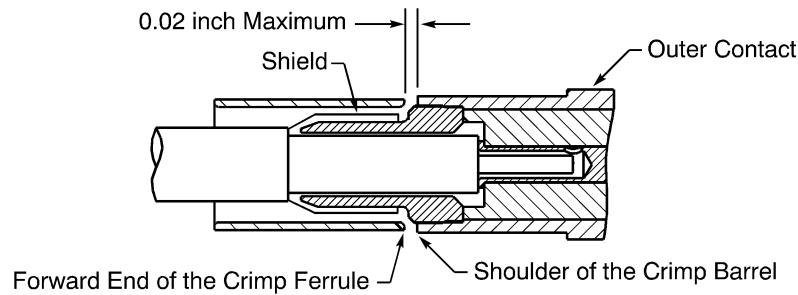
(10) Put the strands of the shield against the outer surface of the crimp barrel.

(11) Push the crimp ferrule forward until the forward end of the crimp ferrule is against the shoulder of the crimp barrel. Refer to Figure 70.

Make sure that the distance between the forward end of the crimp ferrule and the shoulder of the crimp barrel is not more than 0.02 inch.

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



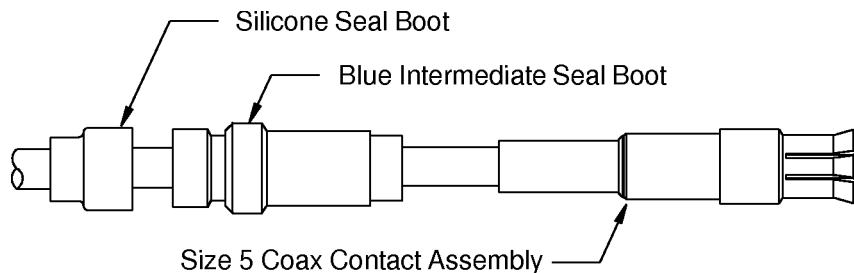
POSITION OF THE CRIMP FERRULE ON THE SHIELD AND THE CRIMP BARREL

Figure 70

- (12) Crimp the ferrule.

Make sure that the distance between the forward end of the crimp ferrule and the shoulder of the crimp barrel is not more than 0.02 inch.

- (13) If the contact has a silicone seal boot and a blue intermediate seal boot, Let the silicone seal boot and the blue intermediate seal boot stay on the cable, away from the contact, until the contact is installed in a connector insert. Refer to Figure 71.



POSITION OF THE BLUE INTERMEDIATE SEAL BOOT

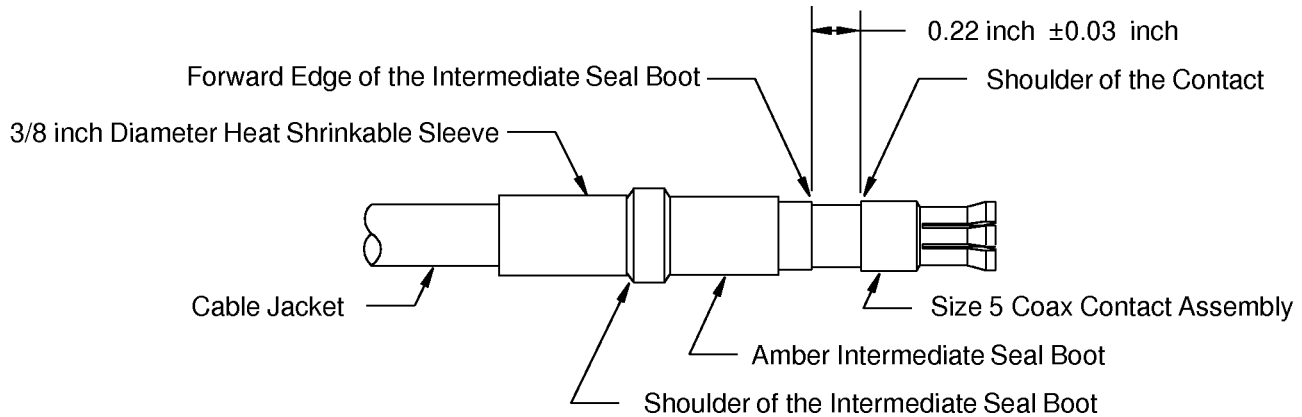
Figure 71

- (14) If the contact is supplied with an amber intermediate seal boot:

- (a) Push the amber intermediate seal boot forward onto the contact body until the forward edge of the seal boot is 0.22 inch \pm 0.03 inch from the rear edge of the shoulder of the contact. Refer to Figure 72..
- (b) Push the 3/8 inch diameter sleeve forward on the intermediate seal boot. Refer to Figure 72. Make sure that the forward edge of the 3/8 inch diameter sleeve is against the shoulder of the intermediate seal boot.

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



POSITION OF THE AMBER INTERMEDIATE SEAL BOOT AND THE HEAT SHRINKABLE SLEEVES
Figure 72

- (c) Shrink the 3/8 inch diameter sleeve into its position.
 Refer to:
- Figure 72.
 - Subject 20-10-14.

D. Assembly of S280W554-111 and S280W554-113 Size 8 Coax Contacts

Table 36
CENTER CONTACT CRIMP TOOLS

Coax Contact Size	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
8	M22520/2-01	5	K1025S

Table 37
OUTER CONTACT CRIMP TOOLS

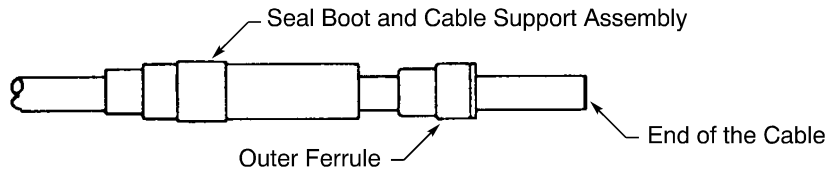
Coax Contact Size	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
8	M22520/5-01	Y793A	A

- (1) Make a selection of a center contact crimp tool from Table 36.
- (2) Make a selection of an outer contact crimp tool from Table 37.
- (3) Put these components on the cable:
 - The seal boot and cable support assembly
 - The outer ferrule.

Refer to Figure 73.

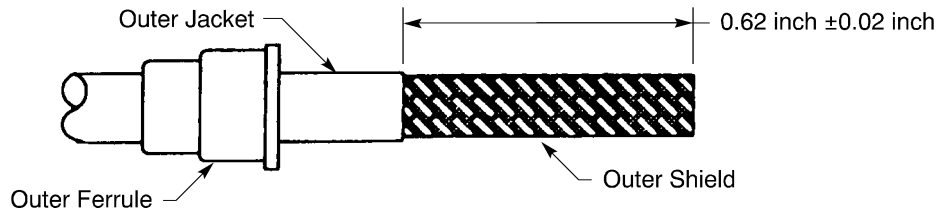
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



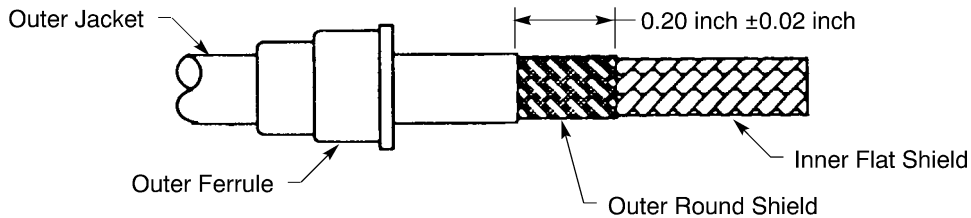
POSITION OF THE SEAL BOOT AND THE OUTER FERRULE ON THE CABLE
Figure 73

- (4) Remove 0.62 inch \pm 0.02 inch of jacket from the end of the cable. Refer to Figure 74.



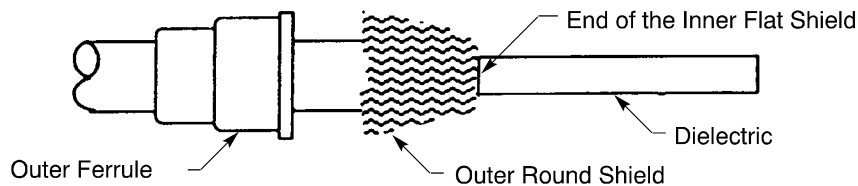
OUTER JACKET REMOVAL LENGTH
Figure 74

- (5) Cut the outer round shield to make the distance from the end of the cable jacket to the end of the round shield equal to 0.20 inch \pm 0.02 inch.
 Refer to Figure 75.



REMOVAL OF THE OUTER ROUND SHIELD
Figure 75

- (6) Loosen the round shield and fold it back on the cable jacket.
 (7) Cut the inner flat shield to align the edge of the shield with the edge of the folded back outer round shield. Refer to Figure 76.

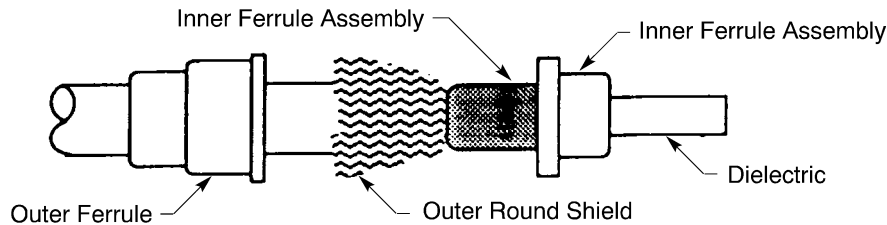


OUTER ROUND SHIELD FOLDED BACK
Figure 76

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

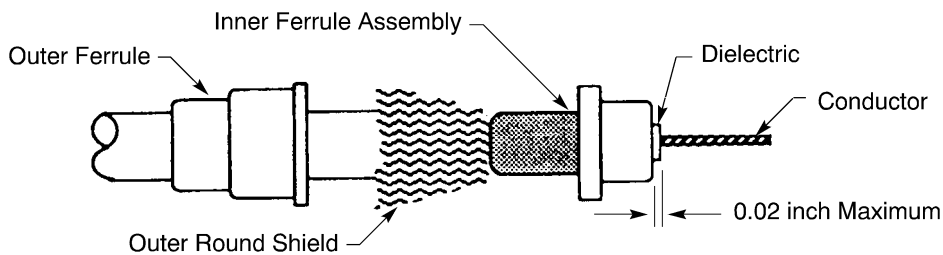
- (8) Push the inner ferrule assembly rearward on the dielectric until it is against the edge of the round shield. Refer to Figure 77.



POSITION OF THE INNER FERRULE ASSEMBLY ON THE CABLE
Figure 77

- (9) Remove the length of the dielectric between the end of the inner ferrule assembly and the end of the cable. Refer to Figure 78.

Make sure that the distance from the end of the dielectric to the edge of the inner ferrule assembly is not greater than 0.02 inch.



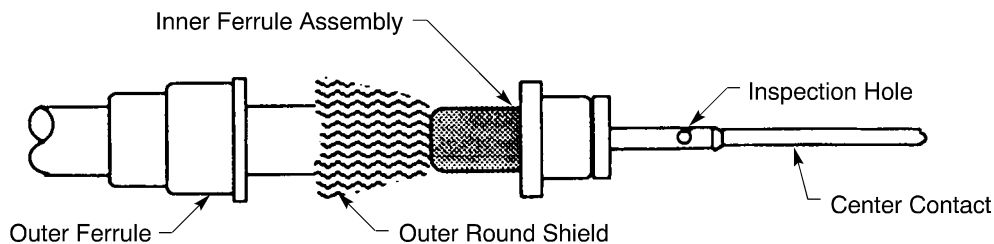
DIELECTRIC REMOVAL
Figure 78

- (10) Put the conductor into the crimp barrel of the center contact.

Make sure that:

- All of the strands of the conductor are in the center contact
- The conductor can be seen in the inspection hole.

- (11) Push the center contact rearward toward the outer ferrule until the inner ferrule assembly is against the outer round shield. Refer to Figure 79.

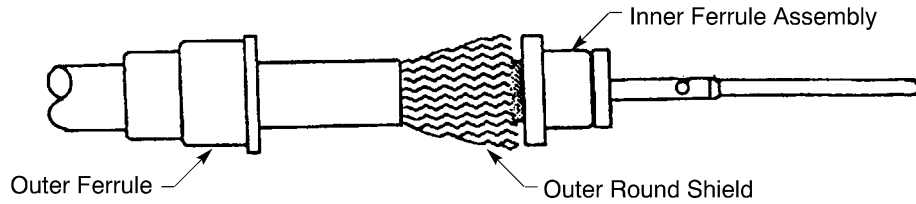


POSITION OF THE CENTER CONTACT ON THE CABLE
Figure 79

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

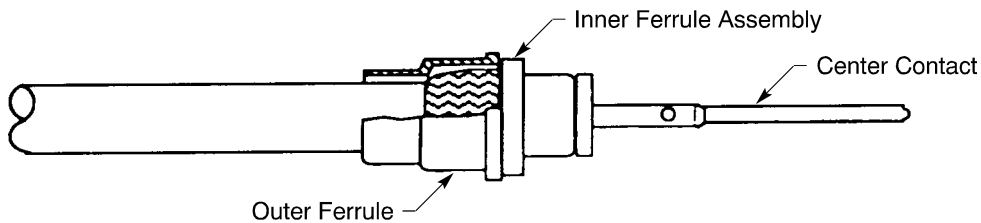
- (12) Crimp the center contact.
- (13) Symmetrically put the outer round shield around the inner ferrule assembly. Refer to Figure 80.



POSITION OF THE OUTER ROUND SHIELD ON THE INNER FERRULE ASSEMBLY

Figure 80

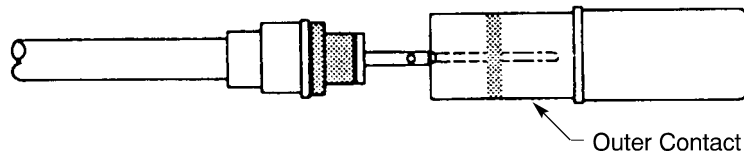
- (14) Push the outer ferrule forward until it is against the inner ferrule assembly. Refer to Figure 81. Make sure that the shield is between the outer ferrule and the inner ferrule assembly.



POSITION OF THE OUTER FERRULE AGAINST THE INNER FERRULE ASSEMBLY

Figure 81

- (15) Remove the unwanted length of the shield strands. Make sure that the end of the shield strands aligns with the rear edge of the shoulder of the inner ferrule assembly.
- (16) Push the cable and the inner contact assembly into the outer contact assembly until it stops. Refer to Figure 82.



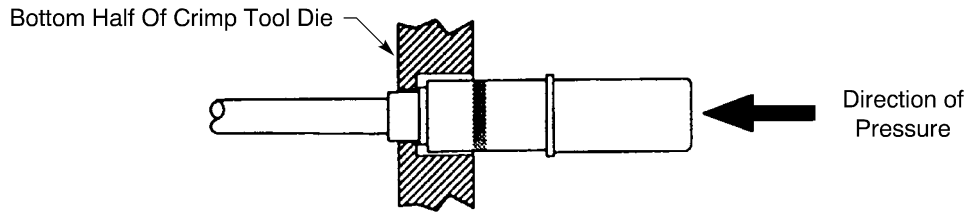
ALIGNMENT OF THE CENTER CONTACT AND THE OUTER CONTACT

Figure 82

- (17) Apply pressure on the outer contact toward the outer and inner ferrule and crimp the outer contact. Refer to Figure 83. Make sure that the outer contact is against the outer ferrule during the crimp operation.

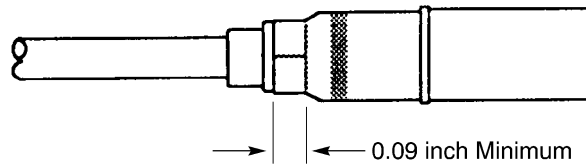
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



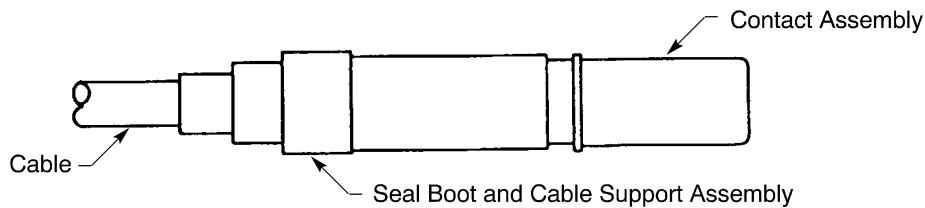
DIRECTION OF PRESSURE DURING THE CRIMP OPERATION
Figure 83

- (18) Examine the crimp area of the outer contact.
Make sure that the length of the crimp area on the outer contact is 0.09 inch or longer. Refer to Figure 84.



CRIMP AREA OF THE OUTER CONTACT
Figure 84

- (19) Push the seal boot and cable support assembly toward the contact assembly until it stops. Refer to Figure 85.



POSITION OF THE SEAL BOOT AGAINST THE CONTACT ASSEMBLY
Figure 85

E. Assembly of Tyco 1757624-1 and 1883369-2 Size 8 Coax Contacts to BMS 13-65 Type 0F Coax Cable

Table 38
CENTER CONTACT CRIMP TOOLS

Coax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
1757624-1	M22520/2-01	5	M22520/2-06
1883369-2	M22520/2-01	5	NONE

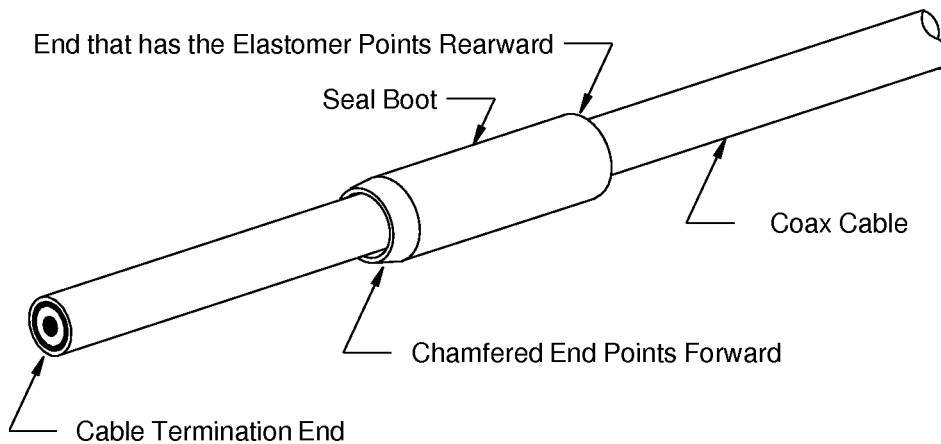
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**Table 39
OUTER CONTACT CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
1757624-1	M22520/5-01	M22520/5-45	B
1883369-2	M22520/5-01	M22520/5-45	B

- (1) Make a selection of a center contact crimp tool from Table 38.
- (2) Make a selection of an outer contact crimp tool from Table 39.
- (3) Discard the seal boot that is included in the coax contact kit.
- (4) Put a Tyco 1877626-1 seal boot on the cable. Refer to Figure 86.

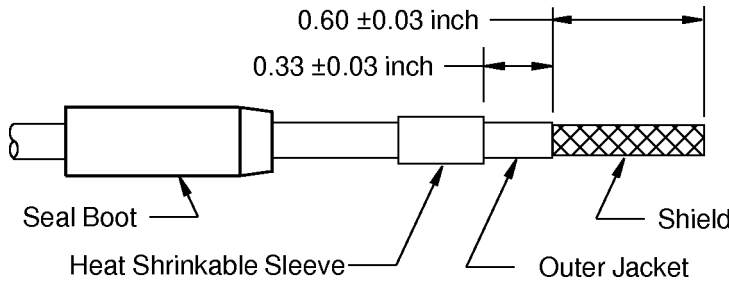


**SEAL BOOT ON THE CABLE
Figure 86**

- (5) Make a selection of a 3/16 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
 - (6) Put a 0.5 inch ± 0.05 inch length of the heat shrinkable sleeve on the cable.
 - (7) Remove 0.60 inch ± 0.03 inch of jacket from the end of the cable.
 - (8) Shrink the sleeve into its position. Refer to Figure 87.
- Make sure that the distance from the end of the cable jacket to the end of the sleeve is 0.33 inch ± 0.03 inch.

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



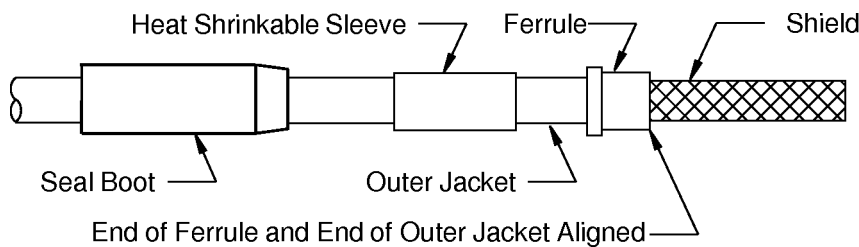
POSITION OF THE HEAT SHRINKABLE SLEEVE ON THE CABLE

Figure 87

(9) Put the ferrule on the cable. Refer to Figure 88.

Make sure that:

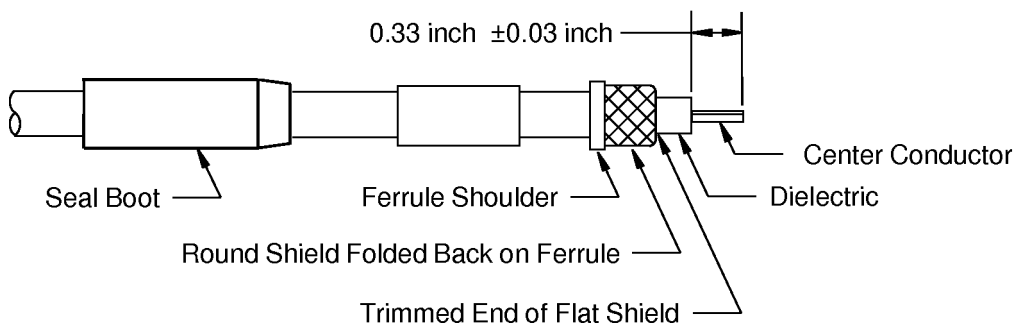
- The smaller end of the the ferrule points to the end of the cable
- The end of the ferrule and the end of the cable outer jacket are aligned.



POSITION OF THE FERRULE ON THE CABLE

Figure 88

(10) Loosen the strands of the round shield and fold the round shield back on the ferrule. Refer to Figure 89.



ROUND SHIELD FOLDED BACK ON THE FERRULE

Figure 89

(11) Remove the unwanted length of the round shield strands that extend rearward of the forward edge of the shoulder of the ferrule. Refer to Figure 89.

(12) Cut the inner flat shield to align the trimmed end of the flat shield and the edge of the folded back round shield. Refer to Figure 89.

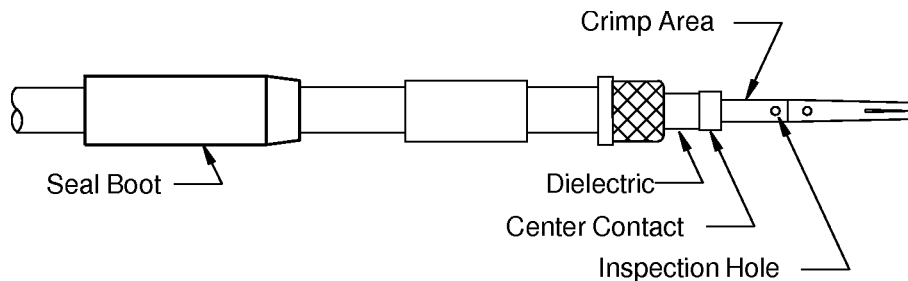
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- (13) Remove 0.33 inch \pm 0.03 inch of the insulation from the end of the center conductor.
- (14) Put the center conductor into the crimp barrel of the center contact. Refer to Figure 90.

Make sure that:

- All of the strands of the center conductor are in the crimp barrel of the center contact
- The conductor can be seen in the inspection hole.



POSITION OF THE CENTER CONTACT ON THE CENTER CONDUCTOR

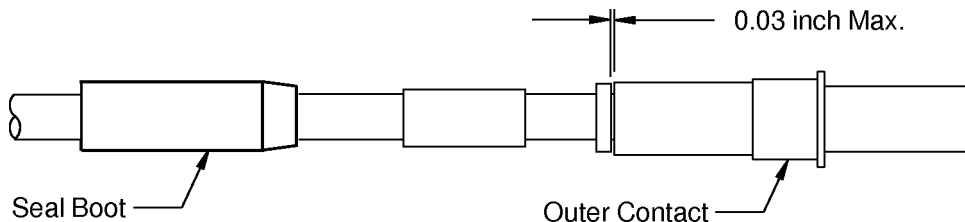
Figure 90

- (15) Crimp the center contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel of the center contact
- The conductor can be seen in the inspection hole.

- (16) Push the cable and the center contact assembly into the outer contact until it stops. Refer to Figure 91.



COAX CONTACT ASSEMBLY

Figure 91

- (17) Hold the contact assembly together, and at the same time, crimp the outer contact.
Make sure that the distance from the shoulder of the inner ferrule to the edge of the outer contact crimp barrel is less than 0.03 inch. Refer to Figure 91.
- (18) Remove the unwanted shield strands that come out from between the outer contact crimp barrel and the shoulder of the ferrule.
- (19) Push the seal boot to the contact assembly until it stops.

F. Twinax Cable Preparation and Contact Assembly

This paragraph gives the procedure to prepare the twinax cable and assemble the twinax contact.

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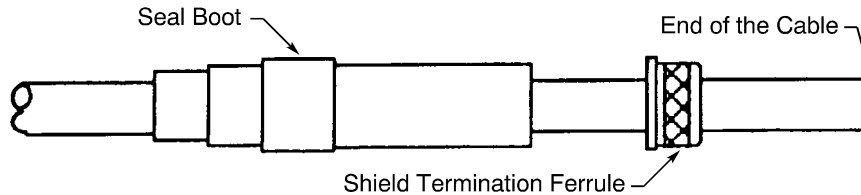
Table 40
CRIMP TOOLS FOR THE TWINAX CONTACT INNER CONTACTS

Twinax Cable Component	Twinax Contact			Crimp Tool			
	Code	Component	Conductor Cavity Location	Basic Unit		Die	
				Part Number	Setting	Part Number	Cavity
Blue Wire	Blank	Center Contact	Center	AFM-2	6	-	-
White Wire	R	Inner Ring	Side	M22520/5-01	-	Y797	A

Table 41
CRIMP TOOLS FOR THE TWINAX CONTACT OUTER CONTACT BODY

Twinax Cable Component	Twinax Contact			Crimp Tool		
	Code	Component	Conductor Location	Basic Unit	Die	
					Part Number	Cavity
Shield	C	Outer Contact Body	Outer Contact Body	M22520/5-01	Y797	B

- (1) Put the seal boot on the cable. Refer to Figure 92.
Make sure that the larger end of the seal boot is pointed forward to the end of the cable.



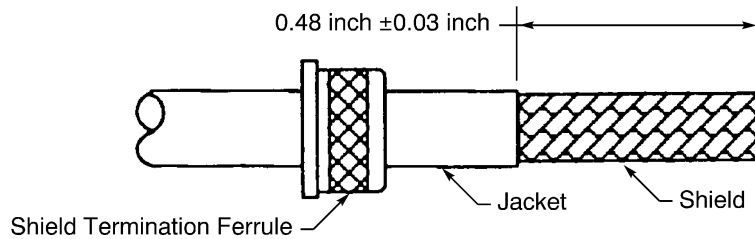
POSITION OF THE SEAL BOOT AND THE FERRULE ON THE CABLE
Figure 92

- (2) Put the shield termination ferrule on the cable. Refer to Figure 92.
Make sure that the larger end of the shield termination ferrule is pointed rearward away from the end of the cable.
- (3) Remove 0.48 inch \pm 0.03 inch of the jacket from the end of the cable.
Refer to Figure 93 and Subject 20-00-15.

CAUTION: DO NOT CAUSE DAMAGE TO THE STRANDS OF THE SHIELD. UNSATISFACTORY PERFORMANCE OF THE CABLE CAN OCCUR.

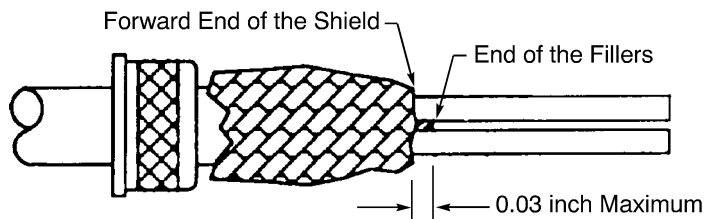
STANDARD WIRING PRACTICES MANUAL

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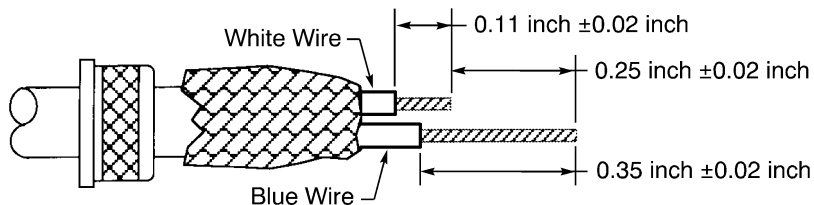
CABLE JACKET REMOVAL LENGTH
Figure 93

- (4) Fold the shield back against the jacket of the cable.
- (5) Cut the fillers at the necessary location to make the distance from the forward end of the shield to the end of the fillers equal to or less than 0.03 inch. Refer to Figure 94.



REMOVAL OF THE CABLE FILLERS
Figure 94

- (6) Prepare the wires. Refer to Figure 95.



INSULATION REMOVAL LENGTH
Figure 95

- (a) Cut the white wire 0.25 inch \pm 0.02 inch from the end of the wire.
- (b) Remove 0.11 inch \pm 0.02 inch of the insulation from the end of the white wire.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.

- (c) Remove 0.35 inch \pm 0.02 inch of the insulation from the end of the blue wire.

CAUTION: DO NOT CAUSE DAMAGE TO THE CONDUCTOR. UNSATISFACTORY PERFORMANCE OF THE WIRE CAN OCCUR.

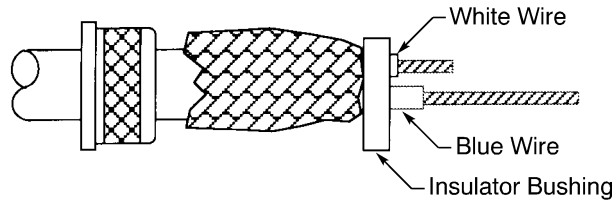
- (7) Put the insulator bushing on the cable. Refer to Figure 96.

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

Make sure that:

- The white wire is in the hole near the edge of the bushing
- The blue wire is in the hole near the center of the bushing
- The bushing is against the shield.



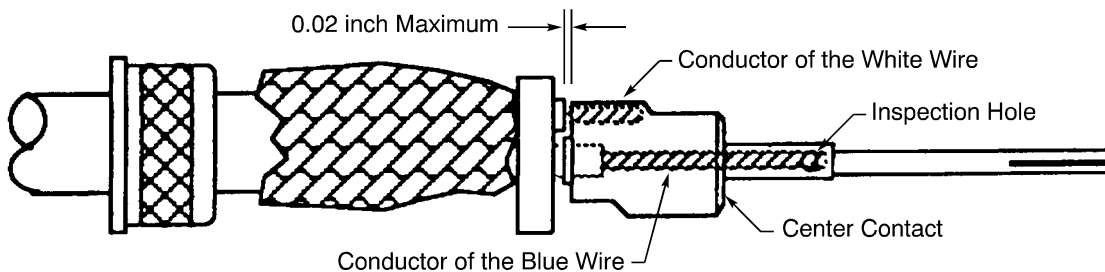
POSITION OF THE INSULATOR BUSHING ON THE CABLE

Figure 96

- (8) Align the conductor of the blue wire and the longer cavity in the center of the center contact.
- (9) Align the conductor of the white wire and the shorter cavity near the side of the center contact.
Make sure that the conductor of the blue wire stays aligned with the longer cavity in the center of the contact.
- (10) Put the center contact on the wires. Refer to Figure 97.

Make sure that:

- All of the strands of the conductor of the blue wire are in the longer center cavity
- All of the strands of the conductor of the white wire are in the shorter side cavity
- The conductor of the blue wire can be seen in the inspection hole
- The distance between the center contact and the end of the insulation of the white wire is a maximum of 0.02 inch.



POSITION OF THE CENTER CONTACT ON THE CABLE

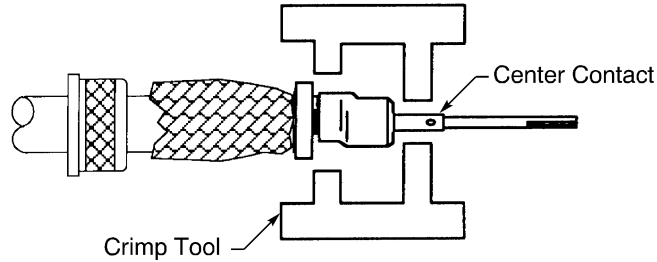
Figure 97

- (11) Make a selection of a center contact crimp tool for the blue wire from Table 40.
- (12) Put the center contact in the crimp tool.
- (13) Crimp the contact.
- (14) Make a selection of a center contact crimp tool for the white wire from Table 40.
- (15) Put the center contact in the crimp tool. Refer to Figure 98.

Make sure that the contact is correctly aligned in the tool.

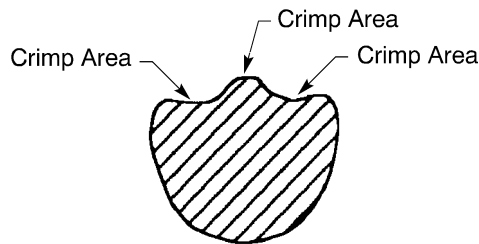
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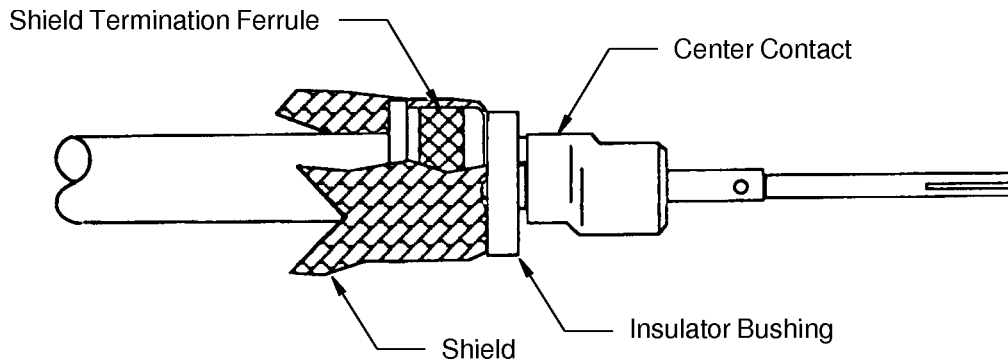
POSITION OF THE CENTER CONTACT IN THE CRIMP TOOL
Figure 98

- (16) Crimp the contact.
- (17) Examine the crimp area of the contact. Refer to Figure 99.
 Make sure that each crimp area does not have a crack.



CRIMP AREAS OF THE CENTER CONTACT
Figure 99

- (18) Push the shield termination ferrule forward until it is against the insulator bushing. Refer to Figure 100.

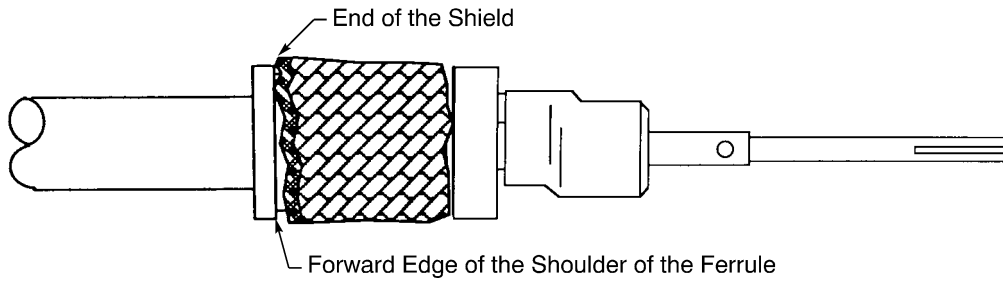


POSITION OF THE FERRULE
Figure 100

- (19) Make the shield flat against the outer surface of the ferrule.
- (20) Cut the shield at the forward edge of the shoulder of the ferrule. Refer to Figure 101.

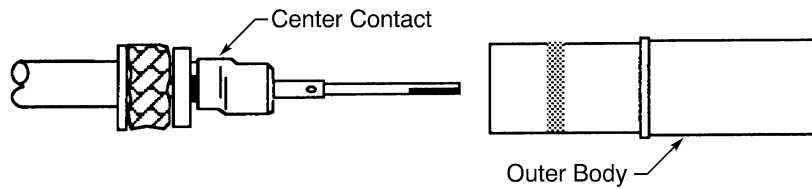
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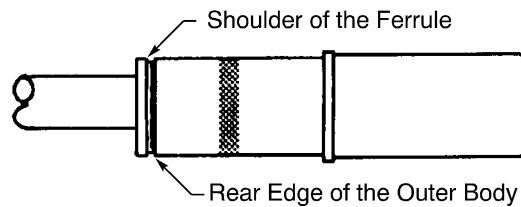
LOCATION OF SHIELD REMOVAL
Figure 101

- (21) Make a selection of an outer contact body crimp tool from Table 41.
- (22) Align the center contact and the outer body. Refer to Figure 102.



ALIGNMENT OF THE CENTER CONTACT AND THE OUTER BODY
Figure 102

- (23) Push the center contact into the outer body until it stops.
 Make sure that the rear edge of the outer body is against the shoulder of the ferrule. Refer to Figure 103.

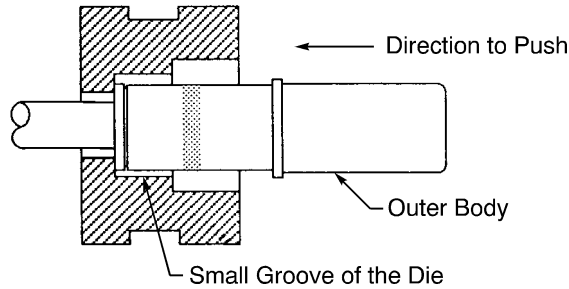


POSITION OF THE OUTER BODY ON THE CENTER CONTACT
Figure 103

- (24) Put the contact in the crimp tool. Refer to Figure 104.
 Make sure that the contact is in the small groove of the die.

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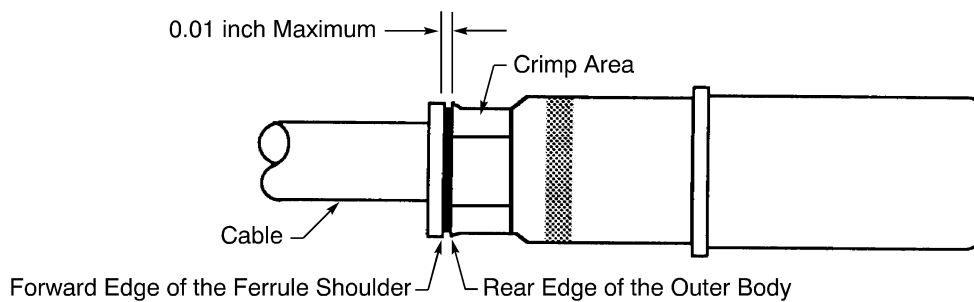


POSITION OF THE CONTACT IN THE CRIMP TOOL
Figure 104

- (25) Push the outer body against the die.
- (26) Continue to push the outer body against the die and crimp the outer body.
 Make sure that the contact stays tight against the die during the crimp operation.
- (27) Examine the crimp area of the contact. Refer to Figure 105.

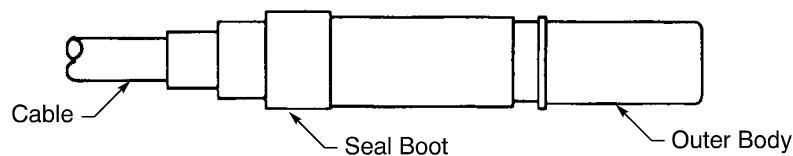
Make sure that:

- The crimp area does not have a crack
- The distance from the rear edge of the outer body to the forward edge of the shoulder of the ferrule is not more than 0.01 inch.



POSITION OF THE OUTER BODY AFTER THE CRIMP OPERATION
Figure 105

- (28) If the crimp area has deformed metal on the edges, turn the contact assembly 60 degrees on its axis and do Step (24) through Step (27) again.
- (29) Remove the unwanted strands of the shield between the outer body and the ferrule.
- (30) Carefully push the seal boot forward until it stops. Refer to Figure 106.



POSITION OF THE SEAL BOOT ON THE CONTACT
Figure 106

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- (31) Examine the position of the engaging end of the center contact.
- (32) If the engaging end of the center contact is not located at the center of the outer contact, carefully push it into its correct position.

CAUTION: IF THE ENGAGING END OF THE CENTER CONTACT IS NOT LOCATED AT THE CENTER OF THE OUTER CONTACT, DAMAGE TO THE CONTACT, THE CONNECTOR, OR THE RECEPTACLE CONNECTOR CAN OCCUR.

G. Assembly of BACC47GA and BACC47GB Quadrax Contacts

**Table 42
QUADRAX CONTACT INNER CONTACT CRIMP TOOLS**

Quadrax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	Part Number
BACC47GA1	M22520/2-01	5	K709
BACC47GB1	M22520/2-01	5	K709

**Table 43
QUADRAX CONTACT OUTER CONTACT CRIMP TOOLS**

Quadrax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACC47GA1	M22520/5-01	M22520/5-45	B
BACC47GB1	M22520/5-01	M22520/5-45	B

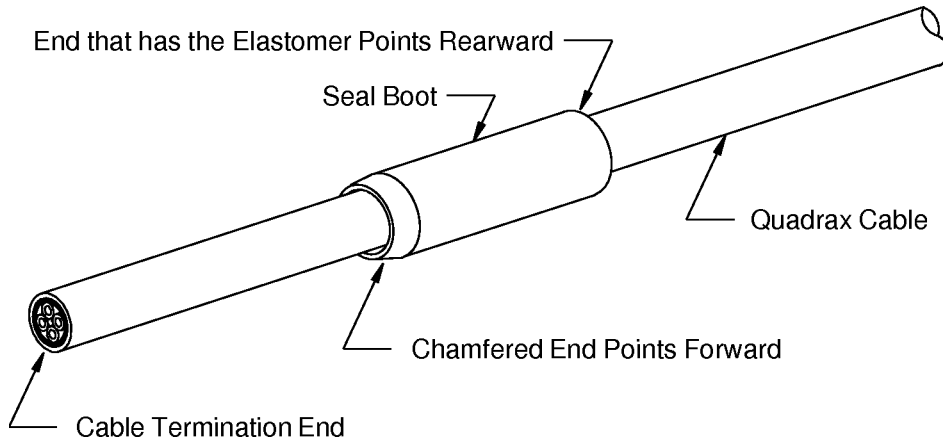
- (1) Make a selection of an inner contact crimp tool from Table 42.
- (2) Make a selection of an outer contact crimp tool from Table 43.
- (3) Cut the cable perpendicular to its longitudinal axis.
- (4) Discard the seal boot that is included in the quadrax contact kit.
- (5) Put a Tyco 1877626-1 seal boot on the cable. Refer to Figure 107.

Make sure that:

- The end of the seal boot that has the chamfer points forward to the end of the cable
- The end of the seal boot that has the inner elastomer points rearward, away from the end of the cable.

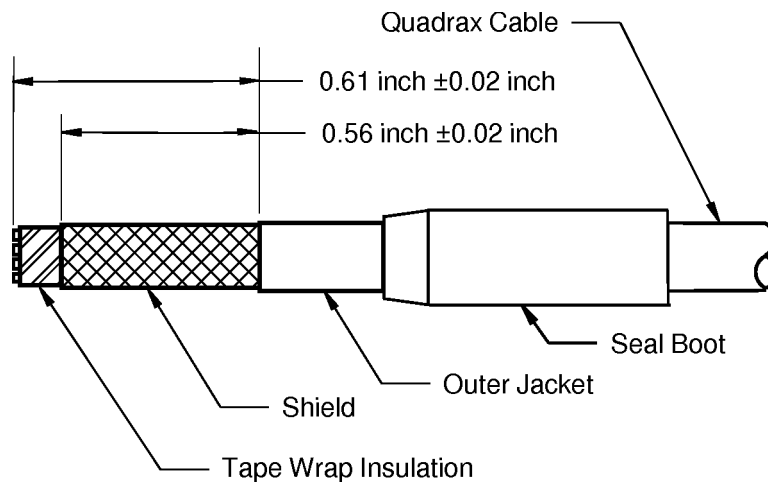
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THE SEAL BOOT ON THE CABLE
Figure 107

- (6) Move the seal boot away from the end of the cable.
- (7) Prepare the end of the cable. Refer to Figure 108.

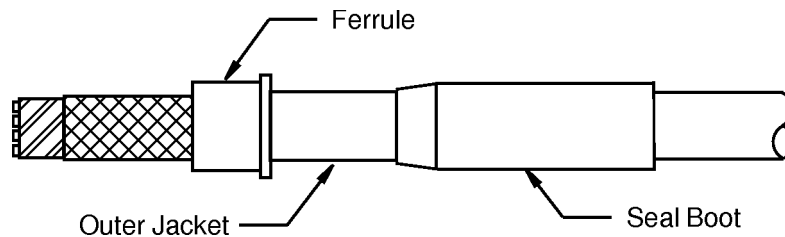


QUADRAX CABLE TRIM DIMENSIONS
Figure 108

- (a) Remove 0.61 inch ± 0.02 inch of the outer jacket from the end of the cable.
 - (b) Remove the necessary length of the shield from the end of the cable to make the distance from the end of the outer jacket to the end of the shield equal to 0.56 inch ± 0.02 inch.
- (8) Put the ferrule on the cable. Refer to Figure 109.
- Make sure that the end of the ferrule that has the smaller diameter points forward to the end of the cable.

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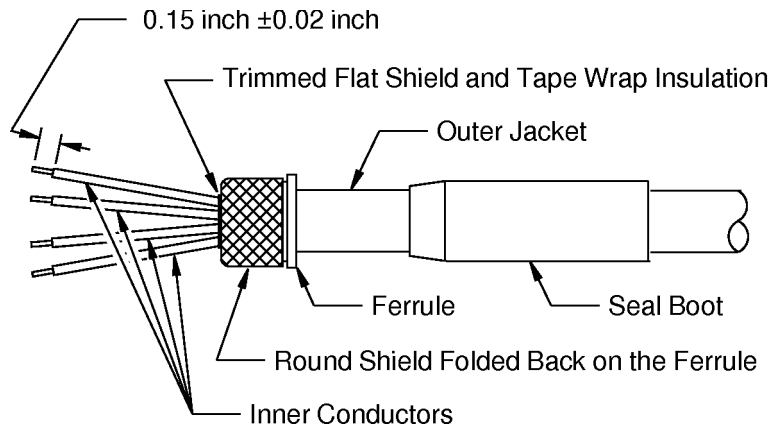
ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS



POSITION OF THE FERRULE ON THE CABLE

Figure 109

- (9) Push the ferrule rearward until it is against the end of the outer jacket. Refer to Figure 109.
- (10) Fold the outer round shield back on the ferrule. Refer to Figure 110.



INNER CONDUCTOR TRIM DIMENSIONS AND SHIELD PREPARATION

Figure 110

- (11) Remove the necessary length of the inner flat shield and the tape wrap insulation.
Make sure that the ends of the flat shield and the tape wrap are approximately aligned with the front end of the ferrule.
- (12) Move the four inner conductors apart.
Make sure that:
 - The inner conductors do not cross each other
 - The initial positions of the inner conductors in the cable is not changed.
- (13) Remove the necessary length of the filler rods.
Make sure that the ends of the filler rods are approximately aligned with the front end of the ferrule.
- (14) Remove 0.15 inch \pm 0.02 inch of insulation from each of the four inner conductors.
Refer to:
 - Refer to Figure 110.
 - Subject 20-00-15 for the procedure to remove the wire insulation.
- (15) Crimp an inner contact on each of the four inner conductors.

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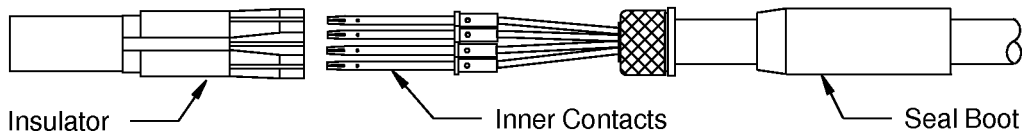
Make sure that:

- The distance between the wire insulation and the end of each inner contact crimp barrel is 0.02 inch maximum
- The wire insulation is not in the crimp barrel
- The conductor strands can be seen in the inspection hole
- All conductor strands are in the crimp barrel
- The conductor strands do not go out of the inspection hole
- The plating of each inner contact is not removed
- The inner contacts have no cracks.

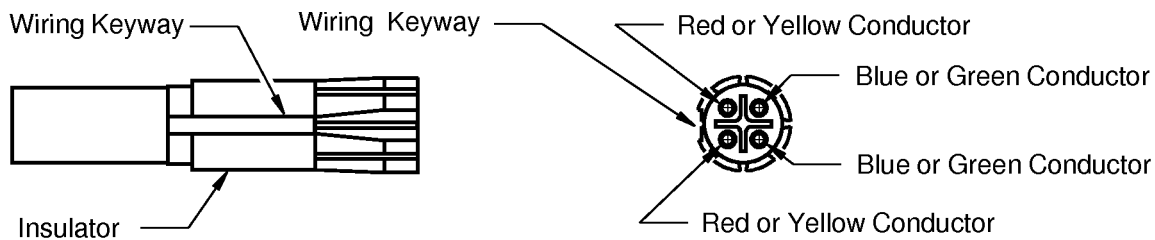
(16) Put the inner contacts into the larger end of the insulator. Refer to Figure 111 and Figure 112.

Make sure that:

- The red conductor and the yellow conductor are adjacent to the wiring keyway of the insulator
- The position of the conductors in the insulator is the same as the position of the conductors in the cable
- Each inner contact is fully installed in the insulator
- The conductors do not cross each other.



INSTALLATION OF THE INNER CONTACTS IN THE INSULATOR
Figure 111

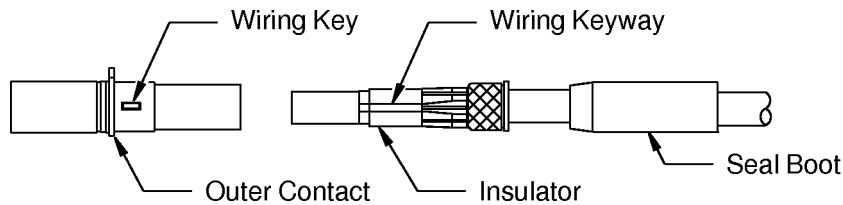


INSULATOR REAR VIEW - WIRE SIDE
POSITIONS OF THE INNER CONTACTS IN THE INSULATOR
Figure 112

(17) Align the wiring key on the outer contact and the wiring keyway of the insulator. Refer to Figure 113.

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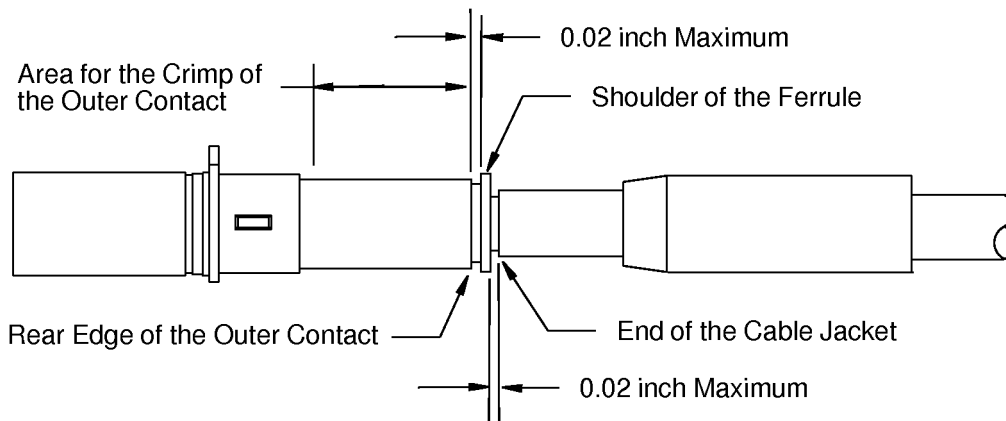


THE OUTER CONTACT AND THE INSULATOR ASSEMBLY
Figure 113

(18) Push the insulator assembly into the outer contact until it stops . Refer to Figure 114.

Make sure that:

- The wiring key on the outer contact and the wiring keyway of the insulator are aligned
- The rear of the insulator is against the shield that is folded back on the ferrule
- The distance from the rear edge of the outer contact to the shoulder of the ferrule is not more than 0.02 inch
- The distance from the rear end of the ferrule to the end of the cable jacket is not more than 0.02 inch.



QUADRAX CONTACT ASSEMBLY
Figure 114

(19) Crimp the outer contact. Refer to Figure 114.

(20) Remove all of the strands of the shield that are between the rear edge of the outer contact and the shoulder of the ferrule.

H. Contact Insertion

This paragraph gives the procedure to install size 2222, 2020, 1616, and 1212 contacts in the connector insert.

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For the procedure to install these contacts in the insert, refer to:

- Paragraph 5.I. for size 5 coax contacts and size 0508 power contacts
- Paragraph 5.J. for size 8 coax, twinax, and size 0808 power contacts
- Paragraph 5.K. for size 8 quadrax contacts
- Paragraph 5.L. for fiber optic termini.

For the procedure to install ground block contacts in the connector ground block, refer to:

- Subject 20-74-12 for BACC65AA and BACC65AB connectors
- Subject 20-74-13 for BACC65AN, BACC65AP, BACC65AV and BACC65AW connectors
- Subject 20-74-14 for BACC65BJ and BACC65BK connectors.

NOTE: Contacts can be installed in the insert before or after the insert is installed in the connector shell.

**Table 44
CONTACT INSERTION TOOLS**

Connector Insert Contact Cavity Size	Contact Size	Insertion Tool	
		Part Number	Color
22	2222	M81969/1-01	Green
		DAK266J	-
20	2020	M81969/39-01	Green
		CIET-20HDL	-
16	1616	M81969/14-03	Blue
		CIET-16	-
12	1212	M81969/14-04	Yellow
		CET-12-4	-

(1) Make a selection of a contact insertion tool from Table 44.

NOTE: An insertion tool is not necessary for the insertion of these contacts:

- Size 2020
- Size 1616
- Size 1212.

(2) If an insertion tool is used:

(a) Put the contact assembly in the insertion tool.

(b) Axially align the insertion tool, the contact assembly and the contact cavity.

Make sure that the insertion tool and the contact assembly are perpendicular to the rear face of the connector insert.

(c) Carefully push the insertion tool into the contact cavity until it stops.

Make sure that the the insertion tool and the contact cavity stay aligned.

(d) Carefully pull the insertion tool out of the contact cavity.

Make sure that the insertion tool stays aligned with the contact cavity.

(e) Remove the insertion tool from the wire.

(3) If an insertion tool is not used:

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- (a) Axially align the contact assembly and the contact cavity.
Make sure that the contact assembly is perpendicular to the rear face of the insert.
- (b) Carefully push the the contact assembly into the contact cavity until it stops.
Make sure that the contact assembly and the contact cavity stay aligned.
- (4) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

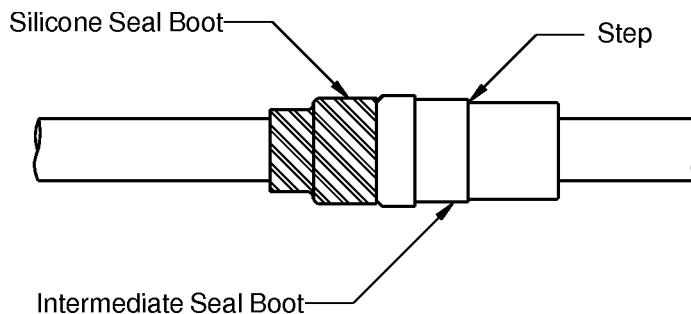
- (5) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly from the contact cavity.
 - (b) Do Step (2) or Step (4) again.

I. Installation of Size 5 Coax and Size 0508 Power Contacts

- (1) If a blue intermediate seal boot and a silicone seal boot are on the contact assembly, move them rearward on the cable away from the contact.
- (2) Axially align the contact assembly and the contact cavity.
- (3) Carefully push the contact assembly into the contact cavity until it stops.
Make sure that the contact assembly and the contact cavity stay aligned.
- (4) Lightly pull the wire.
Make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

- (5) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly from the cavity.
 - (b) Do Step (2) through Step (4) again.
- (6) If a silicone seal boot and a blue intermediate seal boot are on the contact assembly:
 - (a) Push the nylon sealing boot into the silicone sealing boot. Refer to Figure 115.

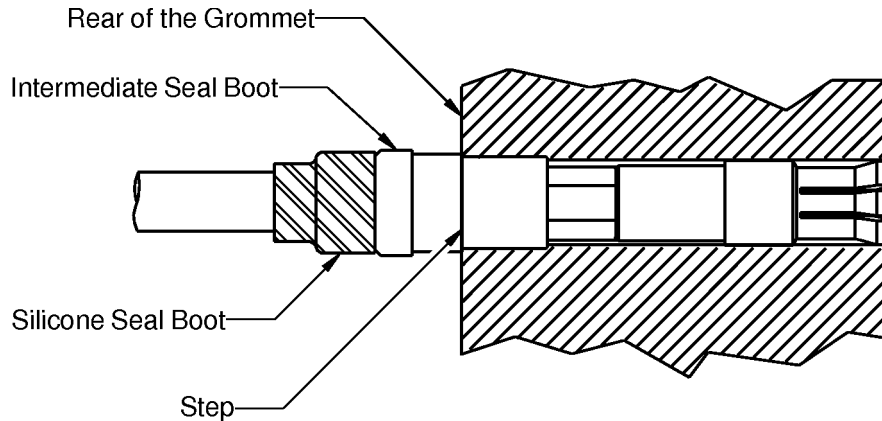


POSITION OF THE NYLON SEALING BOOT IN THE SILICONE SEALING BOOT
Figure 115

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ASSEMBLY OF BAC10AL, BAC10AM, AND BAC10AP RECTANGULAR CONNECTOR INSERTS

- (b) Push the sealing boots forward on the cable until the edge of the step of the nylon sealing boot is against the rear of the grommet. Refer to Figure 116.



POSITION OF THE SEALING BOOTS ON THE COAX CONTACT ASSEMBLY
Figure 116

J. Installation of Size 8 Coax, Size 8 Twinax, and Size 0808 Power Contacts

Table 45
LUBRICANTS

Lubricant	Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

- (1) At the rear of the connector, align the size 8 coax contact assembly and the size 8 contact cavity.
Make sure that the longitudinal axis of the contact assembly is perpendicular to the rear face of the connector.
NOTE: A contact insertion tool is not necessary for the installation of these contacts.
- (2) Push the contact into the contact cavity until the contact stops and is locked.
NOTE: A lubricant can be used to make it easier to push the contact into the contact cavity. Refer to Table 45
- (3) Align the key of the seal boot with the keyway of the contact cavity.
- (4) Push the seal boot into the contact cavity.
Make sure that the rear edge of the seal boot key is aligned with the rear face of the connector.
NOTE: A lubricant can be used to make it easier to push the seal boot into the contact cavity. Refer to Table 45.
- (5) Lightly pull on the cable.
Make sure that the contact is locked in the contact cavity.

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CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (6) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (2) through Step (5) again.

K. Installation of Size 8 Quadrax Contacts

**Table 46
LUBRICANTS**

Lubricant	Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

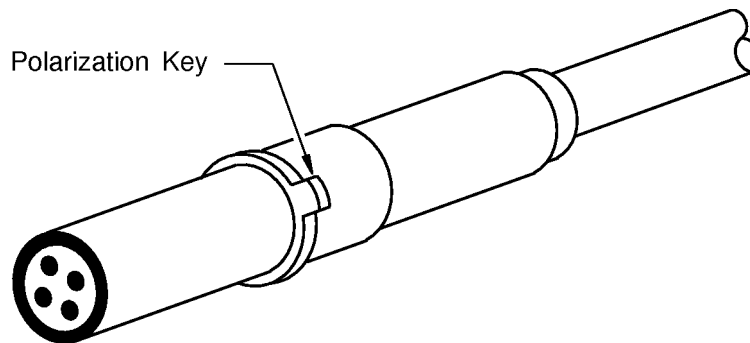
- (1) At the rear of the connector, align the contact polarization key and the keyway of the quadrax contact cavity.

Make sure that the longitudinal axis of the contact assembly is perpendicular to the rear face of the connector.

NOTE: A contact insertion tool is not necessary to install these contacts.

Refer to:

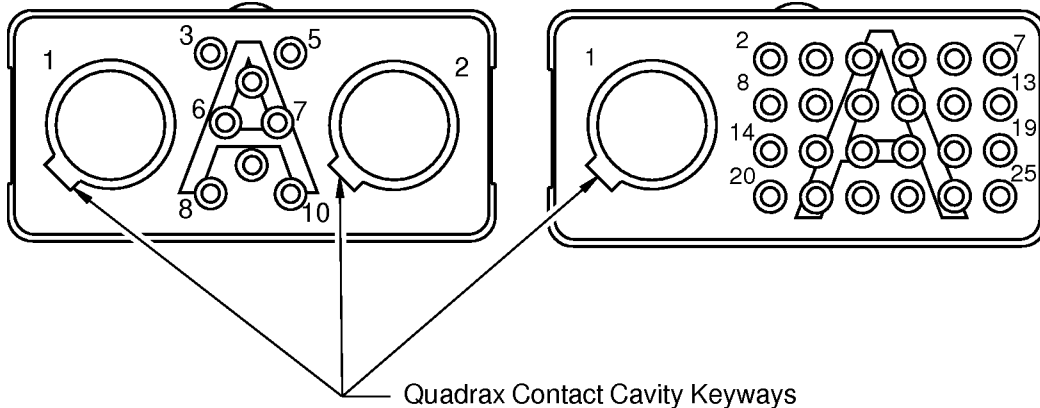
- Figure 117 for the polarization key of the quadrax contact
- Figure 118 for the keyway of the quadrax contact cavity.



**POLARIZATION KEY OF THE QUADRAX CONTACT
Figure 117**

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THE QUADRAX CONTACT CAVITY KEYWAYS
Figure 118

- (2) Push the contact into the contact cavity until the contact stops and is locked.

NOTE: A lubricant can be used to make it easier to push the contact into the contact cavity. Refer to Table 46

- (3) Align the seal boot key with the contact cavity keyway. Refer to Figure 118.

- (4) Push the seal boot into the contact cavity.

Make sure that the rear edge of the seal boot key is aligned with the rear face of the connector.

NOTE: A lubricant can be used to make it easier to push the seal boot into the contact cavity. Refer to Table 46.

- (5) Lightly pull on the cable.

Make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (6) If the contact is not locked in the contact cavity:

- (a) Pull the contact assembly out of the contact cavity.
- (b) Do Step (2) through Step (5) again.

L. Insertion of Fiber Optic Contact Termini

NOTE: A contact terminus can be installed before or after the alignment sleeve insert is installed in the connector.

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CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**Table 47
CONTACT TERMINUS INSERTION TOOLS**

Terminus Size	Insertion Tool	
	Part Number	Color
16	M81969/14-03	Blue

(1) Make a selection of a contact terminus insertion tool from Table 47.

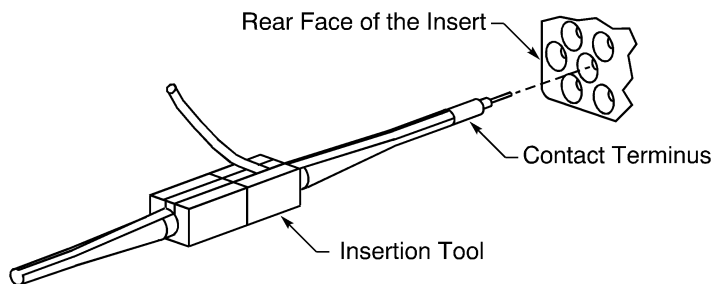
CAUTION: DO NOT USE AN INSERTION TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) If the contact terminus does not have a protection cap or is not in a plastic bag, examine the contact terminus. Refer to Subject 20-12-20.
- (3) Remove the protection from the contact terminus.
- (4) Carefully put the insertion tool on the cable and the contact terminus.

CAUTION: THE CONTACT TERMINUS MUST BE INSTALLED IN THE CONNECTOR IF IT DOES NOT HAVE PROTECTION FROM CONTAMINATION. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

CAUTION: DO NOT TOUCH THE FRONT FACE OF THE TERMINUS. CONTAMINATION ON THE TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

(5) At the rear of the connector, axially align the insertion tool and the terminus with the contact terminus cavity.



**ALIGNMENT OF THE CONTACT TERMINUS, THE INSERTION TOOL, AND THE CONTACT TERMINUS CAVITY
Figure 119**

(6) If the contact terminus has a key, align the key of the terminus and the keyway of the contact terminus cavity.

NOTE: A contact terminus that has a key can only be installed in a contact terminus cavity that has a keyway.

(7) Carefully push the insertion tool and the contact terminus into the terminus cavity until it stops.

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: DO NOT PUSH THE CABLE. DAMAGE TO THE FIBER OPTIC CABLE CAN OCCUR.

CAUTION: IF THE INSERTION TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (8) Carefully pull the insertion tool out of the terminus cavity.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

- (9) Lightly pull the cable to make sure that the terminus is locked in the terminus cavity.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINUS, THE CABLE, OR THE CONNECTOR.

CAUTION: DO NOT MAKE A DENT IN THE CABLE JACKET WITH THE FINGERNAILS. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (10) If the terminus is not locked in the cavity:

- (a) Pull the terminus out of the cavity.
- (b) Do Step (4) through Step (8) again.

- (11) If the connector is not connected immediately, put a protective cap on the connector.

NOTE: A clean plastic bag is a satisfactory alternative for the protection from contamination.

CAUTION: THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

M. Installation of the Fiber Optic Alignment Sleeve Insert

NOTE: The alignment sleeve insert can be installed before or after the contact termini are installed in the insert.

**Table 48
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Allen Wrench	5/64
	Screwdriver, Hex	5/64

- (1) Examine the alignment sleeve insert. Refer to Paragraph 6.B.

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

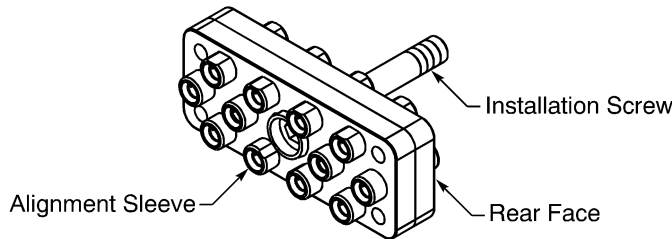
(2) Make a selection of these tools from Table 48:

- A driver
- A torque tool.

NOTE: The driver can have a ball type end.

(3) Align the rear face of the alignment sleeve insert with the engaging face of the connector.

CAUTION: DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT WHEN IT IS INSTALLED IN THE INSERT. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.



ALIGNMENT SLEEVE INSERT
Figure 120

(4) Fully engage the threads of the installation screw and the screw hole in the connector insert.

(5) Torque the screw 8 inch-pounds \pm 1 inch-pound.

N. Seal of an Empty Contact Cavity

Empty contact cavities in the insert must be sealed. Refer to Subject 20-60-08.

Make sure that a size 5 contact cavity is sealed with one of these:

- A seal plug from Table 49.
- A 0.50 inch \pm 0.05 inch length of silicone rubber seal rod from Table 50.

Table 49
SEAL PLUG FOR SIZE 5 CONTACT CAVITY

Part Number	Color	Supplier
MS27488-4-1	Blue	QPL

Table 50
SEAL ROD FOR SIZE 5 CONTACT CAVITY

Part Number	Diameter	Supplier
BMS 1-52	0.324 inch to 0.356 inch	QPL

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

6. INSPECTION AND CLEANING OF A FIBER OPTIC ALIGNMENT SLEEVE INSERT

A. Necessary Tools and Materials

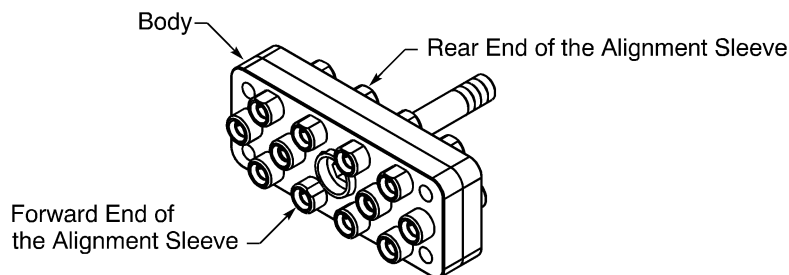
**Table 51
NECESSARY TOOLS**

Tool	Description	Part Number	Supplier
Canned Air	Tetrafluoroethane	ES1620	Chemtronics
Protective Equipment	Finger Cot	-	Available Source
	Gloves, Powder Free	-	Available Source

**Table 52
SOLVENTS**

Solvent	Specification	Supplier
Alcohol, Ethyl	O-E-760	Available Source
Alcohol, Isopropyl	TT-I-735	Available Source
Water, Distilled	-	Available Source

B. Inspection and Cleaning



**ALIGNMENT SLEEVE INSERT
Figure 121**

CAUTION: KEEP THE ALIGNMENT SLEEVE INSERT IN A CLEAN PLASTIC BAG UNTIL IT IS INSTALLED ON THE CONNECTOR. CONTAMINATION ON THE ALIGNMENT SLEEVE INSERT CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

Refer to Figure 121.

- (1) Without magnification, examine each end of the alignment sleeves of the insert.
- (2) If an alignment sleeve has contamination, clean the sleeve without solvent. Refer to Paragraph 6.C.
- (3) Without magnification, examine each end of the alignment sleeves again.
- (4) If an alignment sleeve has remaining contamination, clean the sleeve with solvent. Refer to Paragraph 6.D.
 - (a) Without magnification, examine each end of the alignment sleeves again.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS**

- (b) If an alignment sleeve has remaining contamination, clean the sleeve with solvent again. Refer to Paragraph 6.D.
- (c) Without magnification, examine the alignment sleeves again.
- (d) If an alignment sleeve has remaining contamination, replace the alignment sleeve insert.

C. Contamination Removal - Without Solvent

For the conditions that are applicable for this procedure, refer to Paragraph 6.B.

Refer to Figure 121.

- (1) Make a selection of canned air from Table 51.

NOTE: An equivalent canned air is a satisfactory alternative.

- (2) Make a selection of a protection equipment from Table 51.

NOTE: A satisfactory alternative is to clean the hands.

- (3) If the hands are not clean, put the protection equipment on.
- (4) Apply the canned air in each alignment sleeve that has contamination.

D. Contamination Removal - With Solvent

For the conditions that are applicable for this procedure, refer to Paragraph 6.B.

WARNING: SOME SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF A FLAMMABLE SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE ALIGNMENT SLEEVE INSERT.

Refer to Figure 121.

- (1) Make a selection of canned air from Table 51.

NOTE: An equivalent canned air is a satisfactory alternative.

- (2) Make a selection of these solvents from Table 52:

- An alcohol
- Distilled water.

- (3) Make a selection of a protection equipment from Table 51.

NOTE: A satisfactory alternative is to clean the hands.

- (4) If the hands are not clean, put the protection equipment on.
- (5) Put a quantity of alcohol in a small container that can be sealed with a lid.

Make sure that:

- The container is clean
- The size of the container is sufficient to hold the alignment sleeve insert
- The quantity of alcohol is sufficient to put the body of the alignment sleeve insert below the surface of the alcohol.

- (6) Put a quantity of distilled water in a small container that can be sealed with a lid.

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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

Make sure that:

- The container is clean
- The size of the container is sufficient to hold the alignment sleeve insert
- The quantity of distilled water is sufficient to put the body of the alignment sleeve insert below the surface of the alcohol.

(7) Put the alignment sleeve insert in the container that has alcohol for 30 seconds minimum.

Make sure that the body of the alignment sleeve insert is below the surface of the alcohol.

(8) Remove the alignment sleeve insert from the alcohol.

(9) Seal the alignment sleeve insert in the container that has distilled water.

Make sure that the body of the alignment sleeve insert is below the surface of the distilled water.

(10) Lightly shake the container for 1 to 3 minutes.

(11) Remove the alignment sleeve insert from the water.

(12) Dry the alignment sleeve insert with canned air.

(13) Put the alignment sleeve insert in the container that has alcohol for 30 seconds minimum.

Make sure that the body of the alignment sleeve insert is below the surface of the alcohol.

(14) Remove the alignment sleeve insert from the alcohol.

(15) Dry the alignment sleeve insert with canned air.

7. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 53
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
CET-12-4	ITT Cannon
CET-C8	ITT Cannon
CIET-16	ITT Cannon
CIET-20HDL	ITT Cannon
DRK266J	Daniels
M81969/1-01	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M81969/39-01	QPL
MS3178-001	QPL



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ASSEMBLY OF BAC110AL, BAC110AM, AND BAC110AP RECTANGULAR CONNECTOR INSERTS

B. Contact Crimp Tools

Table 54
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
282 557 020	Radiall
282 581 007	Radiall
282 581 008	Radiall
282 581 009	Radiall
282588	Radiall
4046A	Pico
414DA-8N	Pico
M22520/1-01	QPL
M22520/2-01	QPL
M22520/1-02	QPL
M22520/1-11	QPL
M22520/5-01	QPL
M22520/2-08	QPL
M22520/2-11	QPL
M22520/2-23	QPL
M22520/5-01	QPL
M22520/5-05	QPL
M22520/5-27	QPL
M22520/5-35	QPL
M22520/5-45	QPL
M22520/5-61	QPL
M22520/23-01	QPL
M22520/23-02	QPL
PICO400B	Pico
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels

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C. Contact Insertion Tools

Table 55
CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
CET-12-4	ITT Cannon
CIET-16	ITT Cannon
CIET-20HDL	ITT Cannon
DAK266J	Daniels
DAK83-20	Daniels
M81969/1-01	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M81969/14-11	QPL
M81969/39-01	QPL
ST2220-2-28	Boeing

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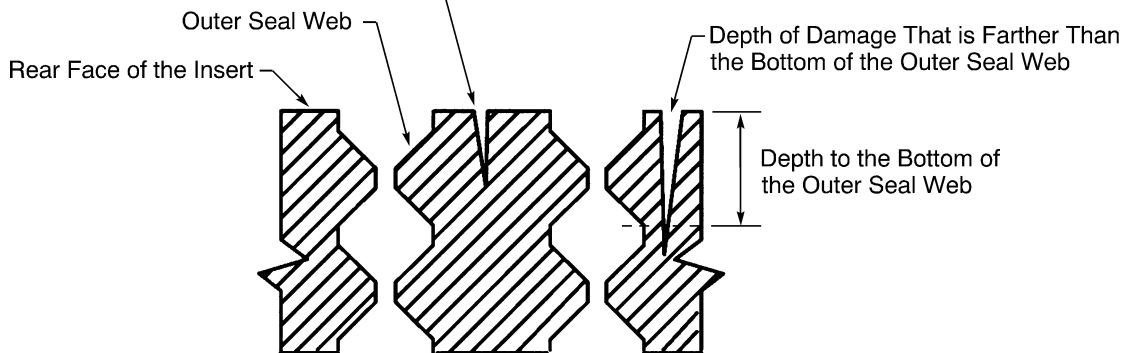
1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

It is necessary to replace the insert if one or more of these conditions occur:

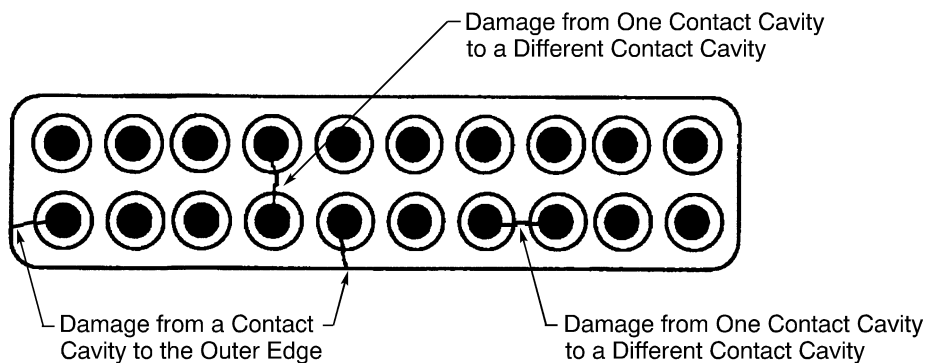
- The depth of the damage extends farther than the bottom of the outer seal web; refer to Figure 1
- The damage extends from one contact cavity to a different contact cavity; refer to Figure 2
- The damage extends from one contact cavity to the outer edge of the insert; refer to Figure 2.

Depth of the Damage That is not Farther Than the Bottom of the Seal Web



REAR FACE OF THE INSERT - DEPTH OF DAMAGE

Figure 1



REAR FACE OF THE INSERT - LENGTH OF DAMAGE

Figure 2

B. Damage Conditions - Front Face of the Insert

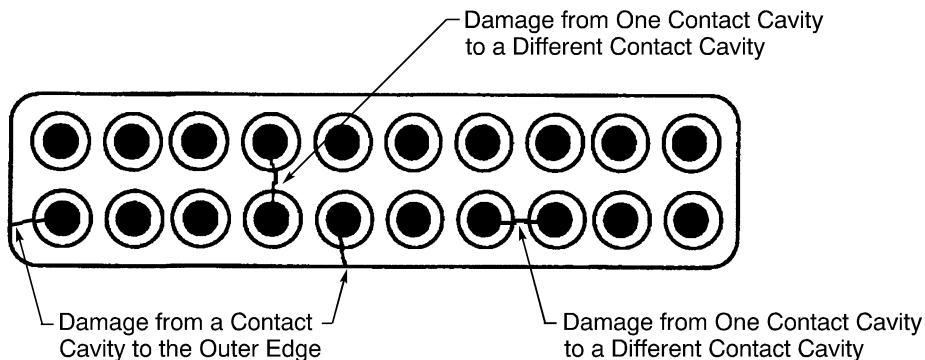
It is necessary to replace the insert if one of these conditions occur:

- The damage extends from one contact cavity to a different contact cavity
- The damage extends from one contact cavity to the outer edge of the insert.

Refer to Figure 3.

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FRONT FACE OF THE INSERT - LENGTH OF DAMAGE

Figure 3

C. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to:

- Subject 20-60-08 for the identification of an environmentally sealed connector
- Table 1 for the minimum wire O.D. that is necessary for a satisfactory seal of a contact cavity hole
- Subject 20-60-08 for the procedure to increase the diameter of the wire.

**Table 1
MINIMUM WIRE O.D. FOR A SATISFACTORY SEAL**

Connector	Description	Contact Cavity Size	Minimum Wire O.D. (inch)
285-00-()	Rear release, rear removal contacts	16	0.065
286-00-()	Rear release, rear removal contacts	16	0.065
MTC100	Rear release, rear removal contacts	16	0.065
MTC100	Rear release, rear removal contacts	16	0.065

2. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 2
CONNECTOR PART NUMBERS**

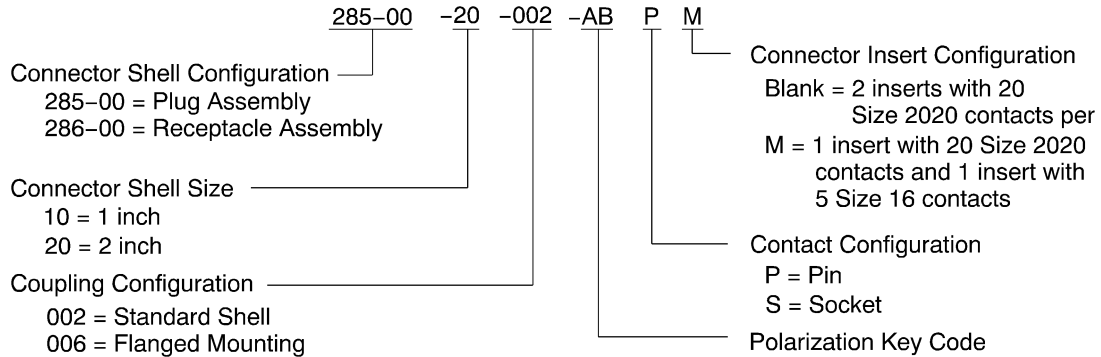
Configuration	Shell Size	Part Number	Supplier
Plug	1	285-00-10-002-()	Cinch
		MTC100-JH1-P32-()	Raychem
	2	285-00-20-002-()	Cinch
		MTC100-JH2-P12-()	Raychem
		MTC100-JH2-P32-()	Raychem

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTC100 CONNECTORS

Table 2 (continued)

Configuration	Shell Size	Part Number	Supplier
Plug, Quick Disconnect	1	MTCPQKT1P()	Raychem
	2	MTCPQKT2P()	Raychem
	1	MTCTQKT1P4FPF	Raychem
Receptacle	1	286-00-10-002-()	Cinch
		MTC100-JH1-R32-()	Raychem
	2	286-00-20-002-()	Cinch
		MTC100-JH2-R32-()	Raychem
Receptacle, Quick Disconnect	1	MTCPQKT1R()	Raychem
	2	MTCPQKT2R()	Raychem
	1	MTCTQKT1R4FSF	Raychem
Receptacle with Mounting Flange	1	286-00-10-006-()	Cinch
		MTC100-SH1-F32-()	Raychem
	2	286-00-20-006-()	Cinch
		MTC100-SH2-F32-()	Raychem

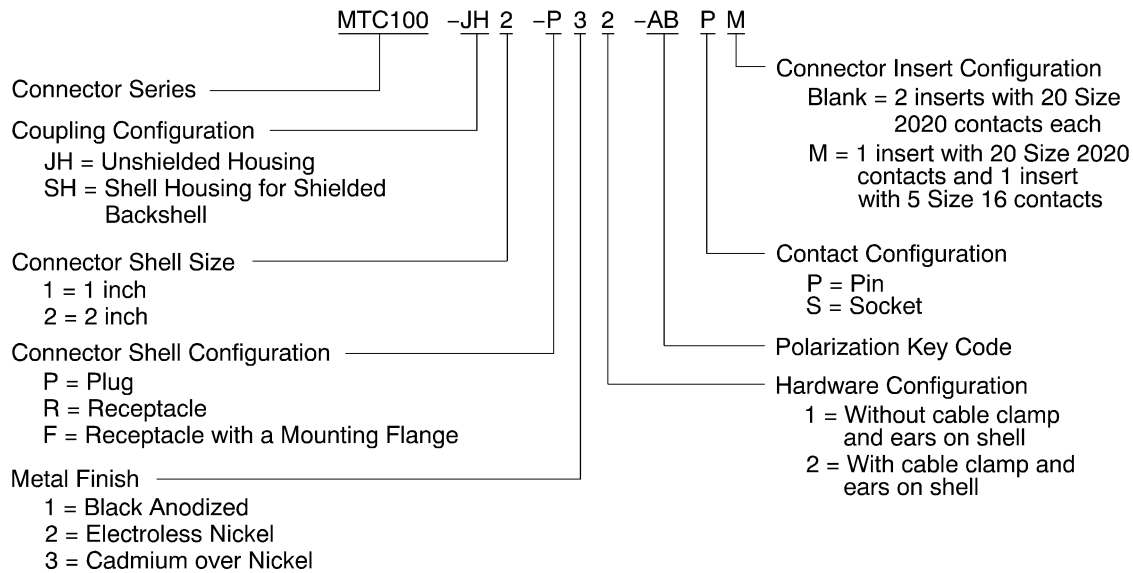


CINCH ACIS CONNECTOR PART NUMBER STRUCTURE

Figure 4

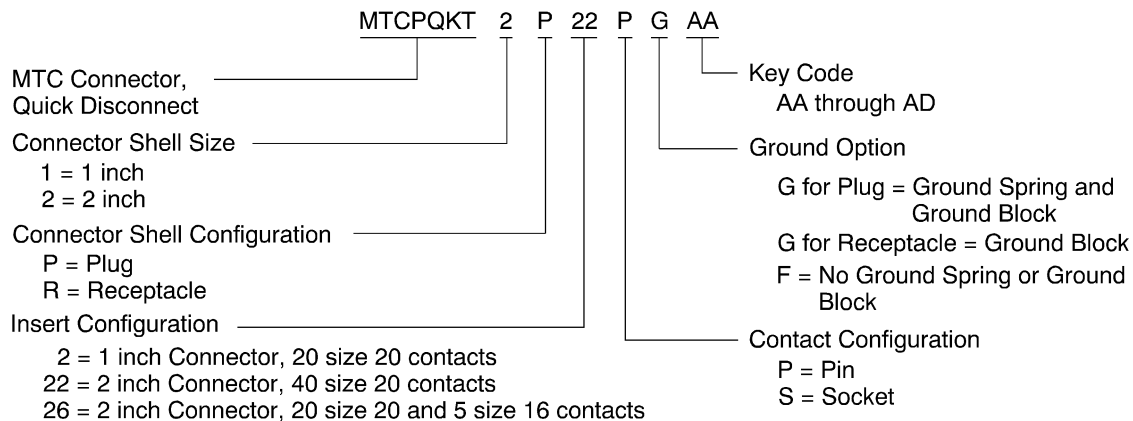
STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTCTQ CONNECTORS



RAYCHEM MTC100 CONNECTOR PART NUMBER STRUCTURE

Figure 5

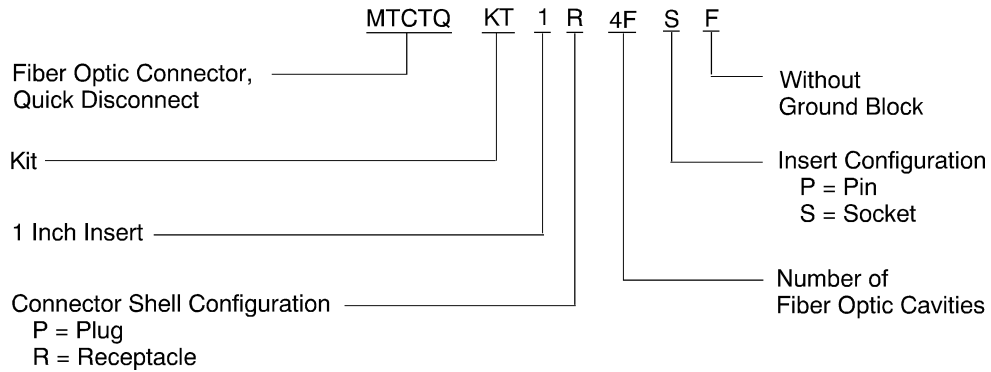


RAYCHEM MTC100 CONNECTOR PART NUMBER STRUCTURE

Figure 6

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, AND MTCTQ CONNECTORS



RAYCHEM MTCTQ CONNECTOR PART NUMBER STRUCTURE
Figure 7

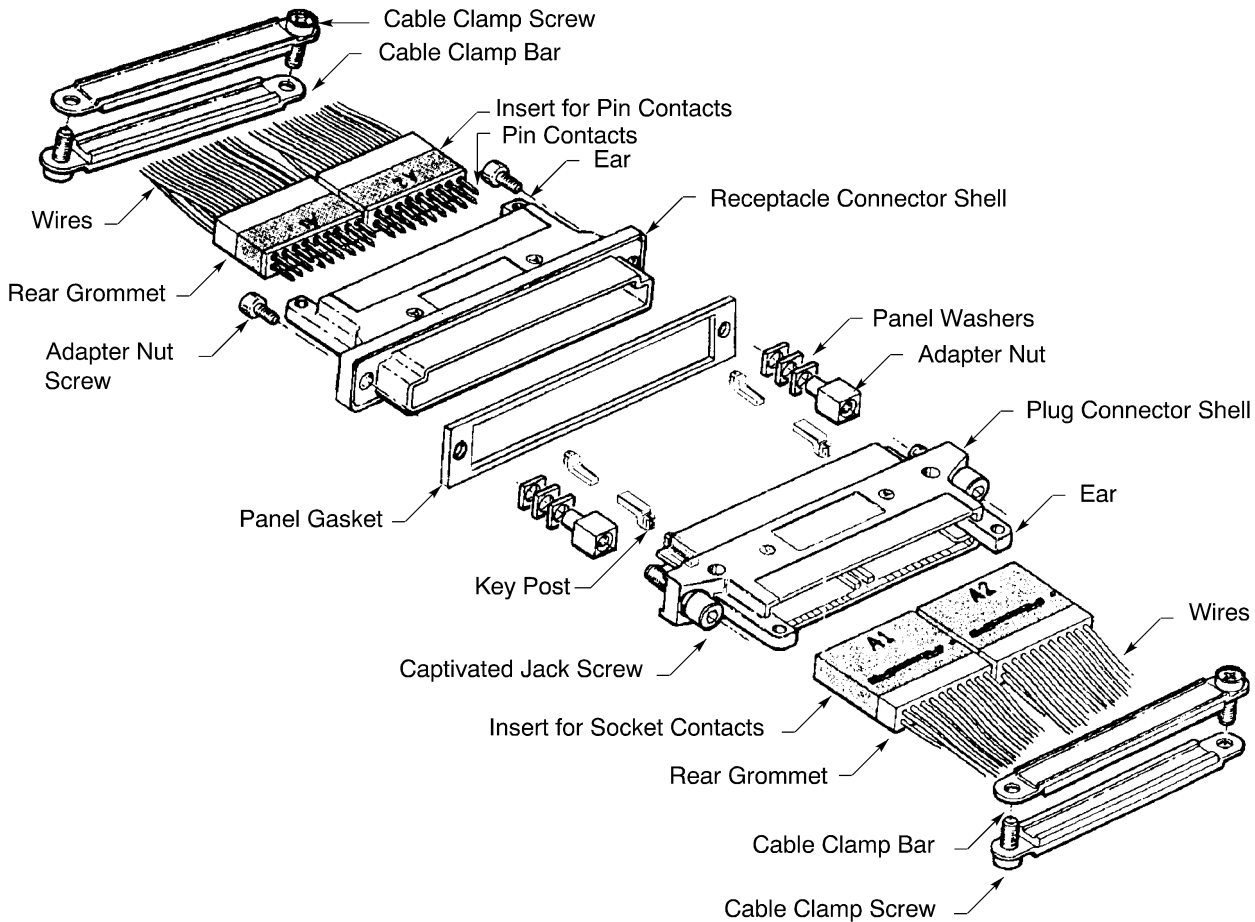
B. Connector Description

The ACIS or MTC100 connector has these technical features:

- A captivated jack screw coupling mechanism
- A rectangular metal shell
- Two shell sizes
- An inline plug
- An inline receptacle or panel mounted receptacle
- Removable inserts
- Rear release, rear removal, crimp contacts.

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTCTQ CONNECTORS



ACIS OR MTC100 CONNECTOR CONFIGURATION

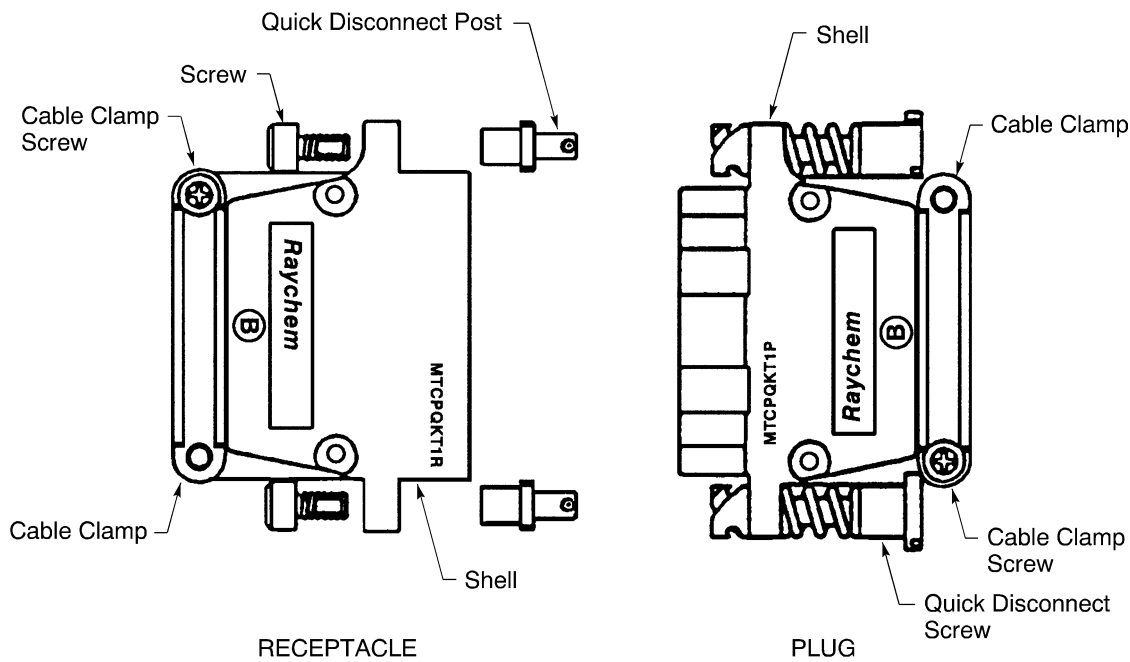
Figure 8

The MTC100 connector has these technical features:

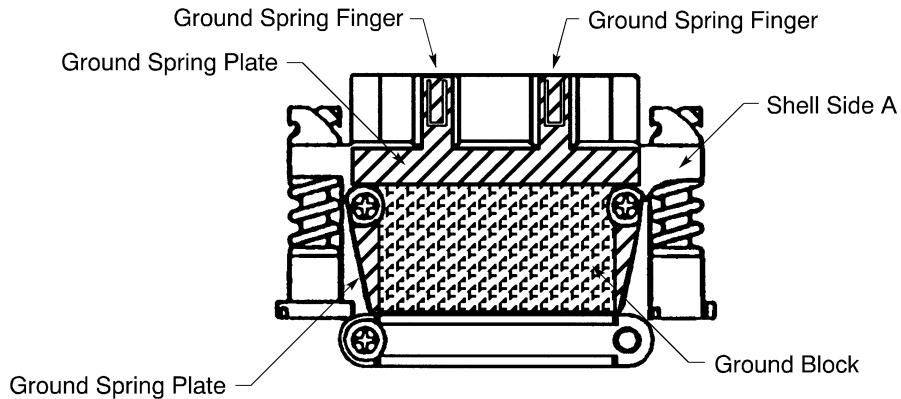
- A quick disconnect coupling mechanism
- A rectangular metal shell
- Two shell sizes
- An inline plug
- An inline receptacle or panel mounted receptacle
- Removable inserts
- Rear release, rear removal crimp contacts
- A ground block in alternative plug and receptacle configurations
- Ground springs in alternative plug configurations.

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS



MTC PQ CONNECTOR CONFIGURATION
Figure 9



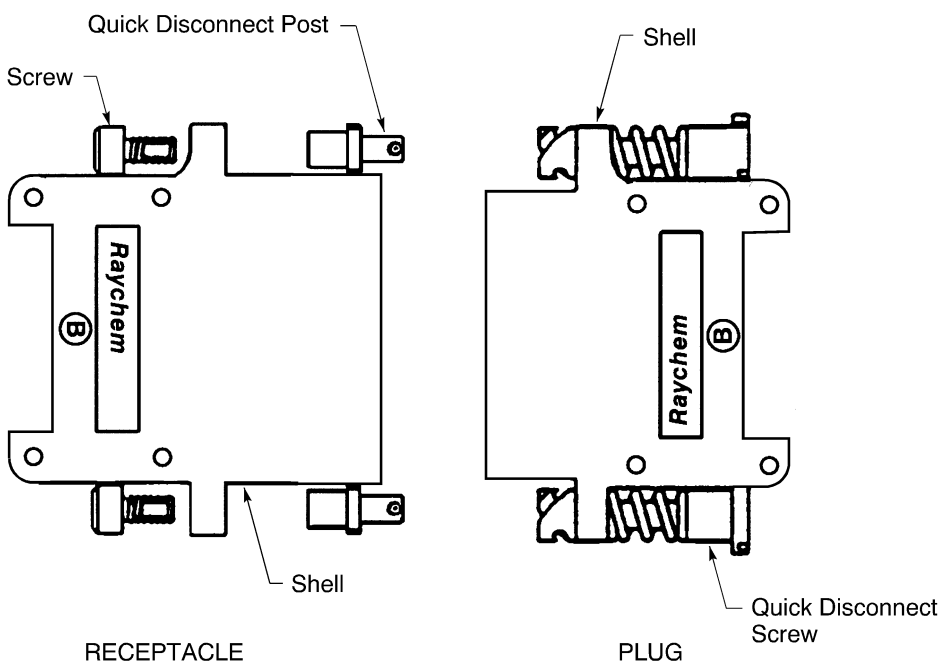
MTC PQ PLUG CONNECTOR WITH GROUND BLOCK
Figure 10

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTCTQ CONNECTORS

The MTCTQ connector has these technical features:

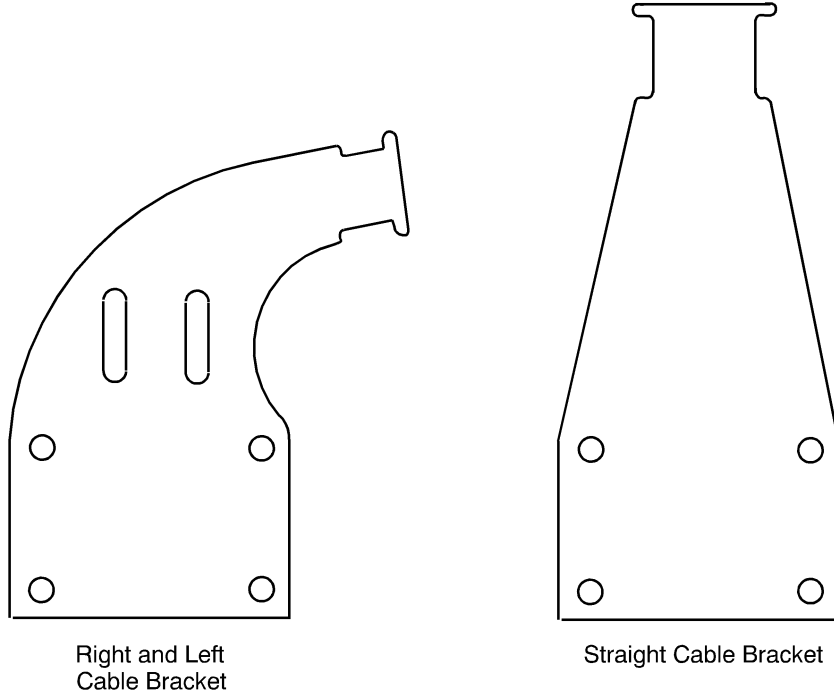
- An insert for fiber optic contact termini
- A rectangular metal shell
- One shell size
- Two backshell brackets
- An inline plug
- A panel mounted receptacle
- A quick disconnect coupling mechanism
- Removable insert that have fiber optic contact termini
- Rear release, rear removal, size 16 fiber optic contact termini



MTCTQ CONNECTOR CONFIGURATION
Figure 11

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, AND MTCTQ CONNECTORS



MTCTQ BACKSHELL BRACKETS
Figure 12

C. Connector Shell Part Numbers

Table 3
MTC100 CONNECTOR SHELL PART NUMBERS

Connector Type	Shell Size	Connector Shell	
		Part Number	Supplier
Plug	1	MTCP100-JH1-P32	Raychem
	2	MTCP100-JH2-P12	Raychem
		MTCP100-JH2-P32	Raychem
Receptacle	1	MTCP100-JH1-R32	Raychem
	2	MTCP100-JH2-R32	Raychem
Receptacle with Mounting Flange	1	MTCP100-SH1-F32	Raychem
	2	MTCP100-SH2-F32	Raychem

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100Q, AND MTCTQ CONNECTORS

**Table 4
MTC100Q CONNECTOR SHELL PART NUMBERS**

Connector Type	Shell Size	Connector Shell	
		Part Number	Supplier
Plug	1	MTC100Q-SH1-P22	Raychem
	2	MTC100Q-SH2-P22	Raychem
Receptacle	1	MTC100Q-SH1-R22	Raychem
	2	MTC100Q-SH2-R22	Raychem

**Table 5
MTCTQ CONNECTOR SHELL PART NUMBERS**

Connector Type	Shell Size	Connector Shell	
		Part Number	Supplier
Plug	1	MTCTQ-YH1-P22	Raychem
Receptacle	1	MTCTQ-YH1-R22	Raychem

D. Connector Assembly Component Part Numbers

**Table 6
MTC100 CONNECTOR ASSEMBLY COMPONENT PART NUMBERS**

Component	Part Number	Supplier
Key Post, Polarization	D-659-0045	Raychem
Kit, Connector Assembly	CHA-0051-003	Raychem
Nut, Adapter	CHA-0095	Raychem
Screw, Adapter	CHA-0094	Raychem
Screw, Cable Clamp	462-92-27-429	Raychem
	NAS514P440-()P	QPL
Washer, Panel	CHA-0093	Raychem

**Table 7
MTC100 CONNECTOR ASSEMBLY KIT COMPONENTS**

Kit	Component	Quantity
CHA-0051-003	Key Post, Polarization	2
	Nut, Adapter	2
	Screw, Adapter	2
	Washer, Panel	6

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS

**Table 8
MTC PQ CONNECTOR ASSEMBLY COMPONENT PART NUMBERS**

Component	Connector Type	Shell Size	Part Number	Supplier
Clamp Kit	-	1	CHA-0298	Raychem
		2	CHA-0299	Raychem
Ground Spring	Plug	1	CHA-0291	Raychem
		2	CHA-0292	Raychem
Key Post	-	-	D-659-0045	Raychem
Post, Quick Disconnect	Receptacle	-	CHA-0297	Raychem
Screw Kit, Quick Disconnect	Plug	-	CHA-0295	Raychem
Screw, Adapter, Quick Disconnect	Receptacle	-	CHA-0296	Raychem
Screw, Plain	-	-	NAS8200A6	QPL
Screw, Self Lock	-	-	NAS8200AL6	QPL

**Table 9
MTC PQ CONNECTOR GROUND BLOCK PART NUMBERS**

Connector Type	Shell Size	Ground Block	
		Part Number	Supplier
Plug	1	CGH10C-22	Cory Components
		CHA0303	Raychem
	2	CGH20C-22	Cory Components
		CHA0304	Raychem
Receptacle	1	CGH10C-22	Cory Components
		CHA0301	Raychem
	2	CGH20C-22	Cory Components
		CHA0302	Raychem

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTCTQ CONNECTORS

**Table 10
MTCTQ CONNECTOR ASSEMBLY COMPONENT PART NUMBERS**

Shell Size	Connector Type	Shell	Component	Part Number	Supplier
1	Plug	MTCTQ-YH1-P22	Clamp Kit, Straight	CHA-1598	Raychem
		MTCTQ-YH1-P22	Clamp Kit, Angled	CHA-1599	Raychem
		MTCTQ-YH1-P22	Dust Cap	D-659-0060	Raychem
		MTCTQ-YH1-P22	Insert	MTCTQ-116-001P	Raychem
	Receptacle	MTCTQ-YH1-S22	Clamp Kit, Straight	CHA-1598	Raychem
		MTCTQ-YH1-S22	Clamp Kit, Angled	CHA-1599	Raychem
		MTCTQ-YH1-S22	Dust Cap	CHA-1600	Raychem
		MTCTQ-YH1-S22	Insert	MTCTQ-116-001S	Raychem
		MTCTQ-YH1-S22	Post and Screw Kit	CHA-0295	Raychem

E. Contact Part Numbers

**Table 11
CONNECTOR CONTACT PART NUMBERS**

Contact Size		Contact Type	Contact	Supplier
Engaging End	Crimp Barrel			
22	20	Pin	462-44-16-478	Cinch
			CTA-0166	Raychem
		Socket	318-01-99-036	Cinch
			CTA-0165	Raychem
16	16	Pin	M39029/58-364	QPL
		Socket	M39029/57-358	QPL

**Table 12
EYELET PART NUMBERS**

Eyelet Part Numbers	
Part Number	Supplier
CE46F	Circon
Y-6015-C	International Eyelets

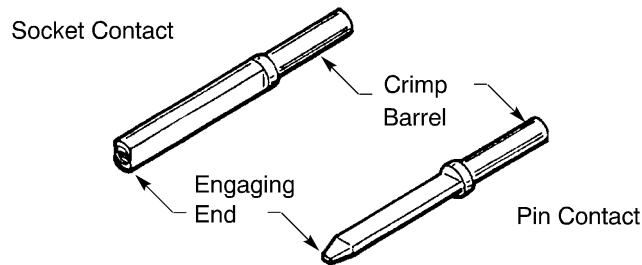
STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS

**Table 13
GROUND BLOCK CONTACT PART NUMBERS**

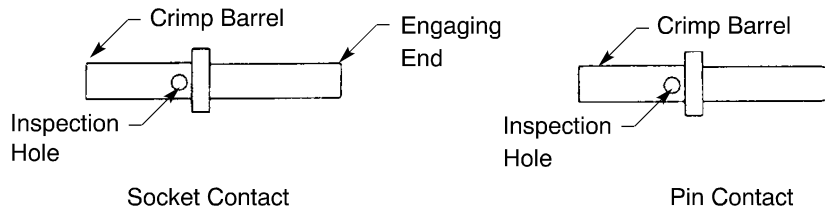
Contact Size		Contact Type	Contact	Supplier
Engaging End	Crimp Barrel			
22	22	Pin	M39029/58-360	QPL

F. Contact Description



SIZE 2020 PIN AND SOCKET CONTACTS

Figure 13



SIZE 1616 M39029/() CONTACTS

Figure 14

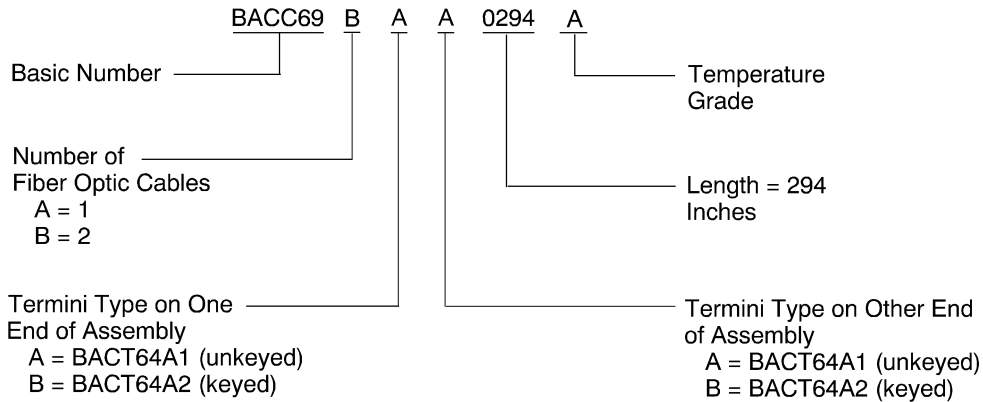
G. Fiber Optic Cable Assembly Part Numbers

**Table 14
FIBER OPTIC CABLE ASSEMBLY PART NUMBERS**

Cable Assembly Part Number	Cable Part Number	Terminus Part Number	Terminus Quantity	Supplier
BACC69A()	BMS13-71T01C01GA	BACT64A()	2	Radiall
BACC69C()	BMS13-71T04C02GA	BACT64A()	4	Radiall

STANDARD WIRING PRACTICES MANUAL

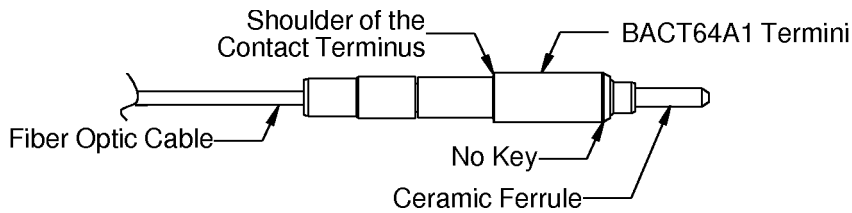
CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTCPPQ, AND MTCTQ CONNECTORS



FIBER OPTIC CABLE ASSEMBLY PART NUMBER STRUCTURE

Figure 15

H. Fiber Optic Termini Description



FIBER OPTIC CONTACT TERMINUS

Figure 16

3. INSERT CONFIGURATIONS

A. Cinch ACIS Screw Coupled Connectors

NOTE: The contact cavity size that is specified in Table 15 is equivalent to the size of the crimp barrel of the contact.

**Table 15
CINCH ACIS CONNECTOR INSERT CONFIGURATIONS**

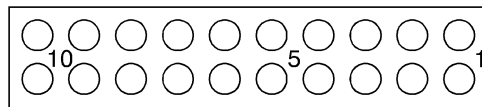
Shell Size	Contact Cavities			Insert				
	Type	Count	Size	Position	Identifier	Part Number	Supplier	Reference
1	Pin	20	20	-	Single	318-07-99-001	Cinch	Figure 17
	Socket	20	20	-	Single	318-07-99-002	Cinch	Figure 17
2	Pin	20	20	Primary	1-10	318-07-99-014	Cinch	Figure 18
		20	20	Secondary	11-20	318-07-99-015	Cinch	
	Socket	20	20	Primary	1-10	318-07-99-016	Cinch	Figure 18
		20	20	Secondary	11-20	318-07-99-017	Cinch	

STANDARD WIRING PRACTICES MANUAL

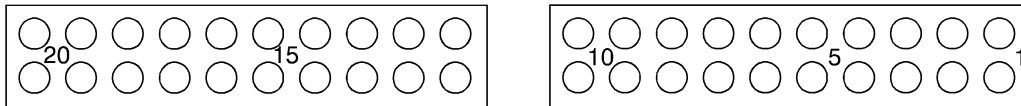
CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTC100 CONNECTORS

NOTE: Figure 17 and Figure 18 show the rear face of inserts that have pin contacts. The view of the rear face of inserts that have socket contacts is the mirror image of this view.

NOTE: Where there are two rows of contacts, the name of a contact cavity is the side of the connector followed by the contact cavity number. Side A or B is marked on the connector shell. For example contact B14 is near side B of the connector at contact cavity position 14. Refer to Figure 18.



SINGLE CINCH ACIS CONNECTOR INSERT
Figure 17



CONFIGURATION OF THE INSERTS IN A SHELL SIZE 2 CINCH ACIS CONNECTOR
Figure 18

B. Raychem MTC100 Screw Coupled Connectors

NOTE: The contact cavity size that is specified in Table 16 is equivalent to the size of the crimp barrel of the contact.

Table 16
RAYCHEM MTC100 CONNECTOR INSERT CONFIGURATIONS

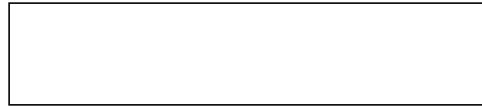
Shell Size	Contact Cavities			Insert				
	Type	Count	Size	Position	Identifier	Part Number	Supplier	Reference
-	-	-	-	-	Blank	D-659-0004	Raychem	Figure 19
1	Pin	20	20	-	Single	MTCP-122-20P	Raychem	Figure 20
	Socket	20	20	-	Single	MTCP-122-20S	Raychem	Figure 20
2	Pin	20	20	Primary	1-10	MTCP-122-20P1	Raychem	Figure 21
		20	20	Secondary	11-20	MTCP-122-20P2	Raychem	
	Pin	20	20	Primary	1-10	MTCP-122-20P1	Raychem	Figure 22
		5	16	Secondary	F-K	MTCP-116-05P2	Raychem	
	Socket	20	20	Primary	1-10	MTCP-122-20S1	Raychem	Figure 21
		20	20	Secondary	11-20	MTCP-122-20S2	Raychem	
	Socket	20	20	Primary	1-10	MTCP-122-20S1	Raychem	Figure 22
		5	16	Secondary	F-K	MTCP-116-05S2	Raychem	

NOTE: Figure 20 through Figure 22 show the rear face of inserts that have pin contacts. The view of the rear face of inserts that have socket contacts is the mirror image of this view.

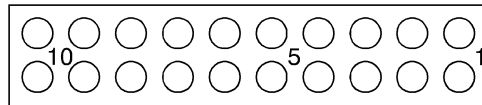
STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTCTQ CONNECTORS

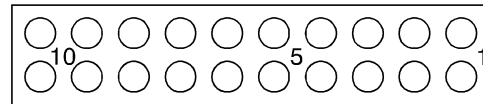
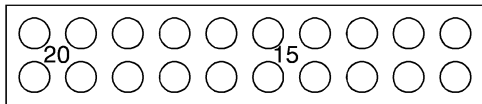
NOTE: Where there are two rows of contacts, the name of a contact cavity is the side of the connector followed by the contact cavity number. Side A or B is marked on the connector shell. For example contact B14 is near side B of the connector at contact cavity position 14. Refer to Figure 21.



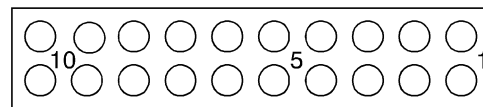
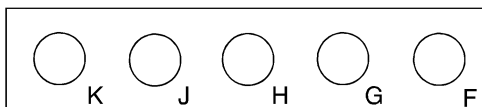
BLANK INSERT
Figure 19



SINGLE INSERT THAT HAS 20 CONTACT CAVITIES IDENTIFIED 1 - 10
Figure 20



CONFIGURATION OF THE INSERTS IN A SHELL SIZE 2 CONNECTOR THAT HAS 40 CONTACT CAVITIES IDENTIFIED 1 - 20
Figure 21



CONFIGURATION OF THE INSERTS IN A SHELL SIZE 2 CONNECTOR THAT HAS 25 CONTACT CAVITIES IDENTIFIED 1 - 10 AND F - K
Figure 22

C. Raychem MTCPQ Quick Disconnect Connectors

NOTE: The contact cavity size that is specified in Table 17 is equivalent to the size of the crimp barrel of the contact.

Table 17
RAYCHEM MTC100 CONNECTOR INSERT CONFIGURATIONS

Shell Size	Contact Cavities			Insert				
	Type	Count	Size	Configuration	Position	Part Number	Supplier	Reference
-	-	-	-	Blank	-	D-659-0004	Raychem	Figure 23

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTC100 CONNECTORS

Table 17 (continued)

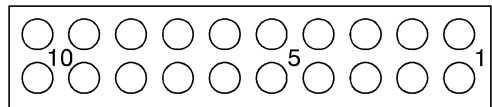
Shell Size	Contact Cavities			Insert				
	Type	Count	Size	Configuration	Position	Part Number	Supplier	Reference
1	Pin	20	20	2	-	MTCP-122-20PQ	Raychem	Figure 24
	Socket	20	20	2	-	MTCP-122-20S	Raychem	Figure 24
2	Pin	20	20	22	Primary	MTCP-122-20PQ1	Raychem	Figure 25
					Secondary	MTCP-122-20PQ2	Raychem	
	Socket	20	20	22	Primary	MTCP-122-20S1	Raychem	Figure 25
					Secondary	MTCP-122-20S2	Raychem	
	Pin	20	20	26	Primary	MTCP-122-20PQ1	Raychem	Figure 26
		5	16		Secondary	MTCP-116-05P2	Raychem	
Socket	20	20	26	Primary	MTCP-122-20S1	Raychem	Figure 26	
	5	16		Secondary	MTCP-116-05S2	Raychem		

NOTE: Figure 24 through Figure 26 show the rear face of inserts that have pin contacts. The view of the rear face of inserts that have socket contacts is the mirror image of this view.

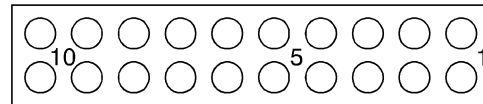
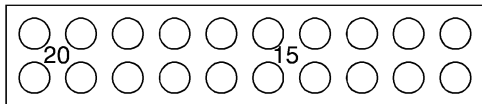
NOTE: Where there are two rows of contacts, the name of a contact cavity is the side of the connector followed by the contact cavity number. Side A or B is marked on the connector shell. For example contact B7 is near side B of the connector at contact cavity position 7. Refer to Figure 26.



BLANK INSERT
Figure 23



SINGLE INSERT THAT HAS 20 CONTACT CAVITIES IDENTIFIED 1 - 10
Figure 24

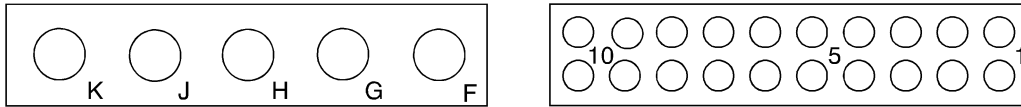


CONFIGURATION OF THE INSERTS IN A SHELL SIZE 2 CONNECTOR THAT HAS 40 CONTACT CAVITIES IDENTIFIED 1 - 20

Figure 25

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTCPQ, AND MTCTQ CONNECTORS



CONFIGURATION OF THE INSERTS IN A SHELL SIZE 2 CONNECTOR THAT HAS 25 CONTACT CAVITIES IDENTIFIED 1 - 10 AND F - K

Figure 26

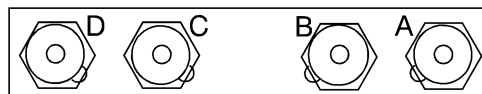
D. Raychem MTCTQ Fiber Optic Connectors

Table 18

RAYCHEM MTCTQ CONNECTOR INSERT CONFIGURATIONS

Shell Size	Contact Cavities			Insert		
	Type	Count	Size	Part Number	Supplier	Reference
1	Fiber Optic Pin Terminus	4	16	MTCTQ-116-001P	Raychem	Figure 27
	Fiber Optic Socket Terminus	4	16	MTCTQ-116-001S	Raychem	Figure 27

NOTE: Figure 27 shows the rear face of an insert that has pin contacts. The view of the rear face of an insert that has socket contacts is the mirror image of this view.



INSERT THAT HAS 4 FIBER OPTIC TERMINUS CAVITIES

Figure 27

4. CONNECTOR DISASSEMBLY

A. Connector Separation

- (1) For an ACIS or a MTC100 connector:
 - (a) Make a selection of one of these tools:
 - A 7/64 inch hex-head driver with or without a ball type end
 - A 7/64 inch allen wrench with or without a ball type end.
 - (b) Turn one of the captivated jack screws two turns in the counterclockwise direction.
 - (c) Turn the other captivated jack screw two turns in the counterclockwise direction.
 - (d) Do Step (b) and Step (c) again until each jack screw is disengaged from each adapter nut.
 - (e) Pull the plug out of the receptacle.
- (2) For an MTCPQ and MTCTQ connectors:

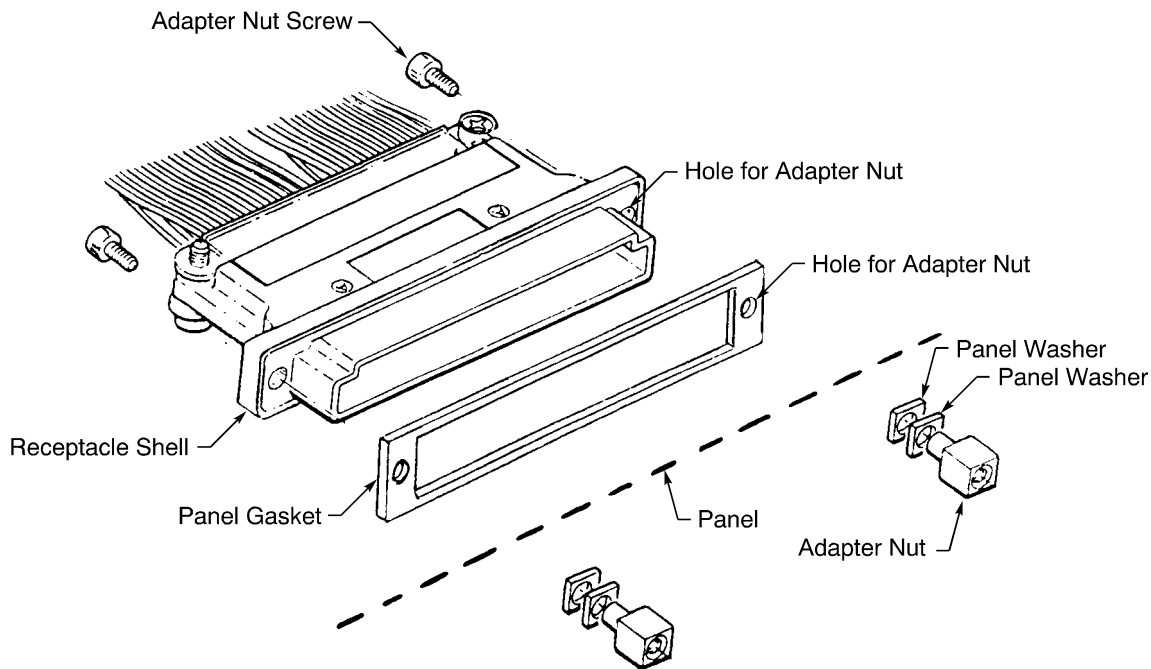
STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS

- (a) Make a selection of one of these tools:
 - A 7/64 inch hex-head driver with or without a ball type end
 - A 7/64 inch allen wrench with or without a ball type end
 - A screwdriver.
- (b) At the same time, push one of the quick disconnect fasteners with the tool and make a 1/2 turn in the counterclockwise direction.
- (c) At the same time, push the other quick disconnect fastener with the tool and make a 1/2 turn in the counterclockwise direction.
- (d) Pull the plug out of the receptacle.

B. Receptacle Removal

CAUTION: MAKE SURE TO KEEP ALL OF THE PANEL WASHERS, PANEL GASKET, AND THE ADAPTER NUTS FROM THE FRONT OF THE CONNECTOR. THEY ARE NECESSARY TO INSTALL THE RECEPTACLE AGAIN.



RECEPTACLE SHELL REMOVAL FROM A PANEL
Figure 28

- (1) Make a selection of one of these tools:
 - A 7/64 inch hex-head driver with or without a ball type end
 - A 7/64 inch allen wrench with or without a ball type end.
- (2) From the rear of the panel, remove one of the adapter nut screws that attach the connector to the panel. Refer to Figure 28.
- (3) From the rear of the panel, remove the other screw.

STANDARD WIRING PRACTICES MANUAL

CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS

CAUTION: MAKE SURE TO KEEP ALL OF THE PANEL WASHERS AND THE ADAPTER NUTS FROM THE FRONT OF THE CONNECTOR. THEY ARE NECESSARY TO INSTALL THE RECEPTACLE AGAIN.

(4) Pull the receptacle from the rear of the panel.

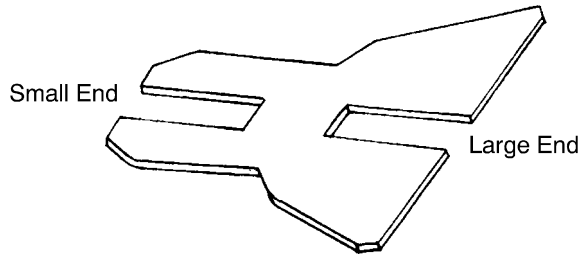
CAUTION: IF THERE IS A PANEL GASKET AT THE REAR OF THE PANEL, MAKE SURE TO KEEP THE GASKET.

C. Insert Removal

NOTE: Contacts or termini can be removed from the insert with the connector inserts in the connector shell.

**Table 19
INSERT REMOVAL TOOLS**

Shell Size	Removal Tool
1	599-11 11 596
	CTA-0161
2	599-11 11 596
	CTA-0161



**INSERT REMOVAL TOOL
Figure 29**

(1) Loosen the screws on the cable clamp bars. Refer to Figure 8.

NOTE: It is not necessary to remove the contacts or termini from the connector insert.

(2) Remove the cable clamp bars and the terminal lugs of the shield ground wires from the ears of the connector shell.

(3) Make a selection of an insert removal tool from Table 19. Refer to Figure 29.

NOTE: Two tools are necessary to remove an insert.

(4) Put a removal tool on each side of the connector insert in the rear of the connector shell.

Make sure to use the:

- The small end of the removal tools for a Size 1 shell
- The large end of the removal tools for a Size 2 shell.

(5) At the same time, push each of the tools into the connector until each tool releases the retention clips and stop.

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- (6) If the connector insert has assembled contacts or termini:
 - (a) Hold the wires and carefully pull the insert from the connector shell.
 - (b) If the insert or inserts do not move when the wires are pulled, do Step (4) through Step (5) again.
- (7) If the connector insert does not have assembled contacts or termini:
 - (a) Put a plastic awl on the front face of the insert.
 - (b) Push the insert out of the connector shell.

D. Contact Removal

**Table 20
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool		
	Part Number	Color	Type
22	M81969/14-01	White	Plastic
20	ATBO-2062	Green	Metal
	ATT 2059	-	Metal Tweezers
	CTA-1160	Green	Plastic
	DRK 237	-	Metal Tweezers
	RRX22RC	-	Metal
16	11-8675-16	White	-
	11-8795-16	White	-
	DRK95-16B	Blue	Metal
	M81969/14-03	White	Plastic
	M81969/8-08	Blue	Metal
	MS27495R16	White	-
	MS27534-16	White	-
	RX16-9	White	-

NOTE: Contacts can be removed from the insert with the connector inserts in the connector shell.

- (1) Make a selection of the contact removal tool from Table 20.
- (2) Remove the cable clamp bars from the rear of the connector. Refer to Paragraph 4.C.
- (3) Put the tip of the tool on the wire near the rear grommet.
- (4) Axially align the tool and the contact cavity.
- (5) Carefully push the tool into the contact cavity until it stops.
- (6) Pull the wire and the tool out of the contact cavity at the same time.
- (7) If the contact is not released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the tool approximately 10 degrees.
 - (c) Do Step (3) through Step (6) again.

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E. Fiber Optic Terminus Removal

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A SEALED CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**Table 21
CONTACT TERMINUS REMOVAL TOOLS**

Terminus Size	Removal Tool	
	Part Number	Color
16	M81969/14-03	White

(1) Make a selection of a contact terminus removal tool from Table 21.

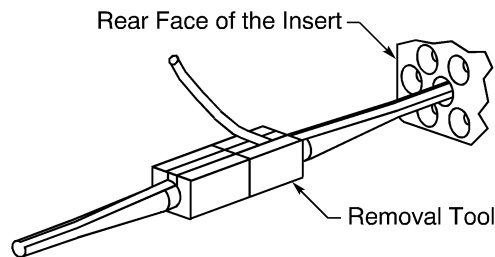
CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) Remove the plastic tie straps or the wire harness ties that are less than 6 inches from the connector.
- (3) At the rear of the connector, put the tip of the removal tool on the cable.
- (4) Axially align the removal tool and contact terminus cavity.
- (5) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

CAUTION: IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.



POSITION OF THE REMOVAL TOOL IN THE CONTACT TERMINUS CAVITY

Figure 30

(6) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out of the cavity.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

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CAUTION: IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (7) If the contact terminus is not released:
 - (a) Carefully remove the tool.
 - (b) Turn the tool approximately 90 degrees on the cable assembly.
 - (c) Do Step (3) through Step (6) again.
- (8) If it is necessary, examine the contact terminus. Refer to Subject 20-12-20.
- (9) If the inspection is not necessary, put a clean protection cap on the contact terminus. Refer to Subject 20-12-20 for the protection cap part numbers.

NOTE: A clean plastic bag is a satisfactory alternative for the protection cap.

- (10) Put the connector in a clean plastic bag.

CAUTION: THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

F. Seal Plug or Seal Rod Removal

- (1) Make a selection of a pair of needle nose pliers that has smooth surfaces and no sharp edges.

CAUTION: NEEDLE NOSE PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) Hold the end of the seal plug or seal rod tightly in the jaws of the needle nose pliers.
- (3) Pull the seal plug or the seal rod out of the contact cavity in the direction that is perpendicular to the face of the rear grommet.

5. CONNECTOR ASSEMBLY

A. Unshielded Wire Preparation

**Table 22
HEAT SHRINKABLE SLEEVES**

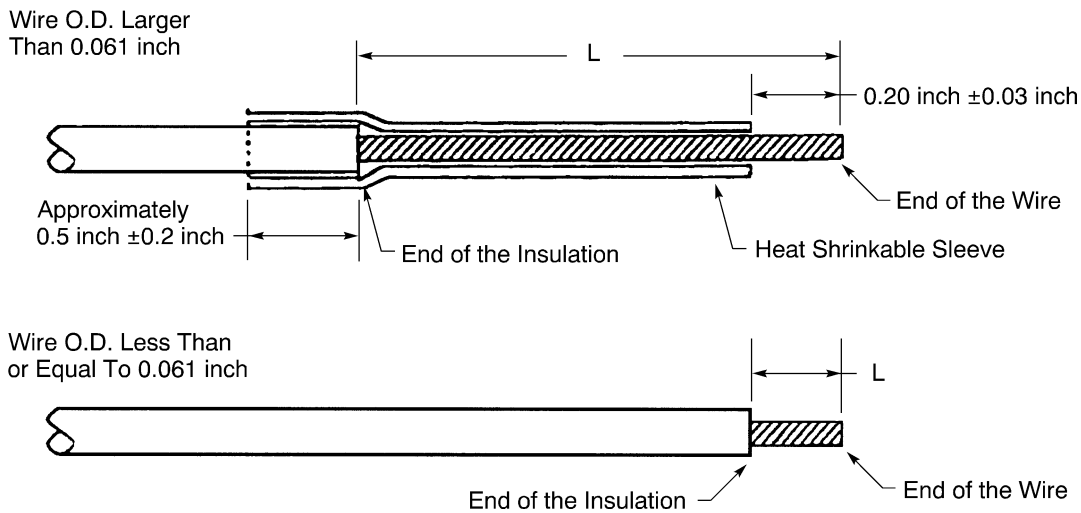
Part Number or Specification	Supplier
AMS-DTL-23053/12 Class 5	An available source
RW-175	Raychem
TFE-4X	Chemplast
	Zeus

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**Table 23
UNSHIELDED WIRE PREPARATION**

Connector	Wire O.D. (inch)	Removal Length L (inch)		Heat Shrinkable Sleeve Length (inch)	
		Target	Tolerance	Target	Tolerance
ACIS	Less than or equal to 0.061	0.20	±0.03	-	-
	More than 0.061	1.10	±0.06	1.15	±0.06
MTC100	Less than or equal to 0.061	0.20	±0.03	-	-
	More than 0.061	1.10	±0.06	1.15	±0.06
MTCPQ	Less than or equal to 0.061	0.20	±0.03	-	-
	More than 0.061	1.25	±0.06	1.50	±0.06



**UNSHIELDED WIRE PREPARATION
Figure 31**

Refer to Table 23 and Figure 31.

- (1) Remove the necessary length of insulation from the end of the wire.
- (2) If a heat shrinkable sleeve is specified:
 - (a) Make a selection of a heat shrinkable sleeve from Table 22.
NOTE: For alternate heat shrinkable sleeves, refer to Subject 20-00-11.
 - (b) Push the necessary length of heat shrinkable sleeve on the wire until the forward end of the sleeve is 0.20 inch 0.03 ± inch from the end of the wire.
Make sure that the sleeve makes approximately a 0.5 inch ± 0.2 inch overlap with the wire insulation.
 - (c) Shrink the sleeve into its position. Refer to Subject 20-10-14.

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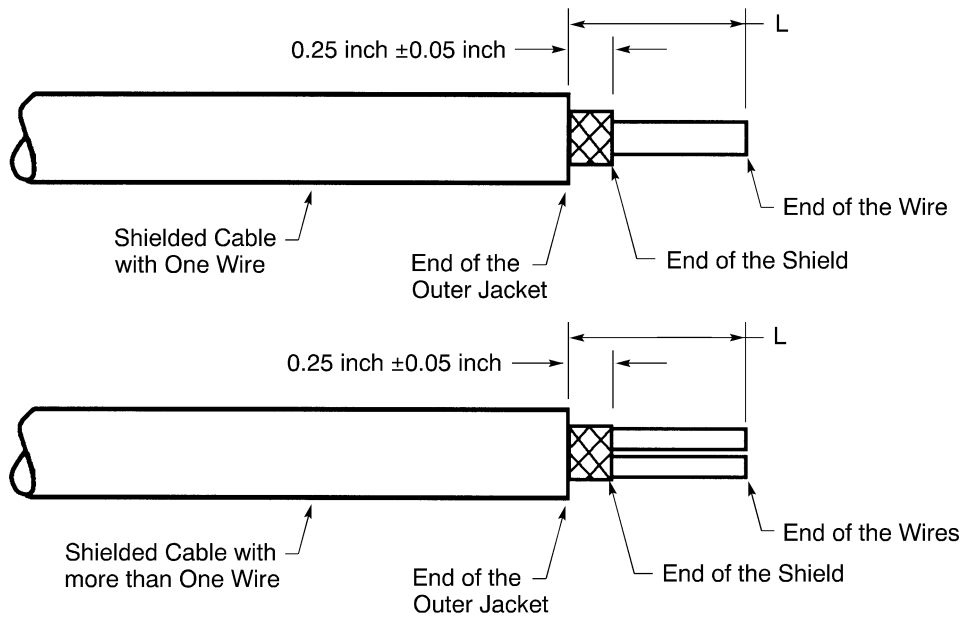
CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS

- (3) For size 16 and larger contact cavities:
 - (a) Measure the O.D. of the wire.
 - (b) If the O.D. of the wire is less than the minimum seal diameter of the connector grommet hole, increase the O.D. of the wire. Refer to Paragraph 1.C.

B. Shielded Cable Preparation

**Table 24
OUTER JACKET REMOVAL LENGTH**

Connector Series	Wire O.D. (inch)	Removal Length L (inch)	
		Target	Tolerance
ACIS	Less than or equal to 0.061	1.80	± 0.05
	Larger than 0.061	2.25	± 0.10
MTC100	Less than or equal to 0.061	1.80	± 0.05
	Larger than 0.061	2.25	± 0.10
MTC PQ	Less than or equal to 0.061	2.00	± 0.10
	Larger than 0.061	2.25	± 0.10



**SHIELDED CABLE PREPARATION
Figure 32**

Refer to Table 24 and Figure 32.

- (1) Remove the necessary length of outer jacket from the end of the cable.

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- (2) Remove the necessary length of the shield that makes the distance from the end of the shield to the end of the outer jacket equal to 0.25 inch ±0.05 inch.
- (3) Assemble the necessary shield ground wires.

Refer to:

- Paragraph 5.C. for the ACIS and MTC100 connectors
- Paragraph 5.D. for the MTCPQ connector.

- (4) Prepare each wire. Refer to Paragraph 5.A.

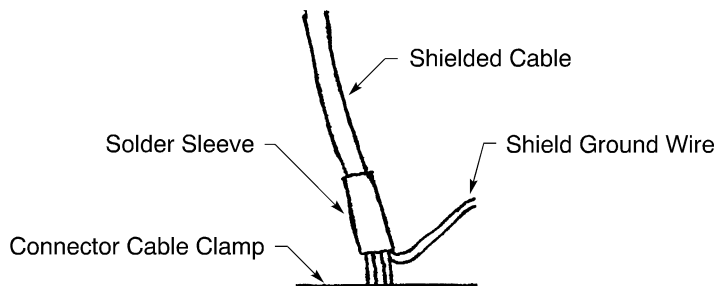
C. Assembly of a Shield Ground Wire with a Terminal Lug

**Table 25
SHIELD GROUND WIRE TERMINAL LUGS**

Terminal Lug	Maximum Number of Shield Ground Wires	Supplier
321892	3	AMP
BACT12AR222	1	QPL
BACT12AC2	3	QPL
BACT12M2	3	QPL

- (1) Make a selection of an AWG 22 wire for a shield ground wire. Refer to Subject 20-10-15 for the type of wire.
- (2) Cut a 2.0 inch ±0.1 inch length of the wire.
- (3) Assemble the shield ground wire with a solder sleeve. Refer to Subject 20-10-15.

Make sure that the shield ground wire makes an exit from the end of the solder sleeve that is adjacent to the connector. Refer to Figure 33.



**SHIELD GROUND WIRE CONFIGURATION
Figure 33**

- (4) Assemble a terminal lug on the end of the wire or wires:
 - (a) Make a selection of a terminal lug from Table 25.
 - (b) Remove 0.17 inch ±0.01 inch of insulation from the end of each shield ground wire.
 - (c) Crimp the wire or wires in the crimp barrel of the terminal lug. Refer to Subject 20-30-11.

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D. Assembly of a Shield Ground Wire with a Contact

**Table 26
SHIELD GROUND WIRE LENGTH**

Shield Ground Wire Contact Installation	Cable Configuration	Length (inch)	
		Minimum	Maximum
Connector Contact Cavity	Shielded cable with one shield	2.5	2.8
	Shielded cable with two shields	-	4.0
	Microdot 202-3836-000	-	6.0
Ground Block Contact Cavity	Shielded cable with one shield	1.5	1.8
	Shielded cable with two shields	-	3.0
	Microdot 202-3836-000	-	5.0

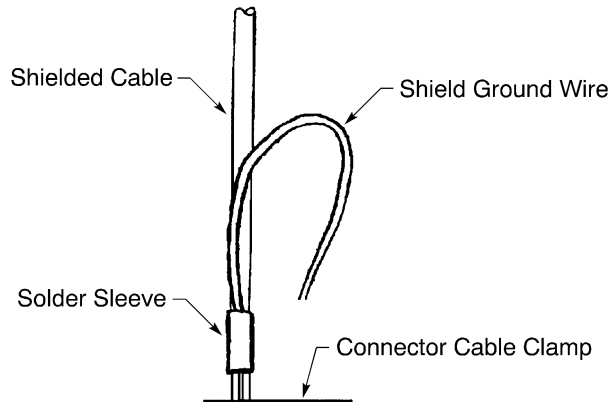
**Table 27
GROUND BLOCK CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
22	22	M22520/2-01	4	M22520/2-09	-
		WA22	4		

- (1) Make a selection of a shield ground wire. Refer to Subject 20-10-15 for the type of wire. Make that the wire is AWG 22.
- (2) Cut the necessary length of the ground wire. Refer to Table 26.
- (3) Assemble the shield ground wire with a solder sleeve. Refer to Subject 20-10-15. Make sure that the shield ground wire makes an exit from the end of the solder sleeve that is:
 - Not adjacent to the connector for Microdot 202-3836-000 cable; refer to Figure 34
 - Adjacent to the connector for other shielded cables; refer to Figure 33.

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SHIELD GROUND WIRE CONFIGURATION FOR MICRODOT 202-3836-000 CABLE
Figure 34

- (4) Assemble a contact on the end of the wire:
 - (a) Make a selection of a size 22 contact from Table 9.
 - (b) Make a selection of a crimp tool from Table 27.
 - (c) Remove 0.15 inch \pm 0.03 inch of insulation from the end of the wire.
 - (d) Crimp the wire in the crimp barrel of the contact.

E. Contact Assembly

Table 28
APPLICABLE CONDITIONS FOR THE ADJUSTMENT OF THE SIZE OF THE CONDUCTOR

Applicable Conditions		Adjustment of the Conductor Size
Wire Size (AWG)	Crimp Barrel Size	
26	20	AWG 26 filler wire
24	16	Eyelet
22	16	Eyelet

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**Table 29
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Contact Type	Crimp Tool			
			Basic Unit		Locator	
			Part Number	Setting	Part Number	Color
24	20	Pin	AFM-10	3	K817-11BE	-
			GWT-202-2204-CTA-165-166	-	-	-
			GWT-202R-2204R-CTA-165-166	-	-	-
			M22520/2-01	4	K817-11	-
			WA22	4	K817-11	-
			WA22BESS	3	K817-11BE	-
		Socket	AFM-10	3	K818-11BE	-
			GWT-202-2204-CTA-165-166	-	-	-
			GWT-202R-2204R-CTA-165-166	-	-	-
			M22520/2-01	4	K818-11	-
			WA22	4	K818-11	-
			WA22BESS	3	K818-11BE	-
22	20	Pin	AFM-10	5	K817-11BE	-
			GWT-202-2204-CTA-165-166	-	-	-
			GWT-202R-2204R-CTA-165-166	-	-	-
			M22520/2-01	5	K817-11	-
			WA22	5	K817-11	-
			WA22BESS	4	K817-11BE	-
		Socket	AFM-10	4	K818-11BE	-
			GWT-202-2204-CTA-165-166	-	-	-
			GWT-202R-2204R-CTA-165-166	-	-	-
			M22520/2-01	5	K818-11	-
			WA22	5	K818-11	-
			WA22BESS	4	K818-11BE	-

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Table 29 (continued)

Wire Size (AWG)	Crimp Barrel Size	Contact Type	Crimp Tool			
			Basic Unit		Locator	
			Part Number	Setting	Part Number	Color
20	20	Pin	AFM-10	5	K817-11BE	-
			GWT-202-2204-CTA-165-166	-	-	-
			GWT-202R-2204R-CTA-165-166	-	-	-
			M22520/2-01	6	K817-11	-
			WA22	6	K817-11	-
			WA22BESS	5	K817-11BE	-
	Socket	AFM-10	5	K818-11BE	-	
		GWT-202-2204-CTA-165-166	-	-	-	
		GWT-202R-2204R-CTA-165-166	-	-	-	
		M22520/2-01	6	K818-11	-	
		WA22	6	K818-11	-	
		WA22BESS	5	K818-11BE	-	
	16	Pin	M22520/1-01	4	M22520/1-04	Blue
			WA27F	4	M22520/1-04	Blue
Socket		M22520/1-01	4	M22520/1-04	Blue	
		WA27F	4	M22520/1-04	Blue	
18	Pin	M22520/1-01	5	M22520/1-04	Blue	
		WA27F	5	M22520/1-04	Blue	
	Socket	M22520/1-01	5	M22520/1-04	Blue	
		WA27F	5	M22520/1-04	Blue	
16	Pin	M22520/1-01	6	M22520/1-04	Blue	
		WA27F	6	M22520/1-04	Blue	
	Socket	M22520/1-01	6	M22520/1-04	Blue	
		WA27F	6	M22520/1-04	Blue	

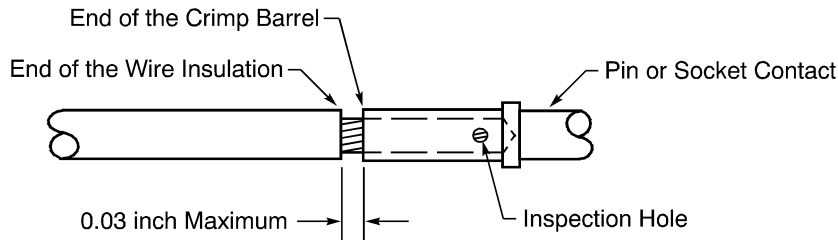
- (1) Find the applicable conditions for the adjustment of the conductor size in Table 28.
- (2) If a filler wire is specified, assemble the contact with a filler wire. Refer to Paragraph 5.F.
- (3) If an eyelet is specified, assemble the contact with an eyelet. Refer to Paragraph 5.G.
- (4) Make a selection of a crimp tool from Table 29.
- (5) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 35.

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Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the shoulder of the contact is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 35

(6) Crimp the contact.

F. Contact Assembly with Filler Wire

For the conditions that are applicable for this procedure, refer to Paragraph 5.E.

Table 30
SIZE OF THE FILLER WIRE

Wire Size (AWG)	Crimp Barrel Size	Filler Wire	
		Quantity	Size (AWG)
26	20	1	26

Table 31
CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
26	20	M22520/2-01	4	K818-11	-
		WA22	4	K818-11	-

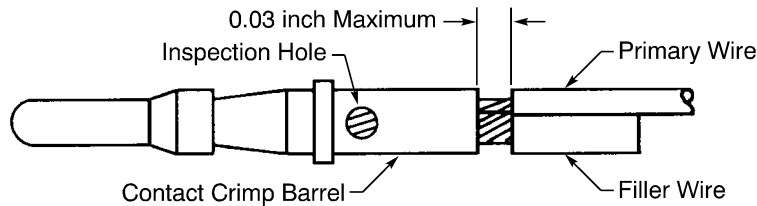
- (1) Make a selection of a crimp tool from Table 31.
- (2) Find the quantity and the size of the filler wire in Table 30.
Make sure that the filler wire is the same wire type as the primary wire.
- (3) Prepare the end of the filler wire. Refer to Paragraph 5.A.
- (4) Put the end of each wire in the crimp barrel of the contact. Refer to Figure 36.

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Make sure that:

- All of the strands of each conductor are in the crimp barrel
- The conductors can be seen in the inspection hole
- The distance from the end of the insulation to the shoulder of the contact is not more than 0.03 inch.



POSITION OF THE PRIMARY WIRE AND THE FILLER WIRE IN THE CRIMP BARREL
Figure 36

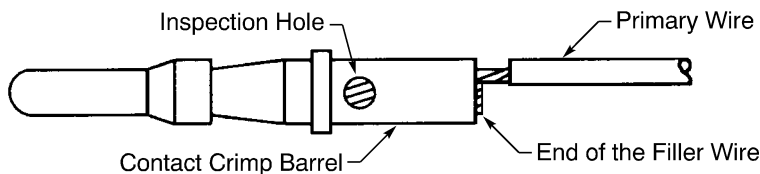
(5) Crimp the contact.

Make sure that:

- All of the strands of each conductor are in the crimp barrel
- The conductors can be seen in the inspection hole
- The distance from the end of the insulation to the shoulder of the contact is not more than 0.03 inch.

(6) Remove the unwanted length of the filler wire as close as possible to the end of the crimp barrel. Refer to Figure 37.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE STRANDS OF THE PRIMARY WIRE. THE MECHANICAL STRENGTH OF THE WIRE CAN BE DECREASED.



REMOVAL OF THE UNWANTED LENGTH OF THE FILLER WIRE
Figure 37

G. Contact Assembly with an Eyelet

For the conditions that are applicable for this procedure, refer to Paragraph 5.E.

Table 32
CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	16	M22520/1-01	5	M22520/1-04	Blue

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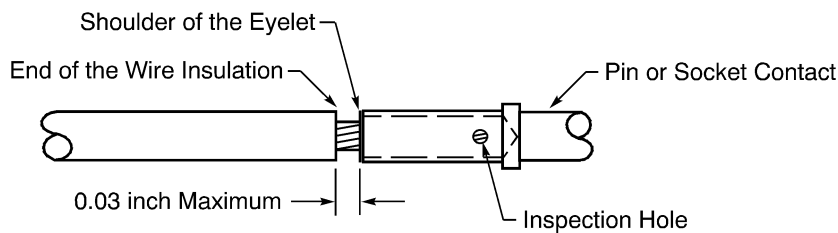
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Table 32 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
22	16	M22520/1-01	6	M22520/1-04	Blue

- (1) Make a selection of a crimp tool from Table 32.
- (2) Make as selection of an eyelet from Table 12.
- (3) Put the eyelet in the crimp barrel of the contact.
Make sure that the shoulder of the eyelet is against the end of the crimp barrel.
- (4) Put the end of the wire in the eyelet. Refer to Figure 38.
Make sure that:
 - All of the strands of the conductor are in the crimp barrel
 - The conductor can be seen in the inspection hole
 - The distance from the end of the insulation to the shoulder of the eyelet is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 38

H. Contact Insertion

Table 33
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool		
	Part Number	Color	Description
20	ATBO-1062	-	Metal
	CTA-1160	Red	Plastic
	RIT22RC	-	Metal

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CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTCTQ CONNECTORS

Table 33 (continued)

Crimp Barrel Size	Insertion Tool		
	Part Number	Color	Description
16	M81969/8-07	Blue	Metal
	M81969/14-03	Blue	Metal
	MS27495A16	Blue	Metal
	11-8674-16	Blue	Metal
	11-8794-16	Blue	Metal
	RTM16-4	Blue	Metal
	ATBX1108	-	Metal
	MS27534-16	Blue	Plastic

(1) Make a selection of a contact insertion tool from Table 33.

CAUTION: DO NOT USE AN INSERTION TOOL THAT HAS:

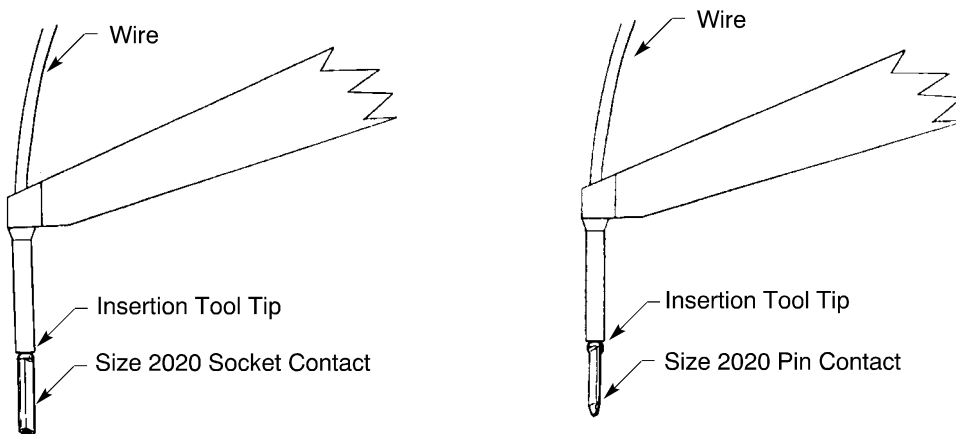
- A BENT TIP
- A BENT BIT
- A FLARED TIP
- A BROKEN TIP
- A TIP WITH A CRACK.

WARNING: IF A DEFECTIVE INSERTION TOOL IS USED, INJURY TO THE OPERATOR CAN OCCUR.

CAUTION: A DEFECTIVE INSERTION TOOL CAN CAUSE:

- DAMAGE TO THE REAR GROMMET OF THE CONNECTOR
- DAMAGE TO THE CONTACT RETENTION CLIPS.

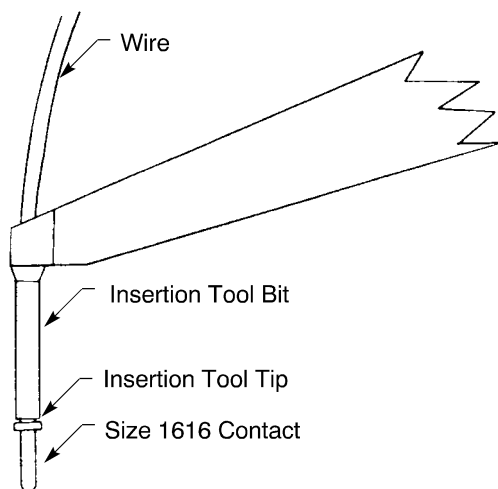
(2) Put the contact assembly in the insertion tool. Refer to Figure 39 and Figure 40.



POSITION OF THE SIZE 2020 CONTACT IN THE INSERTION TOOL
Figure 39

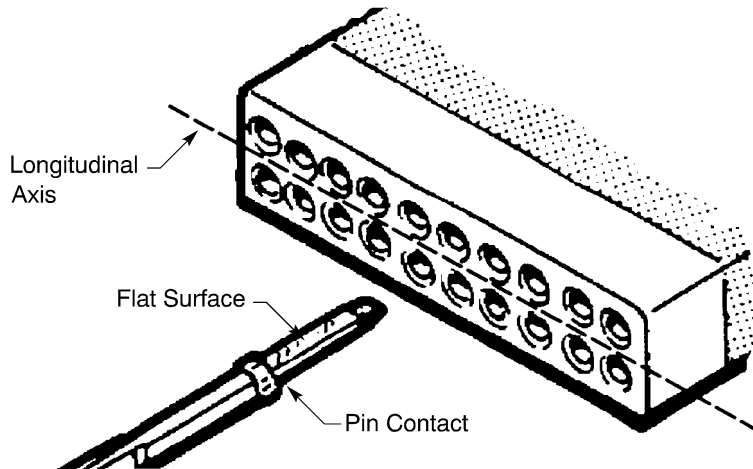
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POSITION OF THE SIZE 1616 CONTACT IN THE INSERTION TOOL
Figure 40

- (3) For a size 20 pin contact, align the flat surface of the contact with the longitudinal axis of the connector insert. Refer to Figure 41.

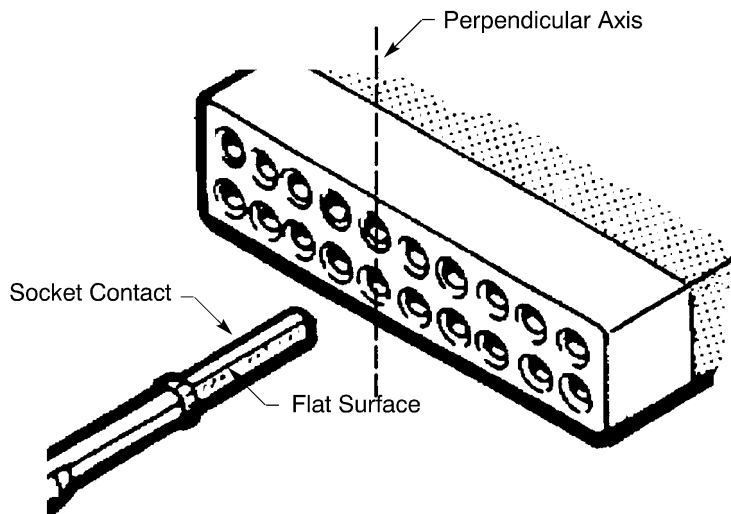


POSITION OF THE PIN CONTACT FOR INSERTION
Figure 41

- (4) For a size 20 socket contact, align the flat surface of the contact with the perpendicular axis of the connector insert. Refer to Figure 42.

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POSITION OF THE SOCKET CONTACT FOR INSERTION
Figure 42

- (5) Push the tool and the contact into the contact cavity until the tool stops.
- (6) Carefully remove the tool from the contact cavity.
- (7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:
 - (a) Pull the contact from the contact cavity.
 - (b) Do Step (2) through Step (7) again.

I. Fiber Optic Terminus Insertion

NOTE: A contact terminus can be installed before or after the alignment sleeve insert is installed in the connector.

CAUTION: THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

Table 34
CONTACT TERMINUS INSERTION TOOLS

Terminus Size	Insertion Tool	
	Part Number	Color
16	M81969/14-03	Blue

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- (1) Make a selection of a contact terminus insertion tool from Table 34.

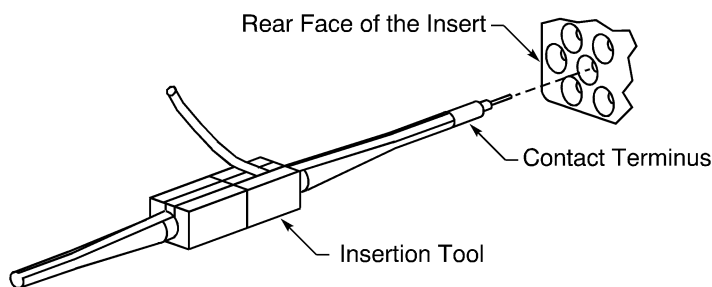
CAUTION: DO NOT USE AN INSERTION TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) If the contact terminus does not have a protection cap or is not in a plastic bag, examine the contact terminus. Refer to Subject 20-12-20.
- (3) Remove the protection from the contact terminus.
- (4) Carefully put the insertion tool on the cable and the contact terminus.

CAUTION: THE CONTACT TERMINUS MUST BE INSTALLED IN THE CONNECTOR IF IT DOES NOT HAVE PROTECTION FROM CONTAMINATION. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

CAUTION: DO NOT TOUCH THE FRONT FACE OF THE TERMINUS. CONTAMINATION ON THE TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (5) At the rear of the connector, axially align the insertion tool and the terminus with the contact terminus cavity.



ALIGNMENT OF THE CONTACT TERMINUS, THE INSERTION TOOL, AND THE CONTACT TERMINUS CAVITY
Figure 43

- (6) Carefully push the insertion tool and the contact terminus into the terminus cavity until it stops.
Make sure that:
- The tool stays aligned with the cavity
 - The tool is not turned in the cavity.

CAUTION: IF THE INSERTION TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

CAUTION: DO NOT PUSH THE CABLE. DAMAGE TO THE FIBER OPTIC CABLE CAN OCCUR.

- (7) Carefully pull the insertion tool out of the terminus cavity.
Make sure that:
- The tool stays aligned with the cavity
 - The tool is not turned in the cavity.

- (8) Lightly pull the cable to make sure that the terminus is locked in the terminus cavity.

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CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINUS, THE CABLE, OR THE CONNECTOR.

CAUTION: DO NOT MAKE A DENT IN THE CABLE JACKET WITH THE FINGERNAILS. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (9) If the terminus is not locked in the cavity:
 - (a) Pull the terminus out of the cavity.
 - (b) Do Step (4) through Step (8) again.
- (10) If the connector is not connected immediately, put the connector in a clean plastic bag.

CAUTION: THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

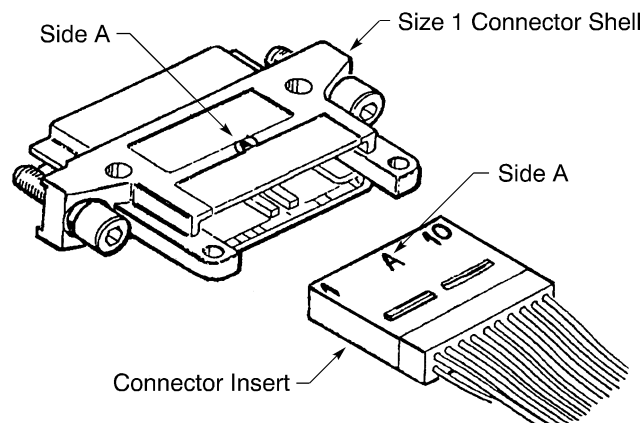
J. Seal of an Empty Contact Cavity and an Empty Terminus Cavity

An empty contact cavity or an empty terminus cavity must be sealed with a seal plug or a seal rod. Refer to Subject 20-60-08.

K. Insert Installation - Size 1 Shell

NOTE: The insert that has fiber optic contact cavities can only be installed in the MTCTQ connector shells.

NOTE: The MTCTQ connector shell can only contain the insert that has fiber optic contact cavities. Refer to Figure 44.

**INSTALLATION OF A CONNECTOR INSERT IN A SIZE 1 SHELL****Figure 44**

- (1) Align Side A of the connector insert with Side A of the connector shell.
- (2) Push the insert into the connector shell until it is locked in position.
- (3) Pull lightly on the wires to make sure that the insert is locked in the shell.
- (4) If the insert is not locked in the shell, do Step (2) and Step (3) again.

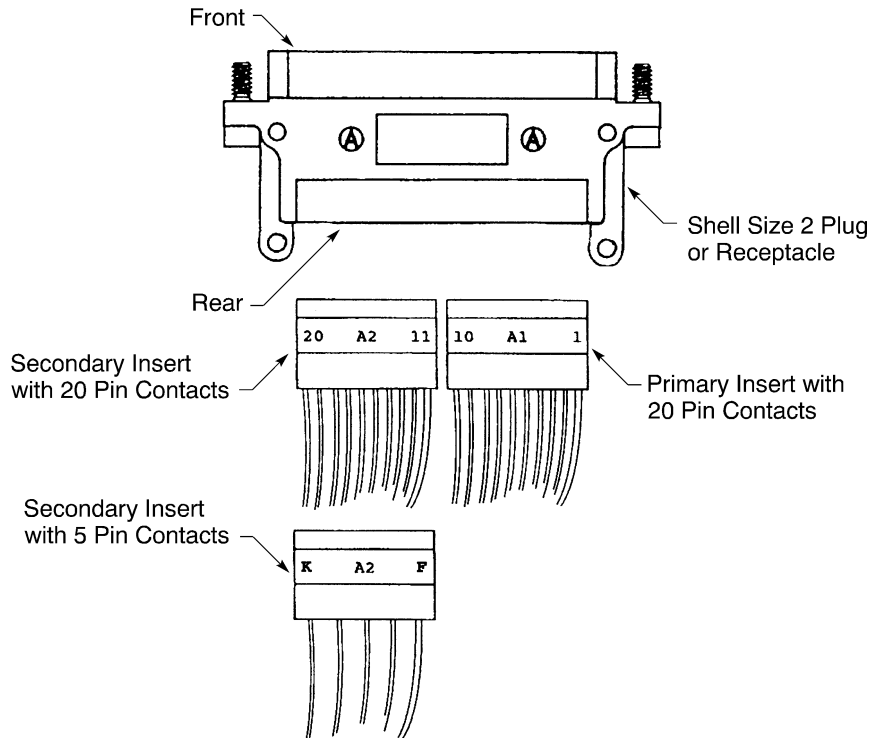
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L. Insert Installation with Pin Contacts - Size 2 Shell

Refer to Figure 45.



INSTALLATION OF CONNECTOR INSERTS WITH PIN CONTACTS IN A SIZE 2 SHELL

Figure 45

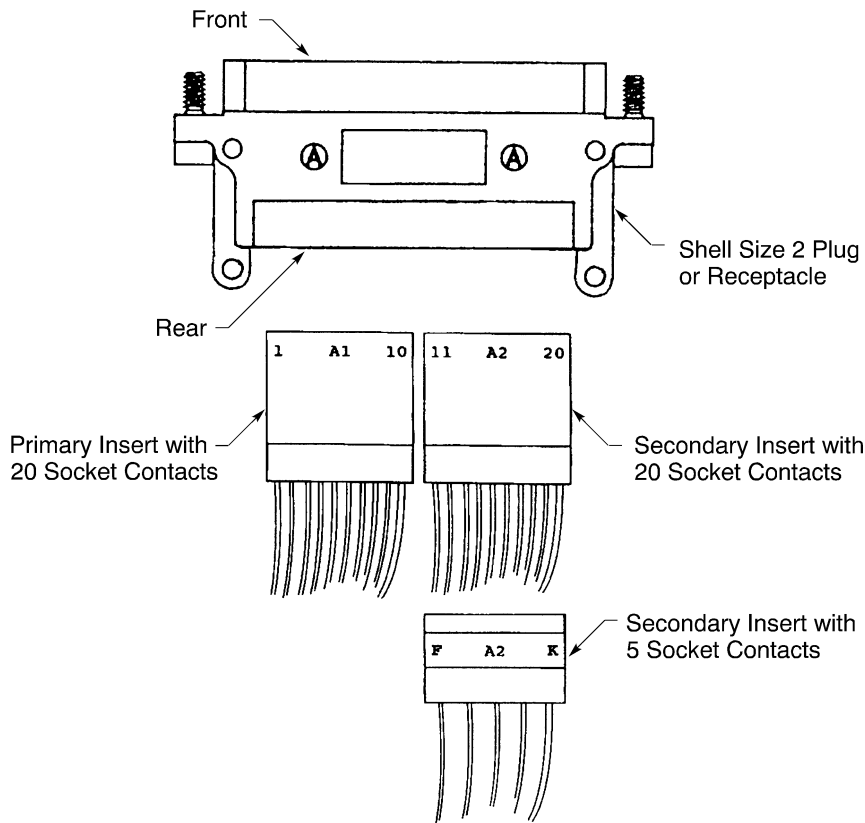
- (1) Put the connector shell flat with Side A up.
- (2) Put the primary 1-10 insert on the right side with Side A1 up.
- (3) Put the secondary 11-20 or F-K insert on the left side with Side A2 up.
- (4) At the same time, push each of the inserts into the connector shell until each insert is locked in position.
- (5) Pull lightly on the wires to make sure that the each insert is locked in the shell.
- (6) If the inserts are not locked in the shell, do Step (4) and Step (5) again.

M. Insert Installation with Socket Contacts - Size 2 Shell

Refer to Figure 46.

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INSTALLATION OF CONNECTOR INSERTS WITH SOCKET CONTACTS IN A SIZE 2 SHELL
Figure 46

- (1) Put the connector shell flat with Side A up.
- (2) Put the primary 1-10 insert on the left side with Side A1 up.
- (3) Put the secondary 11-20 or F-K insert on the right side with Side A2 up.
- (4) At the same time, push each of the inserts into the connector shell until each insert is locked in position.
- (5) Pull lightly on the wires to make sure that the each insert is locked in the shell.
- (6) If the inserts are not locked in the shell, do Step (4) and Step (5) again.

N. Installation of a Cory Ground Block

For the installation of a Raychem ground block, refer to Paragraph 5.O.

Table 35
NECESSARY MATERIALS

Description	Part Number	Supplier
Thread Lock Compound	Loctite 222	Loctite
	Loctite 271	Loctite

Refer to Figure 10.

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- (1) Make a selection of a Cory ground block from Table 9.
- (2) Make a selection of a screw from Table 8.
- (3) If the connector is a plug:
 - (a) Make a selection of a ground spring from Table 8.
 - (b) Put the ground spring on the connector shell.
- (4) Put the connector flat with Side A up.
- (5) Align each hole of the ground block with the applicable hole in the shell.
- (6) If the screw is not a self-lock screw:
 - (a) Make a selection of a thread lock compound from Table 35.
 - (b) Put one drop of thread lock compound on the threads of each screw.
- (7) Install each screw.

O. Installation of a Raychem Ground Block

For the installation of a Cory ground block, refer to Paragraph 5.N.

Refer to Figure 10.

- (1) Make a selection of a Raychem ground block from Table 9.
- (2) Put the connector flat with Side A up.
- (3) Align each hole of the ground block with the applicable hole in the shell.
- (4) Install each screw.

P. Contact Insertion in the Ground Block

**Table 36
GROUND BLOCK CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool		
	Part Number	Color	Description
22	M81969/14-01	Green	Plastic

- (1) Make a selection of a contact insertion tool from Table 36.
- (2) Put the contact assembly in the insertion tool.
- (3) Align the contact with the contact cavity.
- (4) Push the tool and the contact straight into the contact cavity until the tool stops.
- (5) Carefully remove the tool from the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE GROUND BLOCK OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact from the contact cavity.

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(b) Do Step (2) through Step (6) again.

Q. Strain Relief Assembly

**Table 37
NECESSARY PARTS AND MATERIALS**

Description	Part Number	Supplier
Tape, Filler, Silicone	10-62034	QPL
Thread Lock Compound	Loctite 222	Loctite
	Loctite 271	Loctite
Washer	NAS1149DN332J	QPL

These conditions are applicable:

- A maximum of six terminal lugs can be attached to one connector shell
- A maximum of three terminal lugs can be attached to one ear of the connector shell.

(1) Align the holes of each cable clamp bar with the holes in the ears of the connector shell.

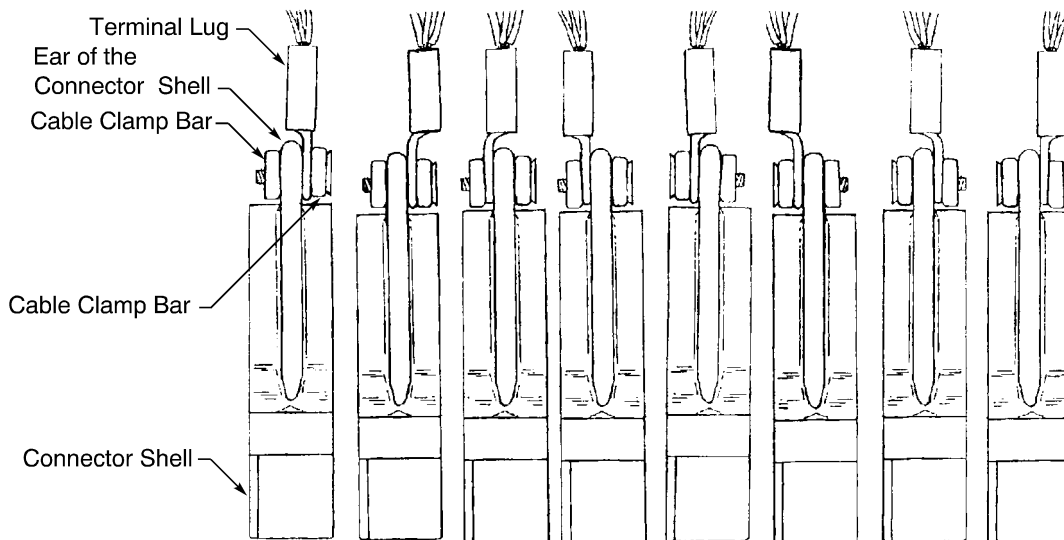
(2) If a shield ground wire has a terminal lug:

(a) Put an equal quantity of terminal lugs between the clamp bars against each ear of the shell.

NOTE: If the length of the shield ground wire is not sufficient to be attached to an ear to keep the quantity equal, the terminal lugs can be attached to the same ear.

Refer to:

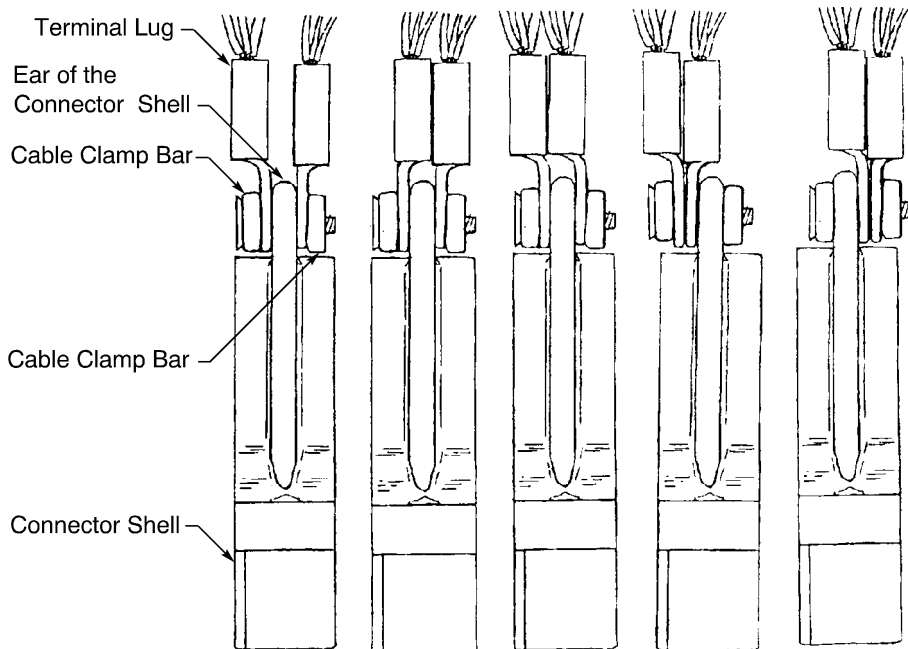
- Figure 47 for alternative positions of one terminal lug
- Figure 48 and Figure 49 for alternative positions of two terminal lugs
- Figure 50 for alternative positions of three terminal lugs.



**ALTERNATIVE POSITIONS FOR ONE TERMINAL LUG
Figure 47**

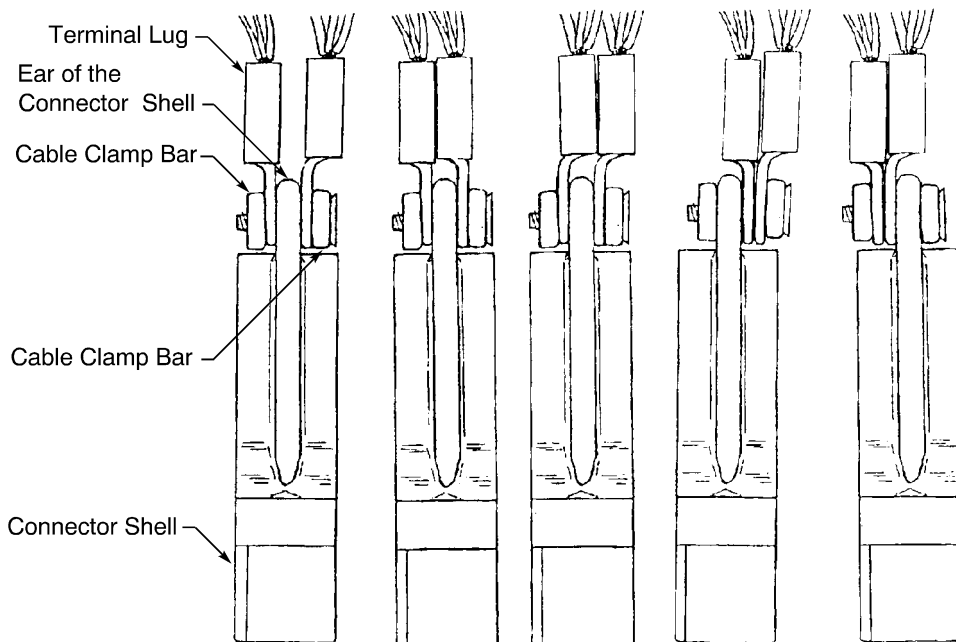
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ALTERNATIVE POSITIONS FOR TWO TERMINAL LUGS

Figure 48

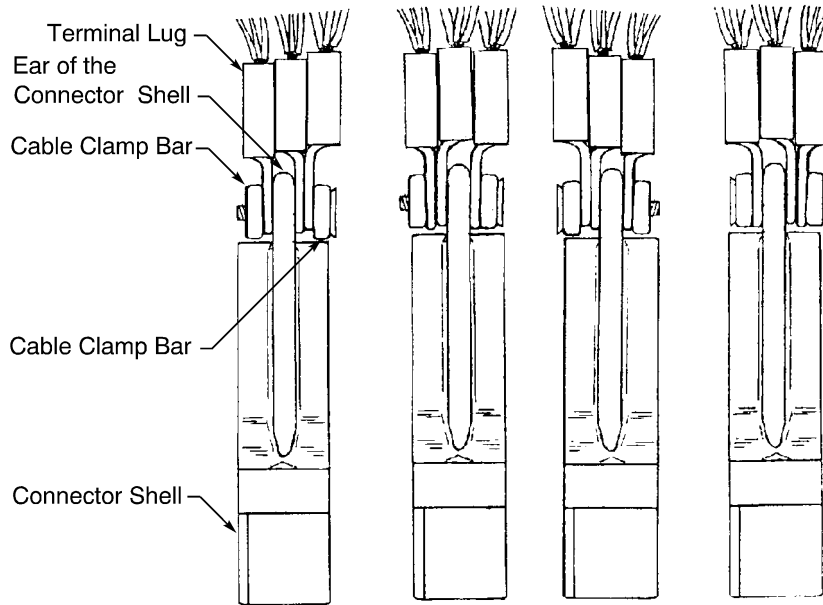


ALTERNATIVE POSITIONS FOR TWO TERMINAL LUGS

Figure 49

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CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS



ALTERNATIVE POSITIONS FOR THREE TERMINAL LUGS
Figure 50

- (b) Align the hole of each terminal lug with the hole in the ear of the shell.
- (c) If the clamp bars are not parallel, put the necessary number of washers below the clamp bar at the ear where the distance between the clamp bars is smaller.

Refer to:

- Table 37 for the washers
- Table 38 for the configuration of terminal lugs and washers.

Table 38
CONFIGURATION OF TERMINAL LUGS, WASHERS AND FILLER TAPE

Total Number of Terminal Lugs	Number of Terminal Lugs on One Ear	Number of Terminal Lugs on the Other Ear	Number of Washers on the Other Ear	Number of Strips of Filler Tape
1	1	0	0	1
2	1	1	0	1
	2	0	1	1
3	2	1	0	1
	3	0	2	2
4	2	2	0	1
	3	1	1	2
5	3	2	0	2
6	3	3	0	2

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(d) Put the necessary quantity of strips of filler tape on the cushion of the clamp bars.

Make sure that:

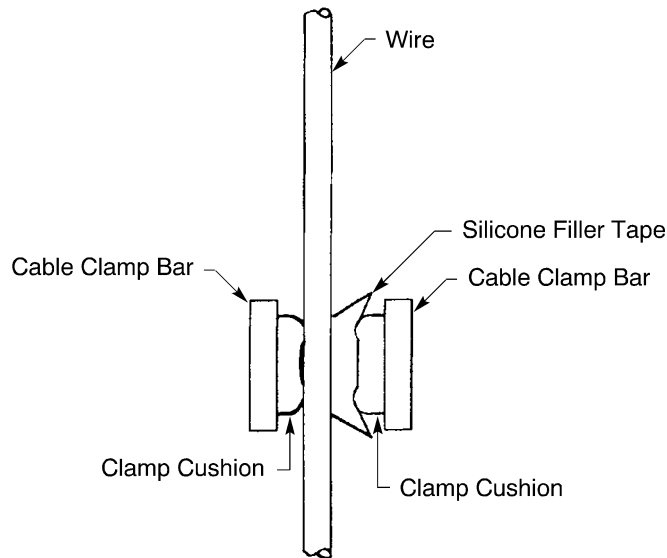
- The groove in the filler tape is against the cushion of the clamp bar
- The wires do not make an overlap.

Refer to:

- Table 37 for the filler tape
- Table 38 for the necessary quantity of strips of filler tape
- Table 39 for the length of the strips of filler tape
- Figure 51 for a cable clamp with one strip of filler tape
- Figure 52 for a cable clamp with two strips of filler tape.

Table 39
LENGTH OF SILICONE FILLER TAPE

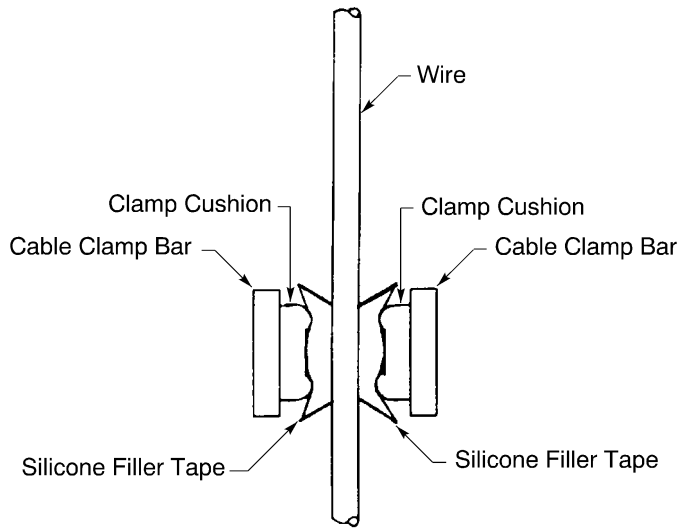
Shell Size (inch)	Length (inch)	
	Target	Tolerance
1	1.0	± 0.1
2	2.0	± 0.1



CABLE CLAMP WITH ONE STRIP OF FILLER TAPE
Figure 51

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CABLE CLAMP WITH TWO STRIPS OF FILLER TAPE
Figure 52

- (3) Make a selection of an installation screw from Table 6.

NOTE: 2 screws are necessary.

- (4) For a NAS514P440-()P screw:

- (a) Make a selection of a thread lock compound from Table 37.
- (b) Put one drop of thread lock compound on the threads of the screw.

- (5) If the shield ground wire has a terminal lug:

- (a) Examine each ear of the connector shell.

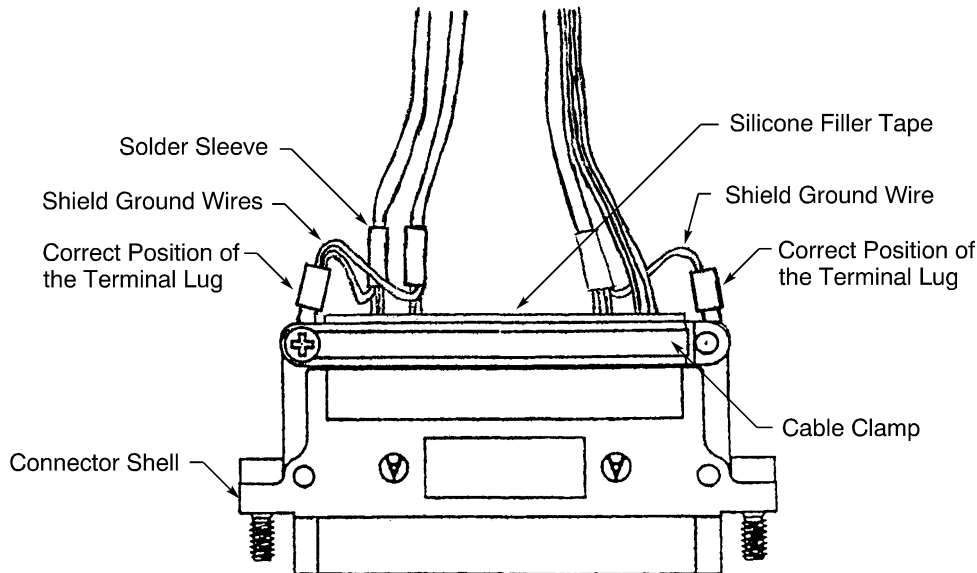
Make sure that a terminal lug is not installed between the head of the screw and the clamp bar.

- (b) Align each ground wire to make the longitudinal axis of the terminal lug point to the wires and away from the sides of the connector shell. Refer to Figure 53.

NOTE: If the terminal lugs are pointed to the side of a connector, it is not possible to tighten the jack screw when the plug and the receptacle are engaged.

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POSITION OF SHIELD GROUND WIRE TERMINAL LUGS

Figure 53

(6) Install each screw.

Make sure that:

- The wires between the cushions of the clamp bars do not make an overlap
- The end of each screw extends through the clamp bar a minimum of one and a half threads
- The distance from the edge of the cable clamp to the end of the screw head is a maximum of 0.04 inch.

(7) Torque each screw 8.5 ± 0.5 inch-pounds.

6. CONNECTOR POLARIZATION AND THE CONNECTOR PART NUMBER

A. Connector Polarization and the Connector Part Number

NOTE: The polarization code in the connector part number identifies the polarization position of the key posts.

- (1) Find the polarization code in the connector part number from the equipment list.
- (2) For that code, find the correct connector polarization for the key posts. Refer to Figure 54.
- (3) If the polarization position of the key posts on the connector do not agree with the polarization code, put the key posts in the correct position.

Refer to Paragraph 6.C.

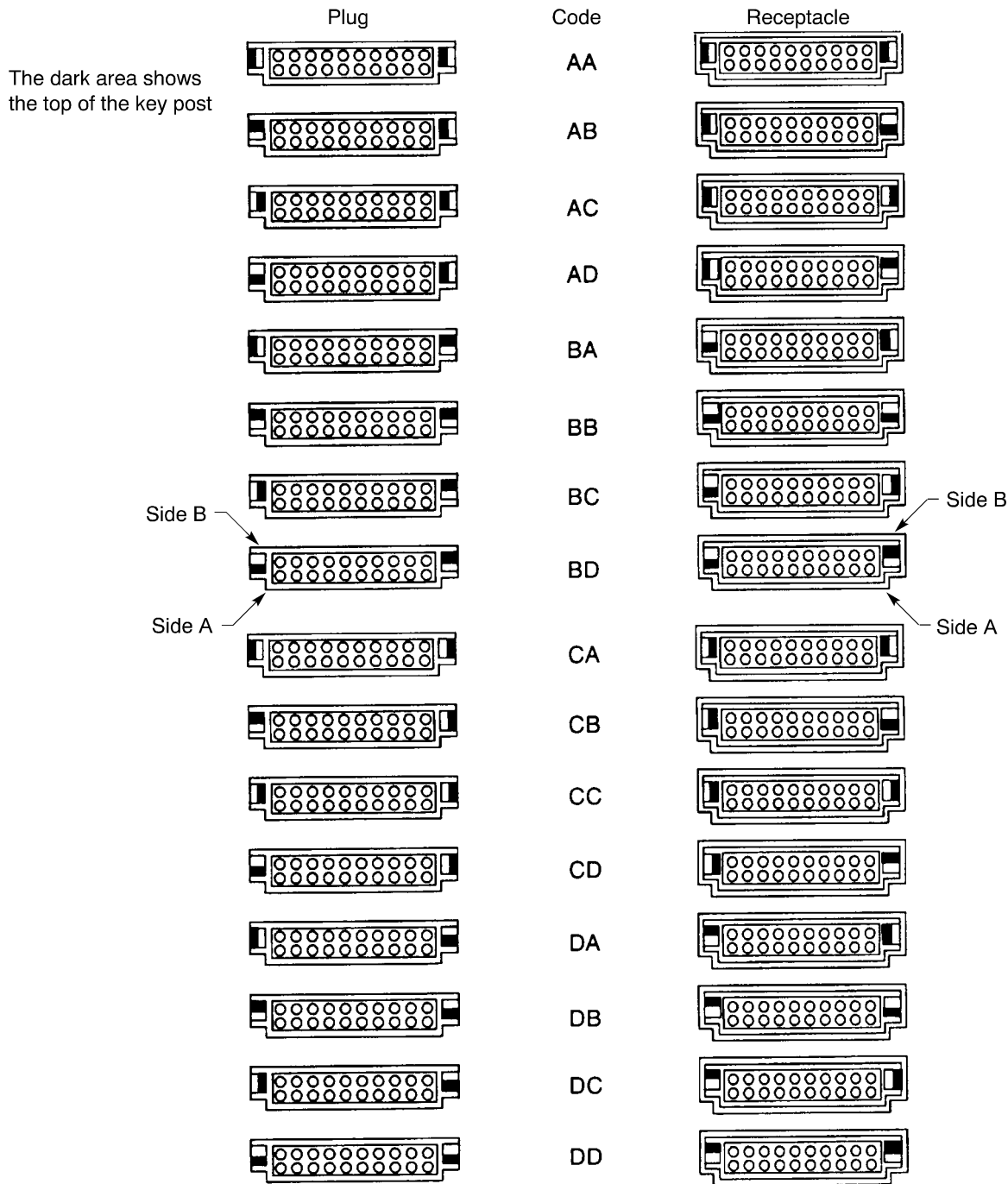
- (4) If the polarization code in the part number on the connector does not agree with the polarization positions, change the part number on the connector.

Refer to Paragraph 6.D.

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B. Polarization Key Post Positions

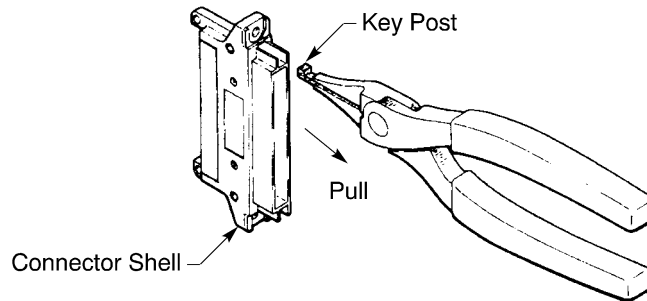


KEY POST POSITIONS
Figure 54

STANDARD WIRING PRACTICES MANUAL**CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS****C. Change of the Polarization Key Posts**

If the position of the key posts on a connector are changed, the polarization code in the connector part number must be changed. Refer to Paragraph 6.D.

- (1) Identify the polarization code in the connector part number from the equipment list.
- (2) For that code, find the correct key post positions. Refer to Figure 54.
- (3) Remove the incorrect polarization key post. Refer to Figure 55.



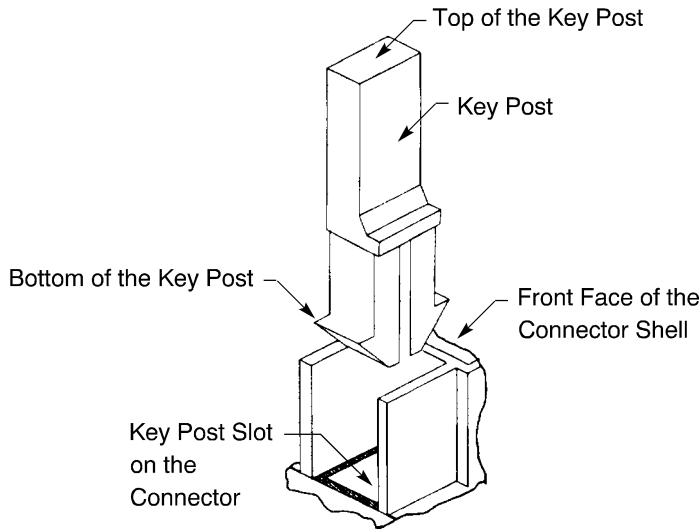
KEY POST REMOVAL
Figure 55

- (a) Make a selection of a pair of long needle nose pliers that has smooth surfaces and no sharp edges.

CAUTION: A NEEDLE NOSE PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE KEY POST.
- (b) Hold the top of the key post tightly in the jaws of the pliers.
- (c) Pull the pliers straight back from the face of the connector.
- (4) Align the key post in the correct position with the key post slot in the connector shell. Refer to Figure 56.

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ALIGNMENT OF THE KEY POST AND THE KEY POST SLOT
Figure 56

- (5) Push the key post into the slot.
 Make sure that the key post is in the correct position.
- (6) Do Step (3) through Step (5) again for the second key post.
 Make sure that the key post is in the correct position.

D. Change of the Polarization Code, Any Part of the Connector Part Number, or the Complete Part Number, on the Connector Shell

Table 40
NECESSARY MATERIALS

Material	Part Number	Supplier
Ink	No. 68 Fast Dry	Independent
	No. 73X NW Opaque	Independent
	No. 73X Opaque	Independent
Paint, Clear	683-3-2	Akzo
	Clear Lacquer	Tartan
	EC-776	3M
	EC-776SR	3M
Pen	Permanent Ink Pen, Ultra Fine Point	Sanford Sharpie

- (1) Make a selection of these necessary materials from Table 40:
 - An ink or a permanent ink pen
 - A clear paint.
- (2) If the connector does not have a part number or a polarization code, write the part number and polarization code in the correct position on the connector shell.

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Refer to the details of the applicable connector part number:

- Figure 4 for the Cinch ACIS series
- Figure 5 for the Raychem MTC100 series
- Figure 6 for the Raychem MTC PQ series.

(3) If the connector part number or polarization code is incorrect:

- (a) Apply a layer of ink on the incorrect part number or polarization code on the connector shell.
Make sure that the incorrect part number and polarization code cannot be read.
- (b) Write the new part number or polarization code on the connector shell:
 - Adjacent to the location of the incorrect part number and polarization code
 - In the correct position on the connector shell.

Refer to the details of the applicable connector part number:

- Figure 4 for the Cinch ACIS series
- Figure 5 for the Raychem MTC100 series
- Figure 6 for the Raychem MTC PQ series.

- (4) Let the ink dry for a minimum of 10 minutes.
- (5) Apply a layer of clear paint on the part number and polarization code on the connector shell.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. PAINT ON THE SURFACE OF A CONTACT CAN CAUSE UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

- (6) Let the paint dry before the connector shell is touched or moved.

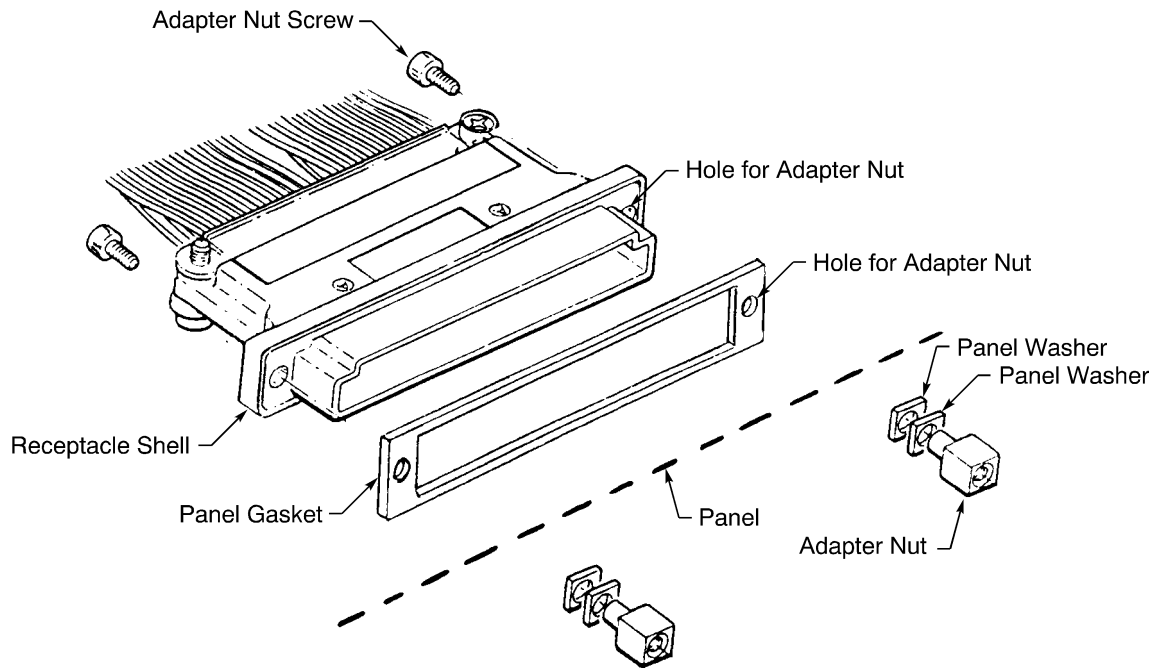
7. CONNECTOR INSTALLATION**A. Installation of the ACIS or MTC100 Receptacle in a Panel**

**Table 41
INSTALLATION PANEL WASHERS**

Panel Thickness (inch)		Necessary Panel Washers
Minimum	Maximum	
0.073	0.103	0
0.042	0.072	1
0.011	0.041	2

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RECEPTACLE INSTALLATION IN A PANEL

Figure 57

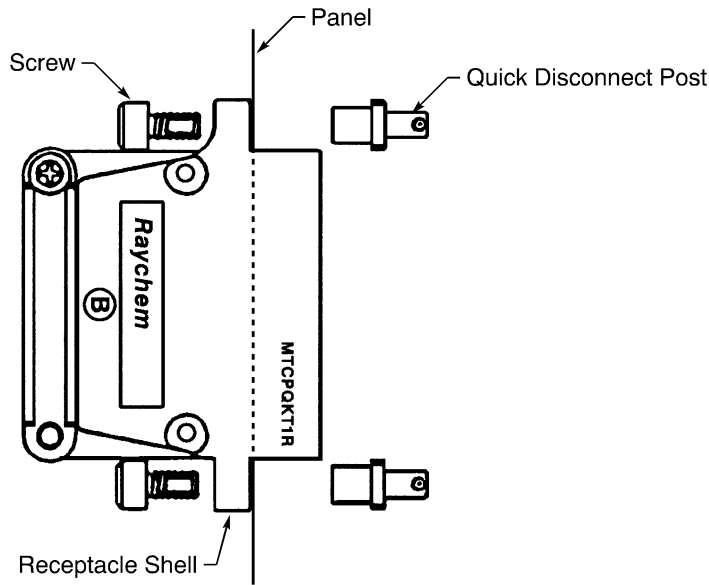
- (1) For installation with a panel gasket, put the panel gasket on the engaging end of the receptacle. Refer to Figure 57.
- (2) For installation without a panel gasket:
 - (a) Measure the thickness of the panel.
 - (b) Find the number of panel washers that are necessary for each adapter nut. Refer to Table 41.
 - (c) Put the necessary quantity of washers on each adapter nut.
- (3) From the back of the panel, push the receptacle into the connector slot in the panel.
- (4) From the front of the panel, put the adapter nuts and the necessary panel washers in the end of the connector slot in the panel and into the adapter nut hole in the end of the receptacle shell.
- (5) From the back of the panel, put an adapter nut screw on the end of each adapter nut.
- (6) Tighten the each screw with one of these tools:
 - A 7/64 inch hex-head driver
 - A 7/64 inch allen wrench.

Make sure that the front surface of the adapter nuts is at the same level as the front surface of the receptacle.
- (7) Torque the screws 13.5 ± 1.5 inch-pounds.

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B. Installation of the MTC100 or MTCTQ Receptacle in a Panel



INSTALLATION OF THE RECEPTACLE

Figure 58

(1) Align the receptacle installation holes with the holes in the panel. Refer to Figure 58.

Make sure that:

- If the receptacle is installed horizontally, Side A is on top
- If the receptacle is installed vertically, contact cavity 1 is on top.

(2) Engage the threads of the screws and the quick disconnect post.

(3) Torque the screw 20.0 inch-pounds ± 2.0 inch-pounds.

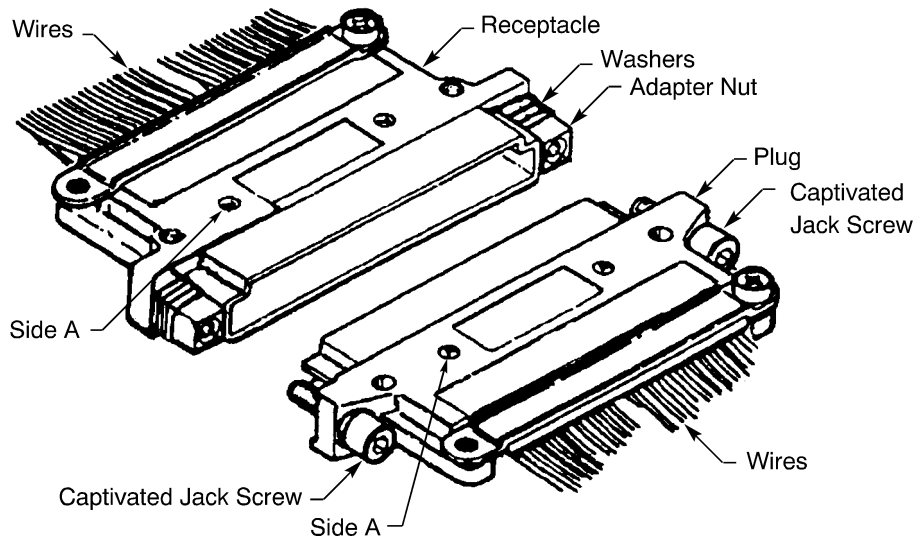
C. Plug and Receptacle Connection

**Table 42
CONNECTOR INSTALLATION TOOLS**

Driver				Calibration (inch-pound)	
Handle		Tip		Target	Tolerance
Part Number	Supplier	Part Number	Supplier		
CE-1603400	Raychem	CE-1603600	Raychem	-	-
TS-35	UTICA	7/64 Hex	Any Source	9.0	± 1.0

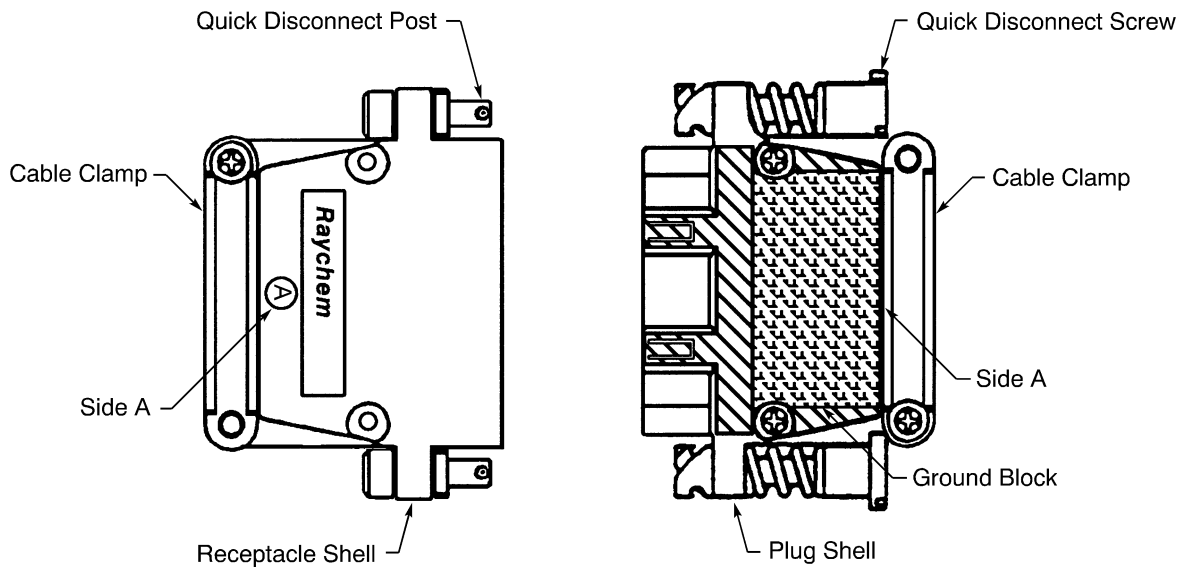
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CONNECTION OF THE ASIC OR MTC100 PLUG AND RECEPTACLE

Figure 59



CONNECTION OF THE MTC100 PLUG AND RECEPTACLE

Figure 60

- (1) To connect an ACIS or a MTC100 plug and an inline receptacle:
 - (a) Make a selection of a connection tool from Table 42.
 - (b) Put three washers on each adapter nut of the receptacle.
 - (c) Put the adapter nuts in the mounting holes of the receptacle.

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- (d) Tighten the adapter nut screws with one of these tools:
- A 7/64 inch hex-head driver
 - A 7/64 inch allen wrench.
- Make sure that the front surface of the adapter nut is level with the front surface of the receptacle.
- (e) Align the front face of the plug with the front face of the receptacle. Refer to Figure 59.
Make sure that:
- Side A of the plug is on the same side as the Side A of the receptacle
 - The key posts in the plug and the receptacle are in the correct positions.
- (f) Push the plug into the receptacle.
- (g) Turn each captivated jack screw two turns in the clockwise direction.
- (h) Turn each screw again until the screw does not turn.
- (2) To connect an ACIS or MTC100 plug and a receptacle that is installed in a panel:
- (a) Make a selection of a connection tool from Table 42.
- (b) Align the front face of the plug with the front face of the receptacle. Refer to Figure 59.
Make sure that:
- Side A of the plug is on the same side as the Side A of the receptacle
 - The key posts in the plug and the receptacle are in the correct positions.
- (c) Push the plug into the receptacle.
- (d) Turn each captivated jack screw two turns in the clockwise direction.
- (e) Turn each screw again until the screw does not turn.
- (3) To connect a MTCPPQ or MTCTQ plug and a receptacle:
- (a) Make a selection of one of these tools:
- A 7/64 inch hex-head driver with or without a ball type end
 - A 7/64 inch allen wrench with or without a ball type end
 - A screwdriver.
- (b) Align the front face of the plug with the front face of the receptacle. Refer to Figure 60.
Make sure that:
- Side A of the plug is on the same side as the Side A of the receptacle
 - The key posts in the plug and the receptacle are in the correct positions.
- (c) Push the plug into the receptacle.
- (d) Put the tool on the head of one of the quick disconnect screws.
- (e) At the same time, push the tool and turn the screw 1/4 turn in the clockwise direction.
- (f) Put the tool on the head of the other quick disconnect screw.
- (g) At the same time, push the tool and turn the screw 1/4 turn in the clockwise direction.
- (h) Turn each screw again until the screw does not turn.

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CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC100, MTC100, AND MTCTQ CONNECTORS

8. APPROVED TOOL SUPPLIERS

A. Insert Removal Tools

**Table 43
INSERT REMOVAL TOOL SUPPLIERS**

Insert Removal Tool	Supplier
599-11 11 596	Cinch
CTA-0161	Raychem

B. Contact and Terminus Removal Tools

**Table 44
CONTACT REMOVAL TOOL SUPPLIERS**

Contact Removal Tool	Supplier
11-8675-16	Amphenol
11-8795-16	Amphenol
ATBO-2062	Astro
ATT 2059	Astro
CTA-1160	Raychem
DRK 237	Daniels
DRK95-16B	Daniels
M81969/14-01	QPL
M81969/14-03	QPL
M81969/8-08	QPL
MS27495R16	QPL
MS27534-16	QPL
RRX22RC	Russtech
RX16-9	Burndy

C. Contact Crimp Tools

**Table 45
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
AFM-10	Daniels
K817-11	Daniels
K817-11BE	Daniels

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CINCH ACIS CONNECTORS, RAYCHEM MTC100, MTC PQ, AND MTCTQ CONNECTORS

Table 45 (continued)

Crimp Tool	Supplier
K818-11	Daniels
K818-11BE	Daniels
GWT-202-2204-CTA-165-166	C.T. Davis Systems
GWT-202R-2204R-CTA-165-166	C.T. Davis Systems
M22520/1-01	QPL
M22520/1-04	QPL
M22520/2-01	QPL
M22520/2-09	QPL
WA22	Daniels
WA22BESS	Daniels
WA27F	Daniels

D. Contact and Terminus Insertion Tools

Table 46

CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
11-8674-16	Amphenol
11-8794-16	Amphenol
ATBO-1062	Astro
ATBX1108	Astro
CTA-1160	Raychem
M81969/14-01	QPL
M81969/14-03	QPL
M81969/8-07	QPL
MS27495A16	QPL
MS27534-16	QPL
RIT22RC	Russtech
RTM16-4	Burndy

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1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

Refer to Subject 20-74-02.

B. Damage Conditions - Front Face of the Insert

Refer to Subject 20-74-02.

C. Damage Conditions - BACC69A Fiber Optic Cable Assembly

The cable assembly must be replaced when one of these conditions occur:

- The fiber optic cable has damage that makes the cable assembly unserviceable; refer to Subject 20-12-20
- The fiber optic contact terminus has damage; refer to Subject 20-12-20.

D. Damage Conditions - EMI Ground Springs

The EMI Ground Springs must be replaced when one or more of the ground spring fingers is bent or broken.

E. Damage Conditions - Cable Clamp

The cable clamp must be replaced if:

- The clamp has a crack
- A wire harness tie tab is broken.

Refer to Figure 17.

F. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to Subject 20-74-02.

2. PART NUMBERS AND DESCRIPTION

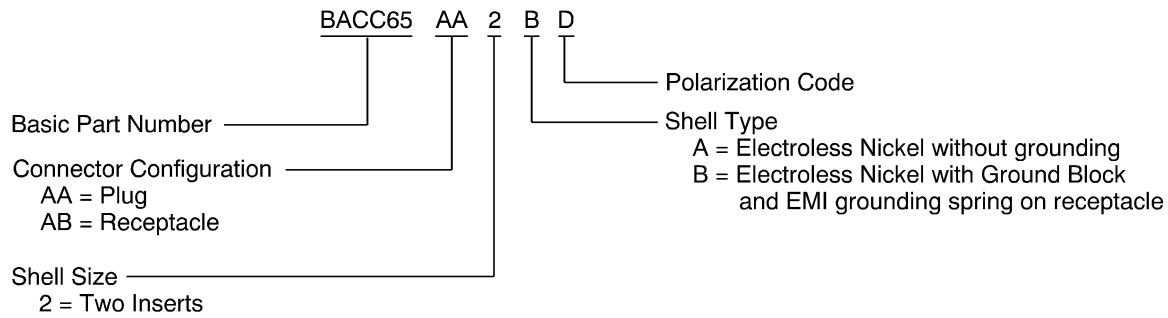
A. Connector Shell Part Numbers

**Table 1
CONNECTOR SHELL PART NUMBERS**

Boeing Standard	Type
BACC65AA()	Plug
BACC65AB()	Receptacle

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



BACC65AA() AND BACC65AB() PART NUMBER STRUCTURE

Figure 1

Table 2

APPROVED SUPPLIERS OF BOEING STANDARD CONNECTOR SHELLS

Connector Shell	Supplier
BACC65AA()	Radiall
BACC65AB()	Radiall

B. Connector Description

Refer to:

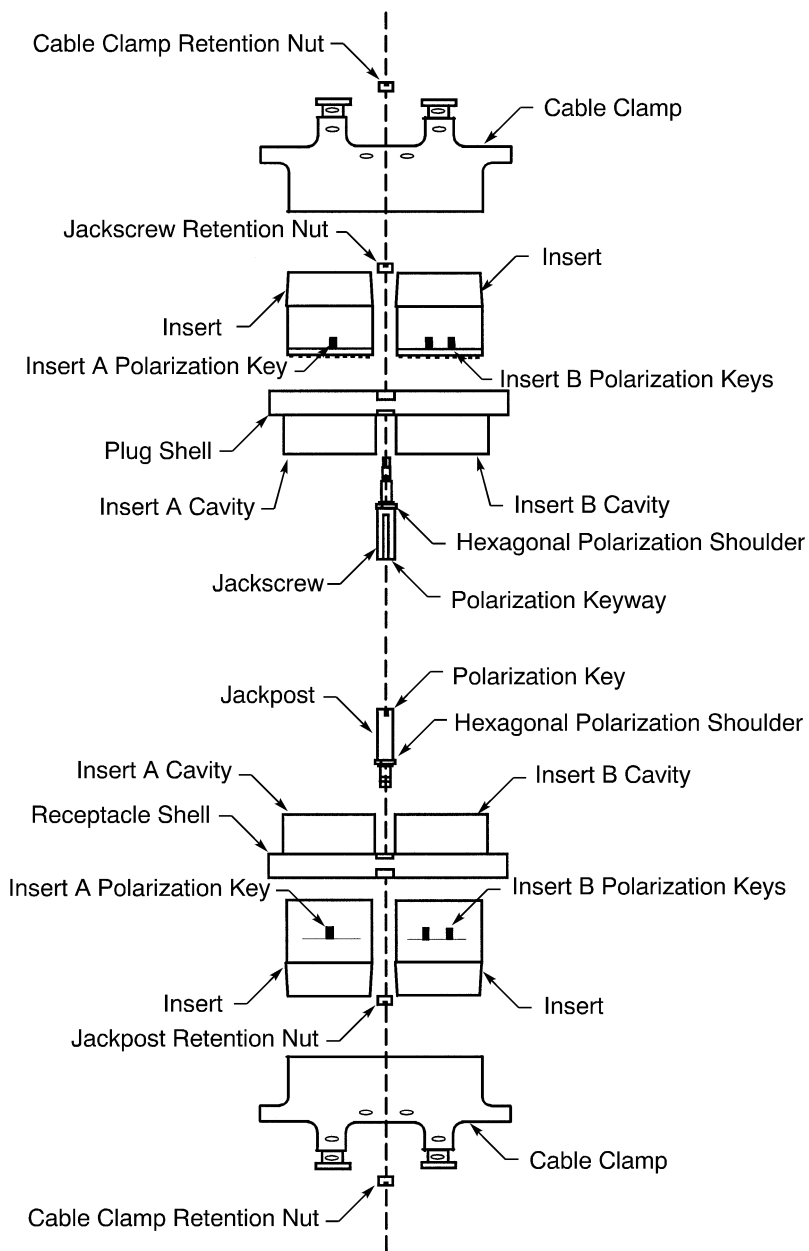
- Figure 2 for the configuration of the BACC65AA() plug and BACC65AB() receptacle
- Figure 3 for the BACC65AA() plug
- Figure 4 for the BACC65AB() receptacle
- Figure 5 for the BACC65AA() plug with a ground block
- Figure 6 for the BACC65AB() receptacle with a ground block.

The BACC65AA and BACC65AB connectors have these technical features:

- A rectangular metal shell
- A ground block
- EMI ground springs on the receptacle with a ground block
- A center jackscrew and jackpost for the retention of the plug and receptacle
- 6 polarization positions
- The polarization key is part of the jackpost for the receptacle
- The polarization keyway is part of the jackscrew for the plug
- 2 removable inserts
- Rear release, rear removal, crimp type contacts
- Rear release, rear removal, fiber optic termini
- A removable cable clamp.

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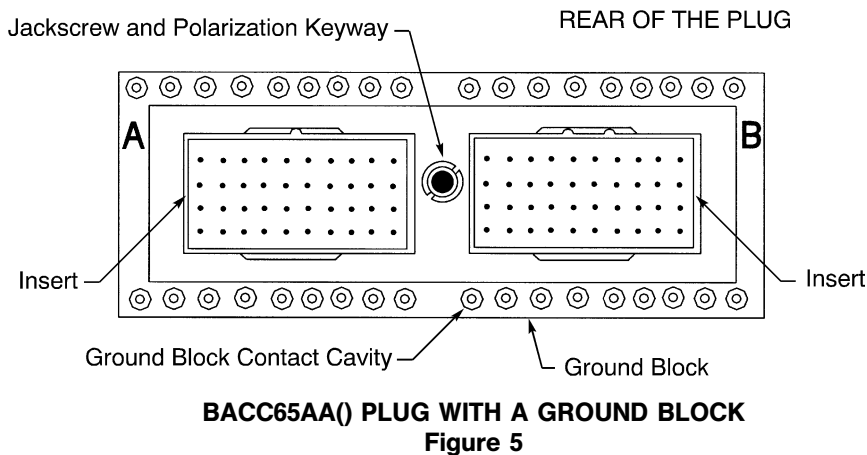
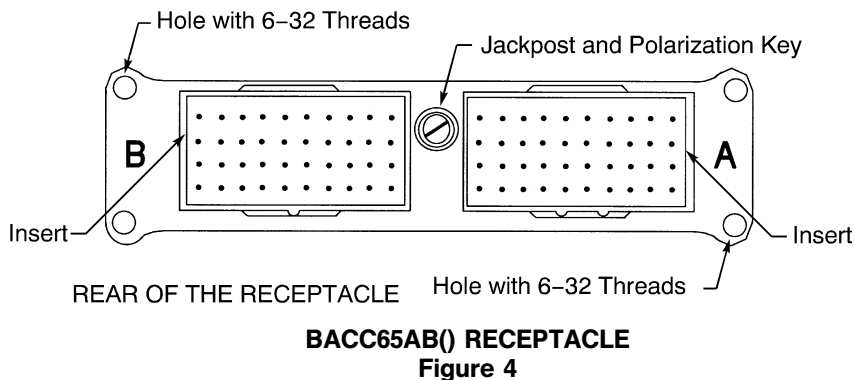
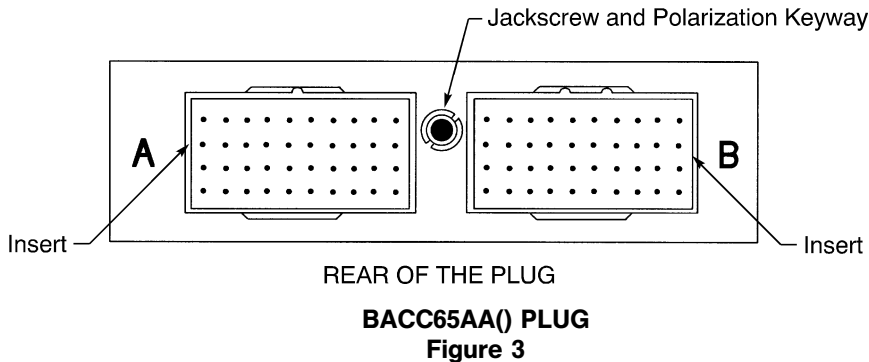


BACC65AA() AND BACC65AB() CONNECTOR CONFIGURATION

Figure 2

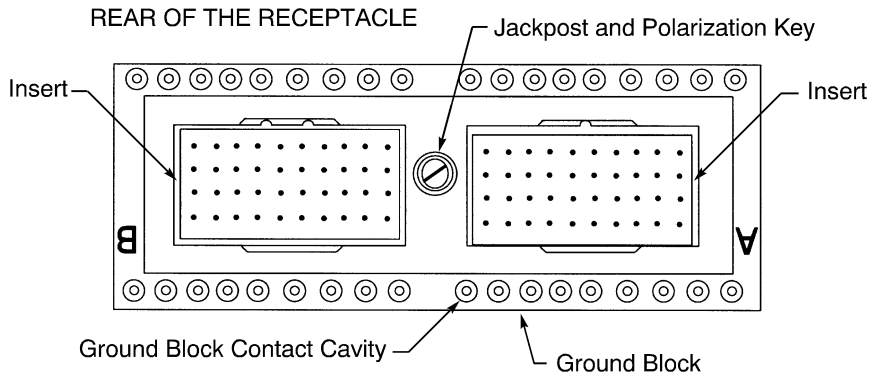
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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



BACC65AB() RECEPTACLE WITH A GROUND BLOCK
Figure 6

C. Connector Insert Part Numbers

Refer to Subject 20-74-02.

D. Connector Insert Part Numbers

Refer to Subject 20-74-02.

E. Ground Block Contact Part Numbers

Table 3
GROUND BLOCK CONTACT PART NUMBERS

Contact Size		Contact Type	Part Number	Supplier	Color Code			
Engaging End	Crimp Barrel				Band	Color		
16	20	Pin	M39029/1-101	QPL	1	Brown		
					2	Black		
					3	Brown		
			18	Pin	S280W555-920	Boeing	1	Red
							2	Red
							3	Red
	18	Pin	S280W555-918	Boeing	1	Red		
					2	White		
					3	Red		

Table 4
APPROVED SUPPLIERS OF BOEING STANDARD GROUND BLOCK CONTACTS

Contact	Supplier
S280W555-920	Burndy
	Tri Star

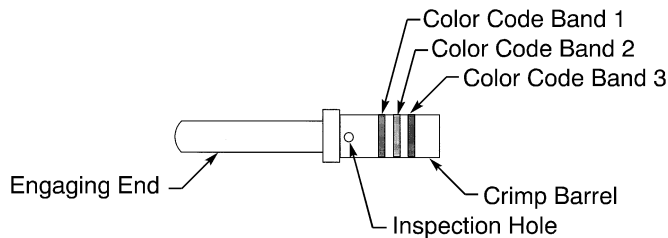
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Table 4 (continued)

Contact	Supplier
S280W555-918	Burndy
	Tri Star



GROUND BLOCK CONTACTS
Figure 7

F. Size 5 and Size 8 Coax Contact Part Numbers

Refer to Subject 20-74-02.

G. Size 8 Twinax Contacts

Refer to Subject 20-74-02.

H. Size 8 Quadrax Contacts

Refer to Subject 20-74-02.

I. Fiber Optic Contact Terminus Part Numbers

Refer to Subject 20-74-02.

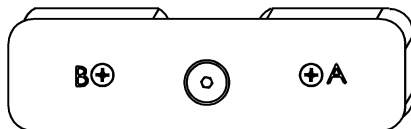
J. Fiber Optic Alignment Sleeve Insert Part Numbers

Refer to Subject 20-74-02.

K. Fiber Optic Insert Receptacle Cap Part Numbers

Table 5
FIBER OPTIC INSERT RECEPTACLE CAP PART NUMBERS

Connector Type	Part Number	Supplier
Receptacle	617954023	Radiall



FIBER OPTIC INSERT RECEPTACLE CAP
Figure 8

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

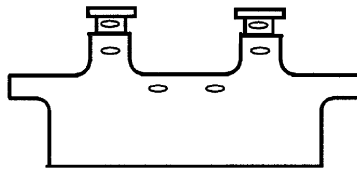
L. Cable Clamp Part Numbers

**Table 6
CABLE CLAMP PART NUMBERS**

Component	Connector Type	Boeing Standard
Clamp, Cable	-	BACC10LD1

**Table 7
APPROVED SUPPLIERS OF BOEING STANDARD CABLE CLAMP PART NUMBERS**

Component	Supplier
BACC10LD1	Radiall



**BACC10LD1 CABLE CLAMP
Figure 9**

M. Connector Assembly Component Part Numbers

**Table 8
CONNECTOR ASSEMBLY COMPONENT PART NUMBERS**

Component	Connector Type	Boeing Standard
Ground Spring, EMI	Receptacle	BACC65AH1
Jackpost	Receptacle	BACC65AG1
Jackcrew	Plug	BACC65AF1

**Table 9
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTOR ASSEMBLY COMPONENTS**

Component	Supplier
BACC65AG1	Radiall
BACC65AF1	Radiall
BACC65AH1	Radiall

3. INSERT CONFIGURATIONS

A. BAC110AL and BAC110AM Inserts

Refer to Subject 20-74-02.

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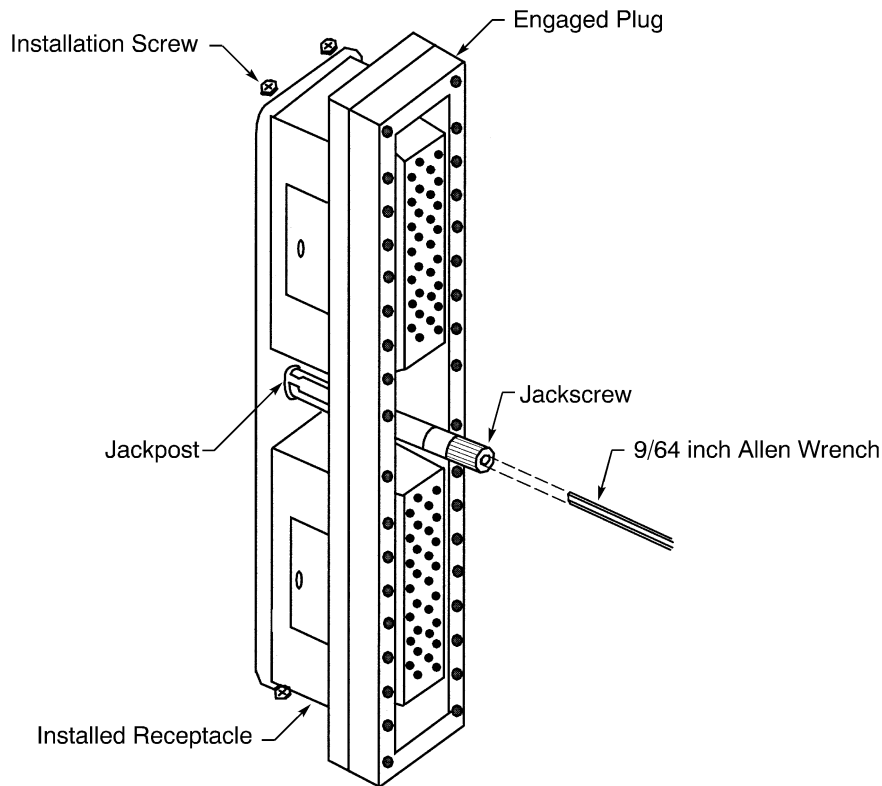
4. CONNECTOR DISASSEMBLY

A. Connector Separation

**Table 10
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	9/64
	Screwdriver, Hex	9/64

- (1) Make a selection of a driver from Table 10.
- (2) Turn the jackscrew on the plug counterclockwise with the driver until it is disengaged. Refer to Figure 10.

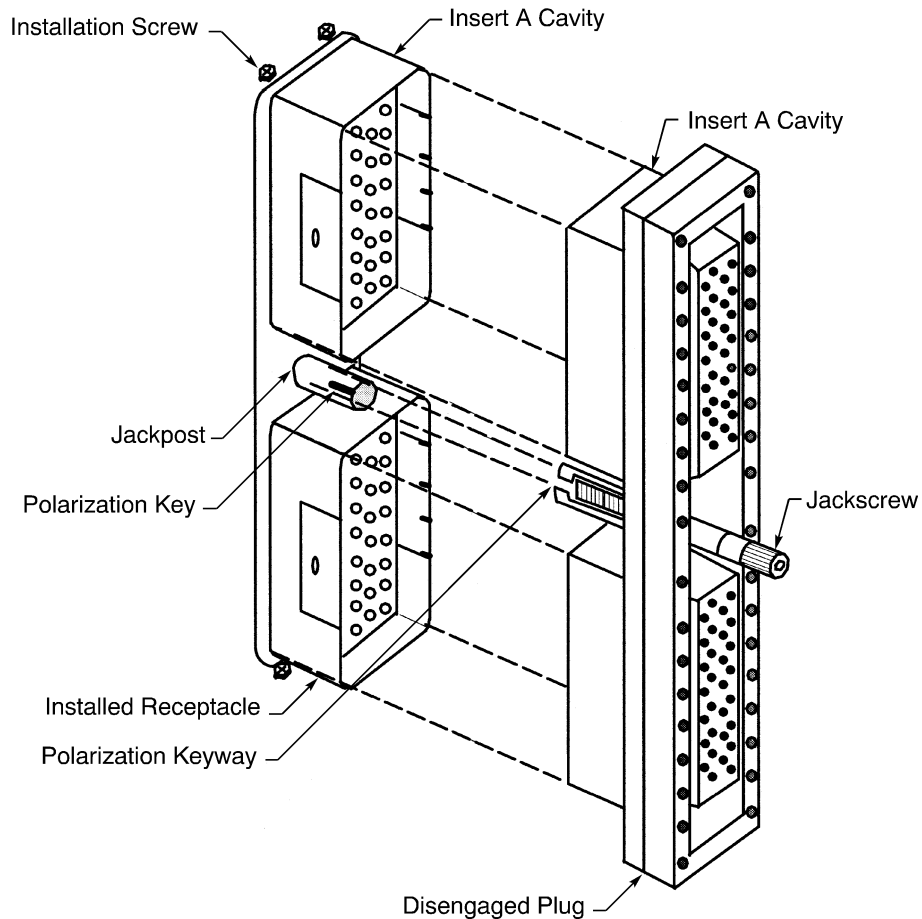


**ALIGNMENT OF THE WRENCH
Figure 10**

- (3) Pull the plug straight away from the receptacle. Refer to Figure 11.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



SEPARATION OF THE PLUG AND THE RECEPTACLE

Figure 11

- (4) For a receptacle with a fiber optic insert, install a protective cap. Refer to Paragraph 4.B.

NOTE: A sealed clean plastic bag is a satisfactory alternative for the protection from contamination.

CAUTION: THE CONNECTOR WITH A FIBER OPTIC CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (5) For a plug connector with a fiber optic insert, put the plug in a clean plastic bag.

CAUTION: THE CONNECTOR WITH A FIBER OPTIC CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

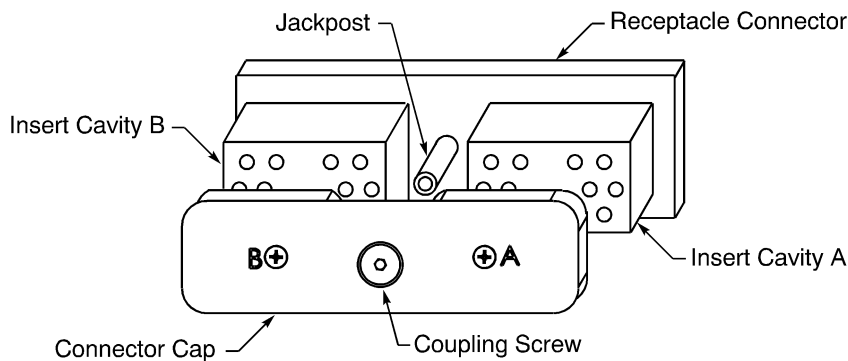
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

B. Fiber Optic Insert Receptacle Cap Installation

**Table 11
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	9/64
	Screwdriver, Hex	9/64
Torque	Allen Wrench	9/64
	Screwdriver, Hex	9/64



**INSTALLATION OF THE CAP
Figure 12**

(1) Make a selection of these tools from Table 11:

- A driver
- A torque tool.

NOTE: The driver can have a ball type end.

(2) Align the cap with the face of the engaging face of the receptacle.

Make sure that the end of the cap that has threads is pointed to the face of the receptacle.

(3) Fully engage the threads of the installation screw and the screw hole in the receptacle.

(4) Torque the screw to 7 inch-pounds ± 1 inch-pound.

C. Removal of the Receptacle from a Panel

**Table 12
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Phillips Head Screwdriver	-
	Socket Wrench	1/4

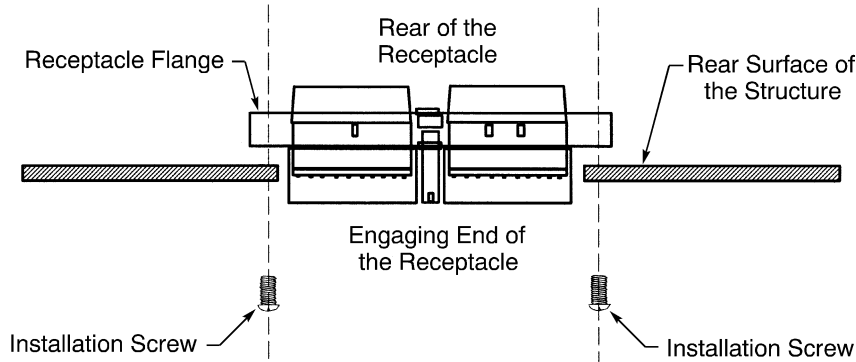
(1) Make a selection of a driver from Table 12.

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

- (2) Remove the plastic tie straps or wire harness ties that:
 - Hold the wire harness to structure
 - Are less than 9 inches from the connector.
- (3) Remove the four installation screws. Refer to Figure 13.



REMOVAL OF THE RECEPTACLE
Figure 13

- (4) Discard the four screws.
- (5) Pull the connector from the structure.

D. Removal of the Alignment Sleeve Insert

Refer to Subject 20-74-02.

E. Insert Removal

NOTE: It is not necessary to remove the insert contacts, or the cable clamp before an insert is removed.

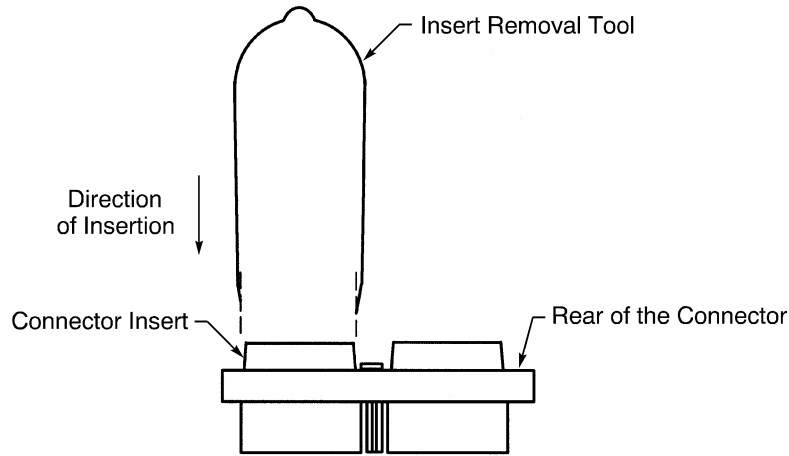
Table 13
INSERT REMOVAL TOOLS

Tool	Part Number
Insert Removal Tool	282 521 002

- (1) Make a selection of an insert removal tool from Table 13.
- (2) If the connector has:
 - A cable clamp, remove the plastic tie straps or the wire harness ties from the clamp.
 - A ground block, remove the ground block contacts from the ground block; refer to Paragraph 4.G.
- (3) From the rear of the connector, align the two ends of the removal tool with the shorter sides of the insert. Refer to Figure 14.

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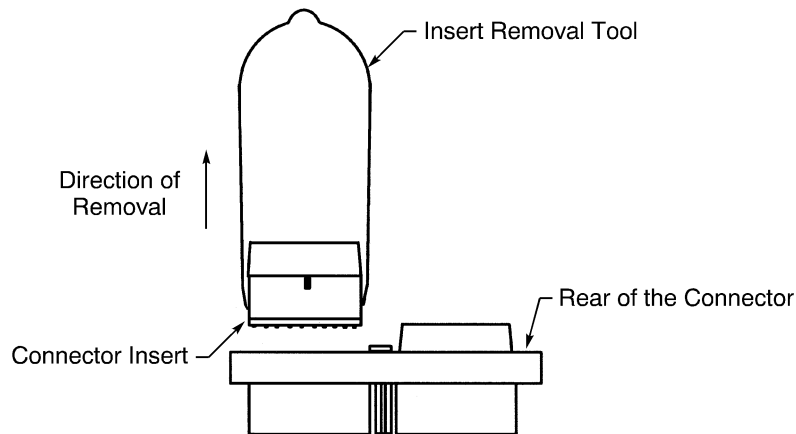
ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



ALIGNMENT OF THE INSERT REMOVAL TOOL

Figure 14

- (4) Carefully push the removal tool between the insert cavity and the insert. Make sure to keep the tool aligned with the insert.
- (5) Push the two sides of the tool at the same time into the connector.
- (6) Pull the insert removal tool and the insert straight out of the connector. Refer to Figure 15.



REMOVAL OF THE INSERT

Figure 15

F. Seal Plug and Seal Rod Removal

Refer to Subject 20-74-02.

G. Contact Removal

This paragraph gives the procedure to remove size 16 ground block contacts from the connector ground block.

Refer to Subject 20-74-02. to remove contacts from the connector insert.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

**Table 14
REMOVAL TOOLS FOR SIZE 16 GROUND BLOCK CONTACTS**

Ground Block Contact Cavity Size	Removal Tool	
	Part Number	Color
16	ATR2080	-
	ATR2079	-
	M81969/14-11	White
	RRX20B	-

(1) Make a selection of a contact removal tool from Table 14 for the ground block contacts.

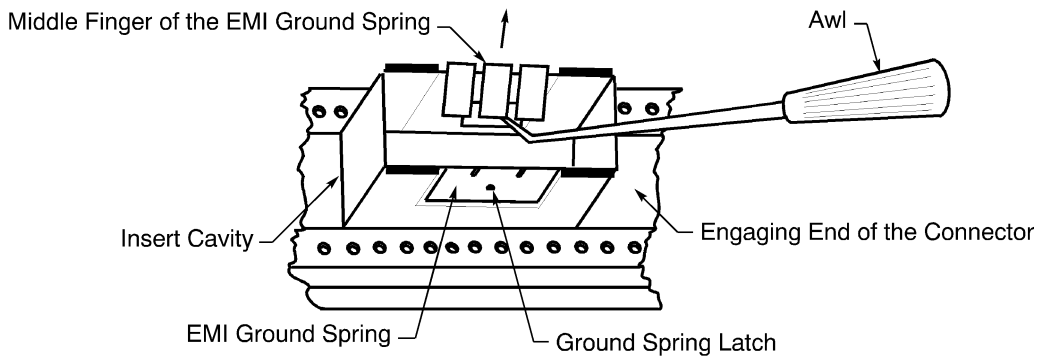
CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

- (2) Remove the plastic tie straps or the wire harness ties that are less than 6 inches from the connector.
- (3) Put the tip of the removal tool on the wire near the grommet or the ground block.
- (4) Axially align the removal tool and the contact cavity.
- (5) Carefully push the removal tool straight into the contact cavity until it stops.
- (6) Carefully pull the wire and the removal tool straight out of the contact cavity at the same time.
- (7) If the contact is not released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (3) through Step (6) again.

H. Contact Terminus Removal

Refer to Subject 20-74-02.

I. EMI Ground Spring Removal



**EMI GROUND SPRING REMOVAL
Figure 16**

Refer to Figure 16.

STANDARD WIRING PRACTICES MANUAL

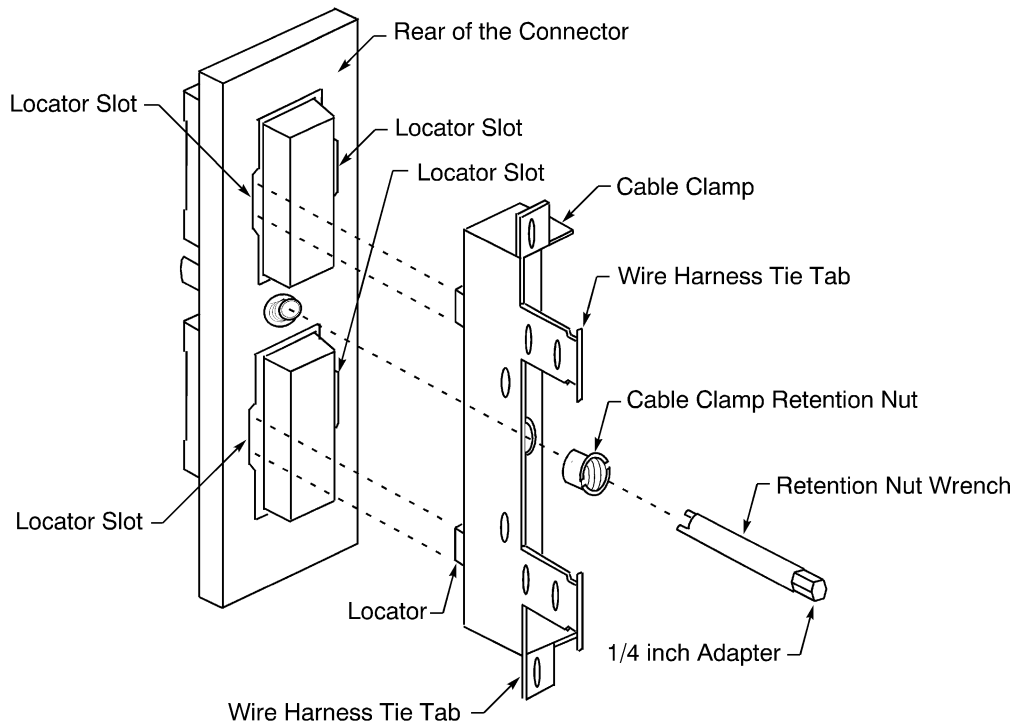
ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

- (1) Make a selection of a tool with a small sharp point at a right angle to the handle.
- NOTE: An awl is a satisfactory tool.
- (2) Carefully put the tip of the tool between the inner wall of the insert cavity and the bottom of the middle finger of the ground spring.
 - (3) Push the tip of the tool through the slot against the ground spring latch that is behind the ground spring fingers.
 - (4) Pull the ground spring away from the insert cavity.

J. Cable Clamp Removal

**Table 15
CABLE CLAMP REMOVAL TOOLS**

Tool	Type	Size (inch)	Part Number
Driver	Retention Nut Wrench	-	282664
	Socket Wrench	1/4	-



**CABLE CLAMP REMOVAL
Figure 17**

Refer to Figure 17.

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

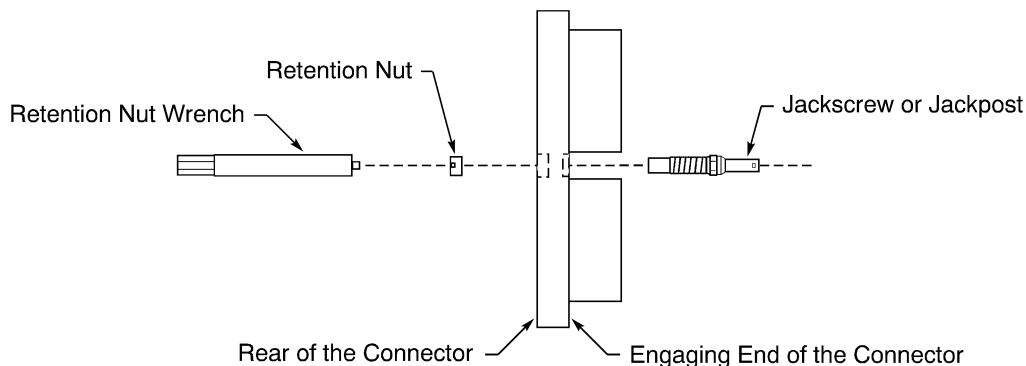
- (1) Make a selection of these tools from Table 15.
 - A retention nut wrench
 - A socket wrench.
- (2) Remove the plastic tie straps or the wire harness tie from the cable clamp.
- (3) If the connector has a ground block, and the ground block has contacts that are installed, remove the contacts from the ground block. Refer to Paragraph 4.G.
- (4) If the inserts are installed and have wired contacts, remove the inserts from the connector. Refer to Paragraph 4.E.
- (5) Put the retention nut wrench with the socket wrench on the cable clamp retention nut.
- (6) Turn the wrench counterclockwise until the threads of the cable clamp retention nut are disengaged with the threads of the jackscrew or jackpost.
- (7) Pull the cable clamp straight from the connector.

K. Jackscrew and Jackpost Removal

**Table 16
JACKSCREW AND JACKPOST REMOVAL TOOLS**

Tool	Type	Size (inch)	Part Number
Driver	Retention Nut Wrench	-	282664
	Socket Wrench	1/4	-

- (1) Make a selection of these tools from Table 16.
 - A retention nut wrench
 - A socket wrench.
- (2) Make a selection of a socket wrench from Table 16.
- (3) If a cable clamp is installed, remove it. Refer to Paragraph 4.J.
- (4) Put the retention nut wrench with the socket wrench on the retention nut on the rear of the connector. Refer to Figure 18.



**JACKSCREW AND JACKPOST REMOVAL
Figure 18**

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- (5) Turn the wrench counterclockwise until the threads of the retention nut are disengaged with the threads of the jackscrew or jackpost.
- (6) Pull the jackscrew or jackpost straight out the engaging side of the connector. Refer to Figure 18.

5. CONNECTOR ASSEMBLY

A. Connector Jackscrew and Jackpost Installation

Polarization of the connector must be done before the installation of the cable clamp.
Refer to Paragraph 6.

B. Cable Clamp Installation

The cable clamp:

- Must be installed on the connector before the installation of an insert with assembled contacts
- Can be installed before or after the installation of an insert with unwired contacts.

**Table 17
NECESSARY MATERIALS**

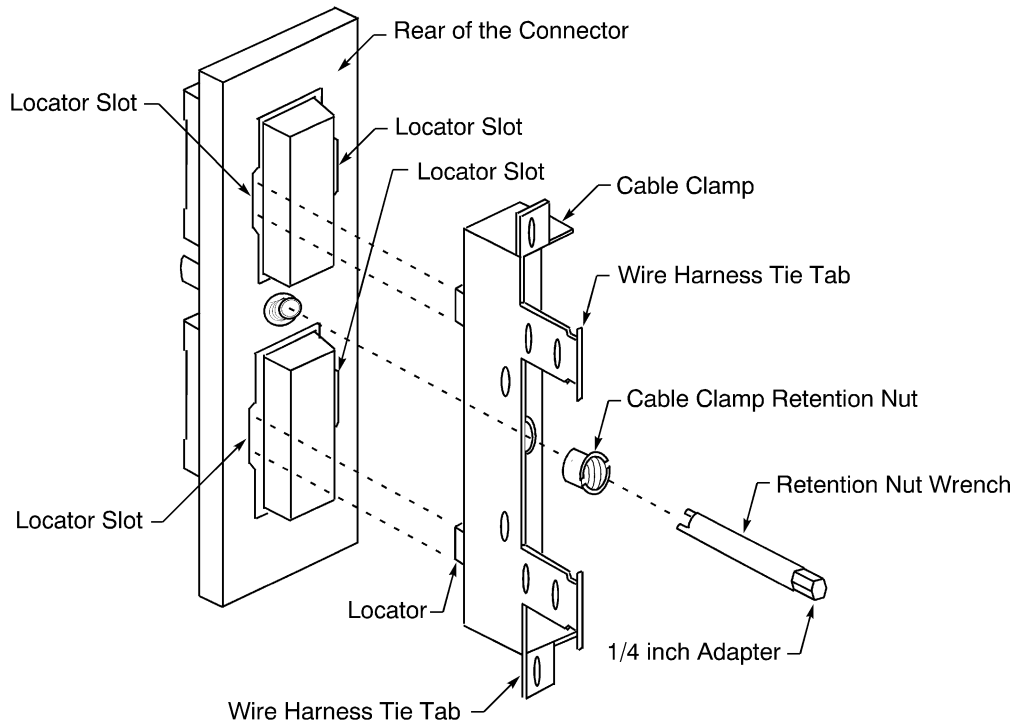
Material	Part Number	Supplier
Thread Lock Compound	222	Loctite
Tape	Scotch 70	3M

**Table 18
CABLE CLAMP INSTALLATION TOOLS**

Tool	Type	Size (inch)	Part Number
Driver	Retention Nut Wrench	-	282664
Torque	Socket Torque Wrench	1/4	-

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CABLE CLAMP INSTALLATION

Figure 19

Refer to Figure 19.

- (1) Make a selection of these tools from Table 18.
 - Retention nut wrench
 - Socket torque wrench.
- (2) Make a selection of these materials from Table 17.
 - Thread lock compound
 - Tape.
- (3) Align the four locators on the cable clamp with the four slots on the rear of the connector.
- (4) Put the cable clamp on the rear side of the connector. Make sure that the locators are in the slots.
- (5) Put a drop of the thread lock compound on a minimum of two threads of the cable clamp retention nut included with the cable clamp.
- (6) Engage the threads of the cable clamp retention nut with the threads of the jackscrew.
- (7) Torque the cable clamp retention nut 7 inch-pounds \pm 1 inch-pound.
- (8) Wind two layers of tape around one of the wire harnesses where the harness is against a wire harness tie tab.
- (9) Assemble a wire harness tie or install a plastic tie strap on the wire harness and the wire harness tie tab. Refer to Subject 20-10-11.
- (10) Do Step (8) and Step (9) for the other wire harness.

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

C. Shield Ground Wire Assembly

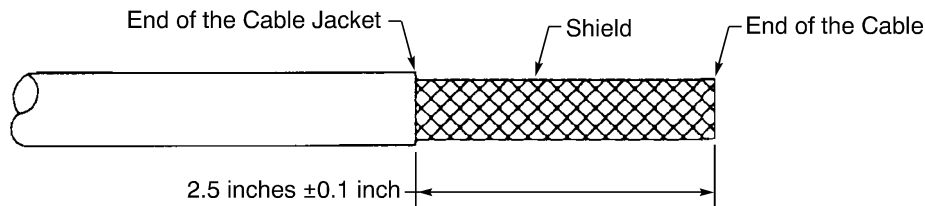
This paragraph gives the procedure to assemble a shield ground wire and a contact for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Raychem 55A6160-() cable, refer to Paragraph 5.D.
- BMS13-60 Type 27 Class 1 wire, refer to Paragraph 5.E.

(1) Remove 2.5 inches ± 0.1 inch of the cable jacket from the end of the cable. Refer to Figure 20.



CABLE JACKET REMOVAL
Figure 20

(2) Assemble an insulated shield ground wire. Refer to Subject 20-10-15.

NOTE: The shield ground wire must have the same size as the crimp barrel of the specified contact. Refer to:

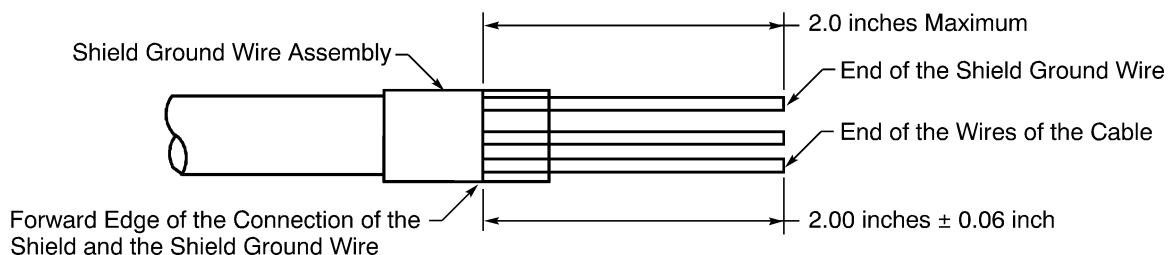
- Table 3 for the ground block contact
- Subject 20-74-02 for the insert contact.

Make sure that:

- The shield ground wire assembly components are applicable for the shield material of the wire
- The length of the shield ground wire is 2.5 inches minimum
- The free end of the shield ground wire is pointed forward to the end of the cable.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A CABLE OR A WIRE WITH A SHIELD THAT HAS NICKEL PLATED CONDUCTORS. UNSATISFACTORY PERFORMANCE OF THE SHIELD TERMINATION CAN OCCUR.

(3) Remove the unwanted length from the end of the shield ground wire and the wires of the cable. Refer to Figure 21.



LENGTH OF THE SHIELD GROUND WIRE AND THE WIRES OF THE CABLE
Figure 21

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NOTE: The connection of the shield and the shield ground wire can be:

- The melted solder ring of a solder sleeve
 - A mechanical ferrule
 - An RSK Shield-Kon.
- (a) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the connection to the end of the shield ground wire equal to 2.0 inches maximum.
- (b) Remove the necessary length from the end of the each wire of the cable to make the distance from the forward edge of the connection to the end of the wire equal to 2.00 inches \pm 0.06 inch.
- (4) Assemble the specified contact on the end of the shield ground wire.
- For the assembly of:
- A ground block contact, refer to Paragraph 5.G.
 - An insert contact, refer to Paragraph 5.F.

D. Shield Ground Wire Assembly for Raychem 55A6160-() Cable

This paragraph gives the procedure to assemble the shield ground wires and contacts for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Wire or cable that has one shield, refer to Paragraph 5.C.
- BMS13-60 Type 27 Class 1 wire, refer to Paragraph 5.E.

**Table 19
NECESSARY PARTS**

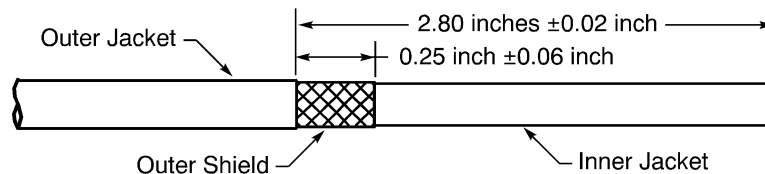
Part	Boeing Standard	Shield Ground Wire Size (AWG)
Solder Sleeve with an integral wire	BACS13CT3C	20

- (1) Make a selection of a solder sleeve with an integral wire from Table 19.

NOTE: Two solder sleeves are necessary.

Refer to Subject 20-10-15 for approved suppliers of Boeing standard solder sleeves.

- (2) Prepare the cable for termination of the outer shield. Refer to Figure 22 and Subject 20-00-15.



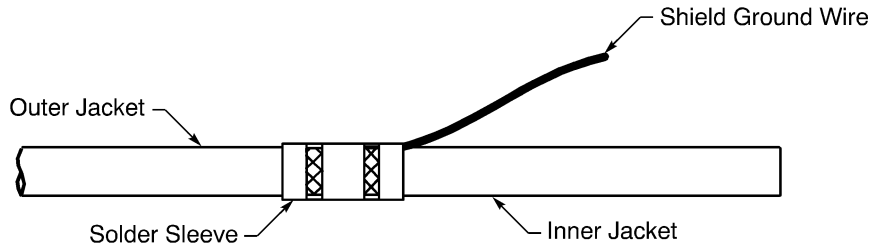
**OUTER JACKET AND OUTER SHIELD REMOVAL
Figure 22**

- (a) Remove 2.80 inches \pm 0.02 inch of the outer jacket from the end of the cable.

STANDARD WIRING PRACTICES MANUAL

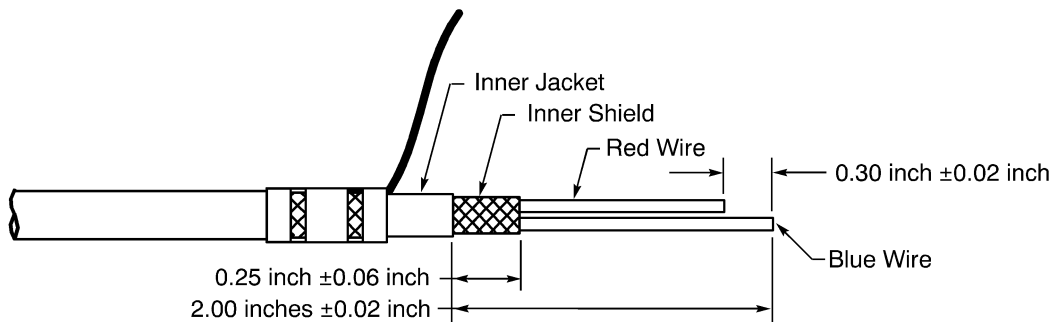
ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

- (b) Remove the necessary length of the shield to make the distance from the end of the jacket to the end of the shield equal to 0.25 inch \pm 0.06 inch.
- (3) Assemble the shield ground wire of the outer shield. Refer to Figure 23.



TERMINATION OF THE OUTER SHIELD
Figure 23

- (a) Put the solder sleeve on the wire or cable.
 Make sure that:
 - The free end of the shield ground wire is pointed forward to the end of the cable
 - The large end of the solder sleeve is put on the wire or cable first
 - The inner edge of the rear seal ring is aligned with the end of the outer jacket.
- (b) Shrink the solder sleeve into its position.
 Make sure that:
 - The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (c) Remove the necessary length of the shield ground wire to make the distance from the forward edge of the solder ring to the end of the wire equal to 2.0 inches maximum.
- (4) Prepare the cable for termination of the inner shield. Refer to Figure 24 and Subject 20-00-15.



INNER JACKET AND INNER SHIELD REMOVAL
Figure 24

- (a) Remove 2.00 inches \pm 0.02 inch of the inner jacket from the end of the cable.
- (b) Remove the necessary length of the inner shield to make the distance from the end of the shield to the end of the jacket equal to 0.25 inch \pm 0.06 inch.

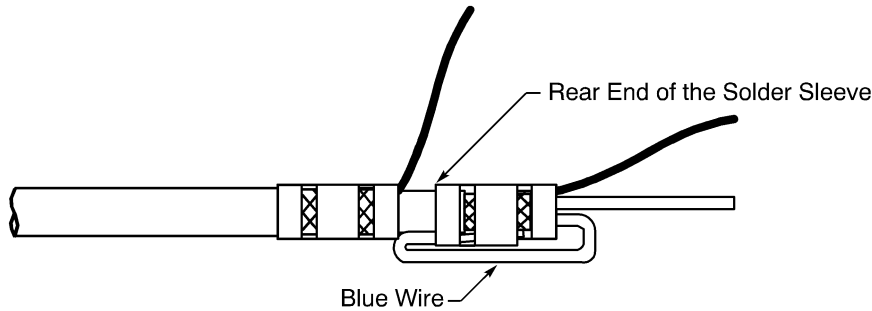
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

- (c) Remove the necessary length of the red wire to make the distance from the end of the red wire to the end of the blue wire equal to 0.30 inch \pm 0.02 inch.
- (d) Remove 0.21 inch \pm 0.02 inch of insulation from the end of the blue wire. Refer to Subject 20-00-15.
- (5) Assemble the shield ground wire of the inner shield. Refer to Figure 25.

Make sure that:

- The free end of the shield ground wire is pointed forward to the end of the cable
- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the end of the jacket.



TERMINATION OF THE INNER SHIELD
Figure 25

- (a) Fold the blue wire back and put the end of the wire between the inner shield and the rear end of the solder sleeve.

Make sure the center of the conductor is aligned with the solder ring of the solder sleeve.

CAUTION: THE STRANDS OF THE WIRE MUST NOT GO INTO THE SHIELD OF THE CABLE. A SHORT CIRCUIT BETWEEN THE CONDUCTOR OF THE WIRE CAN OCCUR.

- (b) Shrink the solder sleeve into its position.

Make sure that:

- The solder sleeve stays in the correct position
- A minimum of 75 percent of the indicator ring on top of the solder ring is melted.

- (c) Remove the necessary length of the shield ground wire to make the distance from the forward edge of the solder ring to the end of the wire equal to 2.0 inches maximum.

- (6) Assemble the specified contact on the end of each shield ground wire.

For the assembly of:

- A ground block contact, refer to Paragraph 5.G.
- An insert contact, refer to Paragraph 5.F.

E. Shield Ground Wire Assembly for BMS13-60 Type 27 Class 1 Wire

Table 20
WIRE TYPE CODES

Cable Description	Wire Type Code
BMS13-60 Type 27 Class 1	M1

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

This paragraph gives the procedure to assemble shield ground wires and contacts for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Wire or cable that has one shield, refer to Paragraph 5.C.
- Raychem 55A6160-() cable, refer to Paragraph 5.D.

**Table 21
MECHANICAL FERRULE PART NUMBERS**

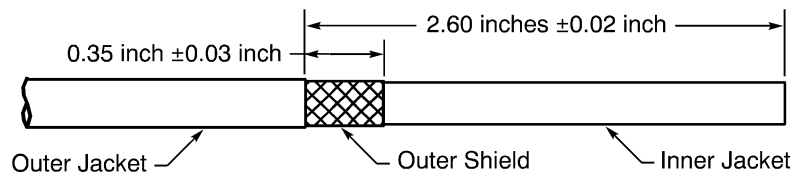
Shield	Ferrule Type	Boeing Standard
Inner	Inner	BACS13S071BNP
	Outer	BACS13S149CNP
Outer	Inner	BACS13S090BNP
	Outer	BACS13S175CNP

NOTE: Refer to Subject 20-10-15 for approved suppliers of Boeing standard mechanical ferrules.

**Table 22
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	SAE-AMS-DTL-23053/12 Class 2	QPL
	SAE-AMS-DTL-23053/12 Class 5	QPL
	TFE-2X	Zeus
	TFE-4X	Zeus

- (1) Prepare the cable for the termination of the outer shield. Refer to Figure 26 and Subject 20-00-15.

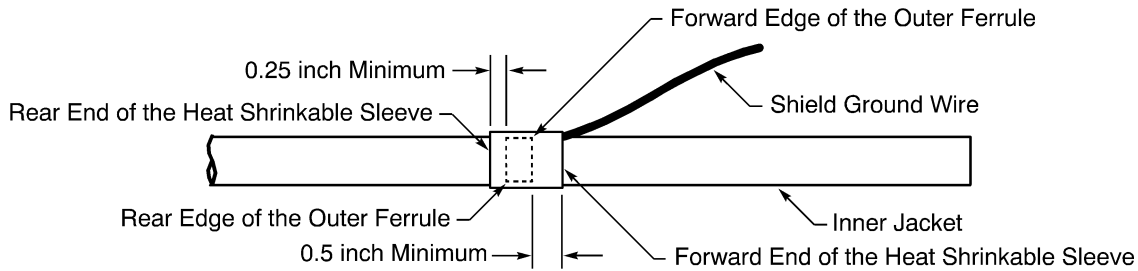


**OUTER JACKET AND OUTER SHIELD REMOVAL
Figure 26**

- (a) Remove 2.60 inches ±0.02 inch of the outer jacket from the end of the cable.
- (b) Remove the necessary length of the outer shield to make the distance from the end of the jacket to the end of the shield equal to 0.35 inch ±0.03 inch.
- (2) Assemble the shield ground wire of the outer shield. Refer to Figure 27.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



TERMINATION OF THE OUTER SHIELD

Figure 27

- (a) Make a selection of an inner and outer ferrule from Table 21.
- (b) Make a selection of a ferrule crimp tool. Refer to Subject 20-10-15.
- (c) Make a selection of a heat shrinkable sleeve from Table 22.
Make sure that the heat shrinkable sleeve has the smallest diameter that can move freely on the shield ground wire assembly.
- NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (d) Make a selection of a shield ground wire. Refer to Subject 20-10-15.
NOTE: The shield ground wire must have the same size as the crimp barrel of the specified contact. Refer to Table 3 for the ground block contact.
- (e) Put the outer ferrule on the cable.
- (f) Put the inner ferrule on the cable.
Make sure that:
 - The inner ferrule is between the shield and the inner jacket
 - The rear end of the inner ferrule is tight against the end of the outer jacket.
- (g) Remove the necessary length of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
Make sure that the bare conductor can extend a small amount farther than the length of the outer ferrule.
- (h) Put the conductor of the shield ground wire between the shield and the outer ferrule.
Make sure that:
 - The free end of the shield ground wire is pointed forward to the end of the wire
 - The bare conductor extends a small amount farther than the rear end of the outer ferrule.
- (i) Push the outer ferrule and the shield ground wire forward until the center of the outer ferrule is aligned with the center of the inner ferrule.
- (j) Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.
- (k) Crimp the outer ferrule.
- (l) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

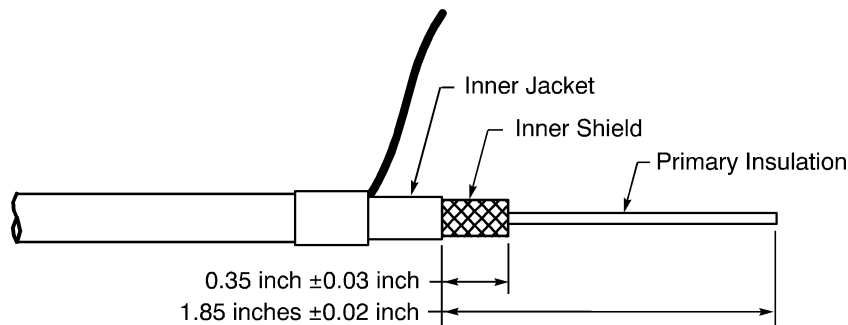
- (m) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the outer ferrule to the end of the wire equal to 2.0 inches maximum.
- (n) Put the necessary length of heat shrinkable sleeve on the wire or cable.

Make sure that the distance:

- From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
- From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.

- (o) Shrink the sleeve into its position. Refer to Subject 20-10-14.

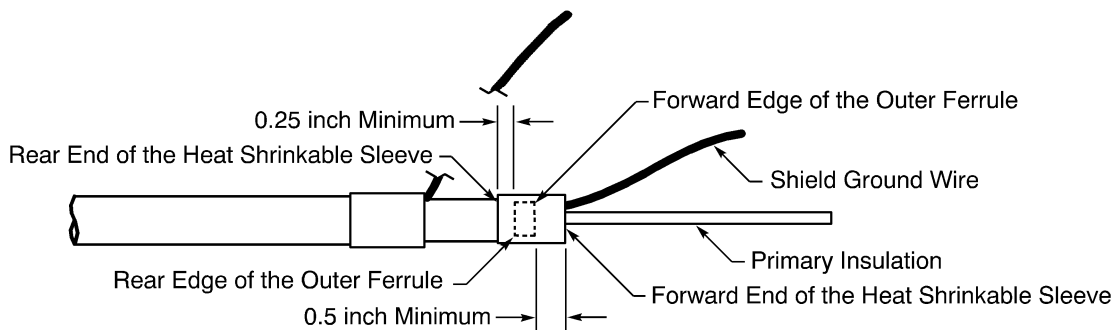
- (3) Prepare the cable for the termination of the inner shield. Refer to Figure 28 and Subject 20-00-15.



INNER JACKET AND INNER SHIELD REMOVAL

Figure 28

- (a) Remove 1.85 inches ± 0.02 inch of the inner jacket from the end of the cable.
 - (b) Remove the necessary length of the inner shield to make the distance from the end of the jacket to the end of the shield equal to 0.35 inch ± 0.03 inch.
- (4) Assemble the shield ground wire of the inner shield. Refer to Figure 29.



TERMINATION OF THE INNER SHIELD

Figure 29

- (a) Make a selection of an inner and outer ferrule from Table 21.
- (b) Make a selection of a ferrule crimp tool. Refer to Subject 20-10-15.
- (c) Make a selection of a heat shrinkable sleeve from Table 22.

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Make sure that the heat shrinkable sleeve has the smallest diameter that can move freely on the shield ground wire assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (d) Make a selection of a shield ground wire. Refer to Subject 20-10-15.

NOTE: The shield ground wire must have the same size as the crimp barrel of the specified contact. Refer to Subject 20-74-02 for the insert contact.

- (e) Put the outer ferrule on the cable.
(f) Put the inner ferrule on the cable.

Make sure that:

- The inner ferrule is between the shield and the primary insulation
- The rear end of the inner ferrule is tight against the end of the inner jacket.

- (g) Remove the necessary length of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.

Make sure that the bare conductor can extend a small amount farther than the length of the outer ferrule.

- (h) Put the conductor of the shield ground wire between the shield and the outer ferrule.

Make sure that:

- The free end of the shield ground wire is pointed forward to the end of the wire
- The bare conductor extends a small amount farther than the rear end of the outer ferrule.

- (i) Push the outer ferrule and the shield ground wire forward until the center of the outer ferrule is aligned with the center of the inner ferrule.

- (j) Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.

- (k) Crimp the outer ferrule.

- (l) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

- (m) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the outer ferrule to the end of the wire equal to 2.0 inches maximum.

- (n) Put the necessary length of heat shrinkable sleeve on the wire or cable.

Make sure that the distance:

- From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
- From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.

- (o) Shrink the sleeve into its position. Refer to Subject 20-10-14.

- (5) Assemble the specified contact on the end of each shield ground wire.

For the assembly of:

- A ground block contact, refer to Paragraph 5.G.
- An insert contact, refer to Paragraph 5.F.

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F. Contact Assembly

For the procedure to assemble:

- Insert contacts, refer to Subject 20-74-02.
- Ground block contacts, refer to Paragraph 5.G.

G. Ground Block Contact Assembly

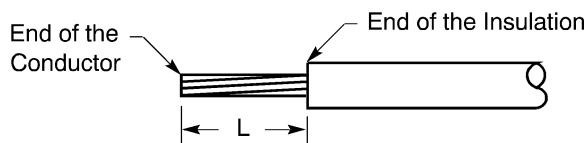
**Table 23
GROUND BLOCK CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-11	-
		WA22	7	M22520/2-11	-
		WA22LC	7	M22520/2-11	-
		WA27F	4	M22520/1-02	Red
18	18	M22520/1-01	5	M22520/1-02	Red
		WA27F	5	M22520/1-02	Red

- (1) Make a selection of a crimp tool from Table 23.
- (2) Remove 0.18 inch ± 0.02 inch of insulation from the end of the shield ground wire.

Refer to:

- Figure 30
- Subject 20-00-15 for the insulation removal procedures.



**INSULATION REMOVAL LENGTH
Figure 30**

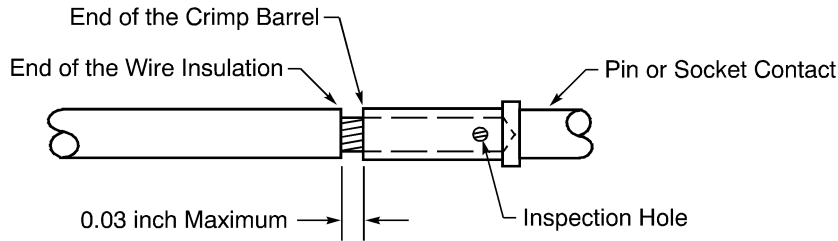
- (3) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 31.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

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POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 31

(4) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.

H. Assembly of Size 5 Power Contacts

Refer to Subject 20-74-02.

I. Size 5 Coax Contact Assembly

Refer to Subject 20-74-02.

J. Assembly of Size 8 Coax Contacts

Refer to Subject 20-74-02.

K. Twinax Cable Preparation and Contact Assembly

Refer to Subject 20-74-02.

L. Size 8 Quadrax Contact Assembly

Refer to Subject 20-74-02.

M. Contact Insertion

This paragraph gives the procedure to install ground block contacts. For the procedure to install other contacts in the connector insert, refer to Subject 20-74-02.

Table 24
GROUND BLOCK CONTACT INSERTION TOOLS

Ground Block Contact Cavity Size	Contact Size	Insertion Tool	
		Part Number	Color
16	1618	DAK83-20	-
		M81969/14-11	Red
		ST2220-2-28	-
	1620	DAK83-20	-
		M81969/14-11	Red
		ST2220-2-28	-

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- (1) If a strain relief clamp is specified, put the strain relief clamp on the wire harness.
Make sure that the wire harness tie tab of the strain relief points away from the end of the harness.
- (2) Make a selection of the contact insertion tool from Table 24 for ground block contacts.
NOTE: An insertion tool is not necessary.
- (3) If an insertion tool is used:
 - (a) Put the contact assembly in the insertion tool.
 - (b) Axially align the insertion tool, the contact assembly and the contact cavity.
Make sure that the insertion tool and the contact assembly are perpendicular to the rear face of the ground block.
 - (c) Carefully push the insertion tool into the contact cavity until it stops.
Make sure that:
 - The contact assembly and the contact cavity stay aligned
 - Tension does not occur between the shield ground wire and the solder sleeve or the contact crimp barrel.
 - (d) Carefully pull the insertion tool out of the contact cavity.
Make sure that the insertion tool stays aligned with the contact cavity.
 - (e) Remove the insertion tool from the wire.
- (4) If an insertion tool is not used:
 - (a) Axially align the contact assembly and the contact cavity.
Make sure that the contact assembly is perpendicular to the rear face of the ground block.
 - (b) Carefully push the the contact assembly into the contact cavity until it stops.
Make sure that:
 - The contact assembly and the contact cavity stay aligned
 - Tension does not occur between the shield ground wire and the solder sleeve or the contact crimp barrel.
- (5) Lightly pull the wire to make sure that the contact is locked in the contact cavity.
CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.
- (6) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly from the contact cavity.
 - (b) Do Step (3) or Step (4) again.

N. Insertion of Fiber Optic Contact Termini

Refer to Subject 20-74-02.

O. Size 5 Coax Contact Insertion

Refer to Subject 20-74-02.

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

P. Insertion of Size 8 Coax and Size 8 Twinax Contacts

Refer to Subject 20-74-02.

Q. Installation of Size 8 Quadrax Contacts

Refer to Subject 20-74-02.

R. Seal of an Empty Contact Cavity

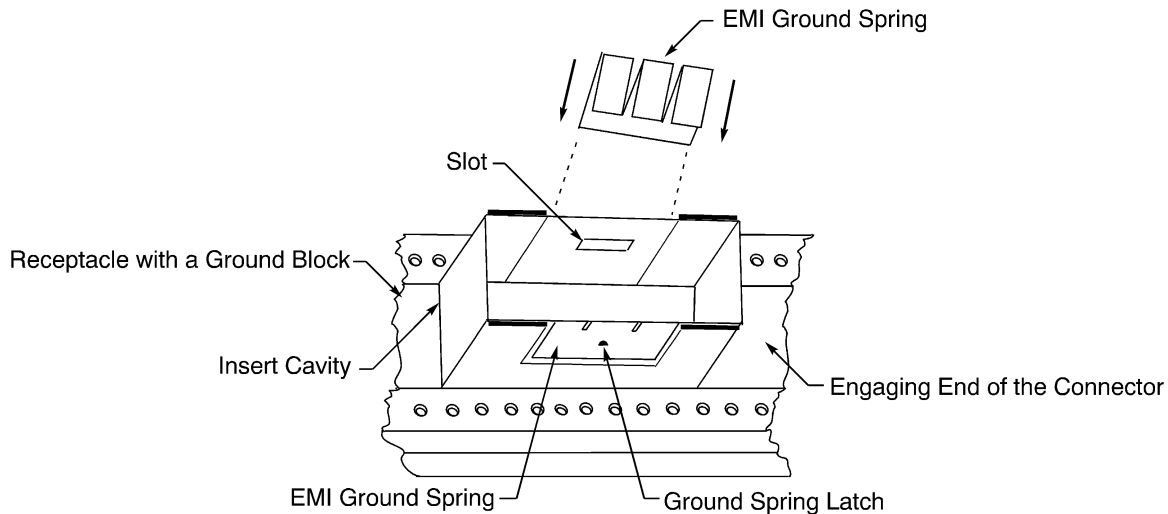
Refer to Subject 20-74-02.

S. Seal of an Empty Contact Terminus Cavity

An empty contact terminus cavity must be sealed with a seal plug or a seal rod. Refer to Subject 20-60-08.

NOTE: The size of the contact terminus cavity is equivalent to the size 16 contact cavity.

T. EMI Ground Spring Installation



EMI GROUND SPRING INSTALLATION
Figure 32

Note: A receptacle with a ground block must have EMI ground springs installed.

Refer to Figure 32.

- (1) From the engaging end of the connector, align the EMI ground spring with the longer sides of the insert cavity.
Make sure that the three springs are on the inside of the insert cavity.
- (2) Push the ground spring to the face of the connector shell until the latch on the spring locks in the slot on the side of the insert cavity.

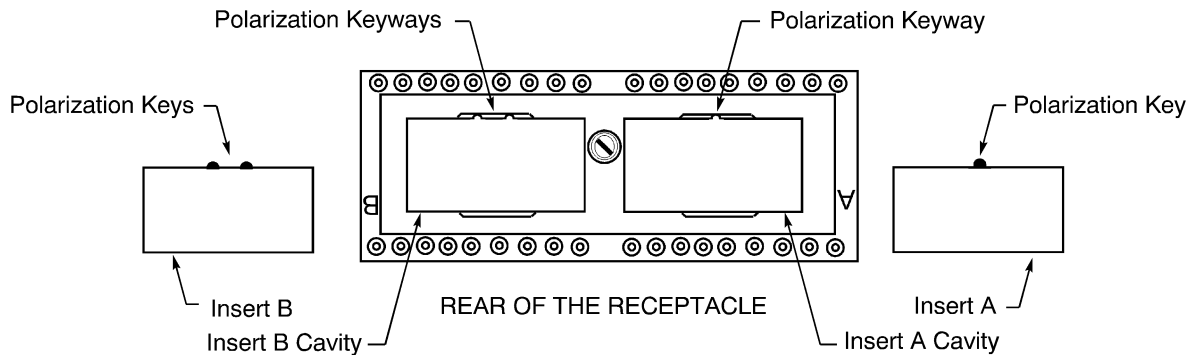
U. Insert Installation

NOTE: The inserts can be installed with or without contacts.

If a cable clamp is specified, it must be installed before an insert with assembled contacts is installed in the connector shell.

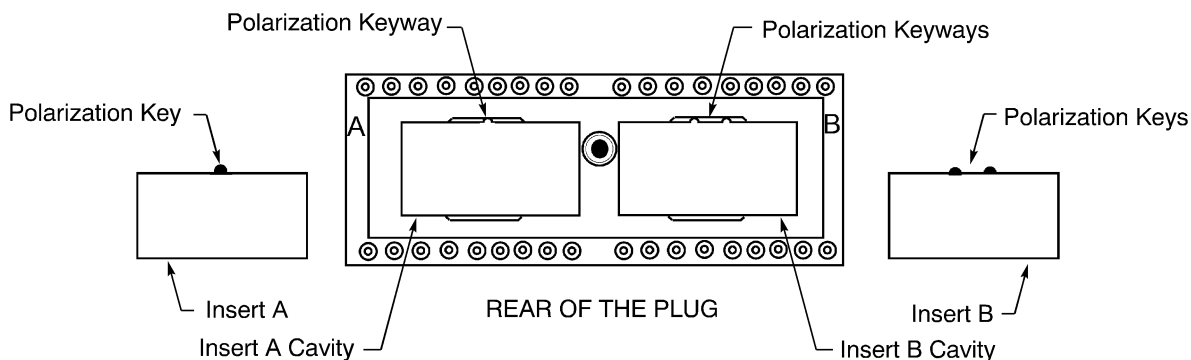
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ALIGNMENT OF THE INSERTS IN THE RECEPTACLE

Figure 33



ALIGNMENT OF OF THE INSERTS IN THE PLUG

Figure 34

Refer to Figure 33 and Figure 34.

- (1) Align the polarization key on the insert A with the polarization keyway on the rear side of the insert cavity A.
- (2) Push the insert A into the insert cavity A until it stops and is locked in position.
- (3) Align the polarization keys on the insert B with the polarization keyways on the rear side of the insert cavity B.
- (4) Push the insert B into the insert cavity B until it stops and is locked in position.

V. Installation of the Fiber Optic Alignment Sleeve Insert

Refer to Subject 20-74-02.

6. CONNECTOR POLARIZATION

A. Connector Polarization

The polarization code of the connector part number identifies the position of:

- The polarization key on the jackpost on the receptacle connector
- The polarization keyway on the jackscrew on the plug connector.

Refer to Figure 1.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

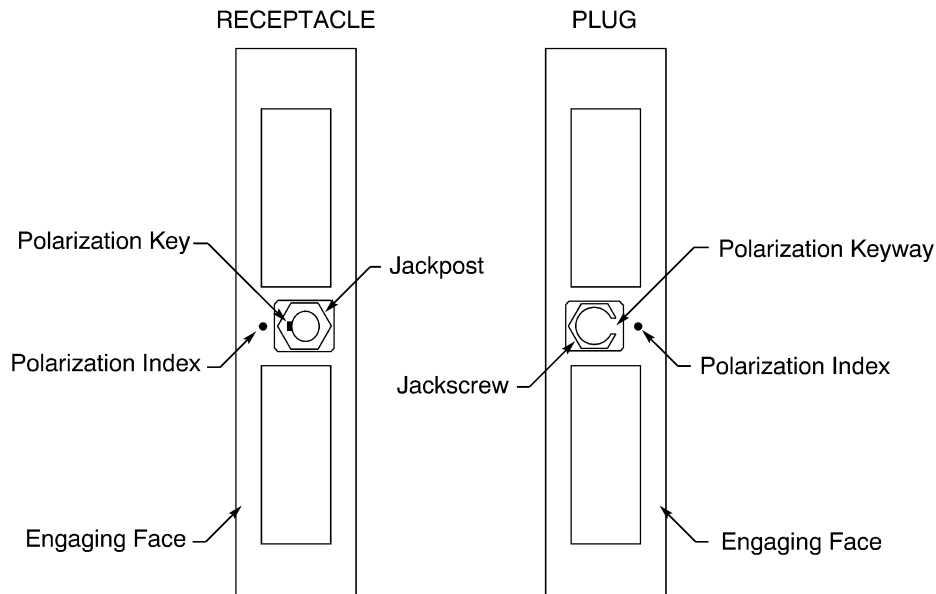
- (1) Find the polarization code in the connector part number from the equipment list.
- (2) For that polarization code, find the correct position of:
 - The polarization key on the receptacle
 - The polarization keyway on the plug.

Refer to Paragraph 6.B.

- (3) If the position of the key or the keyway does not agree with the code in the part number from the equipment list, put the key or keyway into the correct position. Refer to Paragraph 6.C.
- (4) If the polarization code in the part number on the connector shell does not agree with the polarization code in the part number from the equipment list, change the part number on the connector shell. Refer to Paragraph 6.D.

B. Polarization Key and Polarization Keyway Positions

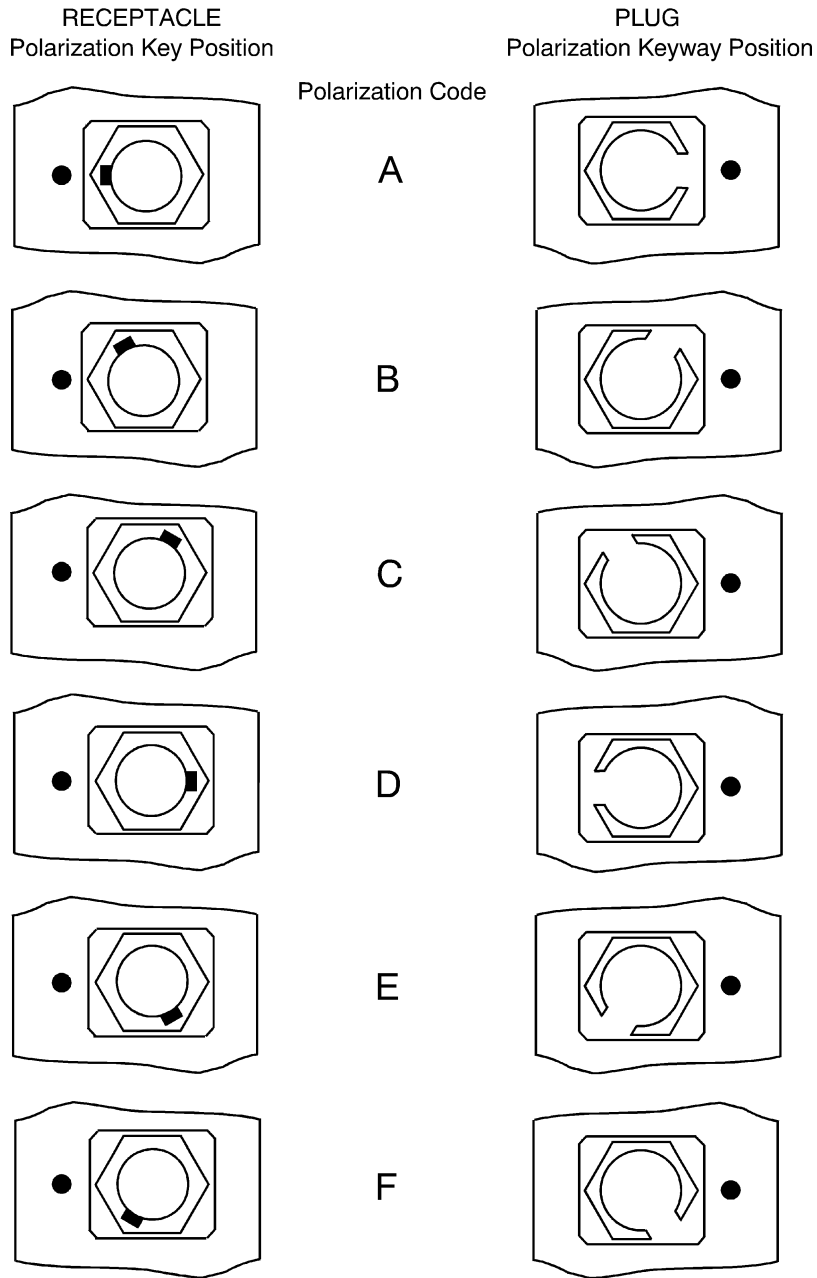
Refer to Figure 35 and Figure 36 for the polarization key position on the receptacle and the polarization keyway position on the plug.



POLARIZATION KEY AND KEYWAY ON THE CONNECTOR
Figure 35

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



POSITIONS OF THE POLARIZATION KEY AND KEYWAY
Figure 36

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS

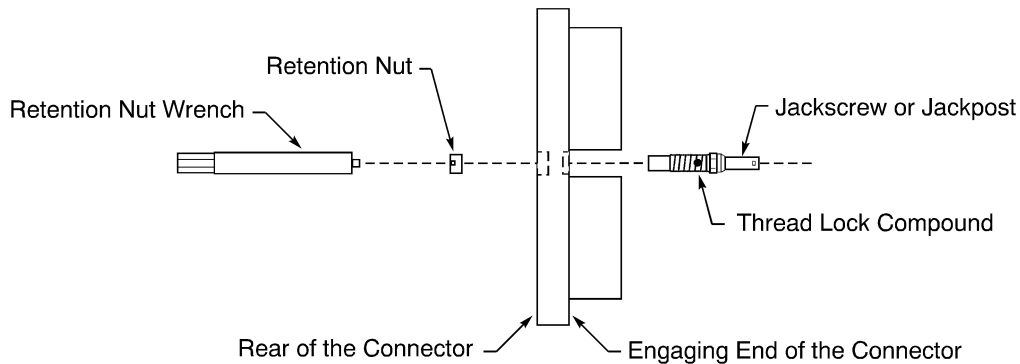
C. Change of the Polarization Key and Keyway Positions

**Table 25
NECESSARY MATERIALS**

Material	Part Number	Supplier
Thread Lock Compound	222	Loctite

**Table 26
JACKSCREW AND JACKPOST INSTALLATION TOOLS**

Tool	Type	Size (inch)	Part Number
Driver	Retention Nut Wrench	-	282664
Torque	Socket Torque Wrench	1/4	-



JACKSCREW AND JACKPOST INSTALLATION

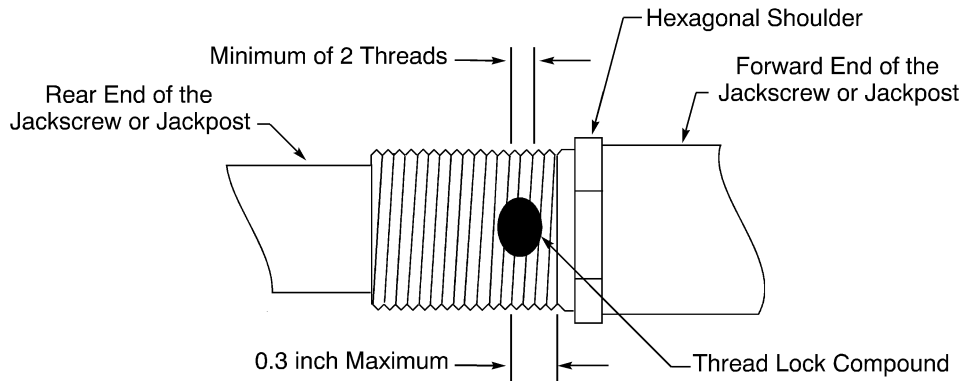
Figure 37

Refer to Figure 37.

- (1) Make a selection of these tools from Table 26.
 - A retention nut wrench
 - A socket torque wrench.
- (2) Make a selection of thread lock compound from Table 25.
- (3) If it is necessary, remove the jackscrew or jackpost. Refer to Paragraph 4.K.
- (4) Put a drop of thread lock compound on a minimum of two threads on the rear end of the jackscrew or jackpost, near the hexagonal shoulder. Refer to Figure 38.

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



PREPARATION OF THE JACKSCREW AND THE JACKPOST
Figure 38

- (5) Put the jackscrew or jackpost in the correct polarization position. Refer to Figure 35 and Figure 36.
- (6) Put the end of the jackscrew or jackpost with threads in the polarization cavity on the engaging end of the connector.
 Make sure that the hexagonal shoulder is in the cavity.
- (7) From the rear of the connector, engage the threads of the retention nut with the threads of the jackscrew or jackpost.
- (8) Torque the nut on the jackscrew 7 inch-pounds \pm 1 inch-pound.

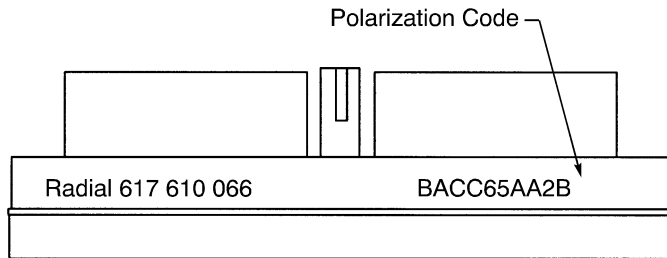
D. Change of the Polarization Code in the Part Number on the Connector

Table 27
NECESSARY MATERIALS

Material	Part Number	Supplier
Ink	No. 68 Fast Dry	Independent
	No. 73X NW Opaque	Independent
	No. 73X Opaque	Independent
Paint, Clear	683-3-2	Akzo
	Clear Lacquer	Tartan
	EC-776	3M
	EC-776SR	3M
Pen	Permanent Ink Pen, Ultra Fine Point	Sanford Sharpie

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



LOCATION OF THE POLARIZATION CODE ON THE CONNECTOR
Figure 39

Refer to Figure 39.

- (1) Make a selection of these materials from Table 27:
 - An ink or a permanent ink pen
 - A clear paint.
- (2) If the polarization code in the part number on the connector is incorrect:
 - (a) Apply a layer of ink on the code on the connector shell.
 Make sure that the code cannot be read.
 - (b) Write the new code on the connector shell adjacent to the layer of ink.
- (3) If the part number on the connector does not have a polarization code, write the code on the connector shell at the end of the part number.
- (4) Let the ink dry for a minimum of 10 minutes.
- (5) Apply a layer of the clear paint on the part number on the connector shell.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. PAINT ON THE SURFACE OF A CONTACT CAN CAUSE UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

- (6) Let the paint dry before the connector shell is touched or moved.

7. INSPECTION AND CLEANING OF A FIBER OPTIC ALIGNMENT SLEEVE INSERT

A. Inspection and Cleaning of a Fiber Optic Alignment Sleeve Insert

Refer to Subject 20-74-02.

8. CONNECTOR INSTALLATION

A. Connector Equipment Identification Number

An equipment identification number for each insert cavity must be put on each related end of the connector.

Table 28
IDENTIFICATION LABEL MATERIAL

Part Number	Type	Supplier
7860	Label	3M
7880	Label	3M
B-428	Label	Brady

STANDARD WIRING PRACTICES MANUAL

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Table 28 (continued)

Part Number	Type	Supplier
B-437	Label	Brady
B-614	Label	Brady
B-637	Label	Brady
B-966B	Label	Brady
B-969	Label	Brady
IT-702	Tape	Ideal Tape
No. 850	Tape	3M
No. 853	Tape	3M
TC	Tape	Brothers Industries
TX	Tape	Brothers Industries
X-24348	Label	Boeing

Table 29

MAXIMUM SIZE OF IDENTIFICATION LABELS

Connector			Label Size (inch)	
Part Number	Type	Configuration	Maximum Length	Maximum Width
BACC65AA2A()	Plug	Without Ground Block	0.7	0.2
BACC65AA2B()	Plug	Ground Block	1.0	0.2
BACC65AB2A()	Receptacle	Without Ground Block	0.7	0.2
BACC65AB2B()	Receptacle	Ground Block	0.7	0.2

- (1) Make a selection of an identification label material from Table 28.

Make sure the identification label material is the correct size for the plug or receptacle. Refer to Table 29.

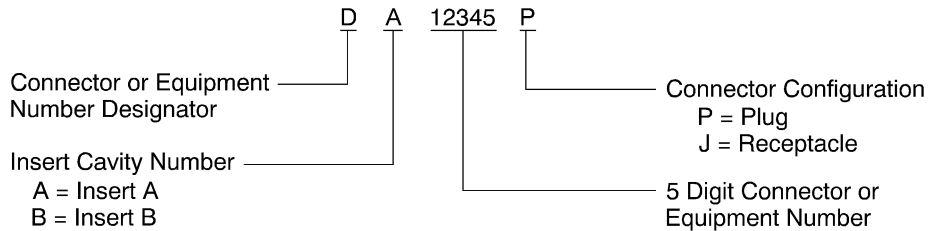
- (2) Make a selection of these materials from Table 27:

- An ink or a permanent ink pen
- A clear paint.

- (3) Make the correct equipment identification number for each insert cavity. Refer to Figure 40.

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



EQUIPMENT IDENTIFICATION NUMBER

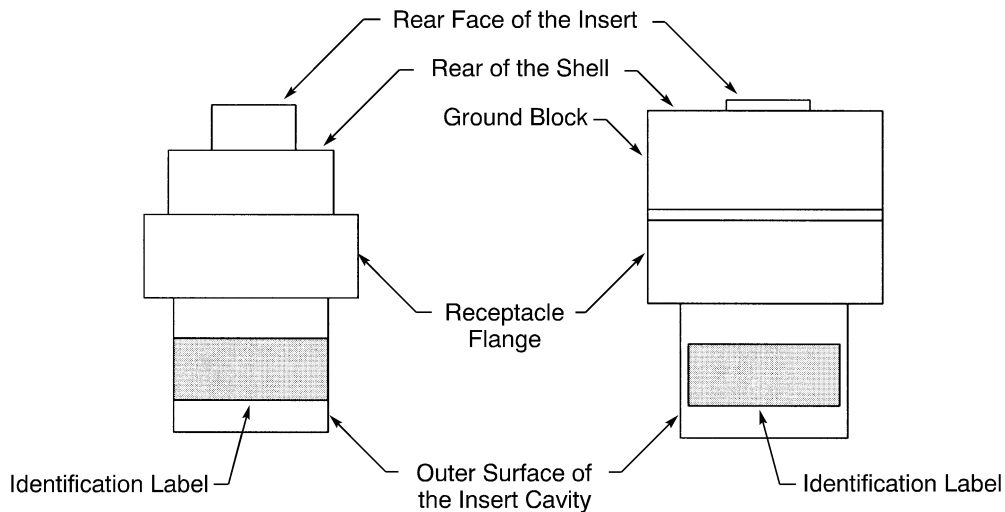
Figure 40

- (a) From the equipment list, identify the equipment number of the connector shell.
 - (b) From this number, use only the numeric portion and the first letter after the numeric portion to make the equipment number of the insert cavity.
- NOTE: The first letter after the numeric portion is a P or a J.
- (c) For insert cavity A, add the characters DA in front of this number.
 - (d) For insert cavity B, add the characters DB in front of this number.
- (4) For each insert cavity, put the applicable equipment number on each applicable label.
 - (5) Let the ink dry for a minimum of 10 minutes.
 - (6) Apply a layer of the clear paint on the equipment number.
 - (7) Let the layer of paint dry.
 - (8) Put the applicable label on the smaller side of the receptacle or plug, near the related insert cavity.

Refer to:

- Figure 41 for the receptacle
- Figure 42 for the plug.

NOTE: Each connector has 2 labels or 2 pieces of tape.

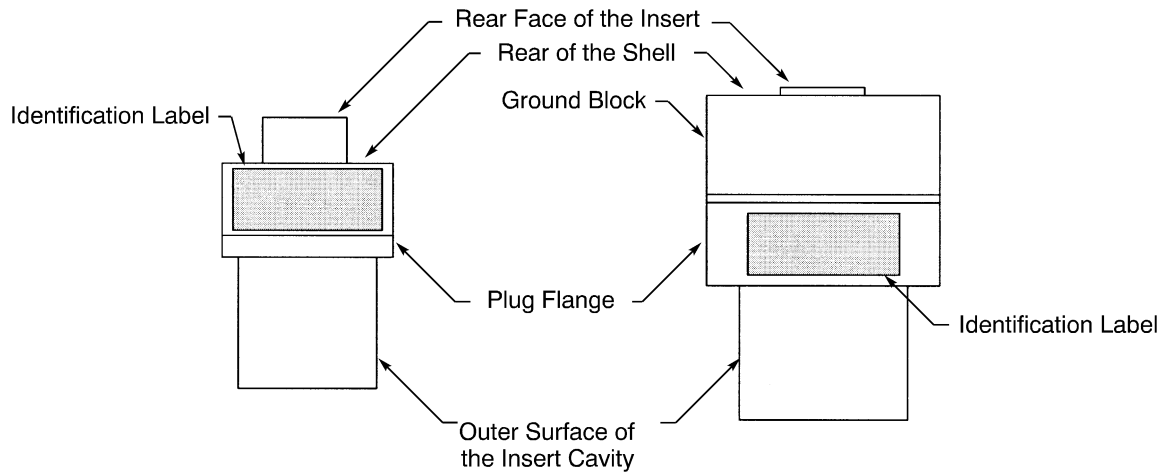


POSITION OF THE EQUIPMENT IDENTIFICATION LABEL ON THE RECEPTACLE

Figure 41

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



POSITION OF THE EQUIPMENT IDENTIFICATION LABEL ON THE PLUG
Figure 42

B. Installation of the Receptacle in a Panel

For the installation of the receptacle with a ground block, refer to Paragraph 8.C.

Table 30
RECEPTACLE INSTALLATION FASTENERS

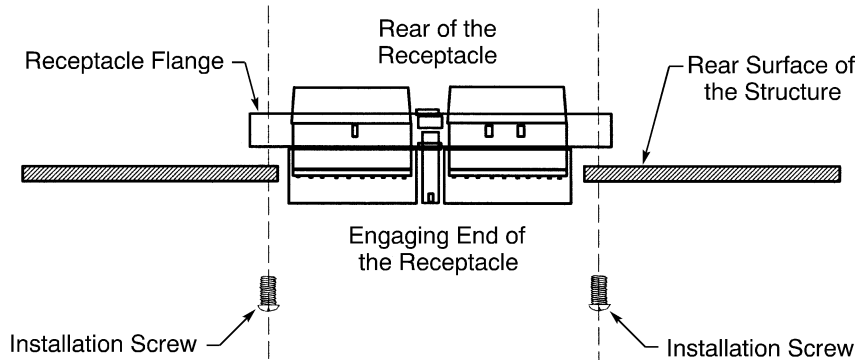
Part	Part Number	Supplier
Screw	NAS1802-6-()	QPL

Table 31
NECESSARY TOOLS

Tool	Type	Size (inch)
Driver	Phillips Head Screwdriver	-
	Socket Wrench	1/4
Torque	Phillips Head Torque Screwdriver	-
	Socket Torque Wrench	1/4

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ALIGNMENT OF THE RECEPTACLE AND THE STRUCTURE

Figure 43

Refer to Figure 43.

- (1) Make a selection of four new screws from Table 30.

CAUTION: MAKE SURE THAT THE SCREWS ARE NEW. SCREWS THAT ARE NOT NEW CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (2) Make a selection of these tools from Table 31.
 - A torque tool
 - A driver.
- (3) On the rear side of the structure, align the mounting holes of the receptacle flange with the holes on the structure.
- (4) Put the connector shell in the cutout.
- (5) From the front side of the structure, install a screw in each of the four mounting holes.
- (6) In sequence, tighten each screw a small amount until:
 - Each screw head is against the structure
 - The connector flange is fully against the structure.
- (7) Torque each screw 30 inch-pounds \pm 2 inch-pounds.

C. Installation of the Receptacle with a Ground Block

For the installation of the receptacle in an unpressurized area, refer to Paragraph 8.D.

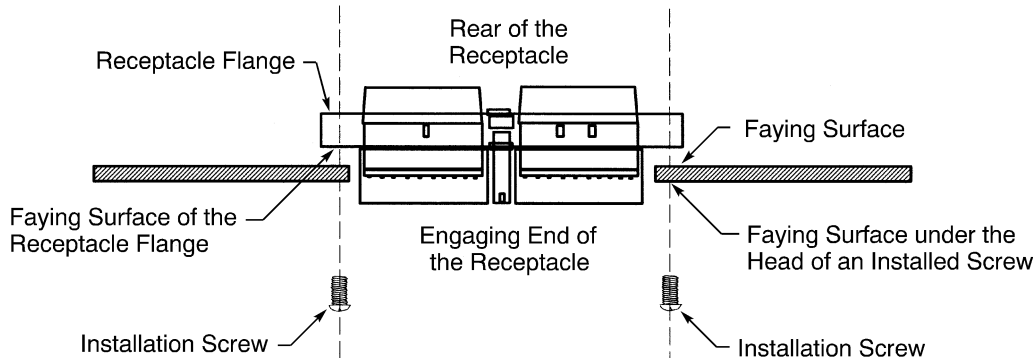
- (1) Prepare the faying surfaces necessary for the electrical bond of the receptacle shell to structure.

Refer to:

- Figure 44 for the connector receptacle flange
- Figure 44 and Figure 45 for the rear surface of the structure
- Figure 44 and Figure 46 for the front surface of the structure adjacent to the bottom surface of the head of the installation screws.
- Subject 20-20-00 for the procedures to prepare the faying surface.

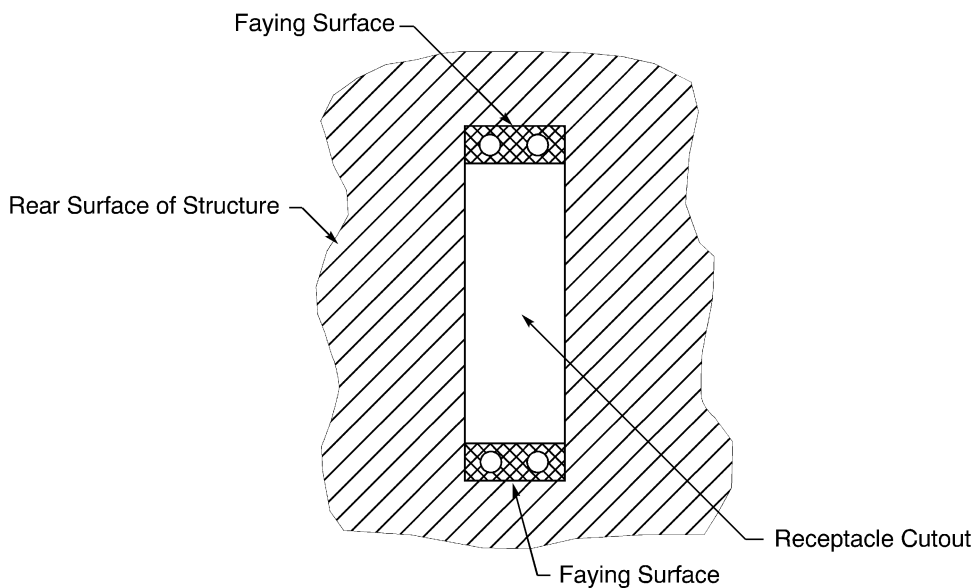
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LOCATION OF THE FAYING SURFACES

Figure 44

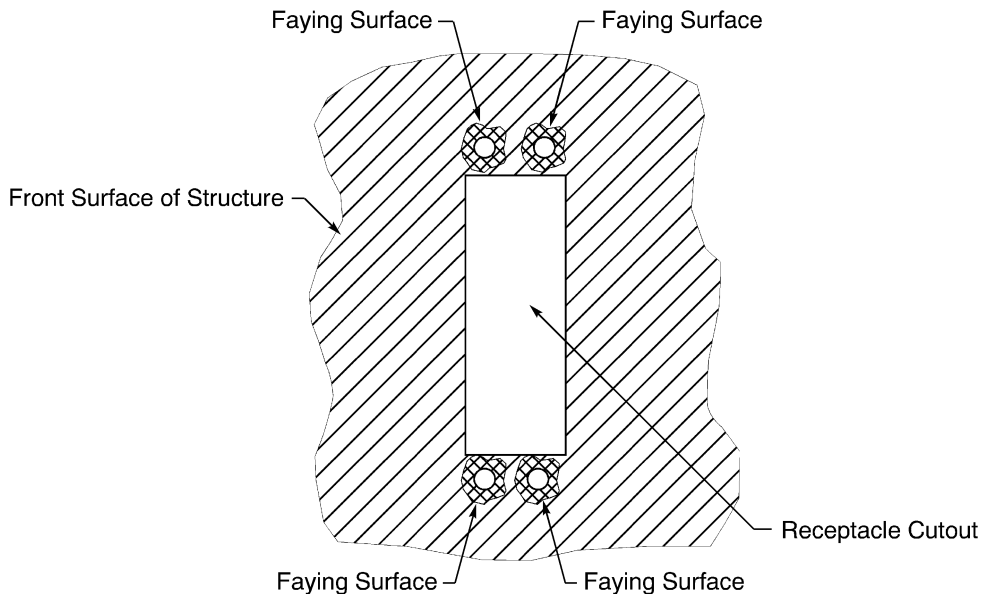


FAYING SURFACE ON THE REAR SIDE OF THE STRUCTURE

Figure 45

STANDARD WIRING PRACTICES MANUAL

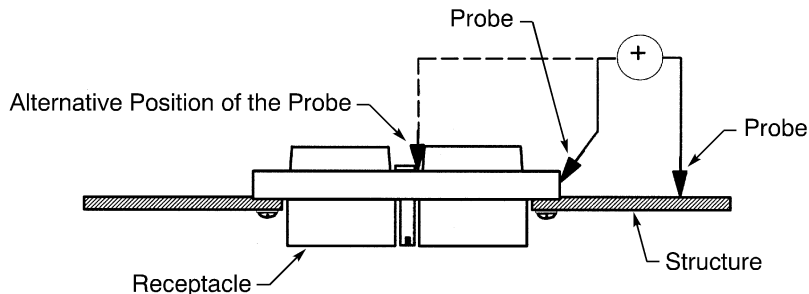
ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



FAYING SURFACE ON THE FRONT SIDE OF THE STRUCTURE

Figure 46

- (2) Install the receptacle. Refer to Paragraph 8.B.
- (3) Do the electrical bond test for receptacle connector shells. Refer to Subject 20-20-00 and Figure 47.



TEST POINTS FOR THE RECEPTACLE TO STRUCTURE BOND

Figure 47

- (4) If the bond has an electrical resistance greater than the maximum for connector shell bonds specified in Subject 20-20-00:
 - Remove the receptacle from the structure. Refer to Paragraph 4.C.
 - Do Step (1) through Step (3) again.

D. Installation of the Receptacle with a Ground Block in an Unpressurized Area

- (1) Install the receptacle. Refer to Paragraph 8.C.
 Make sure that alodine is not applied to the faying surface on the front side of the installation surface adjacent to the bottom of the head of the screw, when the screw is installed. These areas must to remain bare aluminum.
- (2) Seal the connector.

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Refer to Subject 20-20-00 for the assembly of a seal for electrical connector shell bonds.

- (3) Apply a layer the sealant on the head of each screw.

Make sure that the sealant makes an overlap with the head of the screw and the installation surface.

E. Plug and Receptacle Connection

**Table 32
NECESSARY TOOLS**

Tool	Type	Size (inch)
Torque	Wrench with a Hex Driver	9/64

These conditions are applicable:

- Inserts must be installed in each insert cavity
 - The polarization position of the plug and receptacle must be the same.
- (1) Make a selection of an torque tool from Table 32.
 - (2) If the receptacle has a cap, remove the cap. Refer to Paragraph 8.F.
 - (3) Align the plug with the receptacle.

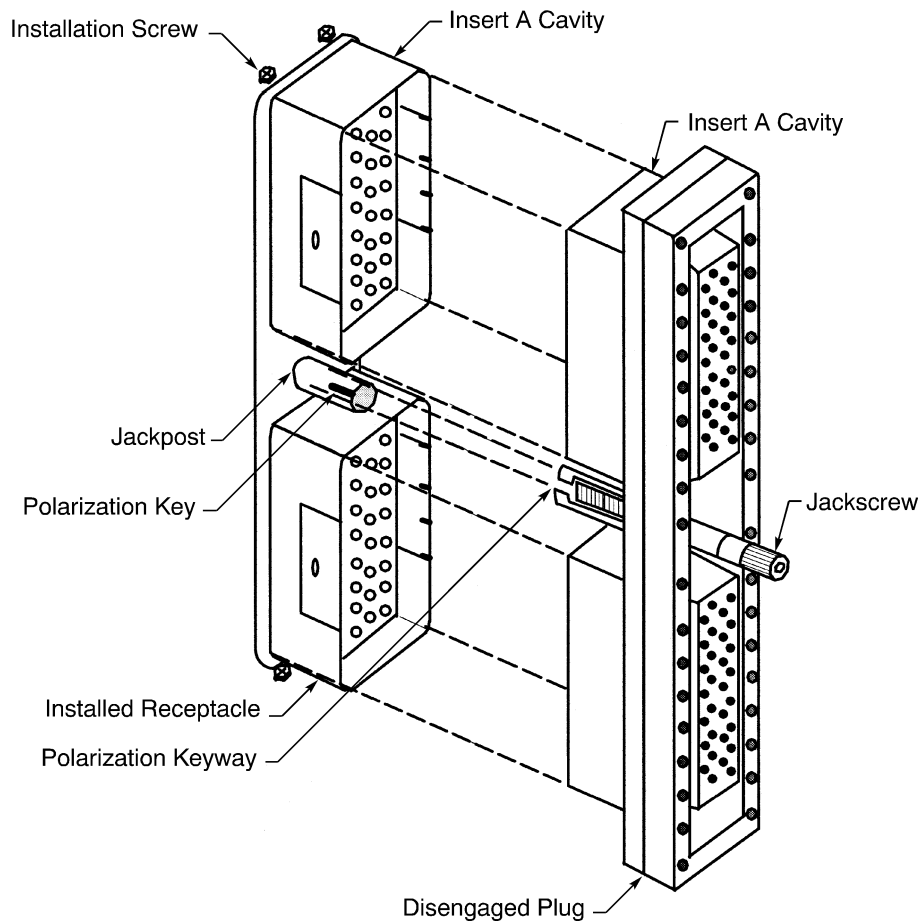
Make sure that:

- Insert A on the plug is aligned with insert A on the receptacle
- Insert B on the plug is aligned with insert B on the receptacle.

Refer to Figure 48.

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ASSEMBLY OF BACC65AA AND BACC65AB CONNECTORS



ALIGNMENT OF THE PLUG AND THE RECEPTACLE
Figure 48

(4) Push the plug to the receptacle until the screw in the jackscrew stops in the jackpost.

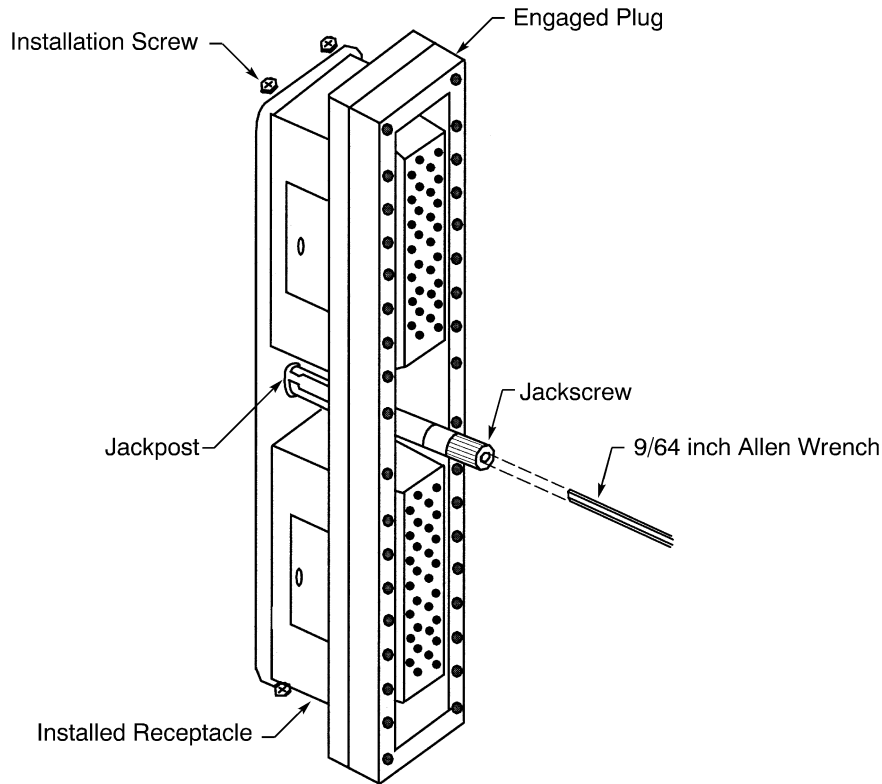
Make sure that:

- The polarization key and keyway are engaged
- The insert cavities are engaged.

Refer to Figure 49.

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PLUG AND RECEPTACLE CONNECTION

Figure 49

- (5) Torque the jackscrew to 7 inch-pounds \pm 1 inch-pound.

F. Fiber Optic Insert Receptacle Cap Removal

**Table 33
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	9/64
	Screwdriver, Hex	9/64

- (1) Make a selection of a driver from Table 33.

NOTE: The driver can have a ball type end.

- (2) Turn the coupling screw on the cap counterclockwise with the driver until the coupling screw is disengaged. Refer to Figure 8.
- (3) Pull the cap from the receptacle.

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9. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 34
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
ATR2079	Astro
ATR2080	Astro
M81969/14-11	QPL
RRX20B	Russtech

B. Contact Crimp Tools

**Table 35
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels
Y797	Daniels

C. Contact Insertion Tools

**Table 36
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
DAK83-20	Daniels
M81969/14-11	QPL
ST2220-2-28	Boeing

D. Contact Terminus Removal Tools

**Table 37
CONTACT TERMINUS REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
M81969/14-03	QPL



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E. Contact Terminus Insertion Tools

Table 38
CONTACT TERMINUS INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
M81969/14-03	QPL

F. Special Tools

Table 39
SPECIAL TOOL SUPPLIERS

Tool	Supplier
282 521 002	Radiall
282664	Radiall

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1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

Refer to Subject 20-74-02.

B. Damage Conditions - Front Face of the Insert

Refer to Subject 20-74-02.

C. Damage Conditions - Coupling Fastener

The coupling fastener must be replaced if:

- The fastener has a crack
- The fastener is bent
- The fastener is broken.

D. Damage Conditions - EMI Ground Springs

The EMI ground springs must be replaced when one or more of the ground spring fingers is bent or broken.

E. Damage Conditions - Strain Relief Clamp

The strain relief clamp must be replaced if:

- The clamp has a crack
- The wire harness tie tab is broken.

A saddle bar of a strain relief clamp must be replaced if:

- The saddle bar screw hole threads are damaged
- The saddle bar has a crack.

F. Minimum Wire O.D. for an Environmentally Sealed Connector

Refer to Subject 20-74-02.

2. PART NUMBERS AND DESCRIPTION

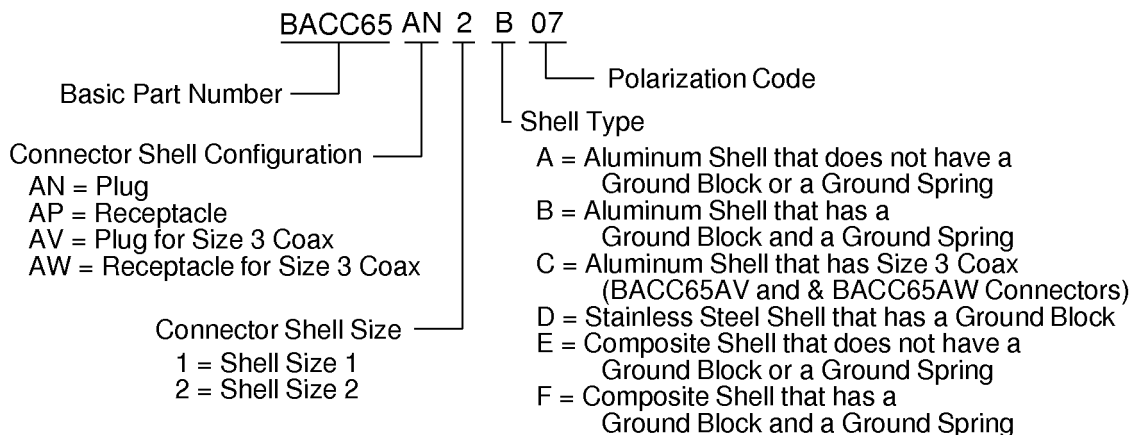
A. Connector Shell Part Numbers

**Table 1
CONNECTOR SHELL PART NUMBERS**

Boeing Standard	Connector Type	Configuration
BACC65AN()	Plug	1 Removable BACI10AL, BACI10AM or BACI10AP Insert
BACC65AP()	Receptacle	
BACC65AV()	Receptacle	1 or 2 Size 3 Coax Contacts
BACC65AW()	Plug	

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CONNECTOR PART NUMBER STRUCTURE
Figure 1

Table 2
SHELL TYPES AND POLARIZATION CODES

Shell Type	Polarization Codes	Polarization Post Retention
A	01 thru 16	Polarization posts and polarization receptacles are retained on the connector shell by a retaining plate.
B		
C		
D	AA thru DD	Polarization posts and polarization receptacles snap into the shell.
E		
F		

Table 3
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTOR SHELLS

Connector	Supplier
BACC65AN()	Radiall
	Jerrik
BACC65AP()	Radiall
	Jerrik
BACC65AV()	Radiall
	Jerrik
BACC65AW()	Radiall
	Jerrik

STANDARD WIRING PRACTICES MANUAL

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B. Connector Shell Component Part Numbers

**Table 4
CONNECTOR SHELL COMPONENT PART NUMBERS**

Component	Part Number or Standard	Applicable Connector		Supplier
		Part Number	Shell Type	
Coupling Fastener Kit	617983001	BACC65AN, BACC65AP, BACC65AV, and BACC65AW	A, B, C, D, E, and F	Radiall
				Jerrik
Polarization Post	BACC65AT1	BACC65AN	A, B, and C	QPL
	BACC65AT2	BACC65AN	D, E, and F	QPL
Polarization Receptacle	BACC65AU1	BACC65AP	A, B, and C	QPL
	BACC65AU2	BACC65AP	D, E, and F	QPL
Retaining Plate	BACC65AY	BACC65AN, BACC65AP, BACC65AV, and BACC65AW	A, B, and C	QPL

**Table 5
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTOR SHELL COMPONENTS**

Boeing Standard	Supplier
BACC65AT	Jerrik
	Radiall
BACC65AU	Jerrik
	Radiall
BACC65AY	Jerrik
	Radiall

C. BACC65AN and BACC65AP Connector Description

Refer to Figure 2 and Figure 3 for configurations of these connectors.



707, 727-787

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

The BACC65AN and BACC65AP connectors have these technical features:

- A rectangular metal or composite shell in two shell sizes
- The larger shell size has a removable BACI10AL, or BACI10AM insert
- The smaller shell size has a removable BACI10AP insert
- Two 1/4 turn coupling fasteners that attach the plug to the receptacle
- Two polarization posts on the BACC65AN plug connector
- Two polarization receptacles on the BACC65AP receptacle connector
- 16 polarization positions
- EMI ground springs on some receptacle shell configurations
- A ground block for ground wire terminations on some connector configurations
- Rear insertion and removal of the insert assembly
- Rear release, rear removal size 2222, 2020, 1616, 1212, 0808, and 0505 crimp type contacts
- Rear release, rear removal size 5 coax contacts
- Rear release, rear removal size 8 coax, twinax, and quadrax contacts
- A removable strain relief clamp
- An EMI backshell on some configurations.

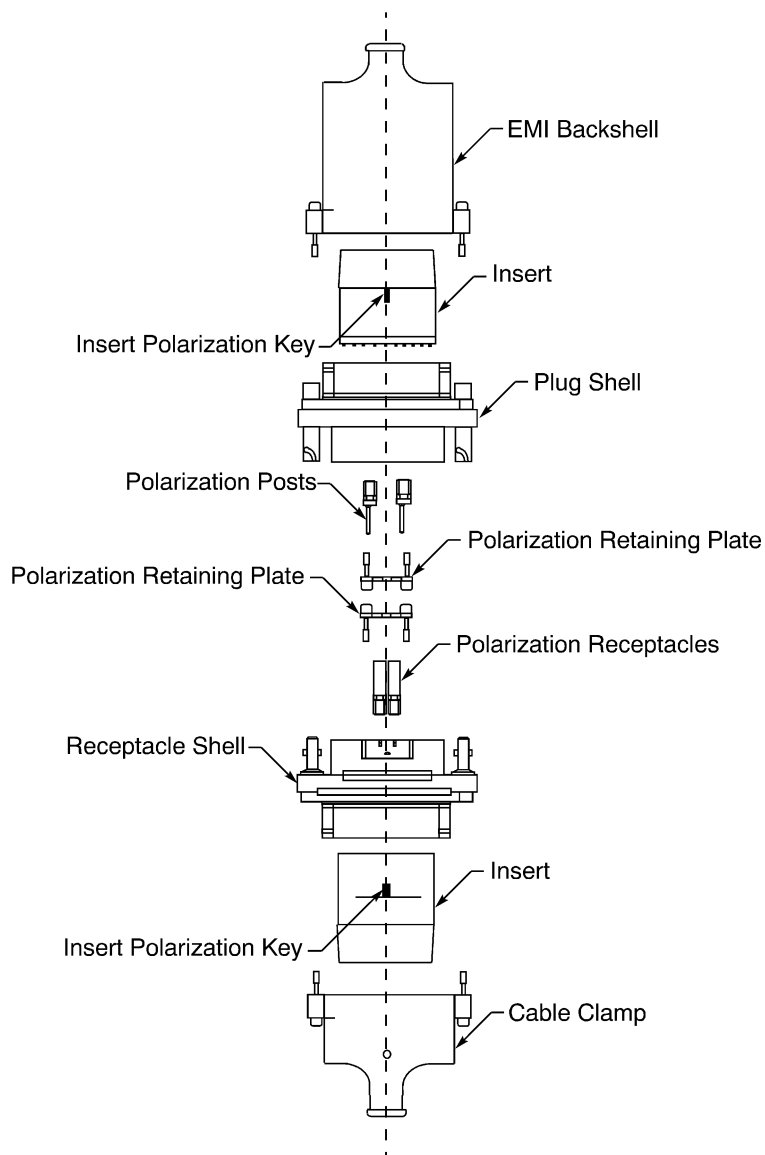
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STANDARD WIRING PRACTICES MANUAL

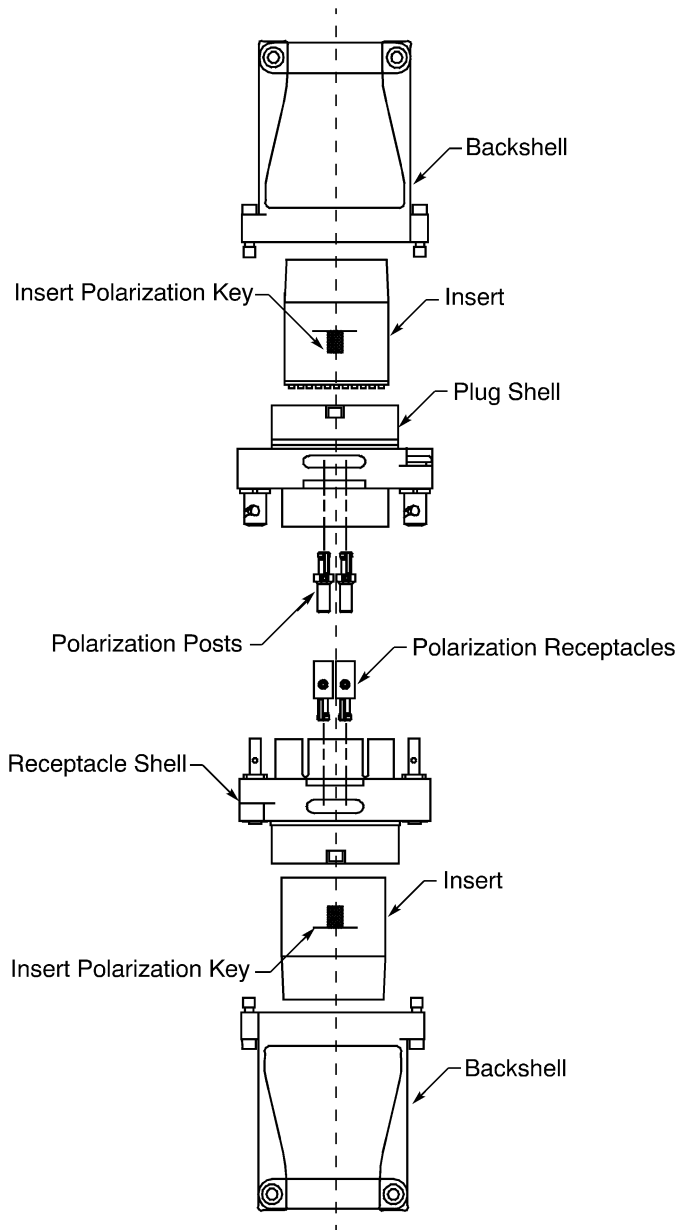
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC65AN() AND BACC65AP() SHELL TYPE A, B, AND C CONNECTOR CONFIGURATION
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC65AN() AND BACC65AP() SHELL TYPE D, E, and F CONNECTOR CONFIGURATION
Figure 3

Table 6
BACC65AN AND BACC65AP CONNECTOR SHELLS

Shell	Shell Size	Type	Configuration	Reference
BACC65AN1A	1	Plug	Without ground block	Figure 4
BACC65AN2A	2	Plug	Without ground block	Figure 5
BACC65AN1B	1	Plug	With ground block	Figure 6

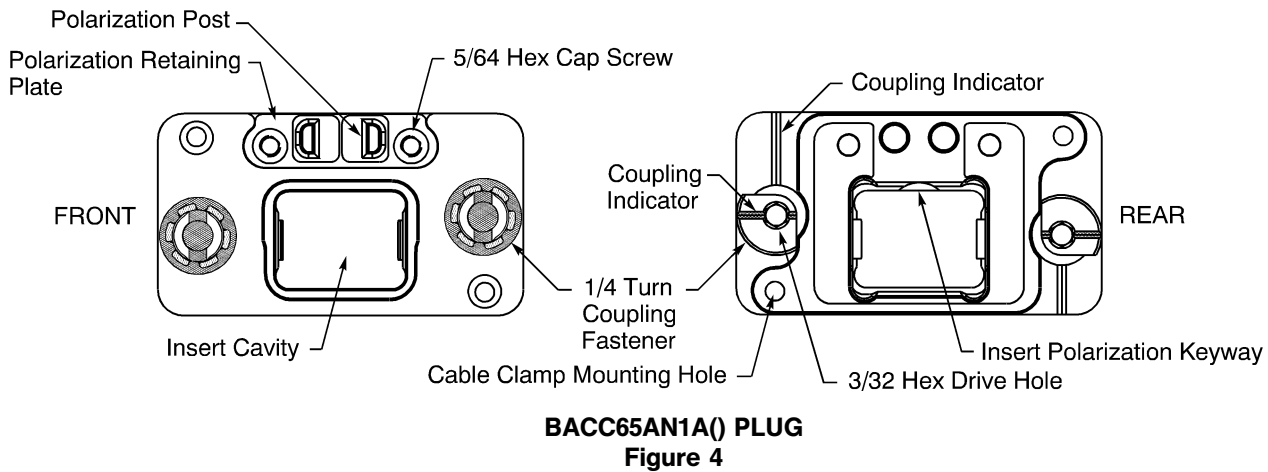
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

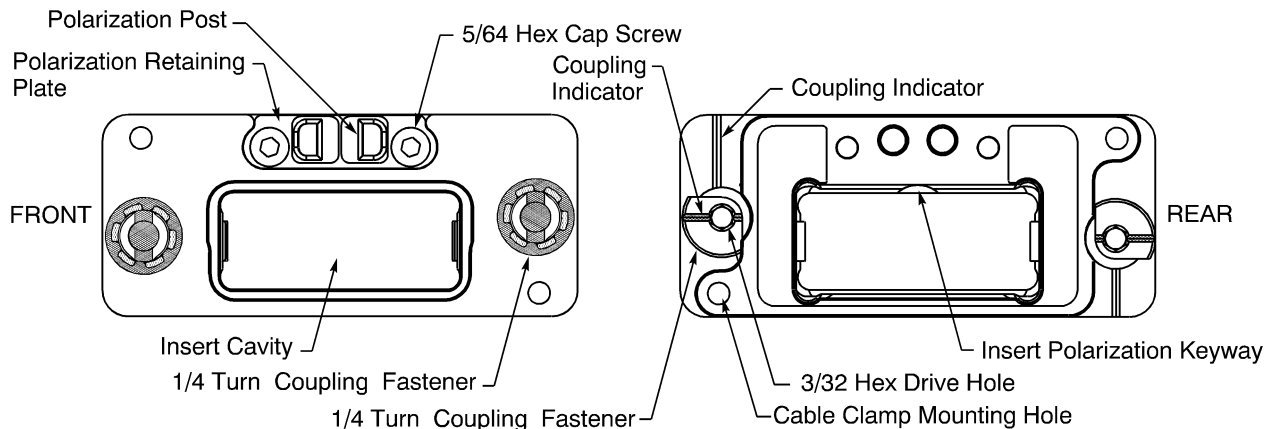
Table 6 (continued)

Shell	Shell Size	Type	Configuration	Reference
BACC65AN2B	2	Plug	With ground block	Figure 7
BACC65AN2D	2	Plug	With ground block	Figure 8
BACC65AP1A	1	Receptacle	Without EMI ground springs, without ground block	Figure 9
BACC65AP2A	2	Receptacle	Without EMI ground springs, without ground block	Figure 10
BACC65AP1B	1	Receptacle	With EMI ground springs, with ground block	Figure 11
BACC65AP2B	2	Receptacle	With EMI ground springs, with ground block	Figure 12
BACC65AP2D	2	Receptacle	With EMI ground springs, with ground block	Figure 13

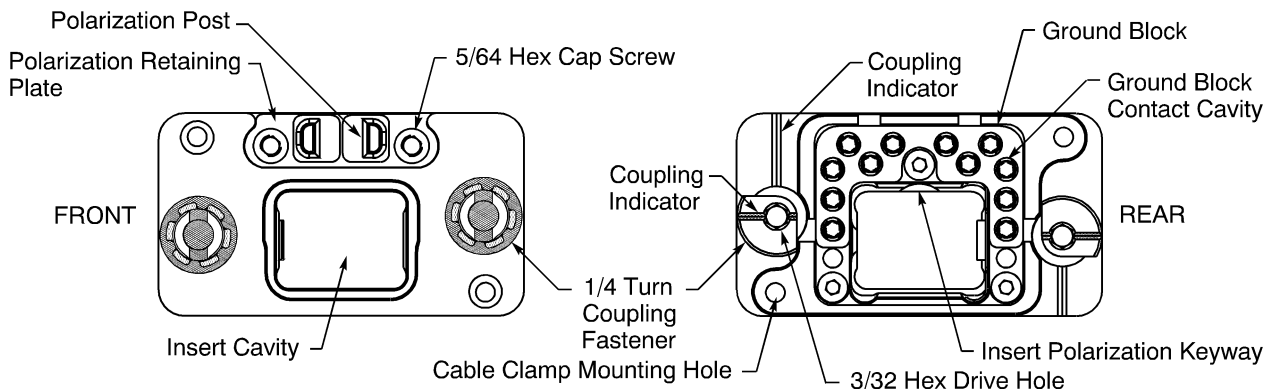


STANDARD WIRING PRACTICES MANUAL

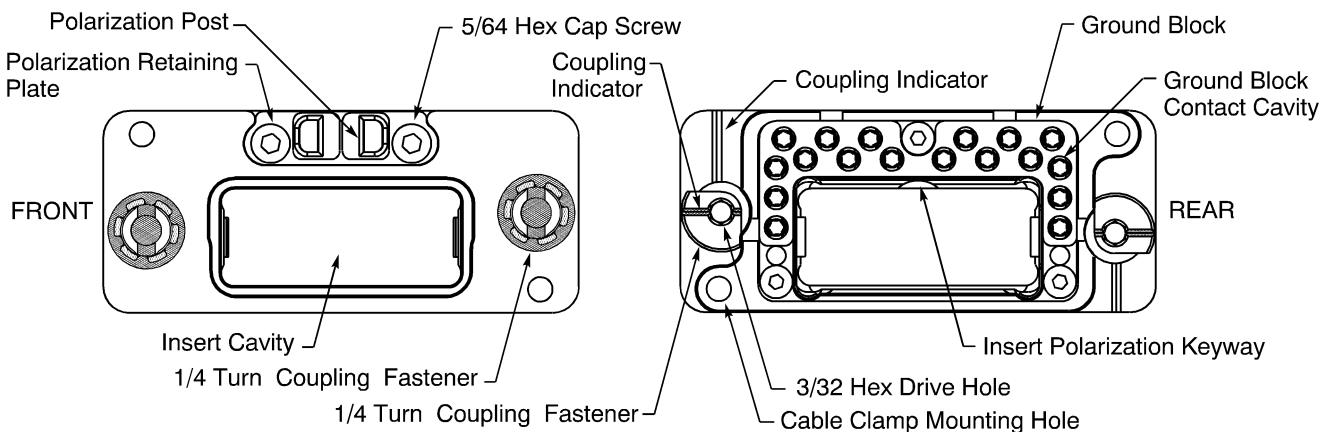
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC65AN2A() PLUG
Figure 5



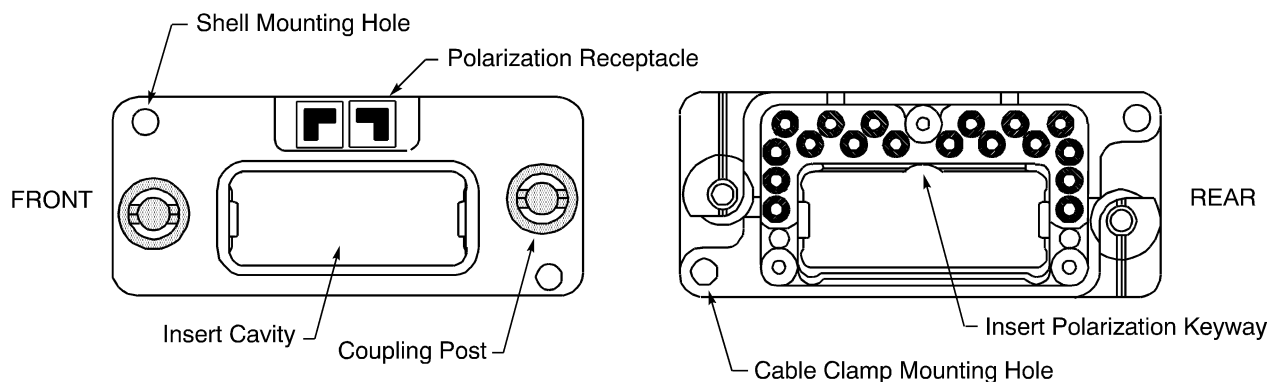
BACC65AN1B() PLUG
Figure 6



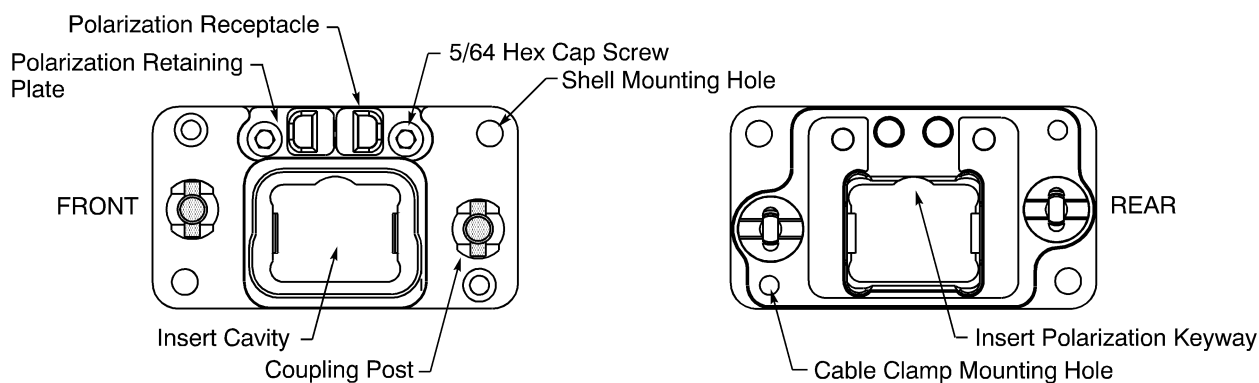
BACC65AN2B() PLUG
Figure 7

STANDARD WIRING PRACTICES MANUAL

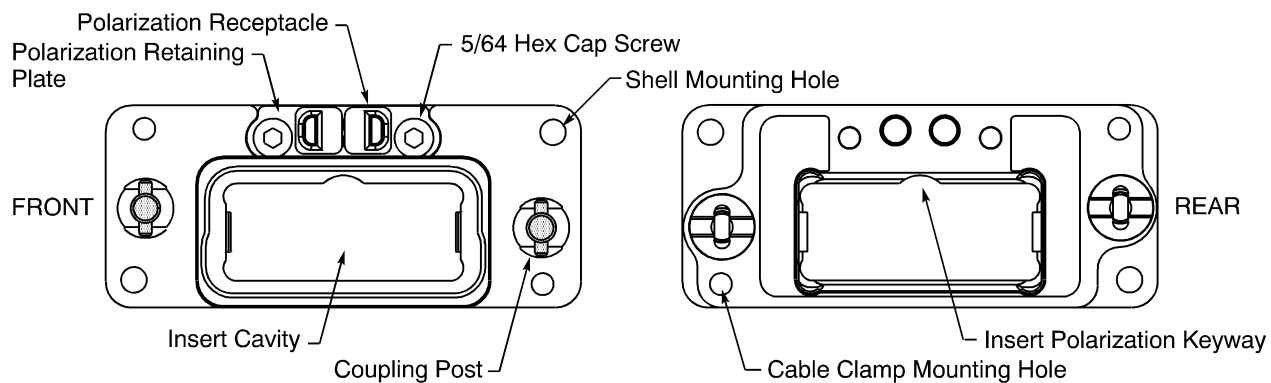
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC65AN2D() PLUG
Figure 8



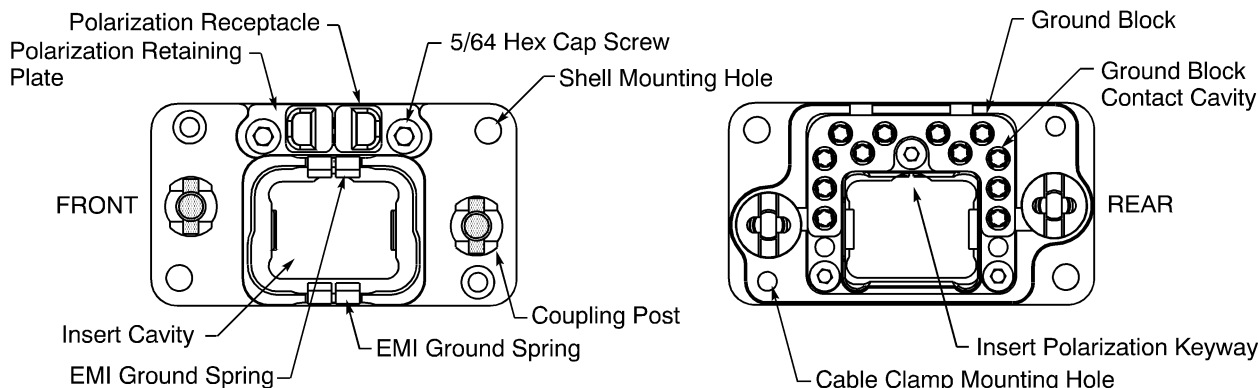
BACC65AP1A() RECEPTACLE
Figure 9



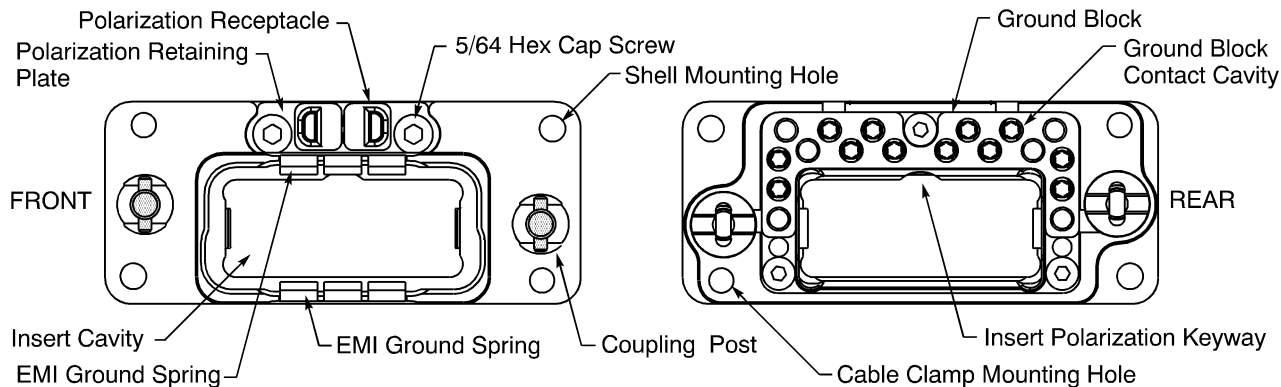
BACC65AP2A() RECEPTACLE
Figure 10

STANDARD WIRING PRACTICES MANUAL

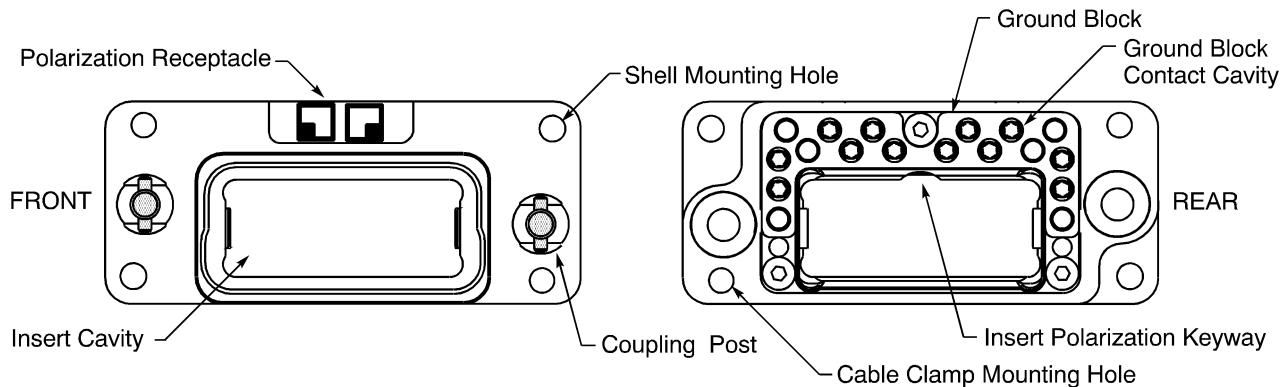
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC65AP1B() RECEPTACLE
Figure 11



BACC65AP2B() RECEPTACLE
Figure 12



BACC65AP2D() RECEPTACLE
Figure 13

STANDARD WIRING PRACTICES MANUAL

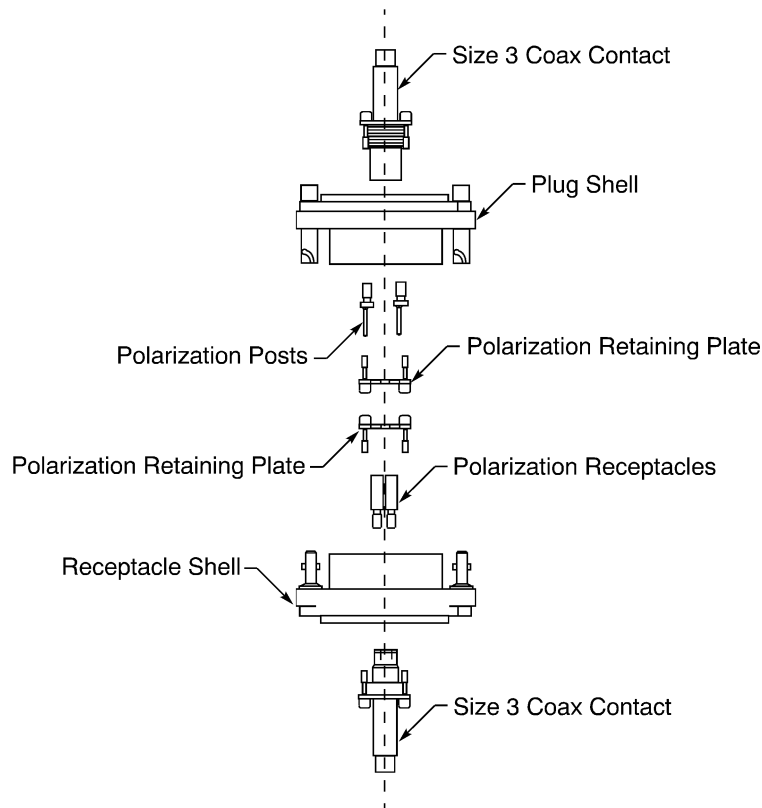
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

D. BACC65AV and BACC65AW Connector Description

Refer to Figure 14 for the configuration of the BACC65AV receptacle and the BACC65AW plug.

The BACC65AV and BACC65AW connectors have these technical features:

- A rectangular metal shell
- Size 3 coax contacts that are assembled to the rear of the connector shell
- Two 1/4 turn coupling fasteners that attach the plug to the receptacle
- Two polarization posts on the BACC65AW plug connector
- Two polarization receptacles on the BACC65AV receptacle connector
- 16 polarization positions
- A removable strain relief clamp



BACC65AV() AND BACC65AW() CONNECTOR CONFIGURATION
Figure 14

Table 7
BACC65AV AND BACC65AW CONNECTORS

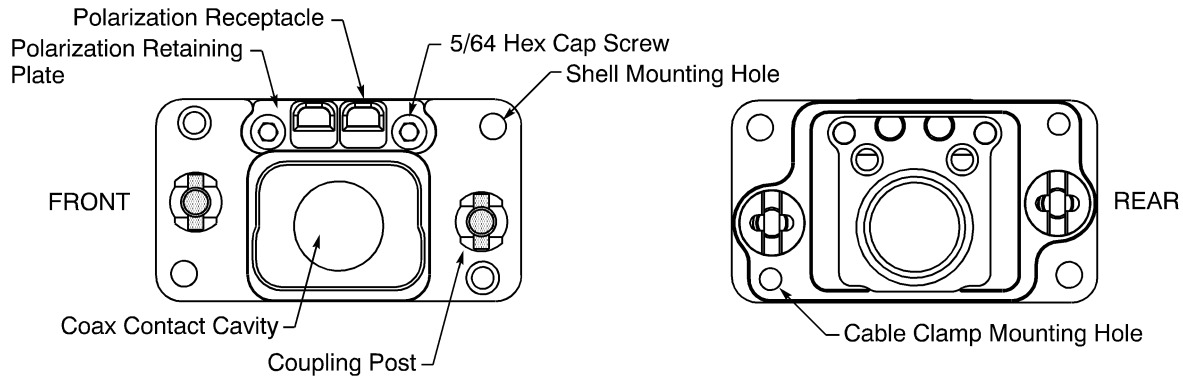
Boeing Standard	Shell Size	Connector Type	Contact			Reference
			Type	Size	Quantity	
BACC65AV1C	1	Receptacle	Coax	3	1	Figure 15
BACC65AV2C	2	Receptacle	Coax	3	2	Figure 16

STANDARD WIRING PRACTICES MANUAL

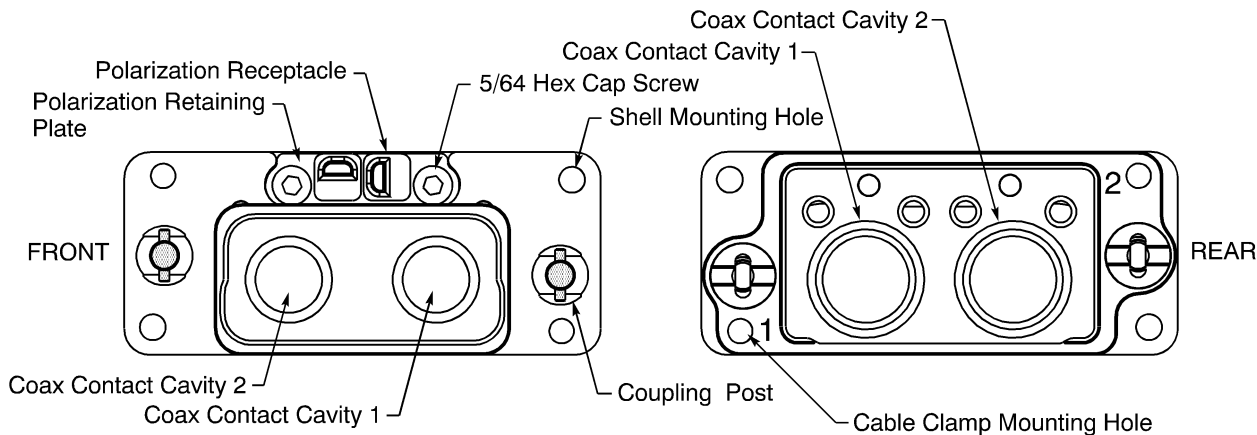
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Table 7 (continued)

Boeing Standard	Shell Size	Connector Type	Contact			Reference
			Type	Size	Quantity	
BACC65AW1C	1	Plug	Coax	3	1	Figure 17
BACC65AW2C	2	Plug	Coax	3	2	Figure 18



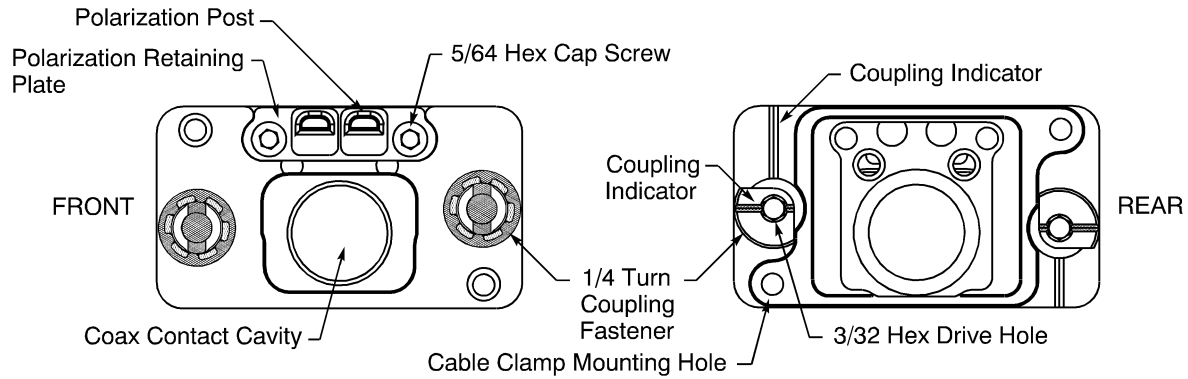
BACC65AV1C() RECEPTACLE
Figure 15



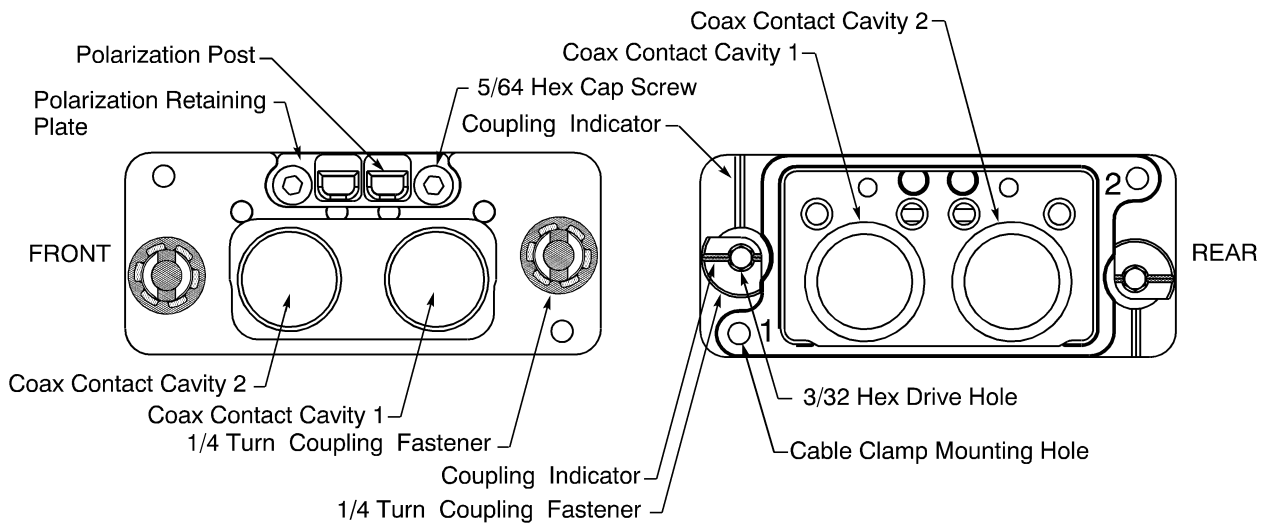
BACC65AV2C() RECEPTACLE
Figure 16

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC65AW1C() PLUG
Figure 17



BACC65AW2C() PLUG
Figure 18

E. Connector Insert Part Numbers

Refer to Subject 20-74-02.

F. Insert Contact Part Numbers

Refer to Subject 20-74-02.

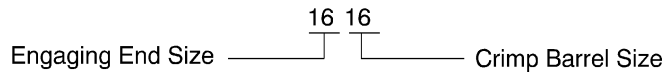
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

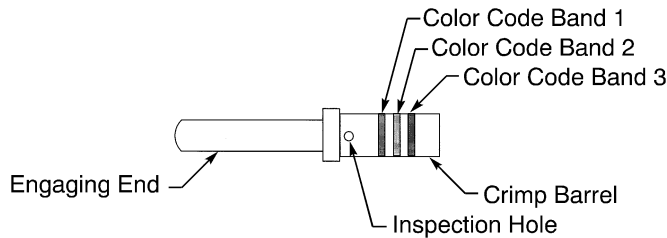
G. Ground Block Contact Part Numbers

**Table 8
GROUND BLOCK CONTACT PART NUMBERS**

Contact Size	Contact Type	Part Number	Supplier	Color Code	
				Band	Color
1620	Pin	M39029/1-101	QPL	1	Brown
				2	Black
				3	Brown
		S280W555-920	Boeing	1	Red
				2	Red
				3	Red
1618	Pin	S280W555-918	Boeing	1	Red
				2	White
				3	Red



**EXAMPLE OF CONTACT SIZE
Figure 19**



**GROUND BLOCK CONTACTS
Figure 20**

**Table 9
APPROVED SUPPLIERS OF BOEING STANDARD GROUND BLOCK CONTACTS**

Contact	Supplier
S280W555-918	Burndy
	Tri Star
S280W555-920	Burndy
	Tri Star

STANDARD WIRING PRACTICES MANUAL

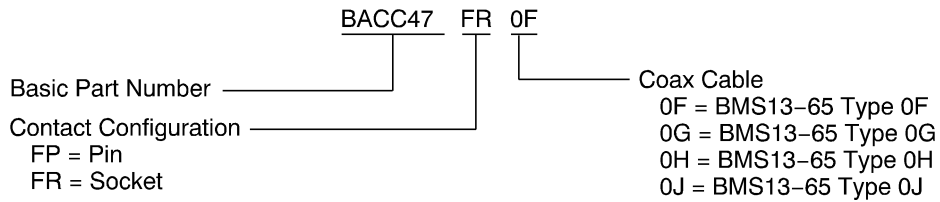
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

H. Size 3, Size 5 and Size 8 Coax Contact Part Numbers

This paragraph gives the part numbers for the size 3 coax contacts for BACC65AV and BACC65AW connectors. For the size 5 and size 8 coax contact part numbers, refer to Subject 20-74-02.

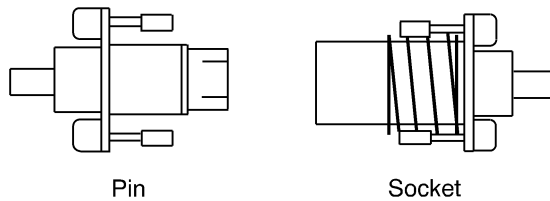
**Table 10
SIZE 3 COAX CONTACT PART NUMBERS**

Coax Contact		Boeing Standard	Coax Cable
Size	Type		
3	Pin	BACC47FP0F	BMS 13-65 Type 0F
		BACC47FP0G	BMS 13-65 Type 0G
		BACC47FP0H	BMS 13-65 Type 0H
		BACC47FP0J	BMS 13-65 Type 0J
	Socket	BACC47FR0F	BMS 13-65 Type 0F
		BACC47FR0G	BMS 13-65 Type 0G
		BACC47FR0H	BMS 13-65 Type 0H
		BACC47FR0J	BMS 13-65 Type 0J



SIZE 3 COAX CONTACT PART NUMBER STRUCTURE

Figure 21



SIZE 3 COAX CONTACTS

Figure 22

**Table 11
APPROVED SUPPLIERS OF BOEING STANDARD COAX CONTACTS**

Coax Contact	Supplier
BACC47FP()	Radiall
	Jerrik

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Table 11 (continued)

Coax Contact	Supplier
BACC47FR()	Radiall
	Jerrik

I. Size 8 Twinax Contacts

Refer to Subject 20-74-02.

J. Size 8 Quadrax Contact Part Numbers

Refer to Subject 20-74-02.

K. Fiber Optic Contact Terminus Part Numbers

Refer to Subject 20-74-02.

L. Fiber Optic Alignment Sleeve Insert Part Numbers

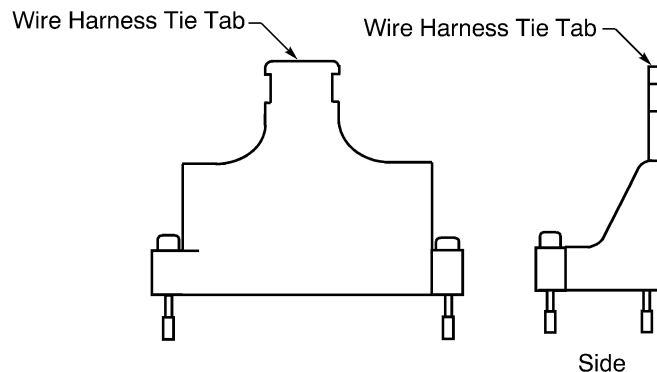
Refer to Subject 20-74-02.

M. Strain Relief Backshell Part Numbers

Table 12

STRAIN RELIEF BACKSHELL PART NUMBERS

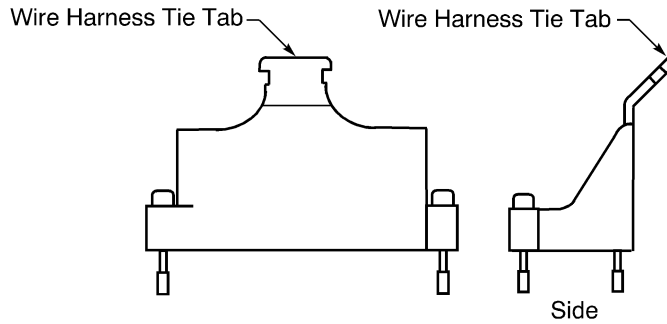
Boeing Standard	Shell Size	Configuration Angle	Strain Relief Description
BACC10LL1	1	Straight	Tie tab
BACC10LL2	2	Straight	Tie tab
BACC10LM1F	1	45 Degree	Tie tab
BACC10LM2F	2	45 Degree	Tie tab
BACC10LV2	2	Straight	Saddle clamp



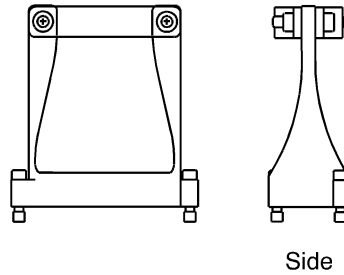
BACC10LL BACKSHELL
Figure 23

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC10LM BACKSHELL
Figure 24



BACC10LV2 BACKSHELL
Figure 25

Table 13
APPROVED SUPPLIERS OF BOEING STANDARD STRAIN RELIEF BACKSHELLS

Boeing Standard	Supplier
BACC10LL()	Radiall
	Jerrik
BACC10LM()	Radiall
	Jerrik
BACC10LV()	Radiall
	Jerrik

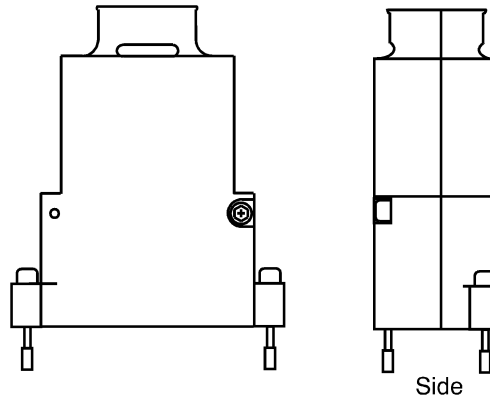
N. EMI Backshell Part Numbers

Table 14
EMI BACKSHELL PART NUMBERS

Boeing Standard	Shell Size	Description
BACC10LH1	1	Straight
BACC10LH2	2	Straight

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC10LH EMI BACKSHELLS
Figure 26

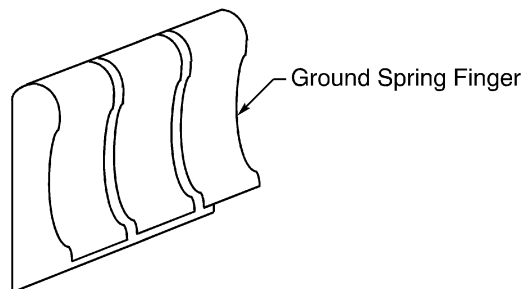
Table 15
APPROVED SUPPLIERS OF BOEING STANDARD EMI BACKSHELLS

Backshell	Supplier
BACC10LH()	Radiall
	Jerrick

O. Ground Spring Part Numbers

Table 16
GROUND SPRING PART NUMBERS

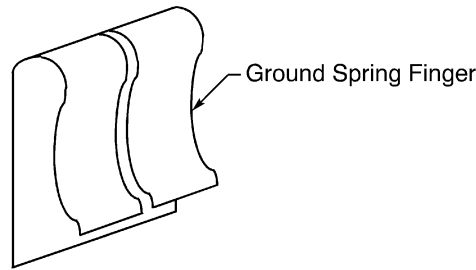
Boeing Standard	Shell Size
BACC65AH1	2
BACC65AH2	1



BACC65AH1 GROUND SPRING
Figure 27

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACC65AH2 GROUND SPRING
Figure 28

Table 17
APPROVED SUPPLIERS OF BOEING STANDARD EMI GROUND SPRINGS

Ground Spring	Supplier
BACC65AH()	Radiall
	Jerrik

3. INSERT CONFIGURATIONS

A. BACI10AL, BACI10AM, and BACI10AP Connector Inserts

Refer to Subject 20-74-02.

4. CONNECTOR DISASSEMBLY

A. Connector Separation

Table 18
NECESSARY TOOLS

Tool	Type	Size (inch)
Driver	Allen Wrench	3/32
	Screwdriver, Hex	3/32

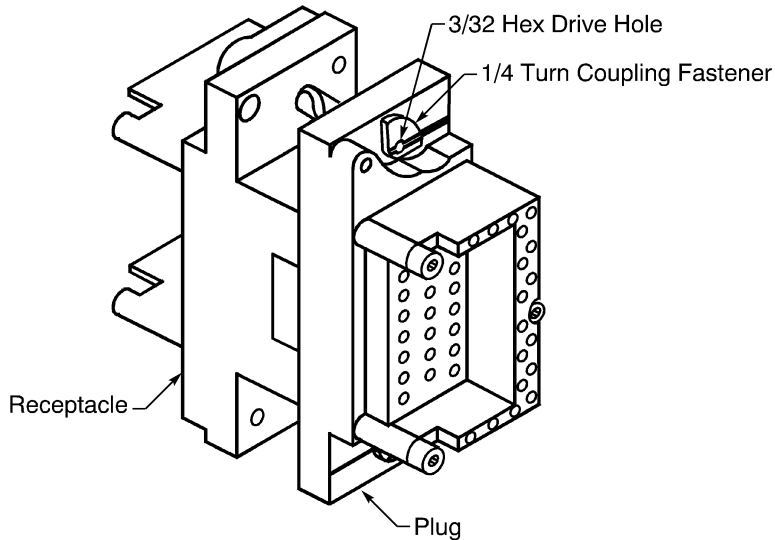
(1) Make a selection of a driver from Table 18.

NOTE: The driver can have a ball style end.

(2) Put the driver into the hex drive hole in one of the coupling fasteners on the rear of the plug connector. Refer to Figure 29.

STANDARD WIRING PRACTICES MANUAL

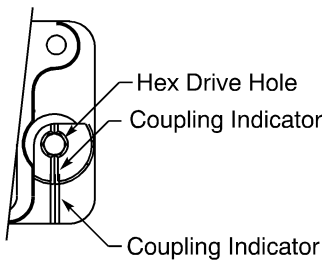
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



LOCATION OF THE COUPLING FASTENER HEX DRIVE HOLES

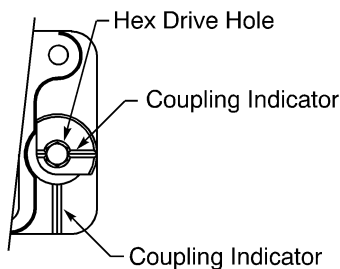
Figure 29

- (3) Turn the coupling fastener with the driver in a counterclockwise direction 1/4 turn to release it. Refer to Figure 30 and Figure 31.



COUPLING FASTENER IN THE LOCKED POSITION

Figure 30



COUPLING FASTENER IN THE RELEASED POSITION

Figure 31

- (4) Do Step (2) and Step (3) again for the other coupling fastener.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

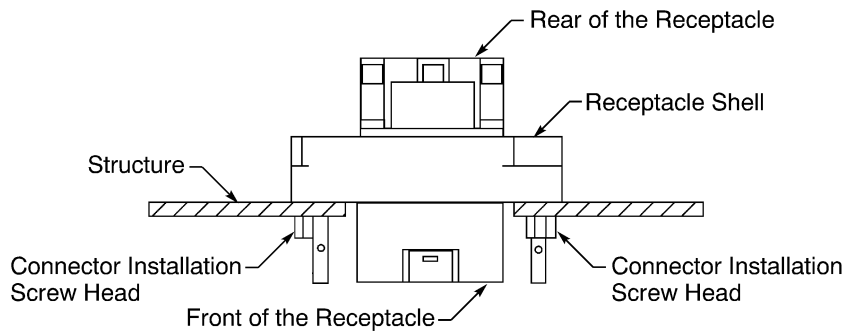
(5) Pull the plug straight away from the receptacle.

B. Removal of the Receptacle

**Table 19
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Phillips Head Screwdriver	-
	Socket Wrench	1/4

- (1) Make a selection of a driver from Table 19.
- (2) Remove the plastic tie straps or the wire harness ties that:
 - Hold the wire harness to the structure
 - Are less than 9 inches from the connector.
- (3) Remove the two receptacle connector installation screws. Refer to Figure 32.



**LOCATION OF THE INSTALLATION SCREWS
Figure 32**

- (4) Discard the two screws.
- (5) Pull the receptacle shell from the structure.

C. Removal of the Fiber Optic Alignment Sleeve Insert

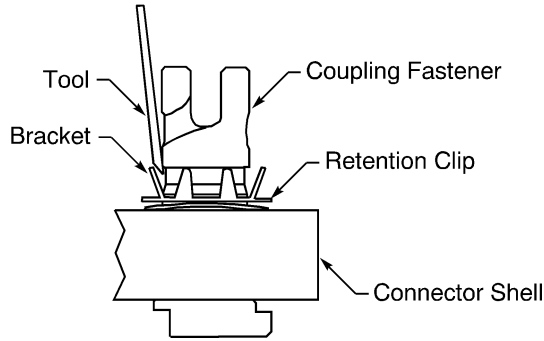
Refer to Subject 20-74-02.

D. Coupling Fastener Removal

- (1) Make a selection of a razor blade or a different tool with a thin edge.
- (2) Bend each of the brackets of the retention clip a small amount away from the shoulder of the coupling fastener. Refer to Figure 33.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



COUPLING FASTENER REMOVAL
Figure 33

- (3) Pull the fastener from the connector shell.
- (4) Discard the coupling fastener, the clip, and the washer.

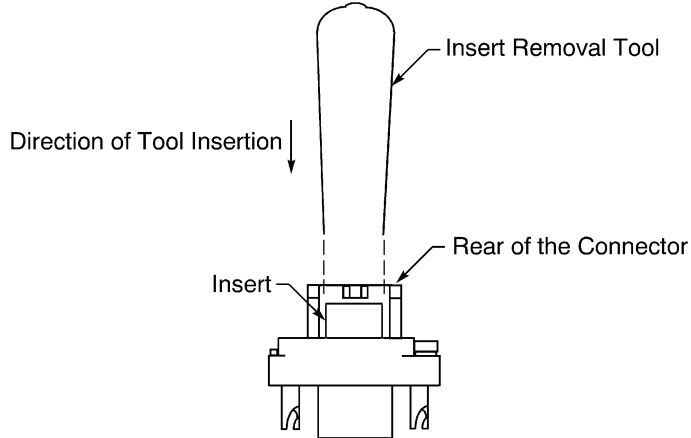
E. Insert Removal

NOTE: It is not necessary to remove the insert contacts, or the strain relief clamp before the insert is removed.

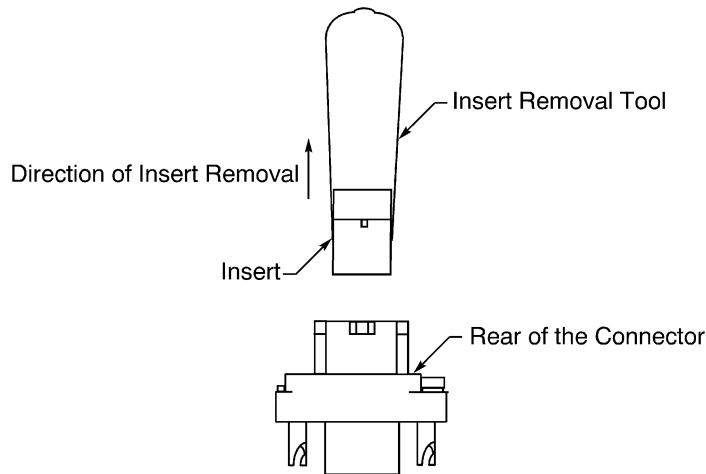
Table 20
INSERT REMOVAL TOOLS

Tool	Part Number
Insert Removal Tool	282 521 002

- (1) Make a selection of an insert removal tool from Table 20.
- (2) If the connector has:
 - An EMI backshell installed, remove the EMI backshell from the connector; refer to Paragraph 4.L.
 - A strain relief clamp, remove the plastic tie strap or the wire harness tie from the clamp
 - A ground block, remove the ground block contacts from the ground block; refer to Paragraph 4.G.
- (3) From the rear of the connector, align the two ends of the removal tool with the shorter sides of the insert. Refer to Figure 34.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS****ALIGNMENT OF THE INSERT REMOVAL TOOL****Figure 34**

- (4) Carefully push the removal tool between the insert cavity and the insert. Make sure to keep the tool aligned with the insert.
- (5) Push the two sides of the tool at the same time into the connector.
- (6) Pull the insert removal tool and the insert straight out of the connector. Refer to Figure 35.

**REMOVAL OF THE INSERT****Figure 35****F. Seal Plug and Seal Rod Removal**

Refer to Subject 20-74-02.

G. Contact Removal

This paragraph gives the procedure to remove size 16 ground block contacts from the connector ground block.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Refer to:

- Subject 20-74-02. to remove contacts from the connector insert
- Paragraph 4.I. for the procedure to remove size 3 coax contacts from the connector.

**Table 21
REMOVAL TOOLS FOR SIZE 16 GROUND BLOCK CONTACTS**

Ground Block Contact Cavity Size	Removal Tool	
	Part Number	Color
16	ATR2080	-
	ATR2079	-
	M81969/14-11	White
	RRX20B	-

(1) Make a selection of a contact removal tool from Table 21 for size 16 ground block contacts.

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

- (2) Remove the plastic tie straps or the wire harness ties that are less than 6 inches from the connector.
- (3) Put the tip of the removal tool on the wire near the ground block.
- (4) Axially align the removal tool and the contact cavity.
- (5) Carefully push the removal tool straight into the contact cavity until it stops.
- (6) Carefully pull the wire and the removal tool straight out of the contact cavity at the same time.
- (7) If the contact is not released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (3) through Step (6) again.

H. Removal of a Fiber Optic Contact Terminus

Refer to Subject 20-74-02.

I. Size 3 Coax Contact Removal

**Table 22
NECESSARY TOOLS**

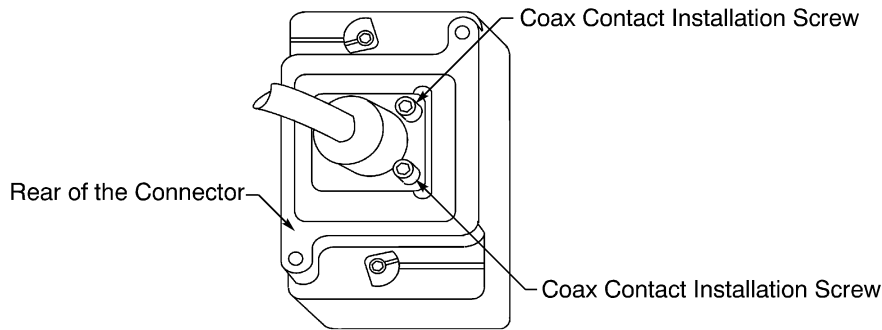
Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Pliers	-	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

- (1) Make a selection of these tools from from Table 22.
 - A driver
 - A pair of pliers.
- (2) Remove the plastic tie straps or the wire harness ties that are less than 6 inches from the connector.
- (3) Disengage the two screws on the coax contact assembly from the connector shell. Refer to Figure 36.

NOTE: The two screws on the coax contact assembly are captivated and cannot be removed from the coax contact assembly.



LOCATION OF THE COAX CONTACT INSTALLATION SCREWS

Figure 36

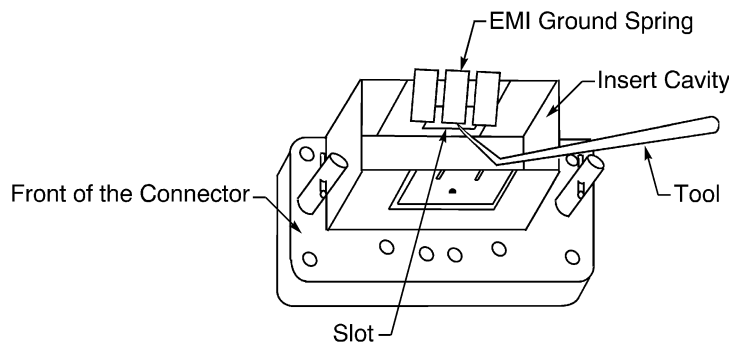
- (4) Pull on the head of one of the screws on the rear of the coax contact assembly with the pliers.

NOTE: Make sure the threads of the screws are completely disengaged from the connector shell before they are removed.

NOTE: A satisfactory alternative is to push on the engaging end of the coax contact with the end of a finger, or a 0.4 inch maximum diameter blunt plastic tool to move the contact out of the rear of the connector.

CAUTION: DO NOT PULL ON THE COAX CABLE TO REMOVE THE COAX CONTACT FROM THE CONNECTOR SHELL. DAMAGE TO THE COAX CABLE TERMINATION, OR DAMAGE TO THE COAX CONTACT CAN OCCUR.

J. EMI Ground Spring Removal



EMI GROUND SPRING REMOVAL

Figure 37

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Refer to Figure 37.

- (1) Make a selection of a tool with a small sharp point at a right angle to the handle.

NOTE: An awl is a satisfactory tool.

- (2) For a ground spring with two fingers, carefully put the tip of the tool between the inner wall of the insert cavity and the bottom of the ground spring between the two fingers.
- (3) For a ground spring with three fingers, carefully put the tip of the tool between the inner wall of the insert cavity and the bottom of the middle finger of the ground spring.
- (4) Push the tip of the tool through the slot against the ground spring latch that is behind the ground spring fingers.
- (5) Pull the ground spring away from the insert cavity.

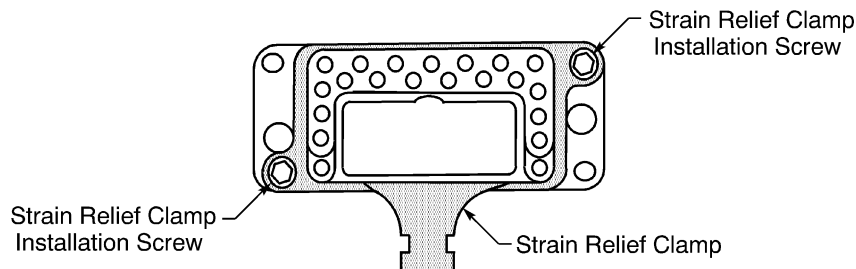
K. Strain Relief Backshell Removal

**Table 23
BACKSHELL REMOVAL TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64

- (1) Make a selection of a driver from Table 23.
- (2) For backshells with a tie tab, remove the plastic tie strap or the wire harness tie from the tie tab.
- (3) For backshells with a saddle clamp, remove the saddle clamp.
- (4) If the inserts are installed and have wired contacts, remove the inserts from the connector. Refer to Paragraph 4.E.
- (5) If the connector has a ground block, and the ground block has contacts that are installed, remove the contacts from the ground block. Refer to Paragraph 4.G.
- (6) Disengage the threads of the backshell installation screws. Refer to Figure 38.

NOTE: The screws are captivated and cannot be removed from the strain relief clamp.



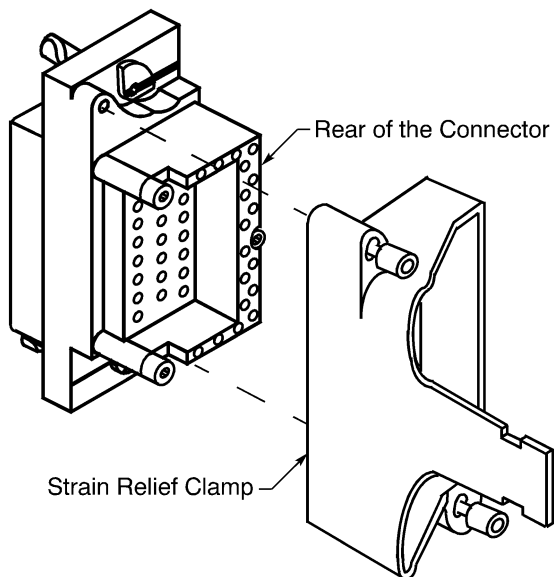
LOCATION OF BACKSHELL INSTALLATION SCREWS

Figure 38

- (7) Pull the backshell from the connector shell. Refer to Figure 39.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



BACKSHELL REMOVAL
Figure 39

L. EMI Backshell Removal

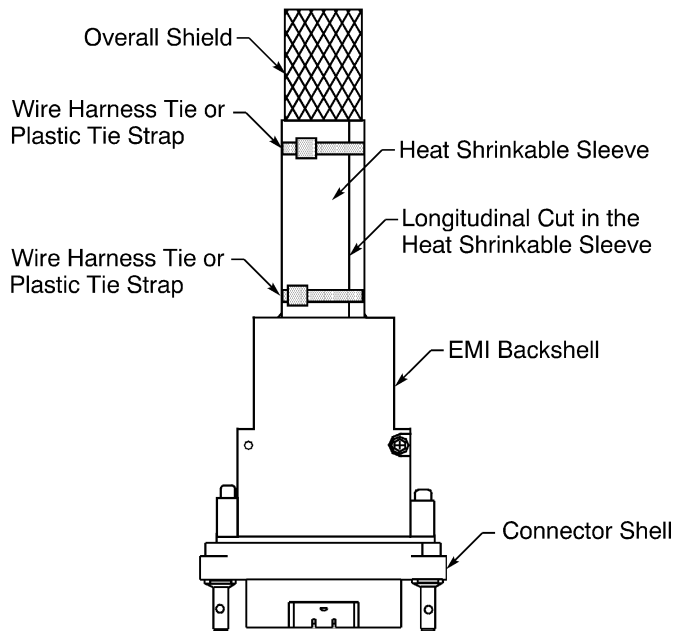
Table 24
EMI BACKSHELL REMOVAL TOOLS

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Diagonal Cutter	-	-
Knife	-	-

(1) Remove the heat shrinkable sleeve from the wire harness. Refer to Figure 40.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



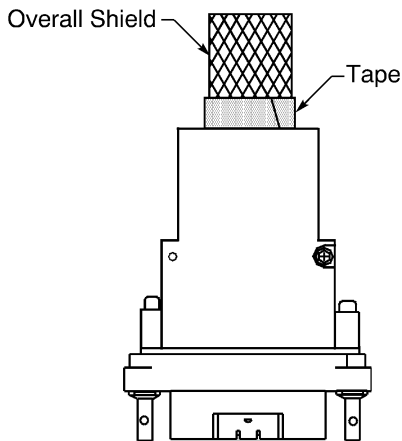
REMOVAL OF THE HEAT SHRINKABLE SLEEVE

Figure 40

- (a) If the heat shrinkable sleeve has tie straps or wire harness ties, cut them off.
- (b) Carefully make a longitudinal cut in the heat shrinkable sleeve from one end to the other end.

CAUTION: DO NOT CUT INTO THE STRANDS OF THE OVERALL SHIELD OR OTHER COMPONENTS OF THE WIRE HARNESS. DAMAGE TO THE SHIELD OR COMPONENTS CAN OCCUR.

- (c) Remove the heat shrinkable sleeve from the wire harness.
- (2) Remove the tape at the end of the overall shield. Refer to Figure 41.

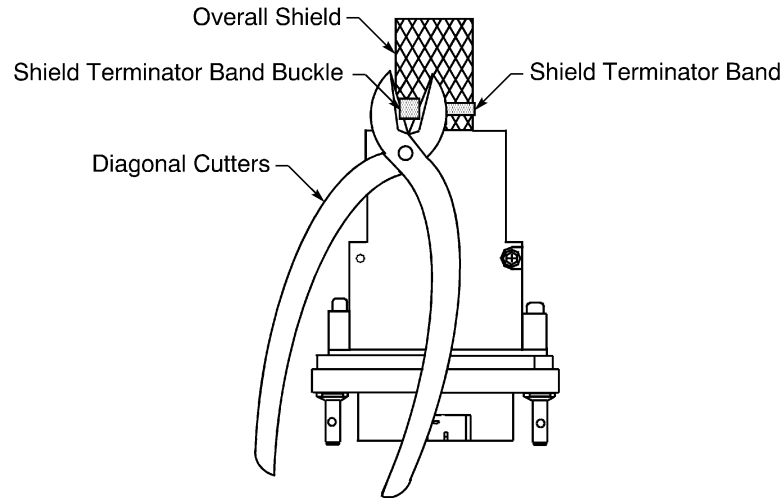


REMOVAL OF THE TAPE

Figure 41

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS**

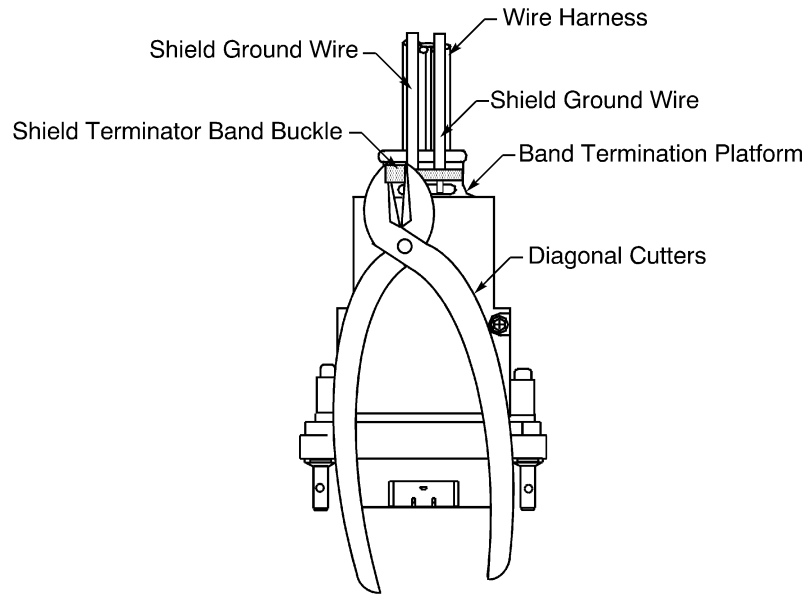
- (3) Make a selection of a pair of diagonal cutters from Table 24.
- (4) Remove the shield terminator band from the overall shield. Refer to Figure 42.

**REMOVAL OF THE SHIELD TERMINATOR BAND FROM THE OVERALL SHIELD****Figure 42**

- (a) Hold the buckle of the shield terminator band with the cutters.
 - (b) Rotate the cutters and lift the buckle of the band away from the backshell until the buckle releases or the band breaks.
 - (c) Remove the band.
- (5) Push the overall shield away from the band termination platform.
 - (6) Remove the shield terminator band from the shield ground wires on the band termination platform. Refer to Figure 43.

STANDARD WIRING PRACTICES MANUAL

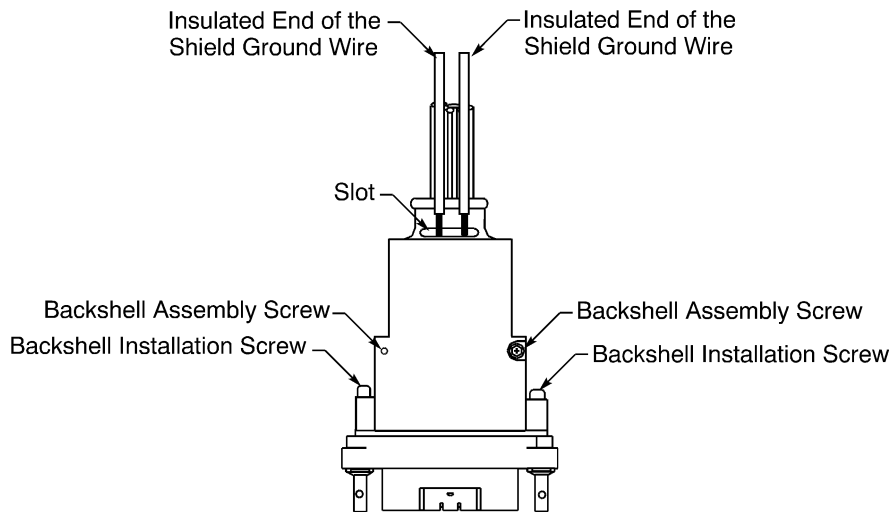
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



REMOVAL OF THE SHIELD TERMINATOR BAND FROM THE SHIELD GROUND WIRES

Figure 43

- (a) Hold the buckle of the shield terminator band with the cutters.
- (b) Rotate the cutters and lift the buckle of the band away from the backshell until the buckle releases or the band breaks.
- (c) Remove the band.
- (7) Make a selection of a driver from Table 24.
- (8) Disengage the threads of the two backshell assembly screws on each side of the EMI backshell. Refer to Figure 44.



LOCATION OF OF THE BACKSHELL ASSEMBLY AND INSTALLATION SCREWS

Figure 44

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS**

- (9) Disengage the threads of the two backshell installation screws on each side of the EMI backshell. Refer to Figure 44.
- (10) Remove the ends of the shield ground wires from each half of the EMI backshell. Refer to Figure 44.
 - (a) Carefully pull one of the shield ground wires through the slot in the EMI backshell.
 - (b) If the insulation on the end of the shield ground wire does not go through the slot, remove the insulation from the shield ground wire.
 - (c) Do Step (a) and Step (b) for each shield ground wire.

5. CONNECTOR ASSEMBLY**A. Shield Ground Wire Assembly**

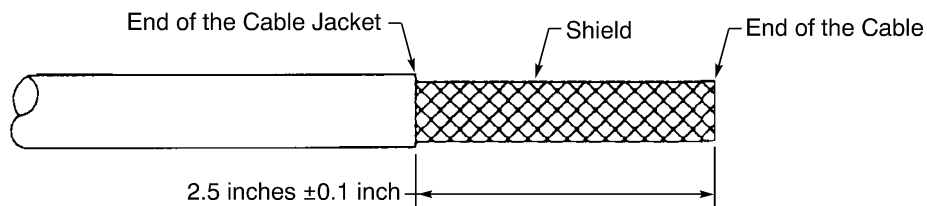
This paragraph gives the procedure to assemble a shield ground wire and a contact for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Raychem 55A6160-() cable, refer to Paragraph 5.C.
- BMS13-60 Type 27 Class 1 wire, refer to Paragraph 5.D.
- The termination of the shield at the EMI backshell, refer to Paragraph 5.B.

- (1) Remove 2.5 inches \pm 0.1 inch of the cable jacket from the end of the cable. Refer to Figure 45.



CABLE JACKET REMOVAL
Figure 45

- (2) Assemble an insulated shield ground wire. Refer to Subject 20-10-15.

NOTE: The shield ground wire must have the same size as the crimp barrel of the applicable contact. Refer to:

- Table 8 for the ground block contact
- Subject 20-74-02 for the insert contact.

Make sure that:

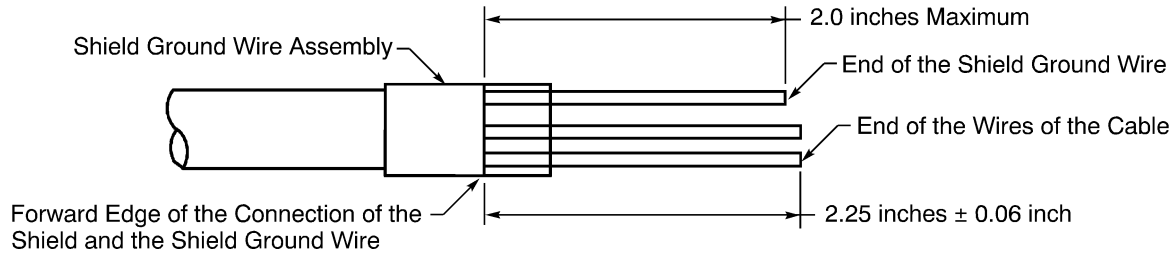
- The shield ground wire assembly components are applicable for the shield material of the wire
- The length of the shield ground wire is 2.5 inches minimum
- The free end of the shield ground wire is pointed forward to the end of the cable.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A CABLE OR A WIRE WITH A SHIELD THAT HAS NICKEL PLATED CONDUCTORS. UNSATISFACTORY PERFORMANCE OF THE SHIELD TERMINATION CAN OCCUR.

- (3) Remove the unwanted length from the end of the shield ground wire and the wires of the cable. Refer to Figure 46.



LENGTH OF THE SHIELD GROUND WIRE AND THE WIRES OF THE CABLE

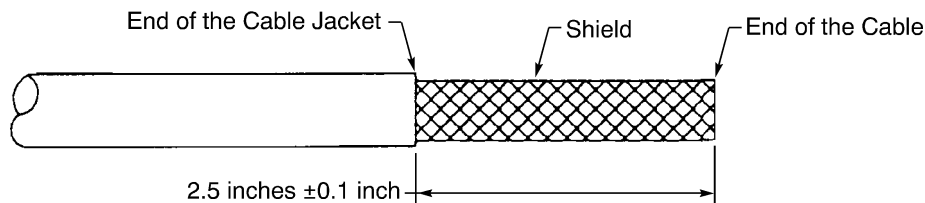
Figure 46

NOTE: The connection of the shield and the shield ground wire can be:

- The melted solder ring of a solder sleeve
 - A mechanical ferrule
 - An RSK Shield-Kon.
- (a) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the connection to the end of the shield ground wire equal to 2.0 inches maximum.
 - (b) Remove the necessary length from the end of the each wire of the cable to make the distance from the forward edge of the connection to the end of the wire equal to 2.25 inches ± 0.06 inch.
- (4) Assemble the specified contact on the end of the shield ground wire.
- For the assembly of:
- A ground block contact, refer to Paragraph 5.F.
 - An insert contact, refer to Paragraph 5.E.

B. Shield Ground Wire Assembly for Shield Termination at the EMI Backshell

- (1) Remove 2.50 inches ± 0.1 inch of the cable jacket from the end of the cable. Refer to Figure 47.



CABLE PREPARATION

Figure 47

- (2) Assemble an uninsulated shield ground wire. Refer to Subject 20-10-15 and Figure 48.

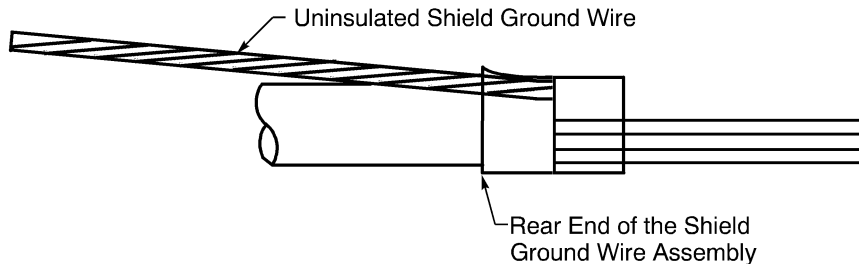
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Make sure that:

- The size of the shield ground wire is AWG 20
- The length of the shield ground wire is 5 inches minimum
- The shield ground wire is pointed back away from the end of the cable.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A CABLE OR A WIRE WITH A SHIELD THAT HAS NICKEL PLATED CONDUCTORS. UNSATISFACTORY PERFORMANCE OF THE SHIELD TERMINATION CAN OCCUR.



SHIELD GROUND WIRE CONFIGURATION
Figure 48

C. Shield Ground Wire Assembly for Raychem 55A6160-() Cable

This paragraph gives the procedure to assemble the shield ground wires and contacts for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Wire or cable that has one shield, refer to Paragraph 5.A.
- BMS13-60 Type 27 Class 1 wire, refer to Paragraph 5.D.

Table 25
NECESSARY PARTS

Part	Boeing Standard	Shield Ground Wire Size (AWG)
Solder Sleeve with an integral wire	BACS13CT3C	20

- (1) Make a selection of a solder sleeve with an integral wire from Table 25.

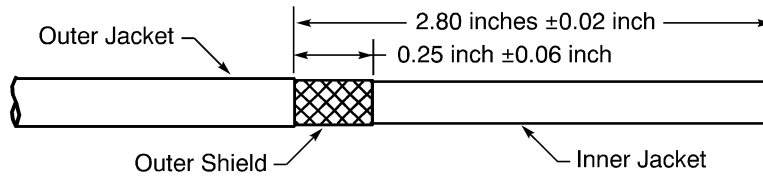
NOTE: Two solder sleeves are necessary.

Refer to Subject 20-10-15 for approved suppliers of Boeing standard solder sleeves.

- (2) Prepare the cable for termination of the outer shield. Refer to Figure 49 and Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL

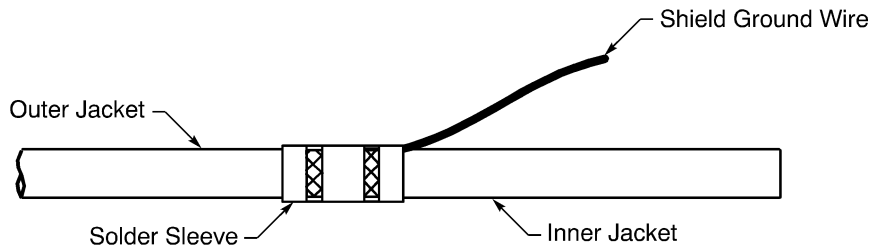
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



OUTER JACKET AND OUTER SHIELD REMOVAL

Figure 49

- (a) Remove 2.80 inches ± 0.02 inch of the outer jacket from the end of the cable.
- (b) Remove the necessary length of the shield to make the distance from the end of the jacket to the end of the shield equal to 0.25 inch ± 0.06 inch.
- (3) Assemble the shield ground wire of the outer shield. Refer to Figure 50.



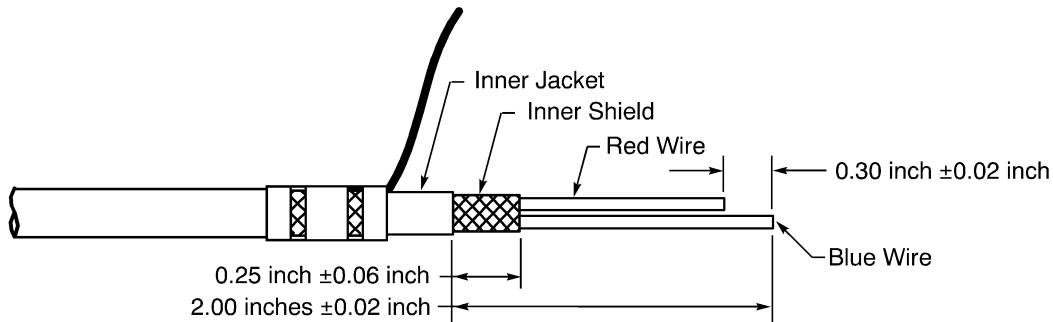
TERMINATION OF THE OUTER SHIELD

Figure 50

- (a) Put the solder sleeve on the wire or cable.
Make sure that:
 - The free end of the shield ground wire is pointed forward to the end of the cable
 - The large end of the solder sleeve is put on the wire or cable first
 - The inner edge of the rear seal ring is aligned with the end of the outer jacket.
- (b) Shrink the solder sleeve into its position.
Make sure that:
 - The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (c) Remove the necessary length of the shield ground wire to make the distance from the forward edge of the solder ring to the end of the wire equal to 2.0 inches maximum.
- (4) Prepare the cable for termination of the inner shield. Refer to Figure 51 and Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

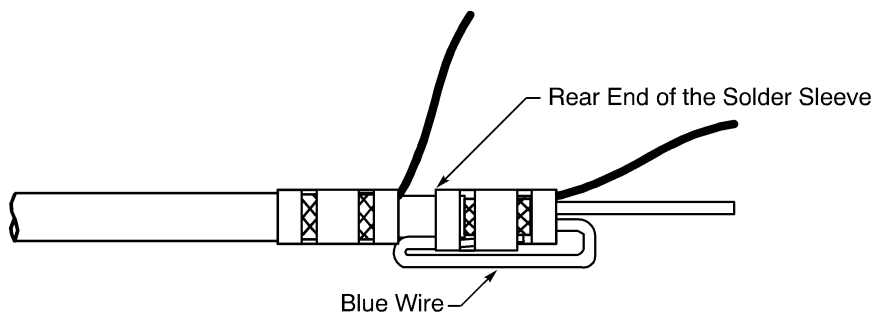


INNER JACKET AND INNER SHIELD REMOVAL
Figure 51

- (a) Remove 2.00 inches ± 0.02 inch of the inner jacket from the end of the cable.
- (b) Remove the necessary length of the inner shield to make the distance from the end of the shield to the end of the jacket equal to 0.25 inch ± 0.06 inch.
- (c) Remove the necessary length of the red wire to make the distance from the end of the red wire to the end of the blue wire equal to 0.30 inch ± 0.02 inch.
- (d) Remove 0.21 inch ± 0.02 inch of insulation from the end of the blue wire. Refer to Subject 20-00-15.
- (5) Assemble the shield ground wire of the inner shield. Refer to Figure 52.

Make sure that:

- The free end of the shield ground wire is pointed forward to the end of the cable
- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the end of the jacket.



TERMINATION OF THE INNER SHIELD
Figure 52

- (a) Fold the blue wire back and put the end of the wire between the inner shield and the rear end of the solder sleeve.

Make sure the center of the conductor is aligned with the solder ring of the solder sleeve.

CAUTION: THE STRANDS OF THE WIRE MUST NOT GO INTO THE SHIELD OF THE CABLE. A SHORT CIRCUIT BETWEEN THE CONDUCTOR OF THE WIRE CAN OCCUR.

- (b) Shrink the solder sleeve into its position.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Make sure that:

- The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (c) Remove the necessary length of the shield ground wire to make the distance from the forward edge of the solder ring to the end of the wire equal to 2.0 inches maximum.
- (6) Assemble the specified contact on the end of the shield ground wire.

For the assembly of:

- A ground block contact, refer to Paragraph 5.F.
- An insert contact, refer to Paragraph 5.E.

D. Shield Ground Wire Assembly for BMS13-60 Type 27 Class 1 Wire

**Table 26
WIRE TYPE CODES**

Cable Description	Wire Type Code
BMS13-60 Type 27 Class 1	M1

This paragraph gives the procedure to assemble shield ground wires and contacts for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Wire or cable that has one shield, refer to Paragraph 5.A.
- Raychem 55A6160-() cable, refer to Paragraph 5.C.

**Table 27
MECHANICAL FERRULE PART NUMBERS**

Shield	Ferrule Type	Boeing Standard
Inner	Inner	BACS13S071BNP
	Outer	BACS13S149CNP
Outer	Inner	BACS13S090BNP
	Outer	BACS13S175CNP

NOTE: Refer to Subject 20-10-15 for approved suppliers of Boeing standard mechanical ferrules.

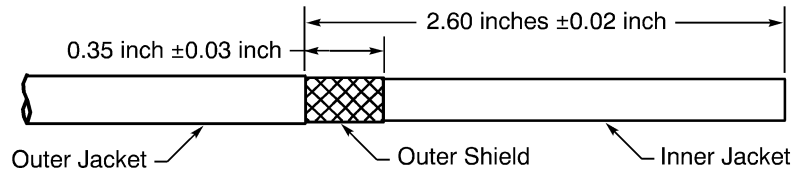
**Table 28
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	SAE-AMS-DTL-23053/12 Class 2	QPL
	SAE-AMS-DTL-23053/12 Class 5	QPL
	TFE-2X	Zeus
	TFE-4X	Zeus

- (1) Prepare the cable for the termination of the outer shield. Refer to Figure 53 and Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL

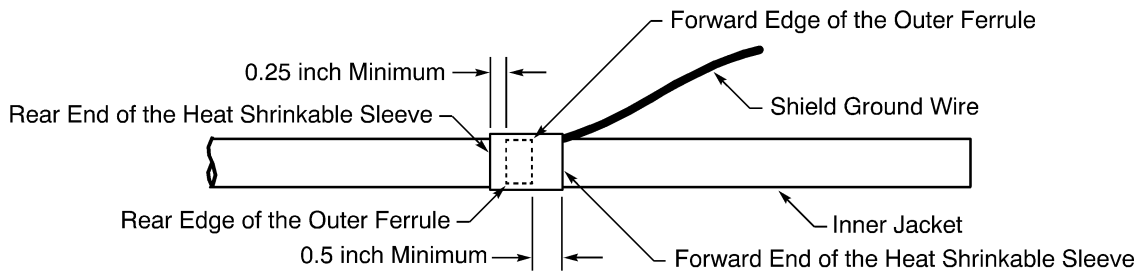
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



OUTER JACKET AND OUTER SHIELD REMOVAL

Figure 53

- (a) Remove 2.60 inches \pm 0.02 inch of the outer jacket from the end of the cable.
 - (b) Remove the necessary length of the outer shield to make the distance from the end of the jacket to the end of the shield equal to 0.35 inch \pm 0.03 inch.
- (2) Assemble the shield ground wire of the outer shield. Refer to Figure 54.



TERMINATION OF THE OUTER SHIELD

Figure 54

- (a) Make a selection of an inner and outer ferrule from Table 27.
 - (b) Make a selection of a ferrule crimp tool. Refer to Subject 20-10-15.
 - (c) Make a selection of a heat shrinkable sleeve from Table 28.
- Make sure that the heat shrinkable sleeve has the smallest diameter that can move freely on the shield ground wire assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (d) Make a selection of a shield ground wire. Refer to Subject 20-10-15.
- NOTE: The shield ground wire must have the same size as the crimp barrel of the specified contact. Refer to Table 8 for the ground block contact.

- (e) Put the outer ferrule on the cable.
- (f) Put the inner ferrule on the cable.

Make sure that:

- The inner ferrule is between the shield and the inner jacket
- The rear end of the inner ferrule is tight against the end of the outer jacket.

- (g) Remove the necessary length of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.

Make sure that the bare conductor can extend a small amount farther than the length of the outer ferrule.

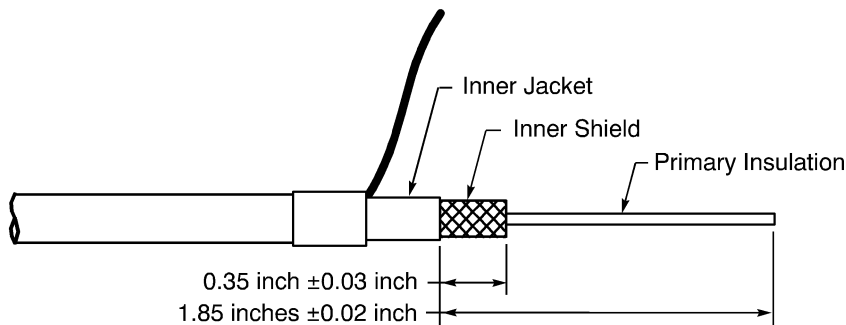
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

- (h) Put the conductor of the shield ground wire between the shield and the outer ferrule.
Make sure that:
 - The free end of the shield ground wire is pointed forward to the end of the wire
 - The bare conductor extends a small amount farther than the rear end of the outer ferrule.
- (i) Push the outer ferrule and the shield ground wire forward until the center of the outer ferrule is aligned with the center of the inner ferrule.
- (j) Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.
- (k) Crimp the outer ferrule.
- (l) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

- (m) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the outer ferrule to the end of the wire equal to 2.0 inches maximum.
 - (n) Put the necessary length of heat shrinkable sleeve on the wire or cable.
Make sure that the distance:
 - From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
 - From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.
 - (o) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (3) Prepare the cable for the termination of the inner shield. Refer to Figure 55 and Subject 20-00-15.



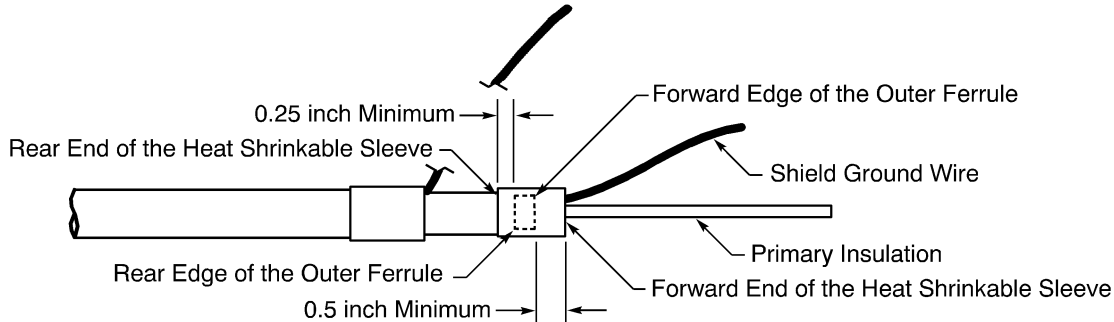
INNER JACKET AND INNER SHIELD REMOVAL

Figure 55

- (a) Remove 1.85 inches ± 0.02 inch of the inner jacket from the end of the cable.
 - (b) Remove the necessary length of the inner shield to make the distance from the end of the jacket to the end of the shield equal to 0.35 inch ± 0.03 inch.
- (4) Assemble the shield ground wire of the inner shield. Refer to Figure 56.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



TERMINATION OF THE INNER SHIELD

Figure 56

- (a) Make a selection of an inner and outer ferrule from Table 27.
- (b) Make a selection of a ferrule crimp tool. Refer to Subject 20-10-15.
- (c) Make a selection of a heat shrinkable sleeve from Table 28.
Make sure that the heat shrinkable sleeve has the smallest diameter that can move freely on the shield ground wire assembly.
- NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (d) Make a selection of a shield ground wire. Refer to Subject 20-10-15.
NOTE: The shield ground wire must have the same size as the crimp barrel of the specified contact. Refer to Subject 20-74-02 for the insert contact.
- (e) Put the outer ferrule on the cable.
- (f) Put the inner ferrule on the cable.
Make sure that:
 - The inner ferrule is between the shield and the primary insulation
 - The rear end of the inner ferrule is tight against the end of the inner jacket.
- (g) Remove the necessary length of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
Make sure that the bare conductor can extend a small amount farther than the length of the outer ferrule.
- (h) Put the conductor of the shield ground wire between the shield and the outer ferrule.
Make sure that:
 - The free end of the shield ground wire is pointed forward to the end of the wire
 - The bare conductor extends a small amount farther than the rear end of the outer ferrule.
- (i) Push the outer ferrule and the shield ground wire forward until the center of the outer ferrule is aligned with the center of the inner ferrule.
- (j) Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.
- (k) Crimp the outer ferrule.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

- (l) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

- (m) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the outer ferrule to the end of the wire equal to 2.0 inches maximum.
- (n) Put the necessary length of heat shrinkable sleeve on the wire or cable.

Make sure that the distance:

- From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
- From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.

- (o) Shrink the sleeve into its position. Refer to Subject 20-10-14.

- (5) Assemble the specified contact on the end of the shield ground wire.

For the assembly of:

- A ground block contact, refer to Paragraph 5.F.
- An insert contact, refer to Paragraph 5.E.

E. Contact Assembly

For the procedure to assemble:

- Insert contacts, refer to Subject 20-74-02.
- Ground block contacts, refer to Paragraph 5.F.
- Size 3 coax contacts, refer to Paragraph 5.L.

F. Ground Block Contact Assembly

**Table 29
GROUND BLOCK CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-11	-
		WA22	7	M22520/2-11	-
		WA22LC	7	M22520/2-11	-
		WA27F	4	M22520/1-02	Red
18	18	M22520/1-01	5	M22520/1-02	Red
		WA27F	5	M22520/1-02	Red

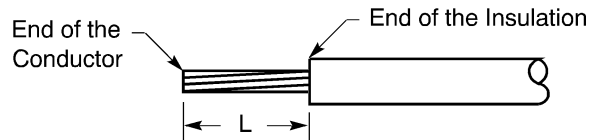
- (1) Make a selection of a crimp tool from Table 29.
- (2) Remove 0.18 inch ± 0.02 inch of insulation from the end of the shield ground wire.

Refer to:

- Figure 57
- Subject 20-00-15 for the insulation removal procedures.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



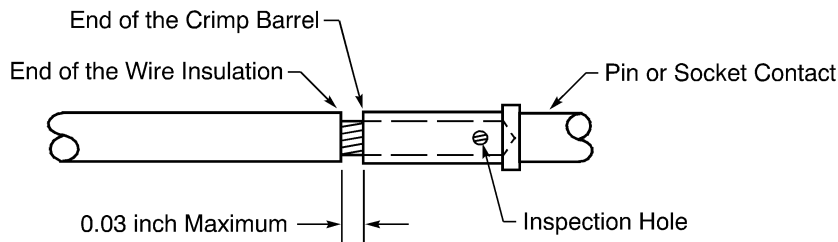
INSULATION REMOVAL LENGTH

Figure 57

(3) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 58.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT

Figure 58

(4) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

G. Assembly of Size 0505 Power Contacts

Refer to Subject 20-74-02.

H. Size 5 Coax Contact Assembly

Refer to Subject 20-74-02.

I. Assembly of Size 8 Coax Contacts

Refer to Subject 20-74-02.

J. Assembly of Size 8 Twinax Contacts

Refer to Subject 20-74-02.

K. Assembly of Size 8 Quadrax Contacts

Refer to Subject 20-74-02.

STANDARD WIRING PRACTICES MANUAL

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L. Size 3 Coax Contact Assembly

**Table 30
COAX CABLE TRIM DIMENSIONS**

Cable	Dimension	Length (inch)	
		Target	Tolerance
BMS13-65 Type 0F	A	0.67	± 0.02
	B	0.30	± 0.02
	C	0.22	± 0.02
BMS13-65 Type 0G	A	0.67	± 0.02
	B	0.30	± 0.02
	C	0.22	± 0.02
BMS13-65 Type 0H	A	0.67	± 0.02
	B	0.30	± 0.02
	C	0.22	± 0.02
BMS13-65 Type 0J	A	0.69	± 0.02
	B	0.30	± 0.02
	C	0.22	± 0.02
BMS13-65 Type 0K	A	0.76	± 0.02
	B	0.38	± 0.02
	C	0.22	± 0.02

**Table 31
COAX CONTACT CENTER CONTACT CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
BACC47FP0F	M22520/1-01	7	282 581 007
BACC47FP0G	M22520/1-01	7	282 581 007
BACC47FP0H	M22520/1-01	8	282 581 007
BACC47FP0J	M22520/1-01	8	282 581 007
BACC47FP0K	M22520/1-01	8	282 581 009
BACC47FR0F	M22520/1-01	7	282 581 007
BACC47FR0G	M22520/1-01	7	282 581 007
BACC47FR0H	M22520/1-01	8	282 581 007
BACC47FR0J	M22520/1-01	8	282 581 007

20-74-13

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Table 31 (continued)

Coax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
BACC47FR0K	M22520/1-01	8	282 581 009

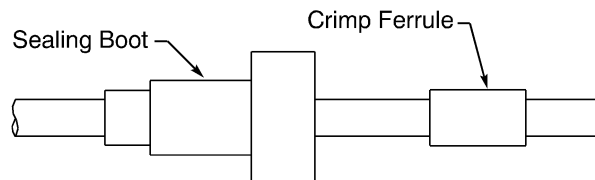
**Table 32
COAX CONTACT FERRULE CRIMP TOOLS**

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACT47FP0F	M22520/5-01	M22520/5-05	B
BACC47FP0G	M22520/5-01	M22520/5-45	B
BACC47FP0H	M22520/5-01	M22520/5-35	A
BACC47FP0J	M22520/5-01	M22520/5-61	A
BACC47FP0K	M22520/5-01	M22520/5-27	-
BACC47FR0F	M22520/5-01	M22520/5-05	B
BACC47FR0G	M22520/5-01	M22520/5-45	B
BACC47FR0H	M22520/5-01	M22520/5-35	A
BACC47FR0J	M22520/5-01	M22520/5-61	A
BACC47FR0K	M22520/5-01	M22520/5-27	-

- (1) Make a selection of a center contact crimp tool from Table 31.
- (2) Make a selection of a ferrule crimp tool from Table 32.
- (3) Cut the cable to make the end of the cable perpendicular to the longitudinal axis of the cable.
- (4) Put these components on the cable:
 - The sealing boot
 - The crimp ferrule.

Refer to:

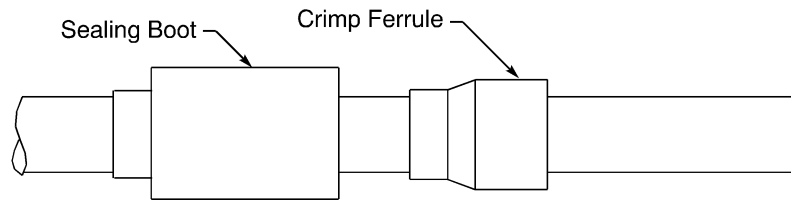
- Figure 59 for BMS 13-65 Type 0F and 0G cable
- Figure 60 for BMS 13-65 Type 0H, 0J, and 0K cable.



**SEALING BOOT AND CRIMP FERRULE ON TYPE 0F AND TYPE 0G CABLE
Figure 59**

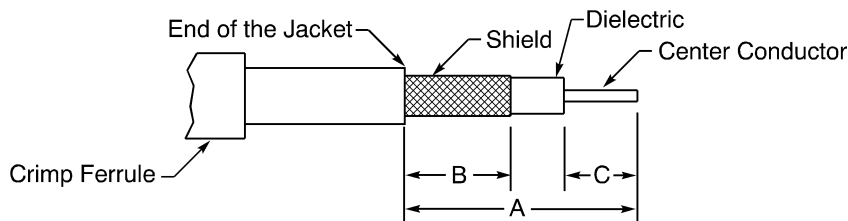
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



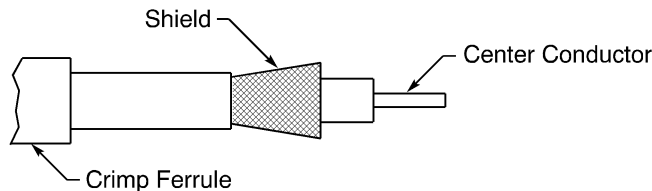
SEALING BOOT AND CRIMP FERRULE ON TYPE 0H, TYPE 0J, AND TYPE 0K CABLE
Figure 60

- (5) Prepare the cable. Refer to Figure 61 and Table 30.



CABLE PREPARATION
Figure 61

- (a) Remove the necessary length of jacket from the end of the cable to make the distance from the end of the jacket to the end of the cable equal to dimension A.
- (b) Remove the necessary length of shield to make the distance from the end of the shield to the end of the cable jacket equal to dimension B.
- (c) Remove the necessary length of the dielectric to make the distance from the end of the dielectric to the end of the center conductor equal to dimension C.
- (6) Prepare the shield. Refer to Figure 62.



SHIELD PREPARATION
Figure 62

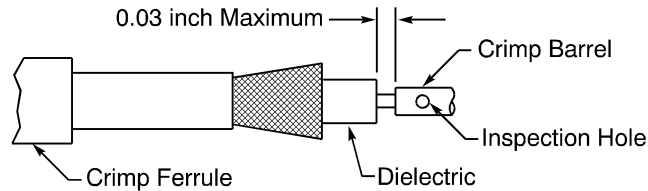
- (a) Move the strands of the round conductor shield apart.
- (b) Move the strands of the flat conductor shield apart.
- (7) Put the center conductor into the crimp barrel of the center contact. Refer to Figure 63.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Make sure that:

- All of the strands are in the crimp barrel
- The strands of the center conductor can be seen in the inspection hole
- The distance between the dielectric and end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE CENTER CONDUCTOR IN THE CRIMP BARREL
Figure 63

(8) Crimp the contact.

Make sure that:

- All of the strands are in the crimp barrel
- The strands of the center conductor can be seen in the inspection hole
- The distance between the dielectric and end of the crimp barrel is not more than 0.03 inch.

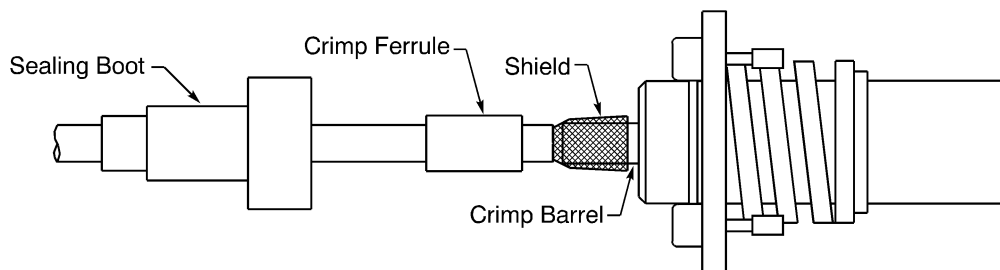
(9) Axially align the center contact assembly with the outer contact.

(10) Push the center contact into the outer contact until it makes a click.

Make sure that the strands of the shield stay on the outer surface of the crimp barrel.

Refer to:

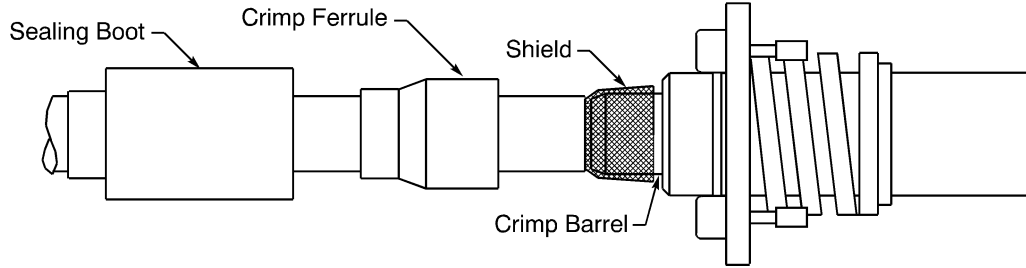
- Figure 64 for BMS 13-65 Type 0F and 0G cable
- Figure 65 for BMS 13-65 Type 0H, 0J, and 0K cable.



POSITION OF THE OUTER CONTACT FOR TYPE 0F AND TYPE 0G CABLE
Figure 64

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



POSITION OF THE OUTER CONTACT FOR TYPE 0H, TYPE 0J, AND TYPE 0K CABLE
Figure 65

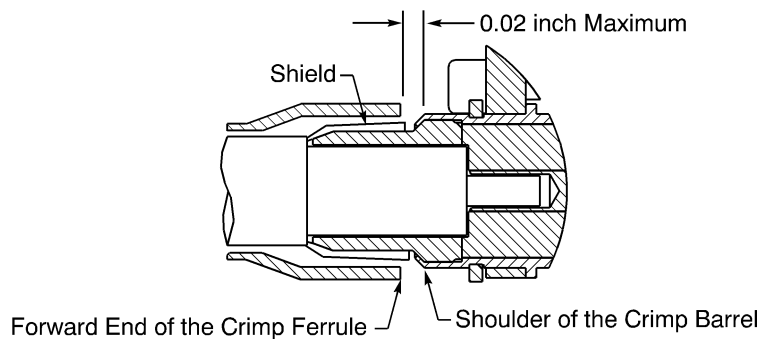
- (11) Lightly pull the cable.

Make sure that the center contact is locked in the outer contact.

CAUTION: DO NOT PULL THE CABLE WITH A STRONG OR A SUDDEN FORCE. DAMAGE TO THE CONNECTOR OR THE CONTACT CAN OCCUR.

- (12) If the center contact is not locked in the outer contact, do Step (10) and Step (11) again.
 (13) Put the strands of the shield against the outer surface of the crimp barrel.
 (14) Push the crimp ferrule forward until the forward end of the ferrule is against the shoulder of the crimp barrel. Refer to Figure 66.

Make sure that the distance between the forward end of the crimp ferrule and the shoulder of the crimp barrel is not more than 0.02 inch.



POSITION OF THE CRIMP FERRULE ON THE SHIELD AND THE CRIMP BARREL
Figure 66

- (15) Crimp the ferrule.

Make sure that the distance between the forward end of the crimp ferrule and the shoulder of the crimp barrel is not more than 0.02 inch.

- (16) Push the sealing boot forward until the forward edge of the boot is against:
- the shoulder of the coax socket contact
 - the retaining ring on the coax pin contact.

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ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

M. Contact Insertion

This paragraph gives the procedure to install ground block contacts. For the procedure to install:

- Other contacts in the connector Insert, refer to Subject 20-74-02.
- Size 3 coax contacts in BACC65AV and BACC65AW connectors, refer to Paragraph 5.L..

**Table 33
GROUND BLOCK CONTACT INSERTION TOOLS**

Ground Block Contact Cavity Size	Contact Size	Insertion Tool	
		Part Number	Color
16	1618	DAK83-20	-
		M81969/14-11	Red
		ST2220-2-28	-
	1620	DAK83-20	-
		M81969/14-11	Red
		ST2220-2-28	-

- (1) If a strain relief clamp is specified, put the strain relief clamp on the wire harness.
Make sure that the wire harness tie tab of the strain relief points away from the end of the harness.
- (2) If an EMI backshell is specified:
 - (a) Make a selection of a heat shrinkable sleeve from Table 38.
Make sure that the sleeve has the smallest diameter that can move on the wire harness easily.
 - (b) Put a 4.0 inch \pm 0.2 inch length of heat shrinkable sleeve on the wire harness.
NOTE: As an alternative, the heat shrinkable sleeve can be cut and attached to the wire harness after the EMI backshell is installed.
- (3) Make a selection of a ground block contact insertion tool from Table 33.
NOTE: An insertion tool is not necessary.
- (4) If an insertion tool is used:
 - (a) Put the contact assembly in the insertion tool.
 - (b) Axially align the insertion tool, the contact assembly and the contact cavity.
Make sure that the insertion tool and the contact assembly are perpendicular to the rear face of the ground block.
 - (c) Carefully push the insertion tool into the contact cavity until it stops.
Make sure that:
 - The contact assembly and the contact cavity stay aligned
 - Tension does not occur between the shield ground wire and the solder sleeve or the contact crimp barrel.
 - (d) Carefully pull the insertion tool out of the contact cavity.
Make sure that the insertion tool stays aligned with the contact cavity.
 - (e) Remove the insertion tool from the wire.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS**

(5) If an insertion tool is not used:

(a) Axially align the contact assembly and the contact cavity.

Make sure that the contact assembly is perpendicular to the rear face of the ground block.

(b) Carefully push the the contact assembly into the contact cavity until it stops.

Make sure that:

- The contact assembly and the contact cavity stay aligned
- Tension does not occur between the shield ground wire and the solder sleeve or the contact crimp barrel.

(6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

(7) If the contact is not locked in the contact cavity:

(a) Pull the contact assembly from the contact cavity.

(b) Do Step (4) or Step (5) again.

N. Insertion of a Fiber Optic Contact Terminus

Refer to Subject 20-74-02.

O. Installation of Size 8 Quadrax Contacts

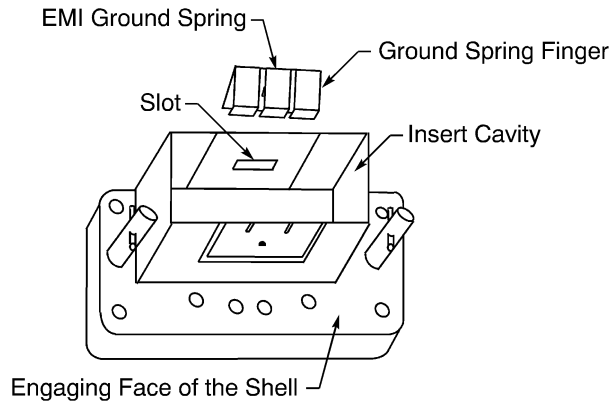
Refer to Subject 20-74-02.

P. Size 5 Coax Contact Insertion

Refer to Subject 20-74-02.

Q. Seal of an Empty Insert Contact Cavity

Refer to Subject 20-74-02.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS****R. EMI Ground Spring Installation**

EMI GROUND SPRING INSTALLATION
Figure 67

A receptacle with a ground block must have EMI ground springs installed.

Refer to Figure 67.

- (1) From the engaging end of the connector, align the EMI ground spring with the longer sides of the insert cavity.
Make sure that the spring fingers are on the inside of the insert cavity.
- (2) Push the ground spring to the front face of the connector shell until the latch on the spring locks in the slot on the side of the insert cavity.

S. Insert Installation

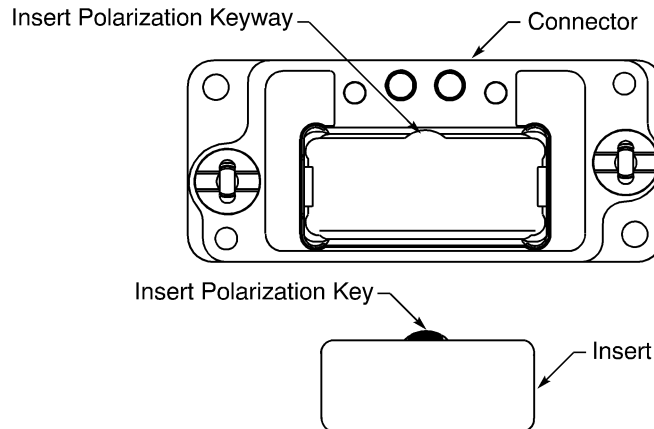
NOTE: An insert can be installed with contacts or without contacts.

If a strain relief clamp is specified, it must be put on the wire harness with the wire harness tie tab pointed away from the end of the harness before:

- An insert with assembled contacts is installed in the connector shell
- Assembled ground block contacts are installed in the ground block.

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ALIGNMENT OF THE INSERT AND THE CONNECTOR SHELL
Figure 68

Refer to Figure 68.

- (1) Align the polarization key on the insert with the polarization keyway on the rear side of the insert cavity.

NOTE: A blank insert does not have a polarization key.

- (2) Push the insert into the insert cavity until it stops and is locked in position.

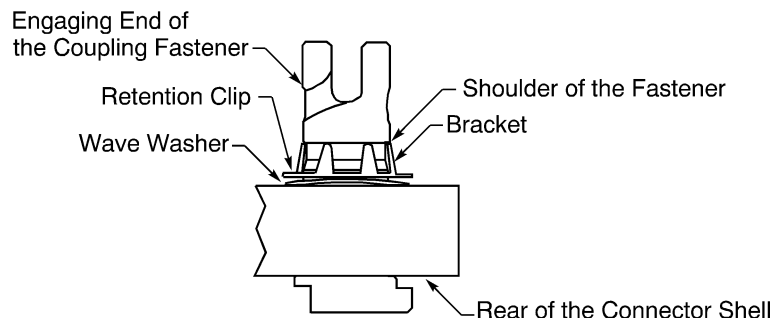
CAUTION: IF THE INSERT DOES NOT GO INTO THE CONNECTOR SHELL EASILY, DO NOT CONTINUE TO PUSH THE INSERT. DAMAGE TO THE INSERT CAN OCCUR.

- (3) If the insert does not go into the connector shell correctly:
 - (a) Remove the insert. Refer to Paragraph 4.E.
 - (b) Do Step (1) and Step (2) again.

T. Installation of the Fiber Optic Alignment Sleeve Insert

Refer to Subject 20-74-02.

U. Coupling Fastener Installation



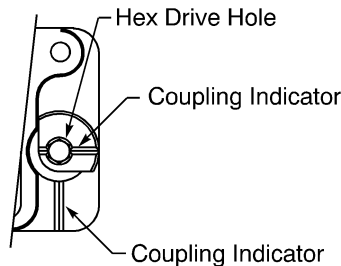
INSTALLATION OF THE COUPLING FASTENER
Figure 69

Refer to Figure 69.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

- (1) Put the coupling fastener in the hole of the connector shell from the rear.
Make sure that the engaging end of the fastener is pointed forward.
- (2) Put the wave washer on the engaging end of the coupling fastener.
- (3) Put the retention clip on the engaging end of coupling fastener.
- (4) Push the clip against the plug shell until end of each bracket is against the body of the fastener below the shoulder of the fastener.
- (5) Turn the coupling fastener to the released position. Refer to Figure 70.



COUPLING FASTENER IN THE RELEASED POSITION
Figure 70

V. Installation of the BACC10LL and BACC10LM Backshells

The strain relief clamp must be put on the wire harness before:

- An insert with assembled contacts is installed in the connector shell
- Assembled ground block contacts are installed in the ground block.

Table 34
NECESSARY MATERIALS

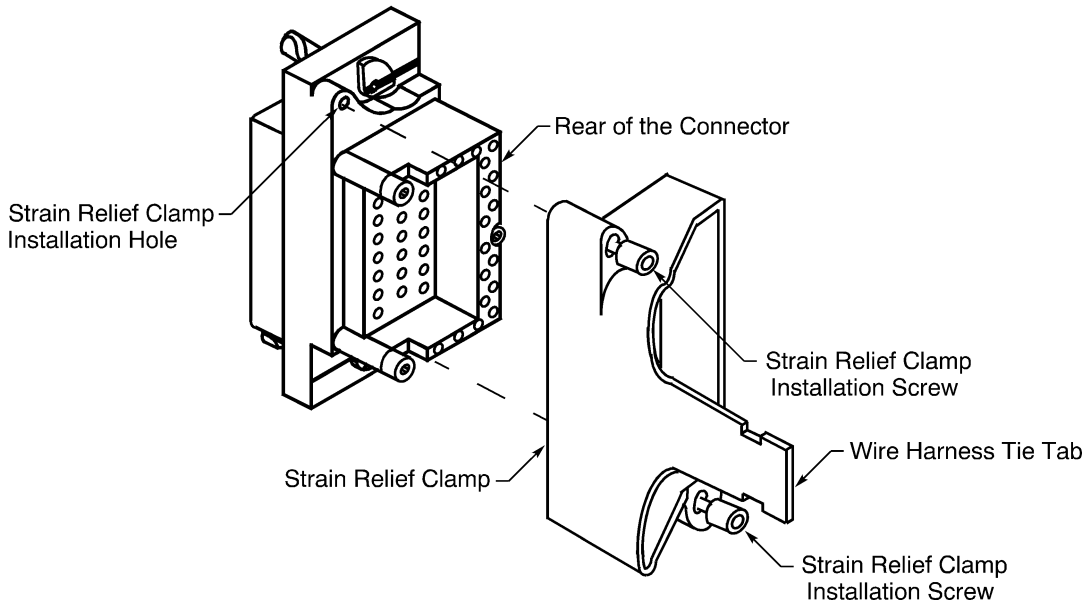
Material	Part Number	Supplier
Tape	Scotch 70	3M

Table 35
BACKSHELL INSTALLATION TOOLS

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Wrench with a Hex Driver	5/64

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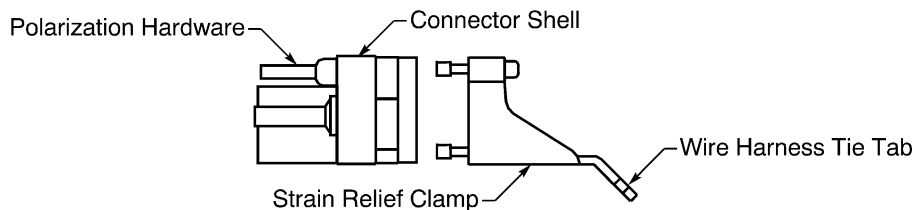


BACKSHELL INSTALLATION

Figure 71

Refer to Figure 71.

- (1) Make a selection of these tools from Table 35:
 - A driver
 - A torque tool.
- (2) Make a selection of a tape from Table 34.
- (3) Align the wire harness tie tab on the backshell with the bottom edge of the connector. Refer to Figure 72.



ALIGNMENT OF THE STRAIN RELIEF CLAMP AND THE CONNECTOR SHELL

Figure 72

- (4) Engage the threads of the backshell installation screws with the screw holes in the connector shell.
- (5) Torque each installation screw 7 inch-pounds \pm 1 inch-pound.
- (6) Wind two layers of tape around the wire harness where the harness is against the wire harness tie tab.
- (7) Assemble a wire harness tie or install a plastic tie strap on the wire harness and the wire harness tie tab. Refer to Subject 20-10-11.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

W. Installation of the BACC10LV Backshell

The strain relief clamp must be put on the wire harness before:

- An insert with assembled contacts is installed in the connector shell
- Assembled ground block contacts are installed in the ground block.

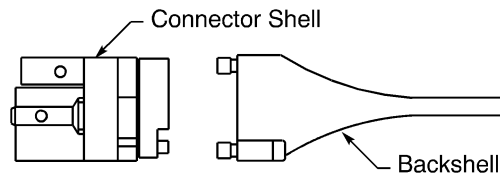
**Table 36
NECESSARY MATERIALS**

Material	Part Number	Supplier
Tape	Scotch 70	3M

**Table 37
BACKSHELL INSTALLATION TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Wrench with a Hex Driver	5/64

- (1) Make a selection of these tools from Table 37:
 - A driver
 - A torque tool.
- (2) Make a selection of a tape from Table 36.
- (3) Align the strain relief clamp with the connector. Refer to Figure 73.



**ALIGNMENT OF THE BACKSHELL AND THE CONNECTOR SHELL
Figure 73**

- (4) Engage the threads of the backshell installation screws with the screw holes in the connector shell.
- (5) Torque each installation screw 7 inch-pounds \pm 1 inch-pound.
- (6) Wind a minimum of two layers of tape on the wire harness where the saddle bars of the cable clamp hold the harness.

Make sure that:

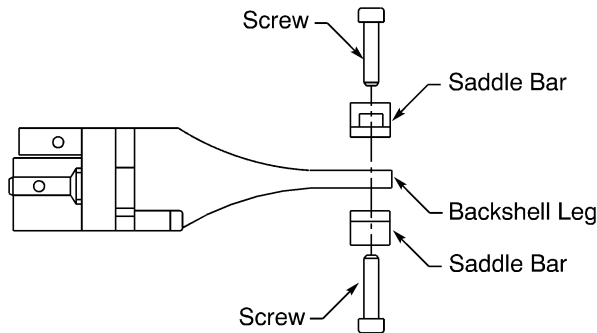
- The center of the tape is aligned with the saddle bar screw holes.
 - The layers of tape make a 100 percent overlap.
 - The number of layers of tape is correct for the correct fit of the wire harness between the saddle bars.
- (7) Install and tighten the saddle bar screws. Refer to Figure 74.

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Make sure that:

- The wire harness is tight between the saddle bars
- The saddle bar screws are tight
- The saddle bars do not crush or pinch the wire harness.



STRAIN RELIEF CLAMP ASSEMBLY
Figure 74

(8) If the wire harness is too tight in the clamp:

- (a) Remove the saddle bar screws.
- (b) Remove some of the tape on the wire harness.
Make sure that the number of layers of tape is correct for the correct fit of the wire harness between the saddle bars.
- (c) Do Step (7) again.
- (d) If it is necessary, do Step (8) or Step (9) again.

(9) If the wire harness is too loose in the clamp:

- (a) Remove the saddle bar screws.
- (b) Put more layers of tape on the wire harness where the saddle bars hold the wire harness.
Make sure that the number of layers of tape is correct for the correct fit of the wire harness between the saddle bars.
- (c) Do Step (7) again.
- (d) If it is necessary, do Step (8) or Step (9) again.

X. Installation of the BACC10LH Backshell

The EMI backshell strain must be installed after:

- An insert with assembled contacts is installed in the connector shell
- Assembled ground block contacts are installed in the ground block.

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**Table 38
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	MIL-LT	Raychem
Tape	Scotch 70	3M
	912-10X12	Arlon

**Table 39
SHIELD TERMINATOR BAND PART NUMBERS**

Boeing Standard	Installation Configuration
BACB42F4	Double Wrap

**Table 40
APPROVED SUPPLIERS OF BOEING STANDARD SHIELD TERMINATOR BANDS**

Band	Supplier
BACB42F4	Band-It Idex
	Glenair
	WTG Group

**Table 41
EMI BACKSHELL INSTALLATION TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Wrench with a Hex Driver	5/64

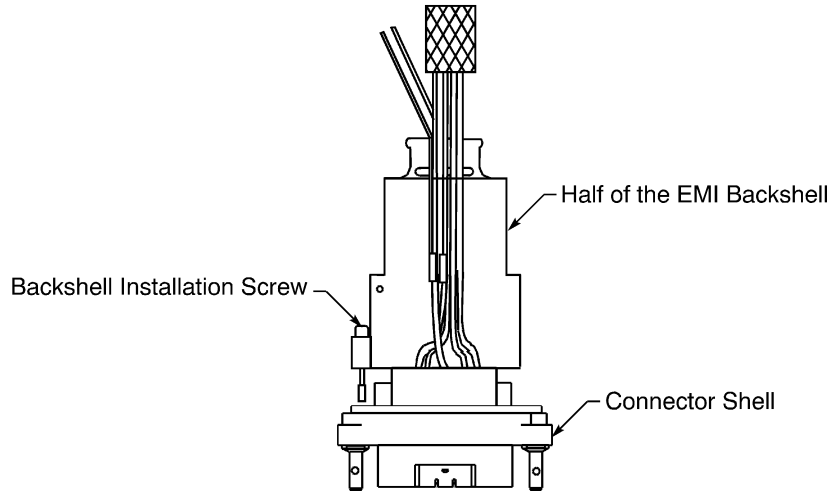
- (1) Make a selection of these tools from Table 41:
 - A driver
 - A torque tool.
- (2) Make a selection of a shield terminator band from Table 39.
NOTE: 2 bands are necessary for the installation of the EMI backshell.
- (3) Make a selection of a tape from Table 38.
 Make sure that the tape has a width of 0.25 inch.
- (4) Make a selection of a heat shrinkable sleeve from Table 38.
 Make sure that the sleeve has a diameter of 0.19 inch.
- (5) Cut a 3.0 inch ± 0.1 inch length of the 0.19 inch diameter heat shrinkable sleeve for each shield ground wire.

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ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

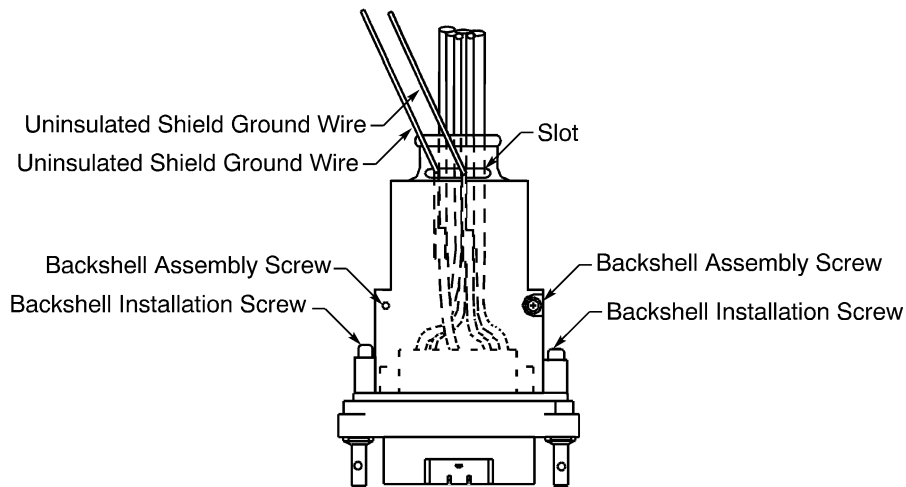
- (6) Put one half of the EMI backshell on the wire harness at the rear of the connector shell. Refer to Figure 75.

NOTE: Each half of an EMI backshell has the same configuration.



POSITION OF ONE HALF OF THE EMI BACKSHELL CONNECTOR ASSEMBLY
Figure 75

- (7) Engage the threads of the backshell installation screw with the threads of the backshell mounting hole on the rear side of the connector shell. Refer to Figure 75.
- (8) Put approximately half of the uninsulated shield ground wires through the slot in the EMI backshell. Refer to Figure 76.



POSITION OF THE SHIELD GROUND WIRES IN THE BACKSHELL SLOT
Figure 76

- (9) Put the remaining uninsulated shield ground wires through the slot in the other half of the EMI backshell.

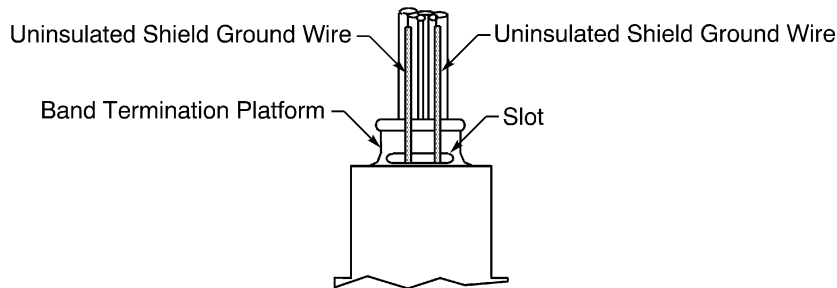
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

- (10) Do Step (6) through Step (8) again for the other half of the EMI backshell.
- (11) Put each half of the EMI backshell together.
- (12) Engage the threads of each assembly screw with the threads in the body of the other half of the EMI backshell. Refer to Figure 76.
- (13) Torque each assembly screw and installation screw 7 inch-pounds \pm 1 inch-pound.
- (14) Carefully pull the end of each uninsulated shield ground wire through the slot in the EMI backshell to decrease unwanted shield ground wire length inside the EMI backshell.
- (15) Put each uninsulated shield ground wire tightly and symmetrically across the band termination platform of the EMI backshell. Refer to Figure 77.

Make sure that:

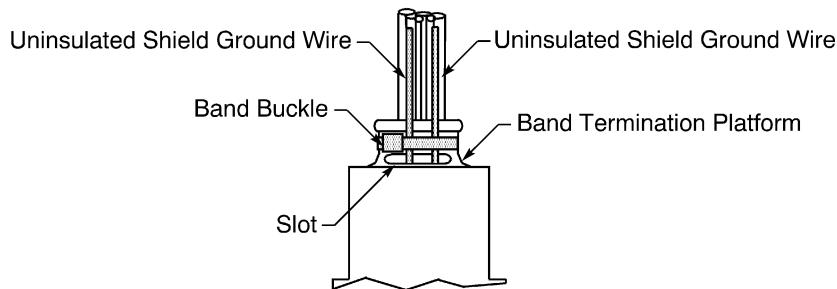
- The distances between the shield ground wires in the slot are equal.
- Each shield ground wire does not make an overlap with a different shield ground wire on the band termination platform.



POSITION OF THE SHIELD GROUND WIRES ON THE BAND TERMINATION PLATFORM
Figure 77

- (16) Install a shield terminator band on the shield ground wires and the band termination platform. Refer to Figure 78 and Paragraph 5.Y.

Make sure that the band buckle does not make an overlap with the shield ground wires or the slot.

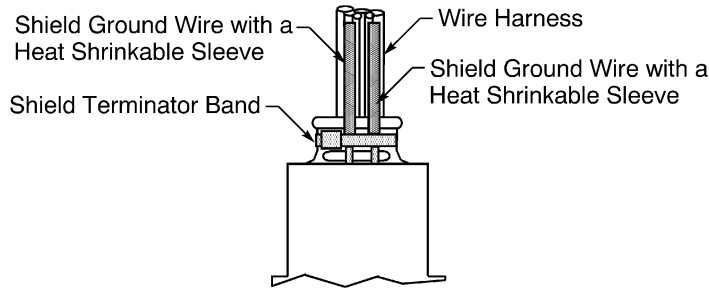


POSITION OF THE SHIELD TERMINATOR BAND ON THE BAND TERMINATION PLATFORM
Figure 78

- (17) Remove the necessary length of each shield ground wire to make the distance from the shield terminator band to the end of the shield ground wire equal to approximately 2.5 inches.
- (18) Put a 3.0 inch length of heat shrinkable sleeve on each shield ground wire. Refer to Figure 79.

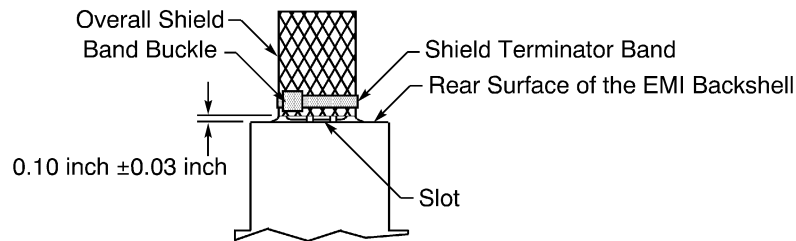
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



POSITION OF THE HEAT SHRINKABLE SLEEVES
Figure 79

- (19) Shrink each sleeve into position. Refer to Subject 20-10-14.
 - (20) Align each of the shield ground wires with the longitudinal axis of the wire harness. Make sure that the shield ground wires do not make an overlap with each other.
 - (21) Push the overall shield of the wire harness forward. Refer to Figure 80.
- Make sure that:
- The shield ground wires are between the wire harness and the overall shield.
 - The forward end of the overall shield is 0.10 inch \pm 0.03 inch from the rear surface of the EMI backshell.

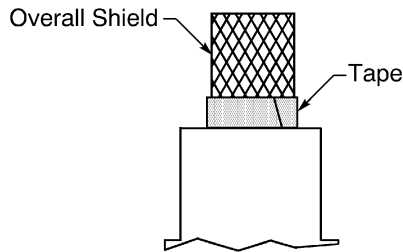


POSITION OF THE OVERALL SHIELD AND THE SHIELD TERMINATOR BAND
Figure 80

- (22) Install a shield terminator band on the overall shield and the band termination platform. Refer to Figure 80 and Paragraph 5.Y.
- Make sure that:
- The band does not make an overlap with the slot on the band termination platform
 - The band buckle does not make an overlap with the slot on the band termination platform.
- (23) Cut a length of the tape that is approximately 2.5 times the distance around the outer surface of the band termination platform.
 - (24) Put one end of the tape on the end of the band that is cut.
 - (25) Wind the tape around the band termination platform. Refer to Figure 81.
- Make sure that the layers of tape make a 100 percent overlap.

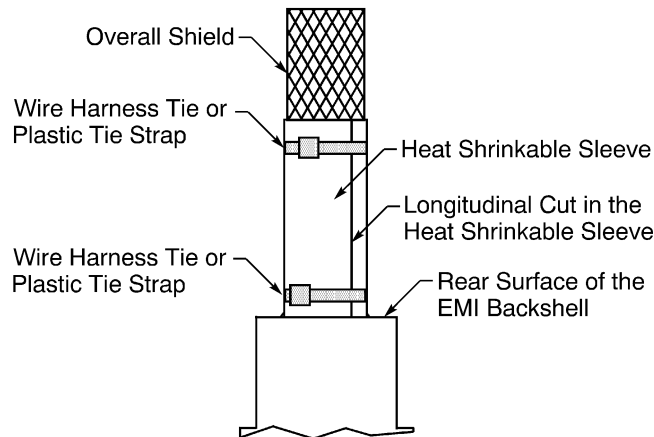
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



POSITION OF THE TAPE ON THE SHIELD TERMINATOR BAND
Figure 81

- (26) If a 4.0 inch length of heat shrinkable sleeve is on the wire harness:
 - (a) Push the heat shrinkable sleeve forward until the forward edge of the sleeve is against the rear surface of the EMI backshell.
 - (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (27) If a 4.0 inch length of heat shrinkable sleeve is not on the wire harness; install a sleeve. Refer to Figure 82.



POSITION OF THE HEAT SHRINKABLE SLEEVE
Figure 82

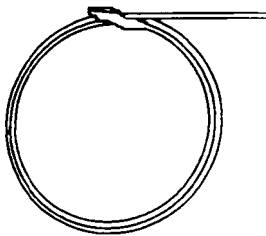
- (a) Make a selection of a heat shrinkable sleeve from Table 38, Make sure that the sleeve has the smallest diameter that can move on the wire harness easily.
- (b) Make a longitudinal cut in a 4.0 inch length of the sleeve from one end to the other end.
- (c) Put the sleeve around the wire harness.
- (d) Push the sleeve forward until the forward edge of the sleeve is against the rear surface of the EMI backshell.
 Make sure that the longitudinal axis of the sleeve is aligned with the longitudinal axis of the wire harness.
- (e) Assemble a wire harness tie, or install a plastic tie strap on each end of the sleeve. Refer to Subject 20-10-11.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS****Y. Shield Terminator Band Installation**

Table 42
SHIELD TERMINATOR BAND INSTALLATION TOOLS

Part Number	Type	Supplier
600-061	Manual	Glenair
A30199	Manual	Band-It Idex

- (1) Make a selection of an installation tool from Table 42.
- (2) If the shield terminator band is flat, make the band into a coil. Refer to Figure 83.

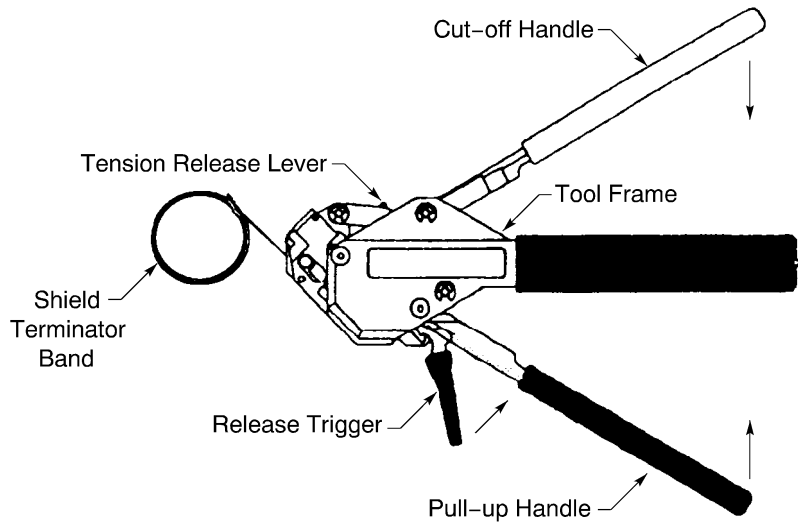


INSTALLATION CONFIGURATION OF THE BACB42F() SHIELD TERMINATOR BAND
Figure 83

- (a) Put the free end of the band through the thin slot in the buckle.
 - (b) Pull the free end through the buckle until the diameter of the loop is approximately the same size as the diameter of the backshell.
 - (c) Put the free end of the BACB42F() shield terminator band through the thin slot in the buckle again.
 - (d) Pull the free end through the buckle until the inner surface of the second loop is against the surface of the first loop.
- (3) Pull the release trigger of the tool in the direction of the pull-up handle.
 - (4) Put the free end of the terminator band into the tool. Refer to Figure 84.
Make sure that the loop is pointed away from the tool.

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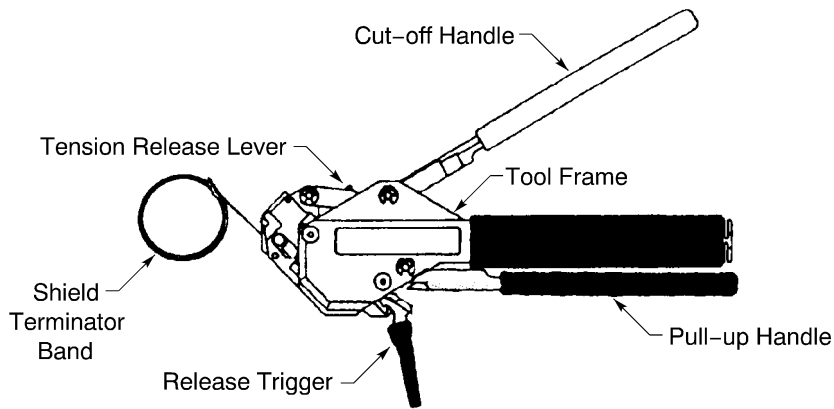
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



POSITION OF THE BACB42F() SHIELD TERMINATOR BAND IN THE TOOL
Figure 84

- (5) Pull the pull-up handle to the tool frame to complete one cycle.
 Refer to Figure 85.

NOTE: The terminator band is held in the internal grip mechanism of the tool.

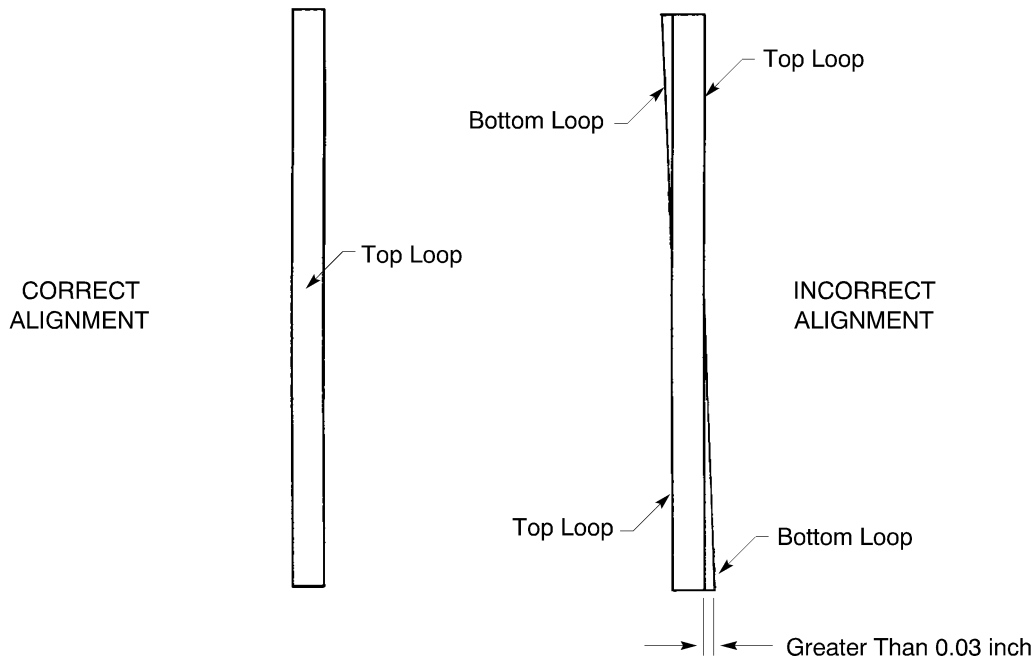


POSITION OF THE PULL-UP HANDLE AT THE END OF A CYCLE
Figure 85

- (6) Put the shield terminator band on the backshell at the location of the installation.
- (7) Align the edges of the two loops of the terminator band. Refer to Figure 86.
 Make sure that the edge of a loop is not more that 0.03 inch farther than the edge of the other loop.

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ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



ALIGNMENT OF THE LOOPS OF THE SHIELD TERMINATOR BAND

Figure 86

- (8) Pull the pull-up handle through the necessary cycles until the terminator band is tight around the backshell.
 Make sure that the position of the pull-up handle at the end of the last cycle is the position of the handle at the end of a cycle. Refer to Figure 85.
- (9) If it is necessary to loosen or remove the terminator band after the band is tightened:
 - (a) Hold the pull-up handle tightly.
 - (b) Push the tension release lever forward.
 - (c) Release the pull-up handle.
NOTE: The pull-up handle opens automatically.
 - (d) Pull the release trigger to the tool frame.
 - (e) Loosen the band and do the installation again from Step (7).
 - (f) If it is necessary, remove the band and do the installation again from Step (3).
- (10) Pull the cut-off handle to the tool frame.
- (11) Pull the release trigger of the tool to cut the band.
- (12) Remove the unwanted length of the band from the tool.

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ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

6. CONNECTOR POLARIZATION

A. Connector Polarization - Shell Types A, B, and C

The polarization code of the connector part number identifies the position of:

- The polarization posts on the plug connector
- The polarization receptacles on the receptacle connector.

Refer to Figure 1.

- (1) Find the polarization code in the connector part number from the equipment list.
- (2) For that code, find the correct position of:
 - The polarization posts on the plug
 - The polarization receptacles on the receptacle.

Refer to Paragraph 6.C.

- (3) If the position of the posts or the receptacles do not agree with the code in the part number from the equipment list, put the posts or the receptacles into the correct position. Refer to Paragraph 6.E.
- (4) If the polarization code in the part number on the connector shell does not agree with the polarization code in the part number from the equipment list, change the part number on the connector shell. Refer to Paragraph 6.G.

B. Connector Polarization - Shell Types D, E and F

The polarization code of the connector part number identifies the position of:

- The polarization posts on the plug connector
- The polarization receptacles on the receptacle connector.

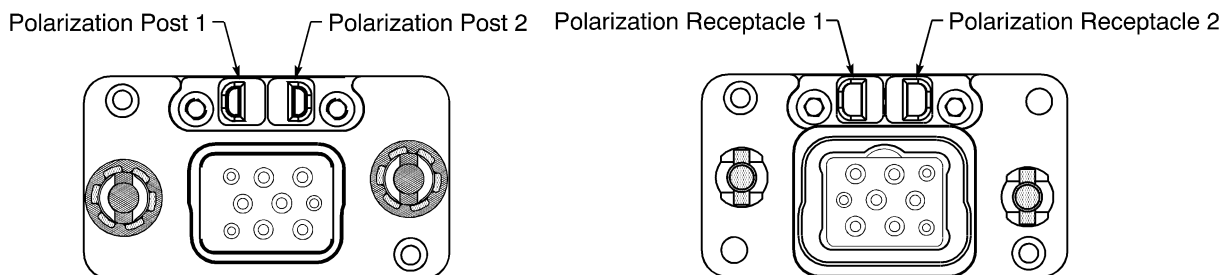
Refer to Figure 1.

- (1) Find the polarization code in the connector part number from the equipment list.
- (2) For that code, find the correct position of:
 - The polarization posts on the plug
 - The polarization receptacles on the receptacle.

Refer to Paragraph 6.D.

- (3) If the position of the posts or the receptacles do not agree with the code in the part number from the equipment list, put the posts or the receptacles into the correct position. Refer to Paragraph 6.F.

C. Polarization Post and Polarization Receptacle Positions - Shell Types A, B, and C



POLARIZATION POSTS AND POLARIZATION RECEPTACLES - SHELL TYPES A, B, AND C

Figure 87

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

A B C D



Dark area shows the polarization post on the plug and the polarization receptacle on the receptacle

POLARIZATION POSITIONS - SHELL TYPES A, B, AND C

Figure 88

Table 43

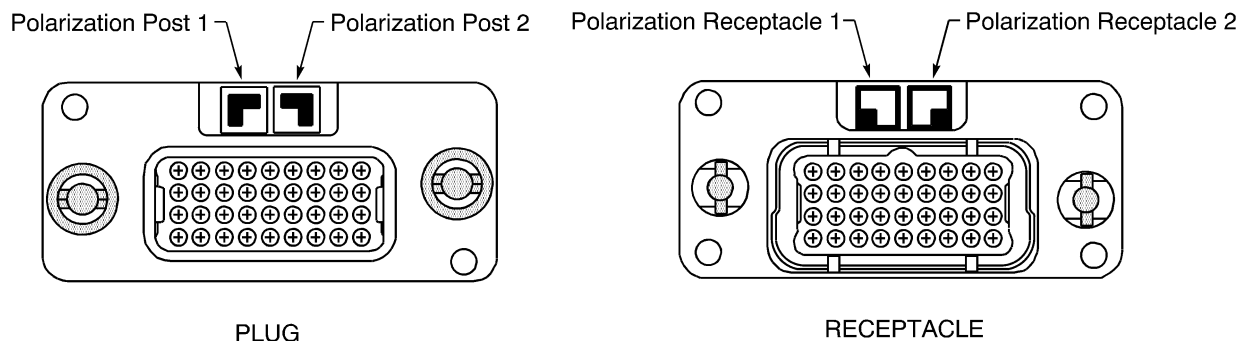
POLARIZATION POST AND POLARIZATION RECEPTACLE POSITIONS - SHELL TYPES A, B, AND C

Polarization Code	Plug Shell		Receptacle Shell	
	Post 1	Post 2	Receptacle 1	Receptacle 2
01	A	A	A	A
02	A	B	D	A
03	A	C	C	A
04	A	D	B	A
05	B	A	A	D
06	B	B	D	D
07	B	C	C	D
08	B	D	B	D
09	C	A	A	C
10	C	B	D	C
11	C	C	C	C
12	C	D	B	C
13	D	A	A	B
14	D	B	D	B
15	D	C	C	B
16	D	D	B	B

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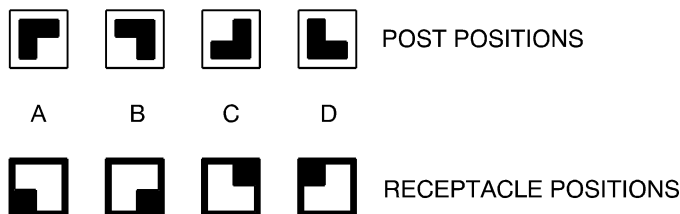
ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

D. Polarization Post and Polarization Receptacle Positions - Shell Types D, E and F



POLARIZATION POSTS AND POLARIZATION RECEPTACLES - SHELL TYPES D, E, and F

Figure 89



Dark area shows the solid part of the polarization post on the plug and the solid part of the polarization receptacle on the receptacle

POLARIZATION POSITIONS - SHELL TYPES D, E and F

Figure 90

Table 44

POLARIZATION POST AND POLARIZATION RECEPTACLE POSITIONS - SHELL TYPES D, E and F

Polarization Code	Plug Shell		Receptacle Shell	
	Post 1	Post 2	Receptacle 2	Receptacle 1
AA	A	A	A	A
AB	A	B	A	B
AC	A	C	A	C
AD	A	D	A	D
BA	B	A	B	A
BB	B	B	B	B
BC	B	C	B	C
BD	B	D	B	D
CA	C	A	C	A
CB	C	B	C	B
CC	C	C	C	C

20-74-13

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ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Table 44 (continued)

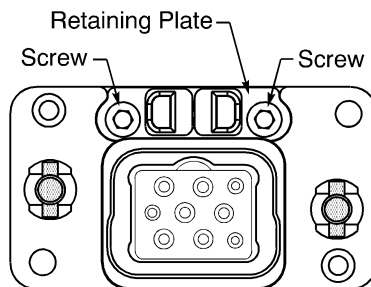
Polarization Code	Plug Shell		Receptacle Shell	
	Post 1	Post 2	Receptacle 2	Receptacle 1
CD	C	D	C	D
DA	D	A	D	A
DB	D	B	D	B
DC	D	C	D	C
DD	D	D	D	D

E. Change of the Polarization Post and Polarization Receptacle Positions - Shell Types A, B, and C

Table 45
POLARIZATION RETAINING PLATE TOOLS

Tool	Type	Size
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Wrench with a Hex Driver	5/64

- (1) Make a selection of these tools from Table 45:
 - A driver
 - A torque tool.
- (2) Disengage the retaining plate screws from the connector shell. Refer to Figure 91.



LOCATION OF THE RETAINING PLATE SCREWS
Figure 91

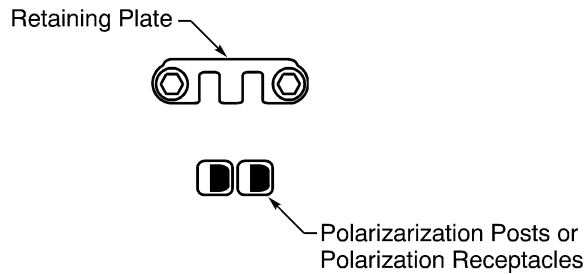
- (3) Remove the retaining plate.
- (4) Remove the posts or the receptacles.
- (5) In the correct polarization position, align the polarization posts or the polarization receptacles with the slots in the retaining plate.

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ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Refer to:

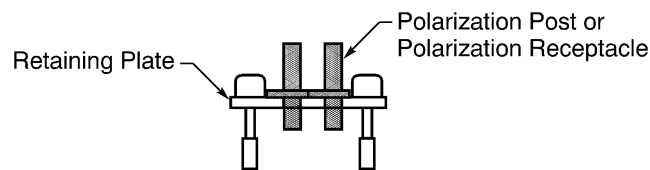
- Table 43 for the polarization codes and positions
- Figure 88 for the polarization positions
- Figure 92.



ALIGNMENT OF THE POLARIZATION POSTS OR POLARIZATION RECEPTACLES WITH THE SLOTS IN THE RETAINING PLATE

Figure 92

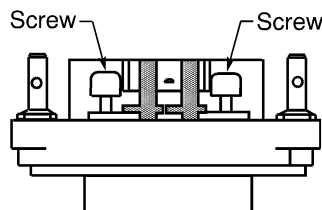
- (6) Put the posts or the receptacles in the slots. Refer to Figure 93.



POSITION OF THE POLARIZATION POSTS OR POLARIZATION RECEPTACLES IN THE RETAINING PLATE

Figure 93

- (7) Engage the threads of each retaining plate screw and screw hole in the connector shell. Refer to Figure 94.



POSITION OF THE POLARIZATION HARDWARE IN THE CONNECTOR SHELL

Figure 94

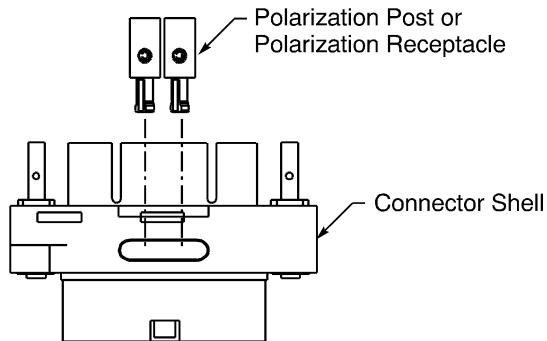
- (8) Torque each screw 7 inch-pounds \pm 1 inch-pound.

F. Change of the Polarization Post and Polarization Receptacle Positions - Shell Types D, E and F

- (1) Pull the polarizing posts or the polarizing receptacles from the connector shell. Refer to Figure 95.

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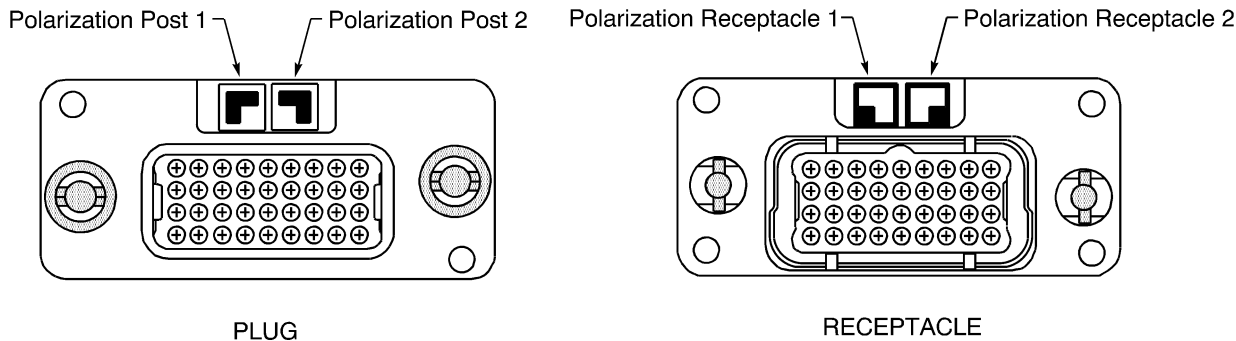
REMOVAL OF THE POLARIZATION POSTS OR THE POLARIZATION RECEPTACLES FROM THE CONNECTOR SHELL

Figure 95

- (2) In the correct polarization position, align the posts or the receptacles with the polarization holes in the connector shell.

Refer to:

- Table 44 for the polarization codes and positions
- Figure 90 for the polarization positions
- Figure 96.



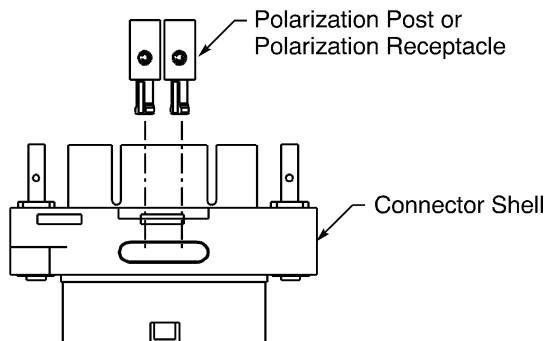
LOCATION OF THE POLARIZATION POSTS OR THE POLARIZATION RECEPTACLES ON THE CONNECTOR SHELL

Figure 96

- (3) Push the posts or the receptacles into the holes in the connector shell. Refer to Figure 97 and Figure 98.

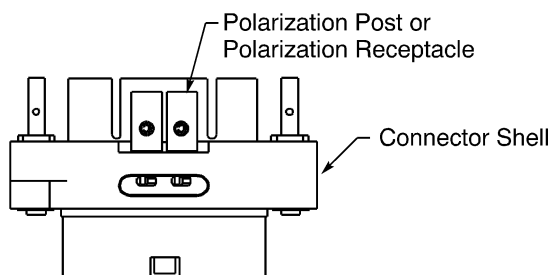
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ALIGNMENT OF THE POLARIZATION POSTS OR POLARIZATION RECEPTACLES WITH THE CONNECTOR SHELL

Figure 97



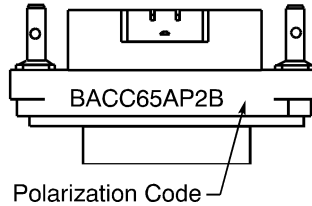
POSITION OF THE POLARIZATION POSTS OR POLARIZATION RECEPTACLES IN THE CONNECTOR SHELL

Figure 98

G. Change of the Polarization Code in the Part Number on the Connector - Shell Types A, B, and C

**Table 46
NECESSARY MATERIALS**

Material	Part Number	Supplier
Ink	No. 68 Fast Dry	Independent
	No. 73X NW Opaque	Independent
	No. 73X Opaque	Independent
Paint, Clear	683-3-2	Akzo
	Clear Lacquer	Tartan
	EC-776	3M
	EC-776SR	3M
Pen	Permanent Ink Pen, Ultra Fine Point	Sanford Sharpie

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS**

LOCATION OF THE POLARIZATION CODE ON THE CONNECTOR
Figure 99

Refer to Figure 99.

- (1) Make a selection of these materials from Table 46:
 - An ink or a permanent ink pen
 - A clear paint.
- (2) If the polarization code in the part number on the connector is incorrect:
 - (a) Apply a layer of ink on the code on the connector shell.
Make sure that the code cannot be read.
 - (b) Write the new code on the connector shell adjacent to the layer of ink.
- (3) If the part number on the connector does not have a polarization code, write the code on the connector shell at the end of the part number.
- (4) Let the ink dry for a minimum of 10 minutes.
- (5) Apply a layer of the clear paint on the part number on the connector shell.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. PAINT ON THE SURFACE OF A CONTACT CAN CAUSE UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

- (6) Let the paint dry before the connector shell is touched or moved.

7. INSPECTION AND CLEANING OF A FIBER OPTIC ALIGNMENT SLEEVE INSERT**A. Inspection and Cleaning of a Fiber Optic Alignment Sleeve Insert**

Refer to Subject 20-74-02.

8. CONNECTOR INSTALLATION**A. Equipment Identification**

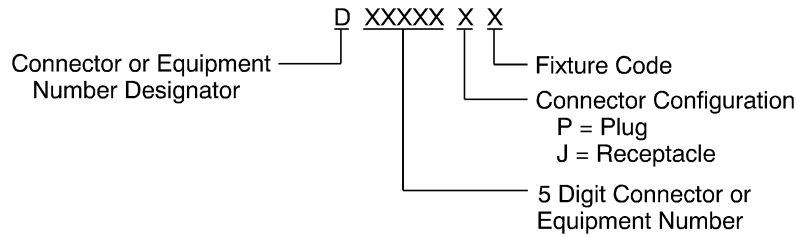
The identification label on the wire harness near the connector can have this information:

- The equipment number for the connector or the connector insert
- The mate-with disconnect panel number
- The connector position on the panel
- The mate-with nomenclature
- The wire harness number.

Refer to Figure 100.

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ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



EQUIPMENT NUMBER STRUCTURE
Figure 100

B. Installation of the Receptacle

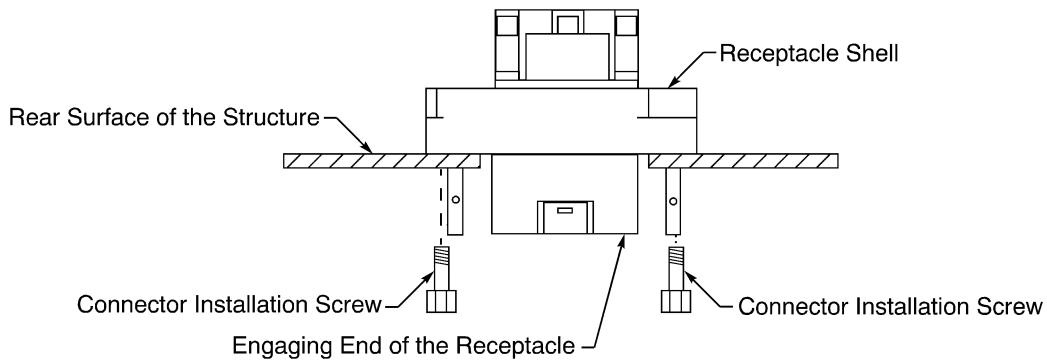
For the installation of the receptacle with a ground block, refer to Paragraph 8.C.

Table 47
RECEPTACLE INSTALLATION FASTENERS

Fastener	Part Number	Supplier
Screw	NAS1802-6-()	QPL

Table 48
NECESSARY TOOLS

Tool	Type	Size (inch)
Driver	Phillips Head Screwdriver	-
	Socket Wrench	1/4
Torque	Phillips Head Torque Screwdriver	-
	Socket Torque Wrench	1/4



ALIGNMENT OF THE RECEPTACLE AND THE STRUCTURE
Figure 101

Refer to Figure 101.

- (1) Make a selection of two screws from Table 47.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS**

Make sure that the screws are new.

CAUTION: SCREWS THAT ARE NOT NEW CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (2) Make a selection of these tools from Table 48:
 - A driver
 - A torque tool.
- (3) From the rear side of the structure, align the mounting holes of the receptacle flange with the holes in the structure.
- (4) Put the connector shell in the cutout.
- (5) From the front side of the structure, install a screw in each of the two mounting holes.
- (6) Tighten each screw until:
 - The screw head is against the structure
 - The connector flange is fully against the structure.

Make sure that the flange of the receptacle is fully flat against the surface of the structure.

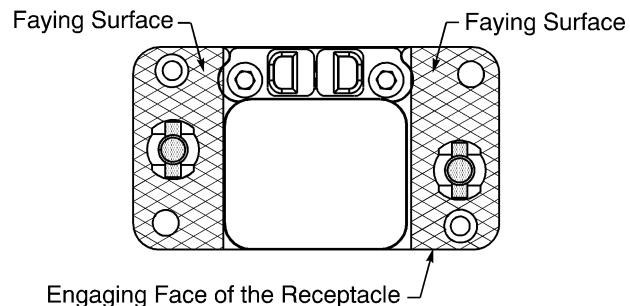
- (7) Torque each screw 13 inch-pounds to 15 inch-pounds.

C. Installation of the Receptacle with a Ground Block

- (1) Prepare the faying surfaces necessary for the electrical bond of the receptacle shell to the structure.

Refer to:

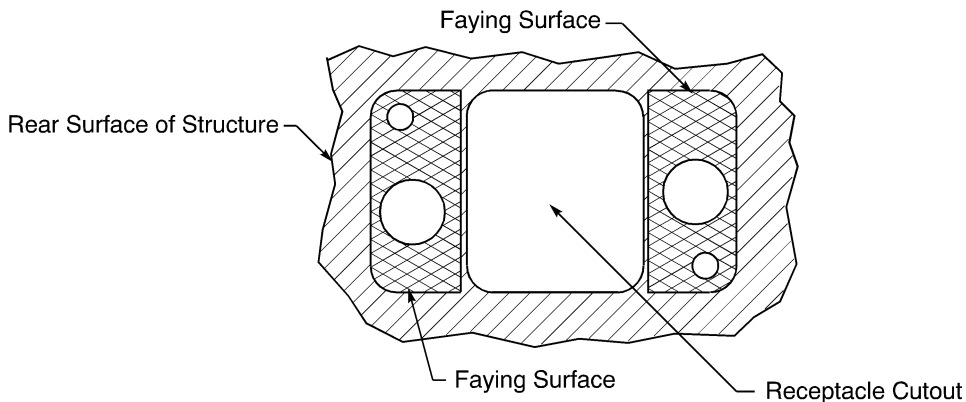
- Figure 102 for the connector receptacle flange
- Figure 103 for the rear surface of the structure
- Figure 104 for the front surface of the structure
- Subject 20-20-00 for the procedures to prepare the faying surface.



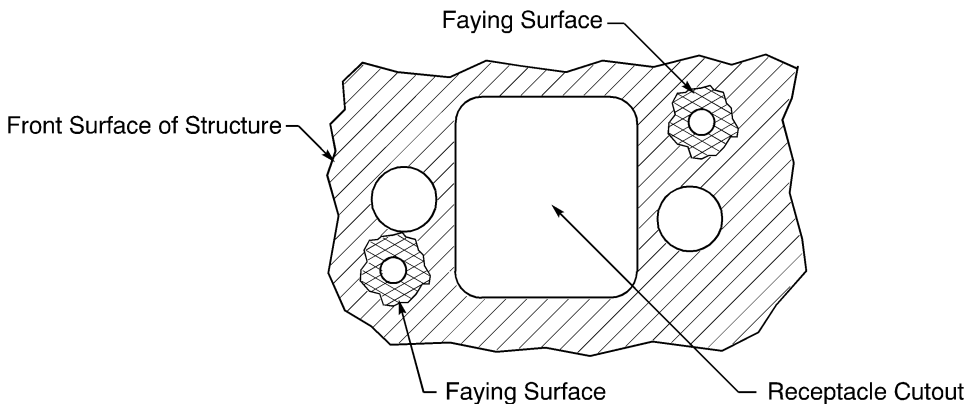
FAYING SURFACE ON THE RECEPTACLE
Figure 102

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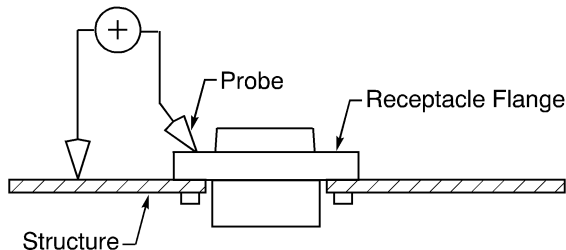


FAYING SURFACE ON THE REAR SIDE OF THE STRUCTURE
Figure 103



FAYING SURFACE ON THE FRONT SIDE OF THE STRUCTURE
Figure 104

- (2) Install the receptacle. Refer to Paragraph 8.B.
- (3) Do the electrical bond test for receptacle connector shells. Refer to Subject 20-20-00 and Figure 105.



TEST POINTS FOR THE RECEPTACLE TO STRUCTURE BOND
Figure 105

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- (4) If the bond has a resistance greater than the maximum for connector shell bonds specified in Subject 20-20-00:
 - Remove the receptacle from the structure. Refer to Paragraph 4.B.
 - Do Step (1) through Step (3) again.

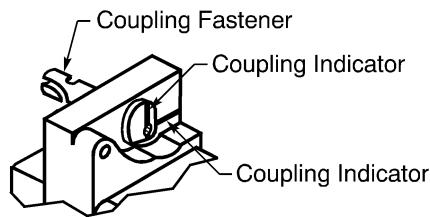
D. Plug and Receptacle Connection

**Table 49
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	3/32
	Screwdriver, Hex	3/32

- (1) Make a selection of a driver from Table 49.
- (2) Put the coupling indicator on each coupling fastener in the position that is perpendicular to the coupling indicator on the plug shell. Refer to Figure 106.

NOTE: The fasteners can be turned by hand.



**POSITION OF THE COUPLING INDICATOR
Figure 106**

- (3) Align the polarization hardware of the plug with the polarization hardware of the receptacle.
- (4) Push the plug forward until the front surface of the insert cavity of the receptacle is against the shell of the plug.

Make sure that the plug and the receptacle are fully engaged.

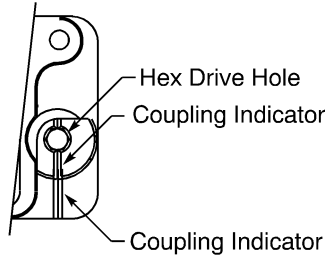
CAUTION: THE PLUG AND THE RECEPTACLE MUST BE FULLY ENGAGED. IF THE PLUG AND THE RECEPTACLE ARE NOT FULLY ENGAGED, DAMAGE TO A COUPLING FASTENER CAN OCCUR.

- (5) With the driver, turn one of the coupling fasteners 1/4 turn in the clockwise direction. Refer to Figure 107.

Make sure that the coupling indicator on the fastener is aligned with the coupling indicator on the plug.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS



ALIGNMENT OF THE COUPLING INDICATORS
Figure 107

- (6) Do Step (5) again for the other coupling fastener to lock the connectors together.
- (7) Examine the engaging end of the coupling fastener.
Make sure that the engaging end of each coupling fastener has no damage.

9. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

Table 50
CONTACT REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
ATR2079	Astro
ATR2080	Astro
M81969/14-11	QPL
RRX20B	Russtech

B. Contact Crimp Tools

Table 51
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
282 557 020	Radiall
282 581 007	Radiall
282 581 008	Radiall
282 581 009	Radiall
282588	Radiall
4046A	Pico
414DA-8N	Pico
M22520/1-01	QPL
M22520/2-01	QPL

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ASSEMBLY OF BACC65AN, BACC65AP, BACC65AV, AND BACC65AW CONNECTORS

Table 51 (continued)

Crimp Tool	Supplier
M22520/1-02	QPL
M22520/1-11	QPL
M22520/5-01	QPL
M22520/2-08	QPL
M22520/2-11	QPL
M22520/2-23	QPL
M22520/5-01	QPL
M22520/5-05	QPL
M22520/5-27	QPL
M22520/5-35	QPL
M22520/5-45	QPL
M22520/5-61	QPL
M22520/23-01	QPL
M22520/23-02	QPL
PICO400B	Pico
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels

C. Contact Insertion Tools

**Table 52
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
CET-12-4	ITT Cannon
CIET-16	ITT Cannon
CIET-20HDL	ITT Cannon
DAK266J	Daniels
DAK83-20	Daniels
M81969/1-01	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M81969/14-11	QPL



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Table 52 (continued)

Insertion Tool	Supplier
M81969/39-01	QPL
ST2220-2-28	Boeing

D. Special Tools

Table 53
SPECIAL TOOL SUPPLIERS

Tool	Supplier
282 521 002	Radiall
600-061	Glenair
A30199	Band-It Idex

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1. GENERAL DATA

A. Damage Conditions - Rear Face of the Insert

Refer to Subject 20-74-02.

B. Damage Conditions - Front Face of the Insert

Refer to Subject 20-74-02.

C. Damage Conditions - Strain Relief Clamp

The strain relief clamp must be replaced if:

- The clamp has a crack
- The wire harness tie tab is broken.

A saddle bar of a strain relief clamp must be replaced if:

- The saddle bar screw hole threads are damaged
- The saddle bar has a crack.

D. Minimum Wire O.D. for an Environmentally Sealed Connector

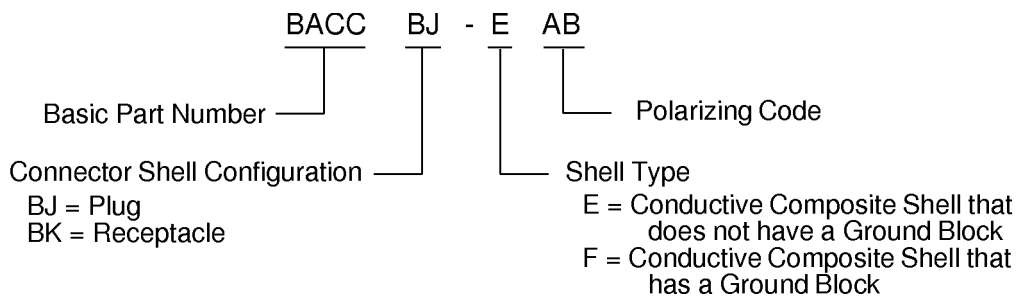
Refer to Subject 20-74-02.

2. PART NUMBERS AND DESCRIPTION

A. Connector Shell Part Numbers

**Table 1
CONNECTOR SHELL PART NUMBERS**

Boeing Standard	Connector Type	Description
BACC65BJ-E	Plug	Nickel Plated Composite, without shield ground block
BACC65BJ-F	Plug	Nickel Plated Composite, with shield ground block
BACC65BK-E	Receptacle	Nickel Plated Composite, without shield ground block
BACC65BK-F	Receptacle	Nickel Plated Composite, with ground block



CONNECTOR PART NUMBER STRUCTURE

Figure 1

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS**

Table 2
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTOR SHELLS

Connector	Supplier
BACC65BJ-E	Radiall
BACC65BJ-F	Radiall
BACC65BK-E	Radiall
BACC65BK-F	Radiall

B. BACC65BJ and BACC65BK Connector Description

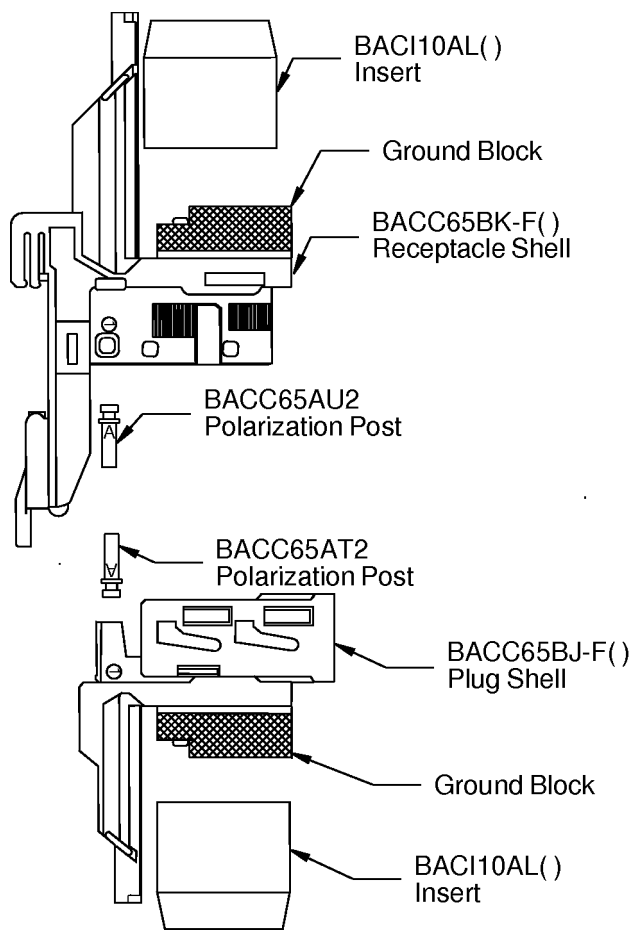
Refer to Figure 2 and Figure 3 for the configuration of the BACC65BJ plug and BACC65BK receptacle.

The BACC65BJ and BACC65BK connectors have these technical features:

- A metallized composite shell
- An integral EMI ground spring on the plug shell
- Shield ground wire terminations on some versions of the plug and the receptacle
- A slide latch mechanism to attach the plug to the receptacle
- A removable insert
- Rear insertion and removal of the insert assembly
- Size 22, 20, 16, 12, and 5 rear release, rear removal, crimp type contacts
- Size 5 coax contacts, rear release and rear removal
- Size 8 Quadrax contacts
- Size 16 fiber optic termini
- Size 22, 20, 16, and 12 rear release, rear removal, crimp type contacts
- A removable EMI backshell when there is no ground block
- 16 polarization positions.

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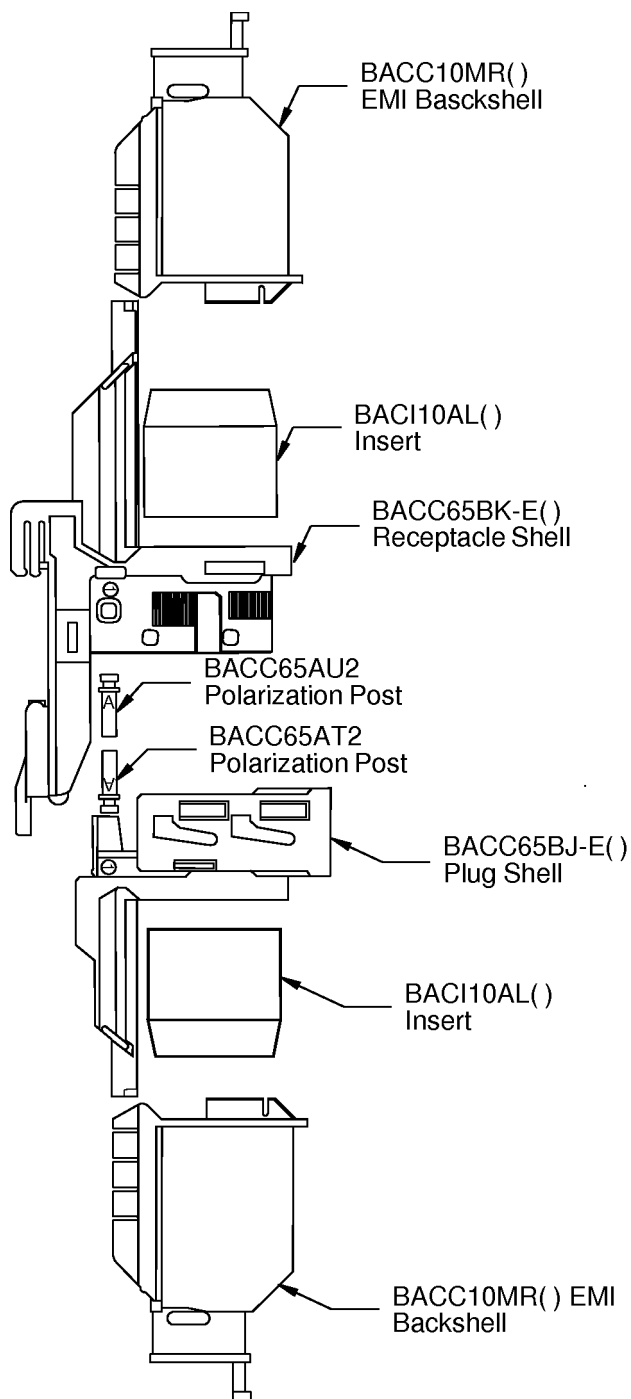
ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



BACC65BJ-F () AND BACC65BK-F () CONNECTOR CONFIGURATIONS
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



BACC65BJ-E () AND BACC65BK-E () CONNECTOR CONFIGURATION
Figure 3



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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

C. Connector Shell Component Part Numbers

**Table 3
CONNECTOR SHELL COMPONENT PART NUMBERS**

Component	Part Number or Standard	Applicable Connector		Supplier
		Part Number	Shell Type	
Polarization Post	BACC65AT2	BACC65BJ	E and F	QPL
Polarization Receptacle	BACC65AU2	BACC65BK	E and F	QPL

**Table 4
APPROVED SUPPLIERS OF BOEING STANDARD CONNECTOR SHELL COMPONENTS**

Boeing Standard	Supplier
BACC65AT	Jerrik
	Radiall
BACC65AU	Jerrik
	Radiall

D. Connector Insert Part Numbers

Refer to Subject 20-74-02.

E. Insert Contact Part Numbers

Refer to Subject 20-74-02.

F. Ground Block Contact Part Numbers

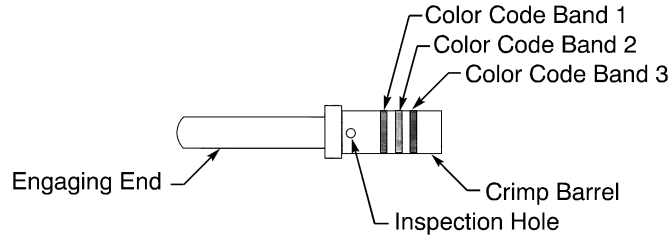
**Table 5
GROUND BLOCK CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Supplier	Color Code	
Engaging End	Crimp Barrel				Band	Color
16	20	Pin	M39029/1-101	QPL	1	Brown
					2	Black
					3	Brown
			S280W555-920	Boeing	1	Red
					2	Red
					3	Red
	18	Pin	S280W555-918	Boeing	1	Red
					2	White
					3	Red

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GROUND BLOCK CONTACTS
Figure 4

Table 6
APPROVED SUPPLIERS OF BOEING STANDARD GROUND BLOCK CONTACTS

Contact	Supplier
S280W555-918	Burndy
	Tri Star
S280W555-920	Burndy
	Tri Star

G. Coax Contact Part Numbers

Refer to Subject 20-74-02.

H. Size 8 Twinax Contacts

Refer to Subject 20-74-02.

I. Size 8 Quadrax Contacts

Refer to Subject 20-74-02.

J. Fiber Optic Contact Terminus Part Numbers

Refer to Subject 20-74-02.

K. Fiber Optic Alignment Sleeve Insert Part Numbers

Refer to Subject 20-74-02.

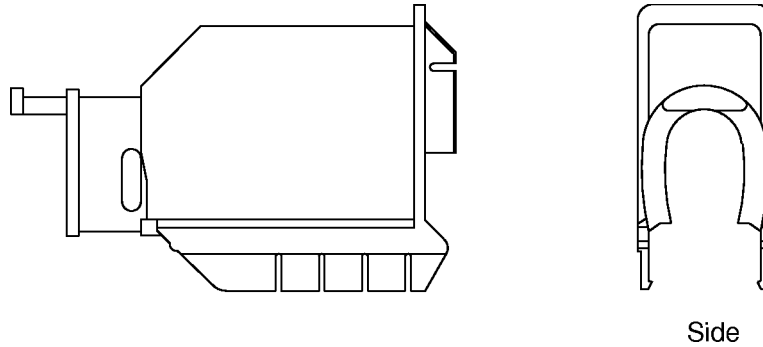
L. EMI Backshell Part Numbers

Table 7
EMI BACKSHELL PART NUMBERS

Boeing Standard	Description
BACC10MR1	Straight

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BACC10MR EMI BACKSHELLS
Figure 5

Table 8
APPROVED SUPPLIERS OF BOEING STANDARD EMI BACKSHELLS

Backshell	Supplier
BACC10MR()	Radiall
	Jerrik

3. INSERT CONFIGURATIONS

A. BAC110AL and BAC110AM Inserts

Refer to Subject 20-74-02.

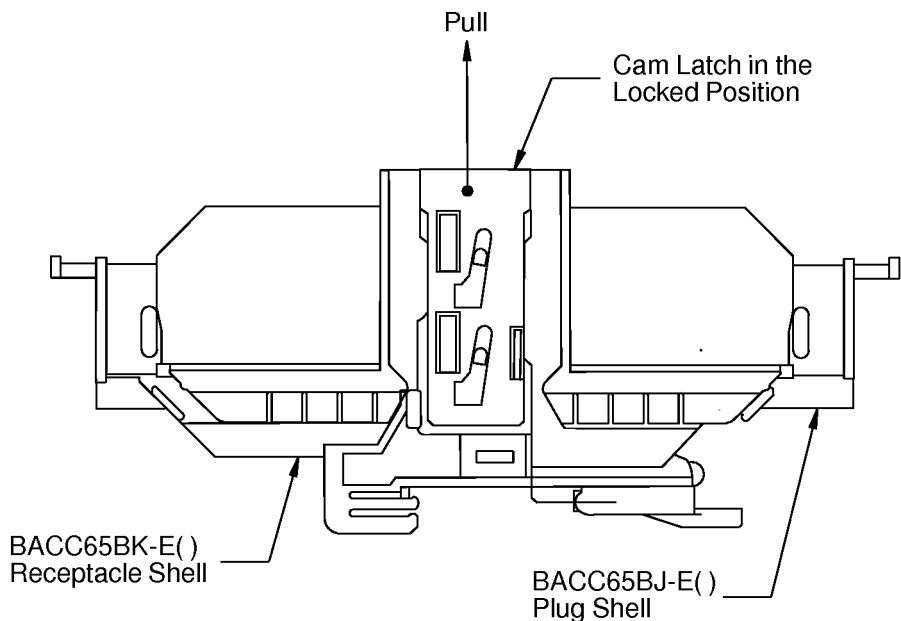
4. CONNECTOR DISASSEMBLY

A. Connector Separation

- (1) Pull the cam latch on the BACC65BJ() plug connector away from the mated connectors until it stops. Refer to Figure 6.

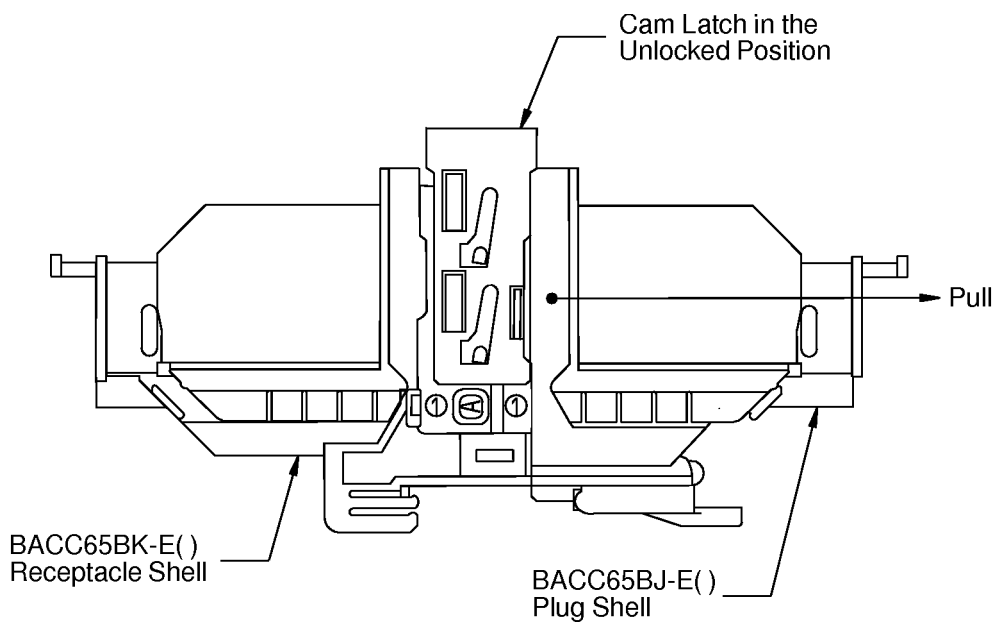
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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



UNLOCKING THE PLUG AND RECEPTACLE

Figure 6



SEPARATION OF THE PLUG AND RECEPTACLE

Figure 7

(2) Pull the plug straight away from the receptacle. Refer to Figure 7.

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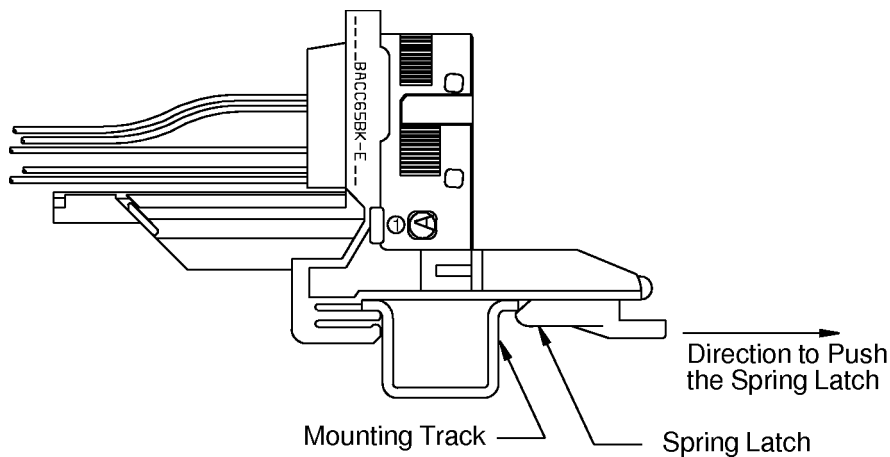
ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

B. Removal of the Receptacle

**Table 9
NECESSARY TOOLS**

Tool	Example	Maximum Shaft Diameter (inch)
A Shaft that Has a Handle	Screwdriver, Hex or Flat Blade	1/8

- (1) Push the spring latch to release the connector from the mounting track. Refer to Figure 8 for the direction to push the latch.

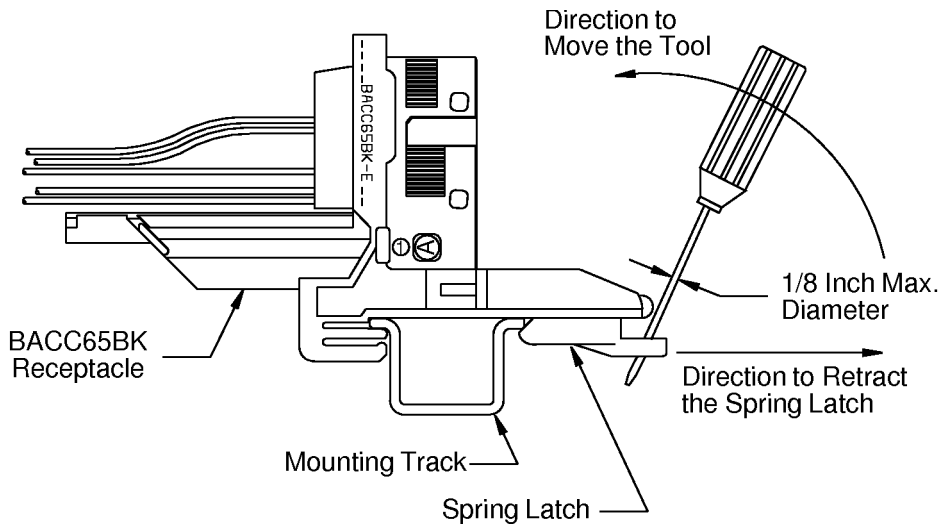


**DIRECTION TO PUSH THE SPRING LATCH FOR RECEPTACLE REMOVAL
Figure 8**

- (2) If the latch does not move, make a selection of a tool from Table 9 to release the connector from the mounting track.
- (3) Put the end of the tool in the hole in the end of the spring latch. Refer to Figure 9 for location to put the tool.

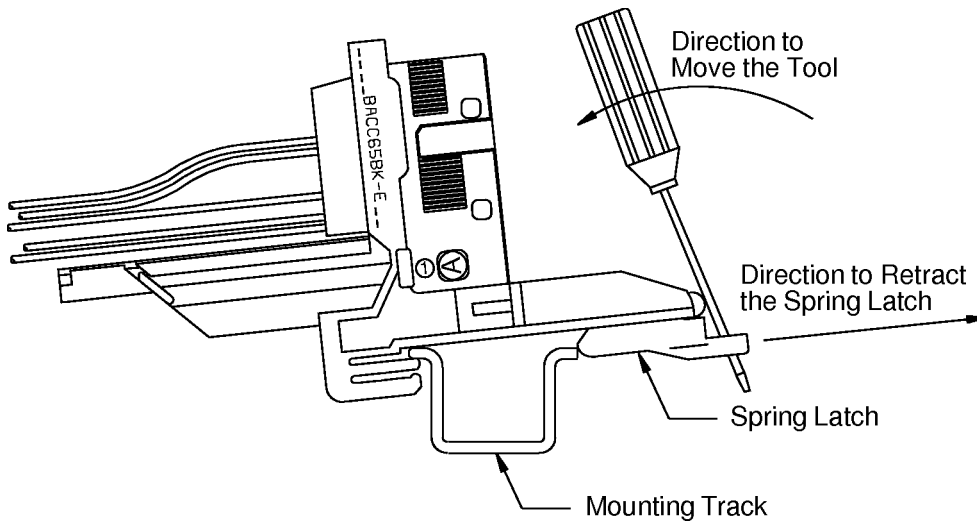
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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



POSITION OF THE TOOL FOR RECEPTACLE REMOVAL STEP 1
Figure 9

- (4) Move the handle of the tool toward the connector to release the connector from the track. Refer to Figure 9 and Figure 10 for direction toe move the tool..

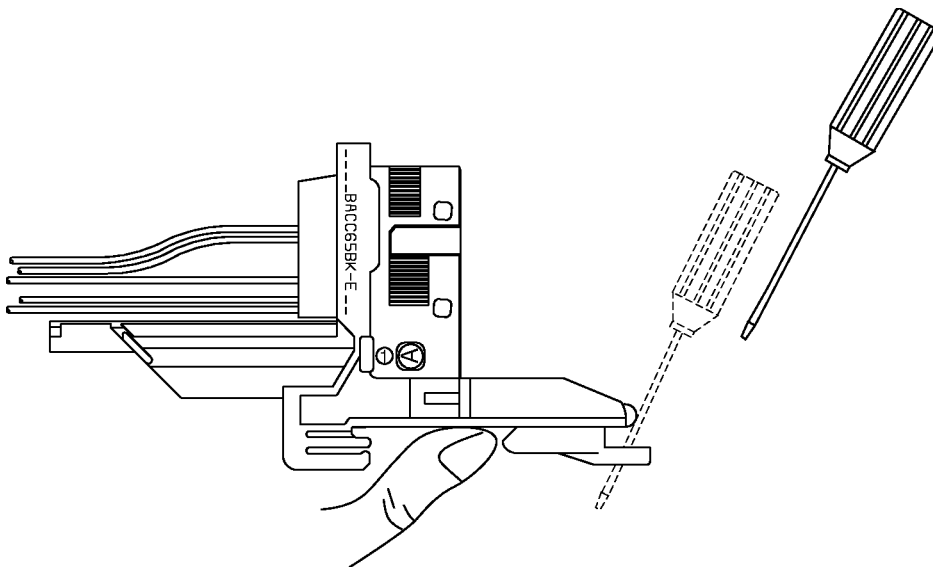


POSITION OF THE TOOL FOR RECEPTACLE REMOVAL STEP 2
Figure 10

- (5) Hold the spring latch with a finger, and at the same time, move handle of the tool back away from the connector and pull the tool out of the spring latch. Refer to Figure 11.

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



REMOVAL OF THE TOOL FROM THE SPRING LATCH

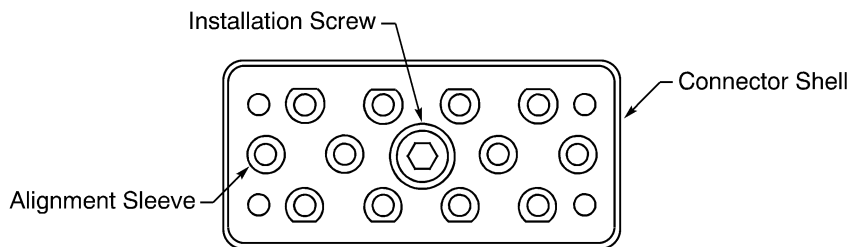
Figure 11

C. Removal of the Alignment Sleeve Insert

CAUTION: DO NOT PULL, SHAKE, OR TWIST THE ALIGNMENT SLEEVE INSERT FROM THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

**Table 10
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64



ALIGNMENT SLEEVE INSERT INSTALLATION SCREW

Figure 12

(1) Make a selection of a driver from Table 10.

NOTE: The driver can have a ball type end.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

- (2) Turn the installation screw in a counterclockwise direction until the screw is disengaged from the face of the connector.

CAUTION: DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT TO REMOVE IT FROM THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

- (3) Put the alignment sleeve insert in a clean plastic bag.

CAUTION: KEEP THE ALIGNMENT SLEEVE INSERT IN A CLEAN PLASTIC BAG UNTIL IT IS INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

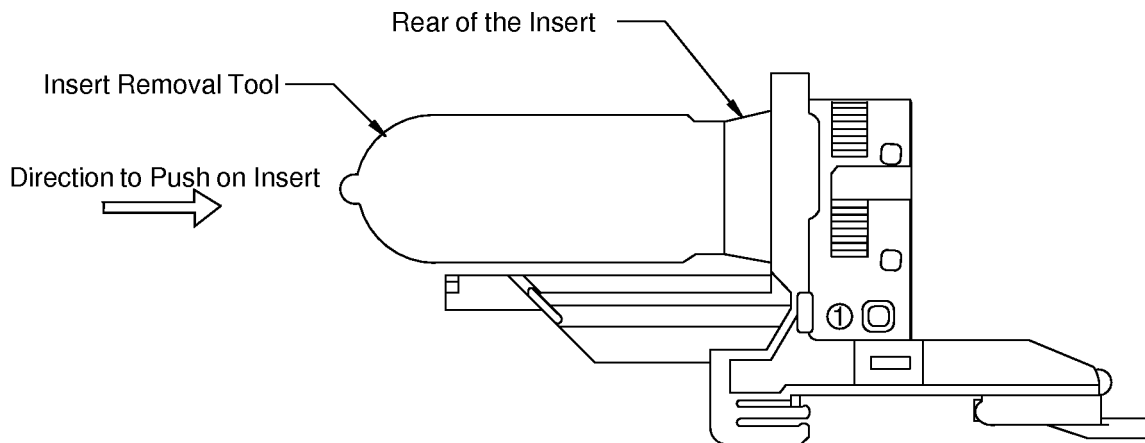
D. Insert Removal

NOTE: Remove the insert contacts before the insert is removed.

**Table 11
INSERT REMOVAL TOOLS**

Tool	Part Number
Insert Removal Tool	282 521 002
Insert Removal Tool	282 521 005

- (1) Make a selection of an insert removal tool from Table 11.
- (2) Remove the EMI backshell from the connector; refer to Paragraph 4.G.
- (3) Remove the ground block contacts from the ground block; refer to Paragraph 4.F.
- (4) From the rear of the connector, align the two ends of the removal tool with the rear of the insert. Refer to Figure 13.



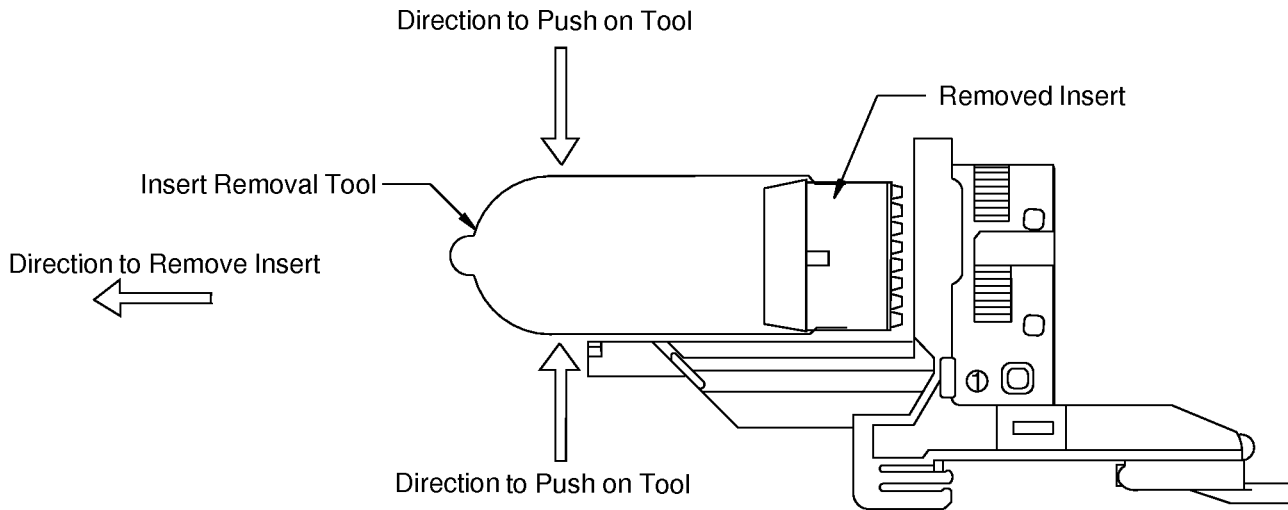
**ALIGNMENT OF THE INSERT REMOVAL TOOL
Figure 13**

- (5) Carefully push the removal tool between the insert cavity and the insert. Make sure to keep the tool aligned with the insert.
- (6) Push the two sides of the tool at the same time into the connector.

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(7) Pull the insert removal tool and the insert straight out of the connector. Refer to Figure 14.



REMOVAL OF THE INSERT
Figure 14

E. Seal Plug and Seal Rod Removal

Refer to Subject 20-74-02.

F. Contact Removal

This paragraph gives the procedure to remove size 16 contacts from the ground block:

For the procedure to remove contacts from the connector insert, refer to Subject 20-74-02.

Table 12
REMOVAL TOOLS FOR SIZE 16 GROUND BLOCK CONTACTS

Contact Cavity Size	Contact			Removal Tool	
	Engaging End Size	Crimp Barrel Size	Size	Part Number	Color
16	16	18	1618	ATR2080	-
				ATR2079	-
				M81969/14-11	White
				RRX20B	-
	20	1620	ATR2080	-	
			ATR2079	-	
			M81969/14-11	White	
			RRX20B	-	

(1) Make a selection of a contact removal tool from Table 12 for size 16 ground block contacts:

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CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

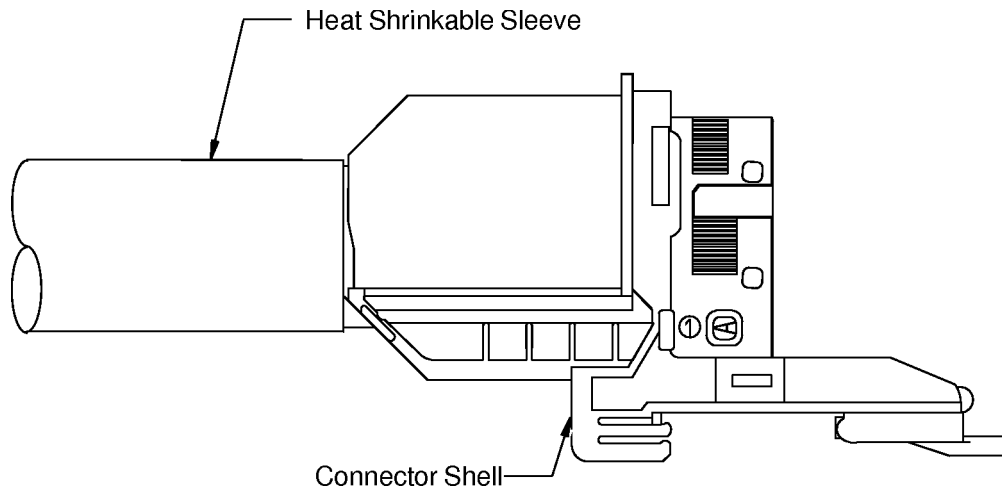
- (2) Remove the plastic tie straps or the wire harness ties that are less than 6 inches from the connector.
- (3) Put the tip of the removal tool on the wire near the grommet or the ground block.
- (4) Axially align the removal tool and the contact cavity.
- (5) Carefully push the removal tool straight into the contact cavity until it stops.
- (6) Carefully pull the wire and the removal tool straight out of the contact cavity at the same time.
- (7) If the contact is not released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (3) through Step (6) again.

G. EMI Backshell Removal

**Table 13
EMI BACKSHELL REMOVAL TOOLS**

Tool	Supplier
Diagonal Cutter	An available source
Knife	An available source

- (1) Remove the heat shrinkable sleeve from the wire harness. Refer to Figure 15.



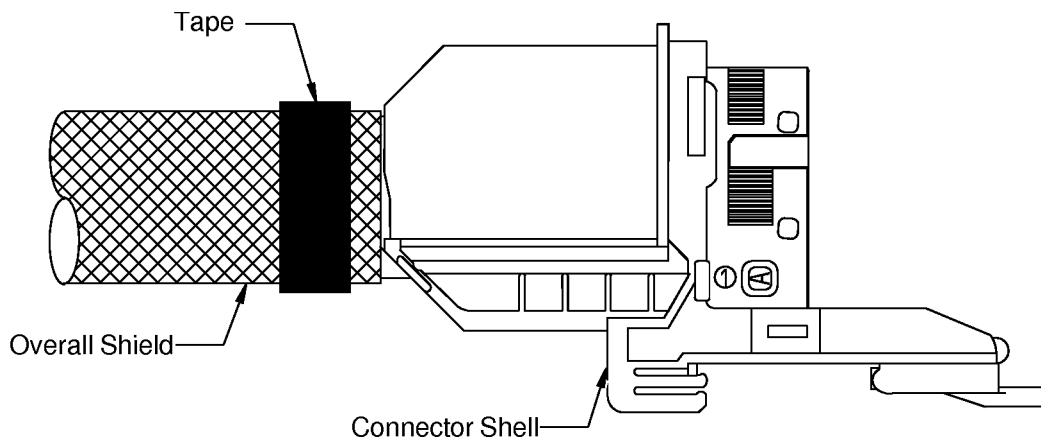
**REMOVAL OF THE HEAT SHRINKABLE SLEEVE
Figure 15**

- (a) If the heat shrinkable sleeve has tie straps or wire harness ties, cut them off.
- (b) Carefully make a longitudinal cut in the heat shrinkable sleeve from one end to the other end.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS**

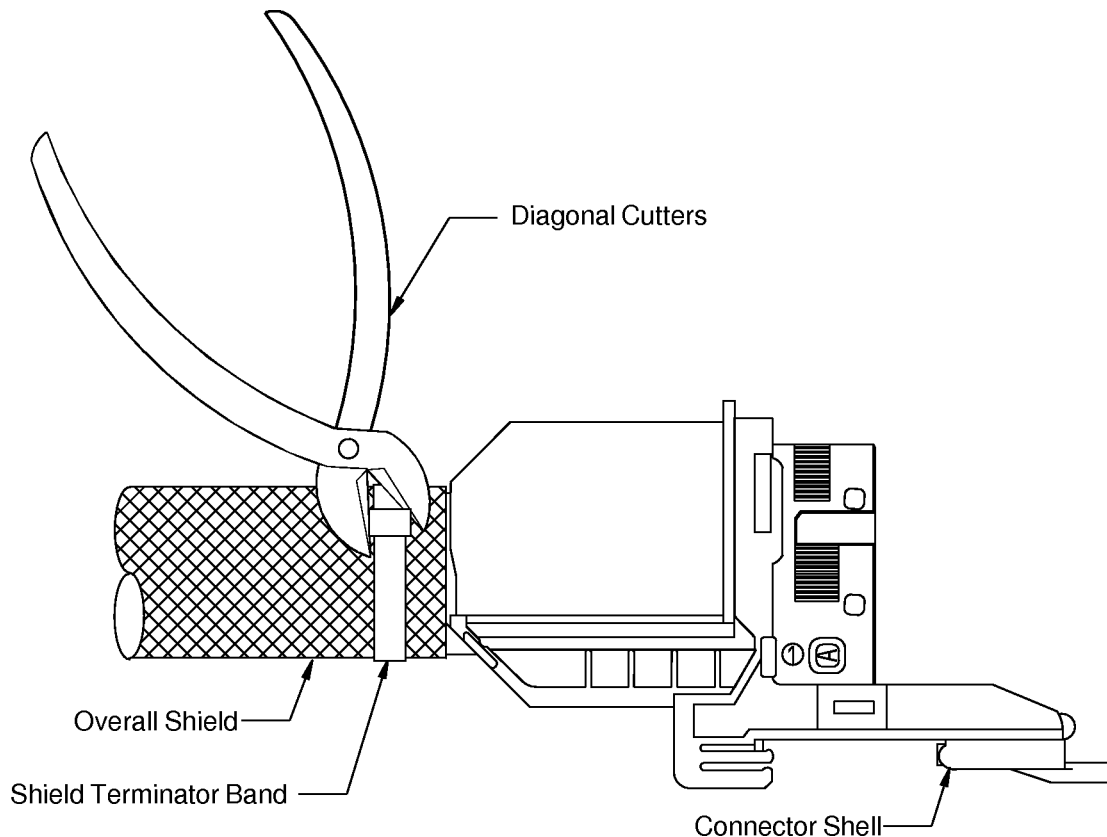
CAUTION: DO NOT CUT INTO THE STRANDS OF THE OVERALL SHIELD OR OTHER COMPONENTS OF THE WIRE HARNESS. DAMAGE TO THE SHIELD OR COMPONENTS CAN OCCUR.

- (c) Remove the heat shrinkable sleeve from the wire harness.
- (2) Remove the tape at the end of the overall shield. Refer to Figure 16.



REMOVAL OF THE TAPE
Figure 16

- (3) Make a selection of a pair of diagonal cutters from Table 13.
- (4) Remove the shield terminator band from the overall shield. Refer to Figure 17.

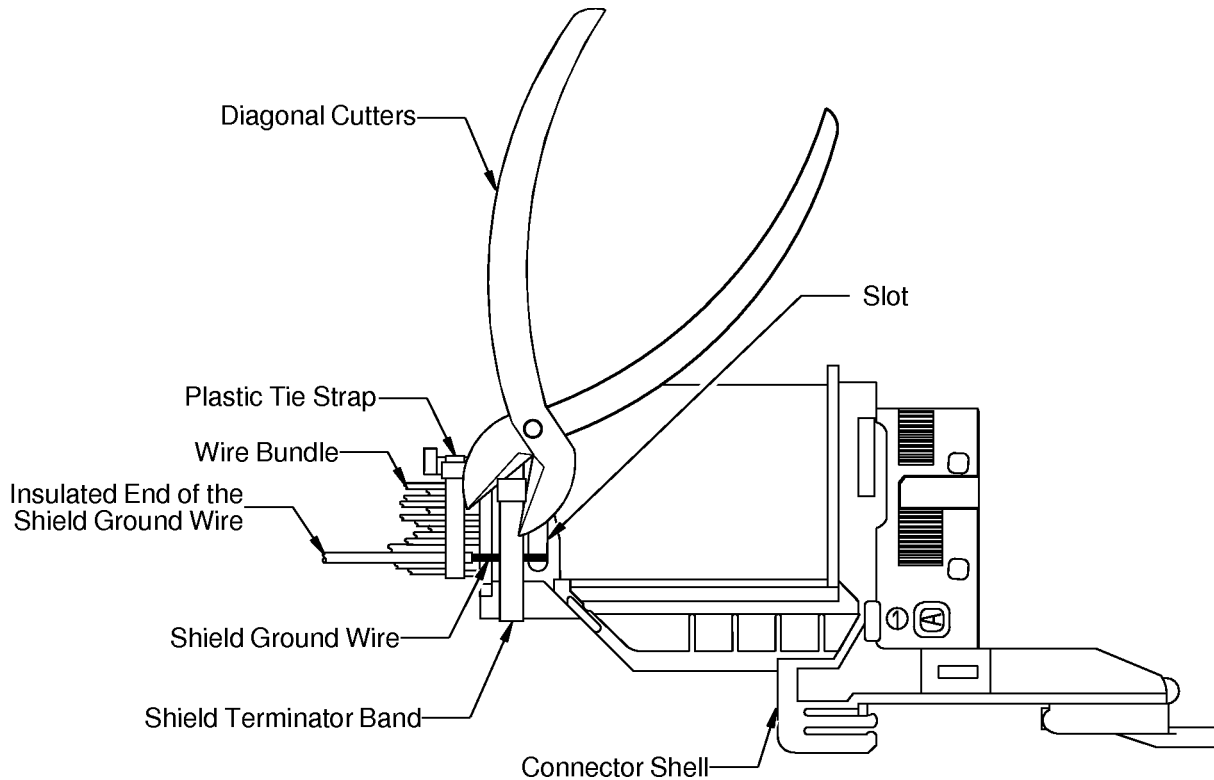
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS****REMOVAL OF THE SHIELD TERMINATOR BAND FROM THE OVERALL SHIELD****Figure 17**

- (a) Hold the buckle of the shield terminator band with the cutters.
- (b) Rotate the cutters and lift the buckle of the band away from the backshell until the buckle releases or the band breaks.
- (c) Remove the band.
- (5) Push the overall shield away from the band termination platform.
- (6) Remove the shield terminator band from the shield ground wires on the band termination platform. Refer to Figure 18.

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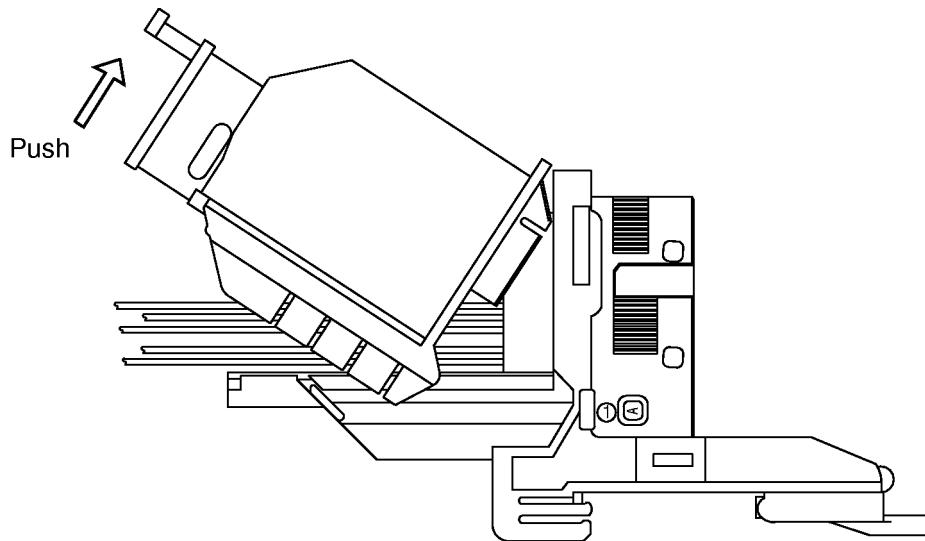


REMOVAL OF THE SHIELD TERMINATOR BAND FROM THE BAND TERMINATION PLATFORM
Figure 18

- (a) Hold the buckle of the shield terminator band with the cutters.
- (b) Rotate the cutters and lift the buckle of the band away from the backshell until the buckle releases or the band breaks.
- (c) Remove the band.
- (7) Remove the plastic tie strap. Refer to Figure 18.
- (8) If the connector has a shield ground wire that comes out of the slot in the EMI backshell:
 - (a) Remove the insulation on the shield ground wire. Refer to Figure 18.
 - (b) Push the EMI Backshell up away from the connector shell.
 - (c) Push the shield ground wire into the slot.
 - (d) Pull the shield ground wire out of the EMI backshell.
 - (e) Do Step (c) and Step (d) for each shield ground wire.
- (9) Remove the EMI backshell from the connector shell. Refer to Figure 19.

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REMOVAL OF THE EMI BACKSHELL FROM THE CONNECTOR SHELL
Figure 19

5. CONNECTOR ASSEMBLY

A. Shield Ground Wire Assembly

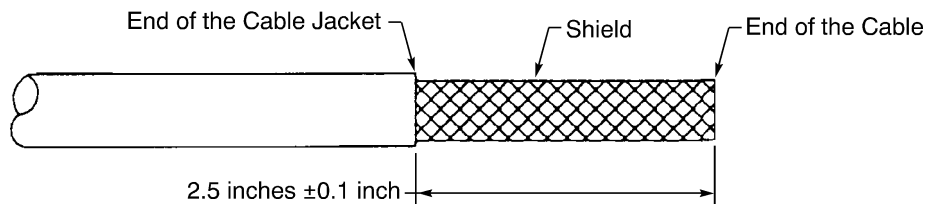
This paragraph gives the procedure to assemble a shield ground wire and a contact for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Raychem 55A6160-() cable, refer to Paragraph 5.C.
- BMS13-60 Type 27 Class 1 wire, refer to Paragraph 5.D.
- The termination of the shield at the EMI backshell, refer to Paragraph 5.B.

- (1) Remove 2.5 inches \pm 0.1 inch of the cable jacket from the end of the cable. Refer to Figure 20.



CABLE JACKET REMOVAL
Figure 20

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

- (2) Assemble an insulated shield ground wire. Refer to Subject 20-10-15.

NOTE: The shield ground wire must have the same size as the crimp barrel of the applicable contact. Refer to:

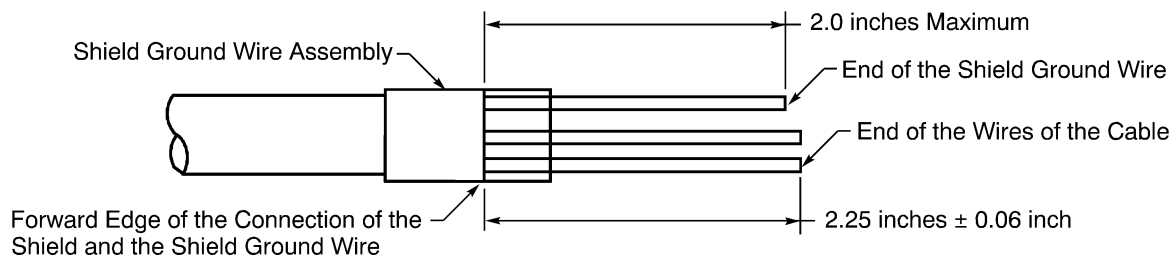
- Table 5 for the ground block contact
- Subject 20-74-02 for the insert contact.

Make sure that:

- The shield ground wire assembly components are applicable for the shield material of the wire
- The length of the shield ground wire is 2.5 inches minimum
- The free end of the shield ground wire is pointed forward to the end of the cable.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A CABLE OR A WIRE WITH A SHIELD THAT HAS NICKEL PLATED CONDUCTORS. UNSATISFACTORY PERFORMANCE OF THE SHIELD TERMINATION CAN OCCUR.

- (3) Remove the unwanted length from the end of the shield ground wire and the wires of the cable. Refer to Figure 21.



LENGTH OF THE SHIELD GROUND WIRE AND THE WIRES OF THE CABLE

Figure 21

NOTE: The connection of the shield and the shield ground wire can be:

- The melted solder ring of a solder sleeve
- A mechanical ferrule
- An RSK Shield-Kon.

- (a) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the connection to the end of the shield ground wire equal to 2.0 inches maximum.
- (b) Remove the necessary length from the end of the each wire of the cable to make the distance from the forward edge of the connection to the end of the wire equal to 2.25 inches ± 0.06 inch.
- (4) Assemble the specified contact on the end of the shield ground wire.

For the procedure to assemble:

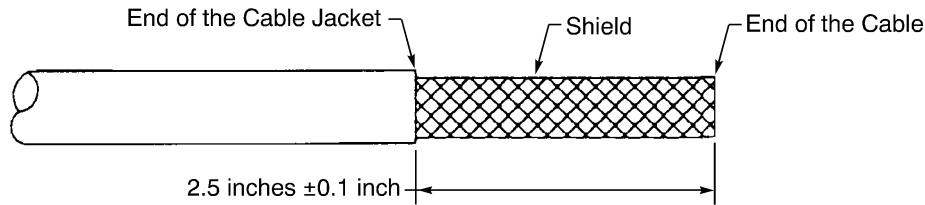
- An insert contact, refer to Subject 20-74-02
- A ground block contact, refer to Paragraph 5.F. .

B. Shield Ground Wire Assembly for Shield Termination at the EMI Backshell

- (1) Remove 2.50 inches ± 0.1 inch of the cable jacket from the end of the cable. Refer to Figure 22.

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



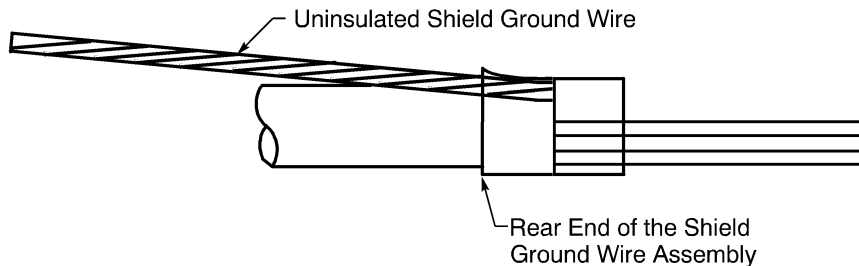
CABLE PREPARATION
Figure 22

(2) Assemble an uninsulated shield ground wire. Refer to Subject 20-10-15 and Figure 23.

Make sure that:

- The size of the shield ground wire is AWG 20
- The length of the shield ground wire is 5 inches minimum
- The shield ground wire is pointed back away from the end of the cable.

CAUTION: A SHIELD GROUND WIRE ASSEMBLY WITH A SOLDER SLEEVE IS NOT APPLICABLE FOR A CABLE OR A WIRE WITH A SHIELD THAT HAS NICKEL PLATED CONDUCTORS. UNSATISFACTORY PERFORMANCE OF THE SHIELD TERMINATION CAN OCCUR.



SHIELD GROUND WIRE CONFIGURATION
Figure 23

C. Shield Ground Wire Assembly for Raychem 55A6160-() Cable

This paragraph gives the procedure to assemble the shield ground wires and contacts for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Wire or cable that has one shield, refer to Paragraph 5.A.
- BMS13-60 Type 27 Class 1 wire, refer to Paragraph 5.D.

Table 14
NECESSARY PARTS

Part	Boeing Standard	Shield Ground Wire Size (AWG)
Solder Sleeve with an integral wire	BACS13CT3C	20

STANDARD WIRING PRACTICES MANUAL

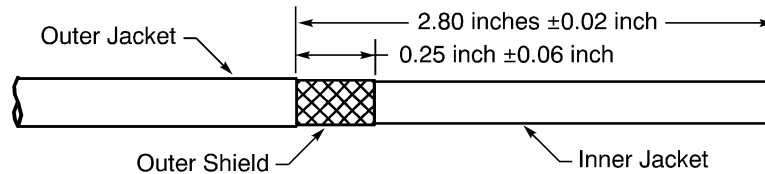
ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

- (1) Make a selection of a solder sleeve with an integral wire from Table 14.

NOTE: Two solder sleeves are necessary.

Refer to Subject 20-10-15 for approved suppliers of Boeing standard solder sleeves.

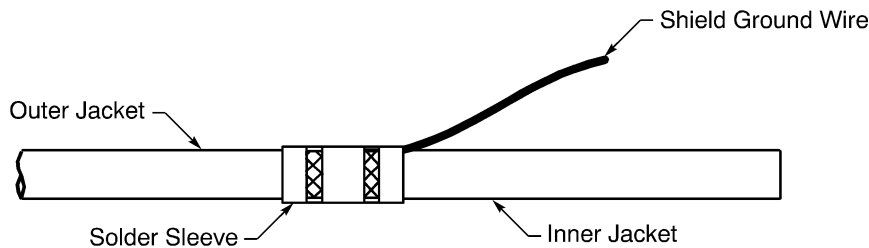
- (2) Prepare the cable for termination of the outer shield. Refer to Figure 24 and Subject 20-00-15.



OUTER JACKET AND OUTER SHIELD REMOVAL

Figure 24

- (a) Remove 2.80 inches ± 0.02 inch of the outer jacket from the end of the cable.
- (b) Remove the necessary length of the shield to make the distance from the end of the jacket to the end of the shield equal to 0.25 inch ± 0.06 inch.
- (3) Assemble the shield ground wire of the outer shield. Refer to Figure 25.



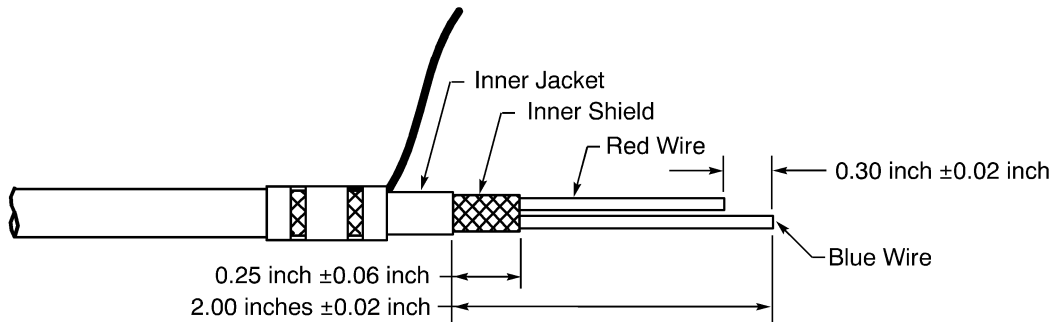
TERMINATION OF THE OUTER SHIELD

Figure 25

- (a) Put the solder sleeve on the wire or cable.
- Make sure that:
- The free end of the shield ground wire is pointed forward to the end of the cable
 - The large end of the solder sleeve is put on the wire or cable first
 - The inner edge of the rear seal ring is aligned with the end of the outer jacket.
- (b) Shrink the solder sleeve into its position.
- Make sure that:
- The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (c) Remove the necessary length of the shield ground wire to make the distance from the forward edge of the solder ring to the end of the wire equal to 2.0 inches maximum.
- (4) Prepare the cable for termination of the inner shield. Refer to Figure 26 and Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



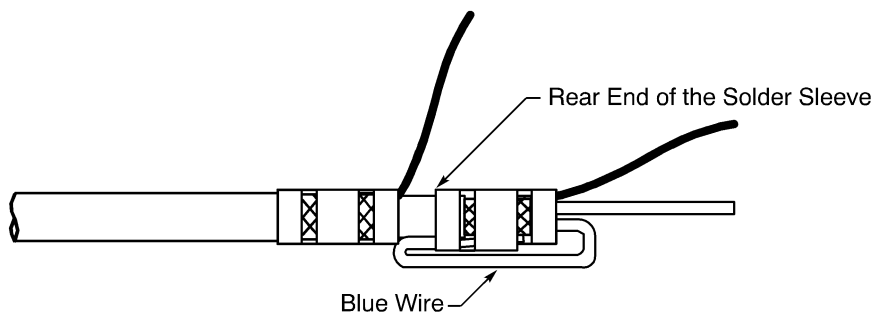
INNER JACKET AND INNER SHIELD REMOVAL

Figure 26

- (a) Remove 2.00 inches ± 0.02 inch of the inner jacket from the end of the cable.
- (b) Remove the necessary length of the inner shield to make the distance from the end of the shield to the end of the jacket equal to 0.25 inch ± 0.06 inch.
- (c) Remove the necessary length of the red wire to make the distance from the end of the red wire to the end of the blue wire equal to 0.30 inch ± 0.02 inch.
- (d) Remove 0.21 inch ± 0.02 inch of insulation from the end of the blue wire. Refer to Subject 20-00-15.
- (5) Assemble the shield ground wire of the inner shield. Refer to Figure 27.

Make sure that:

- The free end of the shield ground wire is pointed forward to the end of the cable
- The large end of the solder sleeve is put on the wire or cable first
- The inner edge of the rear seal ring is aligned with the end of the jacket.



TERMINATION OF THE INNER SHIELD

Figure 27

- (a) Fold the blue wire back and put the end of the wire between the inner shield and the rear end of the solder sleeve.

Make sure the center of the conductor is aligned with the solder ring of the solder sleeve.

CAUTION: THE STRANDS OF THE WIRE MUST NOT GO INTO THE SHIELD OF THE CABLE. A SHORT CIRCUIT BETWEEN THE CONDUCTOR OF THE WIRE CAN OCCUR.

- (b) Shrink the solder sleeve into its position.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

Make sure that:

- The solder sleeve stays in the correct position
 - A minimum of 75 percent of the indicator ring on top of the solder ring is melted.
- (c) Remove the necessary length of the shield ground wire to make the distance from the forward edge of the solder ring to the end of the wire equal to 2.0 inches maximum.
- (6) Assemble the specified contact on the end of the shield ground wire.

For the assembly of:

- A ground block contact, refer to Paragraph 5.F.
- An insert contact, refer to Subject 20-74-02

D. Shield Ground Wire Assembly for BMS13-60 Type 27 Class 1 Wire

This paragraph gives the procedure to assemble shield ground wires and contacts for installation in:

- The connector ground block
- The connector insert.

For the procedure to assemble the shield ground wires for:

- Wire or cable that has one shield, refer to Paragraph 5.A.
- Raychem 55A6160-() cable, refer to Paragraph 5.C.

**Table 15
MECHANICAL FERRULE PART NUMBERS**

Shield	Ferrule Type	Boeing Standard
Inner	Inner	BACS13S071BNP
	Outer	BACS13S149CNP
Outer	Inner	BACS13S090BNP
	Outer	BACS13S175CNP

NOTE: Refer to Subject 20-10-15 for approved suppliers of Boeing standard mechanical ferrules.

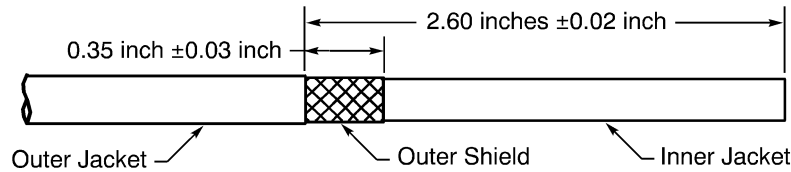
**Table 16
NECESSARY MATERIALS**

Material	Part Number	Supplier
Sleeve, Heat Shrinkable	SAE-AMS-DTL-23053/12 Class 2	QPL
	SAE-AMS-DTL-23053/12 Class 5	QPL
	TFE-2X	Zeus
	TFE-4X	Zeus

- (1) Prepare the cable for the termination of the outer shield. Refer to Figure 28 and Subject 20-00-15.

STANDARD WIRING PRACTICES MANUAL

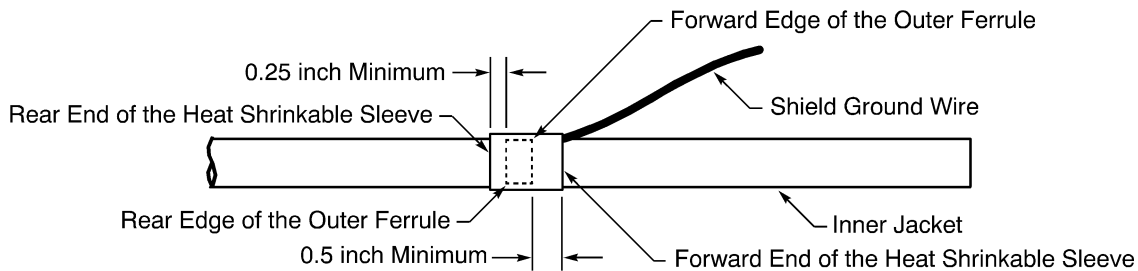
ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



OUTER JACKET AND OUTER SHIELD REMOVAL

Figure 28

- (a) Remove 2.60 inches ± 0.02 inch of the outer jacket from the end of the cable.
 - (b) Remove the necessary length of the outer shield to make the distance from the end of the jacket to the end of the shield equal to 0.35 inch ± 0.03 inch.
- (2) Assemble the shield ground wire of the outer shield. Refer to Figure 29.



TERMINATION OF THE OUTER SHIELD

Figure 29

- (a) Make a selection of an inner and outer ferrule from Table 15.
 - (b) Make a selection of a ferrule crimp tool. Refer to Subject 20-10-15.
 - (c) Make a selection of a heat shrinkable sleeve from Table 16.
- Make sure that the heat shrinkable sleeve has the smallest diameter that can move freely on the shield ground wire assembly.

NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.

- (d) Make a selection of a shield ground wire. Refer to Subject 20-10-15.
- NOTE: The shield ground wire must have the same size as the crimp barrel of the specified contact. Refer to Table 5 for the ground block contact.

- (e) Put the outer ferrule on the cable.
- (f) Put the inner ferrule on the cable.

Make sure that:

- The inner ferrule is between the shield and the inner jacket
- The rear end of the inner ferrule is tight against the end of the outer jacket.

- (g) Remove the necessary length of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.

Make sure that the bare conductor can extend a small amount farther than the length of the outer ferrule.

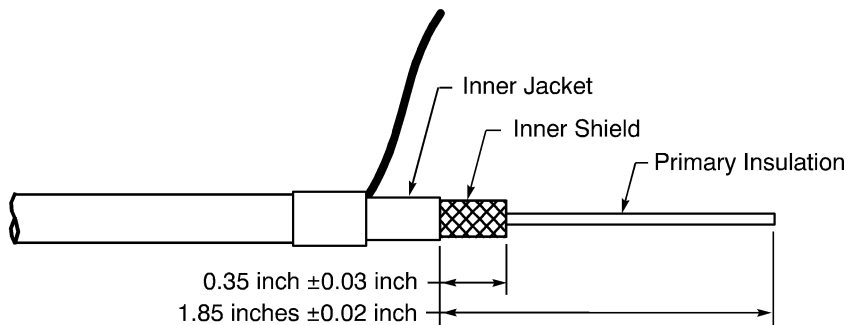
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

- (h) Put the conductor of the shield ground wire between the shield and the outer ferrule.
Make sure that:
 - The free end of the shield ground wire is pointed forward to the end of the wire
 - The bare conductor extends a small amount farther than the rear end of the outer ferrule.
- (i) Push the outer ferrule and the shield ground wire forward until the center of the outer ferrule is aligned with the center of the inner ferrule.
- (j) Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.
- (k) Crimp the outer ferrule.
- (l) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

- (m) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the outer ferrule to the end of the wire equal to 2.0 inches maximum.
 - (n) Put the necessary length of heat shrinkable sleeve on the wire or cable.
Make sure that the distance:
 - From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
 - From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.
 - (o) Shrink the sleeve into its position. Refer to Subject 20-10-14.
- (3) Prepare the cable for the termination of the inner shield. Refer to Figure 30 and Subject 20-00-15.



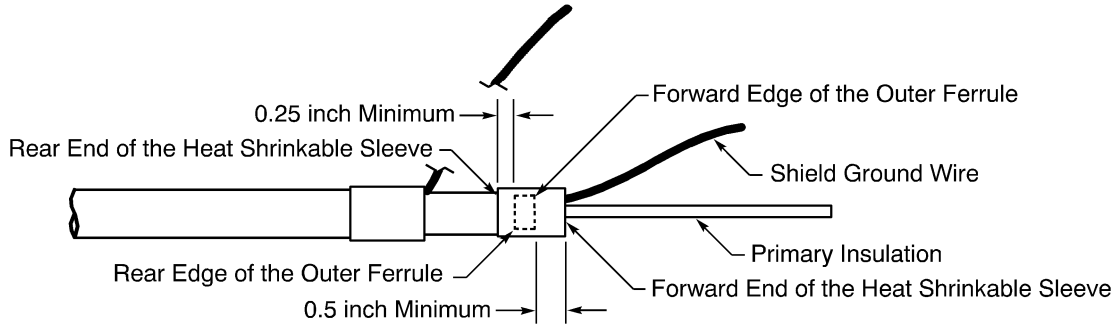
INNER JACKET AND INNER SHIELD REMOVAL

Figure 30

- (a) Remove 1.85 inches ±0.02 inch of the inner jacket from the end of the cable.
 - (b) Remove the necessary length of the inner shield to make the distance from the end of the jacket to the end of the shield equal to 0.35 inch ±0.03 inch.
- (4) Assemble the shield ground wire of the inner shield. Refer to Figure 31.

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



TERMINATION OF THE INNER SHIELD

Figure 31

- (a) Make a selection of an inner and outer ferrule from Table 15.
 - (b) Make a selection of a ferrule crimp tool. Refer to Subject 20-10-15.
 - (c) Make a selection of a heat shrinkable sleeve from Table 16.
Make sure that the heat shrinkable sleeve has the smallest diameter that can move freely on the shield ground wire assembly.
- NOTE: For alternative heat shrinkable sleeves, refer to Subject 20-00-11.
- (d) Make a selection of a shield ground wire. Refer to Subject 20-10-15.
NOTE: The shield ground wire must have the same size as the crimp barrel of the specified contact. Refer to Subject 20-74-02 for the insert contact.
 - (e) Put the outer ferrule on the cable.
 - (f) Put the inner ferrule on the cable.
Make sure that:
 - The inner ferrule is between the shield and the primary insulation
 - The rear end of the inner ferrule is tight against the end of the inner jacket.
 - (g) Remove the necessary length of insulation from one end of the shield ground wire. Refer to Subject 20-00-15.
Make sure that the bare conductor can extend a small amount farther than the length of the outer ferrule.
 - (h) Put the conductor of the shield ground wire between the shield and the outer ferrule.
Make sure that:
 - The free end of the shield ground wire is pointed forward to the end of the wire
 - The bare conductor extends a small amount farther than the rear end of the outer ferrule.
 - (i) Push the outer ferrule and the shield ground wire forward until the center of the outer ferrule is aligned with the center of the inner ferrule.
 - (j) Make sure that the forward end of the inner ferrule does not extend farther than 0.06 inch from the forward end of the outer ferrule.
 - (k) Crimp the outer ferrule.

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- (l) Remove the unwanted length of the shield that extends farther than the forward edge of the outer ferrule.

NOTE: The outer surface of the inner ferrule can be used to cut against.

- (m) Remove the necessary length from the end of the shield ground wire to make the distance from the forward edge of the outer ferrule to the end of the wire equal to 2.0 inches maximum.
- (n) Put the necessary length of heat shrinkable sleeve on the wire or cable.

Make sure that the distance:

- From the rear end of the ferrule to the rear end of the sleeve is 0.25 inch minimum
- From the forward end of the ferrule to the forward end of the sleeve is 0.5 inch minimum.

- (o) Shrink the sleeve into its position. Refer to Subject 20-10-14.

- (5) Assemble the specified contact on the end of the shield ground wire.

For the assembly of:

- A ground block contact, refer to Paragraph 5.F.
- An insert contact, refer to Subject .20-74-02

E. Contact Assembly

For the procedure to assemble:

- Insert contacts, refer to Subject 20-74-02
- Ground block contacts, refer to Paragraph 5.F. .

F. Ground Block Contact Assembly

**Table 17
GROUND BLOCK CONTACT CRIMP TOOLS**

Contact			Wire Size (AWG)	Crimp Tool			
Engaging End Size	Crimp Barrel Size	Size		Basic Unit		Locator	
				Part Number	Setting	Part Number	Color
16	18	1618	18	M22520/1-01	4	M22520/1-02	Red
				M22520/2-01	7	M22520/2-11	-
				WA22	7	M22520/2-11	-
				WA22LC	7	M22520/2-11	-
				WA27F	4	M22520/1-02	Red
	20	1620	20	M22520/1-01	5	M22520/1-02	Red
				WA27F	5	M22520/1-02	Red

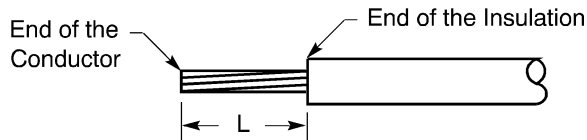
- (1) Make a selection of a crimp tool from Table 17.
- (2) Remove 0.18 inch ± 0.02 inch of insulation from the end of the shield ground wire.

Refer to:

- Figure 32
- Subject 20-00-15 for the insulation removal procedures.

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



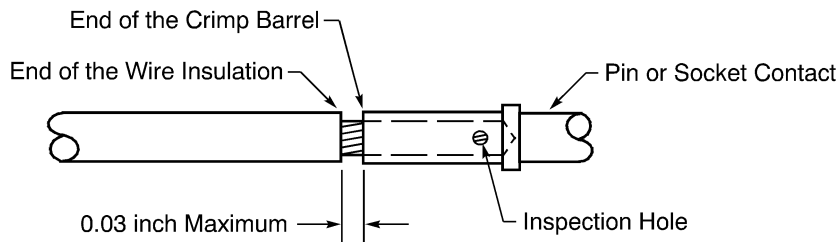
INSULATION REMOVAL LENGTH

Figure 32

(3) Put the end of the wire in the crimp barrel of the contact. Refer to Figure 33.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT

Figure 33

(4) Crimp the contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch.

G. Size 5 Coax Contact Assembly

Refer to Subject 20-74-02.

H. Assembly of Size 5 Power Contacts

Refer to Subject 20-74-02.

I. Assembly of Size 8 Coax Contacts

Refer to Subject 20-74-02.

J. Size 8 Twinax Contact Assembly

Refer to Subject 20-74-02.

K. Insertion of Size 8 Coax and Size 8 Twinax Contacts

Refer to Subject 20-74-02.

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

L. Size 8 Quadrax Contact Assembly

Refer to Subject 20-74-02.

M. Contact Insertion

This paragraph gives the procedure to install ground block contacts. For the procedure to install insert contacts, refer to Subject 20-74-02.

NOTE: Insert contacts can be installed in the insert before or after the insert is installed in the connector shell.

If a cable clamp is specified, it must be installed before:

- An insert with assembled contacts is installed in the connector shell
- Assembled ground block contacts are installed in the ground block.

Table 18
GROUND BLOCK CONTACT INSERTION TOOLS

Engaging End Size	Insertion Tool	
	Part Number	Color
16	DAK83-20	-
	M81969/14-11	Red
	ST2220-2-28	-

- (1) Make a selection of the contact insertion tool from Table 18 for the ground block contacts.
- (2) Put the contact assembly in the insertion tool.
- (3) Axially align the insertion tool and the contact cavity.
- (4) Carefully push the insertion tool and the contact straight into the contact cavity until it stops.

For the ground block contacts, make sure that tension does not occur between the shield ground wire and:

- The solder sleeve
- The contact crimp barrel.

- (5) Carefully pull the insertion tool straight out of the contact cavity.
- (6) Remove the insertion tool from the wire.
- (7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly from the contact cavity.
 - (b) Do Step (2) through Step (7) again.

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N. Insertion of Fiber Optic Contact Termini

Refer to Subject 20-74-02.

O. Size 5 Coax Contact Insertion

Refer to Subject 20-74-02.

P. Installation of Size 8 Quadrax Contacts

Refer to Subject 20-74-02.

Q. Seal of an Empty Contact Cavity

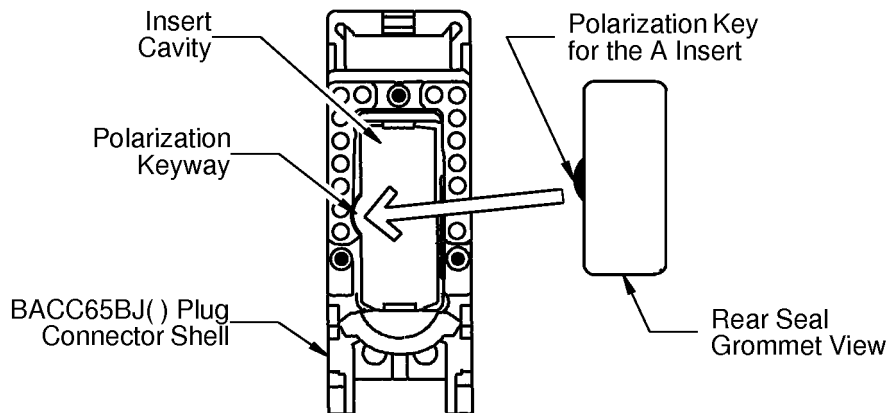
Refer to Subject 20-74-02.

R. Insert Installation

NOTE: An insert can be installed with contacts or without contacts.

The connector shells for the BACC65BJ() and BACC65BK() connector:

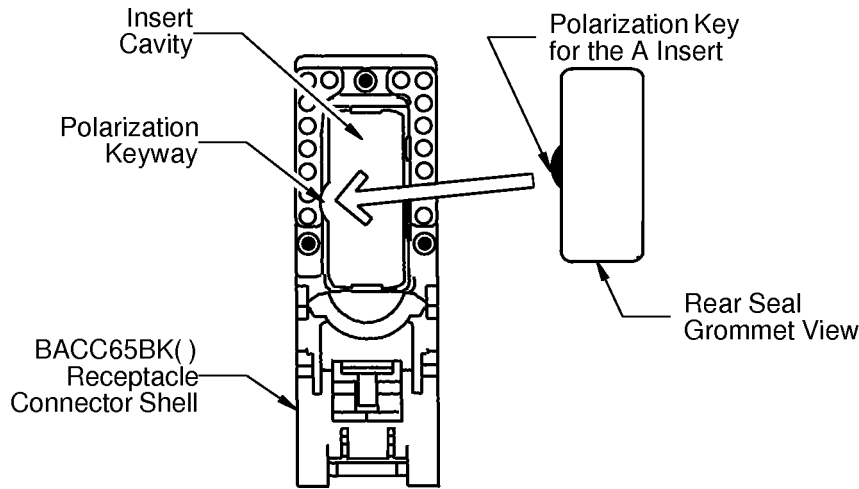
- Will only accept inserts that have "A" polarization
- Will not accept inserts that have "B" polarization.



BACC65BJ() PLUG CONNECTOR INSERT INSTALLATION
Figure 34

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



BACC65BK() RECEPTACLE CONNECTOR INSERT INSTALLATION
Figure 35

- (1) Align the polarization key on the insert with the polarization keyway on the rear side of the insert cavity. Refer to Figure 34 and Figure 35.

NOTE: A blank insert does not have a polarization key.

- (2) Push the insert into the insert cavity until it stops and is locked in position.

CAUTION: IF THE INSERT DOES NOT GO INTO THE CONNECTOR SHELL EASILY, DO NOT CONTINUE TO PUSH THE INSERT. DAMAGE TO THE INSERT CAN OCCUR.

- (3) If the insert does not go into the connector shell correctly:
 - (a) Remove the insert. Refer to Paragraph 4.D.
 - (b) Do Step (1) and Step (2) again.

S. Installation of the Fiber Optic Alignment Sleeve Insert

Refer to Subject .20-74-02.

T. Installation of the BACC10MR() EMI Backshells

Table 19
NECESSARY TOOLS

Part Number	Description	Supplier
600-061	Manual Band Installation Tool	Glenair
A30199	Manual Band Installation Tool	Band-It Idex

Table 20
NECESSARY MATERIALS

Part Number	Description	Supplier
BACB42F()	Band, Shield Termination	QPL
BACS38W2	Plastic Tie Strap	QPL

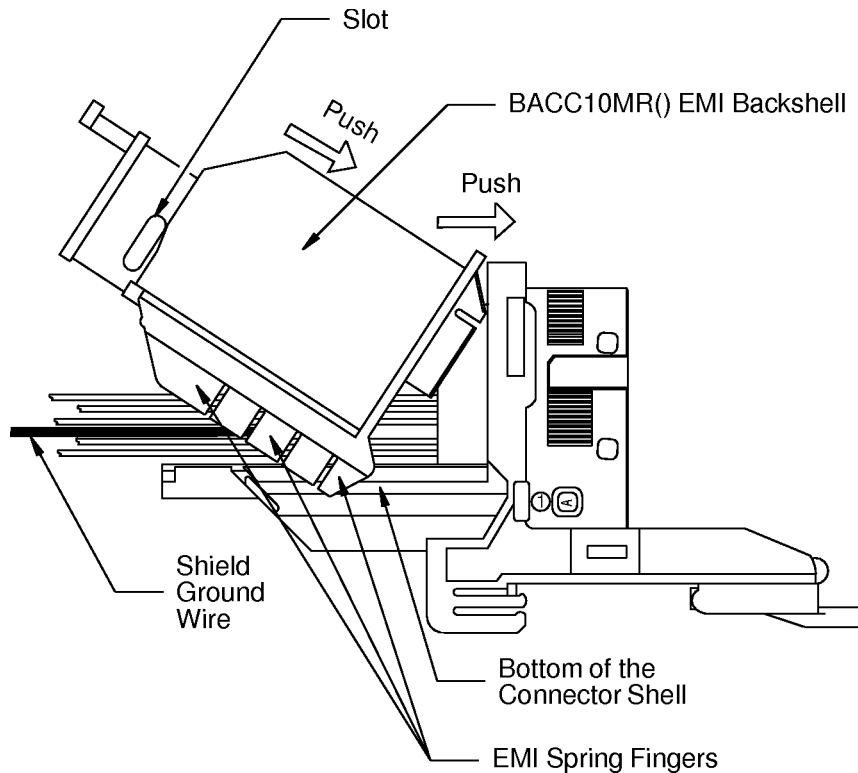
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

Table 20 (continued)

Part Number	Description	Supplier
Scotch 70	Silicone Tape, Self Bonding Silicone Rubber, High Temperature, 0.012 inch thick, 0.25 inch wide	3M
912-10X12	Silicone Tape, Self Bonding Silicone Rubber, High Temperature, 0.012 inch thick, 0.25 inch wide	Arlon

- (1) Engage the EMI spring fingers of the backshell with the bottom of the connector shell. Refer to Figure 36.

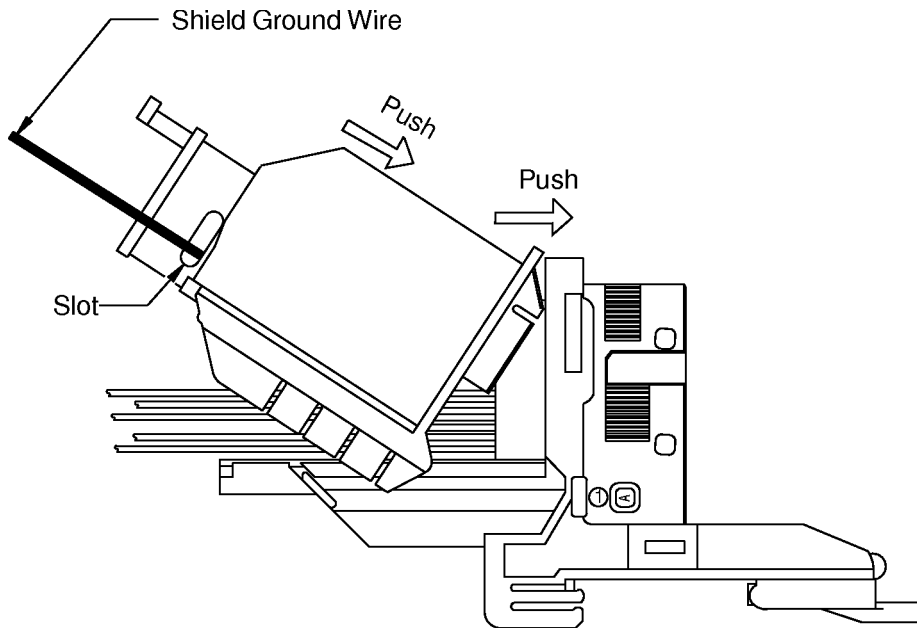


THE EMI SPRING FINGERS ENGAGED WITH THE CONNECTOR SHELL
Figure 36

- (2) Install the shield ground wires.

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



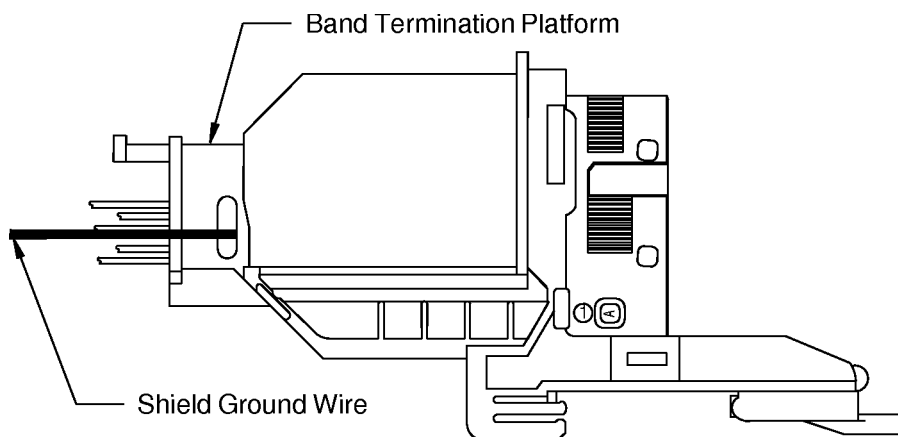
INSTALLATION OF THE SHIELD GROUND WIRE

Figure 37

- (a) Put approximately half of the each free end shield ground wire through the slot in the backshell. Refer to Figure 37 .
- (b) Pull each free end of shield ground wire to make sure that there is no unwanted length of each shield ground wire in the backshell.
- (3) Push the backshell onto the connector shell. Refer to Figure 38.

Make sure that the shield ground wires:

- Are straight
- Are evenly spaced around the band termination platform
- Do not overlap with other shield ground wires.



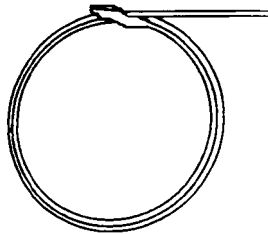
INSTALLATION CONFIGURATION OF THE EMI BACKSHELL

Figure 38

20-74-14

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS**

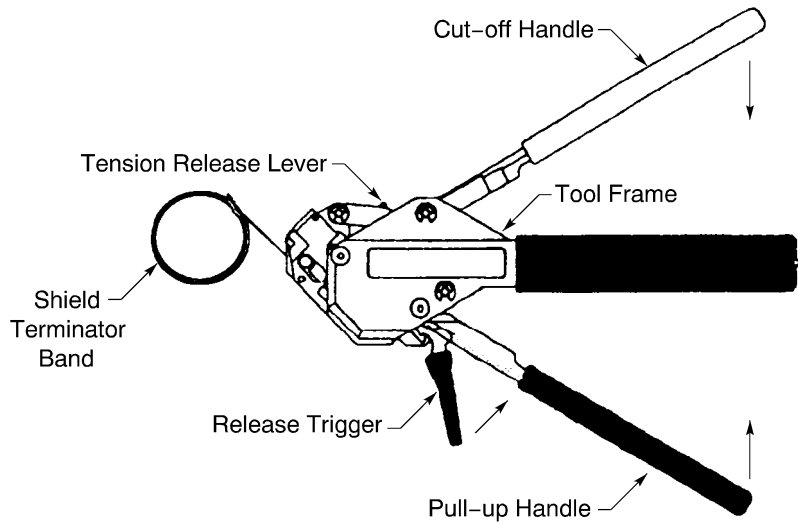
- (4) Make a selection of a band installation tool from Table 19.
- (5) Make a selection of a shield termination band from Table 20.
- (6) If the shield terminator band is flat, make the band into a coil around the band termination platform. Refer to Figure 39.

**INSTALLATION CONFIGURATION OF THE BACB42F() SHIELD TERMINATOR BAND****Figure 39**

- (a) Put the free end of the band through the thin slot in the buckle.
 - (b) Pull the free end through the buckle until the diameter of the loop is approximately the same size as the diameter of the band termination platform on the backshell.
 - (c) Put the free end of the BACB42F() shield terminator band through the thin slot in the buckle again.
 - (d) Pull the free end through the buckle until the inner surface of the second loop is against the surface of the first loop.
- (7) Pull the release trigger of the tool in the direction of the pull-up handle.
 - (8) Put the free end of the terminator band into the tool. Refer to Figure 40.
Make sure that the loop is pointed away from the tool.

STANDARD WIRING PRACTICES MANUAL

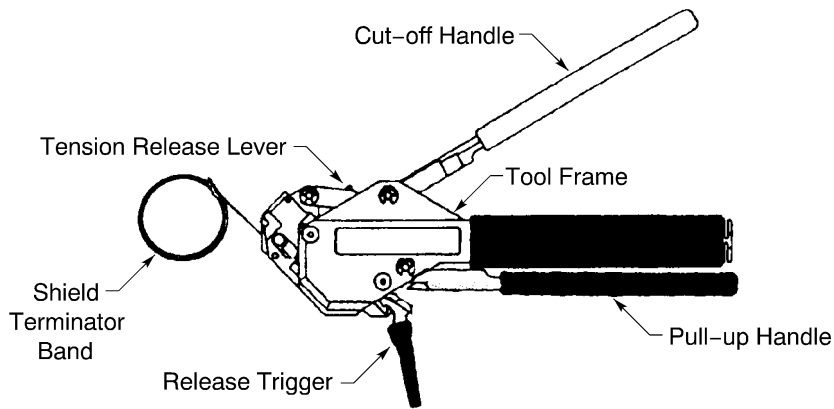
ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



POSITION OF THE BACB42F () SHIELD TERMINATOR BAND IN THE TOOL
Figure 40

- (9) Pull the pull-up handle to the tool frame to complete one cycle.
 Refer to Figure 41.

NOTE: The terminator band is held in the internal grip mechanism of the tool.



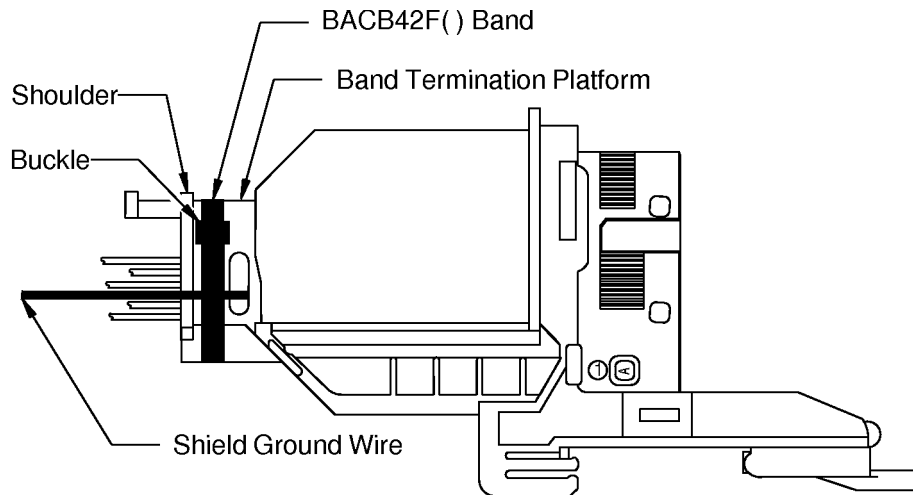
POSITION OF THE PULL-UP HANDLE AT THE END OF A CYCLE
Figure 41

- (10) Put the shield terminator band on the band termination platform. Refer to Figure 42.
 Make sure that:

- The buckle on the band does not overlap with a shield ground wire
- The buckle on the band does not overlap with the slot in the band termination platform
- The buckle on the band lies flat on the band termination platform.

STANDARD WIRING PRACTICES MANUAL

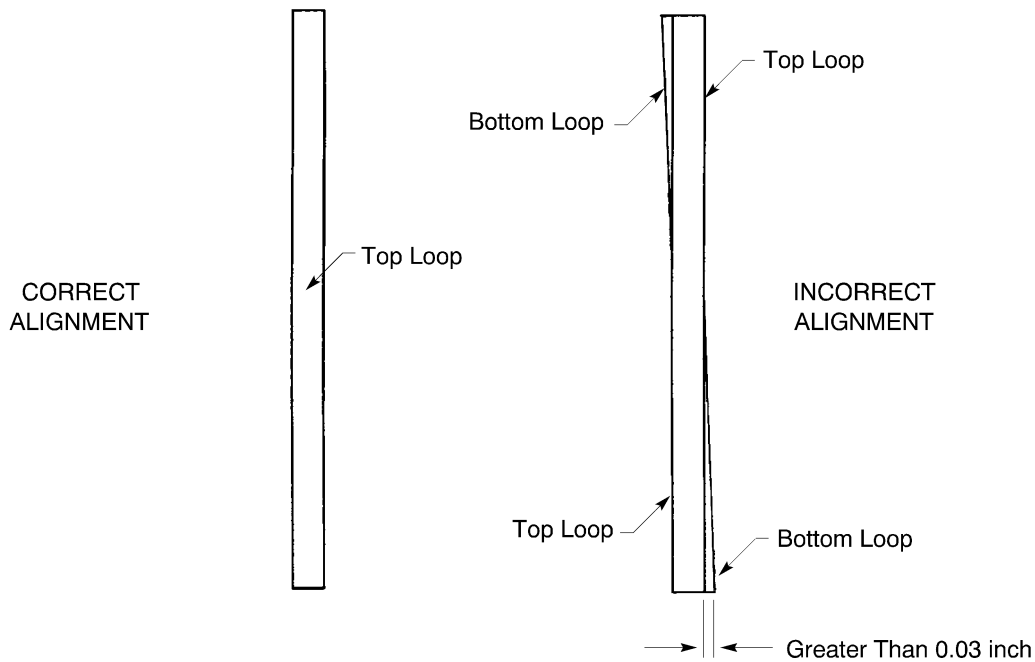
ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



POSITION OF THE SHIELD TERMINATOR BAND

Figure 42

- (11) Align the edges of the two loops of the terminator band. Refer to Figure 43.
 Make sure that the edge of a loop is not more that 0.03 inch farther than the edge of the other loop.



ALIGNMENT OF THE LOOPS OF THE SHIELD TERMINATOR BAND

Figure 43

- (12) Pull the pull-up handle through the necessary cycles until the terminator band is tight around the backshell.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

Make sure that the position of the pull-up handle at the end of the last cycle is the position of the handle at the end of a cycle. Refer to Figure 41.

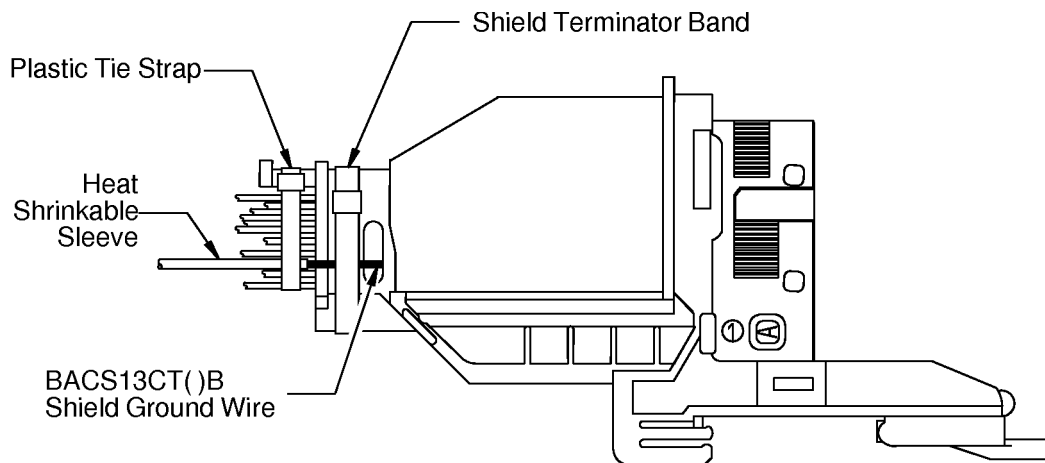
- (13) If it is necessary to loosen or remove the terminator band after the band is tightened:
 - (a) Hold the pull-up handle tightly.
 - (b) Push the tension release lever forward.
 - (c) Release the pull-up handle.

NOTE: The pull-up handle opens automatically.

- (d) Pull the release trigger to the tool frame.
 - (e) Loosen the band and do the installation again from Step (7).
 - (f) If it is necessary, remove the band and do the installation again from Step (3).
- (14) Pull the cut-off handle to the tool frame.
 - (15) Pull the release trigger of the tool to cut the band.
 - (16) Remove the unwanted length of the band from the tool.
 - (17) Trim the shield ground wires, so that it is approximately 2.5 inches long.

Make sure that the length of the shield ground wires is approximately 2.5 inches measured from the shield termination band.

- (18) Make a selection of a heat shrinkable sleeve. Refer to Subject 20-00-11
- (19) Install a 3.00 ± 0.10 inch length and 0.19 inch diameter of heat shrinkable sleeve over the free end of each shield ground wire. Refer to Subject 20-10-14.
- (20) Install a BACS38W2 plastic tie strap at the back of the BACC10MR EMI backshell. Refer to Figure 44.

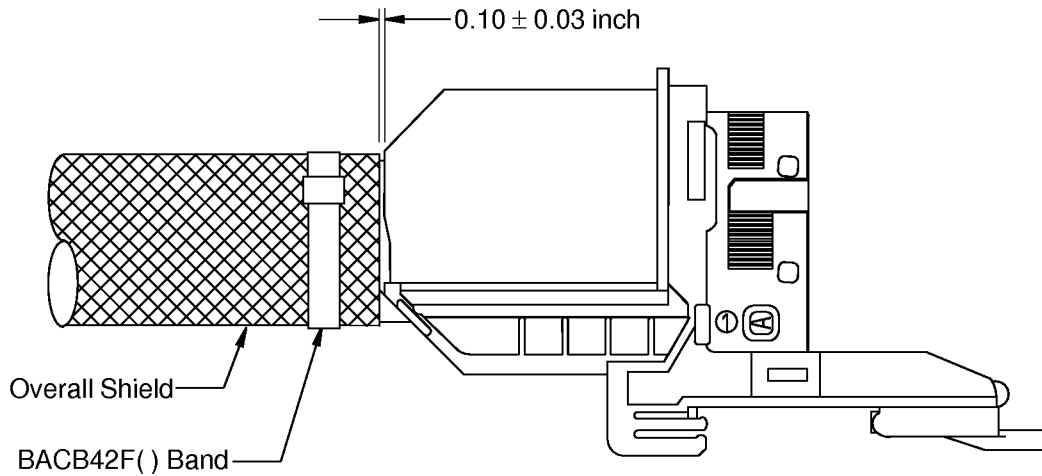


POSITION OF THE PLASTIC TIE STRAP AND THE SHIELD GROUND WIRE
Figure 44

- (21) Put the overall shield over the band termination platform of the backshell. Make sure that the distance from the edge of the overall shield to the top surface of the back shell is 0.10 ± 0.03 inch. Refer to Figure 45.

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



POSITION OF THE OVERALL SHIELD
Figure 45

(22) Install a shield terminator band on the overall shield on the band shield platform. Refer to Step (4) through Step (16).

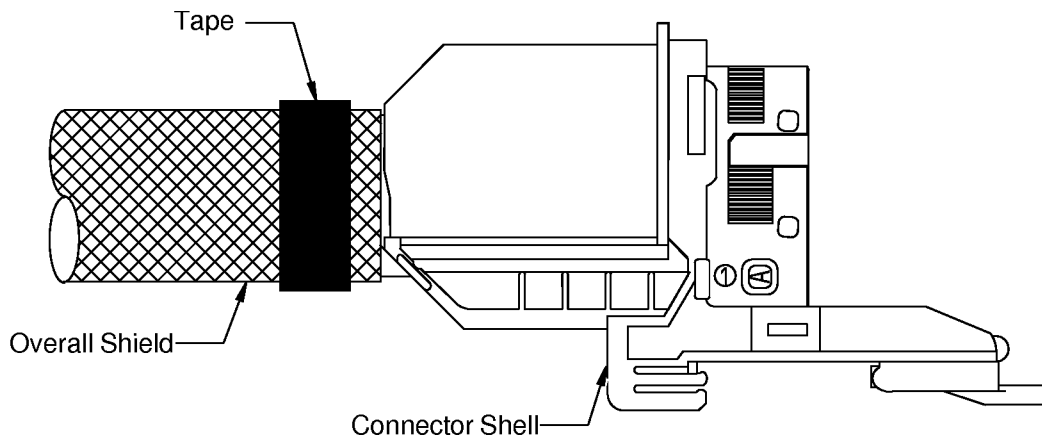
Make sure that:

- The buckle of the band does not overlap a shield ground wire
- The buckle of the band does not overlap the slot in the backshell
- The buckle of the band is not against the collar of the band termination platform
- The buckle of the band lies flat against the band termination platform.

(23) Make a selection of tape from Table 20.

(24) Wind 3 layers of tape around the shield terminator band. Refer to Figure 46.

Make sure that there are 3 layers of tape on the buckle.

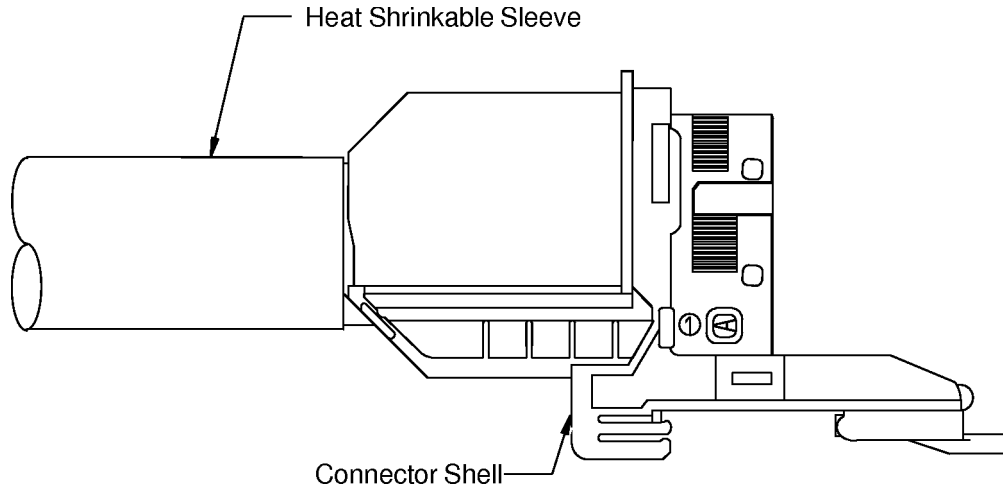


POSITION OF THE SILICONE TAPE
Figure 46

(25) If the wire bundle has an overall heat shrinkable sleeving:

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS**

- (a) Move the sleeving toward the connector until it touches the backshell. Refer to Figure 47
- (b) Shrink the sleeve in position. Refer to Subject 20-10-14.

**POSITION OF THE HEAT SHRINKABLE SLEEVE****Figure 47**

- (26) If the sleeve is loose on the wire bundle, tie the sleeving using lacing tape wire harness ties. Refer to Subject 20-10-11.

6. CONNECTOR POLARIZATION**A. Connector Polarization:**

Procedure to make sure the correct posts or receptacles position are installed on the connector shell:

The polarization code from the connector shell identifies the position of:

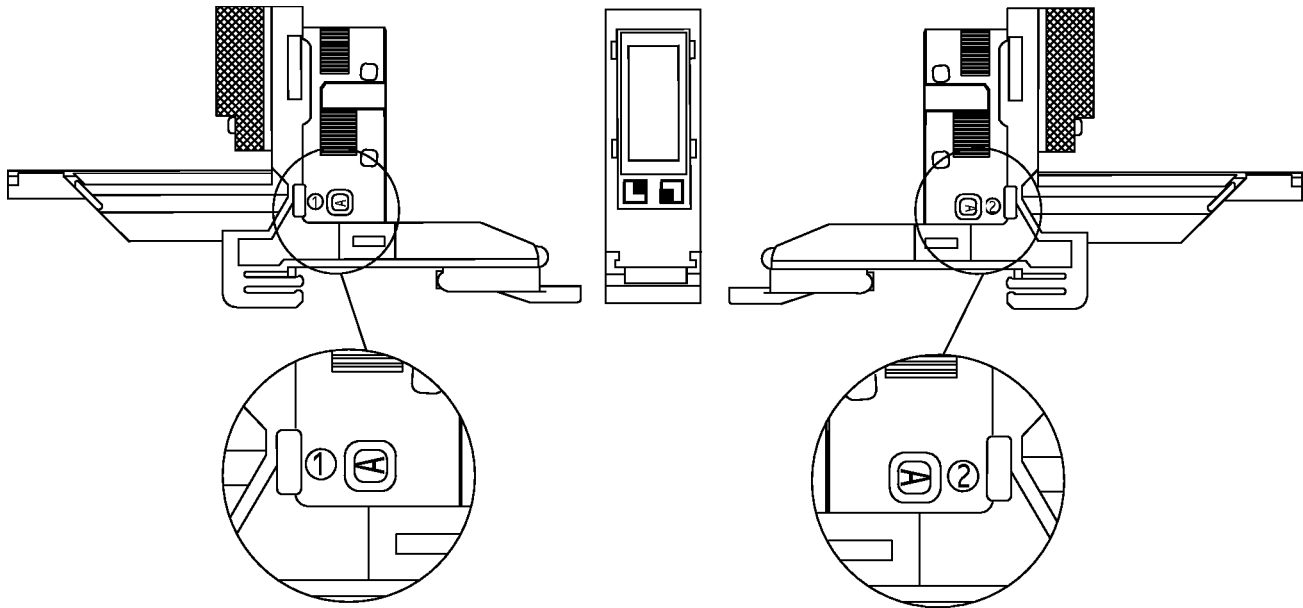
- The polarization posts on the plug connector shell
- The polarization receptacles on the receptacle connectors shell.

- (1) Find the polarization code in the connector part number from the equipment list, refer to Figure 1 for part number structure.
- (2) Find the polarization code from the connector shell. Refer to Paragraph 6.B..
- (3) Match the polarization code from the equipment list with the polarization code from the connector shell.
- (4) If the code from the connector shell does not agree with the code in the part number from the equipment list, adjust the position of the posts or receptacles to show the correct code on the connector shell. Refer to Paragraph 6.C..

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

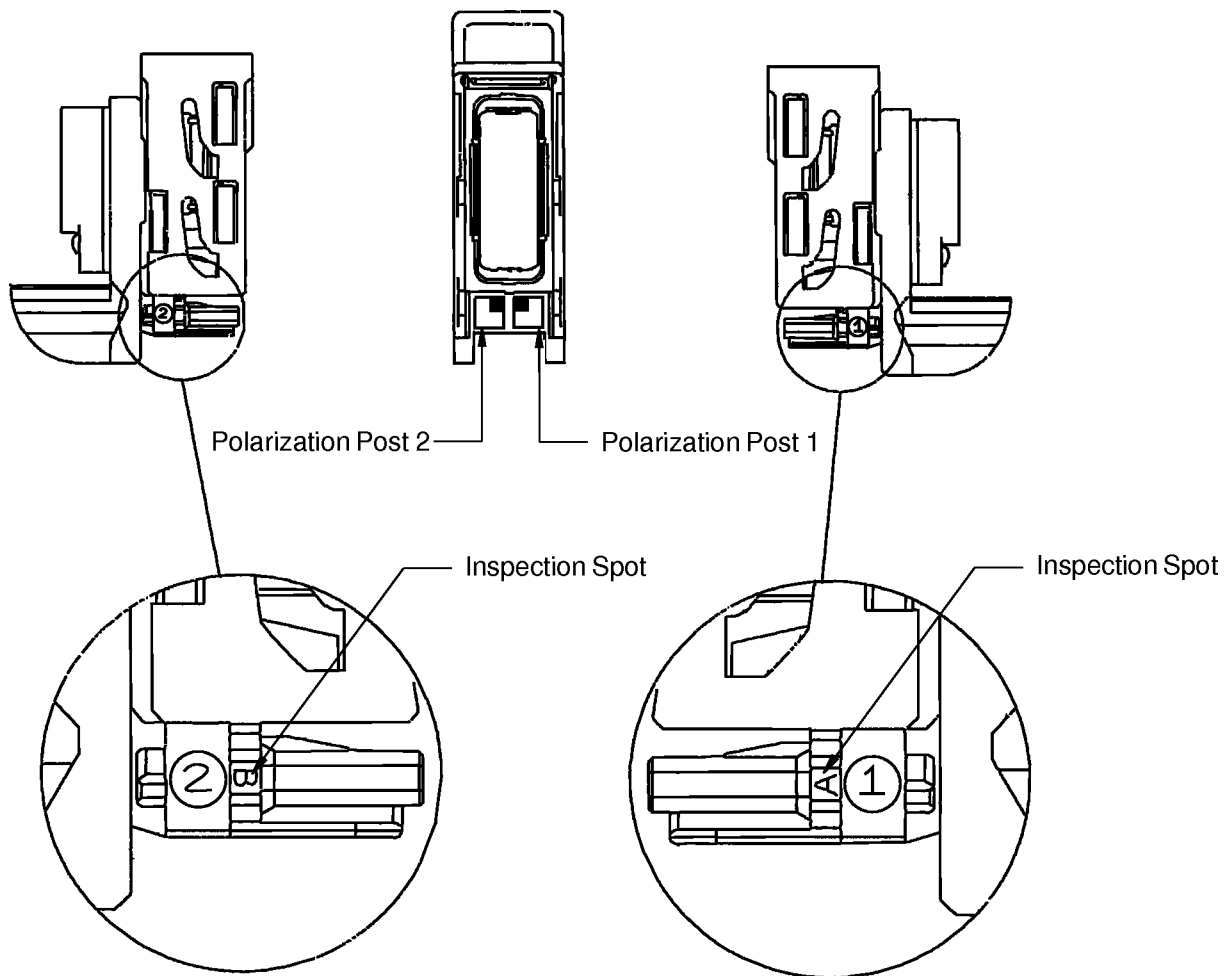
B. Polarization Post and Polarization Receptacle Positions



LOCATION OF THE POLARIZATION RECEPTACLES ON THE RECEPTACLE SHELL
Figure 48

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



LOCATION OF THE POLARIZATION POSTS ON THE PLUG SHELL

Figure 49

**Table 21
POLARIZATION POST AND POLARIZATION RECEPTACLE POSITIONS**

Polarization Code	Plug Shell		Receptacle Shell	
	Post 1	Post 2	Receptacle 1	Receptacle 2
AA	A	A	A	A
AB		B		B
AC		C		C
AD		D		D
BA	B	A	B	A
BB		B		B
BC		C		C
BD		D		D

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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

Table 21 (continued)

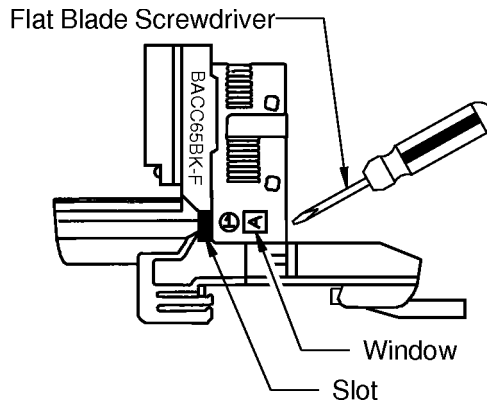
Polarization Code	Plug Shell		Receptacle Shell	
	Post 1	Post 2	Receptacle 1	Receptacle 2
CA	C	A	C	A
CB		B		B
CC		C		C
CD		D		D
DA	D	A	D	A
DB		B		B
DC		C		C
DD		D		D

C. Change of the Polarization Post and Polarization Receptacle Positions

**Table 22
NECESSARY TOOLS**

Tool	Supplier
Screwdriver, Flat Blade	An available source

- (1) Make a selection of a small flat blade screwdriver. Make sure that its tip is able to go into the slot. Refer to Figure 50 and Table 22.
- (2) Put the tip of the screwdriver into the slot of the shell with the flat part of the tip against the end of the post or receptacle.



**LOCATION TO PUT SCREWDRIVER TO REMOVE THE POST OR RECEPTACLE
Figure 50**

- (3) Push the post or receptacle forward to release them from the connector shell.
- (4) Place the screwdriver into the window and push the post or receptacle forward again to fully remove it.

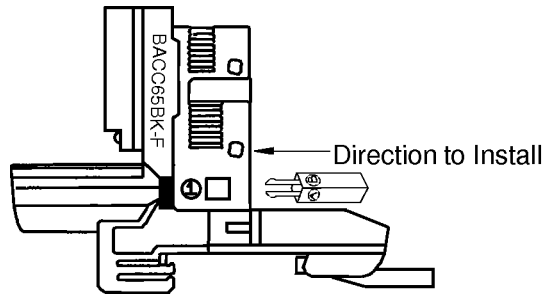
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

- (5) Push the polarization post or polarization receptacle in the correct position into its hole in the connector shell. Refer to Figure 51.

Make sure to:

- Show the correct code on the windows
- Install the posts or receptacles one at a time
- Fully engage each post or receptacle in the hole in the connector shell.



POLARIZATION POST AND RECEPTACLE INSTALLATION

Figure 51

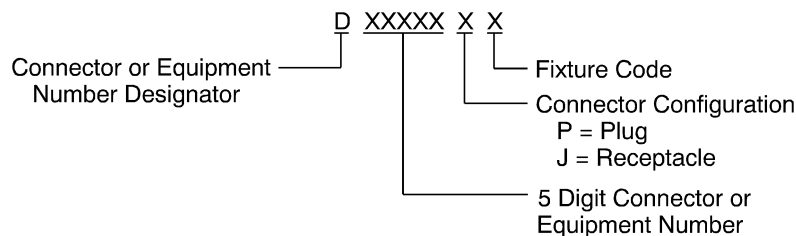
7. CONNECTOR INSTALLATION

A. Equipment Identification

The identification label on the wire harness near the connector can have this information:

- The equipment number for the connector or the connector insert
- The mate-with disconnect panel number
- The connector position on the panel
- The mate-with nomenclature
- The wire harness number.

Refer to Figure 52.



EQUIPMENT NUMBER STRUCTURE

Figure 52

B. Installation of the Receptacle

This procedure applies to installation of the receptacle with a ground block.

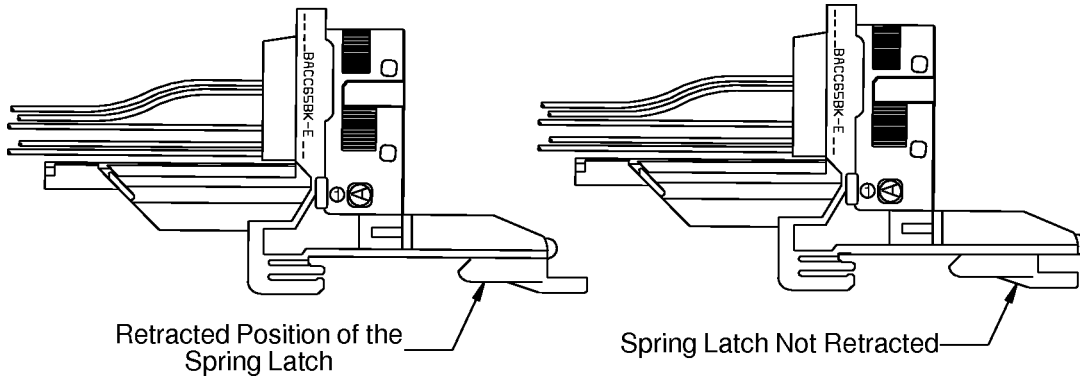
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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

**Table 23
NECESSARY TOOLS**

Tool	Example	Maximum Shaft Diameter (inch)
A shaft that has a handle	Screwdriver, Hex or Flat Blade	1/8

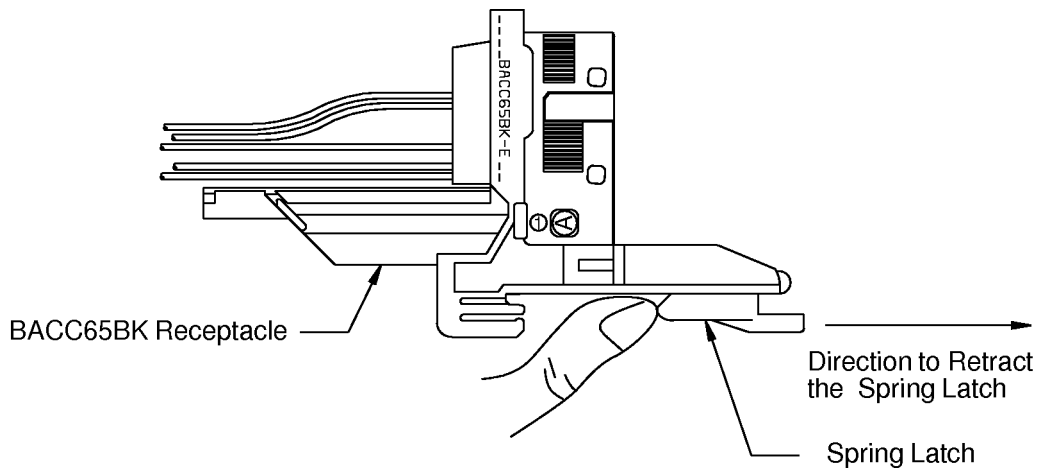
(1) Make sure that the spring latch is locked in the retracted position. Refer to Figure 53.



**SPRING LATCH POSITIONS
Figure 53**

(2) If the spring latch is not in the retracted position:

- (a) Push the spring latch to the retracted position. Hold the spring latch with a finger to make sure that the latch catches in the base of the connector. Refer to Figure 54.



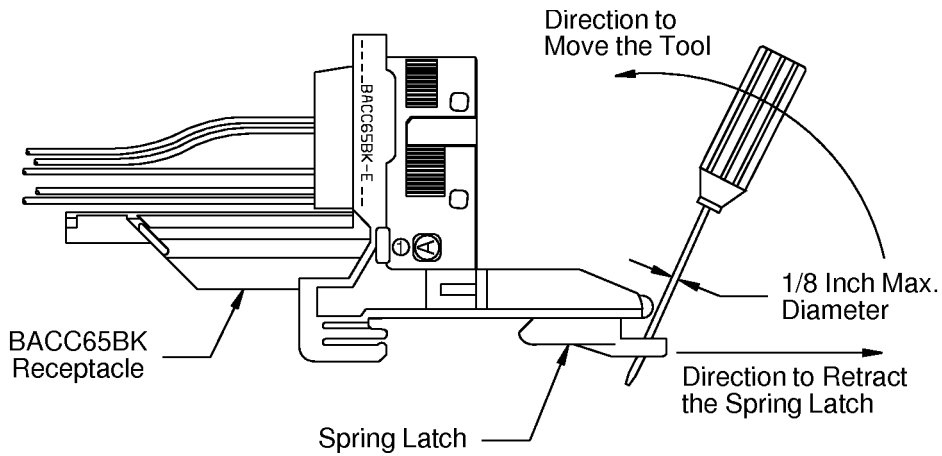
**DIRECTION TO RETRACT THE SPRING LATCH
Figure 54**

- (b) If it is necessary, make a selection of a tool from Table 23 to help push the spring latch to the retracted position. Refer to Figure 55.

Make sure that the latch catches in the base of the connector.

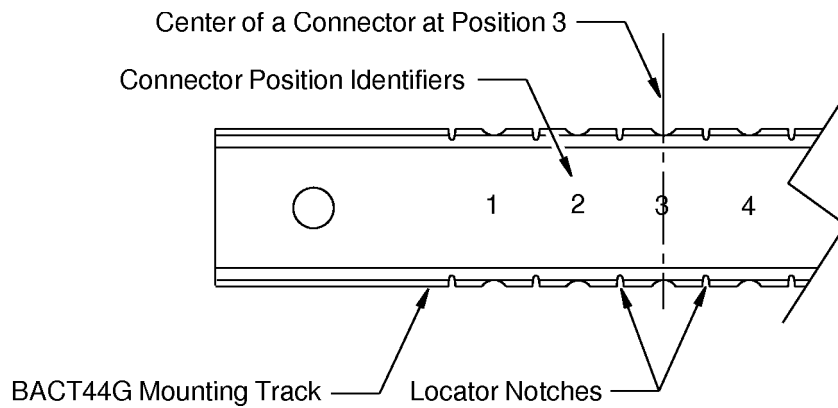
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



DIRECTION TO MOVE THE TOOL TO RETRACT THE SPRING LATCH
Figure 55

- (3) Find the mounting location of the receptacle connector on the mounting track. Refer to Figure 56.

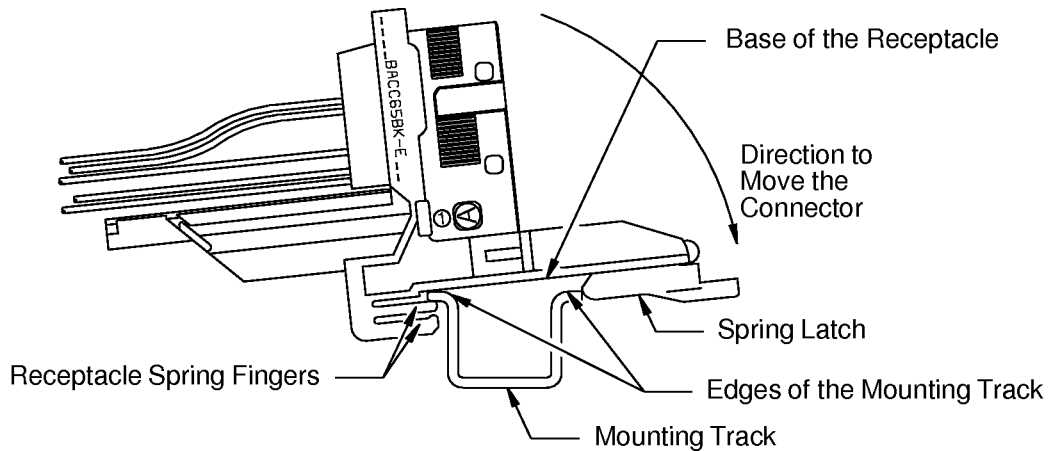


LOCATION TO INSTALL A RECEPTACLE CONNECTOR ON THE MOUNTING TRACK
Figure 56

- (4) Put the receptacle spring fingers against one edge of the mounting track. Refer to Figure 57.

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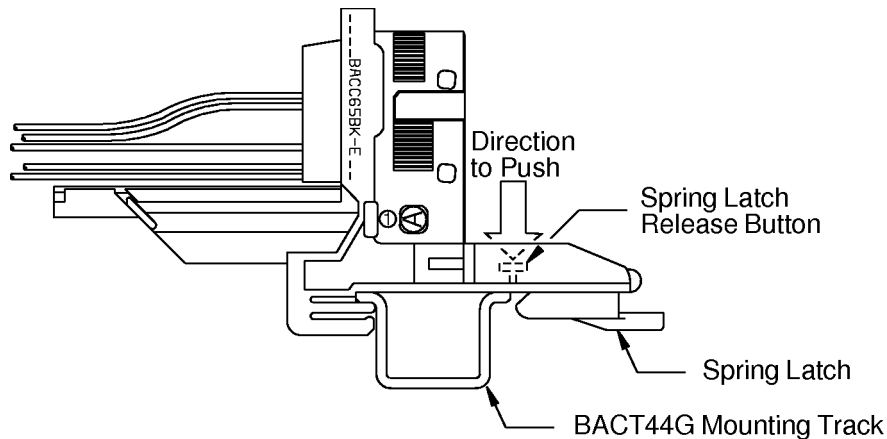
ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



SPRING FINGERS ON THE EDGE OF THE MOUNTING TRACK

Figure 57

- (5) Hold the spring fingers against the edge of the mounting track, and at the same time, move the receptacle onto the mounting track. Refer to Figure 57.
Make sure that the base of the receptacle is against both edges of the mounting track.
- (6) Hold the receptacle against both edges of the mounting track. At the same time, push the spring latch release button in the base of the receptacle to lock the receptacle to the mounting track. Refer to Figure 58.



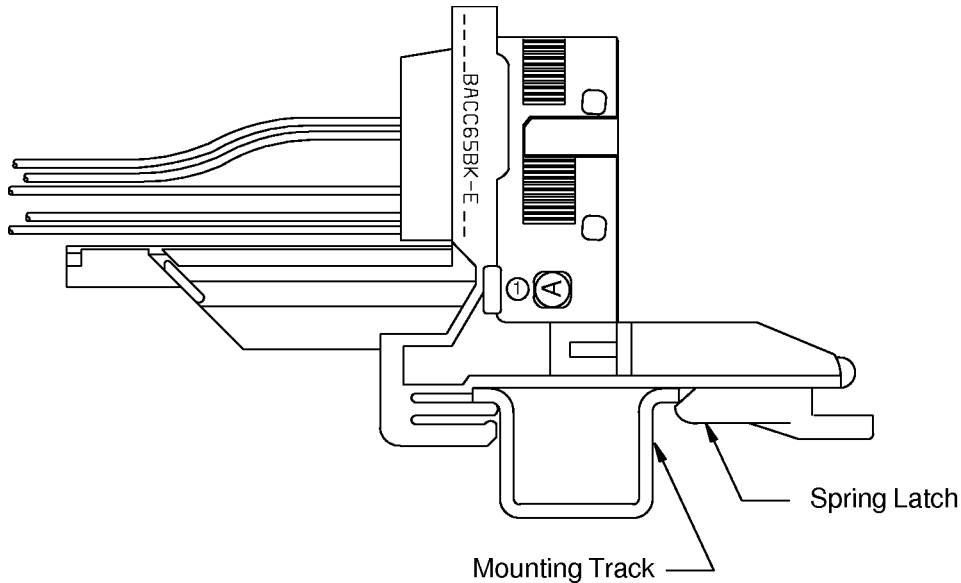
LOCATION OF THE BUTTON TO PRESS TO RELEASE SPRING LATCH

Figure 58

- (7) Make sure that the connector is locked on the mounting track. Refer to Figure 59.

STANDARD WIRING PRACTICES MANUAL

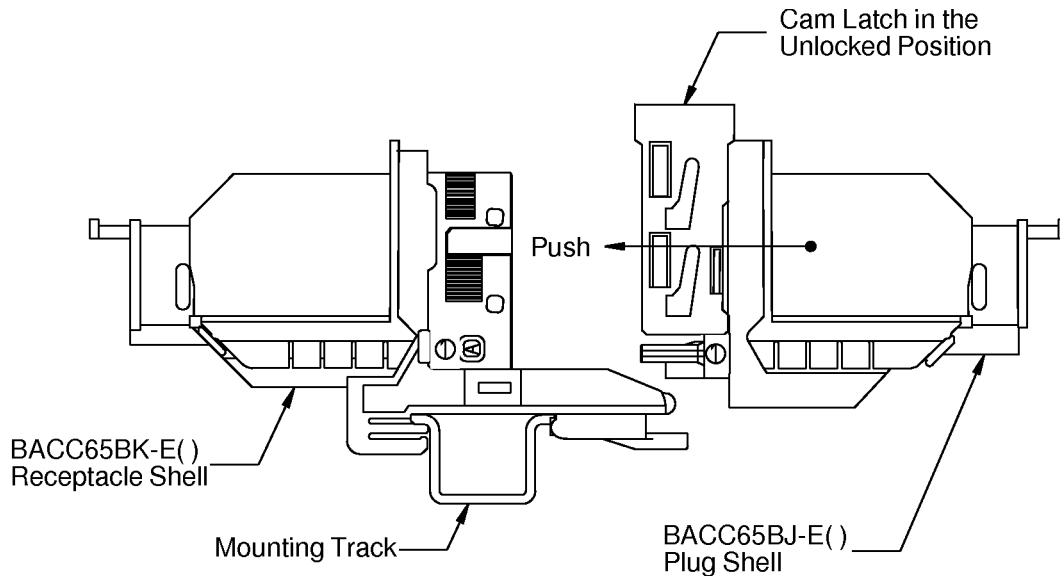
ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



SPRING LATCH LOCKED AGAINST THE MOUNTING TRACK
Figure 59

C. Plug and Receptacle Connection

- (1) Pull the cam latch on the BACC65BJ() plug connector away from the connector until it stops.
- (2) Align the polarization hardware of the plug connector with the polarization of the receptacle connector. Refer to Figure 60.



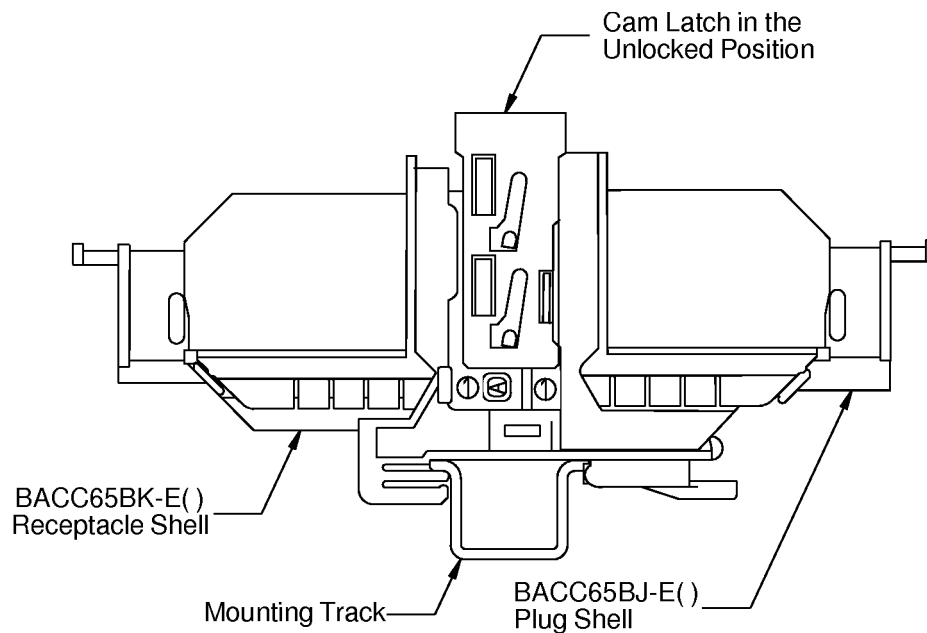
ALIGNING THE PLUG AND RECEPTACLE
Figure 60

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS**

- (3) Push the plug forward until the front surface of the insert cavity of the receptacle is against the shell of the plug. Refer to Figure 61.

Make sure that the plug and the receptacle are fully engaged.

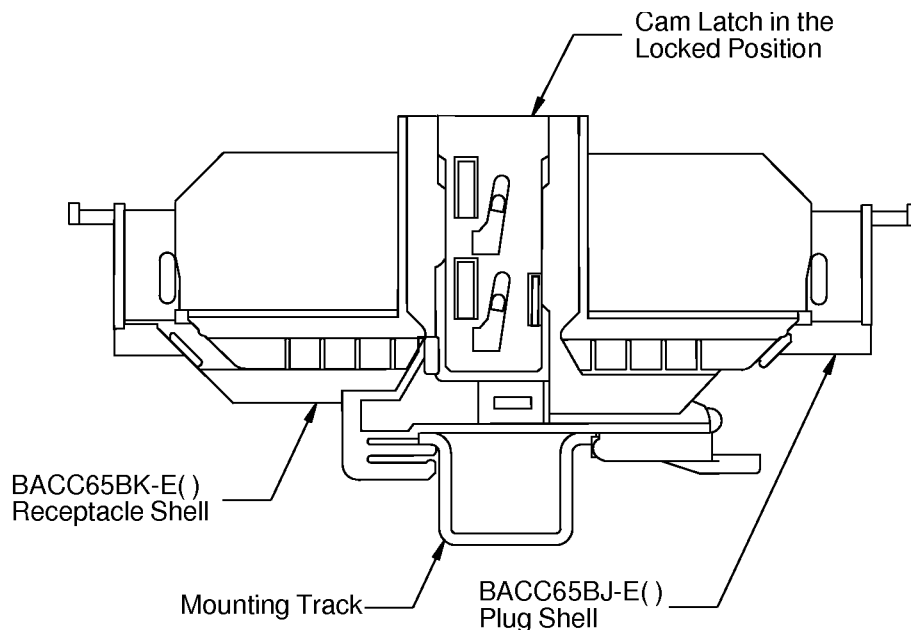
CAUTION: THE PLUG AND THE RECEPTACLE MUST BE FULLY ENGAGED. IF THE PLUG AND THE RECEPTACLE ARE NOT FULLY ENGAGED, DAMAGE TO A COUPLING FASTENER CAN OCCUR.

**JOINING THE PLUG AND RECEPTACLE****Figure 61**

- (4) Push the cam latch toward the mated connectors until it stops in the locked position. Refer to Figure 62.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS



LOCKING THE PLUG AND RECEPTACLE

Figure 62

8. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 24
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
ATR2079	Astro
ATR2080	Astro
M81969/14-11	QPL
RRX20B	Russtech

B. Contact Crimp Tools

**Table 25
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/2-01	QPL
WA22	Daniels
WA22LC	Daniels



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ASSEMBLY OF BACC65BJ AND BACC65BK CONNECTORS

Table 25 (continued)

Crimp Tool	Supplier
WA27F	Daniels

C. Contact Insertion Tools

Table 26

CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
DAK83-20	Daniels
M81969/14-11	QPL
ST2220-2-28	Boeing

D. Special Tools

Table 27

SPECIAL TOOL SUPPLIERS

Tool	Supplier
282 521 002	Radiall
282 521 005	Radiall
600-061	Glenair
A30199	Band-It Idex

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ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

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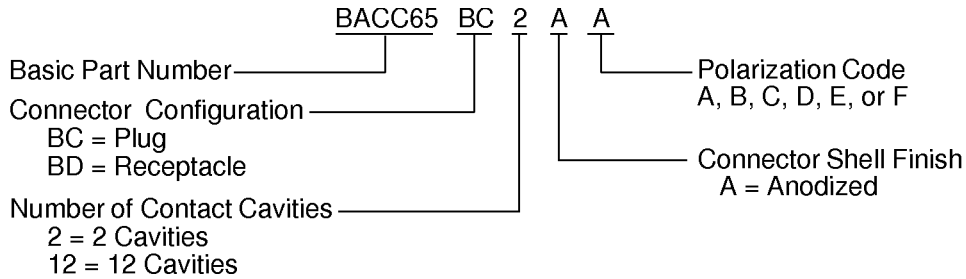
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers



CONNECTOR PART NUMBER STRUCTURE

Figure 1

**Table 1
CONNECTOR AND BACKSHELL PART NUMBERS**

Boeing Standard	Part	Configuration
BACC65BC2()	Plug Connector	2 Contact Cavities
BACC65BD2()	Receptacle Connector	
BACC65BC12()	Plug Connector	12 Contact Cavities
BACC65BD12()	Receptacle	

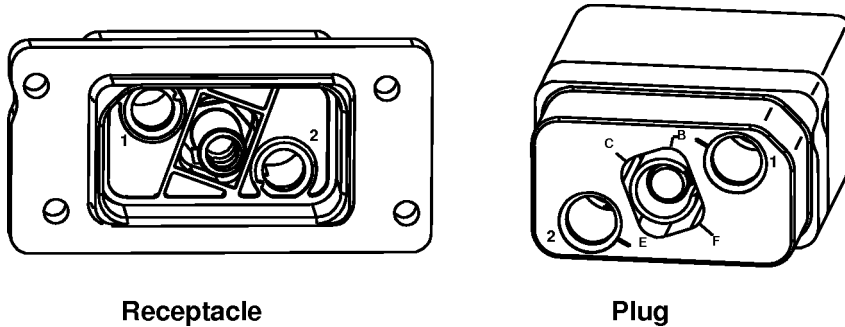
**Table 2
APPROVED CONNECTOR SUPPLIERS**

Connector	Supplier
BACC65BC()	Tyco
BACC65BD()	

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS****B. Connector Description**

The BACC65BC() and BACC65BD() rectangular connector plug and receptacle have these technical features:

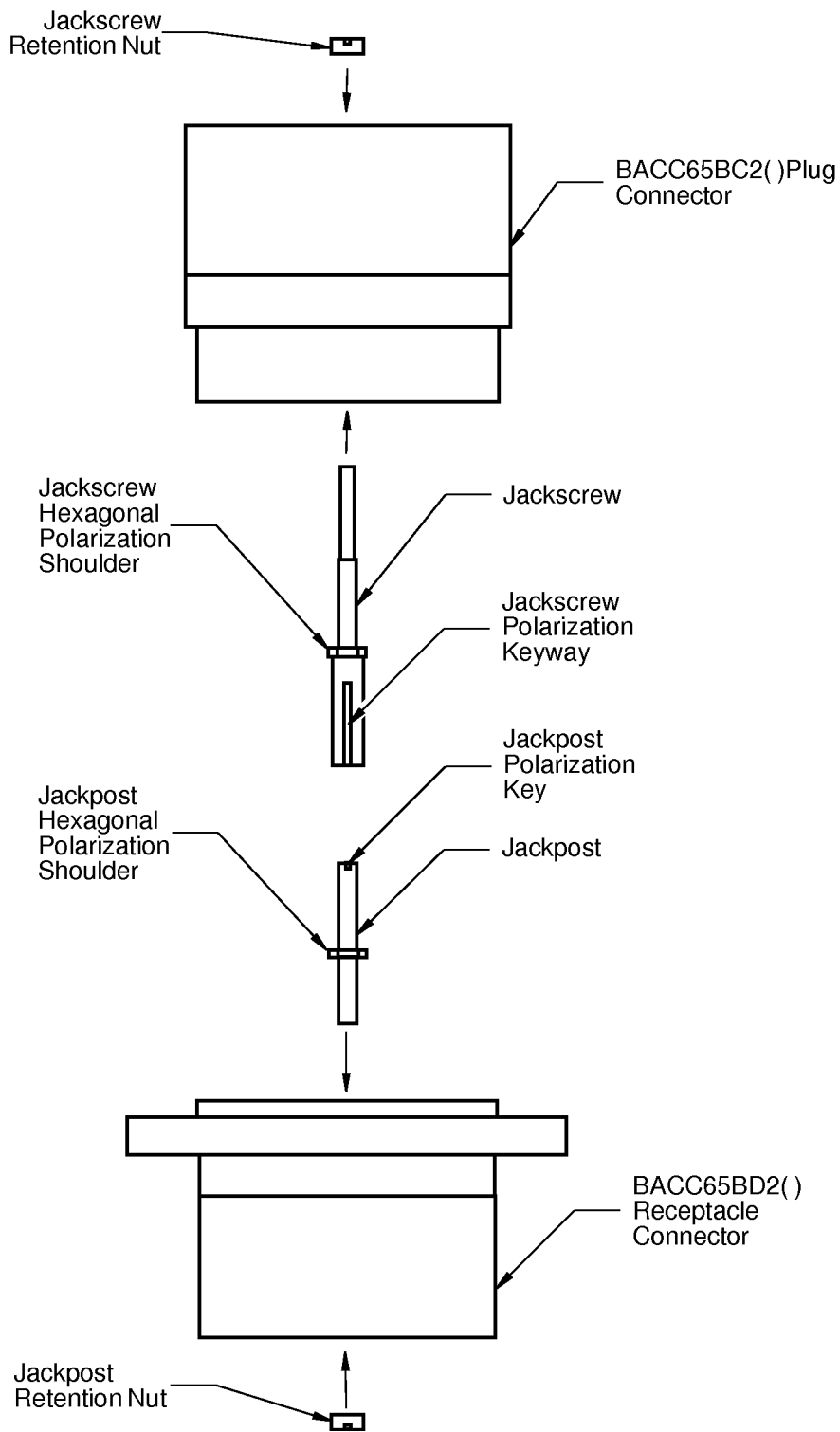
- Are available with 2 contact cavities or 12 contact cavities
- Can accept both size 8 coax contacts and size 8 quadrax contacts
- The connector insert and shell are a one piece design
- The BACC65BC() plug accepts size 8 coax socket contacts and size 8 quadrax socket contacts
- The BACC65BD() receptacle accepts size 8 coax pin contacts and size 8 quadrax pin contacts
- The BACC65BC() plug has the jackscrew
- The BACC65BD() receptacle has the jackpost
- The contact cavities have keyways
- The jackscrew and jackpost have 6 flat polarization positions A,B,C,D,E, and F
- The contacts are inserted and removed from the rear face of the connector
- The backshell is plastic, is removable, and holds the cables with wire harness tie attachments.



THE 2 POSITION BACC65BD2()RECEPTACLE AND BACC65BC2()PLUG
Figure 2

STANDARD WIRING PRACTICES MANUAL

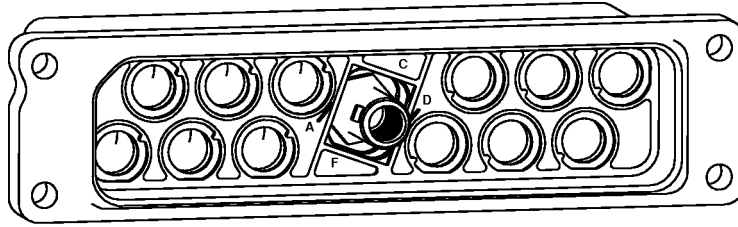
ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



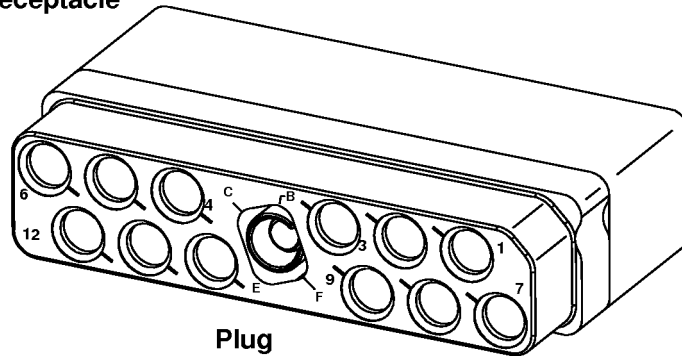
BACC65BC2() AND BACC65BD2() CONNECTOR CONFIGURATION
Figure 3

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



Receptacle

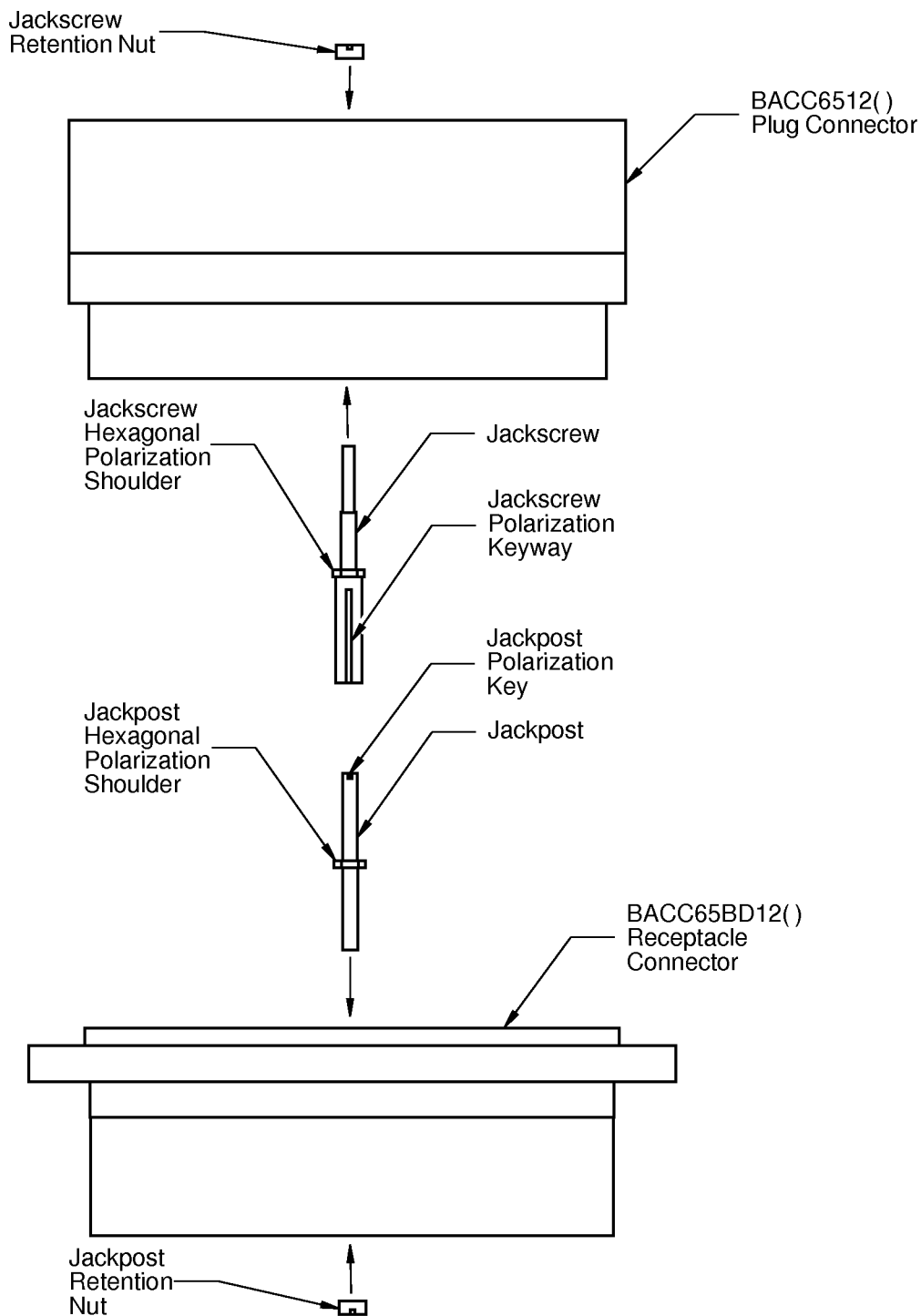


Plug

THE 12 POSITION BACC65BD12() RECEPTACLE AND BACC65BC12() PLUG
Figure 4

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



BACC65BC12 () AND BACC65BD12 () CONNECTOR CONFIGURATION

Figure 5



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

C. Size 8 Coax Contact Part Numbers

**Table 3
SIZE 8 COAX CONTACT PART NUMBERS**

Coax Contact			Coax Cable
Size	Type	Boeing Standard or Part Number	
8	Pin	1757624-1	BMS 13-65 Type 0F
	Socket	1883369-2	BMS 13-65 Type 0F
		S280W554-113	S280W503-2
			BMS 13-65 Type 0F

NOTE: The coax pin contact has an outer pin contact and an inner socket contact.

NOTE: The coax socket contact has an outer socket contact and an inner pin contact.

**Table 4
APPROVED SUPPLIERS OF BOEING STANDARD SIZE 8 COAX CONTACTS**

Coax Contact	Supplier
S280W554-113	ITT Cannon
1757624-1	Tyco
1883369-2	Tyco

**Table 5
ALTERNATIVE PART NUMBERS FOR SIZE 8 COAX CONTACTS**

Boeing Standard	Contact	
	Part Number	Supplier
S280W554-113	349-1087-004	ITT Cannon

D. Size 8 Quadrax Contacts

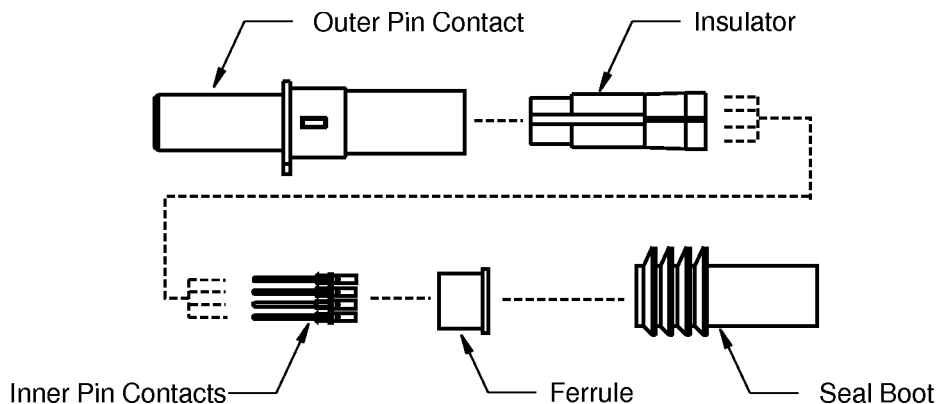
**Table 6
BOEING STANDARD SIZE 8 QUADRAX CONTACTS**

Contact Size	Type	Boeing Standard	Reference
8	Pin	BACC47GA1	Figure 6 6
8	Socket	BACC47GB1	Figure 7

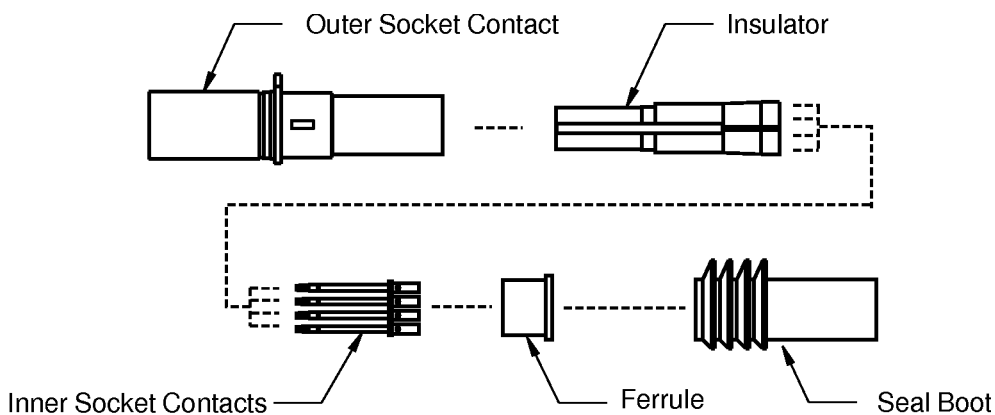
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ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



COMPONENTS SUPPLIED WITH THE BACC47GA QUADRAX PIN CONTACT
Figure 6



COMPONENTS SUPPLIED WITH THE BACC47GB QUADRAX SOCKET CONTACT
Figure 7

Table 7

SUPPLIER PART NUMBERS FOR BOEING STANDARD SIZE 8 QUADRAX CONTACTS

Boeing Standard	Alternative Contact	
	Part Number	Supplier
BACC47GA1	1445692-4	Tyco
BACC47GB1	1445693-4	Tyco

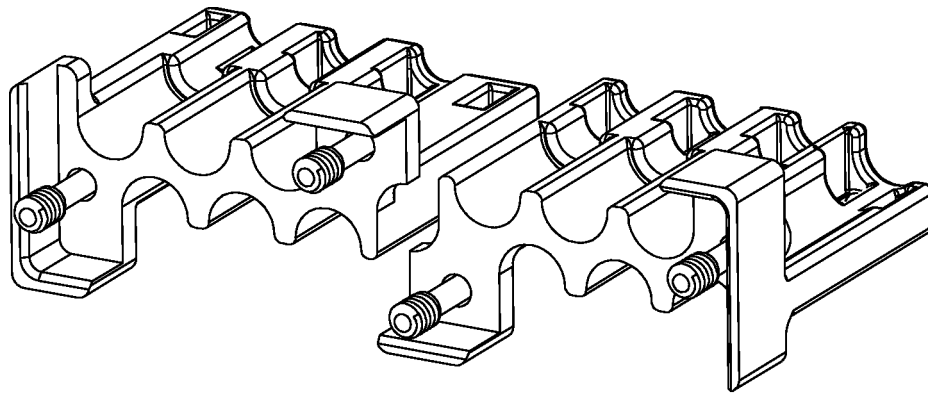
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

E. Backshell Part Numbers

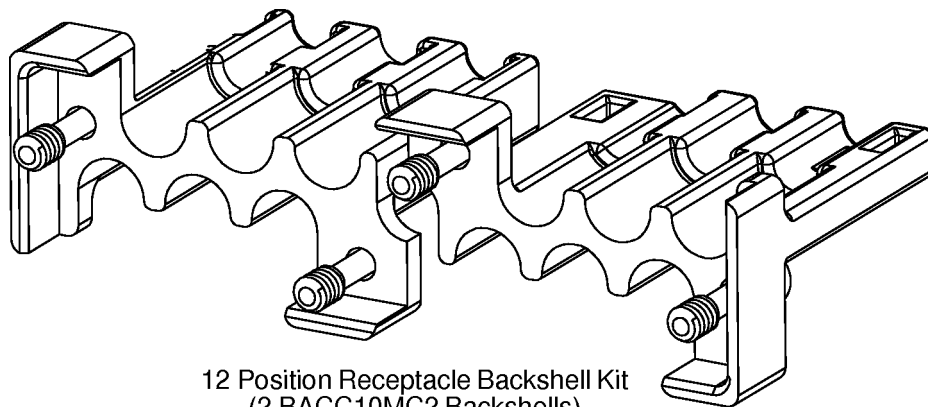
**Table 8
BACKSHELL PART NUMBERS**

Boeing Standard	Part	Configuration
BACC10MC1	Plug Backshell	12 Position
BACC10MC2	Receptacle Backshell	
BACC10MD1	Plug Backshell	2 Position
	Receptacle Backshell	



12 Position Plug Backshell Kit
(2 BACC10MC1 Backshells)

**12 POSITION PLUG BACKSHELL
Figure 8**

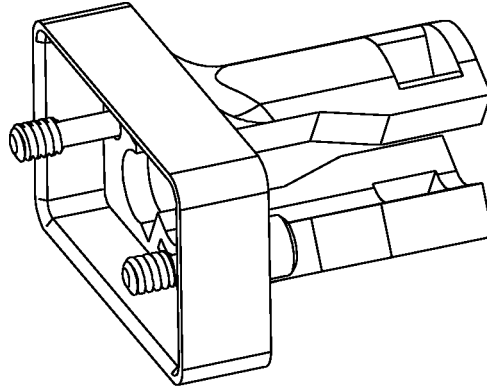


12 Position Receptacle Backshell Kit
(2 BACC10MC2 Backshells)

**12 POSITION RECEPTACLE BACKSHELL
Figure 9**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



2 Position Backshell
(For Both Plugs and Receptacles)

2 POSITION BACKSHELL
Figure 10

Table 9
APPROVED BACKSHELL SUPPLIERS

Boeing Standard	Supplier
BACC10MC1	Tyco
BACC10MC2	
BACC10MD1	

2. CONNECTOR DISASSEMBLY

A. Connector Separation

Table 10
NECESSARY TOOLS

Tool	Type	Size (inch)
Wrench	Allen Wrench	9/64

- (1) Make a selection of a wrench from Table 10.
NOTE: The wrench can have a ball style end.
- (2) With the wrench, turn the jackscrew in the plug counterclockwise until the jackscrew disengages from the jackpost in the receptacle. Refer to Figure 2 and Figure 4.
- (3) Pull the plug straight away from the receptacle.

STANDARD WIRING PRACTICES MANUAL

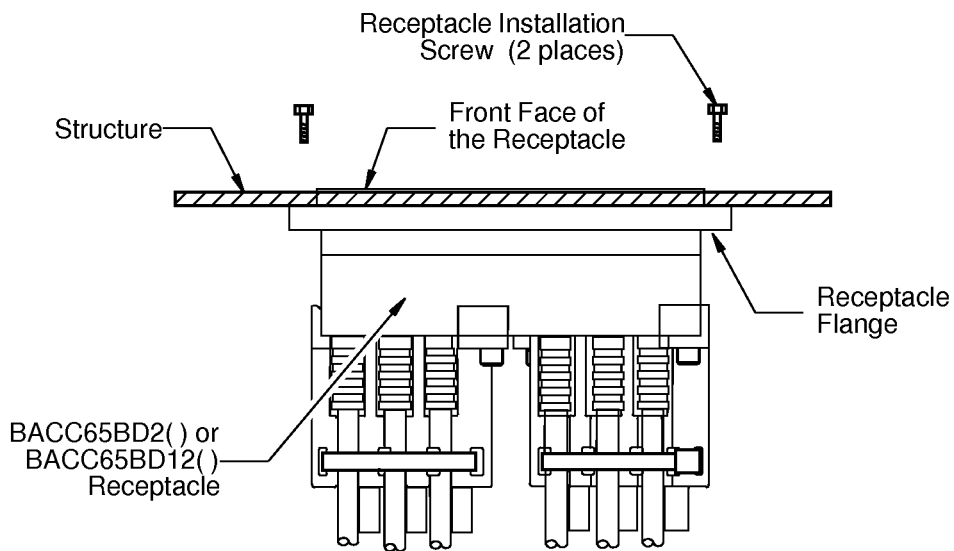
ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

B. Removal of the Receptacle

**Table 11
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Phillips Head Screwdriver	-
	Socket Wrench	1/4

- (1) Make a selection of a driver from Table 11.
- (2) Remove the two receptacle connector installation screws. Refer to Figure 11.



**REMOVAL OF THE RECEPTACLE FROM THE STRUCTURE
Figure 11**

- (3) Pull the receptacle shell from the structure.

C. Strain Relief Backshell Removal

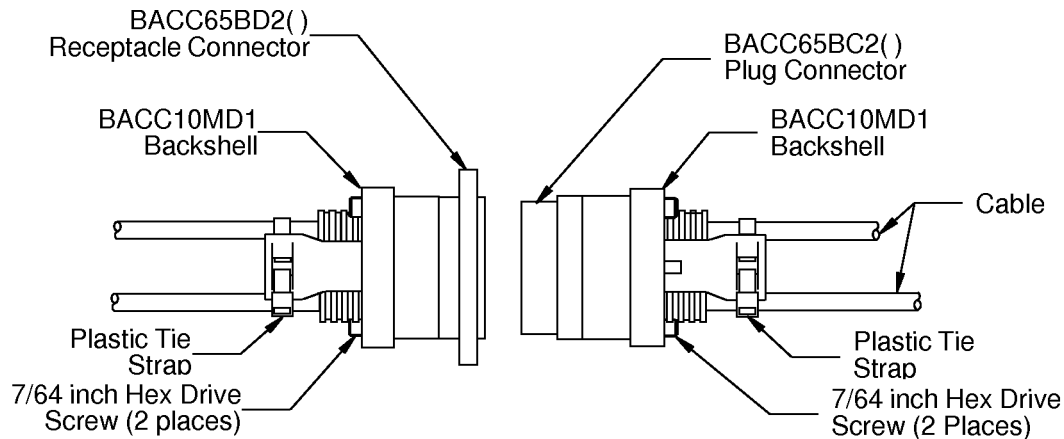
**Table 12
BACKSHELL REMOVAL TOOLS**

Tool	Supplier
Diagonal Cutters	An available source
Allen Wrench, 7/64 inch	An available source

- (1) Make a selection of a pair of diagonal cutters from Table 12.
- (2) Remove the plastic tie straps that hold the cables to the backshell and the plastic tie straps or wire harness ties that are less than 6 inches from the connector. Refer to Figure 12 and Figure 13.

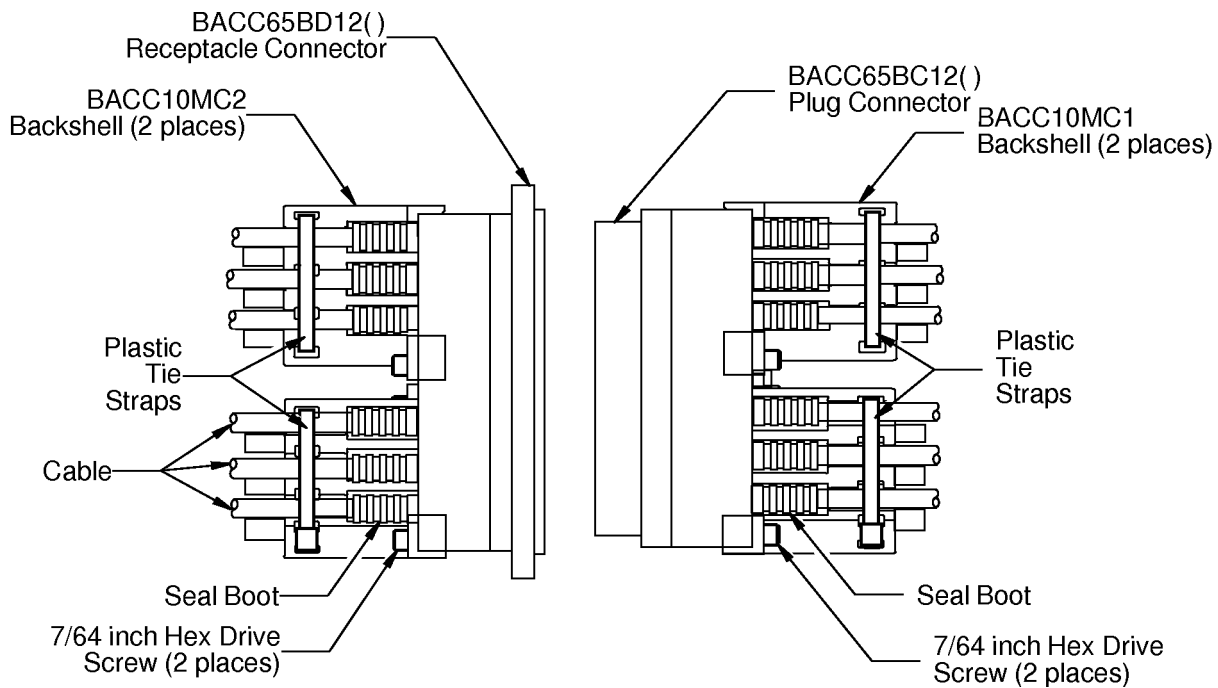
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REMOVAL OF THE BACC10MD1 BACKSHELLS

Figure 12



REMOVAL OF THE BACC10MC1 AND BACC10MC2 BACKSHELLS

Figure 13

- (a) Cut the plastic tie straps at the head, parallel to the cables.
- (b) Remove all the loose strap pieces.
- (c) Examine the cables for damaged insulation.

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ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

CAUTION: Make sure that you remove and discard all the pieces of the lose plastic tie straps. Lose strap pieces can cause abrasion and cutting damage to the cable insulation.

- (3) Make a selection of a wrench from Table 12..
- (4) Disengage the threads of the backshell installation screws. Refer to Figure 12 and Figure 13.

NOTE: The screws are captivated and cannot be removed from the strain relief backshell.

- (5) Pull the backshell from the connector shell.
 - (a) Push the backshell for the BACC65BC2() and BACC65BD2() connector along the cable away from the connector. It cannot be fully removed until the contacts are removed.
 - (b) Remove the backshell for the BACC65BC12() and BACC65BD12() connector.

D. Seal Plug and Seal Rod Removal

**Table 13
NECESSARY TOOLS**

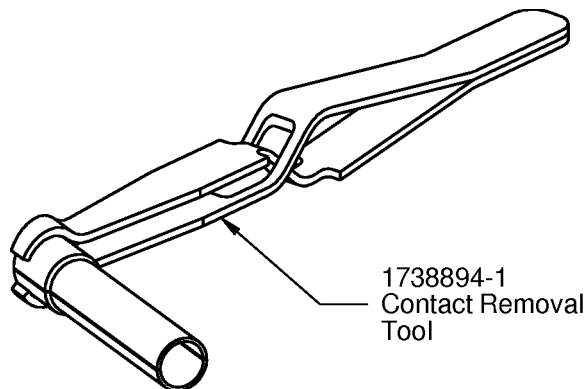
Tool	Type
Pliers	Needle Nose

- (1) Make a selection of a pair of pliers from Table 13.
- (2) Tightly hold the end of the seal plug or the seal rod in the jaws of the pliers.
- (3) Pull the seal plug or the seal rod directly out of the contact cavity.

E. Contact Removal

**Table 14
CONTACT REMOVAL TOOLS FOR SIZE 8 COAX AND SIZE 8 QUADRAx CONNECTORS**

Contact Cavity Size	Removal Tool Part Number	Supplier
8	1738894-1	Tyco
	1738196-1	Tyco



**CONTACT REMOVAL TOOL
Figure 14**

- (1) Make a selection of a contact removal tool from Table 14.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS**

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE CONTACT RETENTION CLIP IN THE CONNECTOR.

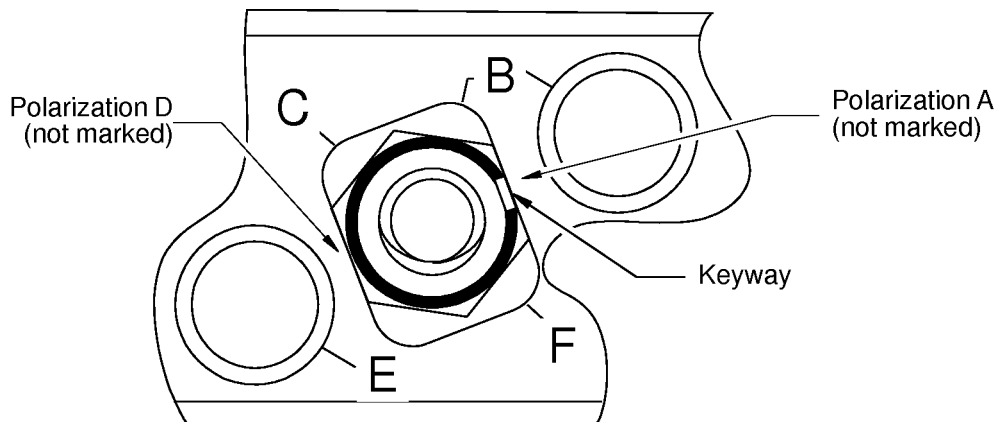
- (2) Put the tip of the removal tool on the cable near the rear of the connector.
- (3) Axially align the removal tool and the contact cavity.
- (4) Carefully push the removal tool straight into the contact cavity until it stops.
- (5) Carefully pull the cable and the removal tool straight out of the contact cavity at the same time.
- (6) If the contact is not released:
 - (a) Pull the contact removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (2) through Step (5) again.

3. CONNECTOR POLARIZATION**A. Connector Polarization**

The polarization code of the connector part number identifies the position of:

- The polarization of the jackscrew on the plug connector
- The polarization of the jackpost on the receptacle connector.

Refer to Figure 15 and Figure 16.

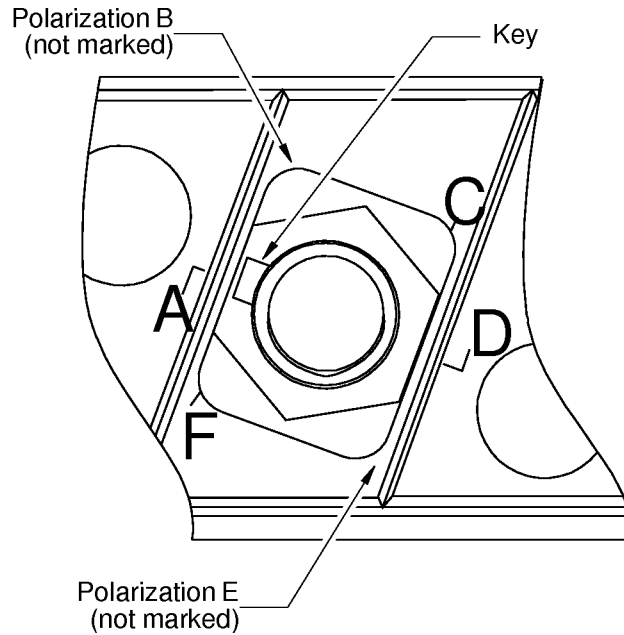


JACKSCREW POLARIZATION ON THE BACC65BC() PLUG CONNECTOR

Figure 15

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



JACKPOST POLARIZATION ON THE BACC65BD() RECEPTACLE CONNECTOR

Figure 16

- (1) Find the polarization code in the connector part number from the equipment list.
- (2) For that code, find the correct position of:
 - The jackscrew keyway on the plug
 - The jackpost key on the receptacle.
- (3) If the position of the jackscrew key way or the jackpost key do not agree with the code in the part number from the equipment list, put the jackscrew and jackpost into the correct position. Refer to Paragraph 3.B..
- (4) If the polarization code in the part number on the connector does not agree with the polarization code in the part number from the equipment list, change the part number on the connector shell. Refer to Paragraph 3.D..

B. Change of the Jackscrew Polarization Keyway on the Plug Connector

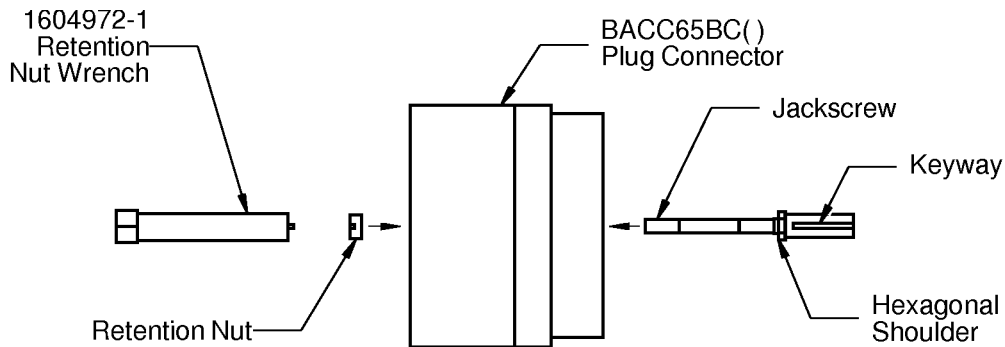
NOTE: If it is necessary, change the polarization of the BACC65BC() and BACC65BD() connectors before the backshells are installed.

**Table 15
POLARIZATION RETAINING PLATE TOOLS**

Tool	Part Number	Supplier
Retention Nut Wrench	1604972-1	Tyco
Torque Tool	-	An available source

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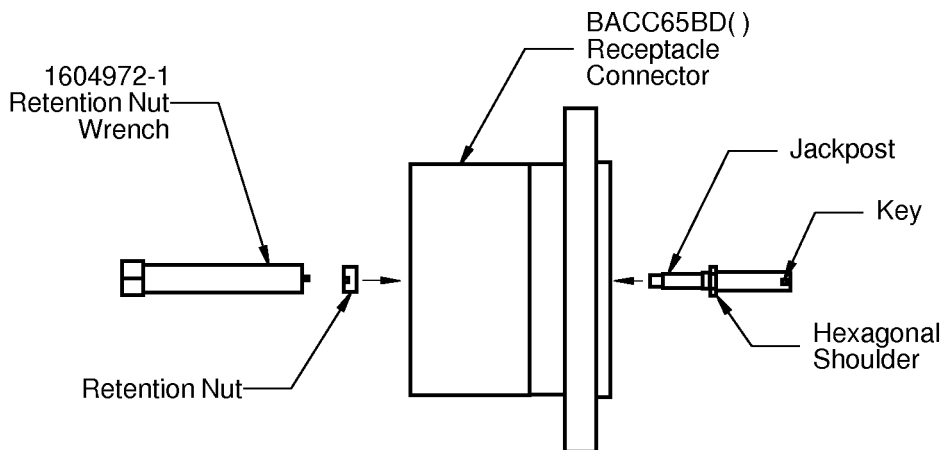


CHANGE OF THE JACKSCREW POLARIZATION KEYWAY
Figure 17

- (1) Make a selection of these tools from Table 15:
 - A retention nut wrench
 - A torque tool.
- (2) From the rear of the connector, remove the jackscrew retention nut. Refer to Figure 17.
- (3) Put the polarization keyway in the correct position. Refer to Figure 15.
- (4) From the front of the connector, push the jackscrew into the jackscrew hole until it stops.
 Make sure that the keyway is in the correct polarization position.
- (5) From the rear of the connector, install the retention nut on the jackscrew.
- (6) Torque the retention nut 10 inch-pounds \pm 1 inch-pound.

C. Change of the Jackpost Polarization Key on the Receptacle Connector

NOTE: If it is necessary, change the polarization of the BACC65BC () and BACC65BD () connectors before the backshells are installed.



CHANGE OF THE JACKPOST KEY ON THE RECEPTACLE CONNECTOR
Figure 18

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ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

- (1) Make a selection of these tools from Table 15:
 - A retention nut wrench
 - A torque tool.
- (2) From the rear of the connector, remove the jackpost retention nut. Refer to Figure 18.
- (3) Put the polarization key in the correct position. Refer to Figure 16.
- (4) From the front of the connector, push the jackpost into the jackpost hole until it stops.
Make sure that the key is in the correct polarization position.
- (5) From the rear of the connector, install the retention nut on the jackpost.
- (6) Torque the retention nut 10 inch-pounds \pm 1 inch-pound.

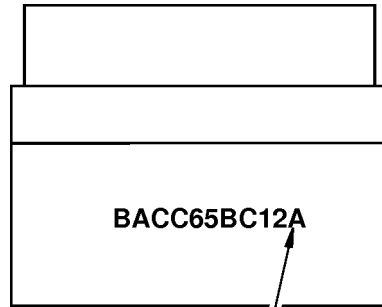
D. Change of the Polarization Code in the Part Number on the Connector

**Table 16
NECESSARY MATERIALS**

Material	Part Number	Supplier
Ink	No. 68 Fast Dry	Independent
	No. 73X NW Opaque	Independent
	No. 73X Opaque	Independent
Paint, Clear	683-3-2	Akzo
	Clear Lacquer	Tartan
	EC-776	3M
	EC-776SR	3M
Permanent Ink Pen	13601	Sanford Sharpie
	13801	

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Mark the Polarization Code here.
 The Polarization Code must be one of these letters: A, B, C, D, E, F

THE LOCATION TO MARK THE POLARIZATION CODE
Figure 19

- (1) Make a selection of these materials from Table 16:
 - An ink or a permanent ink pen
 - A clear paint.
- (2) If the polarization code in the part number on the connector is incorrect:
 - (a) Apply a layer of ink on the code on the connector shell.
 Make sure that the code cannot be read.
 - (b) Write the new code on the connector shell adjacent to the layer of ink.
- (3) If the part number on the connector does not have a polarization code, write the code on the connector shell at the end of the part number. Refer to Figure 19.
- (4) Let the ink dry for a minimum of 10 minutes.
- (5) Apply a layer of the clear paint on the part number on the connector shell.

CAUTION: DO NOT APPLY PAINT ON THE CONTACTS. PAINT ON THE SURFACE OF A CONTACT CAN CAUSE UNSATISFACTORY ELECTRICAL PERFORMANCE OF THE CONTACT.

- (6) Let the paint dry before the connector shell is touched or moved.

4. CONNECTOR ASSEMBLY

A. Assembly of S280W554-113 Size 8 Coax Contacts

Table 17
SEAL BOOT

Part Number	Supplier
1811481-1	Tyco

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ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

**Table 18
CENTER CONTACT CRIMP TOOLS**

Coax Contact Size	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
8	M22520/2-01	5	K1025S

**Table 19
OUTER CONTACT CRIMP TOOLS**

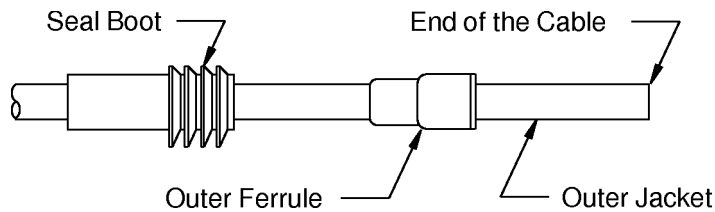
Coax Contact Size	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
8	M22520/5-01	Y793A	A

- (1) Make a selection of a center contact crimp tool from Table 18.
- (2) Make a selection of an outer contact crimp tool from Table 19.
- (3) Discard the seal boot that comes with the S280W554-113 contact.

NOTE: The seal boot that is included in the size 8 coax contact kit will not make a seal in a contact cavity that has a keyway.

- (4) Put these components on the cable:
 - The Tyco 1811481-1 seal boot
 - The outer ferrule.

Refer to Figure 20.

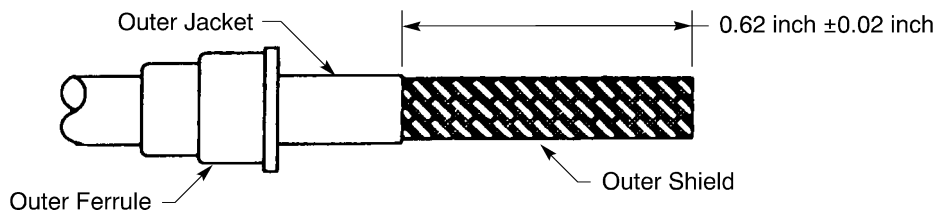


**POSITION OF THE SEAL BOOT AND THE OUTER FERRULE ON THE CABLE
Figure 20**

- (5) Remove 0.62 inch \pm 0.02 inch of jacket from the end of the cable. Refer to Figure 21.

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ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

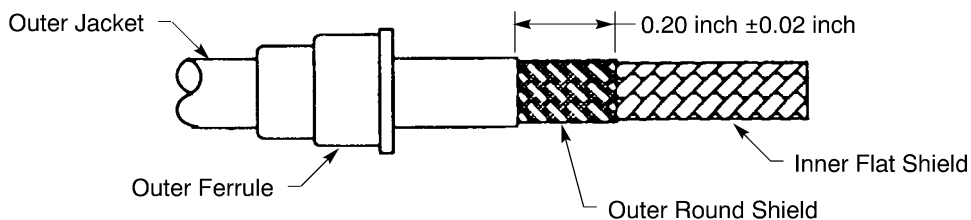


OUTER JACKET REMOVAL LENGTH

Figure 21

- (6) Cut the outer round shield to make the distance from the end of the cable jacket to the end of the round shield equal to 0.20 inch \pm 0.02 inch.

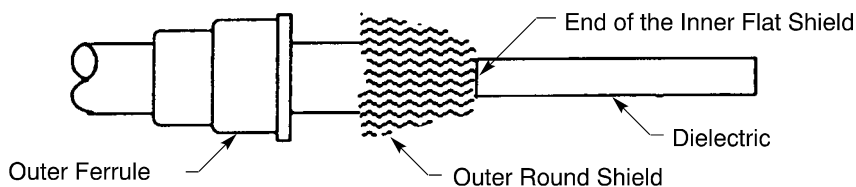
Refer to Figure 22.



REMOVAL OF THE OUTER ROUND SHIELD

Figure 22

- (7) Loosen the round shield and fold it back on the cable jacket.
- (8) Cut the inner flat shield to align the edge of the shield with the edge of the folded back outer round shield. Refer to Figure 23.



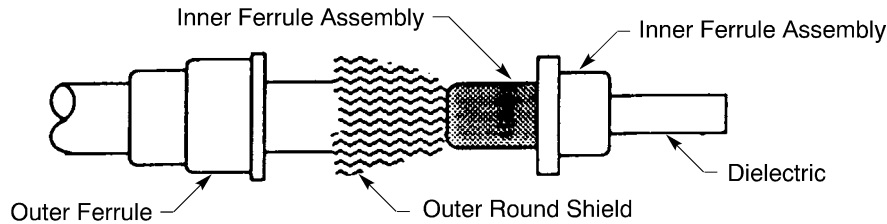
OUTER ROUND SHIELD FOLDED BACK

Figure 23

- (9) Push the inner ferrule assembly rearward on the dielectric until it is against the edge of the round shield. Refer to Figure 24.

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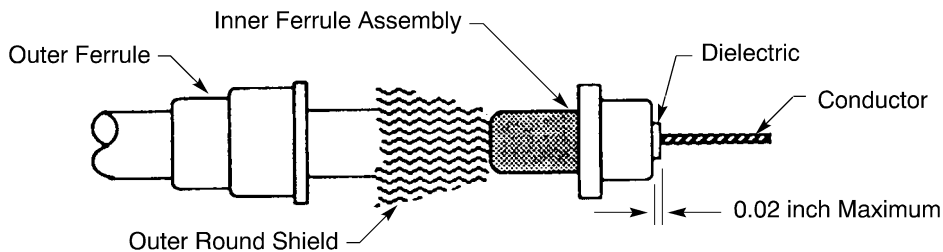
ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



POSITION OF THE INNER FERRULE ASSEMBLY ON THE CABLE
Figure 24

- (10) Remove the length of the dielectric between the end of the inner ferrule assembly and the end of the cable. Refer to Figure 25.

Make sure that the distance from the end of the dielectric to the edge of the inner ferrule assembly is not greater than 0.02 inch.



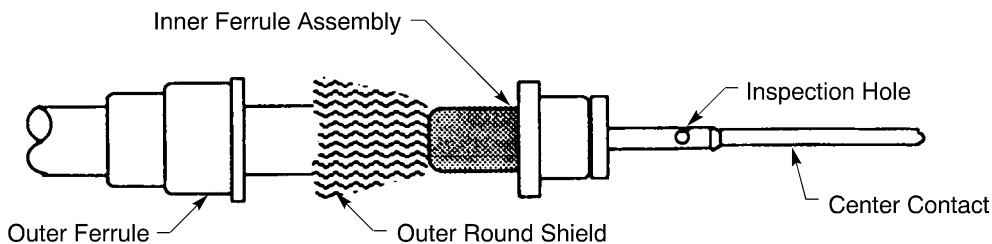
DIELECTRIC REMOVAL
Figure 25

- (11) Put the conductor into the crimp barrel of the center contact.

Make sure that:

- All of the strands of the conductor are in the center contact
- The conductor can be seen in the inspection hole.

- (12) Push the center contact rearward toward the outer ferrule until the inner ferrule assembly is against the outer round shield. Refer to Figure 26.



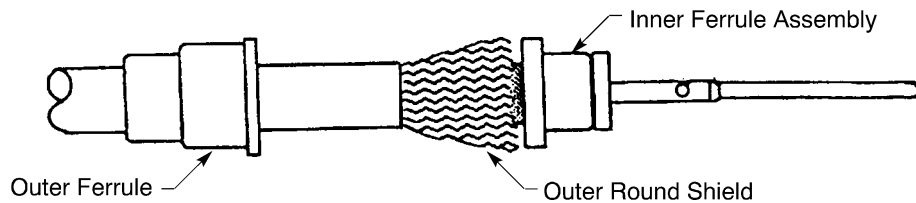
POSITION OF THE CENTER CONTACT ON THE CABLE
Figure 26

- (13) Crimp the center contact.

- (14) Symmetrically put the outer round shield around the inner ferrule assembly. Refer to Figure 27.

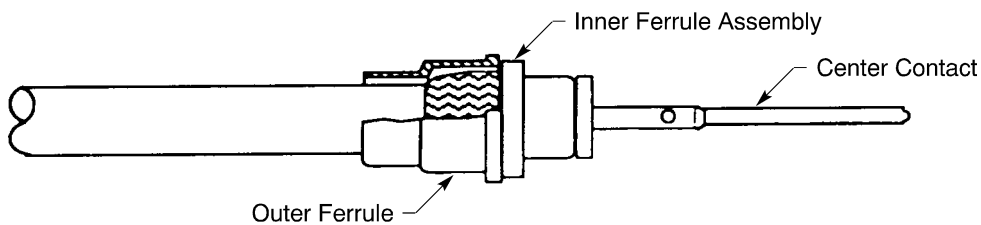
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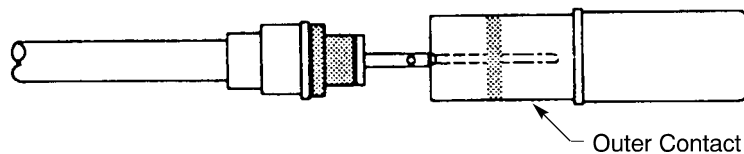
POSITION OF THE OUTER ROUND SHIELD ON THE INNER FERRULE ASSEMBLY
Figure 27

- (15) Push the outer ferrule forward until it is against the inner ferrule assembly. Refer to Figure 28. Make sure that the shield is between the outer ferrule and the inner ferrule assembly.



POSITION OF THE OUTER FERRULE AGAINST THE INNER FERRULE ASSEMBLY
Figure 28

- (16) Remove the unwanted length of the shield strands. Make sure that the end of the shield strands aligns with the rear edge of the shoulder of the inner ferrule assembly.
- (17) Push the cable and the inner contact assembly into the outer contact assembly until it stops. Refer to Figure 29.

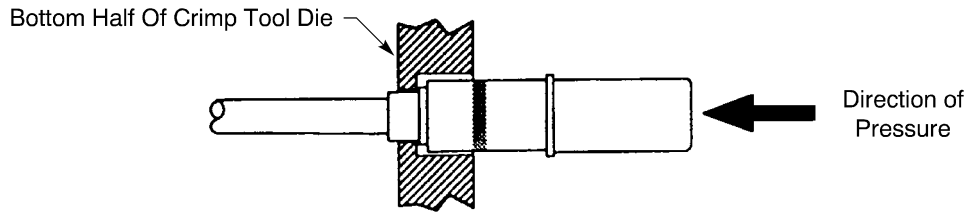


ALIGNMENT OF THE CENTER CONTACT AND THE OUTER CONTACT
Figure 29

- (18) Apply pressure on the outer contact toward the outer and inner ferrule and crimp the outer contact. Refer to Figure 30. Make sure that the outer contact is against the outer ferrule during the crimp operation.

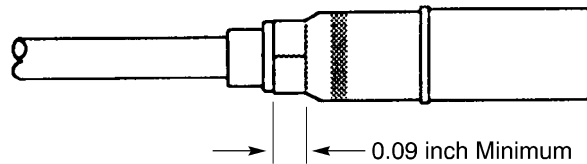
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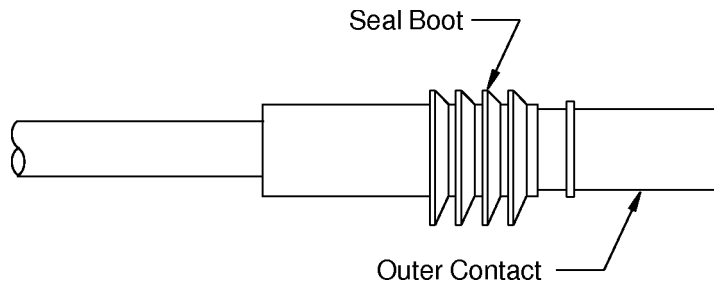
DIRECTION OF PRESSURE DURING THE CRIMP OPERATION
Figure 30

- (19) Examine the crimp area of the outer contact.
Make sure that the length of the crimp area on the outer contact is 0.09 inch or longer. Refer to Figure 31.



CRIMP AREA OF THE OUTER CONTACT
Figure 31

- (20) Push the seal boot and cable support assembly toward the contact assembly until it stops. Refer to Figure 32.



POSITION OF THE SEAL BOOT AGAINST THE CONTACT ASSEMBLY
Figure 32

B. Assembly of Tyco 1757624-1 and 1883369-2 Size 8 Coax Contacts to BMS 13-65 Type 0F Coax Cable

Table 20
CENTER CONTACT CRIMP TOOLS

Coax Contact	Crimp Tool		Locator
	Basic Unit		
	Part Number	Setting	
1757624-1	M22520/2-01	5	M22520/2-06

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ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

Table 20 (continued)

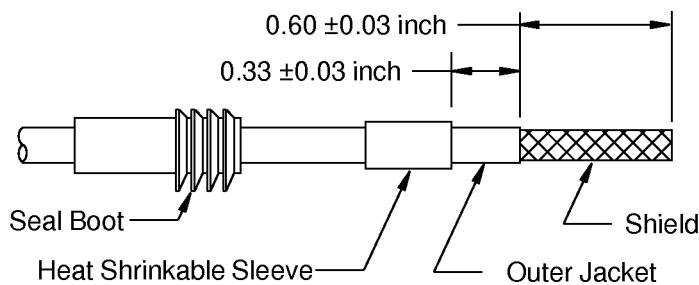
Coax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	
1883369-2	M22520/2-01	5	NONE

Table 21
OUTER CONTACT CRIMP TOOLS

Coax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
1757624-1	M22520/5-01	M22520/5-45	B
1883369-2	M22520/5-01	M22520/5-45	B

- (1) Make a selection of a center contact crimp tool from Table 20.
- (2) Make a selection of an outer contact crimp tool from Table 21.
- (3) Put the seal boot on the cable. Refer to Figure 33.
Make sure that the larger end of the seal boot points to the end of the cable.
- (4) Make a selection of a 3/16 inch diameter Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
- (5) Put a 0.5 inch ± 0.05 inch length of the heat shrinkable sleeve on the cable.
- (6) Remove 0.60 inch ± 0.03 inch of jacket from the end of the cable.
- (7) Shrink the sleeve into its position. Refer to Figure 33.

Make sure that the distance from the end of the cable jacket to the end of the sleeve is 0.33 inch ± 0.03 inch.



POSITION OF THE SEAL BOOT AND THE HEAT SHRINKABLE SLEEVE ON THE CABLE
Figure 33

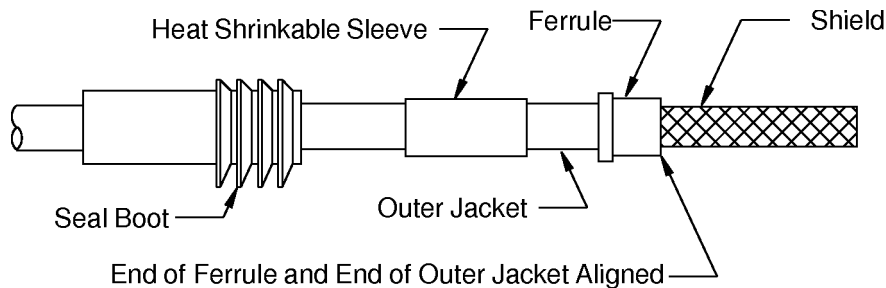
- (8) Put the ferrule on the cable. Refer to Figure 34.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

Make sure that:

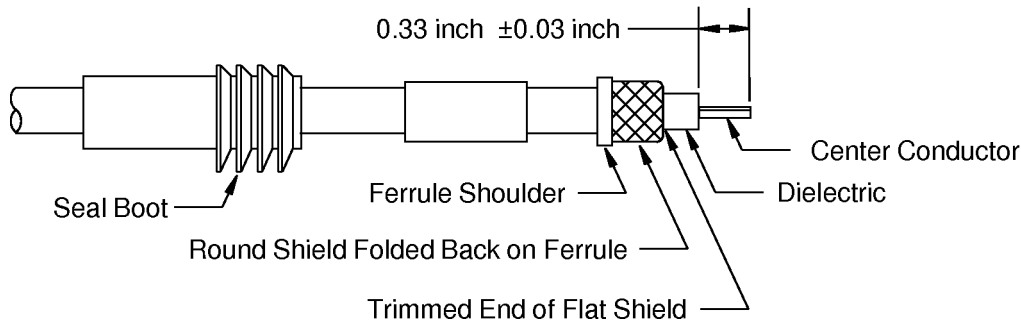
- The smaller end of the the ferrule points to the end of the cable
- The end of the ferrule and the end of the cable outer jacket are aligned.



POSITION OF THE FERRULE ON THE CABLE

Figure 34

- (9) Loosen the strands of the round shield and fold the round shield back on the ferrule. Refer to Figure 35.



ROUND SHIELD FOLDED BACK ON THE FERRULE

Figure 35

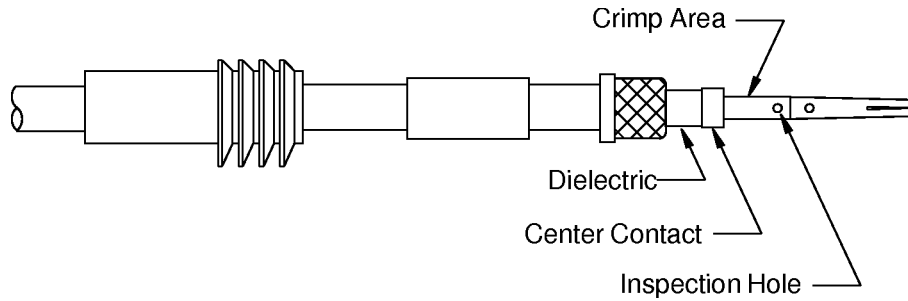
- (10) Remove the unwanted length of the round shield strands that extend rearward of the forward edge of the shoulder of the ferrule. Refer to Figure 35.
- (11) Cut the inner flat shield to align the trimmed end of the flat shield and the edge of the folded back round shield. Refer to Figure 35.
- (12) Remove 0.33 inch \pm 0.03 inch of the insulation from the end of the center conductor.
- (13) Put the center conductor into the crimp barrel of the center contact. Refer to Figure 36.

Make sure that:

- All of the strands of the center conductor are in the crimp barrel of the center contact
- The conductor can be seen in the inspection hole.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



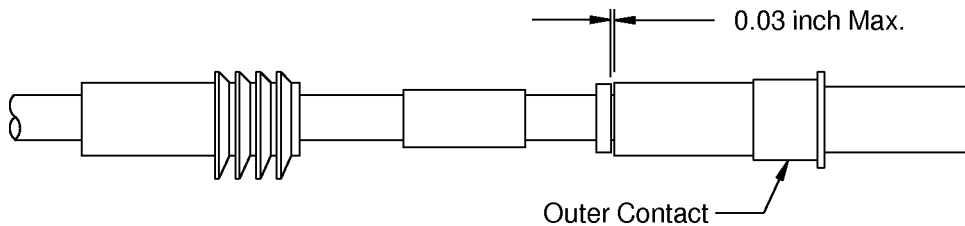
POSITION OF THE CENTER CONTACT ON THE CENTER CONDUCTOR
Figure 36

(14) Crimp the center contact.

Make sure that:

- All of the strands of the conductor are in the crimp barrel of the center contact
- The conductor can be seen in the inspection hole.

(15) Push the cable and the center contact assembly into the outer contact until it stops. Refer to Figure 37.



COAX CONTACT ASSEMBLY
Figure 37

(16) Hold the contact assembly together, and at the same time, crimp the outer contact.

Make sure that the distance from the shoulder of the inner ferrule to the edge of the outer contact crimp barrel is less than 0.03 inch. Refer to Figure 37.

(17) Remove the unwanted shield strands that come out from between the outer contact crimp barrel and the shoulder of the ferrule.

(18) Push the seal boot to the contact assembly until it stops.

C. Assembly of the Size 8 BACC47GA1 and BACC47GB1 Quadrax Contacts

Table 22
QUADRAX CONTACT INNER CONTACT CRIMP TOOLS

Quadrax Contact	Crimp Tool		
	Basic Unit		Locator
	Part Number	Setting	Part Number
BACC47GA1	M22520/2-01	5	K709
BACC47GB1	M22520/2-01	5	K709

STANDARD WIRING PRACTICES MANUAL

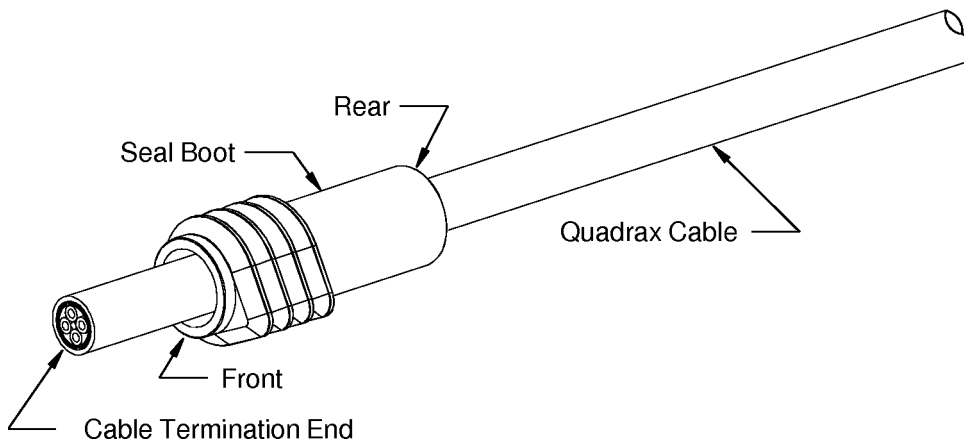
ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

**Table 23
QUADRAX CONTACT OUTER CONTACT CRIMP TOOLS**

Quadrax Contact	Crimp Tool		
	Basic Unit	Die	
		Part Number	Cavity
BACC47GA1	M22520/5-01	M22520/5-45	B
BACC47GB1	M22520/5-01	M22520/5-45	B

- (1) Make a selection of an inner contact crimp tool from Table 22.
- (2) Make a selection of an outer contact crimp tool from Table 23.
- (3) Cut the cable perpendicular to its longitudinal axis.
- (4) Put the seal boot on the cable. Refer to Figure 38.

Make sure that the end of the seal boot that has the smaller diameter points rearward, away from the end of the cable.

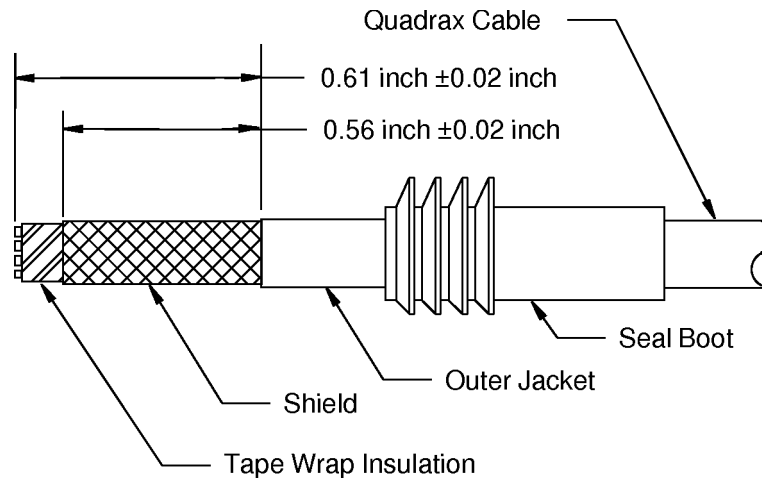


**THE SEAL BOOT ON THE CABLE
Figure 38**

- (5) Move the seal boot away from the end of the cable.
- (6) Prepare the end of the cable. Refer to Figure 39.

STANDARD WIRING PRACTICES MANUAL

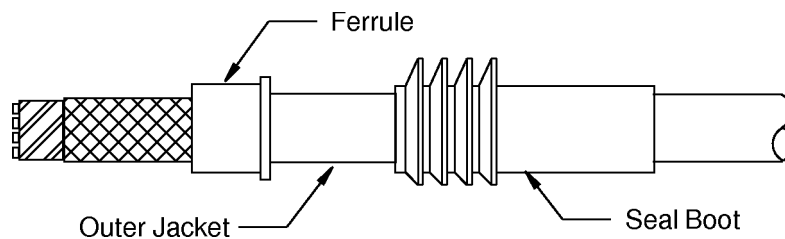
ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



QUADRAX CABLE TRIM DIMENSIONS

Figure 39

- (a) Remove 0.61 inch \pm 0.02 inch of the outer jacket from the end of the cable.
 - (b) Remove the necessary length of the shield from the end of the cable to make the distance from the end of the outer jacket to the end of the shield equal to 0.56 inch \pm 0.02 inch.
- (7) Put the ferrule on the cable. Refer to Figure 40.
- Make sure that the end of the ferrule that has the smaller diameter is pointed forward toward the end of the cable.



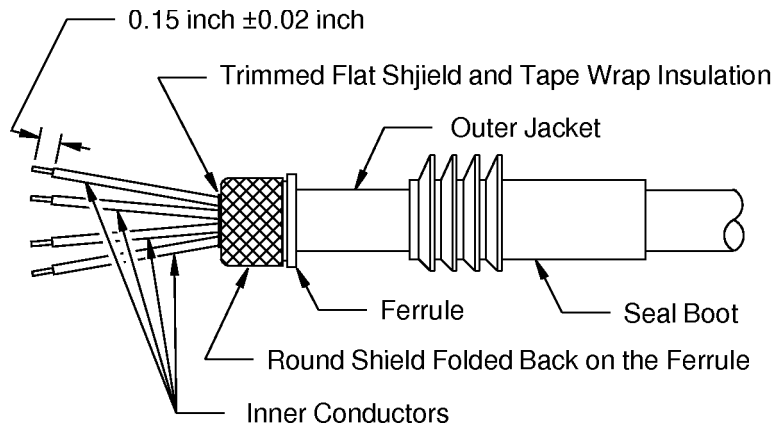
POSITION OF THE FERRULE ON THE CABLE

Figure 40

- (8) Push the ferrule rearward until it is against the end of the outer jacket. Refer to Figure 40.
- (9) Fold the outer round shield back on the ferrule. Refer to Figure 41.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



INNER CONDUCTOR INSULATION REMOVAL DIMENSIONS AND SHIELD PREPARATION

Figure 41

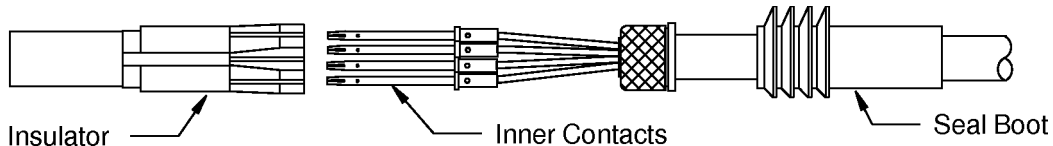
- (10) Remove the necessary length of the inner flat shield and the tape wrap insulation.
Make sure that the ends of the flat shield and the tape wrap are approximately aligned with the front end of the ferrule.
- (11) Move the four inner conductors apart.
Make sure that:
 - The inner conductors do not cross each other
 - The initial positions of the inner conductors in the cable is not changed.
- (12) Remove the necessary length of the filler rods.
Make sure that the ends of the filler rods are approximately aligned with the front end of the ferrule.
- (13) Remove 0.15 inch \pm 0.02 inch of insulation from each of the four inner conductors.
Refer to:
 - Refer to Figure 41.
 - Subject 20-00-15 for the procedure to remove the wire insulation.
- (14) Crimp an inner contact on each of the four inner conductors.
Make sure that:
 - The distance between the wire insulation and the end of each inner contact crimp barrel is 0.02 inch maximum
 - The wire insulation is not in the crimp barrel
 - The conductor strands can be seen in the inspection hole
 - All conductor strands are in the crimp barrel
 - The conductor strands do not go out of the inspection hole
 - The plating of each inner contact is not removed
 - The inner contacts have no cracks.
- (15) Put the inner contacts into the larger end of the insulator. Refer to Figure 42 and Figure 43.

STANDARD WIRING PRACTICES MANUAL

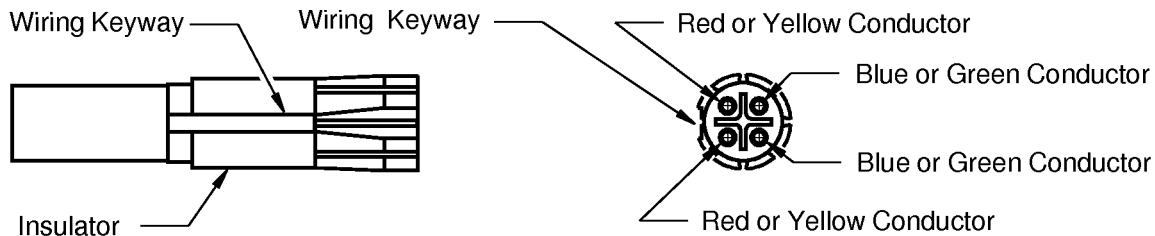
ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

Make sure that:

- The red conductor and the yellow conductor are adjacent to the wiring keyway of the insulator
- The position of the conductors in the insulator is the same as the position of the conductors in the cable
- Each inner contact is fully installed in the insulator
- The conductors do not cross each other.



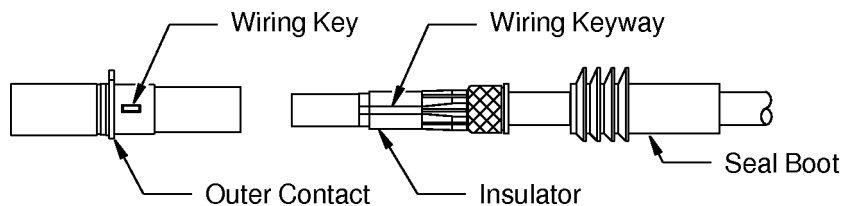
INSTALLATION OF THE INNER CONTACTS IN THE INSULATOR
Figure 42



INSULATOR REAR VIEW - WIRE SIDE

POSITION OF THE INNER CONTACTS IN THE INSULATOR
Figure 43

(16) Align the wiring key on the outer contact and the wiring keyway of the insulator. Refer to Figure 44.



ALIGNMENT OF THE OUTER CONTACT AND THE INSULATOR ASSEMBLY
Figure 44

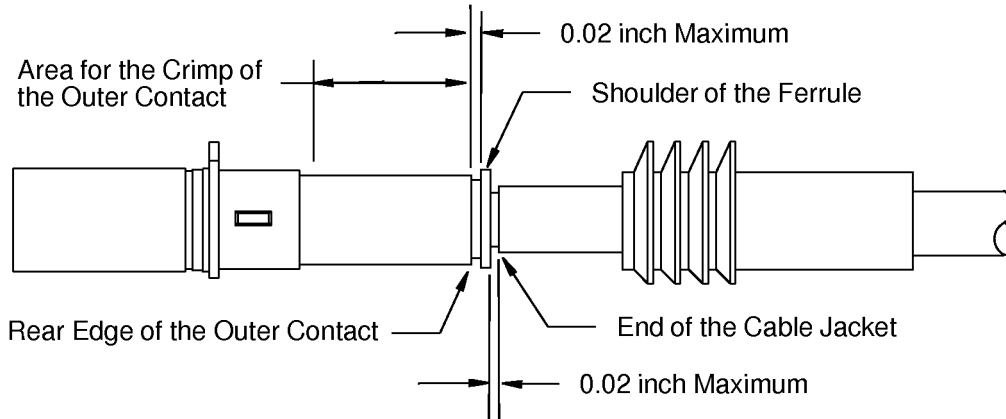
(17) Push the insulator assembly into the outer contact until it stops . Refer to Figure 45.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

Make sure that:

- The wiring key on the outer contact and the wiring keyway of the insulator are aligned
- The rear of the insulator is against the shield that is folded back on the ferrule
- The distance from the rear edge of the outer contact to the shoulder of the ferrule is not more than 0.02 inch
- The distance from the rear end of the ferrule to the end of the cable jacket is not more than 0.02 inch.



QUADRAX CONTACT ASSEMBLY
Figure 45

- (18) Crimp the outer contact. Refer to Figure 45.
- (19) Remove all of the strands of the shield that are between the rear edge of the outer contact and the shoulder of the ferrule.

D. Installation of Size 8 Coax Contacts and Size 8 Quadrax Contacts

NOTE: Change the polarization of the BACC65BC() and BACC65BD() connectors before the backshells are installed.

Refer to paragraph 3.A..

NOTE: Install the 2 contact cavity BACC10MD1 backshell on the cable before contact insertion. Refer to Paragraph 4.D. .

NOTE: Install the 12 contact cavity BACC10MC1 and BACC10MC2 backshells after contact insertion.

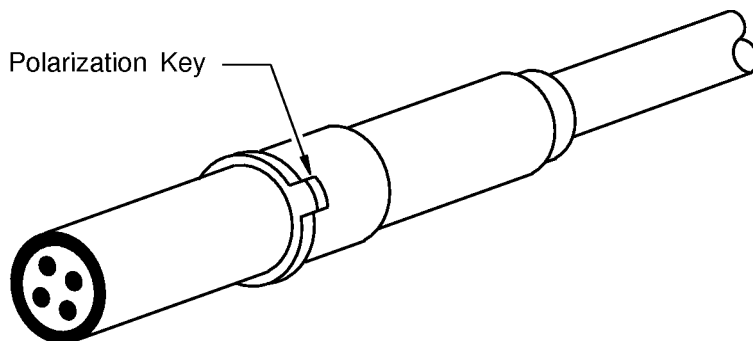
NOTE: Install seal plugs in empty contact cavities before or after contact insertion. Refer to Paragraph 4.E.

Table 24
LUBRICANTS

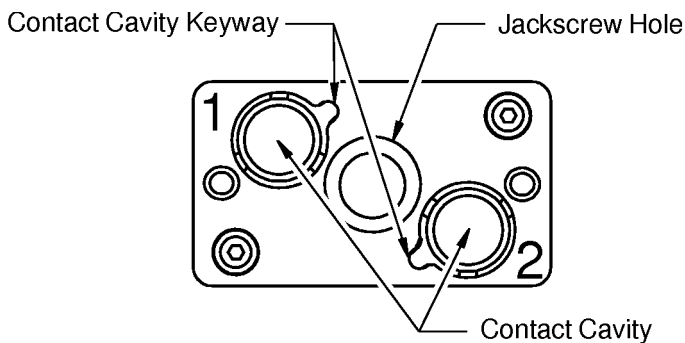
Lubricant	Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

STANDARD WIRING PRACTICES MANUAL

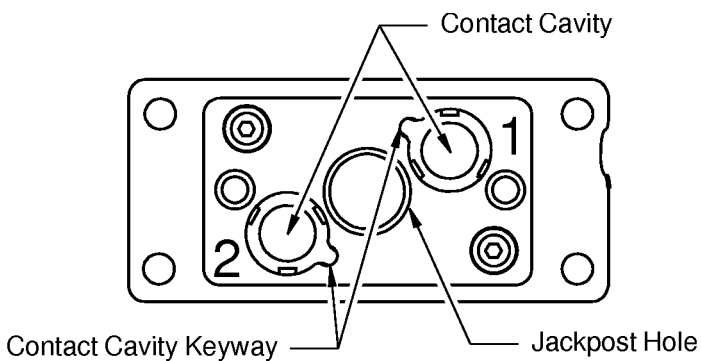
ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



POLARIZATION KEY OF THE QUADRAX CONTACT
Figure 46



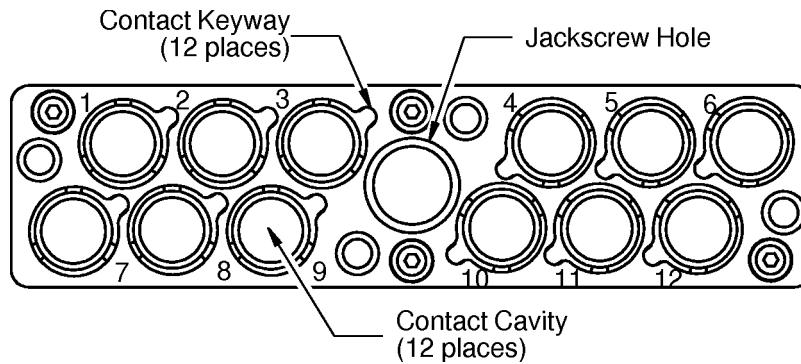
VIEW OF THE REAR FACE OF THE BACC65BC2() PLUG CONNECTOR
Figure 47



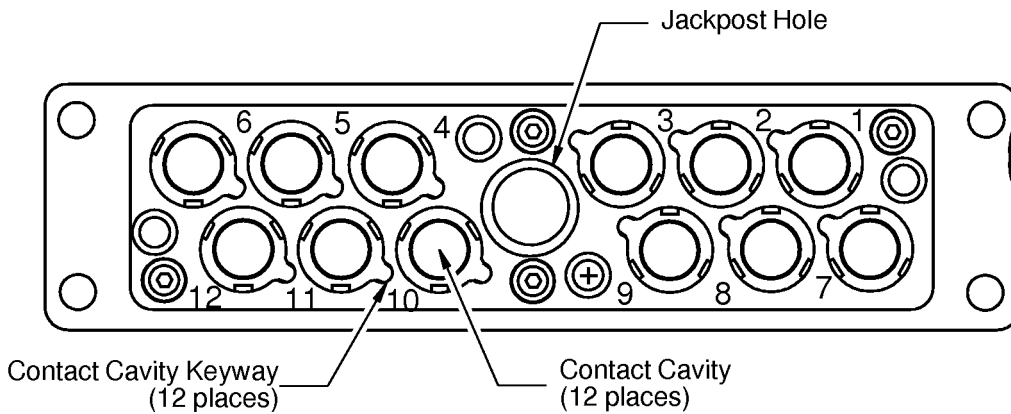
VIEW OF THE REAR FACE OF THE BACC65BD2() RECEPTACLE CONNECTOR
Figure 48

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



VIEW OF THE REAR FACE OF THE BACC65BC12() PLUG CONNECTOR
Figure 49

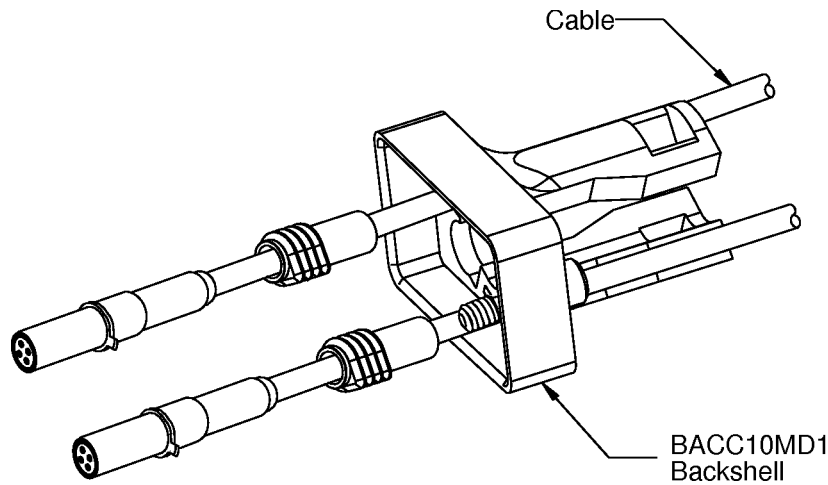


VIEW OF THE REAR FACE OF THE BACC65BD12() RECEPTACLE CONNECTOR
Figure 50

- (1) For the BACC65BC2() and BACC65BD2() connectors that have 2 contact cavities, put the backshell on the cable before you install the contacts. Refer to Figure 51.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



THE BACC10MD1 BACKSHELL ON THE CABLE

Figure 51

NOTE: The backshells for the connectors that have 12 contact cavities are installed after the contacts are installed.

- (2) Install the contacts into the contact cavities on the rear face of the connector.
 - (a) For the size 8 quadrax contact:
 - Axially align the contact with the contact cavity at the rear of the connector
 - Align the contact keyway with the contact cavity keyway.

Refer to:

- Figure 46 for the polarization key of the quadrax contact
- Figure 47, 47, 47 and 47 for the keyway of the quadrax contact cavity.

- (b) For the size 8 coax contact, axially align the contact with the contact cavity at the rear of the connector.

NOTE: The coax contact does not have a polarization key.

Make sure that the longitudinal axis of the contact assembly is perpendicular to the rear face of the connector.

- (3) Push the contact into the contact cavity until the contact stops and is locked.

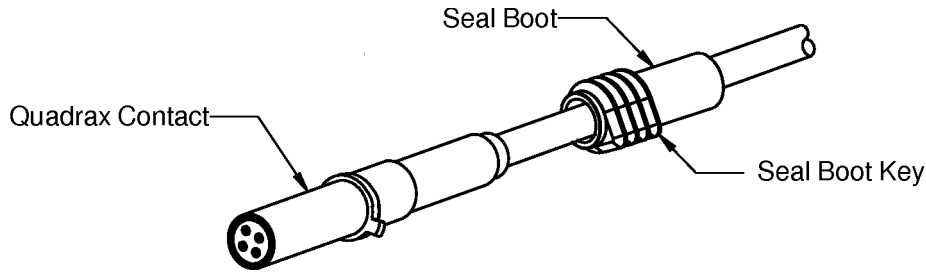
Make sure that the contact stays axially aligned with the contact cavity.

NOTE: A lubricant can be used to make it easier to push the contact into the contact cavity. Refer to Table 24

- (4) Align the seal boot key with the contact cavity keyway. Refer to Figure 52.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



THE LOCATION OF THE SEAL BOOT KEY
Figure 52

- (5) Push the seal boot into the contact cavity.
Make sure that the rear edge of the seal boot key is aligned with the rear face of the connector.
NOTE: A lubricant can be used to make it easier to push the seal boot into the contact cavity. Refer to Table 24.
- (6) Lightly pull on the cable.
Make sure that the contact is locked in the contact cavity.
CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.
CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.
- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (7) through Step (6) again.

E. Seal of an Empty Contact Cavity

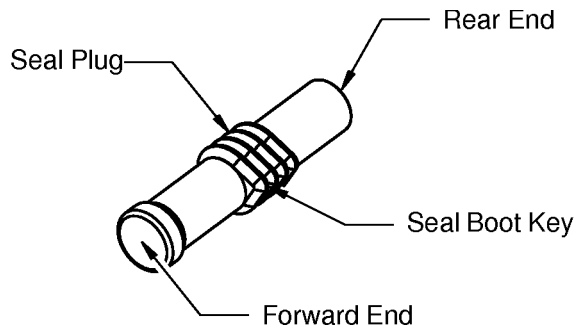
- NOTE:** Install seal plugs before the backshell is installed.
- NOTE:** Install seal plugs before or after the contacts are installed.

Table 25
SEAL PLUGS

Part Number	Supplier
1604872-2	Tyco

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



SEAL PLUG
Figure 53

(1) Put seal plugs in the contact cavities that do not have contacts in them.

Make sure that:

- The seal plug key is aligned with the contact cavity keyway
- The forward end of the seal plug goes in first
- The rear end of the seal plug is flush with the rear face of the connector. Refer to Figure 53.

F. Installation of the BACC10MC1, BACC10MC2, and BACC10MD1 Backshells

NOTE: The BACC10MD1 backshell must be put on the cable before the contacts are installed. Refer to Paragraph 4.D..

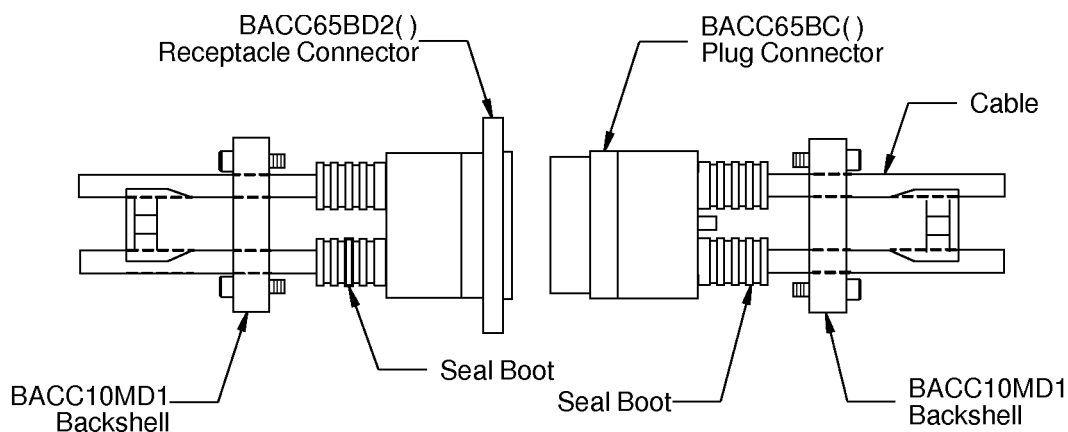
NOTE: The polarization of the connector must be changed before the backshell is installed.

Table 26
BACKSHELL INSTALLATION TOOLS

Tool	Type	Size (inch)
Wrench	Torque	-
Driver	Hex	7/64

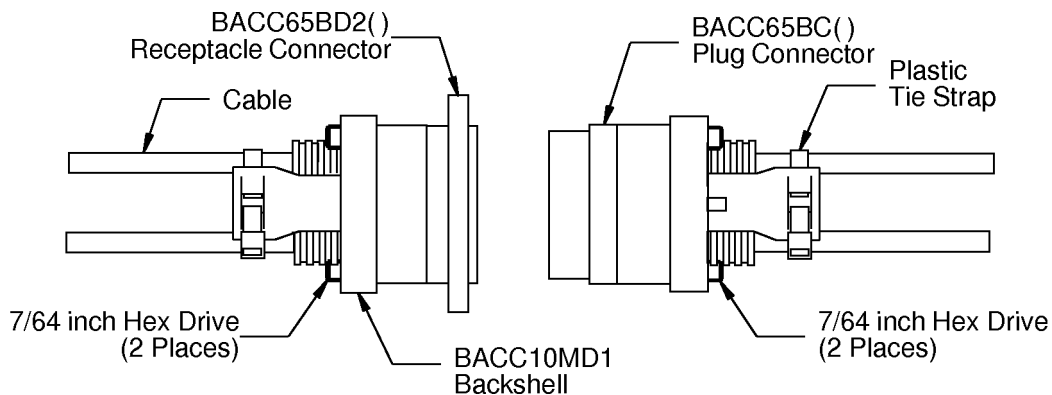
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



INSTALLATION OF THE BACC10MD1 BACKSHELL

Figure 54

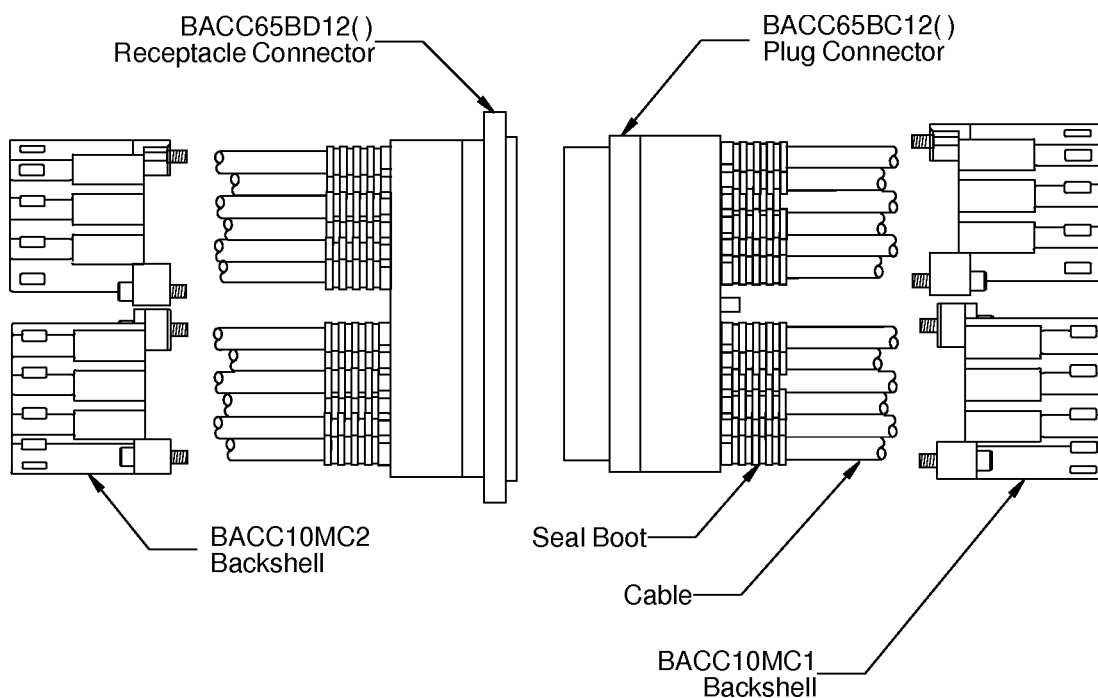


COMPLETED INSTALLATION OF THE BACC10MD1 BACKSHELL

Figure 55

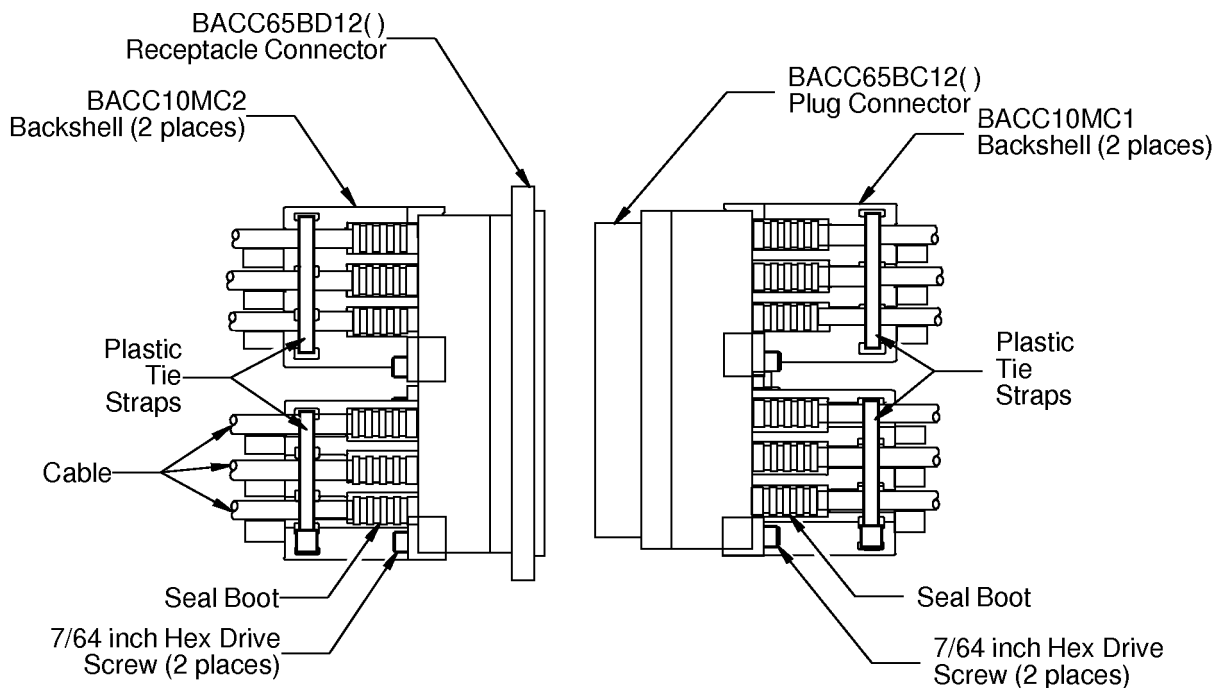
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



INSTALLATION OF THE BACC10MC1 AND BACC10MC2 BACKSHELLS

Figure 56



COMPLETED INSTALLATION OF THE BACC10MC1 AND BACC10MC2 BACKSHELLS

Figure 57

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS**

- (1) Make a selection of these tools from Table 26:
 - A torque tool
 - A driver.
- (2) Engage the threads of the backshell installation screws with the screw holes in the connector.
- (3) Torque each installation screw 10 inch-pounds \pm 1 inch-pound.
- (4) Assemble a plastic tie strap on the backshell. Refer to Subject 20-10-11.

5. CONNECTOR INSTALLATION**A. Installation of the Receptacle**

Table 27
RECEPTACLE INSTALLATION FASTENERS

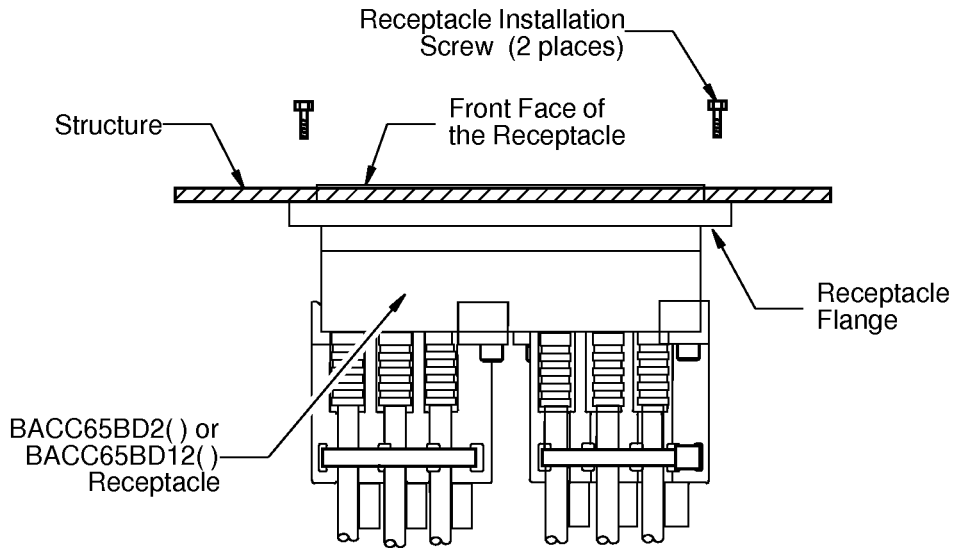
Fastener	Part Number	Supplier
Screw	BACS12HN06U()	QPL

Table 28
NECESSARY TOOLS

Tool	Type	Size (inch)
Driver	Phillips Head Screwdriver	-
	Socket Wrench	1/4
Torque	Phillips Head Torque Screwdriver	-
	Socket Torque Wrench	1/4

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS



INSTALLATION OF THE RECEPTACLE AND THE STRUCTURE
Figure 58

Refer to Figure 58.

- (1) Make a selection of two screws from Table 27.

Make sure that the screws are new.

CAUTION: SCREWS THAT ARE NOT NEW CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (2) Make a selection of these tools from Table 28:

- A driver
- A torque tool.

- (3) From the rear side of the structure, put the front face of the receptacle into the cutout and align the mounting holes of the receptacle flange with the holes in the structure.

- (4) From the front side of the structure, install 2 screws.

- (a) Install the first screw in the mounting hole next to contact cavity number 1.
- (b) Install the second screw in the mounting hole diagonally opposite to the first screw.

- (5) Tighten each screw until:

- The screw head is against the structure
- The connector flange is fully against the structure.

Make sure that the flange of the receptacle is fully flat against the surface of the structure.

- (6) Torque each screw 12 inch-pounds to 15 inch-pounds.

STANDARD WIRING PRACTICES MANUAL

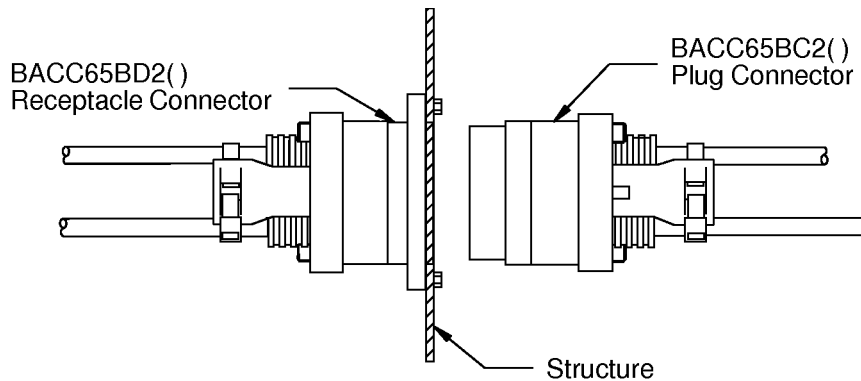
ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

B. Plug and Receptacle Connection

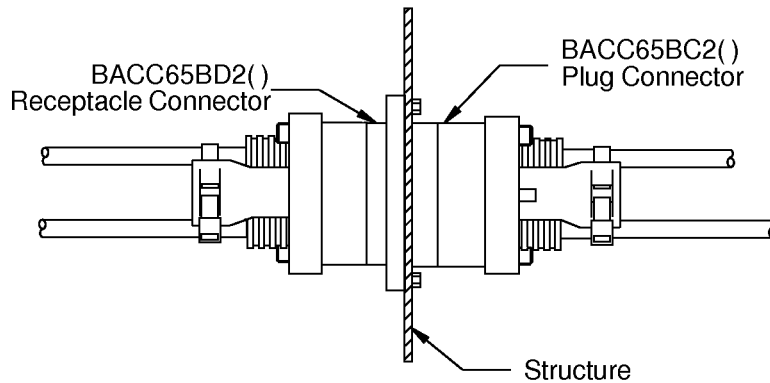
**Table 29
NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Hex Head	9/64

- (1) Make a selection of a driver from Table 29.
- (2) Make sure that the polarization position of the key on the plug connector agrees with the polarization position of the keyway on the receptacle connector.
- (3) Align the plug keyway to the receptacle key.
- (4) Align the the plug connector perpendicular to the front face of the receptacle connector.



Alignment of the Plug to the Receptacle



Completed Installation

INSTALLATION OF THE BACC65BC2 () PLUG CONNECTOR

Figure 59

- (5) Push the plug connector into the receptacle until it stops. Refer to Figure 59.
- (6) With the driver:

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACC65BC AND BACC65BD CONNECTORS

- (a) Engage the threads of the plug jackscrew and the threads of the receptacle jackpost.
- (b) Torque the plug jackscrew 7 inch-pounds to 8 inch-pounds.

6. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 30
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
1738196-1	Tyco

B. Contact Crimp Tools

**Table 31
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
K1025S	Daniels
K709	Daniels
M22520/2-01	QPL
M22520/2-06	QPL
M22520/5-01	QPL
M22520/5-45	QPL
Y793A	Daniels

C. Special Tools

**Table 32
SPECIAL TOOL SUPPLIERS**

Tool	Supplier
1604972-1	Tyco



707, 727-787

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 10-60450 FRONT RELEASE PLUG-IN RELAY SOCKETS

<u>Paragraph</u>		<u>Page</u>
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	B. Contact Part Numbers	1
2.	<u>RELAY SOCKET DISASSEMBLY</u>	1
	A. Contact Removal	1
3.	<u>RELAY SOCKET ASSEMBLY</u>	2
	A. Contact Assembly	2
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 10-60450 FRONT RELEASE PLUG-IN RELAY SOCKETS

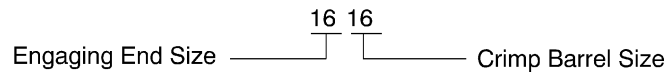
1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

Boeing Standard	Part Number	Supplier
10-60450	82164-1F	Clover
	105-100-02	Methode
	000300-0445	Viking

B. Contact Part Numbers



**EXAMPLE OF CONTACT SIZE
Figure 1**

**Table 2
CONTACT PART NUMBERS**

Contact Size	Part Number	Supplier
1616	BACC47CP2T	Boeing
	MS24255-16S	QPL
1614	248-136-1614S-02	Amphenol

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Contact Engaging End Size	Removal Tool
16	AT 2016
	ATML 1908
	M81969/19-08
	MS24256R16
	DRK16

- (1) Make a selection of a contact removal tool from Table 3.
- (2) At the front of the relay socket, axially align the contact removal tool and the contact cavity.
- (3) Put the tip of the removal tool on the engaging end of the contact.
- (4) Carefully push the removal tool into the contact cavity until it stops.

20-81-11

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 10-60450 FRONT RELEASE PLUG-IN RELAY SOCKETS

- (5) Push the removal tool, and at the same time, push the internal plunger of the removal tool. Make sure that the contact moves out of the rear of the relay socket.

CAUTION: DO NOT USE MORE FORCE THAN THE FORCE THAT IS NECESSARY TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the removal tool out of the contact cavity.
- (7) Pull the wire and contact out of the contact cavity at the rear of the relay socket.

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

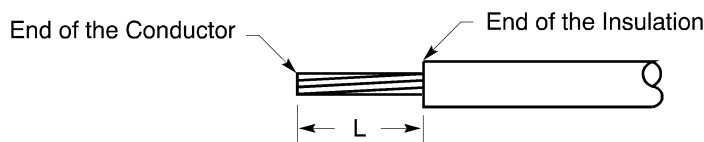
**Table 4
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	1616	M22520/1-01	2	M22520/1-02	Blue
22	1616	M22520/1-01	3	M22520/1-02	Blue
20	1616	M22520/1-01	4	M22520/1-02	Blue
		MS3191-1	-	MS3191-16	-
18	1616	M22520/1-01	5	M22520/1-02	Blue
		MS3191-1	-	MS3191-16	-
16	1616	M22520/1-01	6	M22520/1-02	Blue
		MS3191-1	-	MS3191-16	-
14	1614	M22520/1-01	7	M22520/1-02	Blue

- (1) Make a selection of a crimp tool from Table 4.
- (2) Remove 0.28 inch ±0.03 inch of the wire insulation from the end of the wire.

Refer to:

- Figure 2
- Subject 20-00-15 for the insulation removal procedures.



**WIRE PREPARATION
Figure 2**

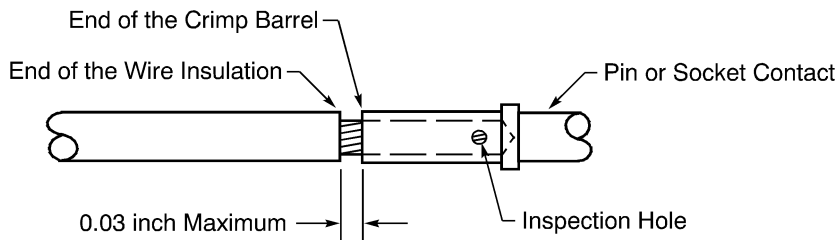
- (3) Put the end of the wire into the crimp barrel of the contact. Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 10-60450 FRONT RELEASE PLUG-IN RELAY SOCKETS

Make sure that:

- The conductor can be seen in the inspection hole of the contact
- All of the strands of the conductor are in the crimp barrel
- The distance between the rear end of the contact and the wire insulation is 0.03 inch maximum.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 3

(4) Crimp the contact.

Make sure that:

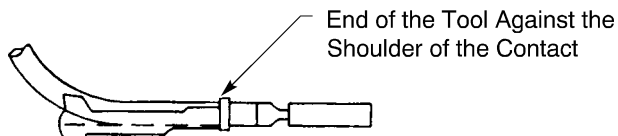
- Make sure the conductor can be seen in the inspection hole of the contact.
- The distance between the rear end of the contact and the wire insulation is 0.03 inch maximum
- The contact does not have a bend larger than 3.5 degrees from the longitudinal axis of the contact.

B. Contact Insertion

Table 5
CONTACT INSERTION TOOLS

Contact Size	Insertion Tool	Supplier
1616	M81969/17-04	QPL
1614	M81969/17-04	QPL

- (1) Make a selection of an insertion tool from Table 5.
- (2) Put the end of the insertion tool tip against the contact shoulder. Refer to Figure 4.



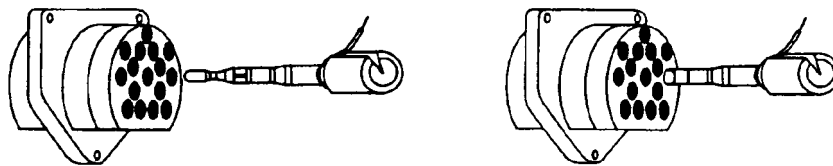
INSERTION TOOL POSITION ON THE CONTACT
Figure 4

- (3) At the rear of the connector, carefully push the tool and the contact into the contact cavity until it stops. Refer to Figure 5.

Make sure that the insertion tool stays aligned with the contact cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 10-60450 FRONT RELEASE PLUG-IN RELAY SOCKETS



CONTACT INSERTION
Figure 5

NOTE: The 10-60450-4 relay socket does not have a rubber grommet.

- (4) Carefully remove the insertion tool.
- (5) Lightly pull on the wire to make sure that the contact is locked in the contact cavity.

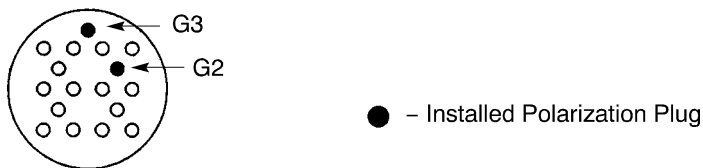
CAUTION: DO NOT MAKE A DENT IN THE INSULATION OF WIRE WITH THE FINGERNAILS. DAMAGE TO THE INSULATION CAN OCCUR.

C. Spare Contact Installation

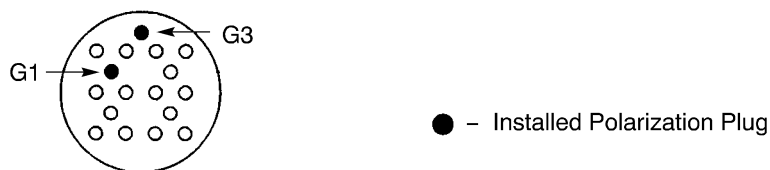
- (1) Install a spare contact in each unused contact cavity.
Refer to Subject 20-60-08.

D. Polarization Plug Installation

Polarization plugs come with the relay socket.



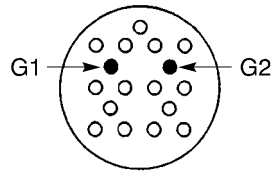
10-60540-1 AND 10-60540-6 RELAY SOCKET POLARIZATION - KEY G1
Figure 6



10-60540-2 RELAY SOCKET POLARIZATION - KEY G2
Figure 7

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 10-60450 FRONT RELEASE PLUG-IN RELAY SOCKETS



● - Installed Polarization Plug

10-60540-3 RELAY SOCKET POLARIZATION - KEY G3

Figure 8

- (1) Install polarization plugs in the socket. Refer to Figure 6, Figure 7, and Figure 8 for the correct key.
 - (a) Make a selection of an insertion tool from Table 5.
 - (b) Put the end of the insertion tool tip against the plug shoulder.
 - (c) Carefully push the plug straight through the grommet hole until the plug is completely inserted.

4. APPROVED TOOL SUPPLIERS

A. Contact Insertion Tools

**Table 6
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
M81969/17-04	QPL

B. Contact Crimp Tools

**Table 7
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
MS3191-1	QPL
MS3191-16	QPL

C. Contact Removal Tools

**Table 8
REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
AT 2016	Astro
ATML 1908	Astro
DRK16	Daniels
M81969/19-08	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF 10-60450 FRONT RELEASE PLUG-IN RELAY SOCKETS

Table 8 (continued)

Removal Tool	Supplier
MS24256R16	QPL

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BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

<u>Paragraph</u>		<u>Page</u>
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	C. Mounting Hardware Part Numbers	2
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BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

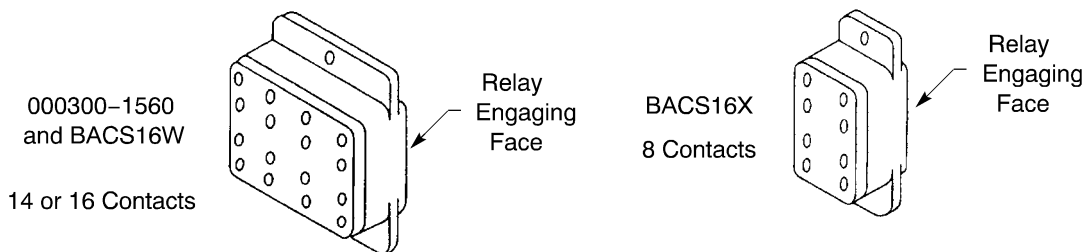
This Subject gives the procedures to assemble relay sockets that have front release contacts.

1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

Boeing Standard	Part Number	Supplier
-	000300-1560	Viking
BACS16W1A	000300-1539	Viking
	102 009-1	Burndy
BACS16W2A	000300-1542	Viking
	102 011-1	Burndy
BACS16W3A	000300-1543	Viking
	102 012-1	Burndy
BACS16W4A	000300-1544	Viking
	102 013-1	Burndy
BACS16W5A	000300-1545	Viking
	102 010-1	Burndy
BACS16X1A	000300-1538	Viking
	102 006-1	Burndy
	S0-1049-8526	Leach
BACS16X2A	000300-1540	Viking
	102 007-1	Burndy
BACS16X3A	000300-1541	Viking
	102 005-1	Burndy

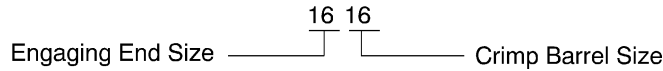


**BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS
Figure 1**

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

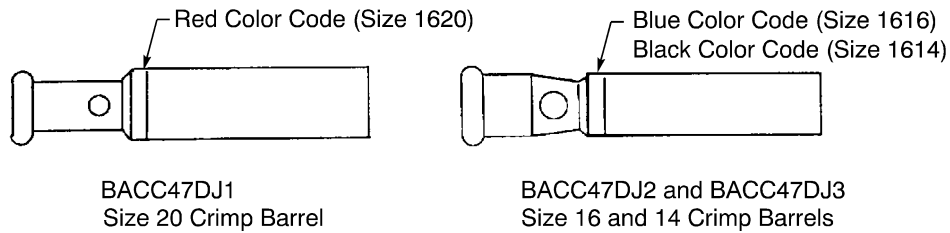
B. Contact Part Numbers



EXAMPLE OF CONTACT SIZE
Figure 2

Table 2
CONTACT PART NUMBERS

Contact Size	Color Code	Boeing Standard	Part Number	Supplier
1620	Red	BACC47DJ1	101-016-1DJ5	Burndy
			318-1620-802	PCD
			019-0249-000	Viking
1616	Blue	BACC47DJ2	101-015-1DJ5	Burndy
			318-1616-802	PCD
			019-0248-000	Viking
1614	Black	BACC47DJ3	101-034-1DJ5	Burndy
			019-0273-000	Viking



BACC47DJ() CONTACTS
Figure 3

C. Mounting Hardware Part Numbers

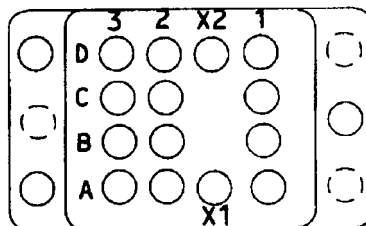
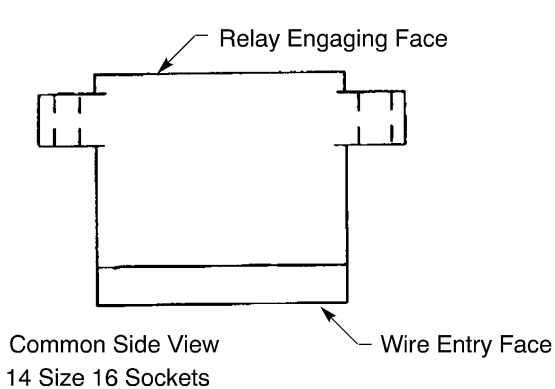
Table 3
MOUNTING HARDWARE PART NUMBERS

Hardware	Part Number	Supplier
Nut	BACN10YRO4C	Boeing
Screw	MS51957-25	QPL
Washer	NAS1676C6	QPL

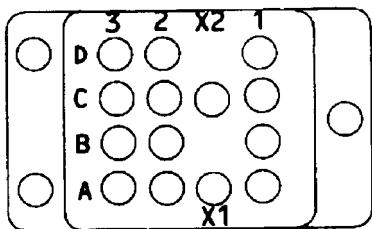
STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

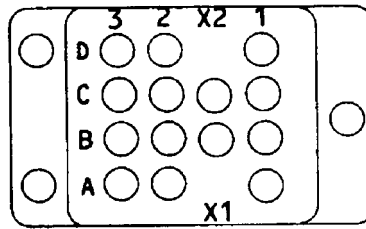
D. Contact Configurations



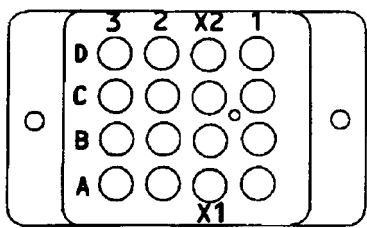
BACS16W1 and BACS16W5
(28V DC)



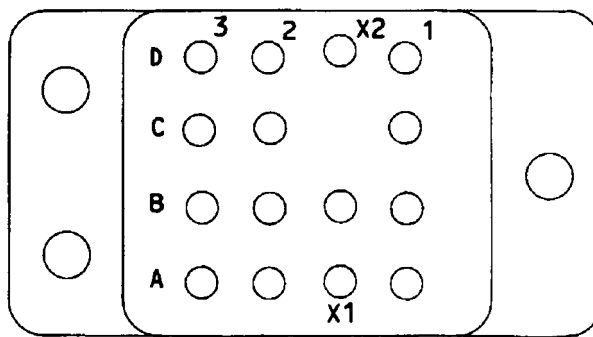
BACS16W2
(28V AC)



BACS16W3
(115V AC)



BACS16W4
(28V AC)

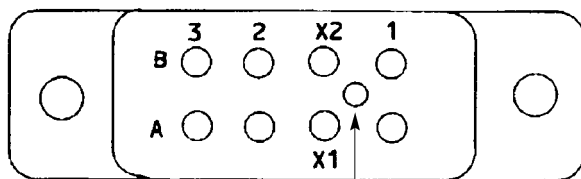


00300-1560
(28V AC)

VIKING 00300-1560 AND BACS16W CONTACT CONFIGURATION
Figure 4

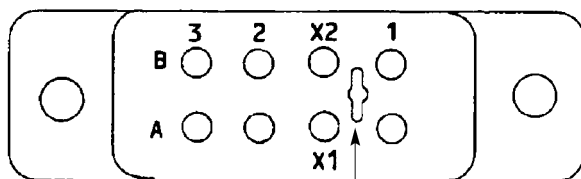
STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS



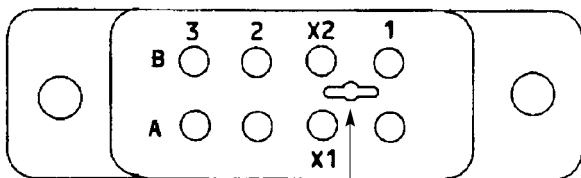
BACS16X1
Circular Polarization
(28V DC Coils)

Polarization Keyway



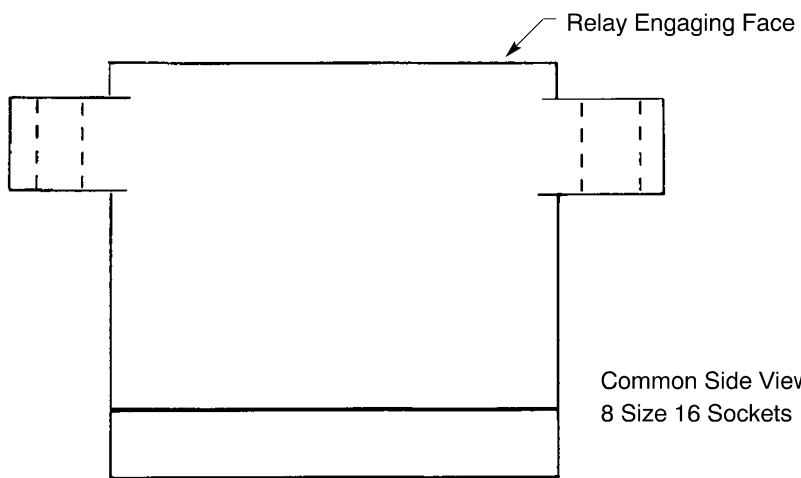
BACS16X2
Vertical Polarization
(28V AC Coils)

Polarization Keyway



BACS16X3
Horizontal Polarization
(28V DC Coils)

Polarization Keyway



Common Side View
8 Size 16 Sockets

BACS16X CONTACT CONFIGURATION

Figure 5



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STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

Table 4
CONTACT REMOVAL TOOLS

Contact Engaging End Size	Removal Tool
16	294-97
	AT 2016
	DRK16
	M81969/19-01
	M81969/19-08
	MS24256R16
	RRBX-16S
	RX16-8
	ZZL-R-9511-16

- (1) Make a selection of a removal tool from Table 4.
- (2) At the front of the relay socket, axially align the contact removal tool and the contact cavity.
- (3) Put the tip of the removal tool on the engaging end of the contact.
- (4) Carefully push the removal tool into the contact cavity until it stops.
- (5) Push the removal tool, and at the same time, push the internal plunger of the removal tool. Make sure that the contact moves out of the rear of the relay socket.

CAUTION: DO NOT USE MORE FORCE THAN THE FORCE THAT IS NECESSARY TO PUSH THE REMOVAL TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the removal tool out of the contact cavity.
- (7) Pull the wire and contact out of the rear of the relay socket.

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

Table 5
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Contact Size	Removal Length (L) (inch)		Special Instructions
		Target	Tolerance	
26	1620	0.44	± 0.03	Fold back the conductor
24	1620	0.19	± 0.03	-
22	1620	0.19	± 0.03	-

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STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 5 (continued)

Wire Size (AWG)	Contact Size	Removal Length (L) (inch)		Special Instructions
		Target	Tolerance	
20	1620	0.19	± 0.03	-
	1616	0.19	± 0.03	-
18	1616	0.19	± 0.03	-
16	1616	0.19	± 0.03	-
14	1614	0.19	± 0.03	-

Table 6

CONTACT CRIMP TOOLS FOR A CONTACT THAT HAS ONE WIRE IN THE CRIMP BARREL

Wire Size (AWG)	Contact		Crimp Tool		
	Part Number	Size	Basic Unit		Locator
			Part Number	Setting	
26	BACC47DJ1	1620	M22520/1-01	5	TP502
			M22520/2-01	7	640003
				7	K866
			MS3191-1	-	038-0003-000
				-	612314
				-	ST2220-1-49
			ST2220-1-Y	-	038-0003-000
				-	612314
				-	ST2220-1-49
			WA22	7	640003
WA22LC	7	640003			

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 6 (continued)

Wire Size (AWG)	Contact		Crimp Tool		
	Part Number	Size	Basic Unit		Locator
			Part Number	Setting	
24	BACC47DJ1	1620	M22520/1-01	5	TP502
			M22520/2-01	8	K866
				7	K892
			MS3191-1	-	038-0003-000
				-	612314
				-	ST2220-1-49
			ST2220-1-Y	-	038-0003-000
				-	612314
				-	ST2220-1-49
			WA22	7	K892
WA22LC	7	K892			
22	BACC47DJ1	1620	M22520/1-01	5	TP502
			M22520/2-01	8	K866
				7	K892
			MS3191-1	-	038-0003-000
				-	612314
				-	ST2220-1-49
			ST2220-1-Y	-	038-0003-000
				-	612314
				-	ST2220-1-49
			WA22	7	K892
WA22LC	7	K892			

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 6 (continued)

Wire Size (AWG)	Contact		Crimp Tool		
	Part Number	Size	Basic Unit		Locator
			Part Number	Setting	
20	BACC47DJ1	1620	M22520/1-01	5	TP502
			M22520/2-01	8	K866
				7	K892
			MS3191-1	-	038-0003-000
				-	612314
				-	ST2220-1-49
			ST2220-1-Y	-	038-0003-000
				-	612314
				-	ST2220-1-49
			WA22	7	K892
WA22LC	7	K892			
20	BACC47DJ2	1616	M22520/1-01	5	TP502
			M22520/2-01	7	K866
				7	K892
			ST2220-1-Y	-	038-0003-000
				-	612314
				-	ST2220-1-49
				-	ST2220-1-65
			WA22	7	K892
WA22LC	7	K892			
20	BACC47DJ3	1614	ST2220-1-Y	-	ST2220-1-65
			MS3191-1	-	ST2220-1-65
			M22520/2-01	6	K866
				6	K892

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 6 (continued)

Wire Size (AWG)	Contact		Crimp Tool		
	Part Number	Size	Basic Unit		Locator
			Part Number	Setting	
18	BACC47DJ2	1616	M22520/1-01	5	TP502
			M22520/2-01	7	K866
				7	K892
			MS3191-1	-	ST2220-1-65
			ST2220-1-Y	-	038-0003-000
				-	612314
				-	ST2220-1-49
				-	ST2220-1-65
WA22	7	K892			
WA22LC	7	K892			
18	BACC47DJ3	1614	M22520/2-01	7	K892
			ST2220-1-Y	-	ST2220-1-65
16	BACC47DJ2	1616	M22520/1-01	5	TP502
			M22520/2-01	8	K866
				7	K892
			MS3191-1	-	ST2220-1-65
			ST2220-1-Y	-	038-0003-000
				-	612314
				-	ST2220-1-49
				-	ST2220-1-65
WA22	7	K892			
WA22LC	7	K892			
16	BACC47DJ3	1614	M22520/2-01	7	K892
14	BACC47DJ3	1614	M22520/2-01	7	K892

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 7

CONTACT CRIMP TOOLS FOR A CONTACT THAT HAS MORE THAN ONE WIRE IN THE CRIMP BARREL

Total Number of Wires	First Wire Size		Second Wire Size		Contact		Crimp Tool		
	Count	Size (AWG)	Count	Size (AWG)	Size	Part Number	Basic Unit		Locator
							Part Number	Setting	
2	2	24	-	-	1620	BACC47DJ1	M22520/2-01	7	640003
							WA22	7	640003
							WA22LC	7	640003
3	3	24	-	-	1616	BACC47DJ2	MS3191-1	-	ST2220-1-65
							M22520/1-01	5	TP502
							M22520/2-01	7	K892
							ST2220-1-Y	-	038-0003-000
								-	612314
								-	ST2220-1-49
								-	ST2220-1-65
							WA22	7	K892
WA22LC	7	K892							
3	3	22	-	-	1616	BACC47DJ2	MS3191-1	-	ST2220-1-65
							M22520/1-01	5	TP502
							M22520/2-01	7	K892
							ST2220-1-Y	-	038-0003-000
								-	612314
								-	ST2220-1-49
								-	ST2220-1-65
							WA22	7	K892
WA22LC	7	K892							

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 7 (continued)

Total Number of Wires	First Wire Size		Second Wire Size		Contact		Crimp Tool		
	Count	Size (AWG)	Count	Size (AWG)	Size	Part Number	Basic Unit		Locator
							Part Number	Setting	
2	2	22	-	-	1616	BACC47DJ2	MS3191-1	-	ST2220-1-65
							M22520/1-01	5	TP502
							M22520/2-01	7	K892
							ST2220-1-Y	-	038-0003-000
								-	612314
								-	ST2220-1-49
							-	ST2220-1-65	
							WA22	7	K892
WA22LC	7	K892							
2	1	24	1	22	1616	BACC47DJ2	MS3191-1	-	ST2220-1-65
							M22520/1-01	5	TP502
							M22520/2-01	7	K892
							ST2220-1-Y	-	038-0003-000
								-	612314
								-	ST2220-1-49
							-	ST2220-1-65	
							WA22	7	K892
WA22LC	7	K892							
2	1	24	1	20	1616	BACC47DJ2	MS3191-1	-	ST2220-1-65
							M22520/1-01	5	TP502
							M22520/2-01	7	K892
							ST2220-1-Y	-	038-0003-000
								-	612314
								-	ST2220-1-49
							-	ST2220-1-65	
							WA22	7	K892
WA22LC	7	K892							

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 7 (continued)

Total Number of Wires	First Wire Size		Second Wire Size		Contact		Crimp Tool		
	Count	Size (AWG)	Count	Size (AWG)	Size	Part Number	Basic Unit		Locator
							Part Number	Setting	
2	1	24	1	18	1616	BACC47DJ2	MS3191-1	-	ST2220-1-65
							M22520/1-01	5	TP502
							M22520/2-01	7	K892
							ST2220-1-Y	-	038-0003-000
								-	612314
								-	ST2220-1-49
							-	ST2220-1-65	
							WA22	7	K892
WA22LC	7	K892							
2	1	22	1	20	1616	BACC47DJ2	MS3191-1	-	ST2220-1-65
							M22520/1-01	5	TP502
							M22520/2-01	7	K892
							ST2220-1-Y	-	038-0003-000
								-	612314
								-	ST2220-1-49
							-	ST2220-1-65	
							WA22	7	K892
WA22LC	7	K892							
2	1	22	1	18	1616	BACC47DJ2	MS3191-1	-	ST2220-1-65
							M22520/1-01	5	TP502
							M22520/2-01	7	K892
							ST2220-1-Y	-	038-0003-000
								-	612314
								-	ST2220-1-49
							-	ST2220-1-65	
							WA22	7	K892
WA22LC	7	K892							
2	2	20	-	-	1616	BACC47DJ2	M22520/2-01	8	K892
							WA22	8	K892
							WA22LC	8	K892

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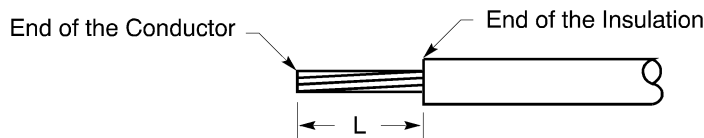
STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 7 (continued)

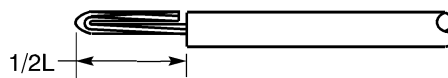
Total Number of Wires	First Wire Size		Second Wire Size		Contact		Crimp Tool		
	Count	Size (AWG)	Count	Size (AWG)	Size	Part Number	Basic Unit		Locator
							Part Number	Setting	
3	3	20	-	-	1614	BACC47DJ3	M22520/2-01	8	640003
							WA22	8	640003
							WA22LC	8	640003
2	2	18	-	-	1614	BACC47DJ3	M22520/2-01	8	640003
							WA22	8	640003
							WA22LC	8	640003
2	1	18	1	20	1614	BACC47DJ3	M22520/2-01	7	640003
							WA22	7	640003
							WA22LC	7	640003

- (1) Make a selection of a crimp tool from:
 - Table 6 for contacts that have one wire
 - Table 7 for contacts that have more than one wire.
- (2) Remove the necessary length of the wire insulation from the end of the wire or wires.
Refer to:
 - Figure 6
 - Table 5 for the insulation removal length
 - Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 6

- (3) If it is specified, fold the conductor back. Refer to Figure 7.



CONDUCTOR FOLDED BACK
Figure 7

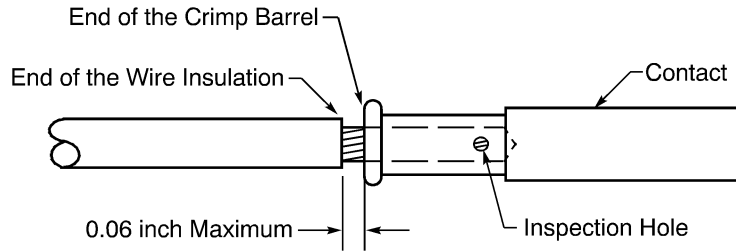
- (4) Put the contact in the locator of the crimp tool.
- (5) Put the end of the wire into the crimp barrel of the contact. Refer to Figure 8.

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Make sure that:

- The conductor can be seen in the inspection hole of the contact
- All of the strands of the conductor are in the crimp barrel
- The distance between the rear end of the contact and the wire insulation is 0.06 inch maximum.



POSITION OF THE WIRE IN THE CRIMP BARREL OF THE BACC47DJ CONTACT
Figure 8

(6) Crimp the contact.

Make sure that:

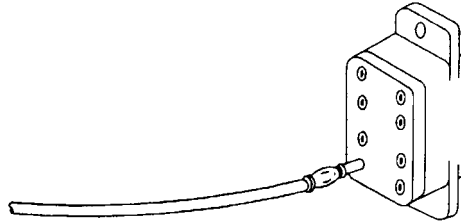
- Make sure the conductor can be seen in the inspection hole of the contact.
- The distance between the rear end of the contact and the wire insulation is 0.06 inch maximum
- The contact does not have a bend larger than 3.5 degrees from the longitudinal axis of the contact.

B. Contact Insertion

Table 8
CONTACT INSERTION TOOLS

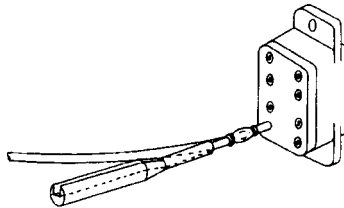
Contact Size	Insertion Tool
1620	294-88
	M81969/17-09
	ZZL-R-9510-20
1616	294-88
	M81969/17-09
	ZZL-R-9510-20
1614	294-88
	M81969/17-09
	ZZL-R-9510-20

- (1) Make a selection of an insertion tool from Table 8.
- (2) At the rear of the relay socket, put each wired contact in the contact cavities with the hand. Refer to Figure 9.

STANDARD WIRING PRACTICES MANUAL**BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS**

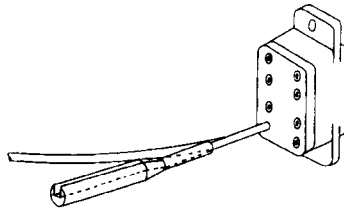
POSITION OF THE CONTACT IN THE CONTACT CAVITY
Figure 9

- (3) Put the end of the insertion tool tip against end of contact. Refer to Figure 10.



POSITION OF THE INSERTION TOOL ON THE CONTACT
Figure 10

- (4) Carefully push the tool and the contact into the contact cavity until it stops. Refer to Figure 11. Make sure that the insertion tool stays aligned with the contact cavity.



FULLY INSERTED CONTACT
Figure 11

- (5) Carefully remove the insertion tool.
(6) Lightly pull on the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT MAKE A DENT IN THE INSULATION OF WIRE WITH THE FINGERNAILS.

- (7) Do Step (3) through Step (6) again for each contact in the relay socket.

C. Spare Contact or Seal Plug Installation

- (1) Install spare contacts or seal plugs in all unused contact cavities.
Refer to Subject 20-60-08.

STANDARD WIRING PRACTICES MANUAL

BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

4. APPROVED TOOL SUPPLIERS

A. Contact Crimp Tools

**Table 9
CONTACT CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
038-0003-000	Viking
640003	Astro
612314	Buchanan
K866	Daniels
K892	Daniels
M22520/1-01	QPL
M22520/2-01	QPL
MS3191-1	QPL
ST2220-1-49	Boeing
ST2220-1-65	Boeing
ST2220-1-Y	Boeing
TP502	Daniels
WA22	Daniels
WA22LC	Daniels

B. Contact Insertion Tool Suppliers

**Table 10
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
294-88	Amphenol
M81969/17-09	QPL
ZZL-R-9510-20	Pyle-National

C. Contact Removal Tool Suppliers

**Table 11
CONTACT REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
294-97	Amphenol
AT 2016	Astro

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BACS16W AND BACS16X FRONT RELEASE RELAY SOCKETS

Table 11 (continued)

Removal Tool	Supplier
DRK16	Daniels
M81969/19-01	QPL
M81969/19-08	QPL
MS24256R16	QPL
RRBX-16S	Russtech
RX16-8	Burndy
ZZL-R-9511-16	Pyle-National

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<u>Paragraph</u>		<u>Page</u>
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	A. Relay Socket Part Numbers	1
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	C. Contact Configuration	1
2.	<u>RELAY SOCKET DISASSEMBLY</u>	1
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3.	<u>RELAY SOCKET ASSEMBLY</u>	2
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ASSEMBLY OF METHODE FRONT RELEASE RELAY SOCKETS

1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

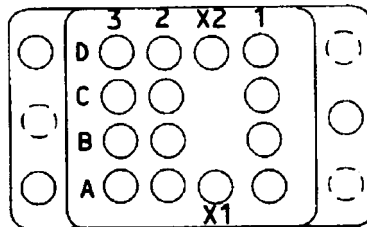
Part Number	Supplier
133-158-02	Methode
133-158-03	Methode
133-179-03	Methode

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Part Number	Supplier
Engaging Eng	Crimp Barrel		
16	16	BACC47CP2T	Boeing
		MS3193-16A	QPL

C. Contact Configuration



**METHODE RELAY SOCKET CONTACT CONFIGURATION
Figure 1**

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Removal Tool	Supplier
MS24256-R16	QPL

(1) Make a selection of a removal tool from Table 3.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF METHODE FRONT RELEASE RELAY SOCKETS

- (2) Slide the contact removal tool over the engaging end of the contact and into the contact cavity until the tool hits the bottom.
- (3) To remove the contact from the wire entry face of the socket:
 - (a) Push the tool plunger
 - (b) Pull the contact completely out of the socket by hand.

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

**Table 4
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Wire Count	Length (inch)		Special Instructions
		Target	Tolerance	
24	1	0.50	0.03	Fold the conductor back
	2	0.25	0.03	-
22	1	0.50	0.03	Fold the conductor back
	2	0.25	0.03	-
20	1	0.25	0.03	-
18	1	0.25	0.03	-
16	1	0.25	0.03	-

**Table 5
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Size	Crimp Tool					
		Basic Unit			Locator		
		Part Number	Setting	Supplier	Part Number	Color	Supplier
24	16	M22520/1-01	4	QPL	M22520/1-02	Blue	QPL
22	16	M22520/1-01	5	QPL	M22520/1-02	Blue	QPL
20	16	M22520/1-01	4	QPL	M22520/1-02	Blue	QPL
18	16	M22520/1-01	5	QPL	M22520/1-02	Blue	QPL
16	16	M22520/1-01	6	QPL	M22520/1-02	Blue	QPL

- (1) Remove the wire insulation.
Refer to Table 4 and Subject 20-00-15.
- (2) Make a selection of the crimp tool from Table 5.
- (3) Put the wire or wires in the crimp barrel.
- (4) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF METHODE FRONT RELEASE RELAY SOCKETS****B. Contact Insertion**

Table 6
CONTACT INSERTION TOOLS

Insertion Tool	Supplier
MS24256-A16	QPL

- (1) Make a selection of an insertion tool from Table 6.
- (2) Put the end of the insertion tool tip against the contact shoulder.
- (3) Align the tool and the contact with the contact cavity.
- (4) Carefully guide the contact into the contact cavity until the contact is completely inserted.



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ASSEMBLY OF VIKING 000300-118() REAR RELEASE RELAY SOCKETS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VIKING 000300-118() REAR RELEASE RELAY SOCKETS

1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

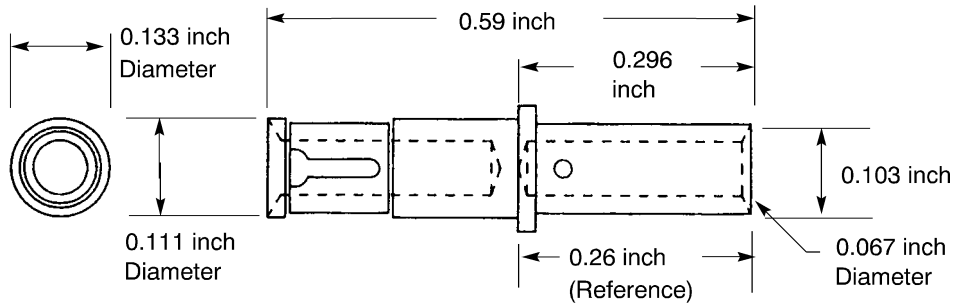
Part Number	Supplier
000300-1180	Viking
000300-1181	Viking
000300-1182	Viking

B. Contact Part Numbers

The Viking relay socket uses a size 16 socket contact that has the dimensions given in Figure 1.

**Table 2
CONTACT PART NUMBERS**

Contact Size		Part Number	Supplier
Engaging End	Crimp Barrel		
16	16	019-0215-000	Viking

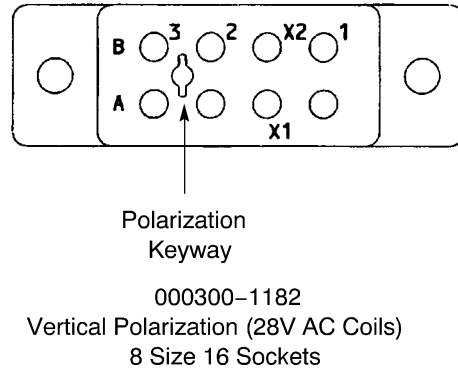
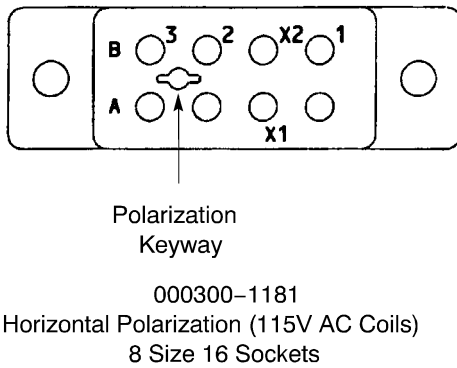
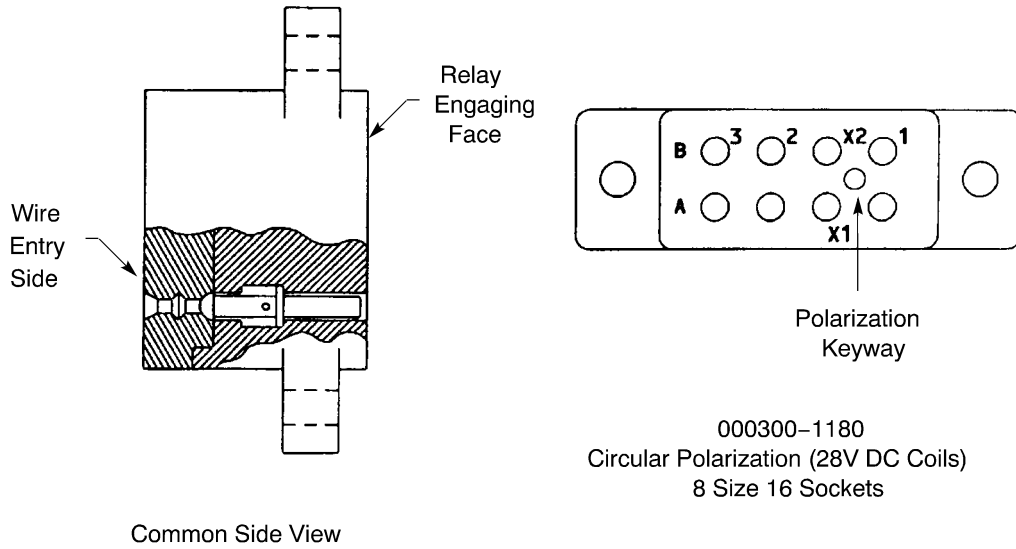


**VIKING 019-0215-000 SOCKET CONTACT
Figure 1**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VIKING 000300-118() REAR RELEASE RELAY SOCKETS

C. Contact Configurations



VIKING 000300-118() RELAY SOCKET CONTACT CONFIGURATIONS
Figure 2

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

- (1) Make a selection of a removal tool from Table 3.
- (2) Put the white end of the tool on the wire.
- (3) Hold the tool straight.
- (4) Slide the tool down the wire and into the contact cavity until the tool hits the bottom.
- (5) Hold the wire against the tool and pull the tool out of the cavity.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF VIKING 000300-118() REAR RELEASE RELAY SOCKETS

**Table 3
CONTACT REMOVAL TOOLS**

Removal Tool	Supplier
NAS1664-16	QPL

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Wire Count	Crimp Barrel Size	Crimp Tool				
			Basic Unit		Locator		
			Part Number	Supplier	Part Number	Color	Supplier
24	1	16	MS3191A	QPL	MS3191-16	Blue	QPL
	2		MS3191A	QPL	MS3191-16	Blue	QPL
22	1	16	MS3191A	QPL	MS3191-16	Blue	QPL
	2		MS3191A	QPL	MS3191-16	Blue	QPL
20	1	16	MS3191A	QPL	MS3191-16	Blue	QPL
18	1	16	MS3191A	QPL	MS3191-16	Blue	QPL
16	1	16	MS3191A	QPL	MS3191-16	Blue	QPL

- (1) Remove 9/32 inch ± 1/32 inch of wire insulation.
Refer to Subject 20-00-15.
- (2) Make a selection of a contact crimp tool from Table 4.
- (3) Put the wire in the crimp barrel.
Make sure that:
 - All the conductor strands are in the crimp barrel
 - The wire is visible in the inspection hole.
- (4) Crimp the contact.

B. Contact Insertion

**Table 5
CONTACT INSERTION TOOLS**

Insertion Tool	Supplier
NAS1664-16	QPL

- (1) Make a selection of an insertion tool from Table 5.
- (2) Put the colored end of the tool on the wire.
- (3) Hold the tool straight and insert the contact into the contact cavity until it hits the bottom.



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ASSEMBLY OF VIKING 000300-118() REAR RELEASE RELAY SOCKETS

C. Spare Contact Installation

- (1) Install a spare contact in each unused contact cavity.
Refer to Subject 20-60-08.

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ASSEMBLY OF LEACH SO-10()-() REAR RELEASE RELAY SOCKETS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-10()-() REAR RELEASE RELAY SOCKETS

1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

The relay socket is designed as a base that the relay plugs into.

**Table 1
RELAY SOCKET PART NUMBERS**

Part Number	Supplier
SO-1056-8691	Leach
SO-1061-8916	Leach
SO-1062-8917	Leach
SO-1064-001	Leach
SO-1064-003	Leach
SO-1064-007	Leach
SO-1066-001	Leach
SO-1066-10197	Leach

**Table 2
ALTERNATIVE RELAY SOCKET PART NUMBERS**

Leach Relay Socket	Alternative Relay Socket	
	Part Number	Supplier
SO-1056-8691	RSE116332	Precision Connector Design
SO-1062-8917	003015-0001	Viking
	RSE112320	Precision Connector Design
SO-1064-001	SO-1064-007	Leach
SO-1064-003	003016-0001	Viking
	RSE120172	Precision Connector Design
SO-1064-007	003017-0001	Viking
	RSE120180	Precision Connector Design
SO-1066-10197	003022-0001	Viking
	RSE120190	Precision Connector Design

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ASSEMBLY OF LEACH SO-10()-() REAR RELEASE RELAY SOCKETS

B. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

Relay Socket	Contact Size		Part Number	Supplier
	Engaging End	Crimp Barrel		
SO-1056-8691	16	16	001-5490-000	Leach
			M39029/5-116	QPL
SO-1061-8916	16	16	001-9007-000	Leach
	12	12	001-9007-001	Leach
SO-1062-8917	16	16	001-9007-000	Leach
	12	12	001-9007-001	Leach
SO-1064-001	20	20	002-3261-000	Leach
			280-30001-31	Boeing
			316-2020-192	Tri-Star
			M39029/22-192	QPL
SO-1064-003	22	22	002-6746-000	Leach
	20	20	002-3261-000	Leach
			280-30001-31	Boeing
			316-2020-192	Tri-Star
M39029/22-192	QPL			
SO-1064-007	20	20	002-3261-000	Leach
			280-30001-31	Boeing
			316-2020-192	Tri-Star
			M39029/22-192	QPL
SO-1066-001	20	20	002-3261-000	Leach
			280-30001-31	Boeing
			316-2020-192	Tri-Star
			M39029/22-192	QPL
SO-1066-10197	20	20	002-3261-000	Leach
			280-30001-31	Boeing
			316-2020-192	Tri-Star
			M39029/22-192	QPL

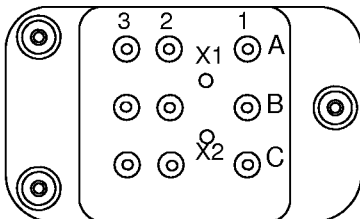
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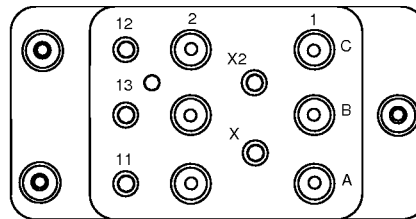
ASSEMBLY OF LEACH SO-10()-() REAR RELEASE RELAY SOCKETS

C. Contact Configurations

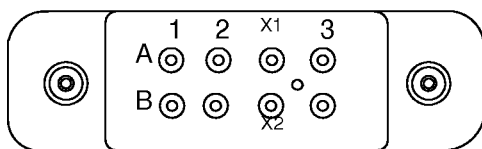
The contact configurations of the Leach SO-10()-() relay sockets are shown in Figure 1 and Figure 2.



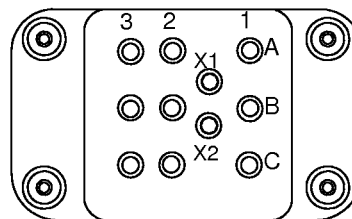
SO-1057-8912



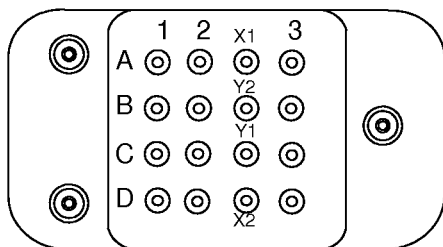
SO-1059-8914



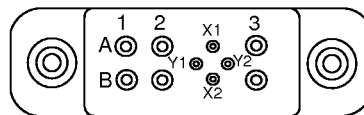
SO-1064-001 and SO-1064-007



SO-1062-8917



SO-1066-003

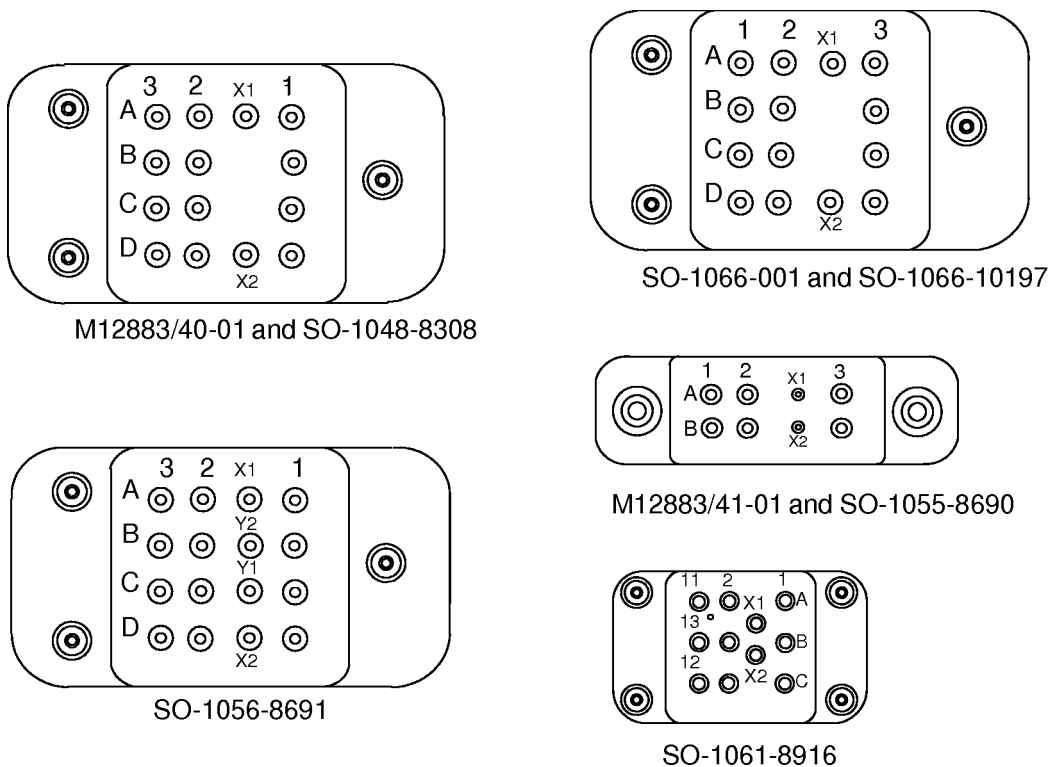


SO-1046-003

LEACH SO-10()-() RELAY SOCKET CONTACT CONFIGURATIONS
Figure 1

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-10()-() REAR RELEASE RELAY SOCKETS



LEACH SO-10()-() RELAY SOCKET CONTACT CONFIGURATIONS (CONTINUED)
Figure 2

D. Eyelet Part Numbers

NOTE: Eyelets are used when these wires are crimped in size 1212 contacts:

- AWG 24
- AWG 22
- AWG 20
- AWG 18.

And when these wires are crimped in size 1616 contacts:

- AWG 24
- AWG 22.

Table 4
EYELET PART NUMBERS

Part Number	Supplier	Alternative Eyelet	
		Part Number	Supplier
CE46FC	Circon	Y6015-C	IEI
CE66FC	Circon	Y9015-C	IEI

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-10()-() REAR RELEASE RELAY SOCKETS

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

**Table 5
CONTACT REMOVAL TOOLS**

Contact Size	Removal Tool		
	Part Number	Color	Supplier
2222L	M81969/14-10	Orange	QPL
	M81969/16-01	White	QPL
	NAS1664-20	White	QPL
2222	M81969/14-01	White	QPL
	MS27534-22D	White	QPL
2020	M81969/14-10	Orange	QPL
	M81969/16-01	White	QPL
	NAS1664-20	White	QPL
	CIET20-1	White	ITT Cannon
1620	M81969/14-03	White	QPL
1616	ATR 2112	-	Astro
	M81969/14-03	White	QPL
	NAC1664-16	White	QPL
	CIET16-3	White	ITT Cannon
1212	ATR 2160	-	Astro
	M81969/14-04	White	QPL
	NAS1664-12	White	QPL

- (1) Make a selection of the removal tool from Table 5.
- (2) Put the end of the tool over the wire.
Make sure that you use the end of the tool that has the correct color for contact removal. Refer to Table 5.
- (3) Hold the tool perpendicular to grommet face.
- (4) Slide the tool down the wire and into the grommet until the tool stops.
- (5) Hold the tool firmly against bottom and press the wire against the serrations in the tool handle.
- (6) Pull the tool and the wire out at the same time.



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ASSEMBLY OF LEACH SO-10()-() REAR RELEASE RELAY SOCKETS

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

**Table 6
INSULATION REMOVAL AND WIRE PREPARATION**

Contact Size	Wire Size (AWG)	Length (inch)		Wire Fold Back	Eyelet Part Number
		Target	Tolerance		
2222L	22	0.14	±0.03	-	-
2222	20	0.18	±0.03	-	-
	22	0.18	±0.03	-	-
	24	0.18	±0.03	-	-
2020	20	0.18	±0.03	-	-
	22	0.18	±0.03	-	-
	24	0.39	±0.03	Fold	-
	26	0.39	±0.03	Fold	-
1616	16	0.25	±0.03	-	-
	18	0.25	±0.03	-	-
	20	0.25	±0.03	-	-
	22	0.25	±0.03	-	CE46F
	24	0.25	±0.03	-	CE46F
1212	12	0.25	±0.03	-	-
	14	0.25	±0.03	-	-
	16	0.25	±0.03	-	-
	18	0.25	±0.03	-	CE66F
	20	0.25	±0.03	-	CE66F
	22	0.53	±0.03	Fold	CE66F
	24	0.53	±0.03	Fold	CE66F

**Table 7
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Contact Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Supplier	Part Number	Supplier
26	2020	M22520/7-01	4	QPL	M22520/7-12	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-48	Boeing

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-10(-) REAR RELEASE RELAY SOCKETS

Table 7 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Supplier	Part Number	Supplier
24	2222	M22520/7-01	4	QPL	M22520/7-11	QPL
	2020	M22520/7-01	3	QPL	M22520/7-12	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-48	Boeing
	1616	M22520/1-01	4	QPL	M22520/1-02	QPL
		WA27F1	4	Daniels	M22520/1-02	QPL
	1212	M22520/1-01	7	QPL	M22520/1-02	QPL
		WA27F1	7	Daniels	M22520/1-01	QPL
	22	2222	M22520/7-01	5	QPL	M22520/7-11
2222L		M22520/02-01	4	QPL	M22520/2-14	QPL
		MS3191-A	-	QPL	MS3191-22D	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-60	Boeing
2020		M22520/7-01	4	QPL	M22520/7-12	QPL
		ST2220-1-Y	-	QPL	M22520/7-01	QPL
1616		M22520/1-01	6	QPL	M22520/1-02	QPL
		MS3191-1	-	QPL	MS3191-16A	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-2	Boeing
		WA27F	6	Daniels	M22520/1-02	QPL
20	2020	M22520/7-01	5	QPL	M22520/7-12	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-48	Boeing
	1616	M22520/1-01	4	QPL	M22520/1-02	QPL
		WA27F	4	Daniels	M22520/1-02	QPL
	1212	M22520/1-01	7	QPL	M22520/1-02	QPL
		WA27F	7	Daniels	M22520/1-02	QPL
18	1616	M22520/1-01	5	QPL	M22520/1-02	QPL
		WA27F	5	Daniels	M22520/1-02	QPL
	1212	M22520/1-01	7	QPL	M22520/1-02	QPL
		WA27F	7	Daniels	M22520/1-02	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-10(-) REAR RELEASE RELAY SOCKETS

Table 7 (continued)

Wire Size (AWG)	Contact Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Supplier	Part Number	Supplier
16	1616	M22520/1-01	6	QPL	M22520/1-02	QPL
		MS3191-1	-	QPL	MS3191-16A	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-2	Boeing
		WA27F	6	Daniels	M22520/1-02	QPL
	1212	M22520/1-01	6	QPL	M22520/1-02	QPL
		WA27F	6	Daniels	M22520/1-02	QPL
14	1212	M22520/1-01	7	QPL	M22520/1-02	QPL
		WA27F	7	Daniels	M22520/1-02	QPL
12	1212	M22520/1-01	8	QPL	M22520/1-02	QPL
		MS3191-1	-	QPL	MS3191-12A	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-3	Boeing
		WA27F	8	Daniels	M22520/1-02	QPL

- (1) Remove the wire insulation.
Refer to Table 6 and Subject 20-00-15.
- (2) Make a selection of the crimp tool from Table 7.
- (3) For AWG 24, AWG 22, AWG 20, and AWG 18 wire in a size 12 contact, insert an eyelet into the contact.
Refer to Table 4.
- (4) Put the wire in the contact crimp barrel.
Make sure that:
 - All the conductor strands are in the barrel
 - The conductor is visible in the contact inspection hole.
- (5) Put the contact in the crimp tool.
- (6) Crimp the contact.
Make sure that the gap between the contact and wire insulation is not more than 1/32 inch.

B. Contact Insertion

Table 8
CONTACT INSERTION TOOLS

Contact Size	Insertion Tool		
	Part Number	Color	Supplier
2222L	M81969/14-10	Red	QPL
	M81969/16-01	Red	QPL
	NAS1664-20	Red	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-10()-() REAR RELEASE RELAY SOCKETS

Table 8 (continued)

Contact Size	Insertion Tool		
	Part Number	Color	Supplier
2222	M81969/14-01	Green	QPL
	MS27534-22D	-	QPL
2020	M81969/14-10	Red	QPL
	M81969/16-01	Red	QPL
	NAS1664-20	Red	QPL
	CIET20-1	Red	ITT Cannon
1620	M81969/14-03	Blue	QPL
1616	ATR 2112	-	Astro
	M81969/14-03	Blue	QPL
	NAC1664-16	Blue	QPL
	CIET16-3	Blue	ITT Cannon
1212	ATR 2160	-	Astro
	M81969/14-04	Yellow	QPL
	NAS1664-12	Yellow	QPL

- (1) Make a selection of an insertion tool from Table 8.
- (2) Snap the colored end of the insertion tool over the wire.
- (3) Slide the tool down over the contact.
Make sure that the tip of the tool is against the contact shoulder.
- (4) Hold the tool perpendicular to the socket grommet face.
- (5) Push the contact into the grommet hole until it stops.
- (6) Carefully remove the insertion tool.
Make sure the contact is completely inserted.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

C. Spare Contact or Seal Plug Installation

- (1) Install a spare contact or a sealing plug in all unused contact cavities.
Refer to Subject 20-60-08.



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ASSEMBLY OF LEACH SO-1057-8912 REAR RELEASE RELAY SOCKETS

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ASSEMBLY OF LEACH SO-1057-8912 REAR RELEASE RELAY SOCKETS

1. PART NUMBERS DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

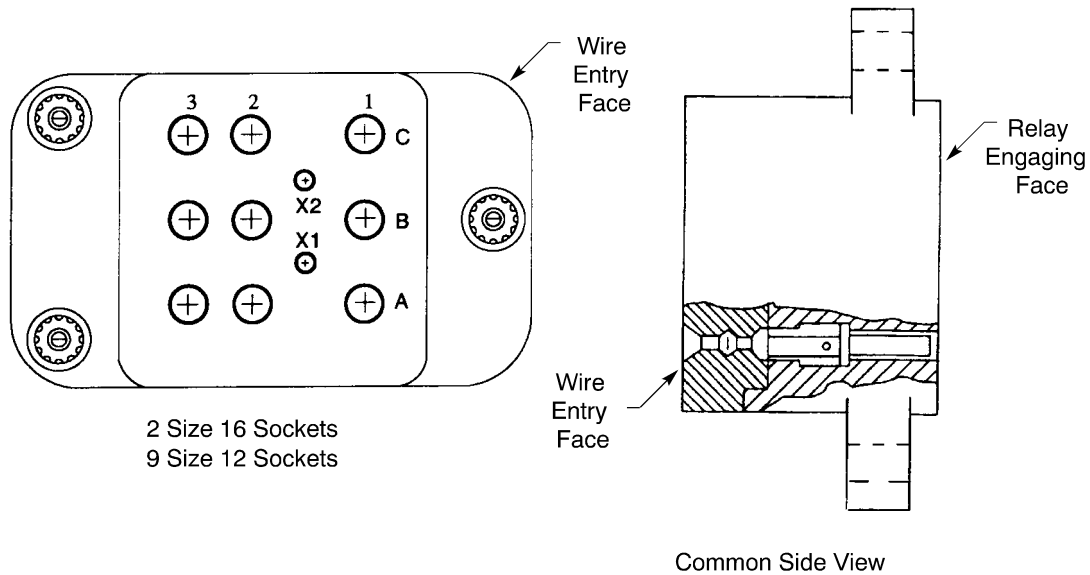
Part Number	Supplier
SO-1057-8912	Leach

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Part Number	Supplier
Engaging End	Crimp Barrel		
16	16	001-9007-000	Leach
12	12	001-9007-001	Leach

C. Contact Configuration



**LEACH SO-1057-8912 RELAY SOCKET CONTACT CONFIGURATION
Figure 1**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-1057-8912 REAR RELEASE RELAY SOCKETS

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	Supplier
16	NAS1664-16	QPL
12	NAS1664-12	QPL

- (1) Make a selection of the removal tool from Table 3.
- (2) Put the tip of the white end of the tool over the wire.
- (3) Hold the tool perpendicular to the face of the grommet.
- (4) Push the tool down the wire and into the grommet until the tool hits the bottom.
- (5) Hold the tool against the bottom and press the wire against the serrations in the tool handle.
- (6) Pull the tool and the wired contact out of the contact cavity at the same time.

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Contact	Crimp Tool				
	Basic Unit		Locator		
	Part Number	Supplier	Part Number	Color	Supplier
001-9007-000	MS3191-1	QPL	MS3191-16A	Blue	QPL
	M22520/1-01	QPL	M22520/1-02	Blue	QPL
001-9007-001	MS3191-1	QPL	M3191-12A	Yellow	QPL
	M22520/1-01	QPL	M22520/1-02	Yellow	QPL

- (1) Remove 1/4 inch ± 1/64 inch of wire insulation. Refer to Subject 20-00-15.
- (2) Make a selection of a crimp tool from Table 4.
- (3) Put the wire or wires in the contact crimp barrel.
Make sure that the conductor can be seen in the contact inspection hole.
- (4) Put the contact in the crimp tool.
- (5) Crimp the contact.
Make sure that the distance from the end of the crimp barrel to the end of the wire insulation is 0.03 inch maximum.

CAUTION: THE INDEX POINT AND THE INDENTERS WILL NOT BE IN THE CORRECT POSITION IF THERE IS TOO MUCH PRESSURE ON THE CONTACT.

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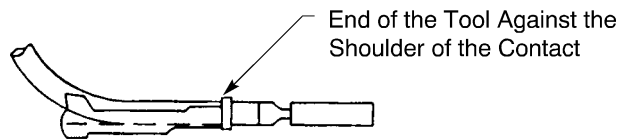
ASSEMBLY OF LEACH SO-1057-8912 REAR RELEASE RELAY SOCKETS

B. Contact Insertion

**Table 5
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	Supplier
16	NAS1664-16	QPL
12	NAS1664-12	QPL

- (1) Make a selection of the insertion tool from Table 5.
- (2) Examine the contact to make sure that it is straight.
- (3) Put the colored end of the insertion tool on the wire.
- (4) Push the tool down over the contact so that the tip of the tool is against the shoulder of the contact. Refer to Figure 2.



**POSITION OF THE INSERTION TOOL ON THE CONTACT
Figure 2**

- (5) Hold the tool perpendicular to the face of the grommet and push the contact into the grommet hole until it stops.
- (6) Carefully remove the insertion tool.
- (7) To make sure that the contact is fully inserted, lightly pull the wire.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

C. Installation of Spare Contacts

Refer to Subject 20-60-08.

If it is necessary to install a spare contact in the contact cavities that are not used:

- (1) Make a selection of a contact insertion tool from Table 5.
- (2) Put the contact in the contact cavity.
- (3) Axially align the tool and the contact.
- (4) Push the tool straight into the contact cavity until the tool stops.
- (5) Carefully remove the tool from the contact cavity.

D. Installation of Seal Plugs or Seal Rods

Refer to Subject 20-60-08.



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ASSEMBLY OF LEACH SO-1057-8912 REAR RELEASE RELAY SOCKETS

If it is necessary to install a seal plug or a seal rod in the contact cavities that are not used:

- (1) Make a selection of a seal plug or a seal rod.
- (2) Push the plug or the rod into the contact cavity.

Make sure that the distance from the end of the plug or the rod to the grommet is less than 0.1 inch.

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ASSEMBLY OF LEACH SO-1048-8308 REAR RELEASE RELAY SOCKETS

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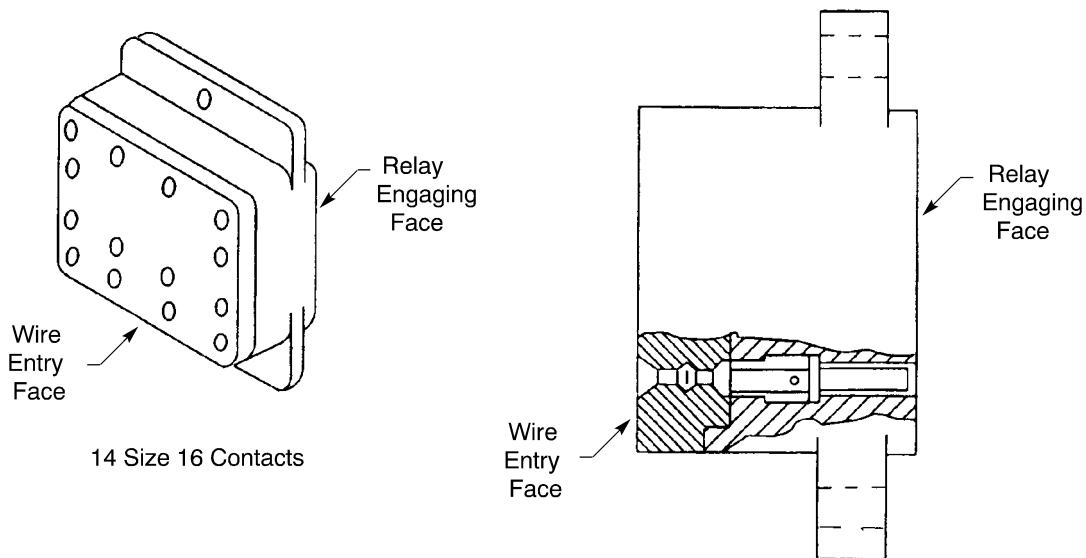
ASSEMBLY OF LEACH SO-1048-8308 REAR RELEASE RELAY SOCKETS

1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

Part Number	Supplier
SO-1048-8308	Leach



**LEACH SO-1048-8308 REAR RELEASE RELAY SOCKET
Figure 1**

B. Contact Part Numbers

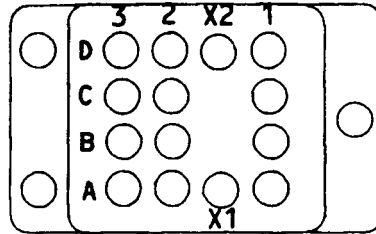
**Table 2
CONTACT PART NUMBERS**

Contact Size		Part Number	Supplier
Engaging End	Crimp Barrel		
16	20	001-5490-001	Leach
	16	001-5490-000	Leach

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-1048-8308 REAR RELEASE RELAY SOCKETS

C. Contact Configuration



**LEACH SO-1048-8308 RELAY SOCKET CONTACT CONFIGURATION
Figure 2**

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	Supplier
20	NAS1664-16	QPL
16	NAS1664-16	QPL

- (1) Make a selection of the removal tool from Table 3.
- (2) Put the tip of the white end of the removal tool over the wire.
- (3) With the tool perpendicular to the grommet face, slide the tool down the wire and into the grommet until the tool hits bottom.
- (4) Hold the tool firmly against the bottom, press the wire against the serrations in the tool handle and pull the tool, contact, and wire out at the same time.

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

**Table 4
SIZE 16 CONTACT FILLER WIRES**

Wire Size (AWG)	Filler Wire	
	Size (AWG)	Number Required
24	18	1
22	18	1
20	20	1

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-1048-8308 REAR RELEASE RELAY SOCKETS

**Table 5
CONTACT CRIMP TOOLS**

Contact	Crimp Tool				
	Basic Unit		Locator		
	Part Number	Supplier	Part Number	Color	Supplier
001-5490-001	MS3191-1	QPL	MS3191-16	Blue	QPL
	M22520/1-01	QPL	M22520/1-02	Blue	QPL
001-5490-000	MS3191-1	QPL	M3191-20	Red	QPL
	M22520/1-01	QPL	M22520/1-02	Red	QPL

- (1) Make a selection of the contact from Table 2.
- (2) Remove 1/4 inch ± 1/64 inch of insulation from wire end.
- (3) For AWG 20, AWG 22, or AWG 24 wire in a size 16 contact:
 - (a) Make a selection of a filler wire from Table 4.
- (4) Make a selection of the crimp tool from Table 5.
- (5) Put the wire or wires in the contact crimp barrel.
Make sure that the conductor is visible in the contact inspection hole.
- (6) Put the contact in the crimp tool.
- (7) Crimp the contact.

CAUTION: THE INDEX POINT AND THE INDENTORS WILL NOT BE IN THE CORRECT POSITION IF THERE IS TOO MUCH PRESSURE ON THE CONTACT.

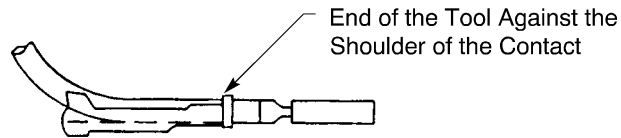
Make sure that the maximum gap between the contact and wire insulation is 1/32 inch.

B. Contact Insertion

**Table 6
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	Supplier
20	NAS1664-16	QPL
16	NAS1664-16	QPL

- (1) Make a selection of the insertion tool from Table 6.
Make sure that the contact is straight.
- (2) Put the colored end of the insertion tool over the wire.
- (3) Slide the tool down over the contact with the tool tip against the contact shoulder. Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF LEACH SO-1048-8308 REAR RELEASE RELAY SOCKETS****POSITION OF THE INSERTION TOOL ON THE CONTACT****Figure 3**

- (4) Hold the tool perpendicular to the socket grommet face and push the contact into grommet hole until it stops.
- (5) Carefully remove the insertion tool.
Make sure the contact is fully inserted.

CAUTION: DO NOT JERK ON THE WIRE OR INDENT THE WIRE INSULATION WITH THE FINGERNAILS.

C. Spare Contact or Seal Plug Installation

- (1) Install a spare contact or a seal plug in all unused contact cavities.
Refer to Subject 20-60-08.



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ASSEMBLY OF BACS16A()1 REAR RELEASE RELAY SOCKETS

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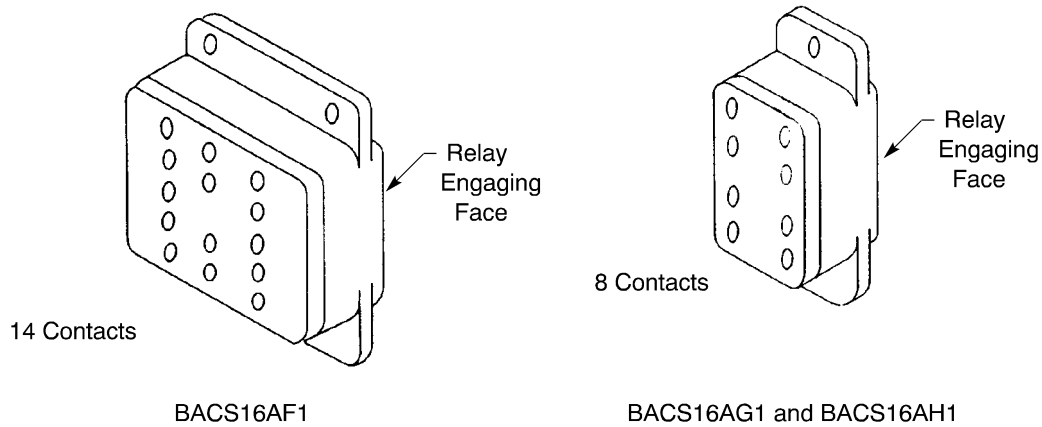
1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

The relay socket is designed as a base that the relay plugs into.

**Table 1
RELAY SOCKET PART NUMBERS**

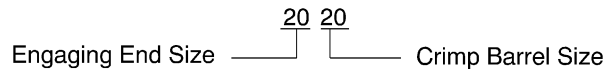
Boeing Standard	Part Number	Supplier
BACS16AF1	451120-027	Precision Connector Design
BACS16AG1	451120-026	Precision Connector Design
BACS16AH1	451120-028	Precision Connector Design



**BACS16AF1, BACS16AG1, AND BACS16AH1 REAR RELEASE RELAY SOCKETS
Figure 1**

B. Contact Part Numbers

Only the socket contacts are removable crimp type contacts.



**EXAMPLE OF A CONTACT SIZE
Figure 2**

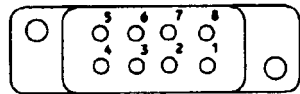
**Table 2
CONTACT PART NUMBERS**

Contact Size	Boeing Standard	Part Number	Supplier
2220	BACC47ER1	422109-900	Precision Connector Design

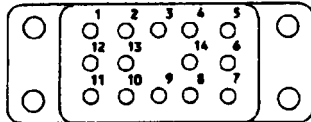
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACS16A()1 REAR RELEASE RELAY SOCKETS

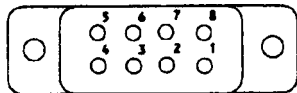
C. Contact Configurations



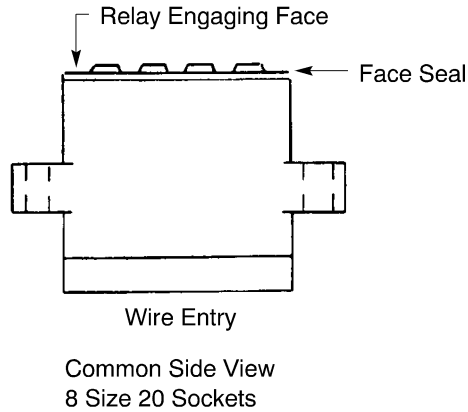
BACS16AG1



BACS16AF1



BACS16AH1



CONTACT ARRANGEMENTS
Figure 3

D. Seal Plug Part Numbers

Table 3
SEAL PLUG PART NUMBERS

Part Number	Supplier
M83723/28-20	QPL
NAS1668-1	QPL

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

Table 4
CONTACT REMOVAL TOOLS

Contact Size	Removal Tool
2220	M83723/31-20

- (1) Make a selection of the removal tool from Table 4.
- (2) At the rear of the relay socket, put the white end of the removal tool on the wire.
- (3) Align the tool with the contact cavity.
- (4) Push the tool into the contact cavity until it stops.
Make sure that the tool stays aligned with the contact cavity.
- (5) Hold the tool against the relay socket and, at the same time, press the wire against the handle of the removal tool.

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ASSEMBLY OF BACS16A()1 REAR RELEASE RELAY SOCKETS

(6) Pull both the tool and wired contact out of the rear of the contact cavity at the same time.

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

**Table 5
CONTACT CRIMP TOOLS FOR ONE WIRE IN THE CRIMP BARREL**

Wire Size (AWG)	Contact		Crimp Tool			
	Size	Boeing Standard	Basic Unit		Locator	
			Part Number	Setting	Part Number	Color
24	2220	BACC47ER1	M22520/2-01	4	M22520/2-11	-
			M22520/1-01	1	M22520/1-04	Red
			ST2220-1-Y	-	ST2220-1-48	-
22	2220	BACC47ER1	M22520/2-01	6	M22520/2-11	-
			M22520/1-01	3	M22520/1-04	Red
			ST2220-1-Y	-	ST2220-1-48	-
20	2220	BACC47ER1	M22520/2-01	7	M22520/2-11	-
			M22520/1-01	4	M22520/1-04	Red
			ST2220-1-Y	-	ST2220-1-48	-

**Table 6
CONTACT CRIMP TOOLS FOR TWO WIRES IN THE CRIMP BARREL**

Two Wires in the Crimp Barrel		Contact		Crimp Tool			
First Wire Size (AWG)	Second Wire Size (AWG)	Size	Boeing Standard	Basic Unit		Locator	
				Part Number	Setting	Part Number	Color
24	24	2220	BACC47ER1	M22520/2-01	6	M22520/2-11	-
				M22520/1-01	3	M22520/1-04	Red
				ST2220-1-Y	-	ST2220-1-48	-

- (1) Remove 0.14 inch ±0.02 inch of wire insulation from the end of the wire.
- (2) Make a selection of a crimp tool from:
 - Table 5 if one wire is to be installed in the crimp barrel
 - Table 6 if two wires are to be installed in the crimp barrel.
- (3) Put wire or wires in the contact barrel.

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ASSEMBLY OF BACS16A()1 REAR RELEASE RELAY SOCKETS

Make sure that:

- All of the conductor strands are in the crimp barrel
- The conductor is visible in the contact inspection hole.

(4) Put the contact in the crimp tool.

NOTE: As an option, the wire can be put in the contact before the contact is put in the crimp tool.

(5) Crimp the contact.

Make sure the distance between the end of the contact and the wire insulation is a maximum of:

- 0.03 inch if one wire is to be installed in the crimp barrel
- 0.05 inch if two wires are to be installed in the crimp barrel.

B. Contact Insertion

**Table 7
CONTACT INSERTION TOOLS**

Contact Size	Insertion Tool
2220	M83723/31-20

CAUTION: DO NOT INSTALL AN UNWIRED CONTACT.

(1) Make a selection of an insertion tool from Table 7.

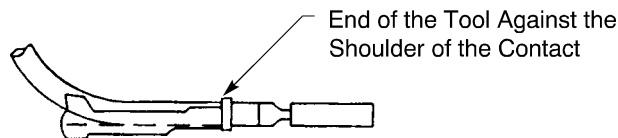
Make sure the contact is straight.

(2) Put the colored end of the insertion tool on the wire.

(3) Move the tool onto the contact. Refer to Figure 4.

Make sure that the tip end of the tool is against the shoulder of the contact.

NOTE: As an option, wired contacts assembled with AWG 22 or larger wire can be inserted by hand.



**POSITION OF THE INSERTION TOOL ON THE CONTACT
Figure 4**

(4) Hold the insertion tool, and at the same time, press the wire against the tool.

(5) Push the contact into the contact cavity until it stops.

Make sure that the tool stays aligned with the contact cavity.

(6) Carefully remove the tool.

Lightly pull on the wire to make sure that contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR SUDDEN FORCE. DAMAGE TO THE CONTACT OR THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT INDENT THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE INSULATION CAN OCCUR.



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ASSEMBLY OF BACS16A()1 REAR RELEASE RELAY SOCKETS

C. Seal Plug Installation

- (1) Make a selection of a seal plug from Table 3.
- (2) Install seal plugs in all unwired grommet holes.

Refer to Subject 20-60-08.

4. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

Table 8
CONTACT REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
M83723/31-20	QPL

B. Crimp Tools

Table 9
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-04	QPL
M22520/2-01	QPL
M22520/2-11	QPL
ST2220-1-Y	Boeing
ST2220-1-48	Boeing

C. Contact Insertion Tools

Table 10
CONTACT INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
M83723/31-20	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-1055-8690 REAR RELEASE RELAY SOCKETS

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	B. Contact Insertion	2

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-1055-8690 REAR RELEASE RELAY SOCKETS

1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

Part Number	Supplier
SO-1055-8690	Leach

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Part Number	Supplier
Engaging End	Crimp Barrel		
22	22	001-7931-000	Leach
16	16	001-9007-000	Leach

2. RELAY SOCKET DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	Supplier
22	NAS1664-20	QPL
16	NAS1664-1-16	QPL

- (1) Make a selection of the removal tool from Table 3.
- (2) Put the tool on the wire.
- (3) Push the tool along the wire and into the contact cavity until the tool hits the bottom.
- (4) Pull the tool and the wire out of the socket at the same time.

3. RELAY SOCKET ASSEMBLY

A. Contact Assembly

**Table 4
CONTACT CRIMP TOOLS**

Crimp Barrel Size	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Supplier	Part Number	Supplier
22	MS3191-A	QPL	MS3191-22D	QPL
	ST2220-1-Y	Boeing	ST2220-1-60	Boeing

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LEACH SO-1055-8690 REAR RELEASE RELAY SOCKETS

Table 4 (continued)

Crimp Barrel Size	Crimp Tool			
	Basic Unit		Locator	
	Part Number	Supplier	Part Number	Supplier
16	M22520/1-01	QPL	M22520/1-02	QPL
	MS3191-A	QPL	MS3191-16A	QPL

- (1) Remove 1/4 inch ± 1/64 inch of wire insulation.
- (2) Make a selection of the contact crimp tool from Table 4.
- (3) Put the wire in the contact crimp barrel.

Make sure that:

- The gap between the wire insulation and the contact is no more than 1/32 inch
- The conductor is visible in the contact inspection hole.

- (4) Crimp the contact.

B. Contact Insertion

**Table 5
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	Supplier
22	NAS1664-20	QPL
16	NAS1664-1-16	QPL

- (1) Make a selection of the insertion tool from Table 5.
- (2) Put the wire and contact into the insertion side of the tool.
- (3) Push the tool and contact into the socket cavity until the tool hits the bottom.
- (4) Remove the tool.

Make sure the contact is locked by a gentle pull on the wire.



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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF RELAY SOCKETS

<u>Paragraph</u>		<u>Page</u>
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STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF RELAY SOCKETS

1. PART NUMBERS AND DESCRIPTION

A. Relay Socket Part Numbers

**Table 1
RELAY SOCKET PART NUMBERS**

Part Number	Supplier
451120-026	Precision Connector Design
451120-027	Precision Connector Design
451120-028	Precision Connector Design
SO-1066-001	Leach
SO-1064-001	Leach
SO-1048-8308	Leach
BACS16AF1	Boeing
BACS16AG1	Boeing
BACS16AH1	Boeing
BACS16X	Boeing
BACS16W	Boeing

B. Mounting Hardware Part Numbers

NOTE: Mounting hardware for Boeing part numbers is supplied with the relay socket.

**Table 2
PRECISION CONNECTOR DESIGN RELAY SOCKET MOUNTING HARDWARE PART NUMBERS**

Part Number	Description	Supplier
422080-815	Stud, Mounting	Precision Connector Design
422080-809	Screw, 2-56	Precision Connector Design
422080-800	Lockwasher, Size 2	Precision Connector Design
422080-801	Lockwasher, Size 4	Precision Connector Design
422080-806	Spacer	Precision Connector Design
422080-817	Hex Nut, 4-40	Precision Connector Design

2. RELAY SOCKET INSTALLATION

A. Leach Relay Sockets

- (1) Install the relay socket and relay with three nuts for each stud. Refer to Figure 1.

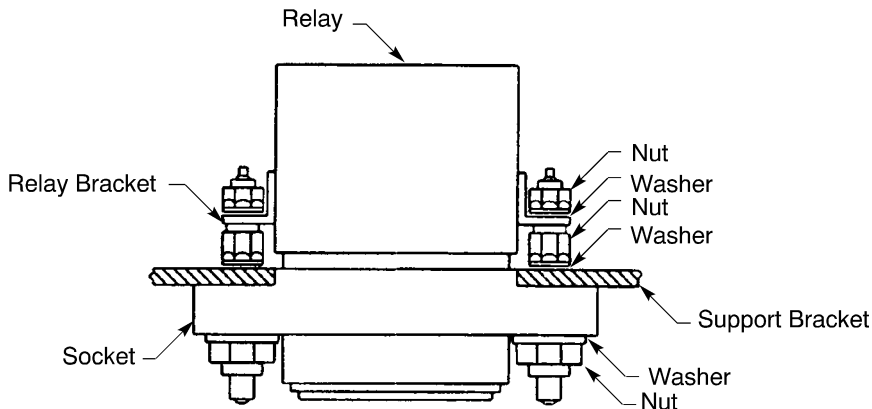
NOTE: The nut and the washer are not required for installation if the socket has molded-in mounting studs.

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF RELAY SOCKETS

NOTE: All the nuts and washers are required when the socket is mounted with either of these conditions:

- Separate mounting studs (loose pieces)
- The bottom of socket against the panel or the support bracket.

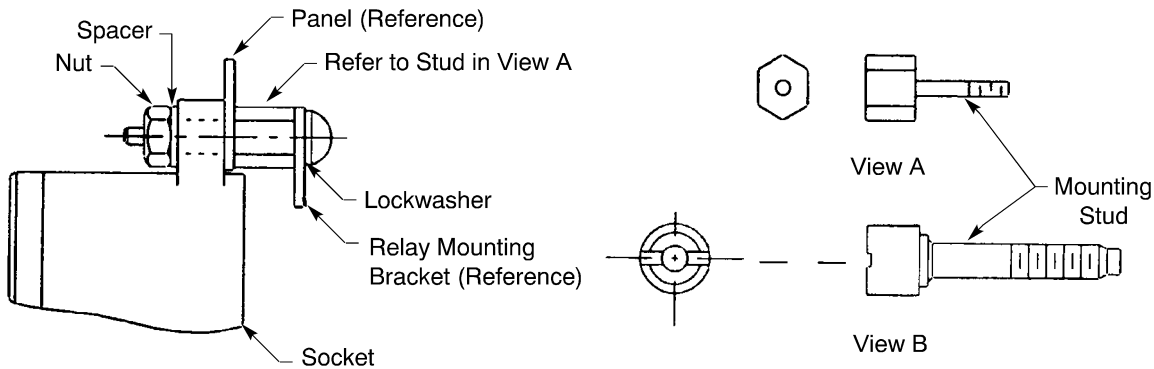


LEACH RELAY SOCKET AND RELAY INSTALLATION

Figure 1

B. BACS16X and BACS16W Relay Sockets

(1) Install the relay socket with one nut per stud. Refer to Figure 2.



BACS16X AND BACS16W RELAY SOCKET INSTALLATION

Figure 2

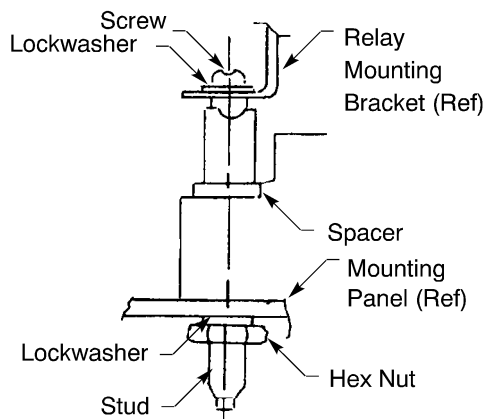
C. BACS16A() and Precision Connector Design Relay Sockets

For mounting hardware for Precision Connector Design relay sockets, refer to Table 2.

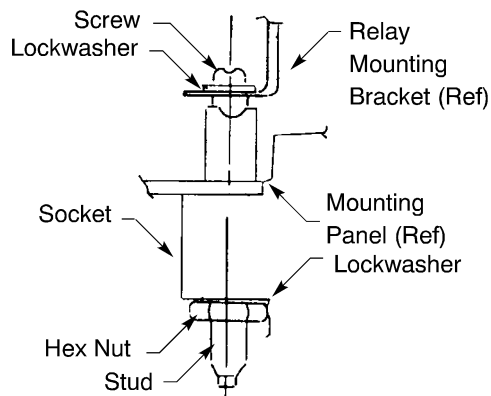
(1) Install the relay socket with one nut. Refer to Figure 3.

STANDARD WIRING PRACTICES MANUAL

INSTALLATION OF RELAY SOCKETS



TOP MOUNTING ASSEMBLY



BOTTOM MOUNTING ASSEMBLY

BACS16A() AND PRECISION CONNECTOR DESIGN RELAY SOCKET INSTALLATION

Figure 3



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STANDARD WIRING PRACTICES MANUAL

AMP TAB-TERMINAL PRINTED CIRCUIT BOARD CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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	B. Contact Part Numbers	1
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	A. Tab-Terminal Contact Removal	2
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3.	<u>CONNECTOR ASSEMBLY</u>	5
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STANDARD WIRING PRACTICES MANUAL

AMP TAB-TERMINAL PRINTED CIRCUIT BOARD CONNECTORS

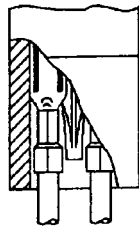
This Subject gives the assembly procedures for AMP dual and quad terminal printed circuit board (PCB) connectors.

1. PART NUMBERS AND DESCRIPTION

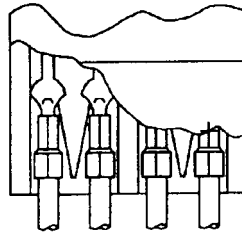
A. Connector Part Numbers

**Table 1
PCB CONNECTOR PART NUMBERS**

Part Number	Connector Configuration	Supplier
582551-1	Dual Terminal	AMP
582583-1	Quad Terminal	AMP
582591-1	Quad Terminal	AMP



Dual:
2 Tab-Terminals



Quad:
4 Tab-Terminals

**AMP TAB-TERMINAL PCB CONNECTOR CONFIGURATIONS
Figure 1**

B. Contact Part Numbers

**Table 2
TAB-TERMINAL CONTACT PART NUMBERS**

Contact Type	Part Number	Identifier	Supplier
Gold Plated Tab-Terminal	66168-2	O	AMP
	66161-2	X	AMP

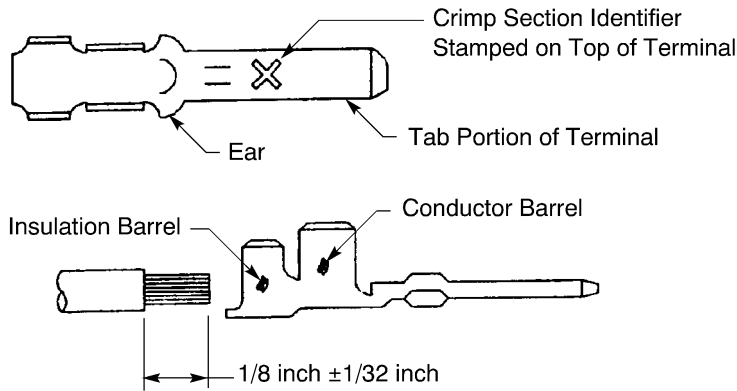
NOTE: Crimp these tab-terminal contacts on stranded wire only.

**Table 3
FEMALE SPRING CONTACT PART NUMBERS**

Connector Configuration	Part Number	Supplier
Dual Terminal	583337-1	AMP
Quad Terminal	583338-1	AMP

STANDARD WIRING PRACTICES MANUAL

AMP TAB-TERMINAL PRINTED CIRCUIT BOARD CONNECTORS

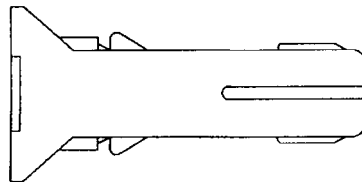


TAB-TERMINAL CONTACT
Figure 2

C. Keying Plug Part Numbers

Table 4
KEYING PLUG PART NUMBERS

Part Number	Supplier
582507-1	AMP



KEYING PLUG
Figure 3

2. CONNECTOR DISASSEMBLY

A. Tab-Terminal Contact Removal

Table 5
TAB-TERMINAL CONTACT REMOVAL TOOLS

Connector Configuration	Removal Tool	Supplier
Dual Terminal	91011-1	AMP
Quad Terminal	91017-3	AMP

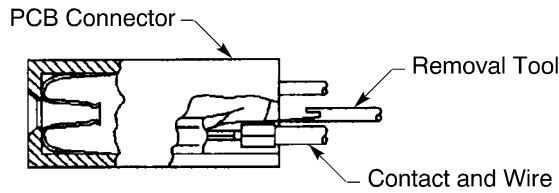
- (1) Make a selection of the removal tool from Table 5.
- (2) With longer tip of the removal tool adjacent to the terminal wire to be removed, insert the removal tool between the pair of terminals. Refer to Figure 4.

Make sure that the removal tool is against the bottom before removing the terminal.

STANDARD WIRING PRACTICES MANUAL

AMP TAB-TERMINAL PRINTED CIRCUIT BOARD CONNECTORS

- (3) Hold the wire and removal tool together and pull them from the connector at the same time.



TAB-TERMINAL CONTACT REMOVAL
Figure 4

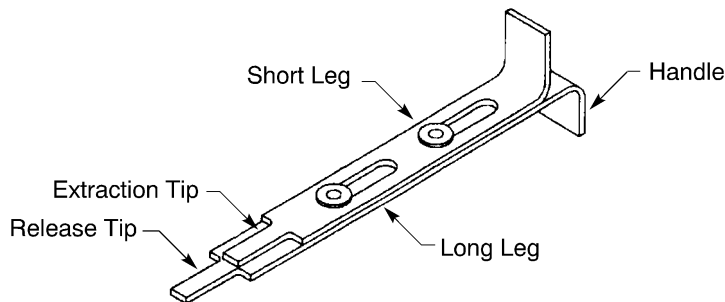
B. Female Spring Contact Removal

Table 6
SPRING CONTACT REMOVAL TOOLS

Connector Configuration	Removal Tool	Supplier
Dual Terminal	91018-1	AMP
Quad Terminal	91018-2	AMP

- (1) Make a selection of the removal tool from Table 6.
- (2) Move the short leg back so that releasing tip is extended. Refer to Figure 5.

CAUTION: DO NOT USE THE SPRING CONTACT AGAIN. THE CONTACT WILL NOT BE SECURED.



SPRING CONTACT REMOVAL TOOL
Figure 5

- (3) Insert the releasing tip into the housing. Refer to Figure 6.

NOTE: As the releasing tip hits the bottom of the housing, it releases the locking latch on the female contact.

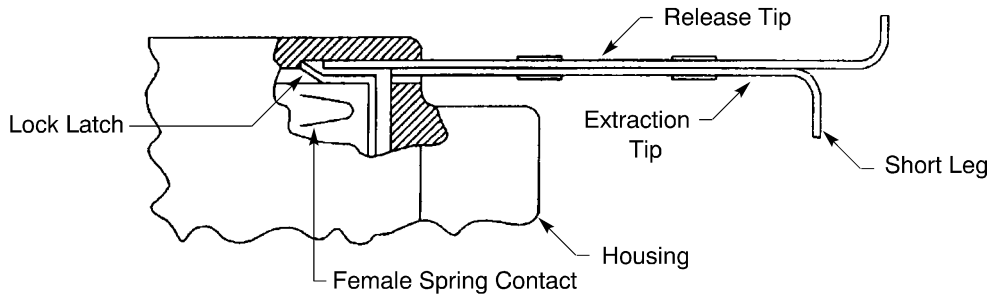
- (4) Push on handle of the short leg.

NOTE: The socket contact will back out part of the way from the housing.

- (5) Remove the tool from the housing.
- (6) Pull back on the contact to remove it completely from the housing.

STANDARD WIRING PRACTICES MANUAL

AMP TAB-TERMINAL PRINTED CIRCUIT BOARD CONNECTORS



SPRING CONTACT REMOVAL TOOL OPERATION

Figure 6

C. Keying Plug Removal

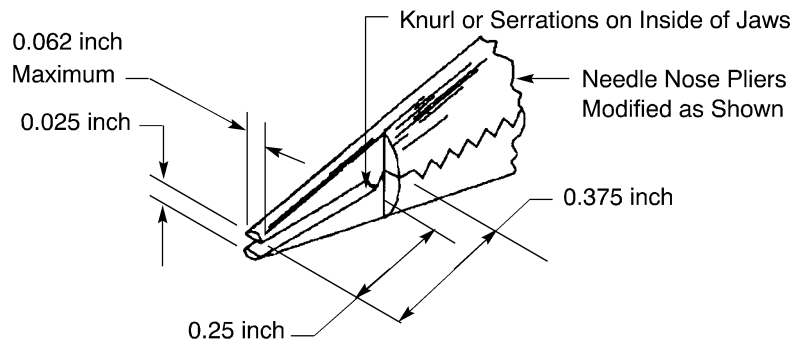
CAUTION: REMOVAL OF THE KEYING PLUG CAUSES DAMAGE TO THE CONTACT. AFTER THE KEYING PLUG IS REMOVED:

- THE OLD TAB TERMINAL CONTACT MUST BE REMOVED; REFER TO PARAGRAPH 2.A.
- A NEW TAB-TERMINAL CONTACT MUST BE ASSEMBLED AND INSTALLED; REFER TO PARAGRAPH 3.A. AND PARAGRAPH 3.C.

- (1) Use a pair a needle nose pliers that have been modified. Refer to Figure 7.
- (2) With the tip of the pliers, squeeze the end of the keying plug.

NOTE: This will cause the triangular projections to disengage the notches in the connector.

- (3) Pull the keying plug out of the connector with the pliers.



KEYING PLUG REMOVAL TOOL - MODIFIED NEEDLE NOSE PLIERS

Figure 7

STANDARD WIRING PRACTICES MANUAL

AMP TAB-TERMINAL PRINTED CIRCUIT BOARD CONNECTORS

3. CONNECTOR ASSEMBLY

A. Tab-Terminal Contact Assembly

**Table 7
TAB-TERMINAL CONTACT SELECTION**

Wire Size (AWG)	Insulation Diameter (inch)		Contact	
	Minimum	Maximum	Part Number	Identifier
26	0.029	0.060	66168-2	O
24	0.029	0.060	66168-2	O
22	0.029	0.060	66168-2	O
	0.046	0.074	66161-2	X
20	0.029	0.060	66168-2	O
	0.046	0.074	66161-2	X
18	0.046	0.074	66161-2	X

**Table 8
TERMINAL CRIMP TOOLS**

Terminal	Identifier	Crimp Tool	
		Basic Unit	Supplier
66168-2	O	90090-2	AMP
		90090-3	AMP
66161-2	X	90090-2	AMP
		90090-3	AMP

- (1) Make a selection of a contact from Table 7.
- (2) Remove 1/8 inch ± 1/32 inch of the wire insulation. Refer to Figure 2.
- (3) Make a selection of the crimp tool from Table 7.
- (4) Crimp the contact:
 - (a) Insert the terminal into the back of the tool so that the tab fits in the slot locator. Refer to Figure 8.
 Make sure:
 - To use the crimp section that matches the crimp identifier on the contact
 - That the terminal hits the bottom of the locator.
 - (b) Close the handles to raise the lower crimping die to hold the terminal.
 The positioner will engage the terminal as the inserts close.

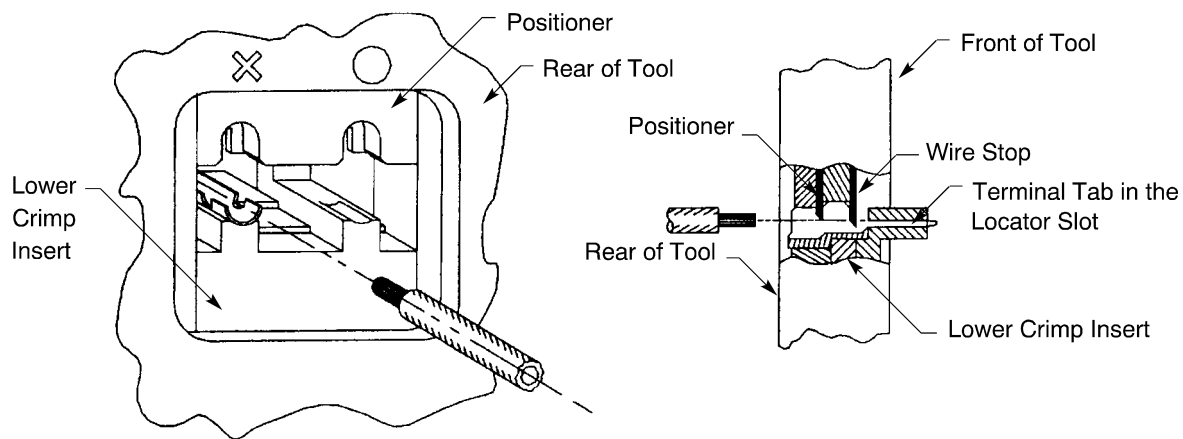
CAUTION: DO NOT DEFORM THE WIRE BARREL OR INSULATION BARREL.

 - (c) Push the wire into the terminal barrel until wire hits the wire stop. Refer to Figure 8.
 - (d) Hold the wire in place and close the tool until the crimp tool ratchet releases.

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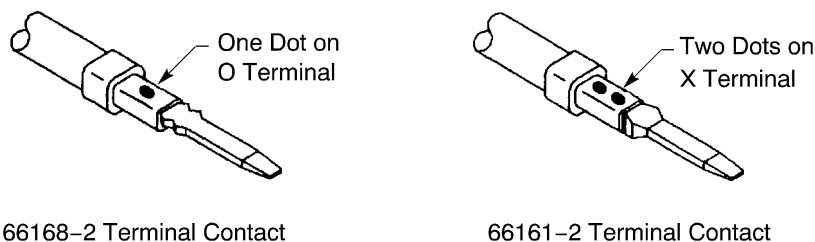
STANDARD WIRING PRACTICES MANUAL

AMP TAB-TERMINAL PRINTED CIRCUIT BOARD CONNECTORS



POSITION OF THE TERMINAL IN THE CRIMP TOOL
Figure 8

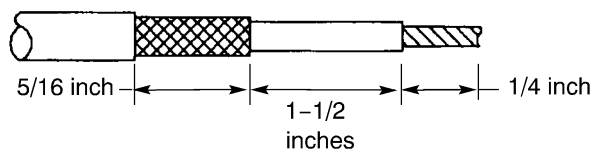
- (e) Open the tool handle and remove the crimped terminal from the tool.
- (f) Examine the raised dots on crimped terminal to make sure that the correct die position has been used. Refer to Figure 9.



CRIMPED TERMINAL IDENTIFICATION
Figure 9

B. Tab-Terminal Contact Assembly with Raychem 5026D1018 Coax Cable

- (1) Prepare the cable. Refer to Figure 10.
 - (a) Remove 2-1/16 inches of the cable jacket.
 - (b) Remove 1-3/4 inches of the shield.
 - (c) Remove 1/4 inch of the dielectric.



RAYCHEM 5026D1018 COAX CABLE TRIM DIMENSIONS
Figure 10

STANDARD WIRING PRACTICES MANUAL**AMP TAB-TERMINAL PRINTED CIRCUIT BOARD CONNECTORS**

- (2) Slide a BACS135-128C outer ferrule over the cable.
- (3) Slide a BACS13S-063B inner ferrule:
 - Over the dielectric
 - Under the shield
 - Up to the edge of the jacket.
- (4) Push the outer ferrule over the shield and the inner ferrule.
- (5) Add a 3-inch length of black shield ground wire.
- (6) Crimp the outer ferrule.
Refer to Subject 20-10-15.
- (7) Install an AMP 66168-2 tab-terminal contact. Refer to Paragraph 3.A.
- (8) Put a 1 inch length of 1/4 inch diameter heat shrinkable sleeve over the ferrule.
- (9) Shrink the sleeve into place.
Refer to Subject 20-10-14.

C. Tab-Terminal Contact Insertion

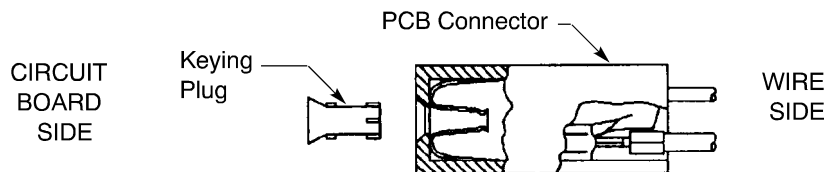
NOTE: No insertion tool is required.

- (1) Hold the molded plastic housing in one hand with the wire side up.
- (2) Push the contact into the contact cavity until it clicks.
- (3) If the contact is wired, lightly pull the wire until it slips between the thumb and forefinger to make sure that the terminal is completely inserted.

D. Keying Plug Installation

- (1) Install a keying plug into the printed circuit board side of the connector at the specified location. Refer to Figure 11.

Make sure that the keying plug is fully inserted. The triangular projections must engage the notches in the connector so that the plug will not slip from side to side.



KEYING PLUG INSTALLATION
Figure 11



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP 3-582151-() PRINTED CIRCUIT CONNECTORS

<u>Paragraph</u>		<u>Page</u>
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	C. Keying Plug Part Numbers	1
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STANDARD WIRING PRACTICES MANUAL

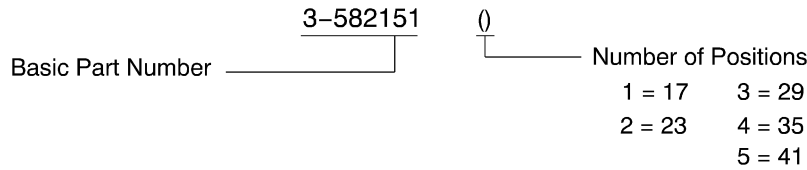
ASSEMBLY OF AMP 3-582151-() PRINTED CIRCUIT CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
PRINTED CIRCUIT CONNECTOR PART NUMBERS**

Part Number	Supplier
3-582151-()	AMP



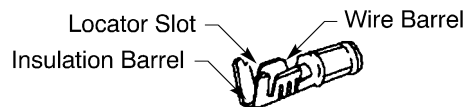
AMP PRINTED CIRCUIT CONNECTOR PART NUMBER STRUCTURE

Figure 1

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Part Number	Supplier
66010-1	AMP
66026-2	AMP



AMP 66010-1 AND 66026-2 CONTACTS

Figure 2

C. Keying Plug Part Numbers

**Table 3
KEYING PLUG PART NUMBERS**

Part Number	Supplier
1-582156-9	AMP

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP 3-582151-() PRINTED CIRCUIT CONNECTORS

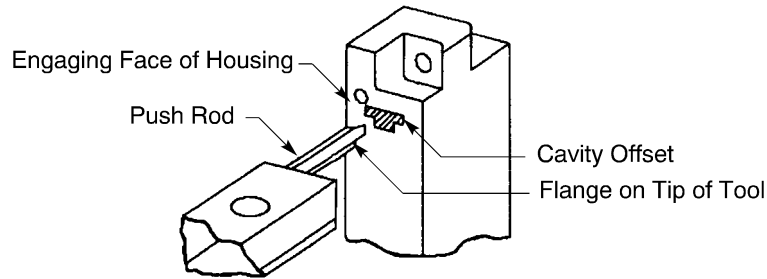
2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 4
CONTACT REMOVAL TOOLS**

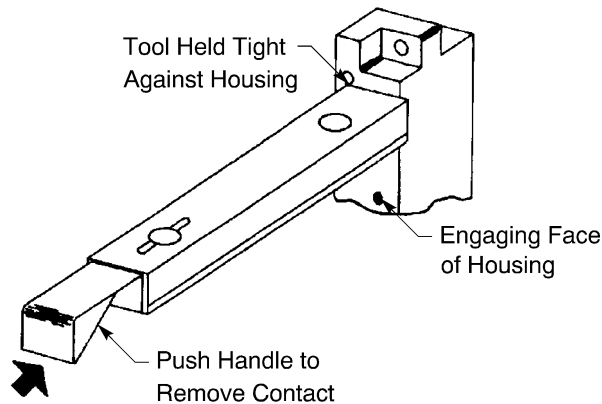
Removal Tool	Supplier
465199-1	AMP

- (1) Make a selection of the removal tool from Table 4.
- (2) Insert the tip of the removal tool into the forward face of the connector. Refer to Figure 3. Make sure that the flange on the tool tip fits into offset in contact cavity.



**CONTACT REMOVAL
Figure 3**

- (3) Hold the tool firmly against the connector face. Make sure to hold the tool perpendicular to mating face of the contact.
- (4) Push the tool handle to remove the contact from the connector. Refer to Figure 4.
- (5) Release the handle and remove the tool.



**REMOVAL TOOL OPERATION
Figure 4**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP 3-582151-() PRINTED CIRCUIT CONNECTORS

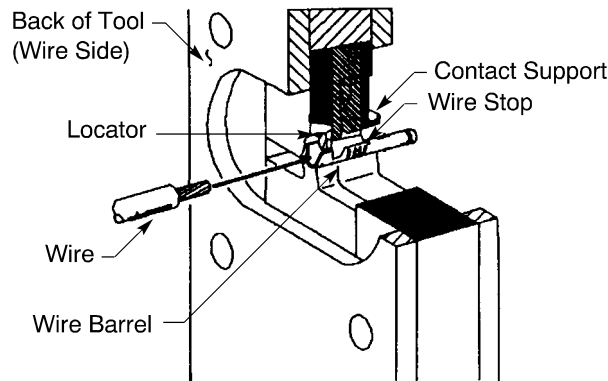
3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 5
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Number Of Wires	Contact	Basic Unit	
			Part Number	Supplier
24	1	66010-2	90083	AMP
	2			
22	1	66010-2	59524	AMP
	2	66010-2	90083	AMP
		66026-2	59525	AMP
20	1	66010-2	90083	AMP
	2	66026-2	59525	AMP

- (1) Remove 1/8 inch \pm 1/32 inch of the insulation from the wire or wires.
- (2) Make a selection of the contact and the crimp tool from Table 5.
- (3) Hold the tool so that the front side of the tool points away. Refer to Figure 2.
- (4) Insert the contact, insulation barrel first, into the front of the crimp section. Refer to Figure 5.
- (5) Position the contact so that the locator will enter the locator slot.



**POSITION OF THE CONTACT IN THE CRIMP TOOL
Figure 5**

- (6) Close the tool handles until the insulation anvil begins to enter the insulation crimper to hold the contact in place.

CAUTION: DO NOT DEFORM THE INSULATION BARREL OR WIRE BARREL.

- (7) Insert the bare wire or wires through the locator and into the contact wire barrel until the wire is against the wire stop.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF AMP 3-582151-() PRINTED CIRCUIT CONNECTORS

- (8) Hold the wire in place and close the tool handles until the ratchet releases.
- (9) Open the tool handles completely.
- (10) Remove the wired contact from the tool.

B. Contact Insertion

NOTE: No insertion tool is required.

- (1) Hold the molded plastic housing in one hand.
- (2) Push the contact into the contact cavity until it clicks.
Make sure that the contact is completely inserted.
- (3) Install the keying plug into the connector.

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STANDARD WIRING PRACTICES MANUAL

BACC65K() AND BACC65L() PRINTED WIRING BOARD CONNECTORS

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BACC65K() AND BACC65L() PRINTED WIRING BOARD CONNECTORS

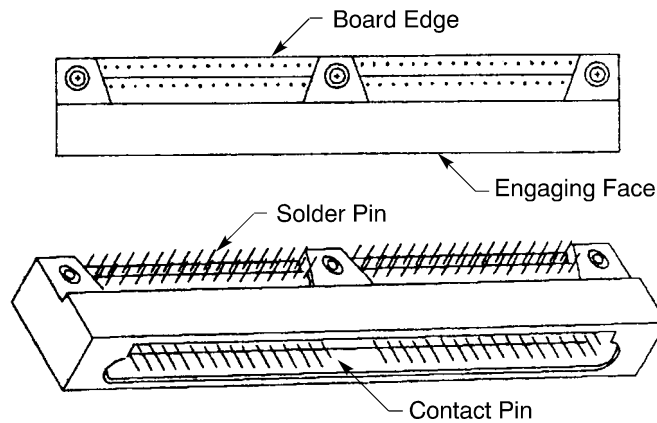
This Subject gives the procedures to assemble and disassemble the fixed contact half and the removable contact half of the engaging BACC65K() and BACC65L() printed wiring board (PWB) connectors.

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
PWB CONNECTOR PART NUMBERS**

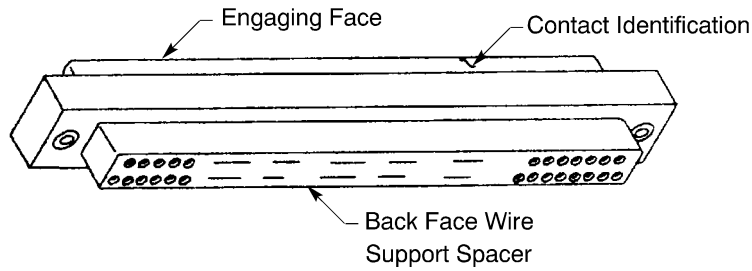
Boeing Standard	Connector		
	Type	Part Number	Supplier
BACC65K41	Plug	191-341-0003	Method
		300048-004	Incon
BACC65K66	Plug	191-366-0006	Method
		300044-001	Incon
BACC65K114	Plug	191-314-0001	Method
		300046-003	Incon
BACC65L41	Receptacle	192-341-0005	Method
		300055-001	Incon
BACC65L66	Receptacle	192-366-0010	Method
		300052-001	Incon
BACC65L114	Receptacle	192-314-0007	Method
		300206-001	Incon



**BACC65K() CONNECTOR PLUG
Figure 1**

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BACC65K() AND BACC65L() PRINTED WIRING BOARD CONNECTORS

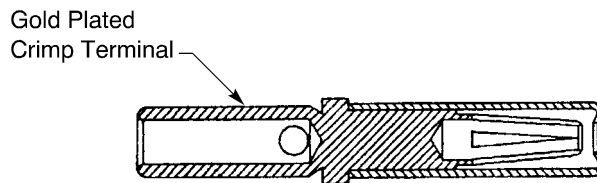


BACC65L() CONNECTOR RECEPTACLE
Figure 2

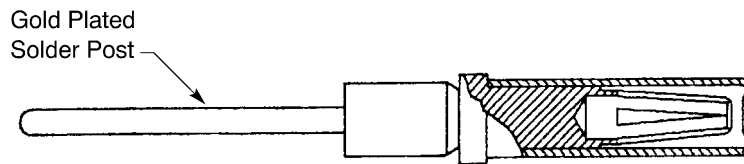
B. Contact Part Numbers

Table 2
CONTACT PART NUMBERS

Contact Type	Boeing Standard	Part Number	Supplier
Crimp	BACC47EK1	141-150-02	Methode
		200086-002	Incon
		210058-01	Fabri-Tek
Solder Post	BACC47EL1	200083-001	Incon
		210059-01	Fabri-Tek



BACC47EK1 REMOVABLE CRIMP TYPE CONTACT SOCKET
Figure 3



BACC47EL1 REMOVABLE SOLDER TYPE CONTACT PIN
Figure 4

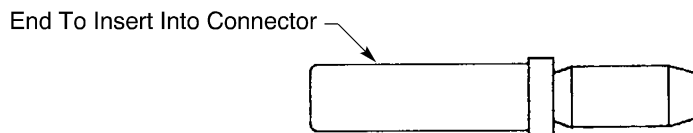
STANDARD WIRING PRACTICES MANUAL

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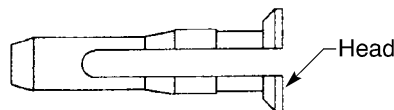
C. Connector Keying Plug Part Numbers

**Table 3
CONNECTOR KEYING PLUG PART NUMBERS**

Boeing Standard	Part Number	Supplier
BACC47EM1	141-1775-01	Methode
	200080-001	Incon
BACC47EM2	200093-001	Incon



**BACC47EM1 REMOVABLE CONTACT KEYING PLUG
Figure 5**



**BACC47EM2 KEYING PLUG
Figure 6**

2. CONNECTOR DISASSEMBLY

A. Crimp Contact Removal

**Table 4
CONTACT REMOVAL TOOLS FOR CRIMP TYPE CONTACTS**

Boeing Standard	Removal Tool		
	Part Number	Description	Supplier
BACC47EK1	710-0020-000	Metal	Incon
	91-021	Plastic, White	Incon
	CIET 22	-	Cannon

- (1) Make a selection of a contact removal tool from Table 4.
- (2) Put the tool on the wire.
- (3) Push the tool into the connector to release the contact.
- (4) Pull the wire and tool out of the contact cavity at the same time.

CAUTION: MAKE SURE THAT DAMAGE TO THE WIRE OR CONTACT WITH THE REMOVAL TOOL OR THE FINGERS DOES NOT OCCUR.

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B. Solder Contact Removal

**Table 5
CONTACT REMOVAL TOOLS FOR SOLDER TYPE CONTACTS**

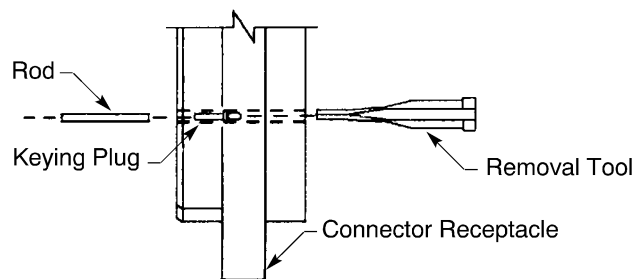
Boeing Standard	Removal Tool		
	Part Number	Description	Supplier
BACC47EL1	710-0020-000	Metal	Incon
	91-021	Plastic, White	Incon
	CIET 22	-	Cannon

- (1) Make a selection of a contact removal tool from Table 5.
- (2) Push tool straight into the contact cavity.
- (3) Lightly move the end of the tool around the contact until it is against the bottom of the cavity.
- (4) Push the contact and the tool out of the cavity with a smooth rod with a maximum diameter of 0.030 inch.

C. Keying Plug Removal

**Table 6
KEYING PLUG REMOVAL TOOLS**

Keying Plug	Removal Tool		
	Part Number	Description	Supplier
BACC47EM1	710-0020-000	Metal	Incon
	91-021	Plastic, White	Incon
	CIET 22	-	Cannon



**BACC47EM1 KEYING PLUG REMOVAL
Figure 7**

Refer to Figure 7.

- (1) Make a selection of a removal tool from Table 6.
- (2) Push the tool straight into the contact cavity until it hits the bottom.
- (3) Push the contact and the tool out of the cavity with a smooth rod with a maximum diameter of 0.030 inch.

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BACC65K() AND BACC65L() PRINTED WIRING BOARD CONNECTORS

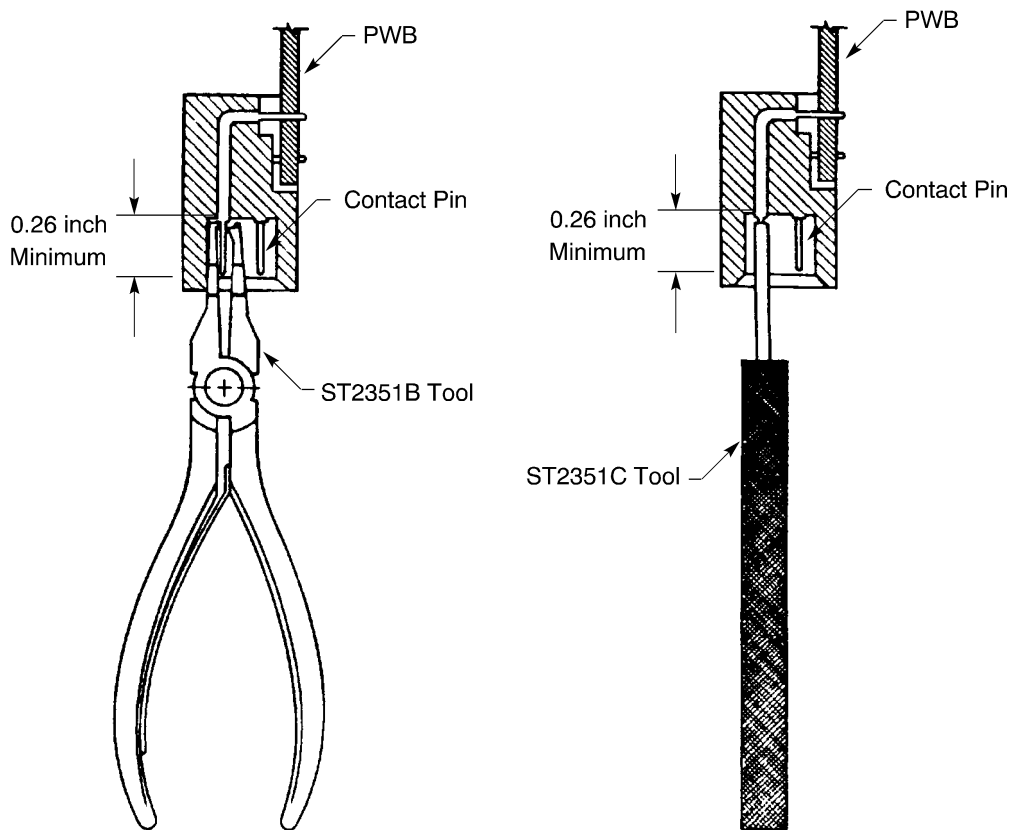
3. CONNECTOR PLUG ASSEMBLY

CAUTION: IT IS IMPORTANT THAT THE CONNECTOR IS KEYPED CORRECTLY BEFORE IT IS INSTALLED ON THE PRINTED WIRING BOARD. IF THE CONNECTOR IS NOT KEYPED CORRECTLY, THE CONNECTOR MUST BE DISCARDED.

A. Connector Plug Keying

**Table 7
CONNECTOR PLUG KEYING TOOLS**

Keying Tool	Supplier
ST2351B	Boeing
ST2351C	Boeing



**BACC65K() CONNECTOR PLUG KEYING TOOLS
Figure 8**

Refer to Figure 8.

- (1) Make a selection of a keying tool from Table 7.
- (2) If the selection is the ST2351B tool, cut the contact pin 0.26 inch minimum below the outer surface of the connector shell.

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STANDARD WIRING PRACTICES MANUAL**BACC65K() AND BACC65L() PRINTED WIRING BOARD CONNECTORS**

CAUTION: DO NOT BEND OR CAUSE ANY DAMAGE TO THE ANY ADJACENT PINS OF THE INSERT FACE OF THE CONNECTOR.

- (3) If the selection is the ST2351C tool, break the contact pin 0.26 inch minimum below the outer surface of the connector shell.

CAUTION: DO NOT BEND OR CAUSE ANY DAMAGE TO THE ANY ADJACENT PINS OF THE INSERT FACE OF THE CONNECTOR.

B. Connector Plug Assembly

- (1) Examine the surfaces of the printed wiring board and the plug that are adjacent when the plug is installed.
- (2) If either surface has any contamination:
- (a) Apply the necessary quantity of either of these cleaners to the surface with a bristle brush:
 - Isopropyl alcohol
 - Solvent cleaner.
 - (b) Let the cleaner evaporate.

NOTE: As an alternative, the cleaner can be dried with compressed air.

- (3) Align the connector solder pins with the correct holes in the printed wiring board.
- (4) Push the connector into the printed wiring board until the surface of the plug is against the surface of the board.

CAUTION: DO NOT USE FORCE. DAMAGE TO THE CONNECTOR OR THE PRINTED WIRING BOARD, OR BOTH CAN OCCUR.

- (5) Install the screws:
- (a) Apply a drop of Loctite 242 on a minimum of two threads on the opposite sides of one of the screws.
 - (b) Put the screw one of the mount holes.
 - (c) Do Step (a) and Step (b) again for the other screw.
 - (d) Torque the screws approximately 4 inch-pounds to 6 inch-pounds.
- (6) Solder the connector pins to the PWB.
- (7) Clean the assembly.
- (8) Apply a layer of conformal coating on the printed wiring assembly (PWA).
- (9) If a layer of conformal coating cannot be put on the assembly within 24 hours, put the assembly:
- In a clean, dry polyethylene bag
 - In an area where the relative humidity is no higher than 50 percent

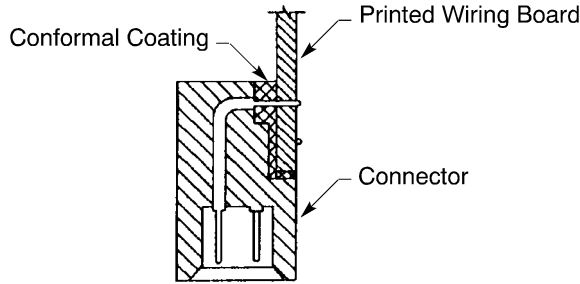
NOTE: A satisfactory alternative is to clean assembly again.

- (10) Apply the same conformal coating to the opening between the connector and the PWB so that any bare conductors or any bare solder pins have a layer of the coating.

Refer to Figure 9.

STANDARD WIRING PRACTICES MANUAL

BACC65K() AND BACC65L() PRINTED WIRING BOARD CONNECTORS



CONFORMAL COATING BETWEEN THE PWB AND THE CONNECTOR BODY
Figure 9

4. CONNECTOR RECEPTACLE ASSEMBLY

CAUTION: IT IS IMPORTANT THAT THE CONNECTOR IS KEYED CORRECTLY BEFORE IT IS INSTALLED ON THE PRINTED WIRING BOARD. IF THE CONNECTOR IS NOT KEYED CORRECTLY, THE CONNECTOR MUST BE DISCARDED.

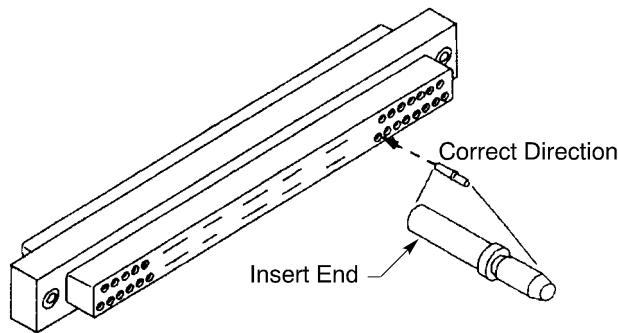
A. BACC65L41 or BACC65L66 Receptacle Connector Keying

Table 8
KEYING PLUG INSERTION TOOLS

Keying Plug	Insertion Tool		
	Part Number	Description	Supplier
BACC47EM1	710-0021-000	Metal	Incon
	91-023	Plastic, Green	Incon
	CIET 22	-	Cannon

- (1) Make a selection of the insertion tool from Table 8.
- (2) Put the BACC47EM1 keying plug into the correct contact cavity at the rear face of the receptacle. Refer to Figure 10.

CAUTION: IF THE KEYING PLUG IS PUT IN BACKWARDS, IT IS LOCKED INTO POSITION AND CANNOT BE REMOVED.



INSERTION OF THE BACC47EM1 KEYING PLUG
Figure 10

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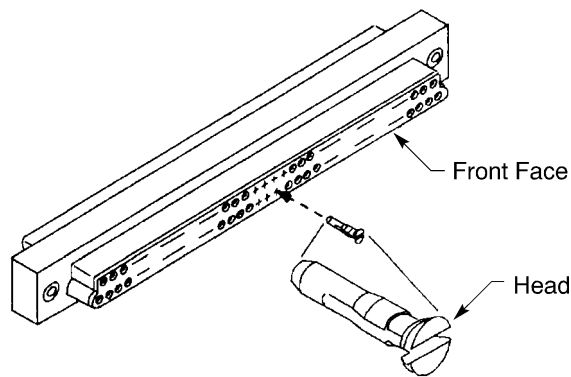
BACC65K() AND BACC65L() PRINTED WIRING BOARD CONNECTORS

- (3) Manually push the keying plug into the connector cavity until the end of the plug is aligned with the wire support spacer on the rear face of the connector.
- (4) Push the plug into the contact cavity with the insertion tool until it makes a click.
- (5) Mark the connector with the keying part number.

B. BACC65L114 Receptacle Connector Keying

- (1) Put the BACC47EM2 keying plug in the contact cavity from the front face of the connector. Refer to Figure 11.

CAUTION: ONCE THE KEYING PLUG HAS BEEN INSTALLED, IT CANNOT BE REMOVED.



INSERTION OF THE BACC47EM2 KEYING PLUG
Figure 11

- (2) Manually push the keying plug into the contact cavity until the surface of the head is aligned with the face of the connector.
- (3) Mark the connector with keying part number.

C. Contact Assembly With Stranded Conductor Wire

Table 9
CRIMP TOOLS FOR CONTACTS WITH STRANDED CONDUCTORS

Wire Size (AWG)	Crimp Tool				
	Basic Unit		Locator	Depth Adjustment (inch)	
	Part Number	Setting		Minimum	Maximum
26	M22520/2-01	5	M22520/2-21	-	-
	612118	-	612827	0.025	0.031
24	M22520/2-01	6	M22520/2-21	-	-
	612118	-	612827	0.030	0.035
22	M22520/2-01	6	M22520/2-21	-	-
	612118	-	612827	0.030	0.035

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- (1) Make a selection of a crimp tool from Table 9.
- (2) Remove 0.18 inch \pm 0.03 inch of the insulation from the end of the wire.
- (3) Crimp the contact.

D. Contact Assembly With Solid Conductor Wire

**Table 10
CRIMP TOOLS FOR CONTACTS WITH SOLID CONDUCTORS**

Solid Conductor Wire (AWG)	Stranded Filler Wire (AWG)	Crimp Tool		
		Basic Unit		Locator
		Part Number	Setting	
30	24	M22520/2-01	6	M22520/2-21
28	24	M22520/2-01	6	M22520/2-21
26	-	M22520/2-01	6	M22520/2-21
24	-	M22520/2-01	6	M22520/2-21

- (1) Make a selection of a crimp tool from Table 10.
- (2) Remove 0.18 inch \pm 0.03 inch of insulation from the end of the solid conductor wire.
- (3) If a stranded filler wire is necessary, remove 0.18 inch \pm 0.03 inch of insulation from the end of the filler wire.
- (4) Put the end of the wire or wires in the crimp barrel of the contact.
- (5) Crimp the contact.
- (6) If a filler wire is used, install the necessary insulation on the free end of the filler wire. Refer to Subject 20-10-11.

E. Contact Insertion for Crimped Contacts

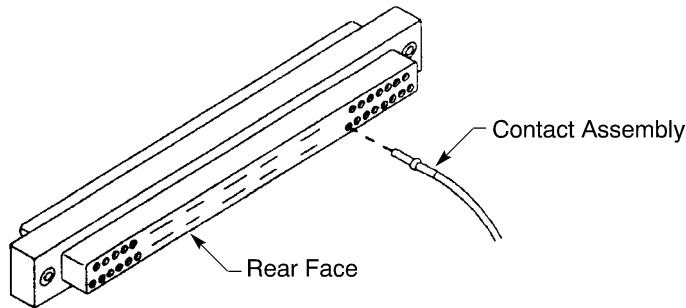
**Table 11
INSERTION TOOLS FOR CRIMPED CONTACTS**

Contact	Insertion Tool	
	Part Number	Description
BACC47EK1	710-0021-000	Metal
	91-023	Plastic, Green
	CIET 22	-

- (1) Make a selection of an insertion tool from Table 11.
- (2) Put the tool on the wire of the contact assembly.
- (3) From the rear of the receptacle, push the contact assembly straight into the contact cavity. Refer to Figure 12.

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CONTACT INSERTION
Figure 12

- (4) Push the tool until the contact seats or clicks to indicate complete insertion.
- (5) Install unwired contacts in all unused contact cavities.

NOTE: Installation of seal rods in the unwired contacts is not necessary.

F. Contact Insertion for Soldered Contacts

Table 12
INSERTION TOOLS FOR SOLDERED CONTACTS

Contact	Insertion Tool	
	Part Number	Description
BACC47EL1	710-0021-000	Metal
	91-023	Plastic, Green
	CIET 22	-

- (1) Make a selection of an insertion tool from Table 12.
- (2) From the rear of the connector, put the contact into the contact cavity.
- (3) Push the contact into the contact cavity until it makes a click.

5. APPROVED TOOL SUPPLIERS

A. Crimp Tools

Table 13
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
612118	Buchanan
612827	Buchanan
M22520/2-01	QPL
M22520/2-21	QPL



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B. Insertion Tools

Table 14
INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
710-0021-000	Incon
91-023	Incon
CIET 22	Cannon

C. Removal Tools

Table 15
REMOVAL TOOL SUPPLIERS

Insertion Tool	Supplier
710-0021-000	Incon
91-023	Incon
CIET 22	Cannon

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ASSEMBLY OF INTEGRATED WIRING TERMINATION SYSTEMS

1. PART NUMBERS AND DESCRIPTION

A. Assembly Part Numbers

Table 1
ASSEMBLIES THAT USE INTEGRATED WIRING TERMINATION SYSTEMS

Part Number	Description	Supplier
10648()-()	Lighted Pushbutton Switch	Jay-El
285T0112	Autobright Sensor Unit Indicator	Boeing
432-632-1089-00()	Lighted Pushbutton Switch Indicator	Korry Electronics
433-673()-()	Lighted Pushbutton Switch Indicator	Korry Electronics
434-674()-()	Lighted Indicator	Korry Electronics
592584-()	Disconnectable Wire Splice	AMP
60B40122-()	Lighted Pushbutton Switch Indicator	Boeing
851-30768-()	Lighted Pushbutton Switch Indicator	MSC
851-30768-()	Lighted Pushbutton Switch Indicator	Eaton
851-35100-()	Lighted Pushbutton Switch Indicator	MSC
851-35100-()	Lighted Pushbutton Switch Indicator	Eaton
AC30-()	Switch	Janco
AC45-()	Switch	Janco
AC60-()	Switch	Janco
AC90-()	Switch	Janco
BACC18AF	Circuit Breaker, Remote Control	Boeing
M27724-23	Toggle Switch	QPL
M27724-24	Toggle Switch	QPL
M81714/11-20	Disconnectable Wire Splice	QPL
MWS()	Disconnectable Wire Splice	AMP
S231T290-()	Lighted Pushbutton Switch Indicator	Boeing
S231T300-()	Lighted Indicator	Boeing
S231T301-()	Lighted Indicator	Boeing
S283T022-()	Switch	Boeing

Table 2
OBSOLETE PART NUMBERS

Obsolete Component		Replacement Component	
Part Number	Supplier	Part Number	Supplier
432-632-1089-001	Korry Electronics	432-632-1089-005	Korry Electronics

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Table 2 (continued)

Obsolete Component		Replacement Component	
Part Number	Supplier	Part Number	Supplier
432-632-1089-002	Korry Electronics	432-632-1089-003	Korry Electronics
433-673-1004-40()	Korry Electronics	433-673-1004-42()	Korry Electronics
433-673-1004-41()	Korry Electronics	433-673-1004-43()	Korry Electronics
434-674-1005-1()	Korry Electronics	434-674-1031-2()	Korry Electronics
851-30768-2()	MSC	851-30768-2()	Eaton
851-30768-3()	MSC	851-30768-3()	Eaton
851-35100-50()	MSC	851-35100-50()	Eaton
S231T290-40()	Boeing	S231T290-42()	Boeing
S231T290-41()	Boeing	S231T290-43()	Boeing
S231T300-1()	Boeing	S231T300-2()	Boeing

Table 3
SUPPLIER PART NUMBERS FOR BOEING STANDARDS

Boeing Standard Number	Supplier Part Number	Supplier
S231T290-1()	433-673-1001-1()	Korry Electronics
S231T300-10()	434-674-1005-10()	Korry Electronics
S231T301-11()	434-674-1007-10()	Korry Electronics
S231T290-2()	851-30768-2()	Eaton
S231T290-3()	851-30768-3()	Eaton
S231T290-41()	433-673-1004-43()	Korry Electronics
S231T290-50()	433-673-1004-42()	Korry Electronics
S231T300-10()	434-674-1031-20()	Korry Electronics
S231T300-11()	434-674-1031-21()	Korry Electronics
S231T300-11()	434-674-1031-11()	Korry Electronics
S231T300-12()	434-674-1031-12()	Korry Electronics
S231T300-12()	434-674-1031-22()	Korry Electronics
S231T300-20()	434-674-1031-20()	Korry Electronics
S231T300-22()	434-674-1031-22()	Korry Electronics
S231T300-23()	434-674-1031-23()	Korry Electronics
S231T301-12()	434-674-1009-12()	Korry Electronics
S231T301-22()	434-674-1032-22()	Korry Electronics
S231T301-21()	434-674-1033-20()	Korry Electronics

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Table 3 (continued)

Boeing Standard Number	Supplier Part Number	Supplier
S231T290-40()	433-673-1004-42()	Korry Electronics
S231T290-2()	851-30768-2()	MSC
S231T290-3()	851-30768-3()	MSC
S283T022-()	AC30-()	JANCO
S231T290-42()	433-673-1004-42()	Korry Electronics
S231T290-43()	433-673-1004-43()	Korry Electronics
S231T290-50()	851-35100-50()	Eaton
S231T290-50()	851-35100-50()	MSC

B. Contact Part Numbers

**Table 4
CONTACT PART NUMBERS**

Contact Size		Part Number	Color Code		Supplier
Engaging End	Crimp Barrel		Band	Color	
16	22	M39029/1-100	1	Brown	QPL
			2	Black	QPL
			3	Black	QPL
	20	M39029/1-101	1	Brown	QPL
			2	Black	QPL
			3	Brown	QPL
		M39029/1-16-20	1	Brown	QPL
			2	Black	QPL
			3	Brown	QPL
		S280W555-920	1	Red	Tri Star
			2	Red	Tri Star
			3	Red	Tri Star

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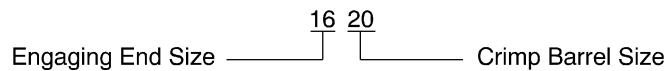
Table 4 (continued)

Contact Size		Part Number	Color Code		Supplier
Engaging End	Crimp Barrel		Band	Color	
14	16	M39029/1-102	1	Brown	QPL
		M39029/1-102	2	Black	QPL
		M39029/1-102	3	Red	QPL
		M39029/1-14-16	1	Brown	QPL
		M39029/1-14-16	2	Black	QPL
		M39029/1-14-16	3	Red	QPL
		S280W555-916	1	Blue	Tri Star
		S280W555-916	2	Blue	Tri Star
		S280W555-916	3	Blue	Tri Star

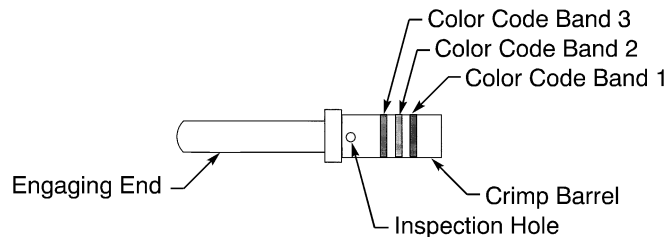
Table 5

OBSOLETE CONTACT PART NUMBERS

Obsolete Contact		Replacement Contact	
Part Number	Supplier	Part Number	Supplier
M39029/1-16-20	QPL	M39029/1-101	QPL
M39029/1-14-16	QPL	M39029/1-102	QPL



EXAMPLE OF A CONTACT SIZE
Figure 1



PIN CONTACT
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF INTEGRATED WIRING TERMINATION SYSTEMS

C. Seal Plug Part Numbers

**Table 6
SEAL PLUG PART NUMBERS**

Crimp Barrel Size	Seal Plug	Supplier
22	MS27488-22	QPL
	MS27488-22-1	QPL
20	MS27488-20	QPL
	MS27488-20-1	QPL
16	M83723/28-16	QPL
	MS27488-16	QPL
	MS27488-16-1	QPL
	NAS1668-3	QPL

2. TERMINATION SYSTEM DISASSEMBLY

A. Contact Removal

**Table 7
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	
	Part Number	Color
22	M81969/14-11	White
	ST2220-3-29	-
20	M81969/14-11	White
	ST2220-3-29	-
16	M81969/14-03	White
	M83723/31-16	-
	NAS1664-16	-
	ST2220-3-7	-

- (1) Make a selection of a contact removal tool from Table 7.
- (2) Put the end of the removal tool on the wire.
- (3) Carefully push the tool straight into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (4) Pull the wire and the tool out of the contact cavity at the same time.
- (5) If the contact does come out of the contact cavity:
 - (a) Pull the tool out of the contact cavity.
 - (b) Turn the tool 90 degrees.

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(c) Do Step (2) through Step (4) again.

B. Seal Plug Removal

- (1) Make a selection of a pair of needle nose pliers that has:
 - Jaws with smooth surfaces
 - No sharp edges.

CAUTION: ROUGH SURFACES OR SHARP EDGES CAN CAUSE DAMAGE TO THE REAR GROMMET.

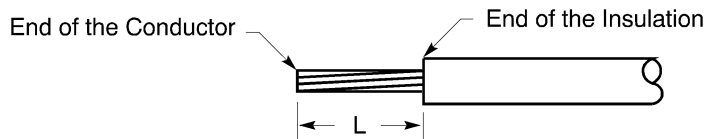
- (2) Hold the end of the seal plug tightly in the jaws of the pliers.
- (3) Pull the seal plug straight out of the rear grommet.

3. TERMINATION SYSTEM ASSEMBLY

A. Wire Preparation

**Table 8
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Minimum	Maximum	
24	22	0.12	0.15	-
	20	0.12	0.15	-
22	22	0.12	0.15	-
	20	0.12	0.15	-
	16	0.24	0.30	Fold the conductor back
20	20	0.12	0.15	-
	16	0.12	0.15	-
18	16	0.21	0.24	-
16	16	0.21	0.24	-



**WIRE PREPARATION
Figure 3**

- (1) Remove the necessary length of insulation from the end of the wire.

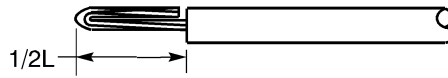
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Refer to:

- Figure 3
- Table 8 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

(2) If it is specified, fold the conductor back. Refer to Figure 4.



CONDUCTOR FOLDED BACK

Figure 4

B. Contact Assembly

**Table 9
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	22	M22520/2-01	3	M22520/2-11	-
		ST2220-10	-	ST2220-10-3	-
		WA22	3	M22520/2-11	-
		WA22LC	3	M22520/2-11	-
	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-11	-
		ST2220-1-Y	-	ST2220-1-12	-
		WA22	5	M22520/2-11	-
		WA22LC	5	M22520/2-11	-
		WA27F	2	M22520/1-02	Red

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Table 9 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
22	22	M22520/2-01	4	M22520/2-11	-
		ST2220-10	-	ST2220-10-3	-
		WA22	4	M22520/2-11	-
		WA22LC	4	M22520/2-11	-
	20	M22520/1-01	3	M22520/1-02	Red
		M22520/2-01	6	M22520/2-11	-
		ST2220-10	-	ST2220-10-8	-
		WA22	6	M22520/2-11	-
		WA22LC	6	M22520/2-11	-
	16	WA27F	3	M22520/1-02	Red
		M22520/1-01	4	M22520/1-02	Blue
	20	20	MS3191-4	-	MS3191-3T
M22520/1-01			4	M22520/1-02	Red
M22520/2-01			7	M22520/2-11	-
ST2220-1			-	ST2220-1-1	-
WA22			7	M22520/2-11	-
WA22LC			7	M22520/2-11	-
16		WA27F	4	M22520/1-02	Red
		M22520/1-01	4	M22520/1-02	Blue
		ST2220-1	-	ST2220-1-2	-
		WA27F	4	M22520/1-02	Blue
		M22520/1-01	4	M22520/1-02	Blue
		MS3191-4	-	MS3191-3T	-
18	16	ST2220-1	-	ST2220-1-2	-
		WA27F	4	M22520/1-02	Blue
		M22520/1-01	5	M22520/1-02	Blue
		MS3191-4	-	MS3191-3T	-

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ASSEMBLY OF INTEGRATED WIRING TERMINATION SYSTEMS

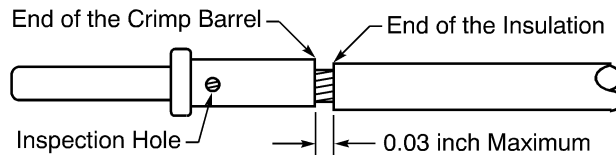
Table 9 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
16	16	M22520/1-01	6	M22520/1-02	Blue
		MS3191-4	-	MS3191-3T	-
		ST2220-1	-	ST2220-1-2	-
		WA27F	6	M22520/1-02	Blue

- (1) Make a selection of a crimp tool from Table 9.
- (2) Put the end the wire into the crimp barrel of the contact. Refer to Figure 5.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is a maximum of 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 5

- (3) Crimp the contact.
- (4) Examine the contact assembly for these types of damage:
 - A broken strand of the conductor
 - A strand of the conductor on which the base metal can be seen
 - A crack in the crimp barrel of the contact.
- (5) If the contact or the wire has damage, replace the contact.

C. Contact Insertion

Table 10
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
22	M81969/14-11	Red
	ST2220-2-30	-

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Table 10 (continued)

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
20	DAK83-20	-
	M81969/14-11	Red
	ST2220-2-28	-
16	DAK83-16	-
	M81969/14-03	Blue
	M83723/31-16	-
	NAS1664-16	-
	ST2220-2-4	-

(1) Make a selection of a contact insertion tool from Table 10.

CAUTION: DO NOT USE A TOOL WITH A TIP THAT:

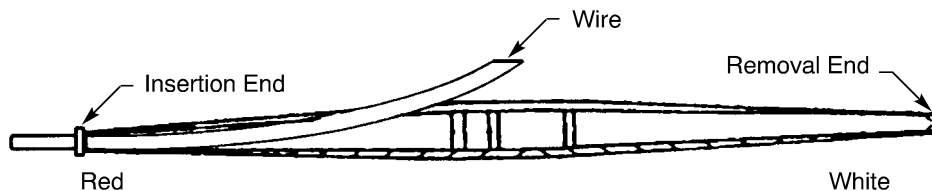
- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

(2) Put the contact assembly in the insertion tool. Refer to Figure 6.

CAUTION: AN UNWIRED CONTACT MUST NOT BE INSTALLED IN A MODULE. IT CANNOT BE REMOVED.



POSITION OF THE CONTACT IN THE INSERTION TOOL

Figure 6

(3) At the rear of the connector, axially align the contact, the tool, and the contact cavity.

(4) Carefully push the tool into the contact cavity until it stops.

Make sure that the tool and the contact cavity stay axially aligned.

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CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool out of the contact cavity.
Make sure that the tool and the contact cavity stay axially aligned.
- (6) Lightly pull the wire to make sure that the contact is locked in position.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINAL MODULE OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact out of the cavity.
 - (b) Do Step (2) through Step (6) again.

D. Seal Plug Installation

- (1) Install seal plugs in all empty contact cavities.
Refer to Subject 20-60-08.

NOTE: Nylon or teflon rods can be used in place of MS() seal plugs.

4. APPROVED TOOL SUPPLIERS

A. Contact Insertion and Removal Tools

**Table 11
INSERTION AND REMOVAL TOOL SUPPLIERS**

Insertion and Removal Tool	Suppliers
DAK83-16	Daniels
DAK83-20	Daniels
M81969/14-03	QPL
M81969/14-11	QPL
M83723/31-16	QPL
NAS1664-16	QPL
ST2220-2-4	Boeing
ST2220-2-28	Boeing
ST2220-2-30	Boeing
ST2220-3-7	Boeing
ST2220-3-29	Boeing



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ASSEMBLY OF INTEGRATED WIRING TERMINATION SYSTEMS

B. Contact Crimp Tools

Table 12
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-11	QPL
MS3191-3T	QPL
MS3191-4	QPL
ST2220-1	Boeing
ST2220-1-1	Boeing
ST2220-1-2	Boeing
ST2220-1-12	Boeing
ST2220-1-Y	Boeing
ST2220-10	Boeing
ST2220-10-3	Boeing
ST2220-10-8	Boeing
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels

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ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM

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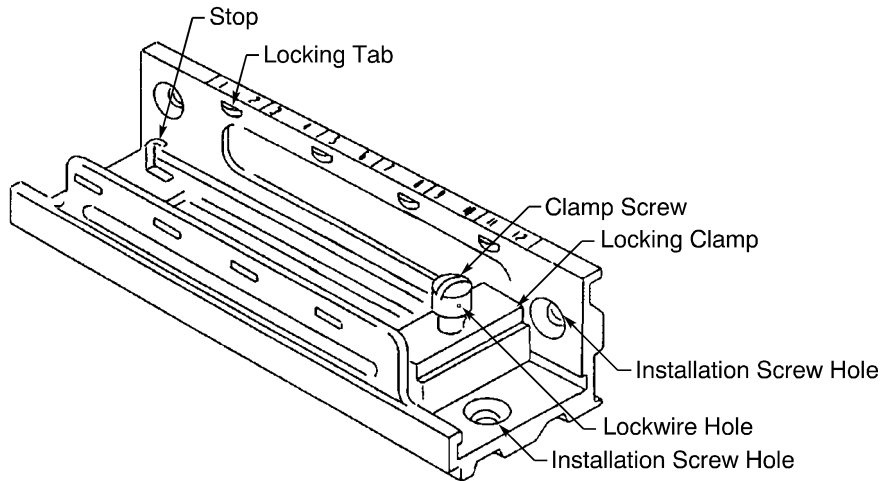
ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM

1. PART NUMBERS AND DESCRIPTION

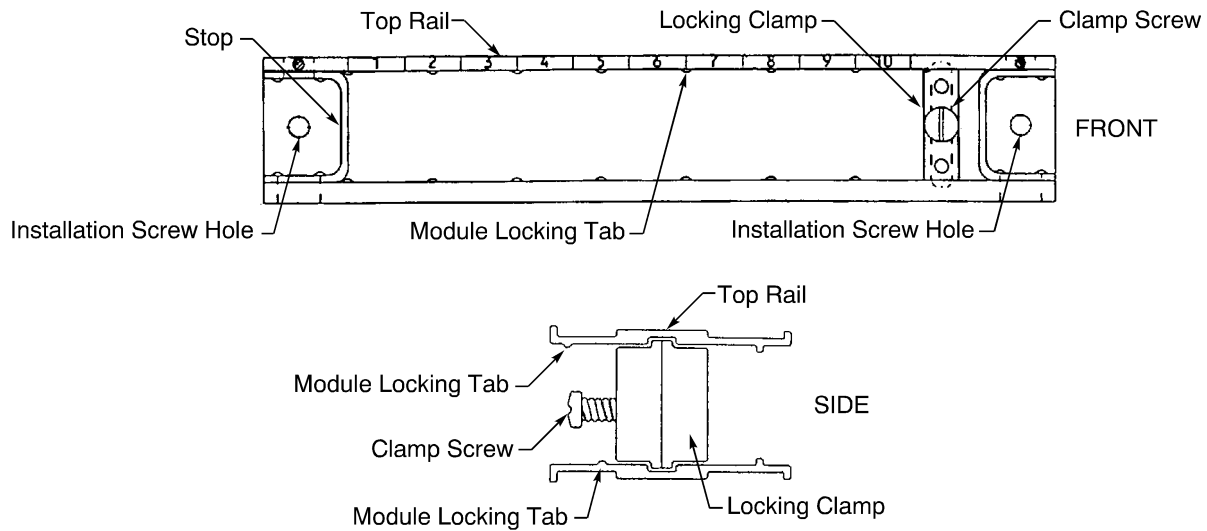
A. Terminal Junction System Description

The terminal junction system has these components:

- Feedback terminal modules
- Feedthru terminal modules
- Tracks for feedback modules
- Tracks for feedthru modules
- Brackets for feedback modules.



M81714/5 AND M81714/16 FEEDBACK TERMINAL MODULE TRACKS
Figure 1

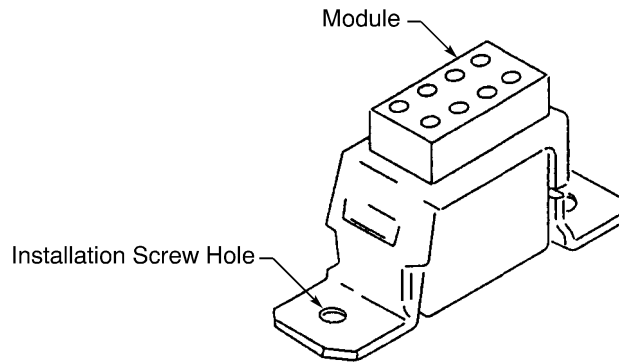


M81714/10 AND M81714/14 FEEDTHRU TERMINAL MODULE TRACKS
Figure 2

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M81714/29 TERMINAL MODULE BRACKET
Figure 3

B. Terminal Module Part Numbers

Feedback terminal modules have these technical properties:

- One grommet
- Bussed contact cavities.

Feedthru terminal modules have these technical properties:

- Two grommets on opposite sides
- Bussed contact cavities that are connected to the cavities on the opposite side.

Table 1
TERMINAL MODULE PART NUMBERS

Part Number	Module Type	Supplier
M81714/1-()	Feedback	QPL
M81714/2-()	Feedback	QPL
M81714/3-()	Feedback	QPL
M81714/4-()	Feedback	QPL
M81714/6-()	Feedthru	QPL
M81714/7-()	Feedthru	QPL
M81714/8-()	Feedthru	QPL
M81714/9-()	Feedthru	QPL
MRFB(E)	Feedthru	Matrix Science
MRTB(E)	Feedback	Matrix Science
TJM11260()	Feedback	Precision Connector Design



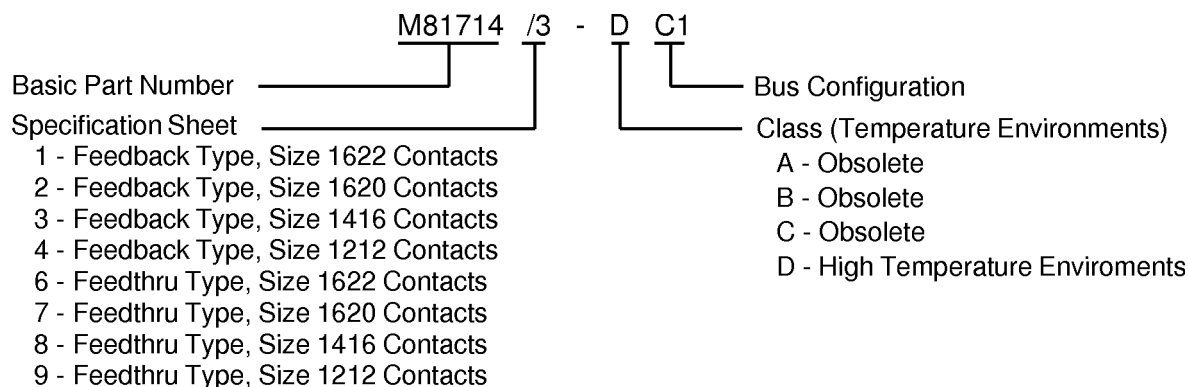
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Table 2
OBSOLETE TERMINAL MODULE PART NUMBERS

Obsolete Module	Replacement Module
MRFB12E01-()	M81714/9-DH1
MRFB12E02-()	M81714/9-DD1
MRFB12E03-()	M81714/9-DB1
MRFB12E04-()	M81714/9-DA1
MRTB16E02-()	M81714/3-DD1
MRTB16E03-()	M81714/3-DB1
MRTB16E04-()	M81714/3-DA1
MRTB20E09-()	M81714/2-DE1
M81714/4-DA1	TJM112601
M81714/4-DB1	TJM112602
M81714/4-DB2	TJM112603
M81714/4-DC1	TJM112605
M81714/4-DC2	TJM112606
M81714/4-DD1	TJM112607



M81714 SERIES I TERMINAL MODULE PART NUMBER STRUCTURE
Figure 4

C. Track Part Numbers

Table 3
TRACK PART NUMBERS

Part Number	Description	Module Type	Configuration	Supplier
99537-()	Track, Light Weight	Feedback	-	Matrix Science
M81714/5-()	Track, Standard Weight	Feedback	Table 5	QPL

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Table 3 (continued)

Part Number	Description	Module Type	Configuration	Supplier
M81714/10-()	Track, Standard Weight	Feedthru	Table 6	QPL
M81714/14-()	Track, Light Weight	Feedthru	Table 6	QPL
M81714/16-()	Track, Light Weight	Feedback	Table 5	QPL

Table 4

OBSOLETE TRACK PART NUMBERS

Obsolete Track	Replacement Track
99537-()	M81714/16-()

Table 5

M81714/5 AND M81714/16 TRACK CONFIGURATIONS

Track	Maximum Number of Modules	Length (inch)
M81714/()-1	10	5.3
M81714/()-2	3	2.6
M81714/()-3	4	3.0
M81714/()-4	5	3.3
M81714/()-5	6	3.7
M81714/()-6	7	4.1
M81714/()-7	8	4.5
M81714/()-8	9	4.9
M81714/()-9	11	5.7
M81714/()-10	12	6.0
M81714/()-11	13	6.5
M81714/()-12	14	6.9
M81714/()-13	15	7.2

Table 6

M81714/10 AND M81714/14 TRACK CONFIGURATIONS

Track	Maximum Number of Modules	Length (inch)
M81714/()-1	10	5.6
M81714/()-2	3	2.8
M81714/()-3	4	3.2
M81714/()-4	5	3.6

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Table 6 (continued)

Track	Maximum Number of Modules	Length (inch)
M81714/()-5	6	4.0
M81714/()-6	7	4.4
M81714/()-7	8	4.8
M81714/()-8	9	5.6
M81714/()-9	11	6.0
M81714/()-10	12	6.3
M81714/()-11	13	6.7
M81714/()-12	14	7.1
M81714/()-13	15	7.5

Table 7
TRACK INSTALLATION FASTENERS

Track	Fastener	Size	Quantity
M81714/5-()	Screw, Flathead	6	2
M81714/10-()	Screw, Flathead	6	2
M81714/14-()	Screw, Flathead	6	2
M81714/16-()	Screw, Flathead	6	2

D. Bracket Part Numbers

Table 8
BRACKET PART NUMBERS

Part Number	Module Type	Supplier
8400-0()-()	Feedback	Matrix Science
M81714/29-()	Feedback	QPL

Table 9
OBSOLETE BRACKET PART NUMBERS

Obsolete Bracket	Replacement Bracket
8400-041-020	M81714/29-1
8400-095-0020	M81714/29-1

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Table 10
M81714/29 BRACKET CONFIGURATIONS

Bracket	Maximum Number of Modules
M81714/29-1	1

Table 11
BRACKET INSTALLATION FASTENERS

Bracket	Fastener	Size	Quantity
M81714/29-()	Screw, Flathead	6	2

E. Contact Part Numbers

The contacts have these technical properties:

- A pin configuration
- A gold finish.

Table 12
CONTACT PART NUMBERS

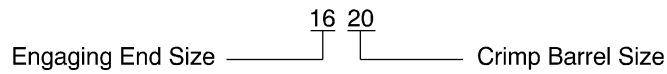
Contact Size		Part Number	Color Code		Supplier
Engaging End	Crimp Barrel		Band	Color	
16	22	M39029/1-100	1	Brown	QPL
			2	Black	QPL
			3	Black	QPL
	20	M39029/1-101	1	Brown	QPL
			2	Black	QPL
			3	Brown	QPL
		S280W555-920	1	Red	Tri Star
			2	Red	Tri Star
			3	Red	Tri Star

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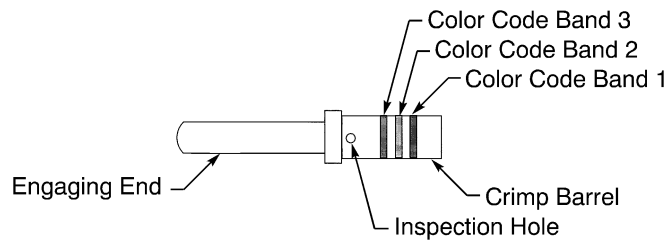
ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM

Table 12 (continued)

Contact Size		Part Number	Color Code		Supplier
Engaging End	Crimp Barrel		Band	Color	
14	16	S280W555-916	1	Blue	Tri Star
			2	Blue	Tri Star
			3	Blue	Tri Star
		M39029/1-102	1	Brown	QPL
			2	Black	QPL
			3	Red	QPL
		M39029/1-14-16	1	Brown	QPL
			2	Black	QPL
			3	Red	QPL
12	12	M39029/1-103	1	Brown	QPL
			2	Black	QPL
			3	Orange	QPL
		M39029/1-12-12	1	Brown	QPL
			2	Black	QPL
			3	Orange	QPL



EXAMPLE OF A CONTACT SIZE
Figure 5



PIN CONTACT
Figure 6

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM

F. Seal Plug Part Numbers

**Table 13
SEAL PLUG PART NUMBERS**

Crimp Barrel Size	Seal Plug	Supplier
22	MS27488-22	QPL
	MS27488-22-1	QPL
20	MS27488-20	QPL
	MS27488-20-1	QPL
16	M83723/28-16	QPL
	MS27488-16	QPL
	MS27488-16-1	QPL
	NAS1668-3	QPL
12	M83723/28-12	QPL
	MS27488-12	QPL
	MS27488-12-1	QPL
	NAS1668-2	QPL

2. TERMINAL MODULE CONFIGURATIONS

A. M81714 Series I Terminal Module Configurations

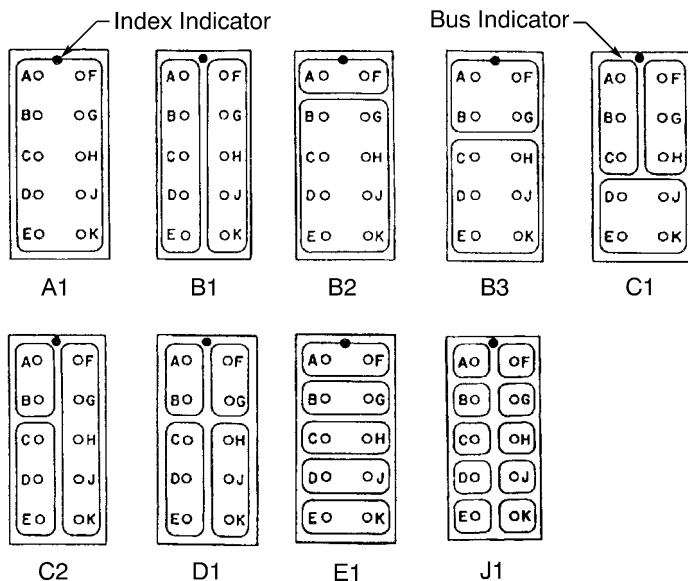
**Table 14
TERMINAL MODULE CONFIGURATIONS**

Module	Contact	
	Size	Quantity
M81714/1-()	22	10
M81714/2-()	20	10
M81714/3-()	16	8
M81714/4-()	12	8
M81714/6-()	22	10
M81714/7-()	20	10
M81714/8-()	16	8
M81714/9-()	12	8

NOTE: The size of the contact cavity is equivalent to the size of the contact crimp barrel.

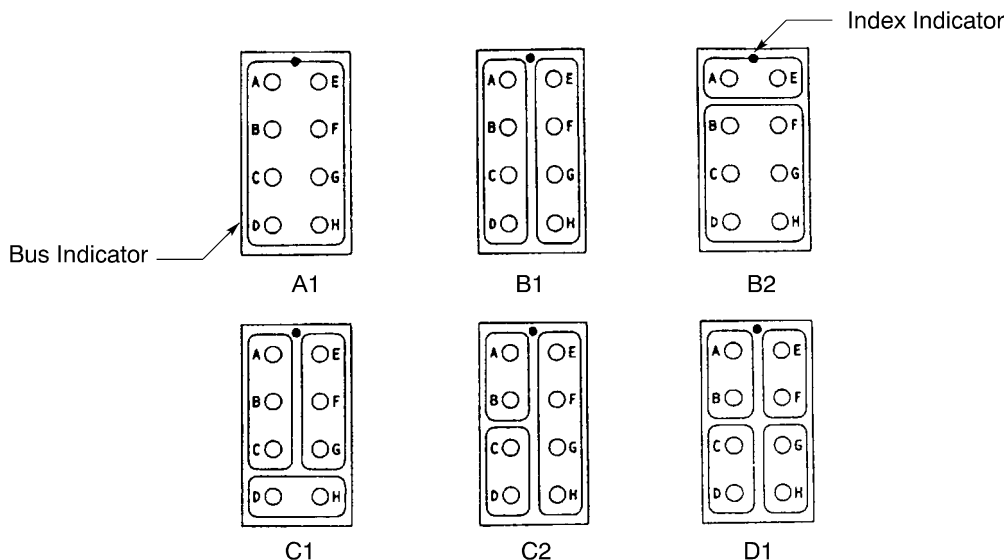
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BUS CONFIGURATIONS FOR SIZE 22 AND SIZE 20 TERMINAL MODULES

Figure 7

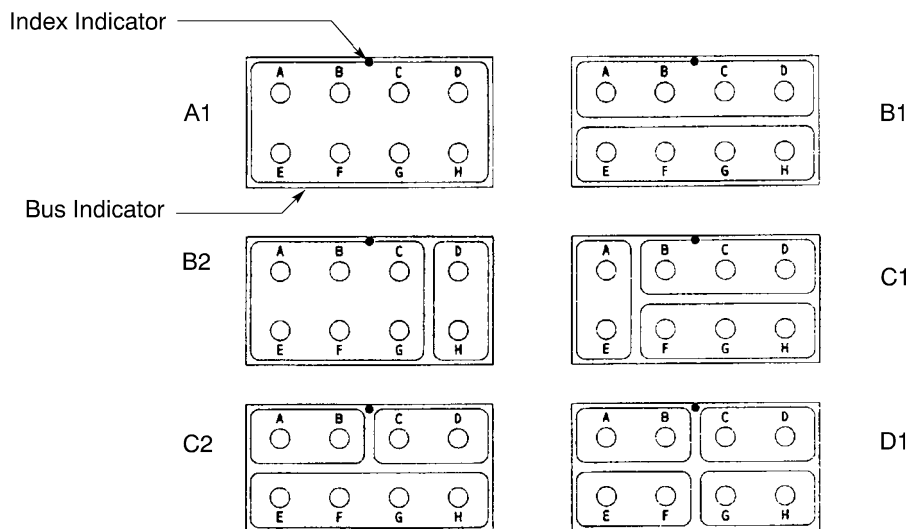


BUS CONFIGURATIONS FOR SIZE 16 TERMINAL MODULES

Figure 8

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM



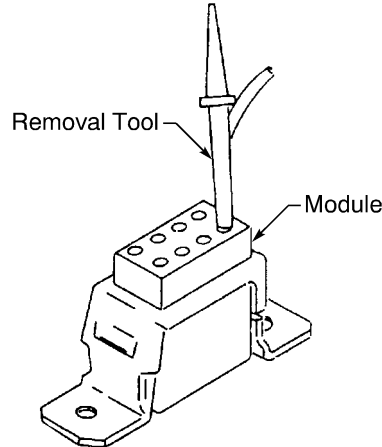
BUS CONFIGURATIONS FOR SIZE 12 TERMINAL MODULES
Figure 9

3. TERMINAL JUNCTION SYSTEM DISASSEMBLY

A. Contact Removal

Table 15
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool	
	Part Number	Color
22	M81969/14-11	White
	ST2220-3-29	-
20	M81969/14-11	White
	ST2220-3-29	-
16	M81969/14-03	White
	M83723/31-16	-
	NAS1664-16	-
	ST2220-3-7	-
12	M81969/14-04	White
	M81969/8-10	-
	M83723/31-12	-
	NAS1664-16	-
	ST2220-3-28	-

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM**

CONTACT REMOVAL
Figure 10

Refer to Figure 10.

- (1) Make a selection of a contact removal tool from Table 15.
- (2) Put the end of the removal tool on the wire.
- (3) Carefully push the tool straight into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (4) Pull the wire and the tool out of the contact cavity at the same time.
- (5) If the contact does come out of the contact cavity:
 - (a) Pull the tool out of the contact cavity.
 - (b) Turn the tool 90 degrees.
 - (c) Do Step (2) through Step (4) again.

B. Seal Plug Removal

- (1) Make a selection of a pair of needle nose pliers that has:
 - Jaws with smooth surfaces
 - No sharp edges.

CAUTION: ROUGH SURFACES OR SHARP EDGES CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) Hold the end of the seal plug tightly in the jaws of the pliers.
- (3) Pull the seal plug straight out of the rear grommet.

C. Removal of the Terminal Module from a Bracket

- (1) Remove the two bracket installation screws.
- (2) Pull the bracket from the module.

D. Removal of the Terminal Module from a Track

- (1) If the clamp screw has lockwire, remove the wire.

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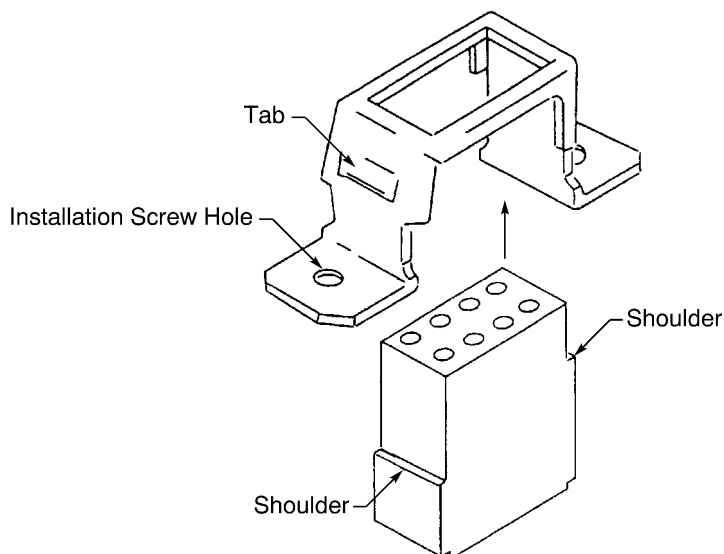
STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM**

- (2) Loosen the clamp screw until it can be moved freely in the track.
- (3) Push the clamp away from the terminal module a minimum of one half the width of the module.
- (4) Horizontally align the module between two locking tabs on each side of the track.
- (5) Pull the module out of the track.

4. TERMINAL JUNCTION SYSTEM ASSEMBLY**A. Installation of a Terminal Module and a Bracket**

- (1) Put the module into the bracket. Refer to Figure 11.

Make sure that each shoulder of the module is against the applicable tab of the bracket.

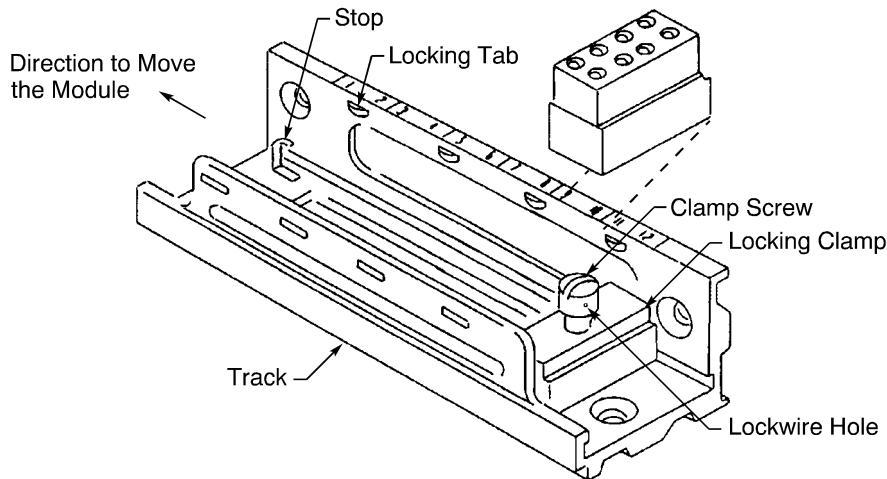
**TERMINAL MODULE INSTALLATION IN A BRACKET****Figure 11**

- (2) Align the installation screw holes of the bracket and the structure.
- (3) Install the screws in the installation screw holes.

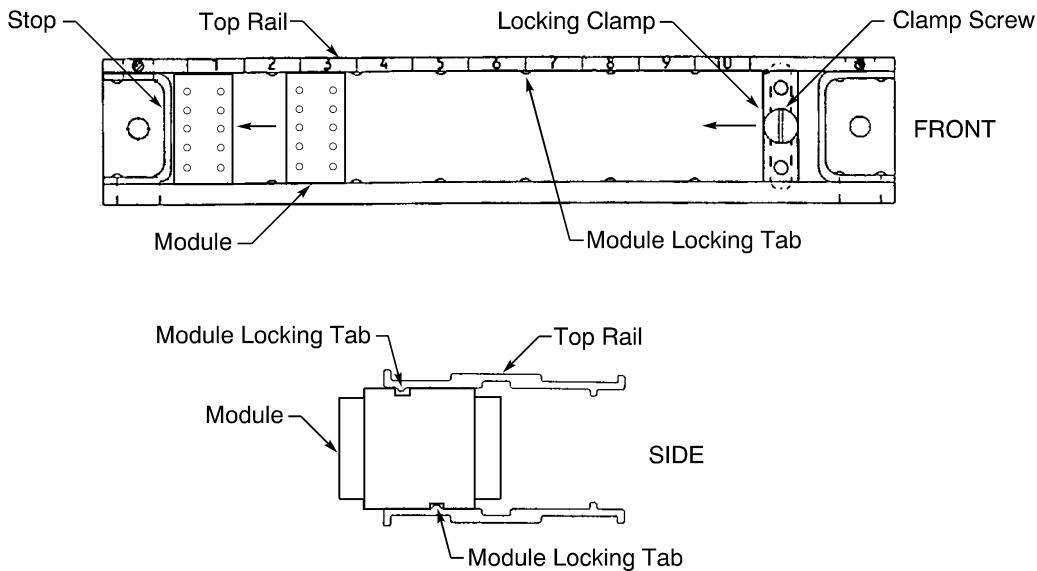
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B. Installation of a Terminal Module into a Track



INSTALLATION OF A TERMINAL MODULE IN AN M81714/5 OR AN M81715/16 TRACK
Figure 12



INSTALLATION OF A TERMINAL MODULE IN AN M81714/10 OR AN M81715/14 TRACK
Figure 13

For the installation of a module in:

- An M81714/5 or an M81714/16 track; refer to Figure 12
- An M81714/10 or an M81714/14 track; refer to Figure 13.

- (1) Horizontally align the module between two module locking tabs in each side of the track.
- (2) Push the module down between the module locking tabs.

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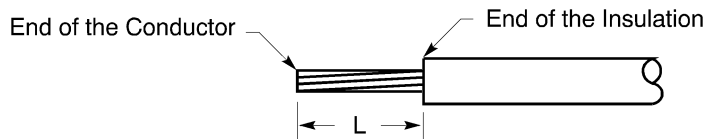
ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM

- (3) Push the module in the direction that is opposite the locking clamp until the module is against the stop or the last installed module.
Make sure that the bottom of the module is flat against the track.
- (4) Do Step (1) through Step (3) again for each module that must be installed.
- (5) Push the locking clamp tightly against the last module that is installed.
- (6) Tighten the clamp screw.
- (7) If the installation is in a high vibration area, install lockwire on the clamp screw.

C. Wire Preparation

**Table 16
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Minimum	Maximum	
24	22	0.12	0.15	-
	20	0.12	0.15	-
22	22	0.12	0.15	-
	20	0.12	0.15	-
	16	0.24	0.30	Fold the conductor back
20	20	0.12	0.15	-
	16	0.12	0.15	-
18	16	0.21	0.24	-
16	16	0.21	0.24	-
	12	0.21	0.24	-
14	12	0.21	0.24	-
12	12	0.21	0.24	-



**WIRE PREPARATION
Figure 14**

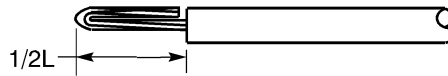
- (1) Remove the necessary length of insulation from the end of the wire.

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Refer to:

- Figure 14
 - Table 16 for the insulation removal length
 - Subject 20-00-15 for the insulation removal procedures.
- (2) If it is specified, fold the conductor back. Refer to Figure 15.



CONDUCTOR FOLDED BACK
Figure 15

- (3) If the O.D. of the wire is less than the minimum seal diameter of the grommet hole, increase the O.D. of the wire. Refer to Table 17.

Table 17
MINIMUM SEAL DIAMETERS

Contact Cavity Size	Minimum Seal Diameter (inch)
22	0.034
20	0.038
16	0.060
12	0.087

- (a) Put a 0.5 inch length of 1/8 inch diameter MIL-LT or equivalent heat shrinkable sleeve on the wire.
Make sure that the distance from the forward end of the sleeve to the end of the insulation is a maximum of 0.1 inch.
- (b) Shrink the sleeve into position. Refer to Subject 20-10-14.

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D. Contact Assembly

**Table 18
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
24	22	M22520/2-01	3	M22520/2-11	-	
		ST2220-10	-	ST2220-10-3	-	
		WA22	3	M22520/2-11	-	
		WA22LC	3	M22520/2-11	-	
	20	M22520/1-01	2	M22520/1-02	Red	
		M22520/2-01	5	M22520/2-11	-	
		ST2220-1-Y	-	ST2220-1-12	-	
		WA22	5	M22520/2-11	-	
		WA22LC	5	M22520/2-11	-	
		WA27F	2	M22520/1-02	Red	
	22	22	M22520/2-01	4	M22520/2-11	-
			ST2220-10	-	ST2220-10-3	-
WA22			4	M22520/2-11	-	
WA22LC			4	M22520/2-11	-	
20		M22520/1-01	3	M22520/1-02	Red	
		M22520/2-01	6	M22520/2-11	-	
		ST2220-10	-	ST2220-10-8	-	
		WA22	6	M22520/2-11	-	
		WA22LC	6	M22520/2-11	-	
		WA27F	3	M22520/1-02	Red	
16		M22520/1-01	4	M22520/1-02	Blue	
		MS3191-4	-	MS3191-3T	-	

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ASSEMBLY OF THE M81714() SERIES I TERMINAL JUNCTION SYSTEM

Table 18 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit		Locator		
		Part Number	Setting	Part Number	Color	
20	20	M22520/1-01	4	M22520/1-02	Red	
		M22520/2-01	7	M22520/2-11	-	
		ST2220-1	-	ST2220-1-1	-	
		WA22	7	M22520/2-11	-	
		WA22LC	7	M22520/2-11	-	
		WA27F	4	M22520/1-02	Red	
	16	M22520/1-01	4	M22520/1-02	Blue	
		ST2220-1	-	ST2220-1-2	-	
		WA27F	4	M22520/1-02	Blue	
		M22520/1-01	4	M22520/1-02	Blue	
		MS3191-4	-	MS3191-3T	-	
		ST2220-1	-	ST2220-1-2	-	
	18	16	WA27F	4	M22520/1-02	Blue
			M22520/1-01	5	M22520/1-02	Blue
MS3191-4			-	MS3191-3T	-	
ST2220-1			-	ST2220-1-2	-	
16	16	WA27F	5	M22520/1-02	Blue	
		M22520/1-01	6	M22520/1-02	Blue	
		MS3191-4	-	MS3191-3T	-	
		ST2220-1	-	ST2220-1-2	-	
	12	612548	-	4763-2	-	
		M22520/1-01	6	M22520/1-02	Yellow	
		ST2220-1-Y	-	ST2220-1-3	-	
14	12	612548	-	4763-2	-	
		M22520/1-01	7	M22520/1-02	Yellow	
		ST2220-1	-	ST2220-1-3	-	
		ST2220-1-Y	-	ST2220-1-3	-	
		WA27F	7	M22520/1-02	Yellow	

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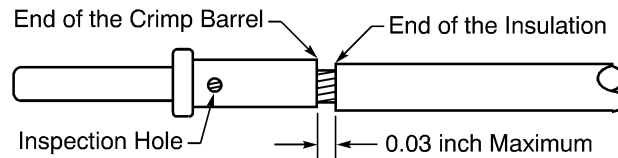
Table 18 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
12	12	612548	-	4763-2	-
		M22520/1-01	8	M22520/1-02	Yellow
		ST2220-1	-	ST2220-1-3	-
		ST2220-1-Y	-	ST2220-1-3	-
		WA27F	8	M22520/1-02	Yellow

- (1) Make a selection of a crimp tool from Table 18.
- (2) Put the end the wire into the crimp barrel of the contact. Refer to Figure 16.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is a maximum of 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 16

- (3) Crimp the contact.
- (4) Examine the contact assembly for these types of damage:
 - A broken strand of the conductor
 - A strand of the conductor on which the base metal can be seen
 - A crack in the crimp barrel of the contact.
- (5) If the contact or the wire has damage, replace the contact.

E. Contact Insertion

Table 19
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
22	M81969/14-11	Red
	ST2220-2-30	-

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Table 19 (continued)

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
20	DAK83-20	-
	M81969/14-11	Red
	ST2220-2-28	-
16	DAK83-16	-
	M81969/14-03	Blue
	M83723/31-16	-
	NAS1664-16	-
	ST2220-2-4	-
12	M81969/14-04	Yellow
	M81969/8-10	-
	NAS1664-16	-
	M83723/31-12	-
	ST2220-2-5	-

(1) Make a selection of a contact insertion tool from Table 19.

CAUTION: DO NOT USE A TOOL WITH A TIP:

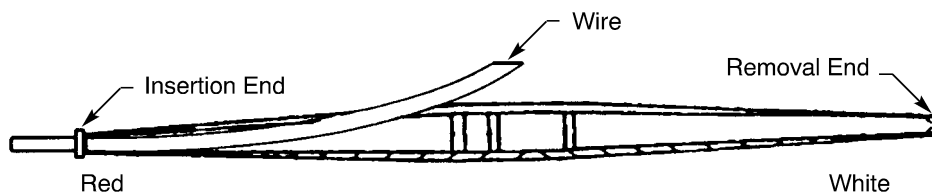
- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

(2) Put the contact into the insertion end of the insertion tool. Refer to Figure 17.

CAUTION: AN UNWIRED CONTACT MUST NOT BE INSTALLED IN A MODULE. IT CANNOT BE REMOVED.



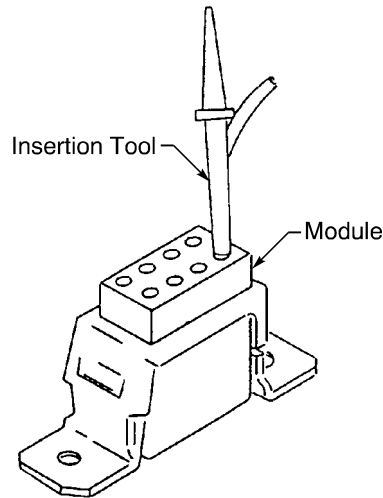
POSITION OF THE CONTACT IN THE INSERTION TOOL

Figure 17

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- (3) Axially align the contact, the tool and the contact cavity. Refer to Figure 18.



ALIGNMENT OF THE INSERTION TOOL AND THE CONTACT CAVITY
Figure 18

- (4) Carefully push the tool straight into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool straight out of the contact cavity.

- (6) Lightly pull the wire to make sure that the contact is locked in position.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINAL MODULE OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:

- (a) Pull the contact out of the cavity.
- (b) Do Step (2) through Step (6) again.

F. Seal of an Empty Contact Cavity

All empty contact cavities must be sealed.

- (1) Make a selection of a seal plug from Table 13.
- (2) Install seal plugs in each empty contact cavity. Refer to Subject 20-60-08.



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5. APPROVED TOOL SUPPLIERS

A. Contact Insertion and Removal Tools

Table 20
INSERTION AND REMOVAL TOOL SUPPLIERS

Insertion and Removal Tool	Suppliers
DAK83-16	Daniels
DAK83-20	Daniels
M81969/8-10	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M81969/14-11	QPL
M83723/31-12	QPL
M83723/31-16	QPL
NAS1664-12	QPL
NAS1664-16	QPL
ST2220-2-4	Boeing
ST2220-2-5	Boeing
ST2220-2-28	Boeing
ST2220-2-30	Boeing
ST2220-3-7	Boeing
ST2220-3-28	Boeing
ST2220-3-29	Boeing

B. Contact Crimp Tools

Table 21
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
4763-2	Astro
4763-2	Buchanan
612548	Astro
612548	Buchanan
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL

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Table 21 (continued)

Crimp Tool	Supplier
M22520/2-11	QPL
MS3191-3T	QPL
MS3191-4	QPL
ST2220-1	Boeing
ST2220-1-1	Boeing
ST2220-1-2	Boeing
ST2220-1-3	Boeing
ST2220-1-12	Boeing
ST2220-1-Y	Boeing
ST2220-10	Boeing
ST2220-10-3	Boeing
ST2220-10-8	Boeing
WA22	Daniels
WA22LC	Daniels
WA27F	Daniels

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	D. Seal Plug Part Numbers	1
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ASSEMBLY OF THE M81714() SERIES II TERMINAL JUNCTION SYSTEM

This Subject gives the procedures:

- To assemble the M81714 Series II terminal block modules
- To install the terminal block modules in the terminal junction system racks.

1. PART NUMBERS AND DESCRIPTION

A. Terminal Block Module Part Numbers

Table 1
TERMINAL BLOCK MODULE PART NUMBERS

Part Number	Supplier
M81714/6()	QPL
280-30001-()	Boeing

B. Assembly Part Numbers

Table 2
ASSEMBLIES THAT USE THE M81714 SERIES II TERMINAL BLOCK MODULES

Part Number	Description	Supplier
117432-2001	Connector, ARINC 404	Sabritec

C. Contact Part Numbers

Table 3
CONTACT PART NUMBERS

Contact Size		Part Number	Supplier
Engaging End	Crimp Barrel		
22	22	M39029/22-191	QPL
20	20	M39029/22-192	QPL
16	16	M39029/22-193	QPL
12	12	CT5-512/12	Deutsch

D. Seal Plug Part Numbers

Table 4
SEAL PLUG PART NUMBERS

Contact Size		Seal Plug	Supplier
Engaging End	Crimp Barrel		
22	22	1613-03-2205	QPL
20	20	81539-20	QPL

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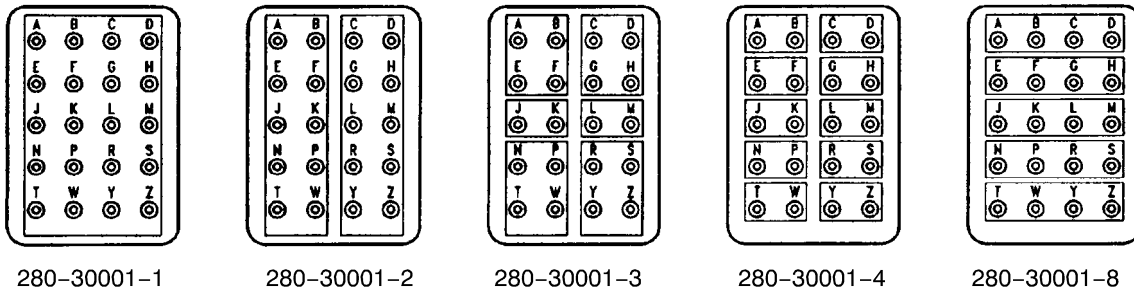
ASSEMBLY OF THE M81714() SERIES II TERMINAL JUNCTION SYSTEM

Table 4 (continued)

Contact Size		Seal Plug	Supplier
Engaging End	Crimp Barrel		
16	16	81539-16	QPL
12	12	81539-12	QPL

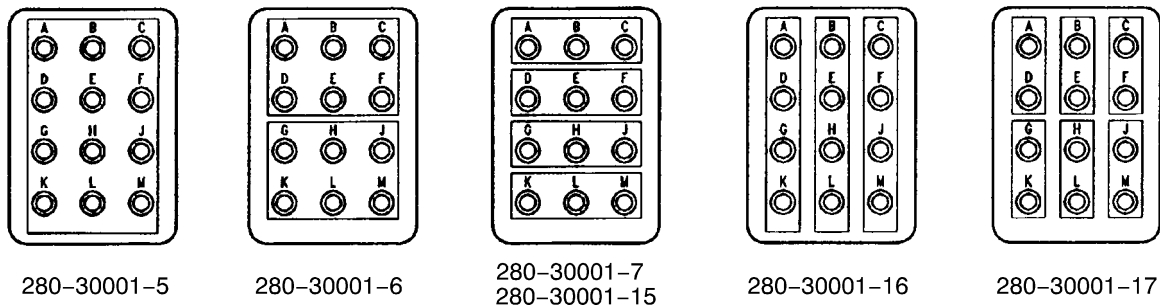
2. INSERT CONFIGURATIONS

A. Boeing 280-30001-() Terminal Block Modules



280-30001-() INSERT CONFIGURATIONS WITH 20 SIZE 22 CONTACTS

Figure 1

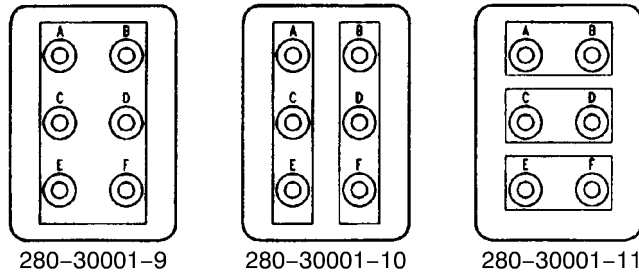


280-30001-() INSERT CONFIGURATIONS WITH 12 SIZE 20 CONTACTS

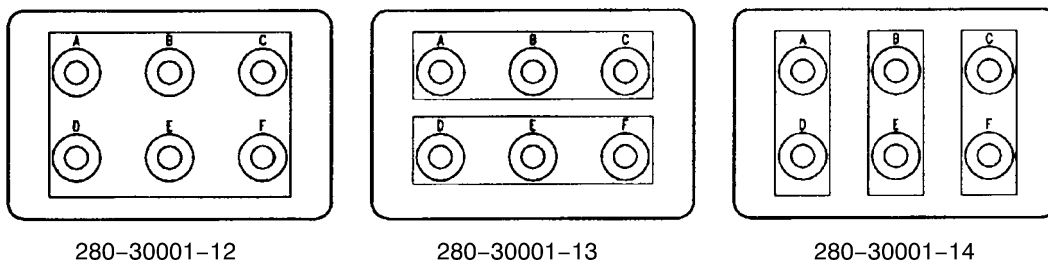
Figure 2

STANDARD WIRING PRACTICES MANUAL

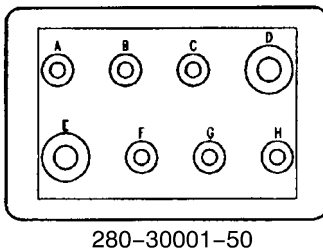
ASSEMBLY OF THE M81714() SERIES II TERMINAL JUNCTION SYSTEM



280-30001-() INSERT CONFIGURATIONS WITH 6 SIZE 16 CONTACTS
Figure 3



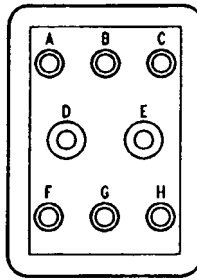
280-30001-() INSERT CONFIGURATIONS WITH 6 SIZE 12 CONTACTS
Figure 4



280-30001-50 INSERT CONFIGURATION WITH 6 SIZE 16 AND 2 SIZE 12 CONTACTS
Figure 5

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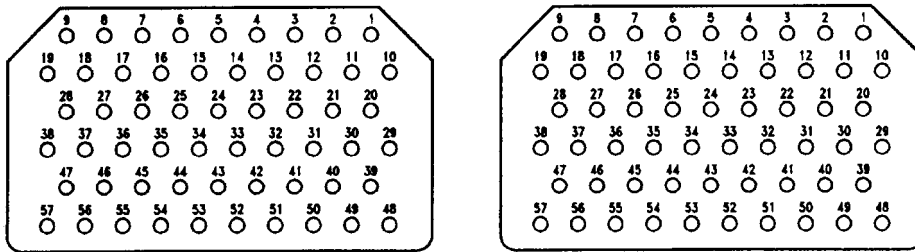
ASSEMBLY OF THE M81714() SERIES II TERMINAL JUNCTION SYSTEM



280-30001-51

280-30001-51 INSERT CONFIGURATION WITH 2 SIZE 16 AND 6 SIZE 20 CONTACTS
Figure 6

B. Sabritec ARINC 404 Connector



Cavity A

Cavity B

117432-2001 INSERT CONFIGURATION WITH 57 SIZE 20 CONTACTS
Figure 7

3. TERMINAL JUNCTION SYSTEM DISASSEMBLY

A. Contact Removal

Table 5
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool	Supplier
22	MS3160-22	QPL
20	M83723/31-20	QPL
16	M83723/31-16	QPL
12	MS3160-12	QPL

- (1) Make a selection of a removal tool from Table 5.
- (2) Put the white end of the tool on the wire.
- (3) Hold the tool so that it is perpendicular to the module.
- (4) Push the tool down the wire and into the module contact cavity until the end of the tool is against the bottom.
- (5) Hold the tool tightly against the bottom and push the wire against the serrations in the tool handle.

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ASSEMBLY OF THE M81714() SERIES II TERMINAL JUNCTION SYSTEM

(6) Pull the tool and the wire out of the contact cavity at the same time.

B. Terminal Block Module Removal

**Table 6
TERMINAL JUNCTION MODULE REMOVAL TOOLS**

Removal Tool	Supplier
CTJ-R06	Deutsch

- (1) Make a selection of the module removal tool from Table 6.
- (2) Put the tool into the grooves on the sides of the module.
- (3) Lightly push the tool until the tool is fully inserted.
- (4) Hold the tines of the tool tightly and pull the tool up.

4. TERMINAL JUNCTION SYSTEM ASSEMBLY

A. Terminal Block Module Installation

- (1) Put the module in the correct position on the top of the rail.
- (2) Lightly push the module down until it makes a click.

B. Contact Assembly

**Table 7
CONTACT CRIMP TOOLS**

Contact Size		Crimp Tool			
Engaging End	Crimp Barrel	Basic Unit		Locator	
		Part Number	Supplier	Part Number	Supplier
22	22	M22520/7-01	QPL	M22520/7-11	QPL
20	20	M22520/7-01	QPL	M22520/7-12	QPL
16	16	M22520/7-01	QPL	M22520/7-13	QPL
12	12	M22520/1-01	QPL	M22520/1-04	QPL

- (1) Make a selection of a crimp tool from Table 7.
- (2) Remove 3/16 inch ± 1/32 inch of the insulation from the end of the wire. Refer to Subject 20-00-15.
- (3) Put the contact in the crimp tool.

NOTE: The wire can be put in the contact before the contact is put into the crimp tool.

- (4) Put the bare end of the wire into the crimp barrel of the contact so that:
 - All of the conductor strands are in the crimp barrel
 - The conductor can be seen in the contact inspection hole.
- (5) Crimp the contact.

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ASSEMBLY OF THE M81714() SERIES II TERMINAL JUNCTION SYSTEM

C. Contact Insertion

**Table 8
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool	Supplier
22	MS3160-22	QPL
20	M83723/31-20	QPL
16	M83723/31-16	QPL
12	MS3160-12	QPL

- (1) Make a selection of an insertion tool from Table 8.
- (2) Install each wired contact one at a time:
 - (a) Examine the contact to make sure that it is straight.
 - (b) Put the colored end of the insertion tool on the wire.
 - (c) Push the end of the tool over the contact so that the tip end of the tool is against the shoulder of the contact.

NOTE: For size 22 contacts, the end of the tool must be against the end of the crimp barrel.
 - (d) Align the tool so that it is perpendicular to the rear face of the module.
 - (e) Carefully push the tool straight into the contact cavity until the contact is fully inserted.
- (3) Carefully pull the tool out of the contact cavity.
- (4) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

D. Seal Plug Installation

Seal plugs must be installed in all contact cavities that are not used. Refer to Subject 20-60-08.

- (1) Make a selection of a seal plug from Table 3.
- (2) Push the seal plug into the contact cavity.



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ASSEMBLY OF MICRO SWITCH 10(TL) SERIES TOGGLE SWITCH

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ASSEMBLY OF MICRO SWITCH 10(TL) SERIES TOGGLE SWITCH

1. PART NUMBERS AND DESCRIPTION

A. Switch Part Numbers

**Table 1
MICRO SWITCH TOGGLE SWITCH PART NUMBERS**

Part Number	Supplier
101TL()	Micro Switch
102TL()	Micro Switch
104TL()	Micro Switch

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

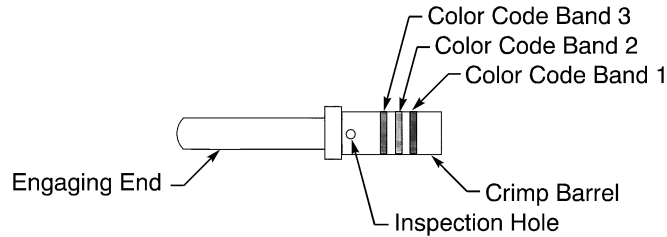
Contact Size		Contact Type	Part Number	Color Code		Supplier
Engaging End	Crimp Barrel			Band	Color	
16	20	Pin	M39029/1-101	1	Brown	QPL
				2	Black	QPL
				3	Brown	QPL
14	16	Pin	M39029/1-102	1	Brown	QPL
				2	Black	QPL
				3	Red	QPL
			M39029/1-14-16	-	-	QPL

**Table 3
OBSOLETE CONTACT PART NUMBERS**

Obsolete Contact		Replacement Contact	
Obsolete Part Number	Supplier	Replacement Part Number	Supplier
M39029/1-14-16	QPL	M39029/1-102	QPL

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ASSEMBLY OF MICRO SWITCH 10(TL) SERIES TOGGLE SWITCH



**PIN CONTACT
Figure 1**

C. Seal Plug Part Numbers

**Table 4
SEAL PLUG PART NUMBERS**

Crimp Barrel Size	Seal Plug	Supplier
20	MS27488-20	QPL
	MS27488-20-1	QPL
16	M83723/28-16	QPL
	MS27488-16	QPL
	MS27488-16-1	QPL
	NAS1668-3	QPL

2. SWITCH DISASSEMBLY

A. Contact Removal

**Table 5
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool		Supplier
	Part Number	Color	
20	M81969/14-11	White	QPL
	ST2220-3-29	-	Boeing
16	M81969/14-03	White	QPL
	M83723/31-16	-	QPL
	NAS1664-16	-	QPL
	ST2220-3-7	-	Boeing

- (1) Make a selection of a contact removal tool from Table 5.
- (2) Put the end of the removal tool on the wire.
- (3) Carefully push the tool straight into the contact cavity until it stops.

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ASSEMBLY OF MICRO SWITCH 10(TL) SERIES TOGGLE SWITCH

CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

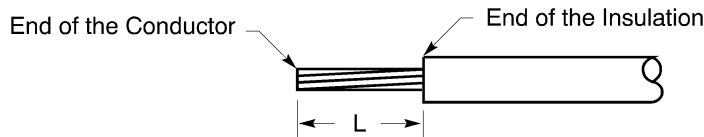
- (4) Pull the wire and the tool out of the contact cavity at the same time.
- (5) If the contact does come out of the contact cavity:
 - (a) Pull the tool out of the contact cavity.
 - (b) Turn the tool 90 degrees.
 - (c) Do Step (2) through Step (4) again.
- (6) Remove the wire and removal tool from the insert cavity at the same time.

3. SWITCH ASSEMBLY

A. Wire Preparation

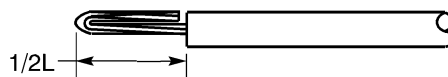
**Table 6
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Minimum	Maximum	
22	20	0.12	0.15	-
	16	0.24	0.30	Fold the conductor back
20	20	0.12	0.15	-
	16	0.12	0.15	-
18	16	0.21	0.24	-
16	16	0.21	0.24	-



**WIRE PREPARATION
Figure 2**

- (1) Remove the necessary length of insulation from the end of the wire. Refer to:
 - Figure 2
 - Table 6 for the insulation removal length.
 - Subject 20-00-15 for the insulation removal procedures.
- (2) If it is specified, fold the conductor back. Refer to Figure 3.



**CONDUCTOR FOLDED BACK
Figure 3**

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ASSEMBLY OF MICRO SWITCH 10(TL) SERIES TOGGLE SWITCH

- (3) If the O.D. of the wire is less than the minimum seal diameter of the grommet hole, increase the O.D of the wire. Refer to Table 7.

**Table 7
MINIMUM SEAL DIAMETERS**

Contact Cavity Size	Minimum Seal Diameter (inch)
20	0.038
16	0.060

- (a) Put a 0.5 inch length of 1/8 inch diameter MIL-LT or equivalent heat shrinkable sleeve on the wire.
 Make sure that the distance from the forward end of the sleeve to the end of the insulation is a maximum of 0.1 inch.
- (b) Shrink the sleeve into position. Refer to Subject 20-60-08.

B. Contact Assembly

**Table 8
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Tool					
	Basic Unit			Locator		
	Part Number	Setting	Supplier	Part Number	Color	Supplier
22	M22520/1-01	3	QPL	M22520/1-02	Blue	QPL
	MS3191-4	-	QPL	MS3191-3T	-	QPL
20	M22520/1-01	4	QPL	M22520/1-02	Blue	QPL
	MS3191-4	-	QPL	MS3191-3T	-	QPL
18	M22520/1-01	5	QPL	M22520/1-02	Blue	QPL
	MS3191-4	-	QPL	MS3191-3T	-	QPL
16	M22520/1-01	6	QPL	M22520/1-02	Blue	QPL
	MS3191-4	-	QPL	MS3191-3T	-	QPL

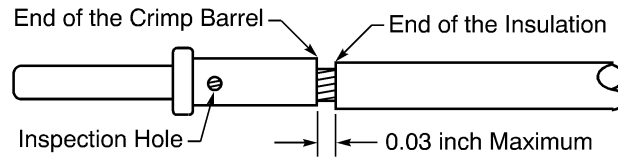
- (1) Make a selection of a contact from Table 2.
 (2) Make a selection of a crimp tool from Table 8.
 (3) Put the end of the wire into the crimp barrel of the contact. Refer to Figure 4.

Make sure that:

- All of the strands of the conductor are in the crimp barrel.
- The strands of the conductor can be seen in the inspection hole.
- The distance from the end of the insulation to the end of the crimp barrel is a maximum of 0.03 inch.

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ASSEMBLY OF MICRO SWITCH 10(TL) SERIES TOGGLE SWITCH



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 4

- (4) Crimp the contact.
- (5) Examine the contact assembly for these types of damage:
 - A broken strand of the conductor
 - A strand of the conductor on which the base metal can be seen
 - A crack in the crimp barrel of the contact
- (6) If the contact or the wire has damage, replace the contact.

C. Contact Insertion

Table 9
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool		Supplier
	Part Number	Color	
20	DAK83-20	-	Daniels
	M81969/14-11	Red	QPL
	ST2220-2-28	-	Boeing
16	DAK83-16	-	Daniels
	M81969/14-03	Blue	QPL
	M83723/31-16	-	QPL
	NAS1664-16	-	QPL
	ST2220-2-4	-	Boeing

- (1) Make a selection of a contact insertion tool from Table 9.

CAUTION: DO NOT USE A TOOL WITH A TIP:

- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

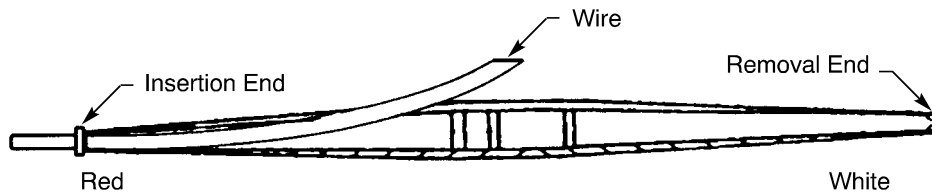
CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

- (2) Put the contact into the insertion end of the insertion tool. Refer to Figure 5.

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ASSEMBLY OF MICRO SWITCH 10(TL) SERIES TOGGLE SWITCH

CAUTION: AN UNWIRED CONTACT MUST NOT BE INSTALLED IN A CONTACT CAVITY. IT CANNOT BE REMOVED.



POSITION OF THE CONTACT IN THE INSERTION TOOL

Figure 5

- (3) Axially align the contact, the tool and the contact cavity.
- (4) Carefully push the tool straight into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool straight out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in position.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINAL MODULE OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact out of the cavity.
 - (b) Do Step (2) through Step (6) again.

D. Seal of an Empty Contact Cavity

- (1) Make a selection of a seal plug from Table 4.
- (2) Install seal plugs in each empty contact cavity. Refer to Subject 20-60-08.



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STANDARD WIRING PRACTICES MANUAL

ESTERLINE-MASON AND WESTERN INDICATOR LAMP SOCKETS AND CONNECTORS

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STANDARD WIRING PRACTICES MANUAL

ESTERLINE-MASON AND WESTERN INDICATOR LAMP SOCKETS AND CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Lamp Socket and Connector Part Numbers

**Table 1
LAMP SOCKET AND CONNECTOR PART NUMBERS**

Part Number	Description	Supplier
502-70T-02	Lamp Socket	Esterline-Mason
502-70T-02	Lamp Socket	Western Indicator
514-74-13-02	Connector	Esterline-Mason
514-74-13-02	Connector	Western Indicator

**Table 2
OBSOLETE LAMP SOCKET AND CONNECTOR PART NUMBERS**

Obsolete Component		Replacement Component	
Part Number	Supplier	Part Number	Supplier
502-70T-02	Western Indicator	502-70T-02	Esterline-Mason
514-74-13-02	Western Indicator	514-74-13-02	Esterline-Mason

2. CONNECTOR DISASSEMBLY

A. Connector Removal

**Table 3
CONNECTOR INSTALLATION AND REMOVAL TOOLS**

Installation and Removal Tool	Supplier
ST2342L	Boeing
ST2342LA	Boeing

- (1) Make a selection of the connector removal tool. Refer to Table 3.
- (2) Disconnect the connector from the lamp socket.

3. CONNECTOR ASSEMBLY

A. Wire Preparation

**Table 4
INSULATION REMOVAL LENGTH**

Number of Wires	Wire Size (AWG)	Length (inch)		Special Instructions
		Target	Tolerance	
1	20	0.56	± 0.03	Fold the conductor back
	22	0.25	± 0.03	Fold the wire to make a loop
	24	0.25	± 0.03	Fold the wire to make a loop

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STANDARD WIRING PRACTICES MANUAL

ESTERLINE-MASON AND WESTERN INDICATOR LAMP SOCKETS AND CONNECTORS

Table 4 (continued)

Number of Wires	Wire Size (AWG)	Length (inch)		Special Instructions
		Target	Tolerance	
2	24	0.25	± 0.03	Fold the wires to make a loop

- (1) Remove the necessary length of insulation from the end of the wire. Refer to Table 4.
- (2) If it is specified, fold the conductor back.
- (3) If a loop is specified:
 - (a) Remove the same length of insulation from the other end of the wire.
 - (b) Fold the wire or wires to make a loop.

B. Contact Assembly

**Table 5
CONTACT CRIMP TOOLS**

Basic Unit	Supplier
CT514	Western Indicator
614464	Astro
614464	Buchanan

**Table 6
OBSOLETE CONTACT CRIMP TOOLS**

Obsolete Crimp Tool		Replacement Crimp Tool	
Basic Unit	Supplier	Basic Unit	Supplier
CT514	Western Indicator	614464	Astro
614464	Buchanan	614464	Astro

- (1) Make a selection of the contact crimp tool. Refer to Table 5.
- (2) Put the conductor or conductors into the contact crimp barrel.
- (3) To adjust the crimp tool crimp depth, set the indenter opening of the crimp tool so that a Number 51 drill (0.067 inch) is lightly gripped by the indentors at the point of the ratchet release.
- (4) Crimp the contact.

C. Connector Installation

- (1) Make a selection of the connector installation tool from Table 3.
- (2) Press the connector assembly onto the lamp socket until the internal ridge of the connector snaps over the lamp socket.

Make sure that the connector plastic hood has covered three threads on the lamp socket.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

1. ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

NOTE: Refer to Subject 20-40-12 for the procedures to assemble the Grimes-Honeywell A-4135 Map Light.

A. Assembly of the Grimes-Honeywell A-8985 Flood Light

Table 1
A-8985 FLOOD LIGHT PART NUMBERS

Flood Light Part Number	Supplier
A-8985-1	Grimes-Honeywell
A-8985-10	Grimes-Honeywell
A-8985-15	Grimes-Honeywell
A-8985-16	Grimes-Honeywell
A-8985-17	Grimes-Honeywell
A-8985-2	Grimes-Honeywell
A-8985-3	Grimes-Honeywell
A-8985-4	Grimes-Honeywell
A-8985-5	Grimes-Honeywell
A-8985-6	Grimes-Honeywell
A-8985-7	Grimes-Honeywell
A-8985-8	Grimes-Honeywell
A-8985-9	Grimes-Honeywell

Table 2
LAMP BULBS FOR THE A-8985 FLOOD LIGHT

Flood Light Part Number	Lamp Bulb			
	Part Number	Voltage (Volts)	Current (Amps)	Supplier
A-8985-1	MS35478-307	28.0	0.67	QPL
A-8985-10	GE-1665	28.0	0.80	GE
A-8985-15	MS35478-307	28.0	0.67	QPL
A-8985-16	GE-1665	28.0	0.80	GE
A-8985-17	GE-1665	28.0	0.80	GE
A-8985-2	MS35478-307	28.0	0.67	QPL
A-8985-3	MS35478-307	28.0	0.67	QPL
A-8985-4	MS35478-307	28.0	0.67	QPL
A-8985-5	GE-1665	28.0	0.80	GE
A-8985-6	GE-1665	28.0	0.80	GE
A-8985-7	MS35478-1691	28.0	0.59	QPL

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

Table 2 (continued)

Flood Light Part Number	Lamp Bulb			
	Part Number	Voltage (Volts)	Current (Amps)	Supplier
A-8985-8	MS35478-1691	28.0	0.59	QPL
A-8985-9	GE-1665	28.0	0.80	GE

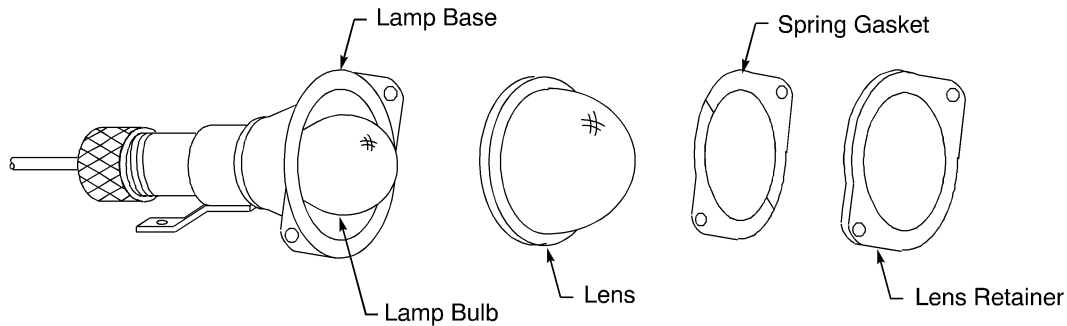
**Table 3
CONTACTS FOR THE A-8985 FLOOD LIGHT**

Flood Light Part Number	Contact	
	Part Number	Supplier
A-8985-1	A-8331-1	Grimes-Honeywell
A-8985-10	60-1541-1	Grimes-Honeywell
A-8985-103	A-8331-1	Grimes-Honeywell
A-8985-11	A-8331-1	Grimes-Honeywell
A-8985-12	A-8331-1	Grimes-Honeywell
A-8985-13	A-8331-1	Grimes-Honeywell
A-8985-14	A-8331-1	Grimes-Honeywell
A-8985-15	A-8331-1	Grimes-Honeywell
A-8985-16	60-1541-1	Grimes-Honeywell
A-8985-17	60-1541-1	Grimes-Honeywell
A-8985-2	A-8331-1	Grimes-Honeywell
A-8985-3	A-8331-1	Grimes-Honeywell
A-8985-4	A-8331-1	Grimes-Honeywell
A-8985-5	A-8331-1	Grimes-Honeywell
A-8985-6	A-8331-1	Grimes-Honeywell
A-8985-7	A-8331-1	Grimes-Honeywell
A-8985-8	A-8331-1	Grimes-Honeywell
A-8985-9	60-1541-1	Grimes-Honeywell

(1) Lamp Bulb Replacement:

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ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

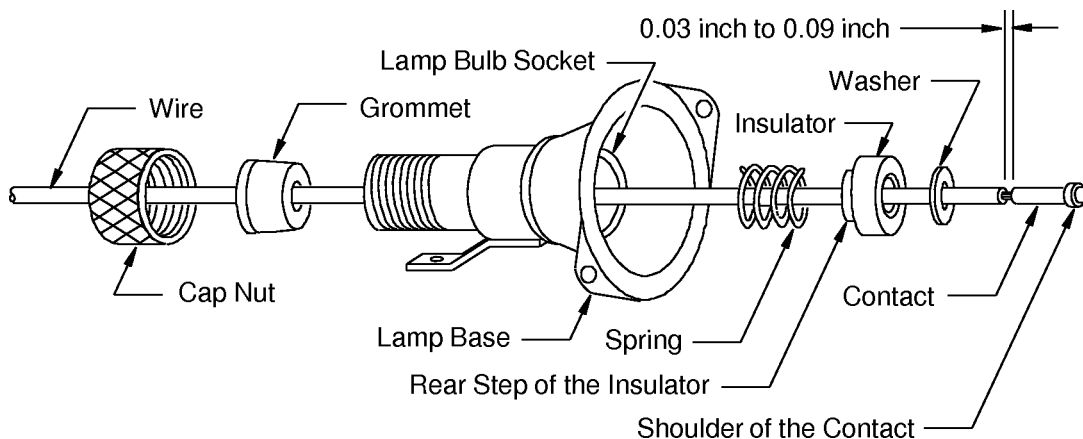


GRIMES-HONEYWELL A-8985 FLOOD LIGHT - LAMP BASE AND LENS
Figure 1

Refer to Figure 1:

- (a) Remove the screws and nuts that hold the lens to the front of the lamp base.
- (b) Remove the lens retainer, the spring gasket, and the lens from the lamp base.
- (c) Push the old lamp bulb into the bulb socket until it stops.
- (d) While you hold the old lamp bulb in, turn it counterclockwise until it stops.
- (e) Remove the old lamp bulb from the lamp bulb socket.
- (f) Make a selection of a lamp bulb from Table 2.
- (g) Push the new lamp bulb into the lamp bulb socket until it stops.
- (h) While you hold the lamp bulb in, turn it clockwise until it stops.
 Make sure that the new lamp bulb is locked in its position.
- (i) Put the lens, the spring gasket, and the lens retainer on the lamp base.
- (j) Install the screws and nuts that hold the lens retainer, the lens, and the spring gasket to the front of the lamp base.

(2) Flood Light Disassembly:



GRIMES-HONEYWELL A-8985 FLOOD LIGHT
Figure 2

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

Refer to Figure 2.

- (a) Remove the lamp bulb. Refer to Step (1).
 - (b) At the rear of the lamp base, disengage the threads of the cap nut and the threads of the lamp base.
 - (c) Remove the cap nut from rear of the lamp base.
 - (d) Pull the grommet from the rear end of the lamp base.
 - (e) From the rear of the floodlight, push the wire forward into the lamp base.
 - (f) From the front of the lamp base, remove:
 - The contact and wire assembly
 - The washer
 - The insulator
 - The spring.
- (3) Flood Light Assembly

**Table 4
INSULATION REMOVAL LENGTH FOR THE A-8985 FLOOD LIGHT**

Wire Size	Insulation Removal Length		Special Instructions
	Target (inch)	Tolerance (inch)	
20	0.50	± 0.02	Fold back the conductor
18	0.25	± 0.02	-

**Table 5
CRIMP TOOLS FOR THE A-8985 FLOOD LIGHT CONTACT**

Wire Size	Crimp Tool			
	Basic Unit	Locator	Setting	Supplier
20	M22520/1-01	M22520/1-02	5	QPL
18	M22520/1-01	M22520/1-02	5	QPL

Refer to Figure 2.

- (a) Put the cap nut on the wire.
Make sure that the end of the cap nut that has the threads points forward to the end of the wire.
- (b) Put the grommet on the wire.
Make sure that the smaller diameter end of the grommet points forward to the end of the wire.
- (c) Put the lamp base on the wire.
Make sure that the threaded end of the lamp base points rearward, away from the end of the wire.
- (d) Put the spring on the wire.
- (e) Put the insulator on the wire.
Make sure that the large end of the insulator points forward to the end of the wire.

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ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

- (f) Put the washer on the wire.
- (g) Remove the correct length of insulation from the end of the wire. Refer to Table 4.
- (h) Make a selection of a crimp tool from Table 5.
- (i) Put the end of the wire into the contact.
 Make sure that:
 - The washer, the insulator, the spring, the lamp base, the grommet and the cap nut are on the wire. Refer to Figure 2.
 - The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.
- (j) Crimp the contact.
- (k) Put the washer against the shoulder of the contact.
- (l) Put the spring, the insulator, the washer and the contact and wire assembly into the front of the lamp bulb socket.
 Make sure that:
 - The shoulder of the contact is against the washer
 - The washer is in the counterbore of the insulator.
- (m) Install the lamp bulb. Refer to Step (1).
- (n) Push the grommet into the end of the lamp base until it stops.
- (o) Engage the threads of the cap nut and the threads of the lamp base.
- (p) Tighten the cap nut.
- (q) Install the lens, the spring gasket, and the lens retainer. Refer to Step (1).

B. Assembly of the Grimes-Honeywell B-9845 Dome Light

**Table 6
B-8945 DOME LIGHT PART NUMBERS**

Part Number	Supplier
B-9845()-1665	Grimes-Honeywell
B-9845()-1691	Grimes-Honeywell
B-9845()-303	Grimes-Honeywell
B-9845()-305	Grimes-Honeywell
B-9845()-307	Grimes-Honeywell

**Table 7
LAMP BULBS FOR THE B-8945 DOME LIGHT**

Dome Light Part Number	Lamp Bulb				
	Part Number	Voltage	Brightness (Candle Power)	Current (Amps)	Supplier
B-9845()-1665	1665	28V	-	0.80	GE
B-9845()-1691	1691	28V	-	0.61	GE
B-9845()-303	303	28V	-	0.30	GE

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ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

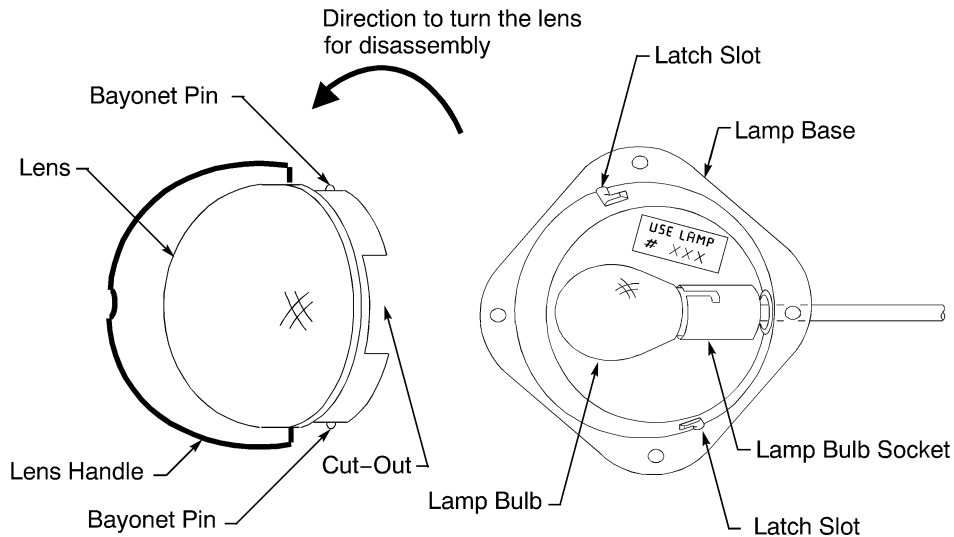
Table 7 (continued)

Dome Light Part Number	Lamp Bulb				
	Part Number	Voltage	Brightness (Candle Power)	Current (Amps)	Supplier
B-9845-()-305	305	28V	15	0.51	GE
B-9845-()-307	307	28V	21	0.67	GE

Table 8
CONTACTS FOR THE B-9845 DOME LIGHT

Part Number	Supplier
TE-096	Grimes-Honeywell

(1) Lamp Bulb Replacement



GRIMES-HONEYWELL B-9845 DOME LIGHT - LAMP BASE AND LENS
Figure 3

Refer to Figure 3.

- Pull the middle of the lens handle away from the lens.
- Use the lens handle to turn the lens in the counterclockwise direction until it stops.
- Use the lens handle to pull the lens from the lamp base.
- Push the old lamp bulb into the bulb socket until it stops.
- While you hold the old lamp bulb in, turn it counterclockwise until it stops.
- Remove the old lamp bulb from the lamp bulb socket.
- Make a selection of a lamp bulb from Table 7.
- Push the new lamp bulb into the lamp bulb socket until it stops.
- While you hold the new lamp bulb in, turn it clockwise until it stops.

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ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

Make sure that the new lamp bulb is locked it in its position

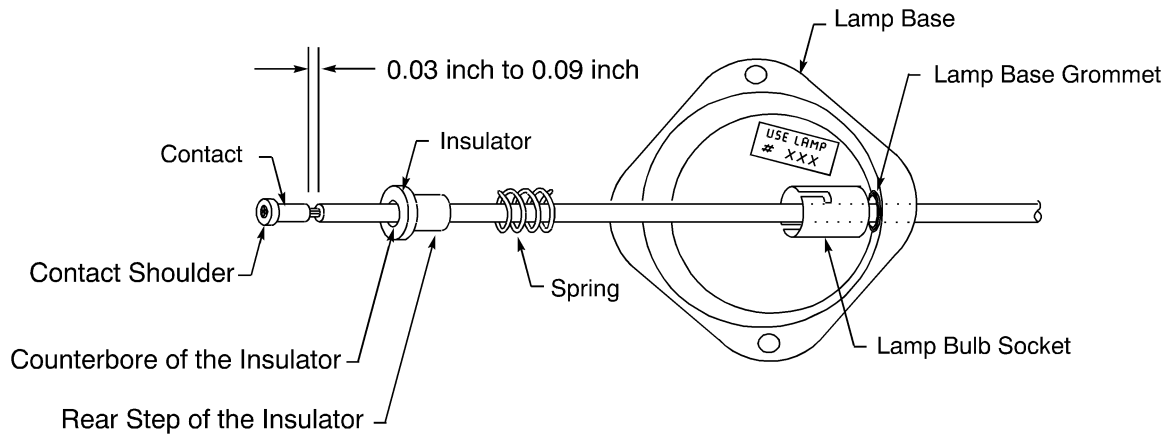
- (j) Align the bayonet pins on the lens and the latch slots on the lamp base.

Make sure that the cut-out is aligned with the lamp bulb socket.

- (k) Push the lens into the lamp base until it stops.
- (l) Use the lens handle to turn the lens in the clockwise direction until it stops.
Make sure that the lens is locked to the lamp base.

- (m) Push the middle of the lens cover handle against the lamp base.

(2) Dome Light Disassembly



GRIMES-HONEYWELL B-9845 DOME LIGHT
Figure 4

Refer to Figure 4.

- (a) Remove the lamp bulb. Refer to Step (1).
- (b) From the rear of the domelight, push the wire forward into the assembly.
- (c) From the front of the lamp bulb socket, remove:
 - The contact and wire assembly
 - The insulator
 - The spring.

(3) Dome Light Assembly

Table 9
INSULATION REMOVAL LENGTH FOR THE B-9845 DOME LIGHT

Wire Size (AWG)	Insulation Removal Length		Special Instructions
	Target (inch)	Tolerance (inch)	
20	0.69	± 0.03	Fold back the conductor
16	0.34	± 0.03	-

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

**Table 10
CRIMP TOOLS FOR THE B-9845 DOME LIGHT CONTACT**

Basic Unit		Die		
Part Number	Supplier	Part Number	Position	Supplier
WT-400	Thomas and Betts	M22520/5-35	B	QPL
M22520/5-01	QPL	M22520/5-35	B	QPL

Refer to Figure 4.

- (a) From the outer side of the lamp base, put the end of the wire through the lamp base grommet and through the lamp bulb socket.
- (b) Put the spring on the wire.
- (c) Put the insulator on the wire.

Make sure that the larger diameter end of the insulator points to the end of the wire.

- (d) Remove the correct length of insulation from the end of the wire. Refer to Table 9.
- (e) Make a selection of a crimp tool from Table 10.
- (f) Put the end of the wire into the contact.

Make sure that:

- The wire goes through the lamp base grommet, the lamp bulb socket, the spring, and the insulator. Refer to Figure 4.
- The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

- (g) Crimp the contact.

Make sure that the flash on the contact crimp barrel does not touch the insulator when the contact is installed in the insulator.

- (h) Put the contact and wire assembly in the insulator.

Make sure that the contact shoulder is in the counterbore of the insulator.

- (i) Put the spring, the insulator, and the contact and wire assembly into the front of the lamp bulb socket.

Make sure that:

- The spring is in the lamp bulb socket
- The rear step of the insulator is in the spring
- The contact shoulder is in the counterbore of the insulator.

- (j) Install the lamp bulb. Refer to Step (1).

- (k) Install the lens. Refer to Step (1).



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STANDARD WIRING PRACTICES MANUAL

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

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STANDARD WIRING PRACTICES MANUAL

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

This subject gives these procedures for the Eaton lighted push button switches:

- Disassembly and assembly
- Removal and installation
- Replacement of contacts and lamps.

1. PART NUMBERS AND DESCRIPTION

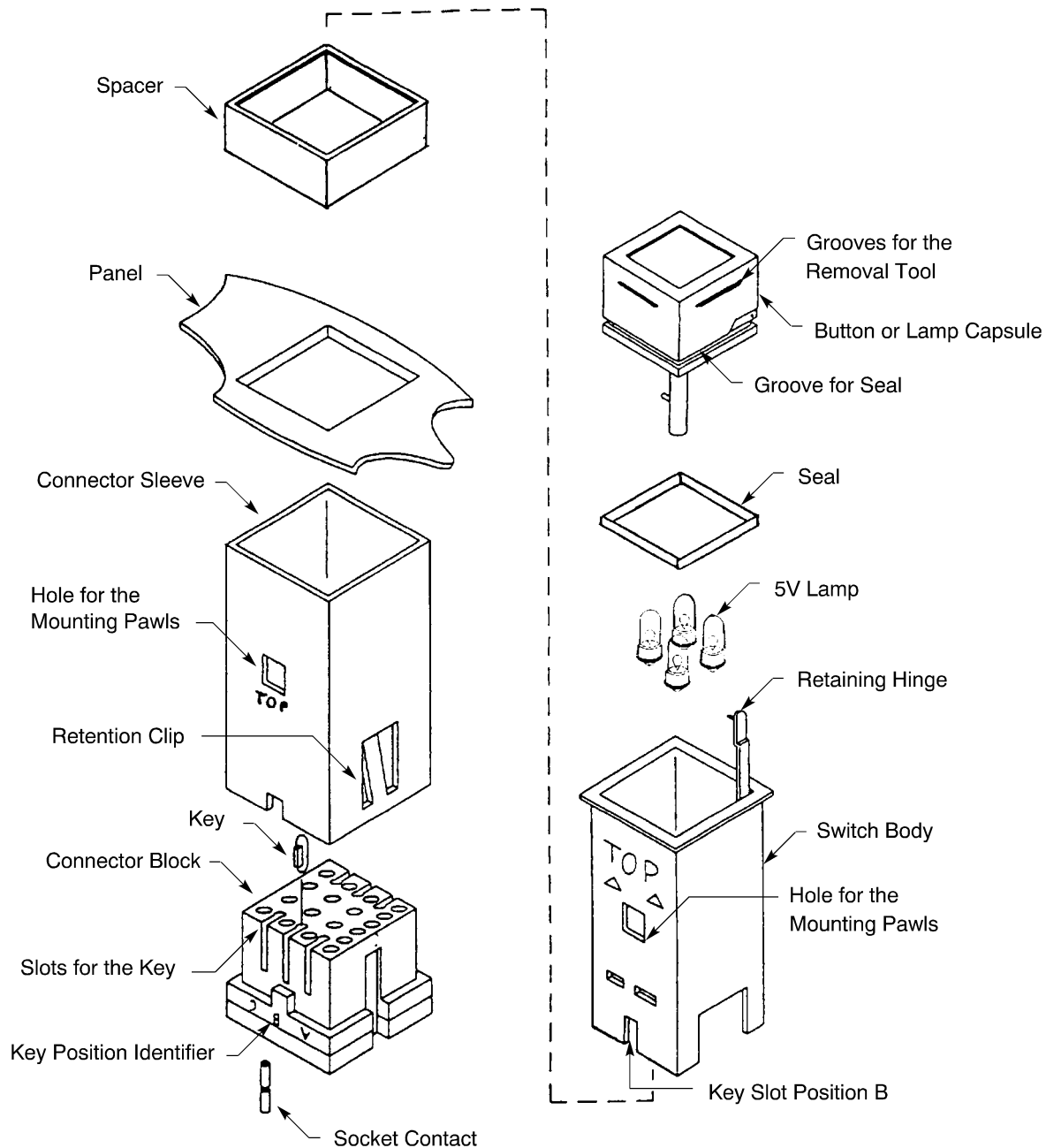
A. Lighted Push Button Switch Part Numbers

**Table 1
LIGHTED PUSH BUTTON SWITCH PART NUMBERS**

Part Number	Type	Button Sign Label		Supplier
		Contents	Color	
851-37167()-001	Momentary	ACPT	White	Eaton
851-37167()-002	Momentary	RJCT	White	Eaton
851-37167()-003	Momentary	CANC	White	Eaton
851-37962()-001	Indicator	-	Red	Eaton
851-37962()-002	Indicator	-	Green	Eaton
851-37962()-003	Indicator	-	White	Eaton
851-37962()-004	Indicator	-	Yellow	Eaton
851-37962()-005	Indicator	EVAC	Yellow	Eaton
851-37962()-006	Indicator	AUTO	Cyan	Eaton
		MANUAL	White	
851-37962()-101	Momentary	-	Red	Eaton
851-37962()-102	Momentary	-	Green	Eaton
851-37962()-103	Momentary	-	White	Eaton
851-37962()-104	Momentary	-	Yellow	Eaton
851-37962()-201	Alternate Action	-	Red	Eaton
851-37962()-202	Alternate Action	-	Green	Eaton
851-37962()-203	Alternate Action	-	White	Eaton
851-37962()-204	Alternate Action	-	Yellow	Eaton

STANDARD WIRING PRACTICES MANUAL

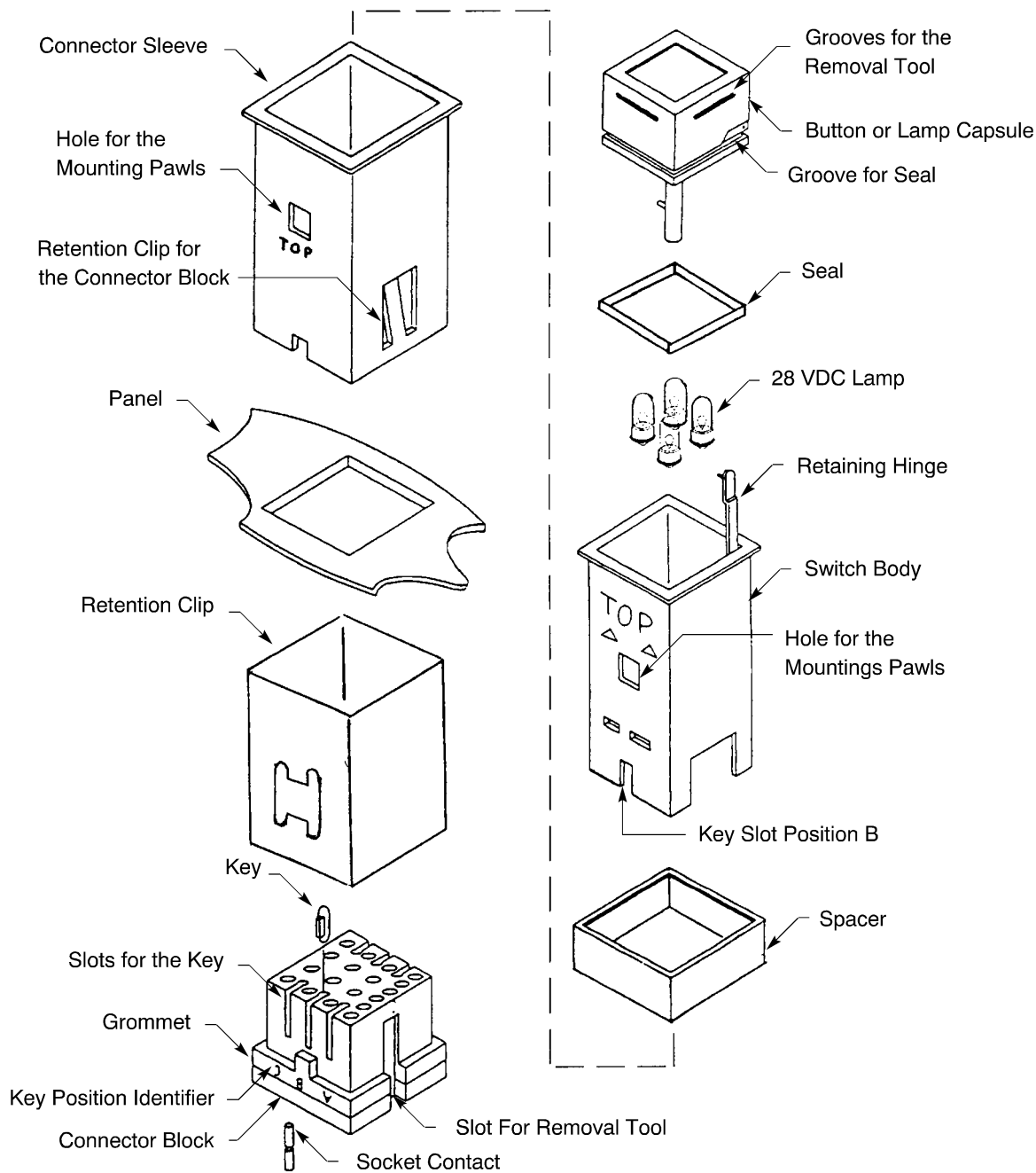
EATON 851-37(-) SERIES LIGHTED PUSH BUTTON SWITCHES



EATON 851-37167(-) LIGHTED PUSH BUTTON SWITCH
Figure 1

STANDARD WIRING PRACTICES MANUAL

EATON 851-37(-) SERIES LIGHTED PUSH BUTTON SWITCHES



EATON 851-37962(-) LIGHTED PUSH BUTTON SWITCH
Figure 2

STANDARD WIRING PRACTICES MANUAL

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

B. Switch Assembly Component Part Numbers

**Table 2
SWITCH ASSEMBLY COMPONENT PART NUMBERS**

Part Number	Description	Supplier
851-37167()-301	Connector Sleeve, Connector Block with Grommet and Key	Eaton
851-37167()-801	Extended Switch Guard	Eaton
851-37962()-301	Connector Sleeve, Retainer Clip, Connector Block with Grommet and Key	Eaton
851-37962()-302	Switch Guard	Eaton
851-37962()-303	Button Guard	Eaton
851-37962()-304	Spacer	Eaton
851-37962()-305	Connector Block Assembly and Key	Eaton

C. Contact Part Numbers

The contacts for the Eaton lighted push button switches are:

- Released from the rear
- Removed from the rear.

**Table 3
CONTACT PART NUMBERS**

Switch	Contact Size		Part Number	Supplier
	Engaging End	Crimp Barrel		
851-37167()-	22	22	M39029/57-354	QPL
851-37962()-	20	20	M39029/22-192	QPL

D. Replacement Lamps

**Table 4
REPLACEMENT LAMPS**

Switch	Replacement Lamp		
	Description	Part Number	Supplier
851-37167()-	T-1 midget, flange base, 5VAC	OL-685	Oshino
		OL-685AS15	Oshino
851-37962()-	T-1 midget, flange base, 28VDC	92490516-020	Eaton
		LTX-6859	Lamptronix
		OL-3335	Oshino

STANDARD WIRING PRACTICES MANUAL

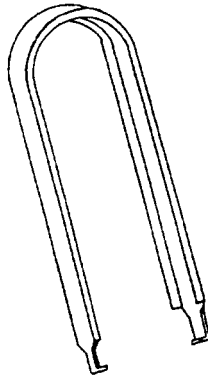
EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

2. SWITCH DISASSEMBLY

A. Lamp Capsule Removal

Table 5
LAMP CAPSULE EXTRACTION TOOLS

Part Number	Supplier
584-901	Eaton

LAMP CAPSULE EXTRACTION TOOL
Figure 3

- (1) Press and release the button or the lamp capsule of the switch so that the button or the lamp capsule is in the OFF position.

Make sure that the outer edge of the button or lamp capsule is out from or beyond the edge of the switch body.

NOTE: The button or lamp capsule of an alternate action switch is:

- Pressed in when the switch is on
- Is out when the switch is off.

CAUTION: REMOVAL OF THE BUTTON OR THE LAMP CAPSULE FROM THE SWITCH WHEN THE BUTTON IS IN THE ON POSITION CAUSES DAMAGE TO THE SWITCH.

- (2) Make a selection of a lamp capsule extraction tool from Table 5.

NOTE: The fingernails are a satisfactory alternative to the extraction tool.

- (3) Put the ends of the tool or the fingernails into the grooves on the opposite sides of the button or the lamp capsule. Refer to Figure 1 or Figure 2.

CAUTION: ONLY THE TOOLS SPECIFIED IN TABLE 5 OR THE FINGERNAILS CAN BE USED TO REMOVE THE CAPSULE. IF DIFFERENT TOOLS ARE USED, DAMAGE TO THE LAMP CAPSULE OR THE SWITCH BODY, OR BOTH CAN OCCUR.

- (4) Pull the lamp capsule approximately 0.25 inch out of the switch body until the button or lamp capsule stops against the retaining hinge.

STANDARD WIRING PRACTICES MANUAL

EATON 851-37(-) SERIES LIGHTED PUSH BUTTON SWITCHES

CAUTION: DO NOT USE MORE THAN THE NECESSARY FORCE TO PULL THE BUTTON OR LAMP CAPSULE AGAINST THE RETAINING HINGE. DAMAGE TO THE CAPSULE, THE HINGE, OR THE SWITCH BODY CAN OCCUR.

B. Switch Removal From The Panel

Access to the back of the panel:

- Is necessary to remove the 851-37167(-) switch body from the front of the panel
- Is not necessary to remove the 851-37962(-) switch body from the front of the panel.

NOTE: The 851-37962(-) switch has a retainer clip that is held loosely in the panel by spring clips. The retainer clip holds the connector sleeve on the panel so that the switch body can be removed from the front of the panel. It is not necessary to remove the connector sleeve and the connector block from the back of the panel.

**Table 6
SWITCH INSTALLATION AND REMOVAL TORQUE TOOLS**

Description	Part Number	Torque Limit (inch-ounce)	Supplier
Torque Screwdriver	584-510	18	Eaton
Torque Screwdriver	TS-100	18	U TI CA

For this procedure, the lamp capsule must be removed from the switch body. Refer to Paragraph 2.A.

- (1) Make a selection of a switch removal tool from Table 6.

NOTE: A small screwdriver is a satisfactory alternative.

- (2) Turn the power to the switch off.
- (3) Extend the retaining hinges of the lamp capsule.
- (4) Find the heads of the two lug screws that tighten the mounting pawls at the bottom of the switch body.
- (5) With the screwdriver, turn each of the lug screws counterclockwise approximately two to four turns loosen the switch body.

CAUTION: DO NOT CONTINUE TO TURN THE SCREWS AFTER THE SWITCH IS LOOSE. DAMAGE TO THE SWITCH CAN OCCUR.

- (6) Pull the switch body from the connector sleeve.

The connector sleeve and connector block of:

- The 851-37167(-) switch disengages from the panel
- The 851-37962(-) switch stays attached to the panel.

C. Switch Connector Block Removal

**Table 7
CONNECTOR BLOCK REMOVAL TOOLS**

Removal Tool	Supplier
RRX-367	Russtech

- (1) Make a selection of a removal tool from Table 7.

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EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

- (2) Put the two round ends of the tool into each slot on both sides of the connector block at the same time.
- (3) Push the tool into the slots until it stops.
- (4) Pull the tool and the connector block out of the connector sleeve.
- (5) Remove the tool from the connector block.

D. Contact Removal

**Table 8
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	
	Part Number	Supplier
22	M81969/14-01	QPL
	MS27495A22M	QPL
20	M82969/14-10	QPL

- (1) Make a selection of a contact removal tool from Table 8.
- (2) Put the tip of the contact removal tool on the wire near the rear grommet.
- (3) Carefully push the contact removal tool in the contact cavity until it stops.
- (4) Pull the wire and the removal tool out of the contact cavity at the same time.
- (5) If the contact does not release:
 - (a) Carefully pull the removal tool out of the contact cavity.
 - (b) Turn the removal tool a small amount.
 - (c) Do Step (2) through Step (4) again.

E. Lamp Replacement

For this procedure, the lamp capsule must be removed from the switch body. Refer to Paragraph 2.A.

- (1) Make a selection of a replacement lamp from Table 4.

CAUTION: THE SELECTION AND INSTALLATION OF AN INCORRECT REPLACEMENT LAMP FOR THE SPECIFIED SWITCH CAN CAUSE ANY OF THESE CONDITIONS:

- DAMAGE TO THE LAMP GROUND CONTACT
- DAMAGE TO THE SWITCH MECHANISM
- INTERMITTENT OPERATION OF THE LAMP
- SHORT LAMP LIFE
- TOO MUCH ILLUMINATION OF THE LAMP
- ILLUMINATION OF THE LAMP THAT IS NOT SUFFICIENT.

- (2) Examine the bottom of the lamp capsule.

In the bottom of the lamp capsule can be:

- As many as four lamp bases
- As many as two plastic plugs in the lamp sockets.

NOTE: A plastic plug prevents the installation of a lamp in the socket.

STANDARD WIRING PRACTICES MANUAL

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

- (3) Pull each lamp out with the fingernails.

NOTE: Each lamp base has an edge around it.

CAUTION: DO NOT REMOVE ANY PLASTIC PLUG THAT IS IN A LAMP SOCKET. A LAMP SOCKET WITH A PLUG CANNOT HAVE A LAMP BECAUSE THERE IS NOT A LIGHTED SIGN FOR THAT AREA OF THE LAMP CAPSULE.

- (4) Install the necessary number of new lamps.

Make sure that Step (a) through Step (c) are done in order.

CAUTION: IF THE STEPS ARE NOT DONE IN ORDER, ANY OF THESE CONDITIONS CAN OCCUR:

- DAMAGE TO THE LAMP GROUND CONTACT
- DAMAGE TO THE SWITCH MECHANISM
- INTERMITTENT OPERATION OF THE LAMP

(a) Put each new lamp in an empty lamp socket, but do not push them in.

(b) Push the two lamps near the top of the lamp capsule in at the same time until they stop.

(c) Push the other two lamps near the bottom of the lamp capsule in at the same time until they stop.

- (5) Align the corners of the lamp capsule with the corners of the switch body.

- (6) Push the lamp capsule into the switch body.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF FORCE ON THE LAMP CAPSULE. DAMAGE TO THE LAMP CAPSULE OR THE SWITCH BODY, OR BOTH CAN OCCUR.

- (7) To help prevent intermittent operation of the lamp, press the button or lamp capsule two times with the finger so that the switch is operated one full ON and OFF cycle.

3. SWITCH ASSEMBLY

A. Contact Assembly

**Table 9
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
26	22	0.14	± 0.02
24	22	0.14	± 0.02
	20	0.20	± 0.02
22	22	0.14	± 0.02
	20	0.20	± 0.02
20	20	0.20	± 0.02

STANDARD WIRING PRACTICES MANUAL

EATON 851-37(-) SERIES LIGHTED PUSH BUTTON SWITCHES

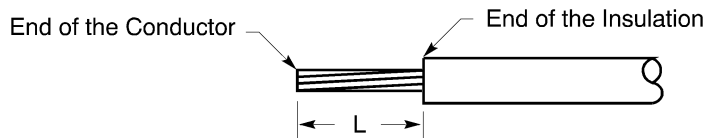
**Table 10
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Supplier	Part Number	Supplier
26	22	M22520/2-01	2	QPL	M22520/2-06	QPL
		ST2220-10	-	Boeing	M22520/10-1	QPL
		WA22	2	Daniels	M22520/2-06	QPL
24	22	M22520/2-01	3	QPL	M22520/2-06	QPL
		ST2220-10	-	Boeing	M22520/10-1	QPL
		WA22	3	Daniels	M22520/2-06	QPL
	20	M22520/7-01	4	QPL	M22520/7-12	QPL
22	22	M22520/2-01	4	QPL	M22520/2-06	QPL
		ST2220-10	-	Boeing	M22520/10-1	QPL
		WA22	4	Daniels	M22520/2-06	QPL
	20	M22520/7-01	5	QPL	M22520/7-12	QPL
20	20	M22520/7-01	6	QPL	M22520/7-12	QPL

- (1) Make a selection of the correct contact from Table 3.
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Table 9
- Figure 4
- Subject 20-00-15.



**INSULATION REMOVAL
Figure 4**

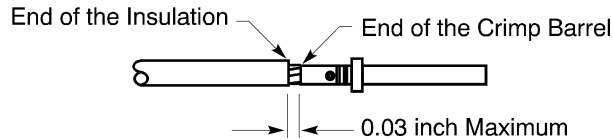
- (3) Make a selection of a crimp tool from Table 9.
- (4) Push the conductor into the contact crimp barrel until the end of the conductor is against the bottom of the crimp barrel. Refer to Figure 5.

STANDARD WIRING PRACTICES MANUAL

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is less than or equal to 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 5

(5) Crimp the contact.

B. Contact Insertion

Table 11
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool	
	Part Number	Supplier
22	M81969/14-01	QPL
	MS27495A22M	QPL
20	M81969/14-10	QPL

(1) Make a selection of an insertion tool from Table 11.

CAUTION: DO NOT USE AN INSERTION TOOL THAT HAS:

- A BENT TIP
- A BENT BIT
- A FLARED TIP
- A BROKEN TIP
- A TIP WITH A CRACK.

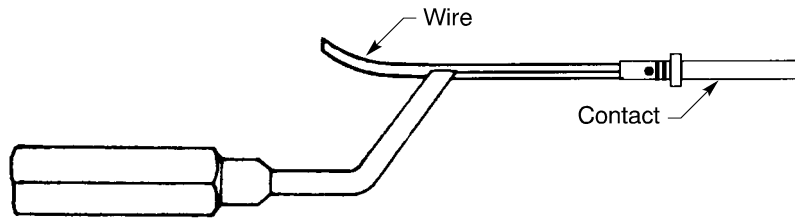
CAUTION: IF A DEFECTIVE INSERTION TOOL IS USED, IT CAN CAUSE:

- INJURY TO THE OPERATOR
- DAMAGE TO THE CONTACT RETENTION CLIPS
- DAMAGE TO THE REAR GROMMET OF THE CONNECTOR BLOCK.

(2) Put the wired contact in the insertion tool. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES



POSITION OF THE WIRED CONTACT IN THE INSERTION TOOL
Figure 6

- (3) Push the wired contact and the tool into the contact cavity from the rear of the connector so that the contact is fully inserted.

C. Connector Block Polarization

Table 12
SWITCH KEY POSITIONS

Switch	Key Position
851-37167-()-001	A
851-37167-()-002	C
851-37167-()-003	B

- (1) Find the correct key position. Refer to Table 12.
- (2) Push the plastic key into the correct slot of the connector block.
- (3) Find the key slot on the end of the switch body.
- (4) Align the key in the connector block with the key slot in the switch body.

CAUTION: IF THE KEY IN THE CONNECTOR BLOCK IS NOT ALIGNED WITH THE KEY SLOT IN THE SWITCH BODY, THE SWITCH BODY CANNOT BE INSTALLED ON THE CONNECTOR BLOCK.

4. SWITCH INSTALLATION

A. Installation of the 851-37167-() Switch in a Panel

For this procedure, the lamp capsule must be removed from the switch body. Refer to Paragraph 2.A.

- (1) Make a selection of a switch removal tool from Table 6.

NOTE: A small screwdriver is a satisfactory alternative.
- (2) If a spacer is used, put the spacer on the switch body from the bottom.
- (3) Turn the connector block so that the side of the connector block with the key position identifiers A B C is on the same side as the TOP mark on the connector sleeve.
- (4) Push the connector block into the end of the connector sleeve until it makes a click.
- (5) Hold the connector sleeve with the connector block behind the panel so that:
 - The connector block is pointed out from the panel
 - The side of the connector sleeve with the TOP mark is pointed up.
- (6) Turn the switch body so that the side with the TOP mark is pointed up.

STANDARD WIRING PRACTICES MANUAL**EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES**

- (7) From the front of the panel, push the switch body into the connector sleeve.
- (8) To tighten the mounting pawls, turn the lug screws at the bottom of the switch body with the screwdriver in the clockwise direction until the torque screwdriver does not turn the screws.

CAUTION: IF THE LUG SCREWS ARE TIGHTENED MORE THAN 18 INCH-OUNCES:

- DAMAGE TO THE SWITCH CAN OCCUR
- DAMAGE TO THE LAMP CAPSULE CAN OCCUR
- THE LAMP CAPSULE DOES NOT MOVE FREELY.

- (9) Push the lamp capsule into the switch body.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF FORCE ON THE LAMP CAPSULE. DAMAGE TO THE LAMP CAPSULE OR THE SWITCH BODY, OR BOTH CAN OCCUR.

- (10) To help prevent intermittent operation of the lamp, press the button or lamp capsule two times with the finger so that the switch is operated one full ON and OFF cycle.

B. Installation of the 851-37962()- Switch in a Panel

- (1) Make a selection of a switch removal tool from Table 6.

NOTE: A small screwdriver is a satisfactory alternative.

- (2) Turn the connector sleeve so that the TOP mark is pointed up.
- (3) From the front of the panel, push the bottom of the connector sleeve through the hole in the panel until the flange is against the panel.
- (4) Align the holes in the retainer clip with the holes for the mounting pawls on the connector sleeve.
- (5) From the back of the panel, push the connector sleeve into the retainer clip until the clip is locked in the sleeve.
- (6) Turn the connector block so that the side with the key position identifiers A B C is on the same side as:
 - The TOP mark on the connector sleeve
 - The TOP mark on the retainer clip.
- (7) Push the connector block into the connector sleeve until it makes a click.
- (8) Remove the lamp capsule from the switch body. Refer to Paragraph 2.A.
- (9) If a button guard is used, put the guard over the switch body from the rear of the switch body.
- (10) If a switch guard is used, put the switch guard over the switch body from the rear of the switch body.
- (11) If a spacer is used, put the spacer over the switch body from the rear of the switch body.
- (12) Turn the switch body so that the side with the TOP mark is pointed up.
- (13) From the front of the panel, push the switch body into the connector sleeve.
- (14) To tighten the mounting pawls, turn the lug screws at the bottom of the switch body with the screwdriver in the clockwise direction until the torque screwdriver does not turn the screws.

CAUTION: IF THE LUG SCREWS ARE TIGHTENED MORE THAN 18 INCH-OUNCES:

- DAMAGE TO THE SWITCH CAN OCCUR
- DAMAGE TO THE LAMP CAPSULE CAN OCCUR
- THE LAMP CAPSULE DOES NOT MOVE FREELY.

- (15) Push the lamp capsule into the switch body.



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EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF FORCE ON THE LAMP CAPSULE. DAMAGE TO THE LAMP CAPSULE OR THE SWITCH BODY, OR BOTH CAN OCCUR.

- (16) To help prevent intermittent operation of the lamp, press the button or lamp capsule two times with the finger so that the switch is operated one full ON and OFF cycle.

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STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

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STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

1. PART NUMBERS AND DESCRIPTION

A. Switch Part Numbers

**Table 1
SWITCH PART NUMBERS**

Part Number	Description	Supplier
09-530-()	Switch, Lighted Pushbutton	ITW Switches
09-530-()	Switch, Lighted Pushbutton	Korry Electronics
S231W240-()	Switch, Lighted Pushbutton	Boeing

**Table 2
SWITCH COMPONENT PART NUMBERS**

Component	Part Number	Supplier
Connector Block	09-530-9501	Korry Electronics
	S231W240-301	Boeing
Fuse	R271.125	Littelfuse
Switch Guard	09-530-9601	Korry Electronics
	S231W240-351	Boeing

**Table 3
OBSOLETE SWITCH PART NUMBERS**

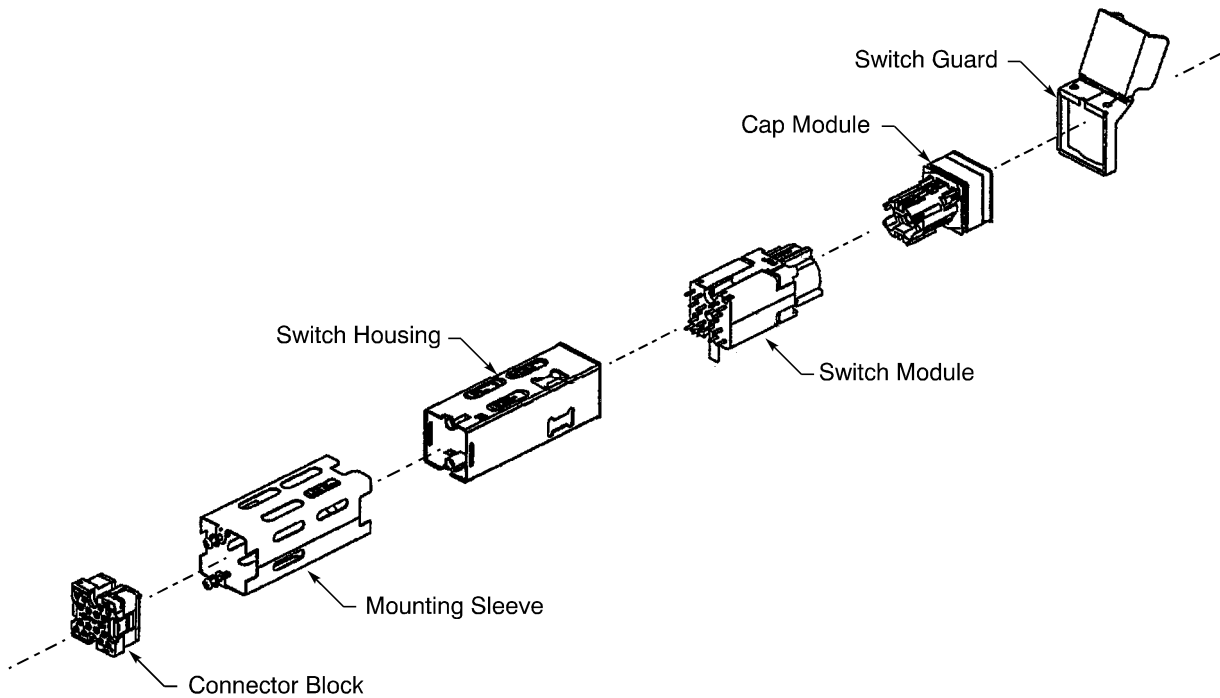
Obsolete Switch		Replacement Switch	
Part Number	Supplier	Part Number	Supplier
09-530-()	ITW Switches	09-530-()	Korry Electronics

**Table 4
SUPPLIER PART NUMBERS FOR BOEING STANDARDS**

Boeing Standard	Part Number	Supplier
S231W240-()	09-530-()	Korry Electronics

STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES



S231W240-() SWITCH
Figure 1

B. Contact Part Numbers

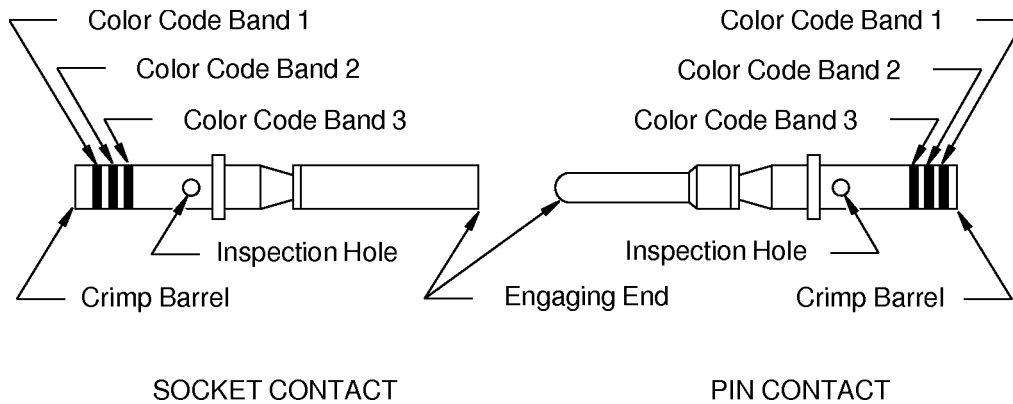
Table 5
CONTACT PART NUMBERS

Contact Size		Contact Type	Color Code		Part Number	Supplier
Engaging End	Crimp Barrel		Band	Color		
20	20	Socket	1	Brown	M39029/22-192	QPL
			2	White		
			3	Red		

NOTE: Color codes start at the crimp barrel end of the contact. Refer to Figure 2.

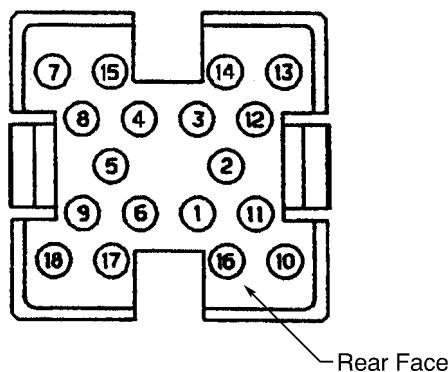
STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES



LOCATION OF CONTACT COLOR CODES
Figure 2

C. Connector Block Insert Configuration



INSERT CONFIGURATION
Figure 3

2. SWITCH DISASSEMBLY

A. Contact Removal

Table 6
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool		
	Part Number	Color	Supplier
20	M81969/14-10	Orange	QPL

NOTE: For plastic tools, the color given in Table 6 is the color of the removal end of the combination tools that are both insertion and removal tools.

- (1) Make a selection of a contact removal tool from Table 6.

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BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

- (2) At the rear of the connector block, put the removal tool on the wire.
- (3) Axially align the removal tool and the contact cavity.
- (4) Carefully push the removal tool into the contact cavity until it stops.

CAUTION: DO NOT ROTATE THE TOOL OR SPREAD THE TOOL TIPS WHILE THE TOOL IS IN THE CONTACT CAVITY.

- (5) Carefully pull the wire and the removal tool from the contact cavity at the same time. Make sure that the removal tool and the contact cavity stay axially aligned.
- (6) If the contact does not release:
 - (a) Pull the removal tool out of the contact cavity.
 - (b) Turn the removal tool approximately 90 degrees.
 - (c) Do Step (2) through Step (5) again.

B. Lamp Replacement

The lamps are Light Emitting Diodes (LED) soldered into the cap module assembly. It is not possible to replace an LED. The cap module must be replaced. Refer to Paragraph 2.H. to separate the cap module from the switch module.

C. Removal of the Connector Block from the Switch Housing

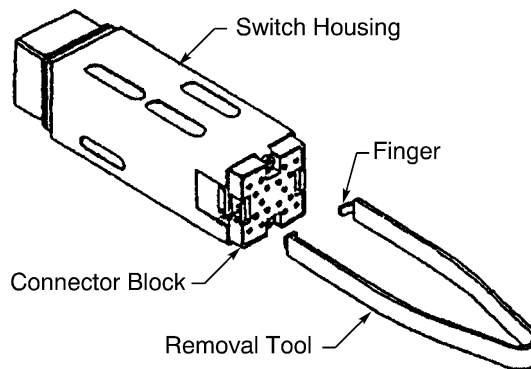
**Table 7
CONNECTOR BLOCK REMOVAL TOOLS**

Removal Tool	Supplier
09-530-9605	Korry Electronics

- (1) Make a selection of a connector block removal tool from Table 7.

NOTE: A satisfactory alternative is to use the fingers to disengage the tabs.

- (2) Align the fingers of the removal tool with the slot on each side of the switch housing. Refer to Figure 4.

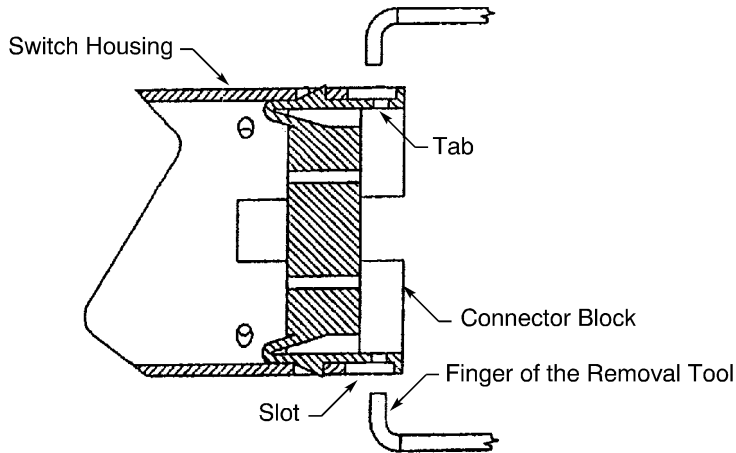


**POSITION OF THE REMOVAL TOOL
Figure 4**

STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

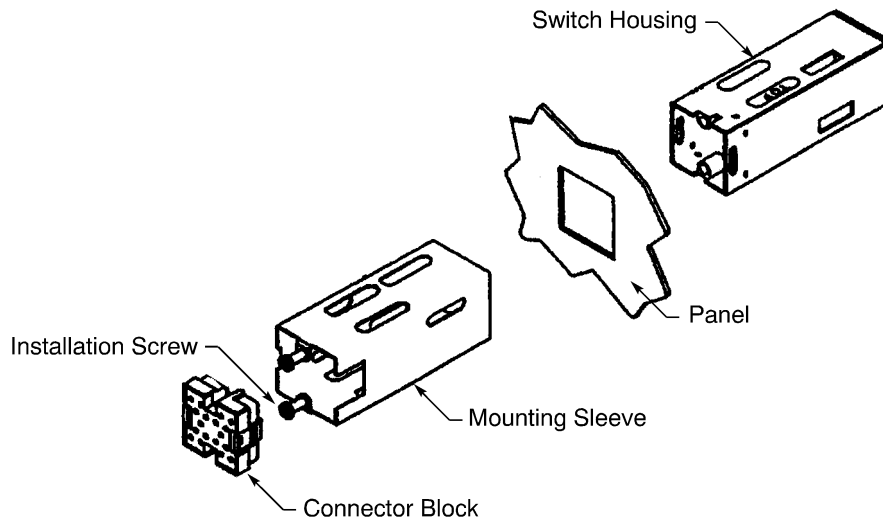
- (3) Push the tool together to press against the tabs on the connector block and at the same time pull the connector block rearward. Refer to Figure 5.



REMOVAL OF THE CONNECTOR BLOCK
Figure 5

D. Removal of the Switch from the Panel

- (1) From the rear of the mounting sleeve, disengage each installation screw from the threads in the switch housing. Refer to Figure 6.



SWITCH REMOVAL
Figure 6

- (2) From the rear of the panel, pull the mounting sleeve rearward off the switch housing. Refer to Figure 6.

STANDARD WIRING PRACTICES MANUAL

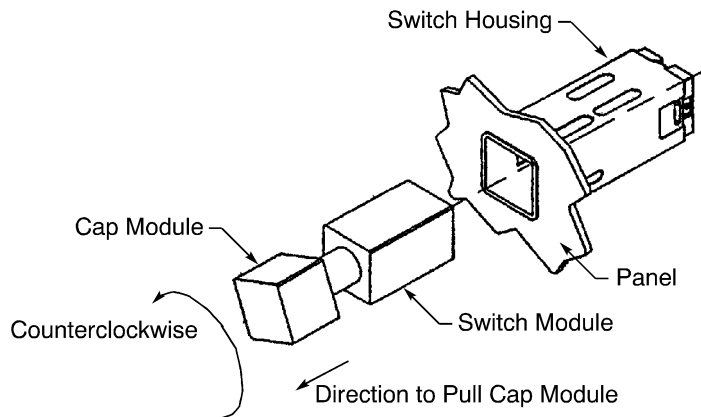
BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

(3) From the front of the panel, pull the switch housing out from the panel. Refer to Figure 6.

E. Switch Guard Removal

- (1) Remove the switch from the panel. Refer to Paragraph 2.D.
- (2) Pull the switch guard to the rear of the switch housing from the switch housing until it is free.

F. Removal of the Switch Module from the Switch Housing



REMOVAL OF THE SWITCH MODULE
Figure 7

Refer to Figure 7.

- (1) If a switch guard is installed, open the cover more than 154 degrees.
- (2) If the cap is in the pushed in position, push the cap in to make it go to the out position.
- (3) Gently hold the sides of the cap module and at the same time, pull the cap module out of the switch module until it stops.
- (4) Turn the cap module counterclockwise 22 degrees or until it stops.
- (5) Pull the switch module out from the switch housing.

G. Fuse Removal

Table 8
FUSE REMOVAL TOOLS

Part Number	Supplier
09-530-9604	Korry Electronics

- (1) Make a selection of a fuse removal tool from Table 8.
- (2) Remove the switch module from the switch housing. Refer to Paragraph 2.F.
- (3) Open the fuse cover.
- (4) Turn the switch module to make the fuse pointed up.
- (5) With the removal tool, gently hold the fuse by the ceramic area of the fuse.
- (6) Pull the fuse out of the clips in the switch module.

STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

H. Separation of the Cap Module from the Switch Module

- (1) Hold the switch module assembly with the rear of the switch module pointed up.
- (2) With a flat blade screwdriver, turn the inner shaft approximately 90 degrees until the slot in the shaft is aligned with the lines that have the mark "UNL".
- (3) Pull the cap module from the switch module.

3. SWITCH ASSEMBLY

A. Contact Assembly

**Table 9
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
20	20	0.18	±0.03

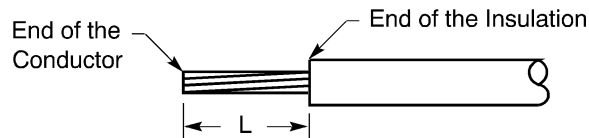
**Table 10
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Part Number
		Part Number	Setting	
24	20	M22520/7-01	3	M22520/7-12
22	20	M22520/7-01	4	M22520/7-12
20	20	M22520/7-01	5	M22520/7-12

- (1) Make a selection of a crimp tool from Table 10 .
- (2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 8
- Table 9 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



**INSULATION REMOVAL LENGTH
Figure 8**

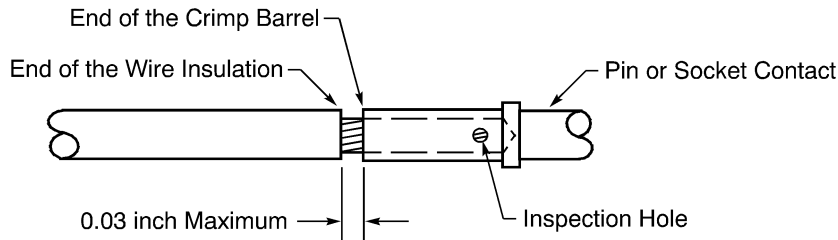
- (3) Put the end of the conductor in the crimp barrel of the contact. Refer to Figure 9.

STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

Make sure that:

- All the conductor strands are in the crimp barrel
- The conductor strands are visible in the inspection hole of the contact
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE CONDUCTOR IN THE CRIMP BARREL OF THE CONTACT

Figure 9

- (4) Crimp the contact.

B. Contact Insertion

**Table 11
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool		
	Part Number	Color	Supplier
20	M81969/14-10	Red	QPL

- (1) Make a selection of an insertion tool from Table 11.

CAUTION: DO NOT USE DAMAGED TOOLS.

- (2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

- (3) Put the contact assembly in the insertion tool.
- (4) Axially align the insertion tool and the contact cavity at the rear of the connector block.
- (5) Carefully push the contact assembly into the contact cavity until it stops.

Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (6) Carefully pull the tool out of the contact cavity.

Make sure that the tool and the contact cavity stay axially aligned.

- (7) Lightly pull the wire to make sure that the contact is locked in the connector block.

STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

- (8) If the contact is not locked in the contact cavity:
 - (a) Pull the contact assembly out of the contact cavity.
 - (b) Do Step (3) through Step (7) again.

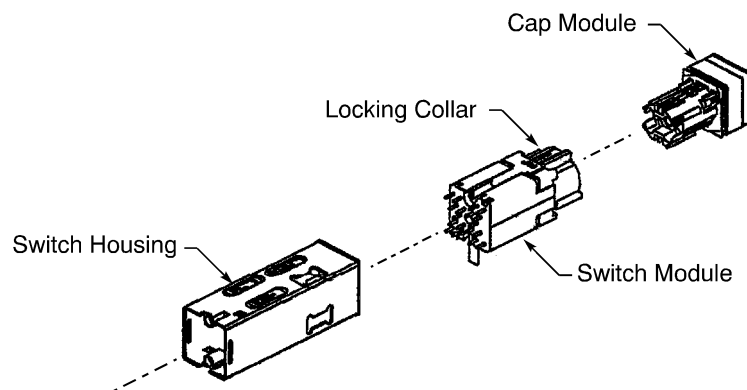
C. Fuse Installation

**Table 12
FUSE INSTALLATION TOOLS**

Part Number	Supplier
09-530-9604	Korry Electronics

- (1) Remove the fuse that has damage. Refer to Paragraph 2.G.
- (2) Make a selection of a fuse installation tool from Table 12.
- (3) Put the fuse between the fingers of the fuse installation tool at the ceramic area of the fuse.
- (4) Gently push the fuse into the clips on the switch module.
- (5) Close the fuse cover.

D. Connection of the Cap Module and the Switch Module



CONNECTION OF THE CAP MODULE AND THE SWITCH MODULE

Figure 10

Refer to Figure 10.

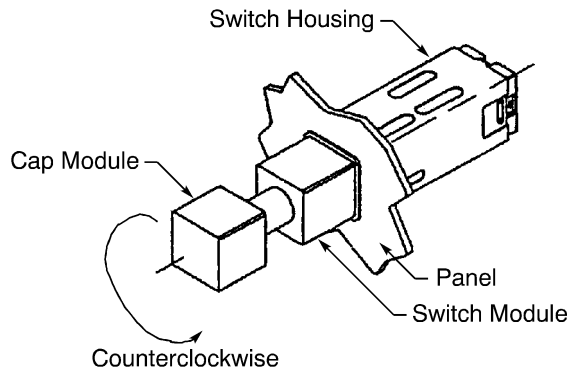
- (1) Hold the switch module with the rear of the module pointed up.
- (2) With a flat blade screwdriver, turn the inner shaft on the rear of the module until the slot in the shaft is aligned with the lines that have the mark "UNL".
- (3) Turn the locking collar on the front of the switch module until the label on the module is aligned with the center of the top of the module.

STANDARD WIRING PRACTICES MANUAL**BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES**

- (4) Turn the cap module until the top of the cap module is aligned with the top of the switch module
- (5) Push the cap module into the switch module until it stops.
- (6) Lightly push the cap module into the switch module and at the same time, use a flat blade screwdriver to turn the inner shaft 90 degrees until the slot is aligned with the lines that have the mark "LKD".

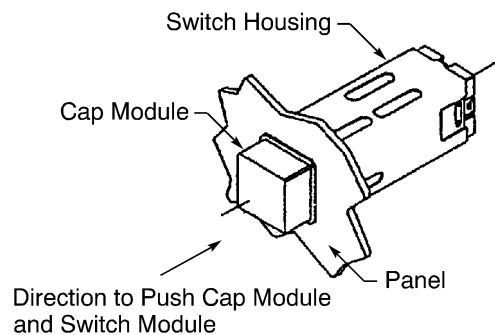
E. Installation of the Switch Module into the Switch Housing

- (1) Hold the switch module with the hand and pull the cap module out from the switch module until it stops.
- (2) Turn the cap module 22 degrees counterclockwise until it stops. Refer to Figure 11.



POSITION OF THE CAP MODULE
Figure 11

- (3) Align the top of the switch module with the top of the switch housing.
- (4) Push the switch module into the switch housing until it stops. Refer to Figure 12.
Make sure that the cap is in the out position.



INSTALLATION OF THE SWITCH MODULE
Figure 12

- (5) Pull gently on the cap module, and at the same time, rotate the cap module clockwise until the top of the cap module is aligned with the switch housing.
- (6) Release the cap module.

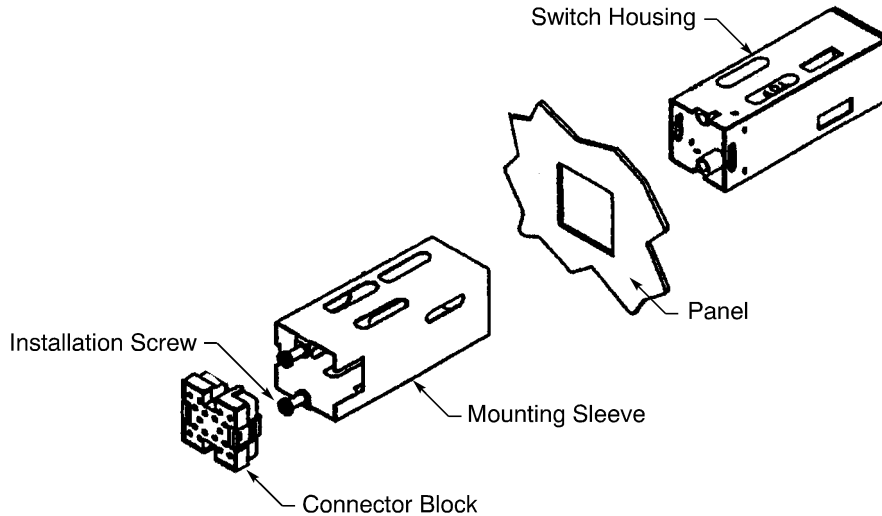
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BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

F. Installation of the Switch Guard

- (1) Put the switch guard on the switch housing.
- (2) Install the switch in the panel. Refer to Paragraph 3.G.

G. Installation of the Switch in the Panel



INSTALLATION OF THE SWITCH IN THE PANEL

Figure 13

- (1) From the front of the panel, put the switch housing through the mounting hole. Make sure that the side of the housing that has the word "TOP" is up.
- (2) From the rear of the panel, align the mounting sleeve with the switch housing. Make sure that the installation screws are aligned with the threaded holes in the switch housing.
- (3) Push the mounting sleeve on the switch housing.
- (4) Tighten the installation screws.
- (5) Torque each installation screw 30 inch-ounces \pm 2 inch-ounces.

H. Installation of the Connector Block in the Switch Housing

- (1) Align the polarization key on the connector block with the polarization keyway on the switch housing.
- (2) Push the connector block into the switch assembly until the tabs on the connector block engage with the slots in the housing.



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STANDARD WIRING PRACTICES MANUAL

BOEING S231W240-() AND KORRY ELECTRONICS 09-530-() LIGHTED PUSHBUTTON SWITCHES

4. APPROVED TOOL SUPPLIERS

A. Tool Suppliers

Table 13
APPROVED TOOL SUPPLIERS

Tool	Supplier
M22520/7-01	QPL
M22520/7-12	QPL
M81969/14-10	QPL

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STANDARD WIRING PRACTICES MANUAL

JANCO AD45-() SWITCHES

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	A. Switch Part Numbers	1
2.	<u>SWITCH DISASSEMBLY</u>	1
	A. Connector Separation	1
3.	<u>SWITCH ASSEMBLY</u>	1
	A. Plug and the Receptacle Connection	1

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STANDARD WIRING PRACTICES MANUAL

JANCO AD45-() SWITCHES

1. PART NUMBERS AND DESCRIPTION

A. Switch Part Numbers

Janco AD45-() switches have these technical features:

- Cory or Tri-Star CSLT2-21R() receptacle connectors mounted on the rear
- Connect to Cory or Tri-Star CSLT2-21P() plug connectors.

Refer to Subject 20-61-29 for assembly of Cory and Tri-Star CSLT2-21P() connectors.

Table 1
SWITCH PART NUMBERS

Part Number	Description	Supplier
AD45-()	Switch, Rotary	Janco

2. SWITCH DISASSEMBLY

A. Connector Separation

Refer to Subject 20-61-29.

3. SWITCH ASSEMBLY

A. Plug and the Receptacle Connection

Refer to Subject 20-61-29.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GLENAIR G2636-() AND G2918-() CONNECTOR CLAMPS

<u>Paragraph</u>		<u>Page</u>
1.	<u>PART NUMBERS AND DESCRIPTION</u>	1
	A. Connector Clamp Part Numbers	1
2.	<u>CONNECTOR CLAMP DISASSEMBLY</u>	1
	A. Clamp Removal	1
3.	<u>CONNECTOR CLAMP ASSEMBLY</u>	1
	A. Clamp Installation	1

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF GLENAIR G2636-() AND G2918-() CONNECTOR CLAMPS

1. PART NUMBERS AND DESCRIPTION

A. Connector Clamp Part Numbers

**Table 1
CONNECTOR CLAMP PART NUMBERS**

Part Number	Supplier
G2636-()	Glenair
G2918-()	Glenair

2. CONNECTOR CLAMP DISASSEMBLY

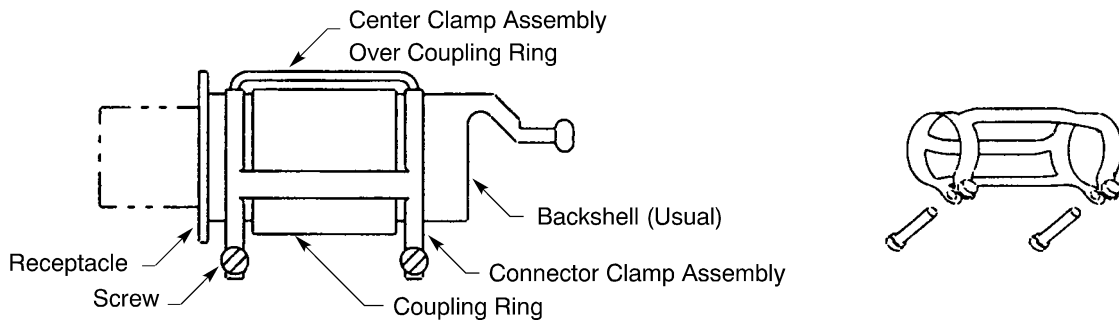
A. Clamp Removal

- (1) Remove the screws from the clamp assembly.
- (2) Spread the clamp assembly to remove it from the connector.

3. CONNECTOR CLAMP ASSEMBLY

A. Clamp Installation

- (1) Install the connector clamp assembly. Refer to Figure 1.
- (2) Tighten the clamp assembly.
Make sure that the torque on the screws is from 10 inch-pounds to 12 inch-pounds.



**CONNECTOR CLAMP ASSEMBLY
Figure 1**



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

<u>Paragraph</u>		<u>Page</u>
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	B. Configuration of Cable Assemblies	1
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	A. Anti-Skid Cable Assembly	2
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3.	<u>LANDING GEAR CABLE ASSEMBLY: 747-400</u>	6
	A. Anti-Skid Cable Assembly	6
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	A. Anti-Skid Cable Assembly	11
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

This Subject gives the procedures to assemble the landing gear cables for these Model 747, Model 767, and Model 777 systems:

- Anti-Skid
- Brake Cooling
- Tire Pressure
- In-Axle.

1. PART NUMBERS AND DESCRIPTION

A. Necessary Parts and Materials

**Table 1
CABLE ASSEMBLY COMPONENT PART NUMBERS**

Component	Part Number	Supplier
Adapter	G1504-()	Glenair
Lanyard	G70259T77-()	Glenair

**Table 2
NECESSARY MATERIALS**

Material	Description	Part Number	Supplier
Heat Shrinkable Sleeve	Grade B, Class 1	-	Refer to Subject 20-00-11.
	Teflon	TFE 2X	Chemplast Zeus Industrial Products
SPIRAP, Teflon	-	500024	AMP

B. Configuration of Cable Assemblies

**Table 3
CONFIGURATION OF LANDING GEAR CABLE ASSEMBLIES**

System	Model	G1504-() Adapter	Lanyard	Length (inch)		Reference
				TFE 2X	SPIRAP	
Anti-Skid	747-100	Yes	-	-	55	Paragraph 2.A.
	747-200					
	747-300					
	747-400	No	-	58	-	Paragraph 3.A.
	767	No	-	39	-	Paragraph 4.A.
Anti-Skid With Brake Cooling	747-200	Yes	-	-	33	Paragraph 2.A.
	747-300					

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

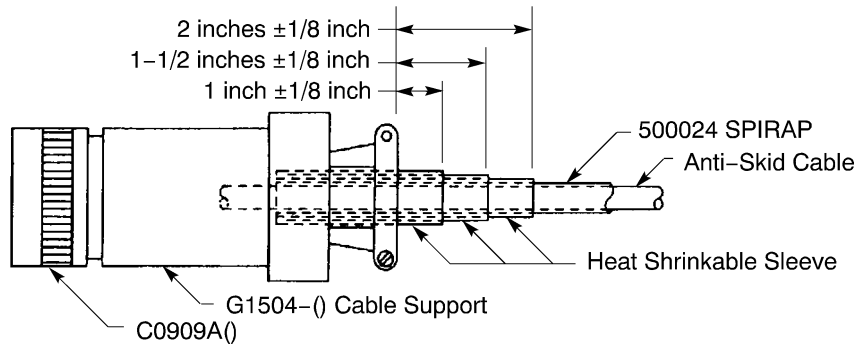
Table 3 (continued)

System	Model	G1504-() Adapter	Lanyard	Length (inch)		Reference
				TFE 2X	SPIRAP	
Anti-Skid With Tire Pressure	747-400	No	-	58	-	Paragraph 3.A.
	767	No	-	39	-	Paragraph 4.A.
Brake Cooling	747-200	Yes	G70259T77-35	-	33	Paragraph 2.B.
	747-300					
	747-400	No	G70259T77-38	41	41	Paragraph 3.B.
	767	No	G70259T77-38	40	40	Paragraph 4.B.
Tire Pressure	747-400	No	-	58	-	Paragraph 3.C.
	767	No	-	39	-	Paragraph 4.B.
In-Axle	777	No	-	Refer to Table 4	-	Paragraph 5.

2. LANDING GEAR CABLE ASSEMBLY: 747-100, 747-200, 747-300

This Paragraph gives the procedures to install Glenair G1504-() cable adapters on landing gear cables for the anti-skid system.

A. Anti-Skid Cable Assembly

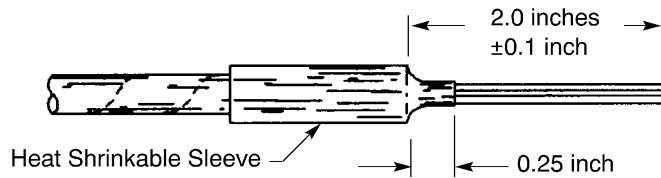


ANTI-SKID CABLE ASSEMBLY
Figure 1

- (1) Cut the length of SPIRAP. Refer to Table 3.
- (2) Put the SPIRAP on the cable.
- (3) Remove 2.0 inches ±0.1 inch of the outer jacket of the cable. Refer to Figure 2.

STANDARD WIRING PRACTICES MANUAL

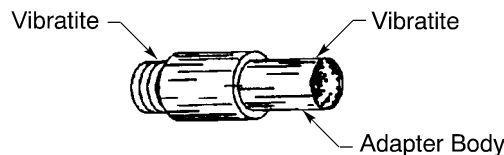
ASSEMBLY OF LANDING GEAR CABLES



CABLE SHIELD TERMINATION

Figure 2

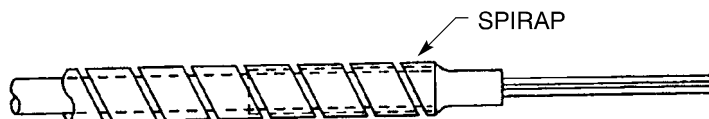
- (4) Terminate the shield so that it is a dead end. Refer to Figure 2 and Subject 20-10-15.
 - (a) Cut the shield so that the end of the shield is 0.25 inch ±0.06 inch from the end of the jacket.
 - (b) Fold the shield back over the jacket.
 - (c) Shrink a 3 inch length of heat shrinkable sleeve over the shield.
- (5) Put these sleeves in this sequence over the cable:
 - (a) A 1-3/4 inch length of 1/2 inch diameter yellow heat shrinkable sleeve
 - (b) A 2-1/4 inch length of 3/8 inch diameter yellow heat shrinkable sleeve
 - (c) A 2-3/4 inch length of 3/8 inch diameter yellow heat shrinkable sleeve.
- (6) Put the Glenair G1504-() cable adapter over the cable.
Make sure to put the clamp end first.
- (7) Remove the cable clamp from the G1504-() adapter.
- (8) Put one drop of Vibratite thread lock compound:
 - On a minimum of two threads of the internal threads of the adapter body
 - On a minimum of two threads of the external threads of the adapter body.
 Refer to Figure 3.



LOCATION OF THE VIBRATITE

Figure 3

- (9) Put the edge of the SPIRAP so that it is approximately flush with the cable jacket. Refer to Figure 4.



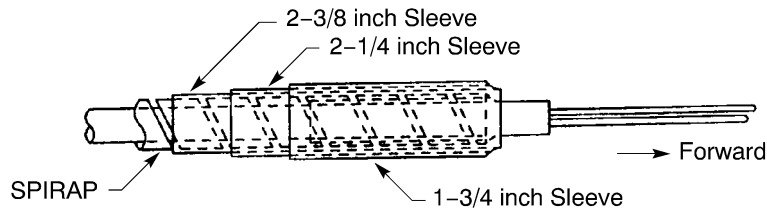
POSITION OF THE SPIRAP

Figure 4

- (10) Install the cable diameter buildup sleeves. Refer to Figure 5 and Subject 20-10-14.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES



CABLE DIAMETER BUILDUP SLEEVES

Figure 5

- (a) Slide the 2-3/4 length of 3/8 inch diameter sleeve to the end of the cable until it extends between 1/8 inch and 1/4 inch farther than the forward edge of the SPIRAP.
 - (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (c) Put the 2-1/4 inch length of 3/8 inch diameter sleeve over the first sleeve.
 - (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (e) Put the 1-3/4 inch length of 1/2 inch diameter sleeve over the second sleeve.
 - (f) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (11) Assemble the connector. Refer to Subject 20-61-11.
 - (12) Hold the two conductors immediately forward of the buildup sleeves and push them to the connector to make the wires bend.
The wires should remain bent after they are released.

CAUTION: DO NOT GRIP THE BUILDUP SLEEVES TO MAKE THE WIRES BEND. THE SLEEVES CAN MOVE OUT OF POSITION.

- (13) Move the adapter body forward.
- (14) Engage the threads of the adapter and the connector.
- (15) Torque the adapter hand tight plus 1/8 of a turn.
- (16) Hold the cable and put the forward edge of the buildup sleeves so that they are flush to 1/8 inch in the end of the adapter body.

Make sure that:

- The sleeve remains in position when the cable is released
- The wires have slack in the adapter.

- (17) Engage the threads of the cable clamp and the adapter.
- (18) Torque the cable clamp hand tight plus 1/8 of a turn.
- (19) Tighten the clamp saddle screws.
- (20) If the cable clamp does not hold the cable tightly:
 - (a) Remove the cable clamp from the adapter.
 - (b) Remove the adapter from the connector.
 - (c) Remove the contacts from the connector. Refer to Subject 20-61-11.
 - (d) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Table 2.
Make sure that the sleeve has the smallest diameter that can move easily on the cable.
 - (e) Put the necessary number of 1 inch lengths of the heat shrinkable sleeve on the cable.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

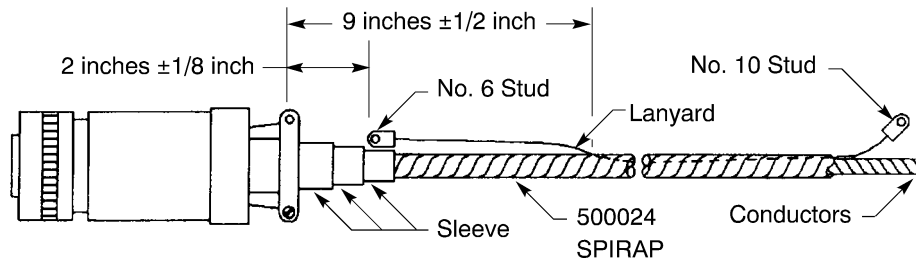
- (f) Align the forward edge of each sleeve with the forward edge of the 2-3/4 inch length of heat shrinkable sleeve.
- (g) Shrink each sleeve in position. Refer to Subject 20-10-14.
- (h) Do Step (11) thru Step (19) again.

Make sure that the clamp holds the cable tightly.

- (21) Install safety wires on the saddle screws.

B. Brake Cooling Cable Assembly

- (1) Assemble the brake cooling cable but do not tighten the saddle clamp screws. Refer to Paragraph 2.A.
- (2) Make a selection of a lanyard from Table 3.
- (3) Install the lanyard. Refer to Figure 6.



INSTALLATION OF THE LANYARD
Figure 6

- (4) Attach the forward lanyard fitting below one of the clamp saddle screws.
Make sure:
 - That the forward lanyard mounting hole is approximately centered over the rear sleeve
 - To keep the lanyard as straight as possible.

A bend in the cable results after the lanyard has been secured to the Glenair adapter.

- (5) Tighten the clamp saddle screws.
- (6) If the cable clamp does not hold the cable tightly:
 - (a) Remove the lanyard from the clamp.
 - (b) Remove the clamp from the connector.
 - (c) Remove the adapter from the connector.
 - (d) Remove the contacts from the connector. Refer to Subject 20-61-11.
 - (e) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Table 2.
Make sure that the sleeve has the smallest diameter that can move easily on the cable.
 - (f) Put the necessary number of 1 inch lengths of the sleeve on the cable.
 - (g) Align the forward edge of each sleeve with the forward edge of the 2-3/4 inch length of heat shrinkable sleeve.
 - (h) Shrink each sleeve in position. Refer to Subject 20-10-14.
 - (i) Do Step (1) thru Step (5) again.

STANDARD WIRING PRACTICES MANUAL

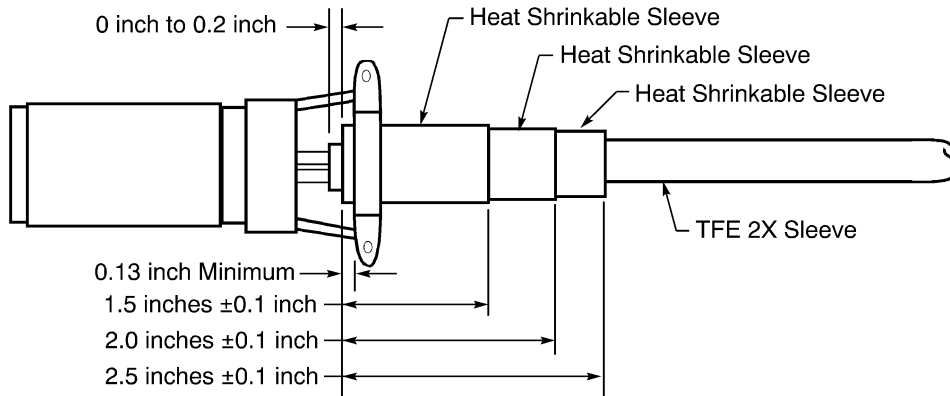
ASSEMBLY OF LANDING GEAR CABLES

Make sure that the clamp holds the cable tightly.

- (7) Install safety wires on the saddle screws.

3. LANDING GEAR CABLE ASSEMBLY: 747-400

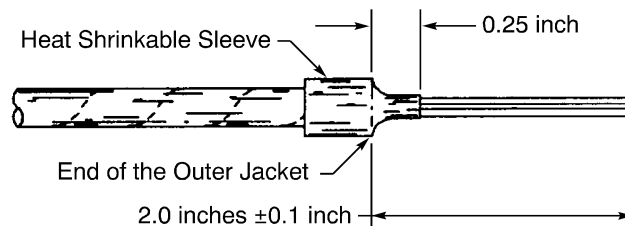
A. Anti-Skid Cable Assembly



ANTI-SKID CABLE ASSEMBLY

Figure 7

- (1) Make a selection of the necessary length of TFE 2X teflon sleeve. Refer to Table 2 and Table 3.
- (2) Put the sleeve on the cable.
- (3) Remove 2.0 inches ± 0.1 inch of the outer jacket of the cable. Refer to Figure 8.



CABLE SHIELD TERMINATION

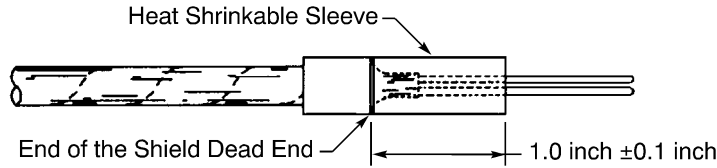
Figure 8

- (4) Assemble a shield dead end. Refer to Figure 8.
 - (a) Cut the shield so that the end of the shield is 0.25 inch ± 0.06 inch from the end of the jacket.
 - (b) Fold the shield back over the jacket.
 - (c) Shrink a 3 inch length of heat shrinkable sleeve.

Make sure the end of the sleeve extends 0.25 inch farther than the end of outer jacket.
- (5) Push a 1.0 inch ± 0.1 inch length of 3/16 inch diameter heat shrinkable sleeve on the cable until the rear end of the sleeve is against the shield dead end. Refer to Figure 9.

STANDARD WIRING PRACTICES MANUAL

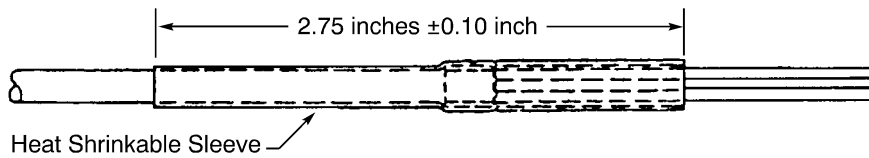
ASSEMBLY OF LANDING GEAR CABLES



POSITION OF THE FORWARD SLEEVE

Figure 9

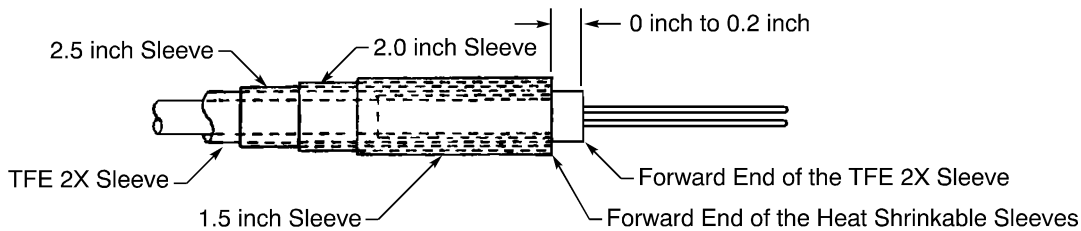
- (6) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (7) Push a 2.75 inch ± 0.10 inch length of 3/16 inch diameter heat shrinkable sleeve on the cable until the forward end is aligned with the forward end of the 1 inch sleeve. Refer to Figure 10.



POSITION OF THE REAR SLEEVE

Figure 10

- (8) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (9) Push the TFE 2X sleeve on the wire end of the cable, over the forward and rear heat shrinkable sleeves until the forward end of the TFE 2X sleeve extends 0 inch to 0.2 inch farther than the end of the heat shrinkable sleeves.
- (10) Put these sleeves in this sequence over the cable:
 - (a) A 1.5 inch ± 0.1 inch length of 1/2 inch diameter yellow heat shrinkable sleeve
 - (b) A 2.0 inch ± 0.1 inch length of 3/8 inch diameter yellow heat shrinkable sleeve
 - (c) A 2.5 inch ± 0.1 inch length of 3/8 inch diameter yellow heat shrinkable sleeve.
- (11) Install the cable diameter buildup sleeves. Refer to Figure 11.



CABLE DIAMETER BUILDUP SLEEVES

Figure 11

- (a) Push the 2.5 inch length of 3/8 inch diameter sleeve forward until the forward edge is 0 inch to 0.2 inch behind the forward edge of the TFE 2X sleeve.
- (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (c) Align the forward end of the 2.0 inch length of 3/8 inch diameter sleeve with the forward end of the 2.5 inch sleeve.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF LANDING GEAR CABLES**

- (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (e) Align the forward end of the 1.5 inch length of 1/2 inch diameter sleeve with the forward end of the 2.0 inch sleeve.
- (f) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (12) Assemble the connector. Refer to Subject 20-61-11.
- (13) Put one drop of Vibratite thread lock compound on the internal threads of the saddle clamp.
Make sure that each drop of Vibratite covers a minimum of two threads.
- (14) Engage the threads of the cable clamp and the connector.
- (15) Torque the cable clamp hand tight plus 1/8 of a turn.
- (16) Tighten the clamp saddle screws.
Make sure that the distance from the forward edge of the clamp bar to the forward edge of the heat shrinkable sleeves is 0.13 inch minimum. Refer to Figure 7.
- (17) If the cable clamp does not hold the cable tightly:
 - (a) Remove the cable clamp from the connector.
 - (b) Remove the contacts from the connector. Refer to Subject 20-61-11.
 - (c) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Table 2.
Make sure that the sleeve has the smallest diameter that can move easily on the cable.
 - (d) Put the necessary number of 1 inch lengths of the sleeve on the cable.
 - (e) Align the forward edge of each sleeve with the forward edge of the 1.5 inch length of heat shrinkable sleeve.
 - (f) Shrink each sleeve into position. Refer to Subject 20-10-14.
 - (g) Do Step (12) thru Step (16) again for each sleeve.
Make sure that the clamp holds the cable tightly.
- (18) Install safety wires the saddle screws.

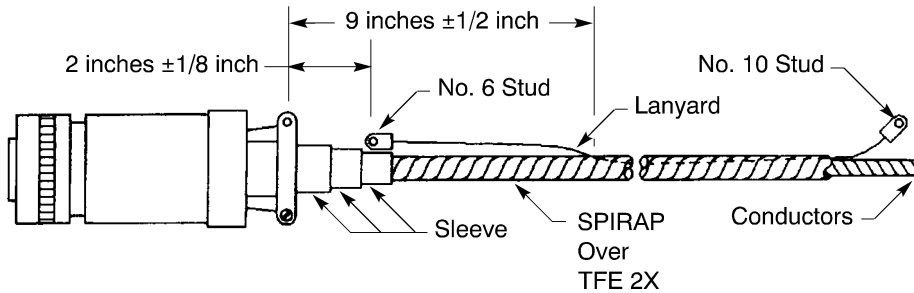
B. Brake Cooling Cable Assembly

- (1) Cut the length of the TFE 2X sleeve. Refer to Table 3.
- (2) Put the TFE 2X sleeve on the cable so that it is 0.9 inch from the cable end.
- (3) Put a 2-1/2 inch length of 3/8 inch diameter heat shrinkable sleeve over the TFE 2X sleeve.
- (4) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (5) Cut the length of SPIRAP. Refer to Table 3.
- (6) Put the SPIRAP on the cable over the TFE 2X sleeve.
- (7) Put a 2 inch length of 1/2 inch diameter heat shrinkable sleeve over the SPIRAP.
- (8) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (9) Put a 1-1/2 inch length of 1/2 inch diameter heat shrinkable sleeve over the SPIRAP and the first sleeve.
- (10) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (11) Assemble the connector. Refer to Subject 20-61-11.
- (12) Put one drop of Vibratite thread lock compound on the internal threads of the saddle clamp.
Make sure that each drop of Vibratite covers a minimum of two threads.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

- (13) Engage the threads of the cable clamp and the connector.
- (14) Torque the cable clamp hand tight plus 1/8 of a turn.
- (15) Make a selection of a lanyard from Table 3.
- (16) Install the lanyard. Refer to Figure 12.



INSTALLATION OF THE LANYARD

Figure 12

- (17) Attach the forward lanyard fitting below one of the clamp saddle screws.
Make sure:
 - That the forward lanyard mounting hole is approximately centered over the rear sleeve
 - To keep the lanyard as straight as possible.

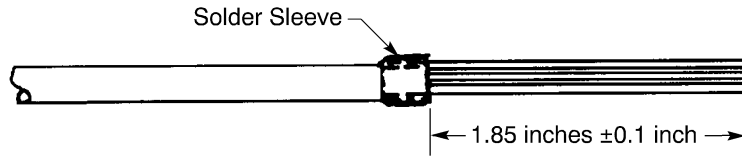
A bend in the cable will result after the lanyard has been secured to the Glenair adapter.
- (18) Tighten the clamp saddle screws.
- (19) If the cable clamp does not hold the cable tightly:
 - (a) Remove the lanyard from the clamp.
 - (b) Remove the clamp from the connector.
 - (c) Remove the contacts from the connector. Refer to Subject 20-61-11.
 - (d) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Table 2.
Make sure that the sleeve has the smallest diameter that can move easily on the cable.
 - (e) Put the necessary number of 1 inch lengths of the sleeve on the cable.
 - (f) Align the forward edge of each sleeve with the forward edge of the 1-1/2 inch length of heat shrinkable sleeve.
 - (g) Shrink each sleeve in position. Refer to Subject 20-10-14.
 - (h) Do Step (11) thru Step (18) again.
Make sure that the clamp holds the cable tightly.
- (20) Install safety wires the on the saddle screws.

C. Tire Pressure Cable Assembly

- (1) Cut the length of the TFE 2X sleeve. Refer to Table 3.
- (2) Put the TFE 2X on the cable.
- (3) Remove 1.85 inches ± 0.1 inch of cable outer jacket.
- (4) Make a shield ground wire with the solder sleeve procedure. Refer to Figure 13 and Subject 20-10-15.

STANDARD WIRING PRACTICES MANUAL

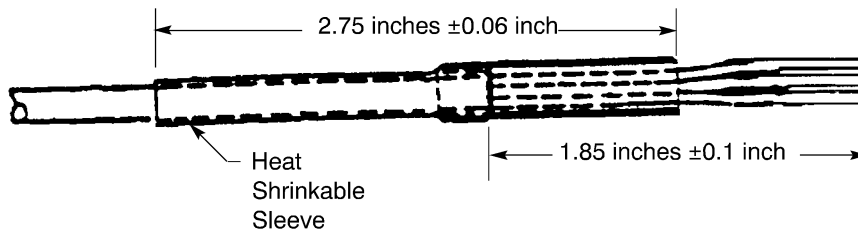
ASSEMBLY OF LANDING GEAR CABLES



CABLE SHIELD TERMINATION

Figure 13

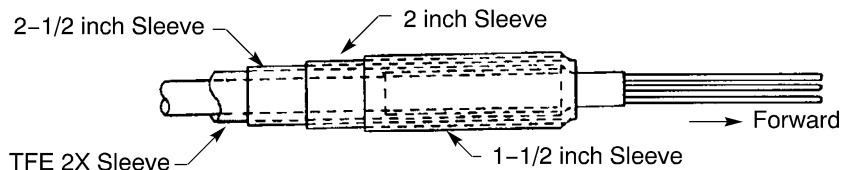
- (5) Put a 1 inch ± 0.06 inch length of 3/16 inch diameter heat shrinkable sleeve against the shield termination.
- (6) Put a 2.75 inch ± 0.06 inch length of 3/16 inch diameter heat shrinkable sleeve over the 1 inch sleeve. Refer to Figure 14.



POSITION OF THE SLEEVE

Figure 14

- (7) Put the TFE 2X sleeve over the cable and heat shrinkable sleeves so that it is flush with the end of the sleeves.
- (8) Put these sleeves in this sequence over the cable:
 - (a) A 1-1/2 inch length of 1/2 inch diameter yellow heat shrinkable sleeve
 - (b) A 2 inch length of 3/8 inch diameter yellow heat shrinkable sleeve
 - (c) A 2-1/2 inch length of 3/8 inch diameter yellow heat shrinkable sleeve.
- (9) Install the cable diameter buildup sleeves. Refer to Figure 15 and Subject 20-10-14.



CABLE DIAMETER BUILDUP SLEEVES

Figure 15

- (a) Put the 2-1/2 length of 3/8 inch diameter sleeve forward until it is flush with the forward edge of the TFE 2X sleeve.
- (b) Shrink the sleeve into position. Subject 20-10-14.
- (c) Put the 2 inch length of 3/8 inch diameter sleeve over the first sleeve.

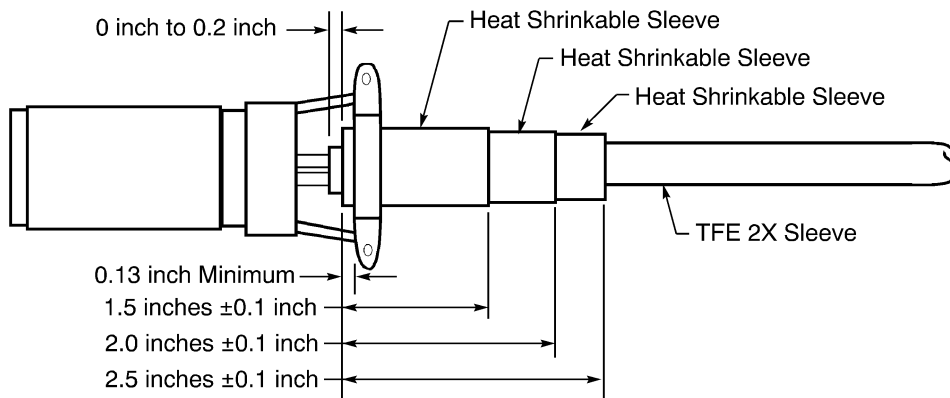
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

- (d) Shrink the sleeve into position. Subject 20-10-14.
- (e) Put the 1-1/2 inch length of 1/2 inch diameter sleeve over the second sleeve.
- (f) Shrink the sleeve into position. Subject 20-10-14.
- (10) Assemble the connector. Refer to Subject 20-61-11.
- (11) Put one drop of Vibratite thread lock compound on the internal threads of the saddle clamp. Make sure that each drop of Vibratite covers a minimum of two threads.
- (12) Engage the threads of the cable clamp and the connector.
- (13) Torque the cable clamp hand tight plus 1/8 of a turn.
- (14) Tighten the clamp saddle screws.
- (15) If the cable clamp does not hold the cable tightly:
 - (a) Remove the cable clamp from the connector.
 - (b) Remove the contacts from the connector. Refer to Subject 20-61-11.
 - (c) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Table 2. Make sure that the sleeve has the smallest diameter that can move easily on the cable.
 - (d) Put the necessary number of 1 inch lengths of the sleeve on the cable.
 - (e) Align the forward edge of each sleeve with the forward edge of the 1-1/2 inch length of heat shrinkable sleeve.
 - (f) Shrink each sleeve in position. Refer to Subject 20-10-14.
 - (g) Do Step (10) thru Step (14) again. Make sure that the clamp holds the cable tightly.
- (16) Install safety wires the on the saddle screws.

4. LANDING GEAR CABLE ASSEMBLY: 767

A. Anti-Skid Cable Assembly



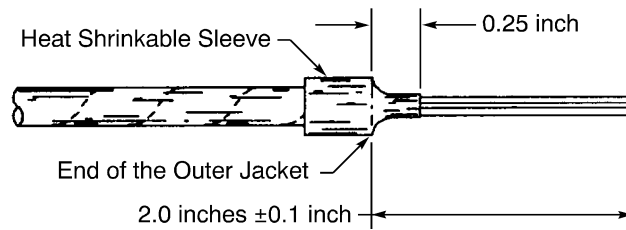
ANTI-SKID CABLE ASSEMBLY
Figure 16

- (1) Make a selection of the necessary length of TFE 2X teflon sleeve. Refer to Table 2 and Table 3.
- (2) Put the sleeve on the cable.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

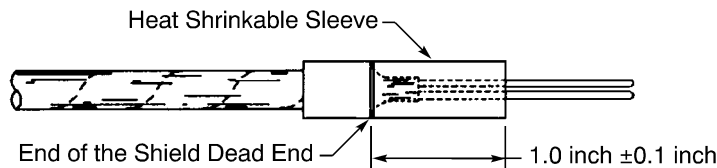
- (3) Remove 2.0 inches ± 0.1 inch of the outer jacket of the cable. Refer to Figure 17.



CABLE SHIELD TERMINATION

Figure 17

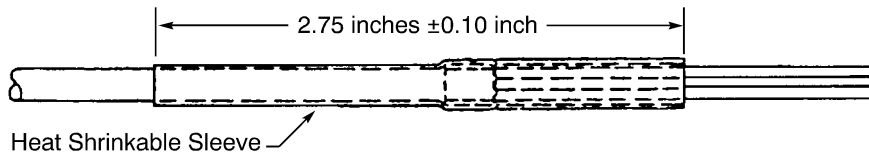
- (4) Assemble a shield dead end. Refer to Figure 17.
- Cut the shield so that the end of the shield is 0.25 inch ± 0.06 inch from the end of the jacket.
 - Fold the shield back over the jacket.
 - Shrink a 3 inch length of heat shrinkable sleeve over the shield.
Make sure the end of the sleeve extends 0.25 inch farther than the end of outer jacket.
- (5) Push a 1.0 inch ± 0.1 inch length of 3/16 inch diameter heat shrinkable sleeve on the cable until the rear end of the sleeve is against the shield dead end. Refer to Figure 18.



POSITION OF THE FORWARD SLEEVE

Figure 18

- (6) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (7) Push a 2.75 inch ± 0.10 inch length of 3/16 inch diameter heat shrinkable sleeve on the cable until the forward end is aligned with the forward end of the 1 inch sleeve. Refer to Figure 19.



POSITION OF THE REAR SLEEVE

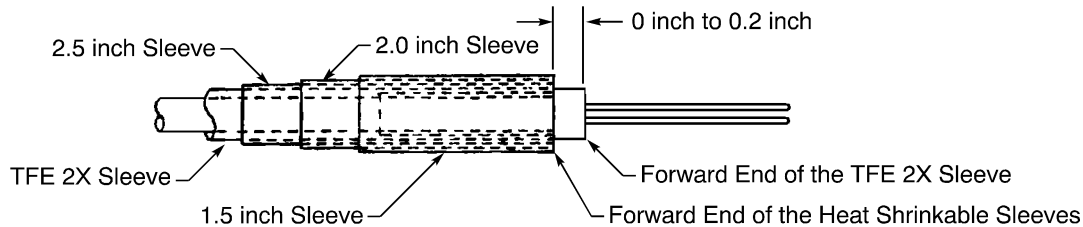
Figure 19

- (8) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (9) Push the TFE 2X sleeve on the wire end of the cable, over the forward and rear heat shrinkable sleeves until the forward end of the TFE 2X sleeve extends 0 inch to 0.2 inch farther than the end of the heat shrinkable sleeves.
- (10) Put these sleeves in this sequence over the cable:

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

- (a) A 1.5 inch \pm 0.1 inch length of 1/2 inch diameter yellow heat shrinkable sleeve
 - (b) A 2.0 inch \pm 0.1 inch length of 3/8 inch diameter yellow heat shrinkable sleeve
 - (c) A 2.5 inch \pm 0.1 inch length of 3/8 inch diameter yellow heat shrinkable sleeve.
- (11) Install the cable diameter buildup sleeves. Refer to Figure 20 and Subject 20-10-14.



CABLE DIAMETER BUILDUP SLEEVES

Figure 20

- (a) Push the 2.5 inch length of 3/8 inch diameter sleeve forward until the forward edge is 0 inch to 0.2 inch behind the forward edge of the TFE 2X sleeve.
 - (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (c) Align the forward end of the 2.0 inch length of 3/8 inch diameter sleeve with the forward end of the 2.5 inch sleeve.
 - (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (e) Align the forward end of the 1.5 inch length of 1/2 inch diameter sleeve with the forward end of the 2.0 inch sleeve.
 - (f) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (12) Assemble the connector. Refer to Subject 20-61-11.
- (13) Put one drop of Vibratite thread lock compound on the internal threads of the saddle clamp. Make sure that each drop of Vibratite covers a minimum of two threads.
- (14) Engage the threads of the cable clamp and the connector.
- (15) Torque the cable clamp hand tight plus 1/8 of a turn.
- (16) Tighten the clamp saddle screws.
- Make sure that the distance from the forward edge of the clamp bar to the forward edge of the heat shrinkable sleeves is 0.13 inch minimum. Refer to Figure 16.
- (17) If the cable clamp does not hold the cable tightly:
- (a) Remove the cable clamp from the connector.
 - (b) Remove the contacts from the connector. Refer to Subject 20-61-11.
 - (c) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Table 2. Make sure that the sleeve has the smallest diameter that can move easily on the cable.
 - (d) Put the necessary number of 1 inch lengths of the sleeve on the cable.
 - (e) Align the forward edge of each sleeve with the forward edge of the 1.5 inch length of heat shrinkable sleeve.
 - (f) Shrink each sleeve into position. Refer to Subject 20-10-14.
 - (g) Do Step (12) thru Step (16) again for each sleeve.

STANDARD WIRING PRACTICES MANUAL

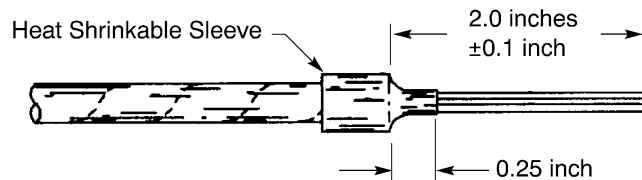
ASSEMBLY OF LANDING GEAR CABLES

Make sure that the clamp holds the cable tightly.

- (18) Install safety wires the on the saddle screws.

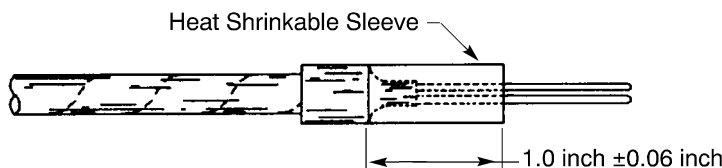
B. Brake Cooling and Tire Pressure Cable Assembly

- (1) Cut the length of the TFE 2X sleeve. Refer to Table 3.
- (2) Put the TFE 2X on the cable.
- (3) Cut the length of SPIRAP. Refer to Table 3.
- (4) Put the SPIRAP on the cable over the TFE 2X sleeve.
- (5) Remove 2.0 inches ± 0.1 inches of the outer jacket of the cable.
- (6) Terminate the shield so that it is a dead end. Refer to Figure 21 and Subject 20-10-15.



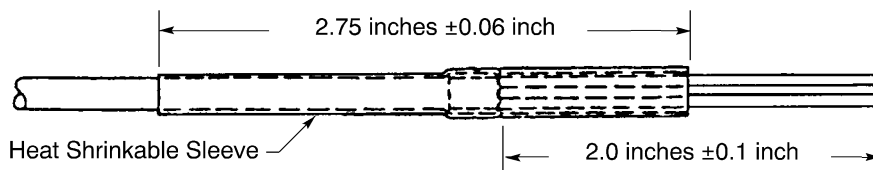
CABLE SHIELD TERMINATION
Figure 21

- (a) Cut the shield so that the end of the shield is 0.25 inch ± 0.06 inch from the end of the jacket.
- (b) Fold the shield back over the jacket.
- (c) Shrink a 3 inch length of heat shrinkable sleeve over the shield.
- (7) Put a 1 inch ± 0.06 inch length of 3/16 inch diameter heat shrinkable sleeve against the shield dead end. Refer to Figure 22.



POSITION OF THE FORWARD SLEEVE
Figure 22

- (8) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (9) Put a 2.75 inch ± 0.06 inch length of 3/16 inch diameter heat shrinkable sleeve over the 1 inch sleeve. Refer to Figure 23.

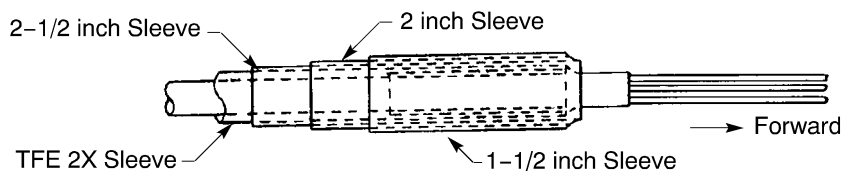


POSITION OF THE REAR SLEEVE
Figure 23

20-85-12

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF LANDING GEAR CABLES**

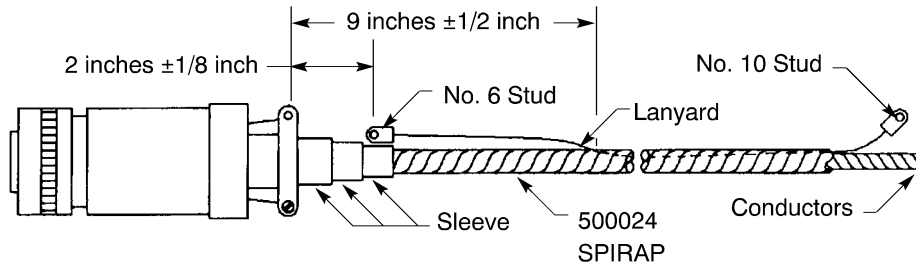
- (10) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (11) Put the TFE 2X sleeve on the wire end of the cable, over the forward and rear heat shrinkable sleeves.
- Make sure that the sleeve extends 0.125 inch farther than the end of the heat shrinkable sleeves.
- (12) Put these sleeves in this sequence over the cable:
- (a) A 1-1/2 inch length of 1/2 inch diameter yellow heat shrinkable sleeve
 - (b) A 2 inch length of 3/8 inch diameter yellow heat shrinkable sleeve
 - (c) A 2-1/2 inch length of 3/8 inch diameter yellow heat shrinkable sleeve.
- (13) Install the cable diameter buildup sleeves. Refer to Figure 24 and Subject 20-10-14.

**CABLE DIAMETER BUILDUP SLEEVES****Figure 24**

- (a) Put the 2-1/2 length of 3/8 inch diameter sleeve forward until it is flush with the forward edge of the TFE 2X sleeve.
 - (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (c) Put the 2 inch length of 3/8 inch diameter sleeve over the first sleeve.
 - (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
 - (e) Put the 1-1/2 inch length of 1/2 inch diameter sleeve over the second sleeve.
 - (f) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (14) Assemble the connector. Refer to Subject 20-61-11.
- (15) Put one drop of Vibratite thread lock compound on the internal threads of the saddle clamp.
- Make sure that each drop of Vibratite covers a minimum of two threads.
- (16) Engage the threads of the cable clamp and the connector.
- (17) Torque the cable clamp hand tight plus 1/8 of a turn.
- (18) Make a selection of a lanyard from Table 3.
- (19) Install the lanyard. Refer to Figure 25.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES



INSTALLATION OF THE LANYARD
Figure 25

(20) Attach the forward lanyard fitting below one of the clamp saddle screws.

Make sure:

- That the forward lanyard mounting hole is approximately centered over the rear sleeve
- To keep the lanyard as straight as possible.

A bend in the cable will result after the lanyard has been secured to the Glenair adapter.

(21) If the cable clamp does not hold the cable tightly:

- (a) Remove the lanyard from the cable clamp.
- (b) Remove the cable clamp from the connector.
- (c) Remove the contacts from the connector. Refer to Subject 20-61-11.
- (d) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Table 2.

Make sure that the sleeve has the smallest diameter that can move easily on the cable.

- (e) Put the necessary number of 1 inch lengths of the sleeve on the cable.
- (f) Align the forward edge of each sleeve with the forward edge of the 1-1/2 inch length of heat shrinkable sleeve.
- (g) Shrink each sleeve in position. Refer to Subject 20-10-14.
- (h) Do Step (14) thru Step (20) again.

Make sure that the clamp holds the cable tightly.

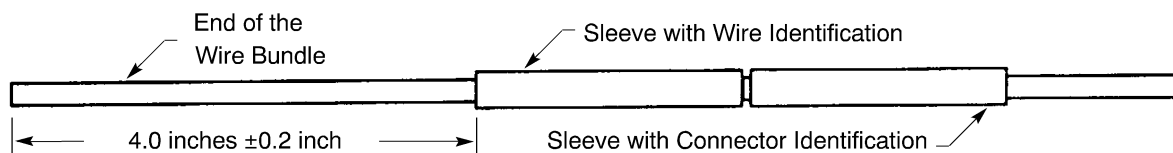
(22) If the cable clamp does not hold the cable tightly, install the necessary number of 1 inch heat shrinkable sleeves.

(23) Install safety wires on the saddle screws.

5. LANDING GEAR IN-AXLE CABLE ASSEMBLY: 777

A. Wire Preparation

(1) Put the sleeves with connector and wire identification on the cable. Refer to Figure 26.

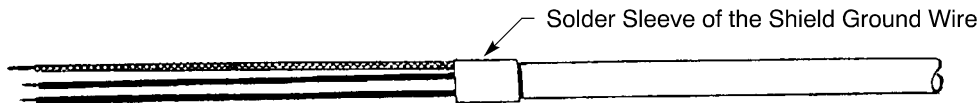


LOCATION OF THE CONNECTOR AND WIRE IDENTIFICATION SLEEVES
Figure 26

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

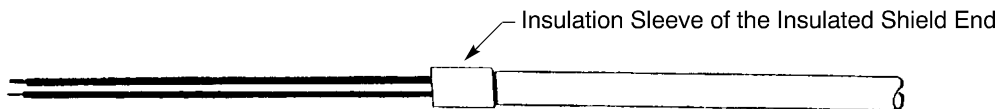
- (a) Put the sleeve with the connector identification on the wire harness.
 - (b) Put the sleeve with the wire identification on the cable so that it is 4.0 inches \pm 0.2 inches from the end of the cable.
 - (c) Shrink the wire identification sleeve into position. Refer to Subject 20-10-14.
- (2) Remove 2.0 inches \pm 0.13 inch of the outer jacket of the cable.
- (3) If the wiring diagram shows that the end of the shield has a shield ground wire, install the shield ground wire with a solder sleeve.
- Refer to Figure 27 and Subject 20-10-15.



SHIELD TERMINATION WITH A SHIELD GROUND WIRE

Figure 27

- (4) If the wiring diagram shows that the end of the shield is not terminated, terminate the shield so that it is a dead end.
- Refer to Figure 28 and Subject 20-10-15.



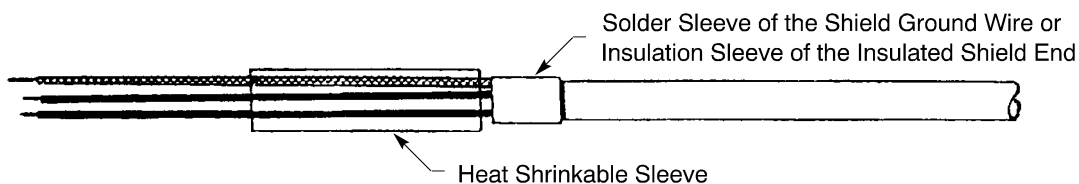
SHIELD DEAD END

Figure 28

- (5) Put a 1.0 inch \pm 0.1 inch length of heat shrinkable sleeve on the cable so that it is adjacent to the solder sleeve of the shield ground wire or against the insulation sleeve of the insulated shield.

NOTE: Use a sleeve with the smallest diameter that can move easily on the wires.

Refer to Figure 29.



POSITION OF THE FORWARD SLEEVE

Figure 29

- (6) Put a 2.75 inch \pm 0.1 inch length of heat shrinkable sleeve over the shield end and the first sleeve so that the edge is aligned with the edge of the first sleeve.

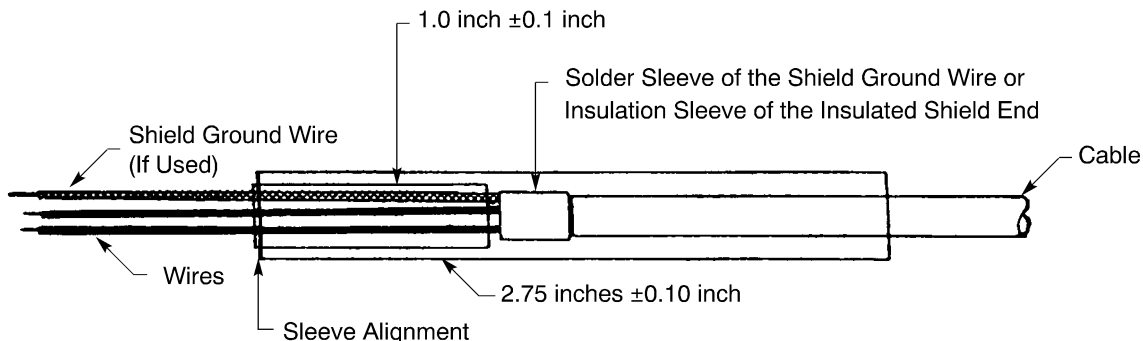
NOTE: Use a sleeve with the smallest diameter that can move easily on the wires.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

Refer to Figure 30.



OUTER CABLE END SLEEVE POSITION
Figure 30

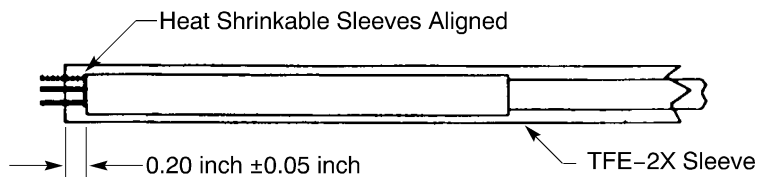
- (7) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (8) Cut a length of TFE 2X sleeve. Refer to Table 4.
This sleeve goes on the sleeves 1.0 inch and 2.75 inch lengths of sleeve.

Table 4
TFE 2X SLEEVE LENGTH

Landing Gear		Sleeve Length (inch)
Axle	Truck Location	
Nose	-	46
Left Main	Front	82
	Center	88
	Rear	73
Right Main	Front	82
	Center	88
	Rear	73

- (9) Put the TFE 2X sleeve on the cable so that the end of the sleeve extends 0.20 inch ± 0.05 inch farther than the aligned end of the other sleeves.

Refer to Figure 31.

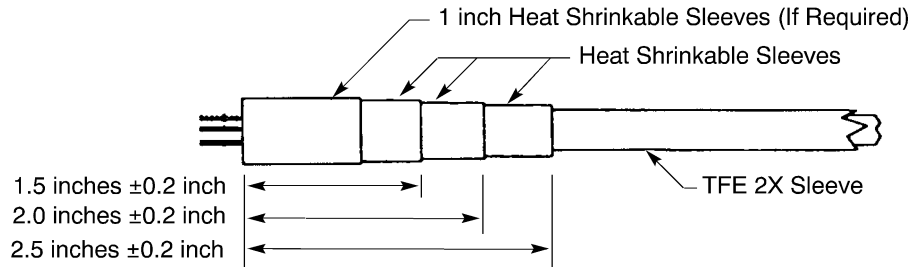


POSITION OF THE TFE 2X SLEEVE
Figure 31

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

- (10) Install the cable diameter buildup sleeves. Refer to Figure 32 and Subject 20-10-14. These sleeves are installed so that the backshell cable clamps hold the cable tightly.



CABLE DIAMETER BUILDUP SLEEVES

Figure 32

- (a) Put a 2.5 inch ± 0.2 inch length of heat shrinkable sleeve on the cable so that the edge of the sleeve aligns with the end of the TFE 2X sleeve.
Make sure that each sleeve has the smallest diameter that can move easily on the cable.
- (b) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (c) Put a 2.0 inch ± 0.2 inch length of heat shrinkable sleeve on the cable so that the edge of the sleeve aligns with the end of the TFE 2X sleeve.
Make sure that each sleeve has the smallest diameter that can move easily on the cable.
- (d) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (e) Put a 1.5 inch ± 0.2 inch length of heat shrinkable sleeve on the cable so that the edge of the sleeve aligns with the end of the TFE 2X sleeve.
Make sure that each sleeve has the smallest diameter that can move easily on the cable.
- (f) Shrink the sleeve into position. Refer to Subject 20-10-14.
- (11) Install more sleeves for cable diameter buildup so that the cable assembly cannot move when the screws of the strain relief clamp are tightened.
Refer to Figure 32 and Subject 20-10-14.
- (a) Put a 1.0 inch ± 0.2 inch length of heat shrinkable sleeve on the cable so that the edge of the sleeve aligns with the end of the TFE 2X sleeve.
Make sure that each sleeve has the smallest diameter that can move easily on the cable.
- (b) Shrink the sleeve into position. Refer to Subject 20-10-14.

B. Connector Assembly

- (1) Put the strain relief backshell on the cable.
- (2) Remove the wire insulation. Refer to Subject 20-61-11.
- (3) Assemble the contacts. Refer to Subject 20-61-11.
- (4) Insert the contacts. Refer to Subject 20-61-11.
- (5) Use the procedures in the Subject 20-25-12 to do these three tasks:
- (6) Attach the strain relief backshell to the connector. Refer to Subject 20-25-12.
- (7) Attach the shield ground wire terminals to the strain relief backshell.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF LANDING GEAR CABLES

- (8) Tighten the cable clamps on the cable. Refer to Subject 20-25-12.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY MT17R-1 CONNECTORS

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	B. Contact Part Numbers	1
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY MT17R-1 CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Connector Part Numbers

**Table 1
CONNECTOR PART NUMBERS**

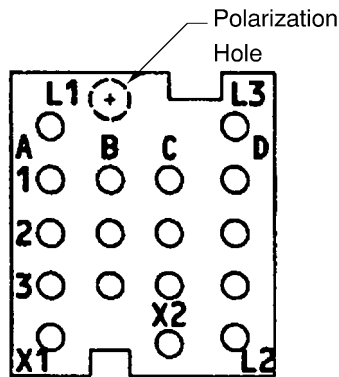
Part Number	Supplier
MT17R-1	Burndy

B. Contact Part Numbers

**Table 2
CONTACT PART NUMBERS**

Contact Size		Part Number	Supplier
Engaging End	Crimp Barrel		
20	20	MS24255-20S	QPL
		BACC47CP1T	Boeing
20	16	48-100-5007S-02	Amphenol

C. Insert Configuration



**BURNDY MT17R-1 RECEPTACLE CONTACT CONFIGURATION
Figure 1**

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY MT17R-1 CONNECTORS

2. CONNECTOR DISASSEMBLY

A. Contact Removal

**Table 3
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	Supplier
20	ST2220-3-13	Boeing
	MS24256-R20	QPL
	294-89	Amphenol
16	ST2220-3-13	Boeing

- (1) Make a selection of a removal tool from Table 3.
- (2) Align the removal tool with the contact on the front side of the connector.
- (3) Press firmly until the contact is loosened.
- (4) Gently pull on the wire from the rear of the receptacle until the contact is completely removed.

3. CONNECTOR ASSEMBLY

A. Contact Assembly

**Table 4
INSULATION REMOVAL LENGTH**

Crimp Barrel Size	Removal Length (inch)	
	Target	Tolerance
20	3/16	1/16
16	5/16	1/16

**Table 5
CONTACT CRIMP TOOLS**

Contact Size		Crimp Tool				
Engaging End	Crimp Barrel	Basic Unit			Locator	
		Part Number	Setting	Die Set	Part Number	Color
20	20	ST2220-1-Y	-	-	ST2220-1-1	-
		M10S	-	S-6	SL-3	-
		MS3191-1	-	-	MS3191-20()	Red
20	16	ST2220-1-Y	-	-	ST22220-1-45	-
		MS3191-1	-	-	294-1140	-

NOTE: A maximum of two AWG 20 wires may be terminated in a size 16 wire barrel.

- (1) Make a selection of a contact from Table 2.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY MT17R-1 CONNECTORS

- (2) Remove the wire insulation to the length given in Table 4.
- (3) Make a selection of a crimp tool from Table 5.
- (4) Insert the wire into the contact crimp barrel.
- (5) Crimp the contact.

B. Contact Insertion

**Table 6
CONTACT INSERTION TOOLS**

Crimp Barrel Size	Insertion Tool			
	Handle	Supplier	Bit	Supplier
20	ST2220-2	Boeing	ST2220-2-8	Boeing
	MS24256-A20	QPL	-	-
	294-88	Burndy	-	-
16	ST2220-2	Boeing	ST2220-2-8	Boeing

- (1) Make a selection of an insertion tool from Table 6.
- (2) Slide the contact into the tool tip.
- (3) Place the contact into the grommet hole at the rear of the receptacle.
- (4) Hold the tool straight and push forward until the contact is fully seated.

4. APPROVED TOOL SUPPLIERS

A. Contact Crimp Tools

**Table 7
CRIMP TOOL SUPPLIERS**

Part Number	Supplier
294-1140	Amphenol
M10S	Burndy
MS3191-1	QPL
MS3191-20()	QPL
S-6	Burndy
SL-3	Burndy
ST2220-1-1	Boeing
ST22220-1-45	Boeing
ST2220-1-Y	Boeing



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ASSEMBLY OF BURNDY MT17R-1 CONNECTORS

B. Contact Insertion Tools

Table 8
INSERTION TOOL SUPPLIERS

Part Number	Supplier
294-88	Burndy
MS24256-A20	QPL
ST2220-2	Boeing
ST2220-2-8	Boeing

C. Contact Removal Tools

Table 9
REMOVAL TOOL SUPPLIERS

Part Number	Supplier
294-89	Amphenol
MS24256-R20	QPL
ST2220-3-13	Boeing

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STANDARD WIRING PRACTICES MANUAL

HF ANTENNA LEAD ASSEMBLY AND PROBE RECEPTACLES

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STANDARD WIRING PRACTICES MANUAL

HF ANTENNA LEAD ASSEMBLY AND PROBE RECEPTACLES

This Subject gives the procedures to assemble the 69B41500 HF antenna lead assembly to the 69-54481 HF probe antenna receptacle.

1. PART NUMBERS AND DESCRIPTION

A. HF Antenna Part Numbers

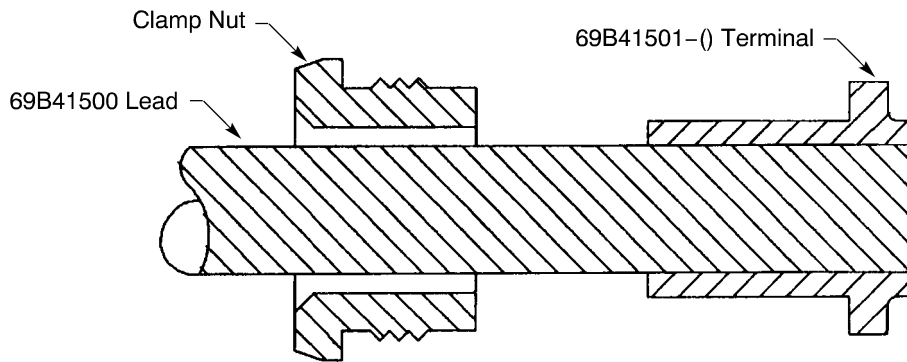
**Table 1
HF ANTENNA PART NUMBERS**

Description	Part Number	Supplier
HF Antenna Lead Assembly	69B41500	Boeing
HF Probe Antenna Receptacle	69-54481	Boeing
Terminal	69B41501-()	Boeing

2. HF ANTENNA LEAD TO HF PROBE ANTENNA RECEPTACLE ASSEMBLY

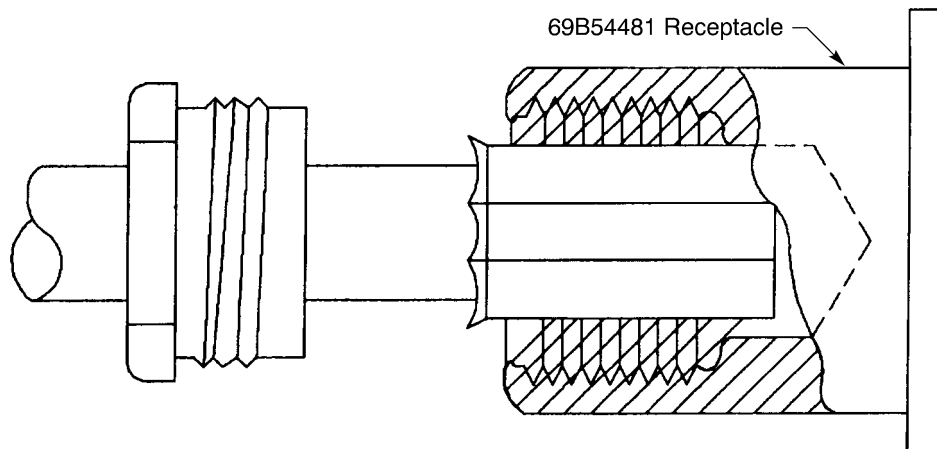
A. Terminal Assembly

- (1) Slide the clamp nut and terminal on the lead. Refer to Figure 1.



**CLAMP NUT AND TERMINAL POSITION
Figure 1**

- (2) Put the 69B41501-() terminal into the 69-54481 antenna receptacle. Refer to Figure 2. Make sure that the terminal is against the bottom of the receptacle.

STANDARD WIRING PRACTICES MANUAL**HF ANTENNA LEAD ASSEMBLY AND PROBE RECEPTACLES****TERMINAL AND RECEPTACLE ASSEMBLY****Figure 2**

- (3) Turn the clamp nut on the receptacle.
- (4) Tighten the clamp nut on the receptacle.
Make sure that the clamp nut is torqued to 95 inch-pounds \pm 5 inch-pounds.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

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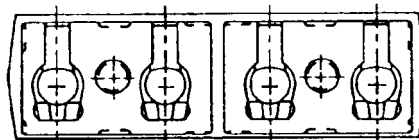
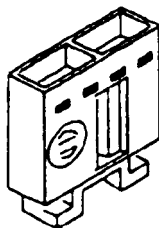
ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

1. PART NUMBERS AND DESCRIPTION

A. Terminal Block Module Part Numbers

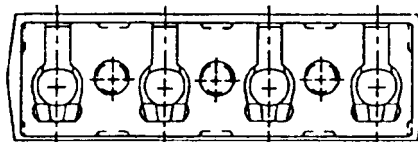
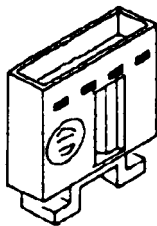
**Table 1
TERMINAL BLOCK MODULES**

Boeing Standard	Block Type (Reference)	Terminal Block Module		
		Part Number	Density	Supplier
BACM15C1A	F	YHLZ-22	Standard	Burndy
BACM15C1B	G	YHLZ-44	Standard	Burndy
BACM15C2A	H	YHLZ-8	Standard	Burndy
BACM15C3A	X	YHLZ16-2	High	Burndy
BACM15C3D		421120-450	High	Precision Connector Design
BACM15C3B	Y	YHLZ16-4	High	Burndy
BACM15C3E		421120-452	High	Precision Connector Design
BACM15C3C	Z	YHLZ16-8	High	Burndy
BACM15C3F		421120-454	High	Precision Connector Design



Four Sockets, Two Sockets In Each Section Are Bussed Together

**TYPE F TERMINAL BLOCK
Figure 1**

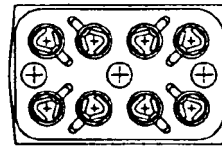
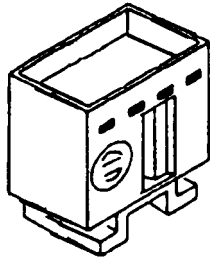


Four Sockets All Bussed Together

**TYPE G TERMINAL BLOCK
Figure 2**

STANDARD WIRING PRACTICES MANUAL

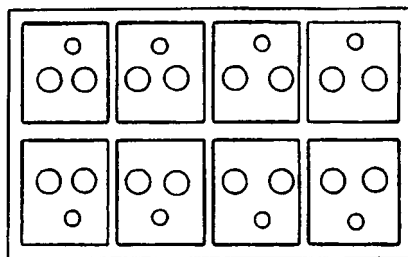
ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES



Eight Sockets All Bussed Together

TYPE H TERMINAL BLOCK

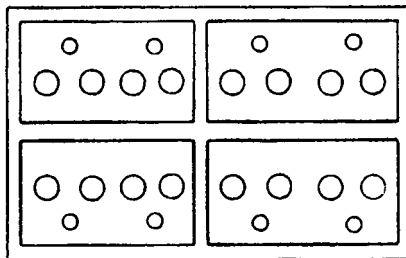
Figure 3



16 Sockets Divided Into 8 Sections,
2 Sockets In Each Section
Are Bussed Together

TYPE X TERMINAL BLOCK

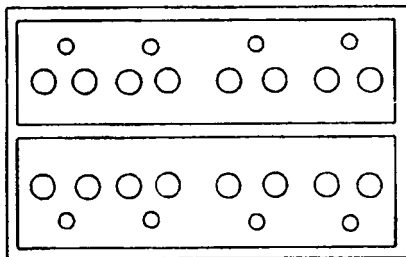
Figure 4



16 Sockets Divided Into 4 Sections,
4 Sockets In Each Section Are
Bussed Together

TYPE Y TERMINAL BLOCK

Figure 5



16 Sockets Divided Into 2 Sections,
8 Sockets In Each Section Are
Bussed Together

TYPE Z TERMINAL BLOCK

Figure 6

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD(-) AND YHLZR(-) TERMINAL BLOCK MODULES

B. Resistor and Diode Terminal Block Part Numbers

**Table 2
BURNDY RESISTOR TERMINAL BLOCK MODULES**

Part Number	Resistance (ohm)	Watts (W)	Tolerance (percent)	Color		Supplier
				Side A	Side B	
YHLZR-1	27K	0.5	2	Blue	Natural	Burndy
YHLZR-2	4.3K	0.5	2	Blue	Black	Burndy
YHLZR-3	5.6K	0.5	2	Black	Black	Burndy
YHLZR-4	6.2K	0.5	2	Yellow	Yellow	Burndy
YHLZR-5	9.1K	0.5	2	Black	Orange	Burndy
YHLZR-6	10	0.25	2	Yellow	Black	Burndy
YHLZR-7	120	0.25	5	Yellow	Green	Burndy
YHLZR-8	51.1K	0.25	1	Yellow	Blue	Burndy
YHLZR-9	12K	0.5	2	Yellow	Red	Burndy
YHLZR-10	11K	0.25	1	Yellow	Natural	Burndy
YHLZR-11	24K	0.5	2	Brown	Brown	Burndy
YHLZR-13	240	0.25	2	Brown	Brown	Burndy
YHLZR-14	1K	0.5	2	Green	Green	Burndy
YHLZR-15	2.7K	0.5	2	Black	Red	Burndy
YHLZR-16	71.5	0.5	1	Red	Orange	Burndy
YHLZR-17	2.0K	2	1	Green	Brown	Burndy
YHLZR-18	4.3K	0.5	2	Brown	Brown	Burndy
YHLZR-19	270	0.5	1	Brown	Brown	Burndy
YHLZR-20	820	0.5	1	Brown	Brown	Burndy
YHLZR-21	23.2K	0.25	1	Brown	Brown	Burndy
YHLZR-22	2.15K	0.25	1	Brown	Brown	Burndy
YHLZR-23	1.69K	0.25	1	Brown	Brown	Burndy
YHLZR-24	750	0.25	1	Brown	Brown	Burndy
YHLZR-25	487	0.25	1	Brown	Brown	Burndy
YHLZR-26	316	0.25	1	Brown	Brown	Burndy
YHLZR-27	232	0.25	1	Brown	Brown	Burndy
YHLZR-28	1.8K	0.1	0.5	Brown	Brown	Burndy
YHLZR-29	1.5K	0.25	1	Brown	Brown	Burndy
YHLZR-30	3K	0.125	0.5	Brown	Brown	Burndy

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

Table 2 (continued)

Part Number	Resistance (ohm)	Watts (W)	Tolerance (percent)	Color		Supplier
				Side A	Side B	
YHLZR-31	16K	0.25	2	Brown	Brown	Burndy
YHLZR-32	100K	0.1	1	Brown	Brown	Burndy
YHLZR-33	10K	0.25	2	Brown	Brown	Burndy
YHLZR-34	120K	0.1	1	Brown	Brown	Burndy
YHLZR-35	80.6K	0.125	1	Brown	Brown	Burndy
YHLZR-36	33K	0.25	5	Brown	Brown	Burndy
YHLZR-37	15	2	1	Brown	Brown	Burndy
YHLZR-38	4.99K	0.25	1	Brown	Brown	Burndy
YHLZR-39	332	0.5	1	Brown	Brown	Burndy
YHLZR-40	365	0.5	1	Brown	Brown	Burndy
YHLZR-41	200K	0.25	1	Brown	Brown	Burndy
YHLZR-42	100	0.5	1	Brown	Brown	Burndy
YHLZR-43	47K	0.25	2	Brown	Brown	Burndy
YHLZR-44	200K	0.25	1	Brown	Brown	Burndy
YHLZR-47	150	1	2	Brown	Brown	Burndy

Table 3
BURNDY DIODE TERMINAL BLOCK MODULES

Part Number	Color		Diode Type	Supplier	Notes
	Side A	Side B			
YHLZD-9	Red	Red	JAN 1N3613	Burndy	YHLZD-32 is Preferred
YHLZD-11	Red	Green	JAN 1N3022	Burndy	-
YHLZD-14	Red	Blue	R4615	Burndy	No Longer Available, No Alternate
YHLZD-15	Red	Natural	1N5552	Burndy	Obsolete, Use YHLZD-33
YHLZD-23	Green	Blue	UZ1325	Burndy	No Longer Available, No Alternate
YHLZD-24	Green	Orange	UDZ860	Burndy	-
YHLZD-26	Green	Black	1N5061	Burndy	-
YHLZD-28	Brown	Black	JANTX 1N4965	Burndy	-
YHLZD-29	Brown	Yellow	JANTX 1N5551	Burndy	-
YHLZD-30	Brown	Orange	JANTX 1N5618	Burndy	-
YHLZD-31	Green	Yellow	JANTX 1N4971	Burndy	-

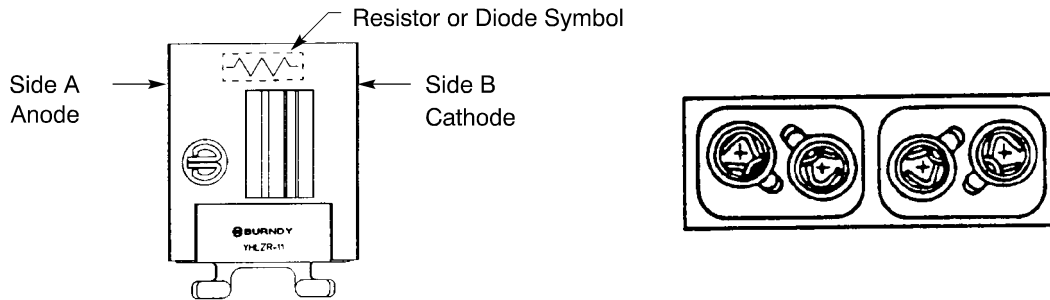
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

Table 3 (continued)

Part Number	Color		Diode Type	Supplier	Notes
	Side A	Side B			
YHLZD-32	Blue	Yellow	JANTX 1N3613	Burndy	-
YHLZD-33	Red	Yellow	JANTX 1N5552	Burndy	-
YHLZD-34	Red	Brown	JANTX 1N5553	Burndy	-
YHLZD-35	Red	Black	JANTX 1N4148-1	Burndy	-
YHLZD-38	Blue	Blue	JANTX 1N4972	Burndy	-
YHLZD-39	Natural	Red	JANTX 1N6467	Burndy	-



TYPE F RESISTOR OR DIODE TERMINAL BLOCK
Figure 7

C. Terminal Block Module Accessory Part Numbers

NOTE: A BACS18AR1 identification spacer is not necessary when the BACC29A2 end clamp is used.

Table 4
TERMINAL BLOCK MODULE ACCESSORIES

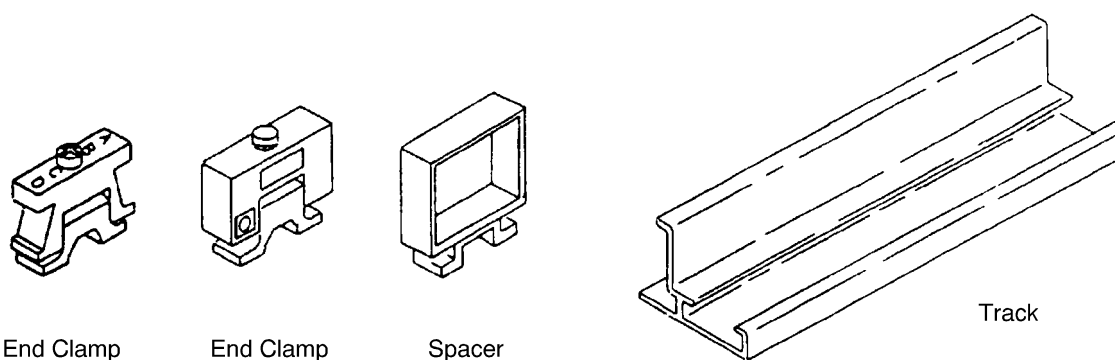
Accessory	Boeing Standard	Module Accessories	
		Part Number	Supplier
End Clamp	BACC49A1	AMMC-6	Burndy
		H-28-1	Harper
		UP103	Metal Forms
	BACC49A2	H-49-2	Harper
		MF104-2	Metal Forms
	BACC49A3	H-49-3	Harper
MF104-3		Metal Forms	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

Table 4 (continued)

Accessory	Boeing Standard	Module Accessories	
		Part Number	Supplier
Spacer	BACS18AR1	YHLZ1C-2	Burndy
		FAB276-A	Fabricators
		H-21-1	Harper
		UP300-1	Metal Forms
	BACS18AR6	YHLZ1C-7	Burndy
		FAB276-0	Fabricators
		H-21-6	Harper
		UP300-6	Metal Forms
Track	BACT44()	AMY()T()	Burndy



TERMINAL BLOCK MODULE ACCESSORIES
Figure 8

D. Contact Part Numbers for the Standard Density Terminal Block

NOTE: The Boeing Standard contacts that have the suffix A are recommended over the contacts that do not have the suffix A.

Table 5
STANDARD DENSITY CONTACT PART NUMBERS

Boeing Standard	Contact	
	Part Number	Supplier
BACC47DE1A	YHMM16-6D28	Burndy
	417-1215-332	Tri-Star
BACC47DE1	YHMM16-1F50	Burndy



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ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

Table 5 (continued)

Boeing Standard	Contact	
	Part Number	Supplier
BACC47DE3A	YHMM22-4D28	Burndy
	417-1223-332	Tri-Star
BACC47DE3	YHMM22-1DB8	Burndy
BACC47DE4A	YHMM22-5D28	Burndy
	417-1222-332	Tri-Star
BACC47DE4	YHMM22-2DB8	Burndy
BACC47DE5A	YHMM16-7D28	Burndy
	417-1216-332	Tri-Star
BACC47DE5	YHMM16-4F50	Burndy
BACC47DE6A	YHMM18-3D28	Burndy
	417-1218-332	Tri-Star
BACC47DE6	YHMM18-2F50	Burndy
BACC47DE7A	YHMM20-3D28	Burndy
	417-1220-332	Tri-Star
BACC47DE7	YHMM20-2DB8	Burndy
BACC47DE8A	YHMM24-3D28	Burndy
	417-1224-332	Tri-Star
BACC47DE8	YHMM24-1F50	Burndy

Table 6

ALTERNATIVE CONTACT PART NUMBERS

SPECIFIED CONTACT		ALTERNATIVE CONTACT	
Part Number	Supplier	Part Number	Supplier
YHMM20-1F50	Burndy	BACC47DE7A	Boeing

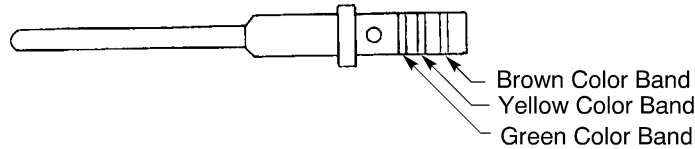
E. Contact Part Numbers for the High Density Terminal Block

Table 7

HIGH DENSITY CONTACT PART NUMBERS

Part Number	Crimp Barrel Color Code	Supplier
M39029/11-145	Brown Yellow Green	QPL

20-90-11

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES**

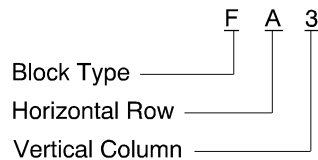
THE M39029/11-145 CONTACT
Figure 9

2. TERMINAL BLOCK MODULE LOCATION CODES**A. Terminal Block Module Identification**

Terminal block modules are identified on the wire diagrams by a code that gives:

- The block type
- The location.

Refer to Figure 10.



TERMINAL BLOCK MODULE LOCATION CODE
Figure 10

The location code is the position of the block in relation to the horizontal row identifier and the vertical column identifier.

Refer to Figure 11.

The vertical column identifier:

- Can be located on the T bar or on the block mount rail
- Gives the column of the cavities that is directly adjacent to the number.

The horizontal row identifier:

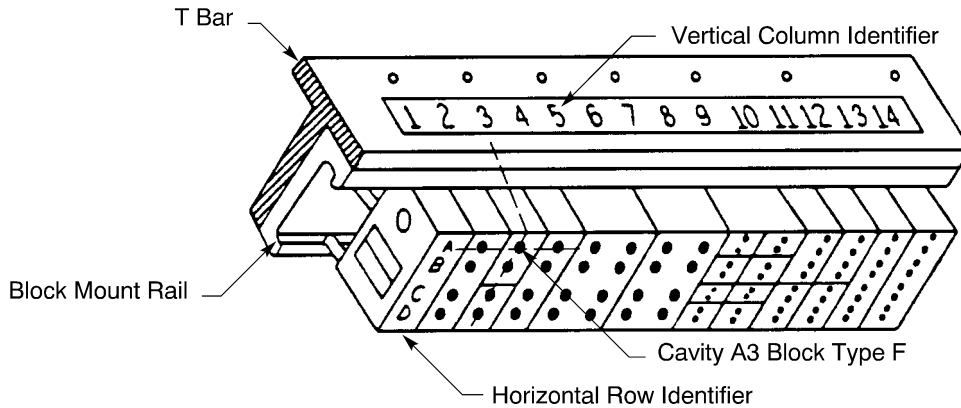
- Can be located on the end clamp, on a spacer, or on the block mount rail
- Gives the row of the cavities in all the blocks in the rail that is directly adjacent to the letter.

NOTE: If the block module identification code does not have a horizontal row identifier:

- All the cavities in that column are bussed together
- The horizontal location is not important.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES



LOCATION OF A MODULE
Figure 11

3. TERMINAL BLOCK MODULE REMOVAL

A. Removal of the Module from the Track

- (1) Loosen the clamp screw until the clamp can be moved.
 - (2) Turn the clamp 90 degrees and lift from the track.
- NOTE: A satisfactory alternative is to slide the clamp out of the track.
- (3) Move or remove any terminal block modules next to the specified module.
 - (4) To remove the block module, turn the module 90 degrees and lift from the track.

NOTE: A satisfactory alternative is to slide the block module out of the track.

4. TERMINAL BLOCK MODULE DISASSEMBLY

A. Contact Removal from Standard Density Terminal Block Modules

Table 8
CONTACT REMOVAL TOOLS

Contact	Removal Tool		
	Handle	Tip	Supplier
BACC47DE()	ATB3062-2	-	Astro
	DHK21	-	Daniels
	J-1276-1	-	Burndy
	ST2220-3-34-1	ST2220-3-34A-3	Boeing
	ST2220-3-34-2	ST2220-3-34A-8	Boeing

- (1) Make a selection of a contact removal tool from Table 8.

CAUTION: USE ONLY THE REMOVAL TOOLS THAT ARE GIVEN IN TABLE 8. OTHER TOOLS CAN CAUSE DAMAGE TO THE MODULE.

- (2) Put the removal tool into the contact removal tool slot in the module.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

The contact removal tool slot is adjacent to the contact.

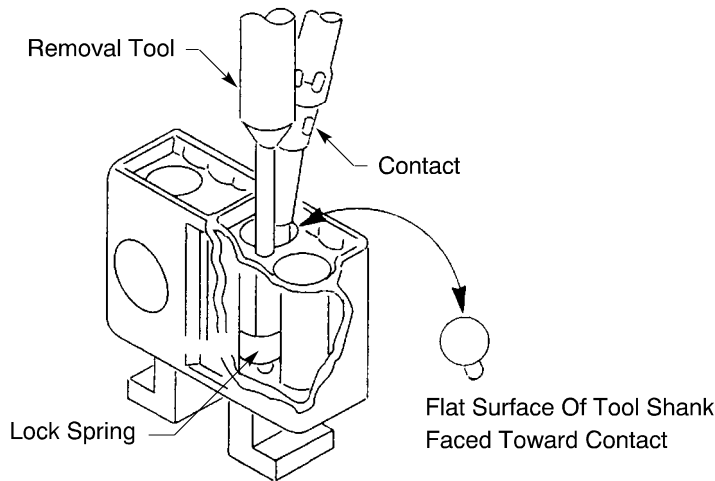
- (3) Push the tool into the slot of the module until it stops.

This releases the lock spring that locks the contact in position.

CAUTION: IF A CONTACT IS REMOVED WHEN THE LOCK SPRING IS NOT RELEASED, DAMAGE TO ANY OF THESE COMPONENTS OCCURS:

- THE CONTACT
- THE MODULE
- THE WIRE.

- (4) Carefully, pull the wire and the contact from the cavity of the module. Refer to Figure 12.



CONTACT REMOVAL
Figure 12

- (5) After the wired contact is removed, pull the removal tool out of the slot.

B. Contact Removal from High Density Terminal Block Modules

Table 9
CONTACT REMOVAL TOOLS

Contact	Removal Tool	Supplier
M39029/11-145	CIET20HDL	Cannon
	DRK-269	Daniels
	M81969/1-02	QPL
	MS3156-20	QPL

- (1) Make a selection of a removal tool from Table 9.

NOTE: The DRK-269 contact removal tool is recommended for high density terminal blocks.

- (2) Put the removal tool on the wire.
- (3) Push the tool on the wire and into the module block until it stops.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

- (4) Hold the wire against the tool.
- (5) Pull the tool and the wired contact out of the module at the same time.

5. STANDARD DENSITY TERMINAL BLOCK MODULE ASSEMBLY

A. Contact Assembly

**Table 10
CONTACT SELECTION FOR A CONTACT THAT HAS ONE WIRE IN THE CRIMP BARREL**

Wire Size (AWG)	Wire Insulation Diameter (inch)		Contact			
	Min	Max	Crimp Barrel Wire Size Range	Boeing Standard	Finish	Color Band
24	0.032	0.045	24	BACC47DE8A	Gold	Violet
				BACC47DE8	Silver	Green
	0.041	0.065	22-24	BACC47DE4A	Gold	Green
				BACC47DE4	Gold	Green
	0.070	0.080	22-24	BACC47DE3A	Gold	None
				BACC47DE3	Gold	None
22	0.047	0.065	20-22	BACC47DE7A	Gold	Red
				BACC47DE7	Gold	Red
	0.041	0.065	22-24	BACC47DE4A	Gold	Green
				BACC47DE4	Gold	Green
	0.070	0.080	22-24	BACC47DE3A	Gold	None
				BACC47DE3	Gold	None
20	0.047	0.065	20-22	BACC47DE7A	Gold	Red
				BACC47DE7	Gold	Red
	0.056	0.069	18-20	BACC47DE6A	Gold	Black
				BACC47DE6	Silver	Black
	0.063	0.083	16-20	BACC47DE5A	Gold	Blue
				BACC47DE5	Silver	Red
0.080	0.110	16-20	BACC47DE1A	Gold	Brown	
			BACC47DE1	Silver	None	

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

Table 10 (continued)

Wire Size (AWG)	Wire Insulation Diameter (inch)		Contact			
	Min	Max	Crimp Barrel Wire Size Range	Boeing Standard	Finish	Color Band
18	0.056	0.069	18-20	BACC47DE6A	Gold	Black
				BACC47DE6	Silver	Black
	0.063	0.083	16-20	BACC47DE5A	Gold	Blue
				BACC47DE5	Silver	Red
	0.080	0.110	16-20	BACC47DE1A	Gold	Brown
				BACC47DE1	Silver	None
16	0.063	0.083	16-20	BACC47DE5A	Gold	Blue
				BACC47DE5	Silver	Red
	0.080	0.110	16-20	BACC47DE1A	Gold	Brown
				BACC47DE1	Silver	None

Table 11

CONTACT SELECTION FOR A CONTACT THAT HAS TWO WIRES IN THE CRIMP BARREL

Wire Combination		Boeing Standard
First Wire Conductor Size (AWG)	Second Wire Conductor Size (AWG)	
20	20	BACC47DE1A
		BACC47DE1
		BACC47DE5A
		BACC47DE5
		BACC47DE6A
		BACC47DE6
20	22	BACC47DE1A
		BACC47DE1
		BACC47DE5A
		BACC47DE5
		BACC47DE6A
		BACC47DE6

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

Table 11 (continued)

Wire Combination		Boeing Standard
First Wire Conductor Size (AWG)	Second Wire Conductor Size (AWG)	
20	24	BACC47DE1A
		BACC47DE1
		BACC47DE5A
		BACC47DE5
		BACC47DE6A
		BACC47DE6
22	22	BACC47DE1A
		BACC47DE1
		BACC47DE5A
		BACC47DE5
		BACC47DE6A
		BACC47DE6
22	24	BACC47DE1A
		BACC47DE1
		BACC47DE5A
		BACC47DE5
		BACC47DE6A
		BACC47DE6
24	24	BACC47DE1A
		BACC47DE1
		BACC47DE5A
		BACC47DE5
		BACC47DE6A
		BACC47DE6

Table 12
MANUAL CRIMP TOOLS

Basic Unit	Die	Locator	Supplier
M10S-1	S-1	SL-53	Burndy

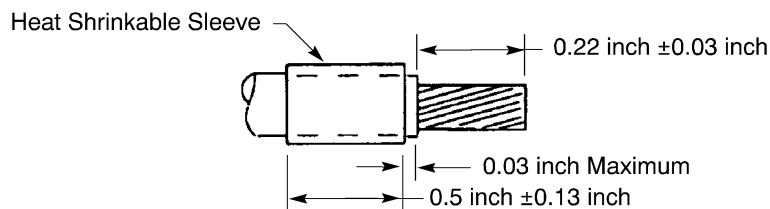
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

**Table 13
POWER CRIMP TOOLS**

Basic Unit	Die	Positioner	Supplier
YD2-1	YDD-1	-	Burndy
AM2-4	AMK-11	-	Burndy
AM4D-1	AMK-11	-	Burndy
WA22HPB	-	D30	Daniels
WA27XF	-	TP-904	Daniels
WA27FAP	-	AP27SA	Daniels

- (1) Make a selection of a contact from:
 - Table 10 for a contact that has one wire in the crimp barrel
 - Table 11 for a contact that has two wires in the crimp barrel.
- (2) Remove 0.22 inch \pm 0.03 inch of the insulation from the end of the wire or wires. Refer to Figure 13.



**WIRE PREPARATION
Figure 13**

- (3) If only one wire will be terminated in the contact, measure the diameter of the insulation of the wire.
- (4) If one wire will be terminated in the contact, and If the wire insulation diameter is less than the minimum wire insulation diameter specified in Table 10 for the contact, do step (a) through step (d).
 - (a) Make a selection of a Grade B, Class 1 heat shrinkable sleeve from Subject 20-00-11.
 - (b) Put a 0.5 inch \pm 0.13 inch length of the sleeve on the wire.
Make sure that the end of the sleeve is aligned with the end of the wire insulation.
 - (c) Shrink the sleeve in its position. Refer to Subject 20-10-14.
Make sure that the end of the sleeve:
 - Is not on the conductor
 - Is within 0.03 inch of the end of the insulation.
 - (d) If the insulation grip of the contact and the outer diameter of the sleeve on the wire do not make a fit, measure the new diameter of the sleeve and insulation on the wire, and make a selection of a different contact from Table 10.
- (5) Make a selection of a manual crimp tool from Table 12 or a power crimp tool from Table 13.
- (6) Put the conductor or the conductors into the crimp barrel of the contact. Refer to Figure 14.

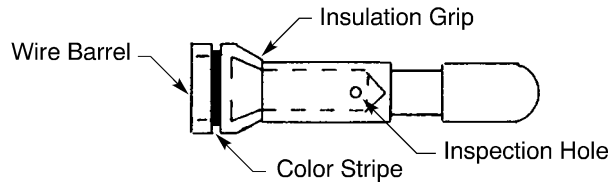
STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

Make sure that:

- All of the conductors of the wire or wires are inside the crimp barrel of the contact
- The conductors can be seen in the inspection hole of the contact
- If only one wire is in the crimp barrel of the contact, the wire insulation is against the bottom of the insulation grip of the contact.

NOTE: If two wires are in the crimp barrel, it is not necessary for the wire insulation of the wire to be in the insulation grip of the contact.

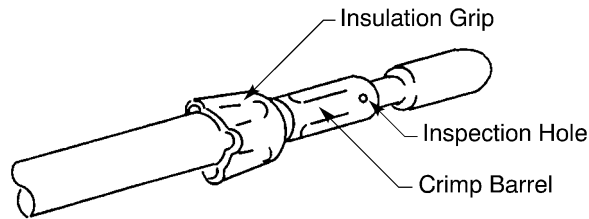


POSITION OF THE CONTACT
Figure 14

(7) Crimp the contact. Refer to Figure 15.

Make sure that there are four crimp indents on:

- The contact crimp barrel
- The wire insulation grip.



CONTACT CRIMP DETAIL
Figure 15

B. Contact Insertion

Table 14
CONTACT INSERTION TOOLS

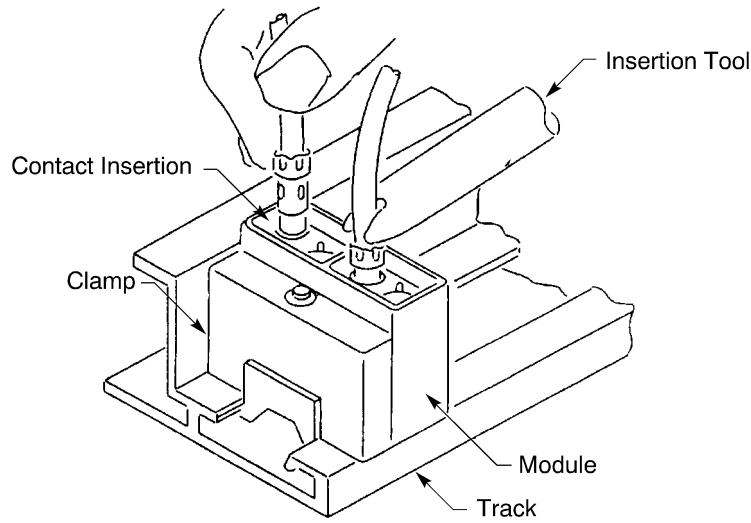
Contact	Insertion Tool	Supplier
BACC47DE()	ST2220-3-34A-1	Boeing
	ST2220-3-34A-2	Boeing

- (1) Make a selection of a contact insertion tool from Table 14.
- (2) Put the tip of the wired contact into the contact cavity of the module.
- (3) Put the tip of the tool on the contact until it makes a click and the contact stops.
- (4) Push the contact in position. Refer to Figure 16.

Make sure that the contact is locked in the module.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES



CONTACT INSERTION
Figure 16

6. HIGH DENSITY TERMINAL BLOCK MODULE ASSEMBLY

A. Contact Assembly

Table 15
CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Supplier	Part Number	Supplier
24	20	612916	6	Buchanan	-	-
		M22520/2-01	5	QPL	M22520/2-08	QPL
		M22520/7-01	4	QPL	M22520/7-02	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-43	Boeing
		WA22	5	Daniels	M22520/2-08	QPL
22	20	612916	7	Buchanan	-	-
		M22520/2-01	6	QPL	M22520/2-08	QPL
		M22520/7-01	5	QPL	M22520/7-02	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-43	Boeing
		WA22	6	Daniels	M22520/2-08	QPL

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES

Table 15 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Supplier	Part Number	Supplier
20	20	612916	8	Buchanan	-	-
		M22520/2-01	7	QPL	M22520/2-08	QPL
		M22520/7-01	6	QPL	M22520/7-02	QPL
		ST2220-1-Y	-	Boeing	ST2220-1-43	Boeing
		WA22	7	Daniels	M22520/2-08	QPL

- (1) Make a selection of a contact from Table 7.
- (2) Remove 3/16 inch ± 1/32 inch of the wire insulation.
- (3) Make a selection of a crimp tool from Table 15.
- (4) Put the conductor into the wire barrel of the contact.
- (5) Crimp the contact.

B. Contact Insertion

**Table 16
CONTACT INSERTION TOOLS**

Contact	Insertion Tool	Supplier
M39029/11-145	M81969/1-02	QPL
	MS3156-20	QPL

- (1) Make a selection of an insertion tool from Table 16.
NOTE: Manual insertion of the contact is a satisfactory alternative.
- (2) Insert the wired contact into the contact cavity.

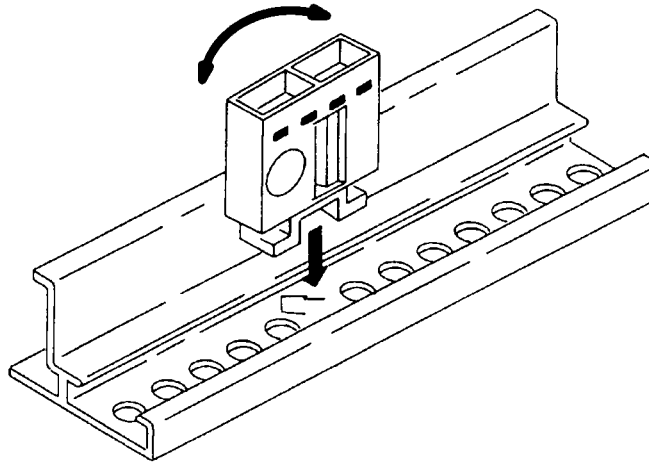
7. TERMINAL BLOCK MODULE INSTALLATION

A. Installation of the Module on the Track

- (1) Install the block module. Refer to Figure 17.
NOTE: A satisfactory alternative is to slide the block module into the track from the end.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BACM15C AND BURNDY YHLZD-() AND YHLZR-() TERMINAL BLOCK MODULES



INSTALLATION OF A MODULE
Figure 17

- (a) Put the block module in the track.
Make sure that the sides of the terminal blocks and the end clamps that have the part numbers are turned toward the open side of the track assembly.
- (b) Turn the block 90 degrees.
- (2) When all the terminal blocks and fillers are aligned correctly in the track, push the end clamp tightly against the last block or filler.

NOTE: The A side of the end clamp is on the closed side of the track assembly.

- (3) Tighten the clamp screw so that:
 - The lockwasher is fully compressed
 - The end clamp does not move or turn when pressure is applied.

NOTE: Only a split lockwasher is permitted under the screw head.



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ASSEMBLY OF BURNDY SEALOK SEALED TERMINAL BLOCKS

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY SEALOK SEALED TERMINAL BLOCKS

1. PART NUMBERS AND DESCRIPTION

A. Terminal Block Part Numbers

Table 1
TERMINAL BLOCK PART NUMBERS

Terminal Block		Contact
Part Number	Supplier	
TBS20-8-1	Burndy	YTB20-2
TBS20-22-1	Burndy	YTB20-2
TBS20-42-1	Burndy	YTB20-2
TBS20-44-1	Burndy	YTB20-2
TBS20-62-1	Burndy	YTB20-2
TBS1620-8-1	Burndy	YTB16-1
		YTB20-2
TBS1620-22-1	Burndy	YTB16-1
		YTB20-2
TBS1620-44-1	Burndy	YTB16-1
		YTB20-2
TBS16-8-1	Burndy	YTB16-1
TBS16-22-1	Burndy	YTB16-1
TBS16-44-1	Burndy	YTB16-1
TBS12-8-1	Burndy	YTB12-1
TBS12-22-1	Burndy	YTB12-1
TBS12-44-1	Burndy	YTB12-1

B. Contact Part Numbers

Table 2
TERMINAL BLOCK CONTACT PART NUMBERS

Part Number	Supplier
YTB20-2	Burndy
YTB16-1	Burndy
YTB12-1	Burndy

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY SEALOK SEALED TERMINAL BLOCKS

C. Seal Plug Part Numbers

**Table 3
SEAL PLUG PART NUMBERS**

Terminal Block	Seal Plug		
	Part Number	Color	Supplier
TBS20-8-1	TBP20-1	Red	Burndy
TBS20-22-1	TBP20-1	Red	Burndy
TBS20-42-1	TBP20-1	Red	Burndy
TBS20-44-1	TBP20-1	Red	Burndy
TBS20-62-1	TBP20-1	Red	Burndy
TBS1620-8-1	TBP16-1	Blue	Burndy
	TBP20-1	Red	Burndy
TBS1620-22-1	TBP16-1	Blue	Burndy
	TBP20-1	Red	Burndy
TBS1620-44-1	TBP16-1	Blue	Burndy
	TBP20-1	Red	Burndy
TBS16-8-1	TBP16-1	Blue	Burndy
TBS16-22-1	TBP16-1	Blue	Burndy
TBS16-44-1	TBP16-1	Blue	Burndy
TBS12-8-1	TBP12-1	Yellow	Burndy
TBS12-22-1	TBP12-1	Yellow	Burndy
TBS12-44-1	TBP12-1	Yellow	Burndy

D. Terminal Block Mounting Track Part Number

**Table 4
TERMINAL BLOCK MOUNTING TRACK PART NUMBERS**

Mounting Track	Supplier
TBT7200-()	Burndy

2. TERMINAL BLOCK DISASSEMBLY

A. Terminal Block Removal

- (1) Make a selection of the removal tool from Table 8.
- (2) Remove the terminal block from the mounting track.
Refer to the instructions on the tool.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF BURNDY SEALOK SEALED TERMINAL BLOCKS

B. Contact Removal

- (1) Make a selection of the contact removal tool from Table 7.
- (2) Remove the contact from the module block with the removal end of the tool.

3. TERMINAL BLOCK ASSEMBLY

A. Contact Assembly

**Table 5
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact	Removal Length (inch)	
		Target	Tolerance
24	YBT20-2	3/16	± 1/32
22	YBT20-2	3/16	± 1/32
20	YBT20-2	3/16	± 1/32
	YBT16-1	3/16	± 1/32
18	YBT16-1	3/16	± 1/32
16	YBT16-1	3/16	± 1/32
14	YBT12-1	1/4	± 1/32
12	YBT12-1	1/4	± 1/32

**Table 6
CONTACT CRIMP TOOLS**

Contact	Crimp Tool			
	Basic Unit	Die	Locator	Supplier
YBT12-1	M10S-1	S-8	SL-2	Burndy
YBT16-1	M10S-1	S-7	SL-3A	Burndy
YBT20-2	M10S-1	S-6A	SL-3A	Burndy

- (1) Remove the necessary length of insulation from the end of the wire.
Refer to Table 5 and Subject 20-00-15.
- (2) Make a selection of a crimp tool from Table 6.
- (3) Put the wire in the crimp barrel of the contact.
Make sure that:
 - All the strands of the conductor are in the crimp barrel
 - The strands of the conductor are can be seen in the inspection hole.
- (4) Crimp the contact.

STANDARD WIRING PRACTICES MANUAL**ASSEMBLY OF BURNDY SEALOK SEALED TERMINAL BLOCKS****B. Contact Insertion**

Table 7
CONTACT INSERTION AND REMOVAL TOOLS

Contact	Insertion and Removal Tool	Supplier
YBT20-2	NAS1664-20	Burndy
YBT16-1	NAS1664-16	Burndy
YBT12-1	NAS1664-12	Burndy

NOTE: Each tool is both an insertion tool and a removal tool.

- (1) Make a selection of an insertion tool from Table 7.
- (2) Put the contact in the module block with the insertion end of the tool.

C. Seal Plug Installation

A sea plug must be installed in all unused contact cavities.

- (1) Make a selection of a seal plug from Table 3.
- (2) Manually install a seal plug in the contact cavity.

D. Terminal Block Installation

Table 8
TERMINAL BLOCK INSTALLATION AND REMOVAL TOOLS

Installation and Removal Tool	Supplier
TBTS-1	Burndy

NOTE: The tool is both an installation tool and a removal tool.

- (1) Make a selection of an installation tool from Table 8.
- (2) Install the terminal block in the mounting track.
Refer to the instructions on the tool.



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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH JIFFY JUNCTION SPLICES

<u>Paragraph</u>		<u>Page</u>
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	A. Jiffy Junction Splice Part Numbers	1
	B. Contact Part Numbers	1
2.	<u>MODULE DISASSEMBLY</u>	1
	A. Contact Removal	1
3.	<u>MODULE ASSEMBLY</u>	2
	A. Contact Assembly	2
	B. Contact Insertion	3
4.	<u>APPROVED TOOL SUPPLIERS</u>	4
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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH JIFFY JUNCTION SPLICES

1. PART NUMBERS AND DESCRIPTION

A. Jiffy Junction Splice Part Numbers

Table 1
JIFFY JUNCTION SPLICE PART NUMBERS

Part Number	Supplier
TSE-20-01	Deutsch
TSE-16-01	Deutsch
TSE-12-01	Deutsch

B. Contact Part Numbers

Table 2
CONTACT PART NUMBERS

Contact Size		Part Number	Supplier
Engaging End	Crimp Barrel		
20	20	1841-1-5620	Deutsch
16	16	1841-1-5616	Deutsch
12	12	1841-1-5612	Deutsch

2. MODULE DISASSEMBLY

A. Contact Removal

Table 3
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool	Supplier
20	M15570-20	Deutsch
	M81969/14-02	QPL
	M83723/31-20	QPL
16	M15570-16	Deutsch
	M81969/14-03	QPL
	M83723/31-16	QPL
12	M15570-12	Deutsch
	M81969/14-04	QPL
	M83723/31-12	QPL

- (1) Make a selection of a contact removal tool from Table 3.
- (2) Slide the tip of the removal tool over the wired contact and into the module until the tool releases the contact retention clip.

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STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH JIFFY JUNCTION SPLICES

(3) Hold the wire against the tool and pull the wired contact and the tool out at the same time.

3. MODULE ASSEMBLY

A. Contact Assembly

**Table 4
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Contact Size		Removal Length (inch)		Special Instructions
	Engaging End	Crimp Barrel	Target	Tolerance	
24	20	20	13/64	1/64	-
22	20	20	13/64	1/64	-
20	20	20	13/64	1/64	-
	16	16	13/64	1/64	-
18	16	16	19/64	1/64	-
16	16	16	19/64	1/64	-
14	12	12	19/64	1/64	-
12	12	12	19/64	1/64	-

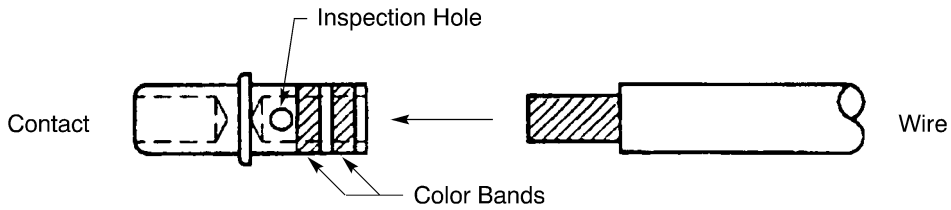
**Table 5
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/2-01	5	M22520/2-02	-
22	20	M22520/2-01	6	M22520/2-02	-
20	20	M22520/2-01	7	M22520/2-02	-
20	16	M22520/1-01	4	M22520/1-02	Blue
18	16	M22520/1-01	5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
14	12	M22520/1-01	7	M22520/1-02	Yellow
12	12	M22520/1-01	8	M22520/1-02	Yellow

- (1) Remove the necessary length of insulation from the end of the wire.
Refer to Table 4 and Subject 20-00-15.
- (2) Put the wire in the contact crimp barrel. Refer to Figure 1.
Make sure that the wire is inserted completely into the crimp barrel.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH JIFFY JUNCTION SPLICES



WIRE POSITION IN THE CONTACT CRIMP BARREL
Figure 1

- (3) Make a selection of a crimp tool from Table 5.
- (4) Crimp the contact.
- (5) Remove the crimped contact from the tool.

Make sure that:

- All the wire strands are in the contact crimp barrel
- The wire strands are visible in the inspection hole.

B. Contact Insertion

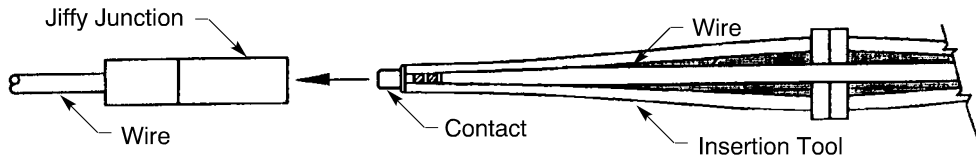
Table 6
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool	Supplier
20	M15570-20	Deutsch
	M81969/14-02	QPL
	M83723/31-20	QPL
16	M15570-16	Deutsch
	M81969/14-03	QPL
	M83723/31-16	QPL
12	M15570-12	Deutsch
	M81969/14-04	QPL
	M83723/31-01	QPL

- (1) Make a selection of an insertion tool from Table 3.
NOTE: As an option, the contact can be inserted by hand.
- (2) Push the contact into the contact cavity. Refer to Figure 2.
 Make sure the contact snaps into the retention clip.

STANDARD WIRING PRACTICES MANUAL

ASSEMBLY OF DEUTSCH JIFFY JUNCTION SPLICES



CONTACT INSERTION
Figure 2

4. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

Table 7
REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
M15570-20	Deutsch
M15570-16	Deutsch
M15570-12	Deutsch
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M83723/31-20	QPL
M83723/31-16	QPL
M83723/31-12	QPL

B. Contact Crimp Tools

Table 8
CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-02	QPL



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ASSEMBLY OF DEUTSCH JIFFY JUNCTION SPLICES

C. Contact Insertion Tools

**Table 9
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
M15570-20	Deutsch
M15570-16	Deutsch
M15570-12	Deutsch
M81969/14-02	QPL
M81969/14-03	QPL
M81969/14-04	QPL
M83723/31-20	QPL
M83723/31-16	QPL
M83723/31-12	QPL

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STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

<u>Paragraph</u>		<u>Page</u>
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STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

1. PART NUMBERS AND DESCRIPTION

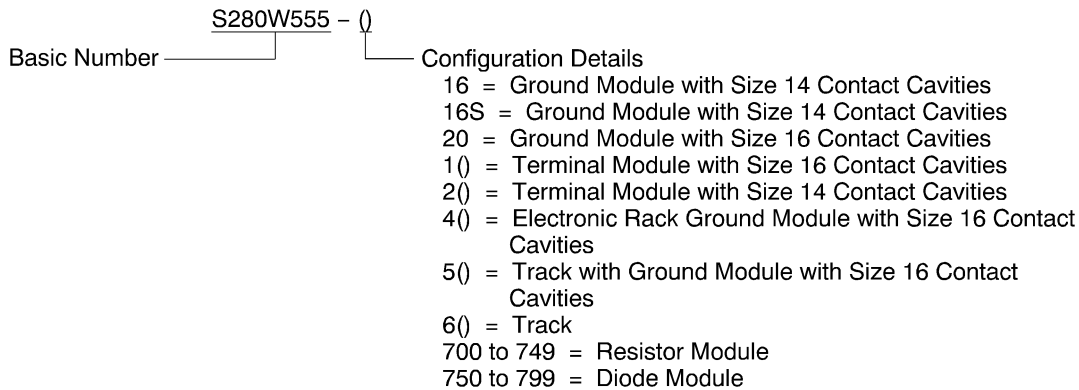
A. Terminal Junction System Description

The terminal junction system has these components:

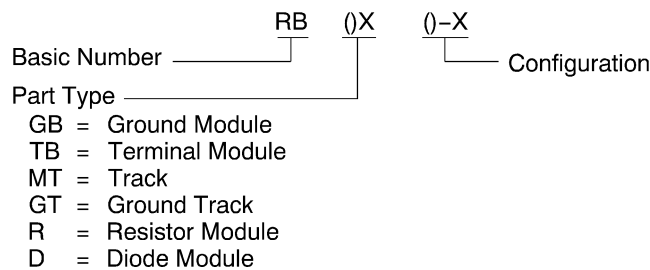
- Terminal modules
- Ground modules
- Tracks
- Tracks with ground modules
- Diode modules
- Resistor modules.

All contact cavities in a ground module are connected to ground. You can install a contact in any cavity in a ground module.

The contact cavities in each bus set are connected together. You can install a contact in any cavity that belongs to a bus set. Divisions between bus sets are shown by lines on the face of the terminal module. Reference Table 13 and Figure 13.



S280W555-() TERMINAL JUNCTION SYSTEM PART NUMBER STRUCTURE
Figure 1



BURNDY TERMINAL JUNCTION SYSTEM PART NUMBER STRUCTURE
Figure 2



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STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

B. Terminal Module Part Numbers

Table 1
TERMINAL MODULE PART NUMBERS

Boeing Standard	Description
S280W555-102	Feedback
S280W555-104	Feedback
S280W555-108	Feedback
S280W555-203	Feedback
S280W555-206	Feedback

Table 2
SUPPLIER PART NUMBERS OF BOEING S280W555-() TERMINAL MODULES

Boeing Standard	Part Number	Supplier
S280W555-102	RBTB20-2	Burndy
S280W555-104	RBTB20-4	Burndy
S280W555-108	RBTB20-8	Burndy
S280W555-203	RBTB16-3	Burndy
S280W555-206	RBTB16-6	Burndy

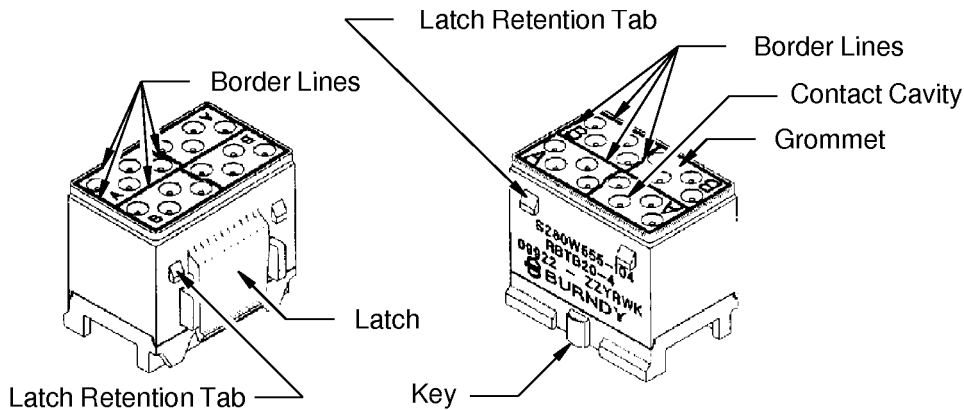
Table 3
ALTERNATIVE TERMINAL MODULE PART NUMBERS

Specified Module	Alternative Module	
	Part Number	Supplier
S280W555-104	MDTB20-4	Framatome Connectors International
S280W555-108	MDTB20-8	Framatome Connectors International

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S280W555-() TERMINAL JUNCTION SYSTEM



The contact cavities within border lines are electrically connected together. The contact cavities that are electrically connected together are called a bus set.

S280W555-() TERMINAL MODULE
Figure 3

C. Ground Module Part Numbers

Table 4
GROUND MODULE PART NUMBERS

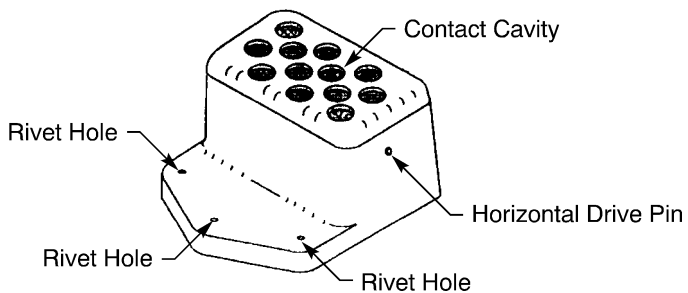
Boeing Standard	Description	Mount Type
S280W555-16	Ground Module	Panel
S280W555-16S	Ground Module	Panel
S280W555-20	Ground Module	Panel
S280W555-401	Electronic Rack Ground Module	Electronic Rack
S280W555-402	Electronic Rack Ground Module	Electronic Rack

Table 5
SUPPLIER PART NUMBERS OF BOEING S280W555-() GROUND MODULES

Boeing Standard	Part Number	Supplier
S280W555-16	RBGB16-1	Burndy
S280W555-20	RBGB20-1	Burndy
S280W555-401	RBG516-1	Burndy
S280W555-402	RBG532-1	Burndy

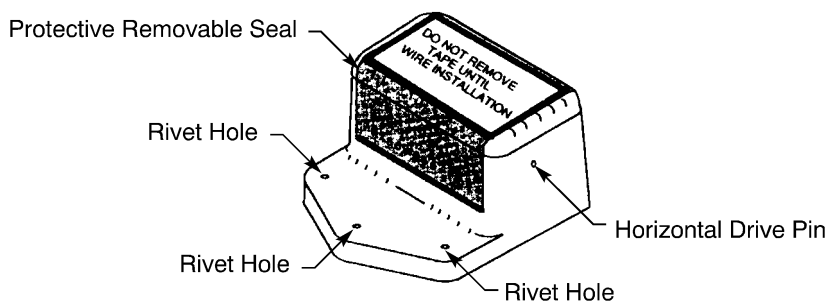
STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM



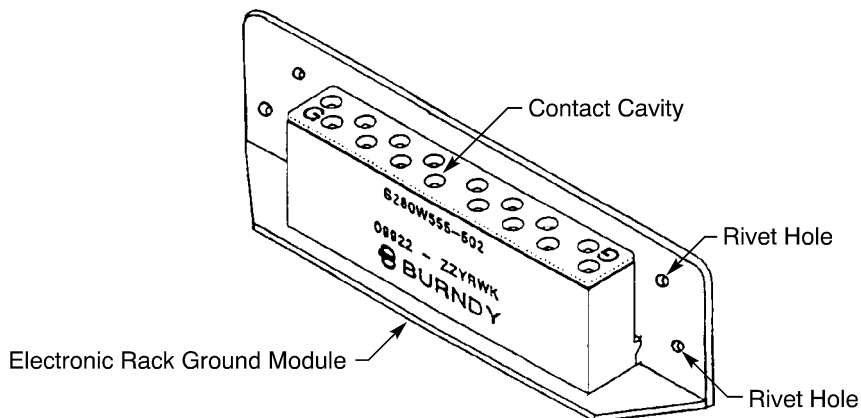
S280W555-() GROUND MODULE

Figure 4



S280W555-() GROUND MODULE WITH A PROTECTIVE SEAL

Figure 5



S280W555-4() ELECTRONIC RACK GROUND MODULE

Figure 6

STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

D. Terminal Module Track Part Numbers

**Table 6
TERMINAL MODULE TRACK PART NUMBERS**

Boeing Standard	Description	Length (inch)
S280W555-502	Track with Ground Module	2
S280W555-504	Track with Ground Module	4
S280W555-506	Track with Ground Module	6
S280W555-508	Track with Ground Module	8
S280W555-510	Track with Ground Module	10
S280W555-514	Track with Ground Module	14
S280W555-516	Track with Ground Module	16
S280W555-522	Track with Ground Module	22
S280W555-526	Track with Ground Module	26
S280W555-602	Track	2
S280W555-604	Track	4
S280W555-606	Track	6
S280W555-608	Track	8
S280W555-610	Track	10
S280W555-614	Track	14
S280W555-616	Track	16
S280W555-622	Track	22
S280W555-626	Track	26

**Table 7
SUPPLIER PART NUMBERS OF BOEING S280W555-() TERMINAL MODULE TRACKS**

Boeing Standard	Part Number	Supplier
S280W555-502	RBGT2	Burndy
S280W555-504	RBGT4	Burndy
S280W555-506	RBGT6	Burndy
S280W555-508	RBGT8	Burndy
S280W555-510	RBGT10	Burndy
S280W555-514	RBGT14	Burndy
S280W555-516	RBGT16	Burndy
S280W555-522	RBGT22	Burndy
S280W555-526	RBGT26	Burndy

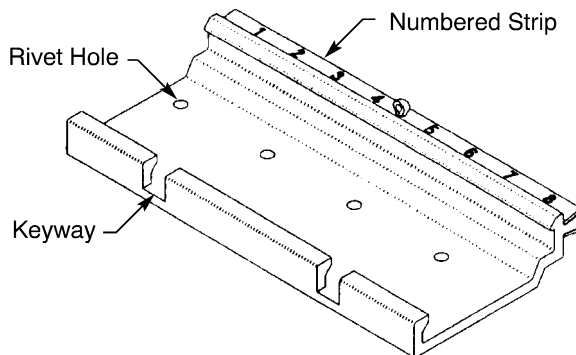
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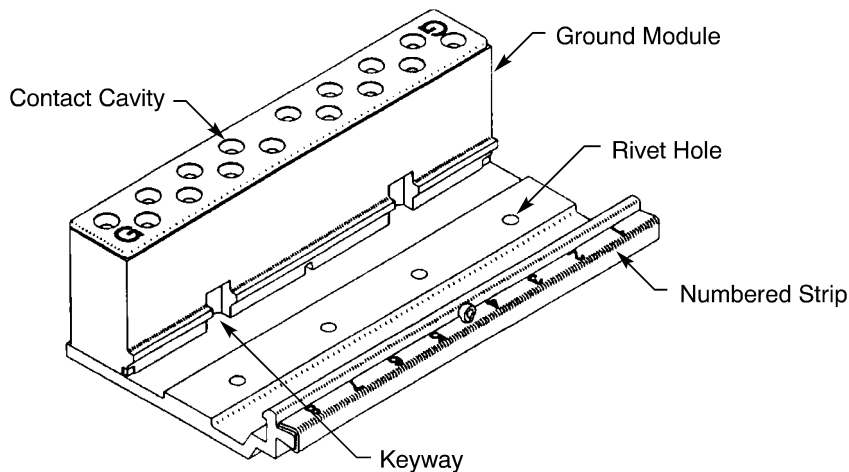
S280W555-() TERMINAL JUNCTION SYSTEM

Table 7 (continued)

Boeing Standard	Part Number	Supplier
S280W555-602	RBMT2	Burndy
S280W555-604	RBMT4	Burndy
S280W555-606	RBMT6	Burndy
S280W555-608	RBMT8	Burndy
S280W555-610	RBMT10	Burndy
S280W555-614	RBMT14	Burndy
S280W555-616	RBMT16	Burndy
S280W555-622	RBMT22	Burndy
S280W555-626	RBMT26	Burndy



S280W555-6() TRACK
Figure 7



S280W555-5() TRACK WITH A GROUND MODULE
Figure 8

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STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

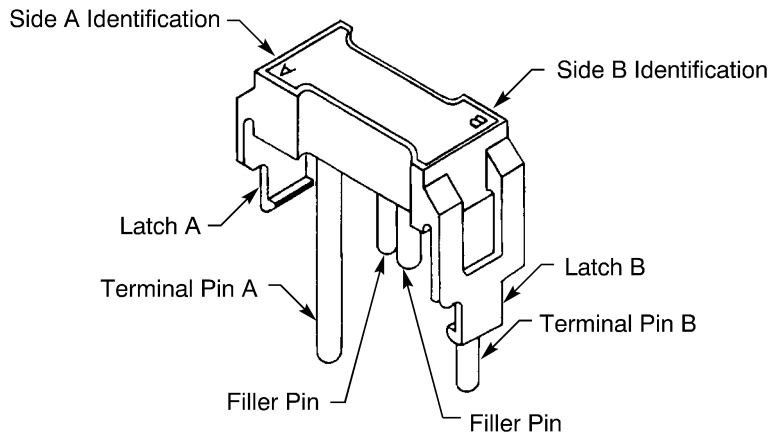
E. Diode Module Part Numbers

**Table 8
DIODE MODULE PART NUMBERS**

Boeing Standard	Diode Current (amp)
S280W555-751	1
S280W555-753	3

**Table 9
SUPPLIER PART NUMBERS OF BOEING S280W555-() DIODE MODULES**

Boeing Standard	Part Number	Supplier
S280W555-751	RBD20-1	Burndy
S280W555-753	RBD20-2	Burndy



**S280W555-7() DIODE MODULE
Figure 9**

F. Resistor Module Part Numbers

**Table 10
RESISTOR MODULE PART NUMBERS**

Boeing Standard	Resistance (ohm)
S280W555-702	4300
S280W555-703	12000
S280W555-704	49900
S280W555-705	71.5

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S280W555-() TERMINAL JUNCTION SYSTEM

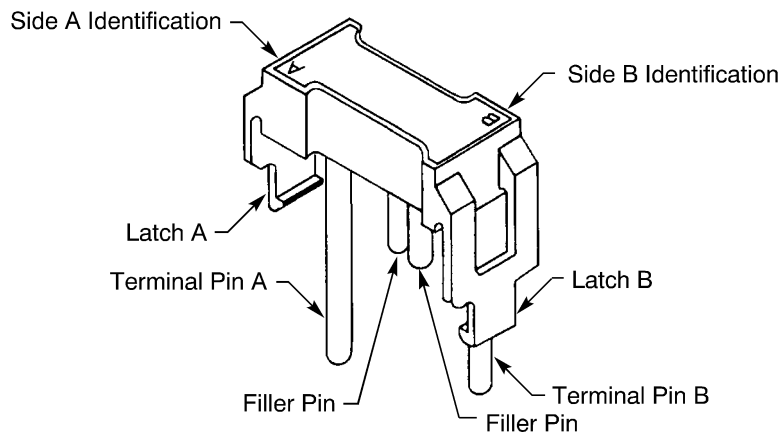
Table 10 (continued)

Boeing Standard	Resistance (ohm)
S280W555-706	10000
S280W555-707	1800

Table 11

SUPPLIER PART NUMBERS OF BOEING S280W555-() RESISTOR MODULES

Boeing Standard	Part Number	Supplier
S280W555-702	RBR20-2	Burndy
S280W555-703	RBR20-3	Burndy
S280W555-704	RBR20-4	Burndy
S280W555-705	RBR20-5	Burndy
S280W555-706	RBR20-6	Burndy
S280W555-707	RBR20-7	Burndy



S280W555-7() RESISTOR MODULE

Figure 10

G. Contact Part Numbers

The contacts have these technical properties:

- A pin configuration
- A gold finish.

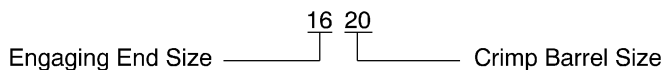
NOTE: The Burndy RBM18M-1DJ5 contact does not have a gold finish.

STANDARD WIRING PRACTICES MANUAL

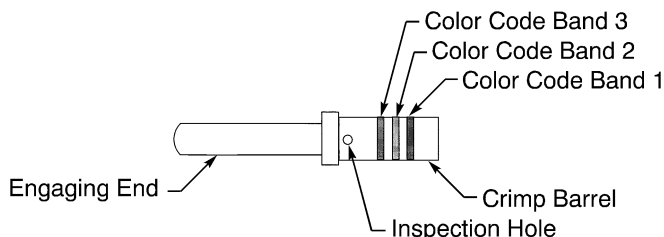
S280W555-() TERMINAL JUNCTION SYSTEM

**Table 12
CONTACT PART NUMBERS**

Contact Size		Contact Type	Part Number	Color Code		Supplier
Engaging End	Crimp Barrel			Band	Color	
16	20	Pin	M39029/1-101	1	Brown	QPL
				2	Black	
				3	Brown	
	18	Pin	S280W555-920	1	Red	Tri Star
				2	Red	
				3	Red	
14	16	Pin	RBM18M-1DJ5	-	-	Burndy
				1	Red	Tri Star
			S280W555-918	2	White	
				3	Red	
16	20	Pin	M39029/1-102	1	Brown	QPL
				2	Black	
				3	Red	
	18	Pin	S280W555-916	1	Blue	Tri Star
				2	Blue	
				3	Blue	



**EXAMPLE OF A CONTACT SIZE
Figure 11**



**PIN CONTACT
Figure 12**

STANDARD WIRING PRACTICES MANUAL

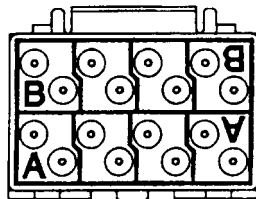
S280W555-() TERMINAL JUNCTION SYSTEM

2. TERMINAL MODULE AND GROUND MODULE CONFIGURATIONS

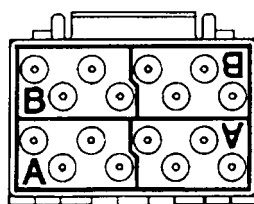
A. Terminal Module Configurations

**Table 13
TERMINAL MODULE CONFIGURATIONS**

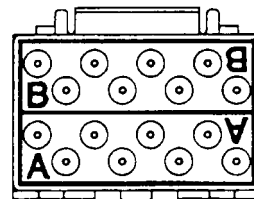
Boeing Standard	Contact		Bus Configuration	
	Engaging End Size	Quantity	Bus Sets	Contact Cavities
S280W555-102	16	16	8	2
S280W555-104	16	16	4	4
S280W555-108	16	16	2	8
S280W555-203	14	12	4	3
S280W555-206	14	12	2	6



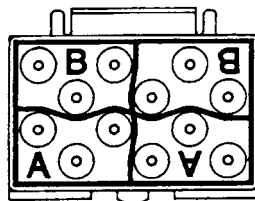
S280W555-102



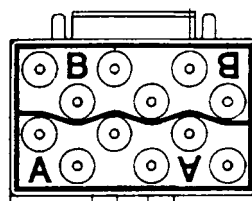
S280W555-104



S280W555-108



S280W555-203



S280W555-206

TERMINAL MODULE BUS CONFIGURATIONS

Figure 13

The contact cavities in each bus set are connected together. You can install a contact in any cavity that belongs to a bus set. Divisions between bus sets are shown by lines on the face of the terminal module. Reference Table 13 and Figure 13.

B. Ground Module Configurations

**Table 14
GROUND MODULE CONFIGURATIONS**

Boeing Standard	Contact	
	Engaging End Size	Quantity
S280W555-16	14	12

STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

Table 14 (continued)

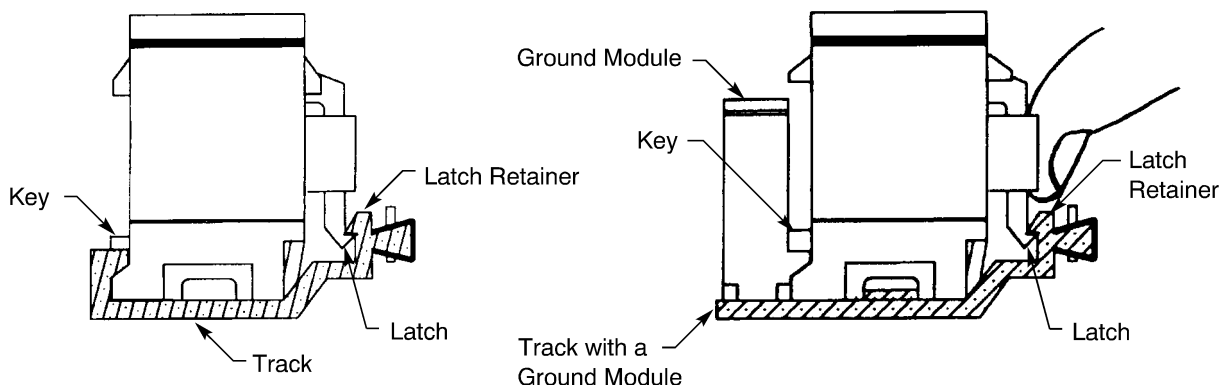
Boeing Standard	Contact	
	Engaging End Size	Quantity
S280W555-16S	14	12
S280W555-20	16	16
S280W555-401	16	16
S280W555-402	16	32
S280W555-502	16	16
S280W555-504	16	32
S280W555-506	16	48
S280W555-508	16	64
S280W555-510	16	80
S280W555-514	16	112
S280W555-516	16	128
S280W555-522	16	176
S280W555-526	16	208

All contact cavities in a ground module are connected to ground. You can install a contact in any cavity in a ground module.

3. DISASSEMBLY OF THE TERMINAL JUNCTION SYSTEM

A. Removal of a Terminal Module from a Track

- (1) Push the latch of the terminal module to release the latch from the latch retainer on the track. Refer to Figure 14.

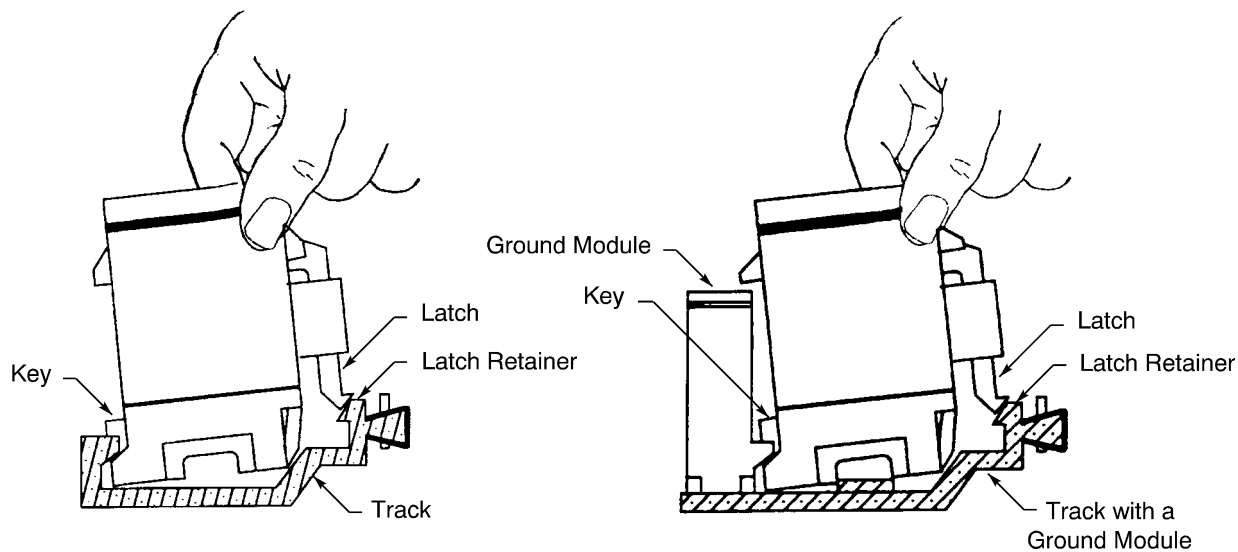


LOCATION OF THE LATCH ON THE TERMINAL MODULE
Figure 14

- (2) Pull the front of the module from the front of the track. Refer to Figure 15.

STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM



REMOVAL OF THE TERMINAL MODULE FROM THE TRACK

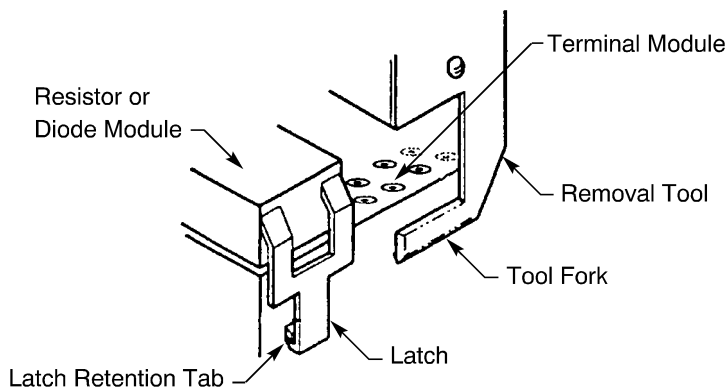
Figure 15

- (3) Carefully pull the module to the front of the track until the key is disengaged from the keyway.
- (4) Pull the module from the track.

B. Removal of a Diode or a Resistor Module

**Table 15
MODULE REMOVAL TOOLS**

Module	Removal Tool
Diode	RDW20-4
Resistor	RDW20-4



DIODE OR RESISTOR MODULE REMOVAL

Figure 16

STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

Refer to Figure 16.

- (1) Make a selection of a removal tool from Table 15.
- (2) Put the fork of the tool behind the latch of the module to release the latch retention tab.
- (3) Pull the tool up to remove the resistor or diode module from the terminal module.

C. Contact Removal

For the procedure to remove an unwired contact, refer to Paragraph 3.D.

**Table 16
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	
	Part Number	Color
20	ATR 2080 BAC	-
	ATR 2079 BAC	-
	DRK83-20	Red
	M81969/14-11	White
	RRX20B	-
18	ATR 2080 BAC	-
	ATR 2079 BAC	-
	M81969/14-11	White
16	ATR 2112 BAC	-
	ATR 2106 BAC	-
	M81969/14-03	White
	RRX16B	-

- (1) Make a selection of a contact removal tool from Table 16.
- (2) Put the end of the tool on the wire near the rear grommet.
- (3) Carefully push the tool straight into the contact cavity until it stops.

CAUTION: DO NOT TURN THE TOOL WHILE IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (4) Carefully pull the wire and the tool out of the contact cavity at the same time.
- (5) If the contact does not come out of the contact cavity:
 - (a) Pull the tool out of the contact cavity.
 - (b) Turn the tool 90 degrees.
 - (c) Do Step (2) through Step (4) again.

STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

D. Unwired Contact Removal

**Table 17
UNWIRED CONTACT REMOVAL TOOLS**

Contact Size		Removal Tool		
Engaging End	Crimp Barrel	Handle	Bit	
			Part Number	Color
16	20	DRK-110-1SA	DRK-20-2	Red
	18	DRK-110-1SA	DRK-20-2	Red
	16	DRK-110-1SA	DRK-16-2	Blue

- (1) Make a selection of a contact removal tool from Table 17.
- (2) Align the tool axially with the contact.
- (3) Pull the plunger back until it stops.
- (4) Hold the plunger in position.
- (5) Carefully push the end of the tool straight into the contact cavity until it stops.
- (6) Carefully pull the tool straight out of the contact cavity.
- (7) Push the plunger forward to release the contact from the tool.

E. Seal Plug or Seal Rod Removal

- (1) Make a selection of a pair of needle nose pliers that has:
 - Jaws with smooth surfaces
 - No sharp edges.

CAUTION: ROUGH SURFACES OR SHARP EDGES CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) Hold the end of the seal plug or seal rod tightly in the jaws of the pliers.
- (3) Pull the plug or rod straight out of the rear grommet.

4. ASSEMBLY OF THE TERMINAL MODULE

A. Contact Assembly

**Table 18
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	20	0.15	±0.02	-
	16	0.54	±0.04	Fold the conductor back
22	20	0.15	±0.02	-
	16	0.54	±0.04	Fold the conductor back

STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

Table 18 (continued)

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
20	20	0.15	± 0.02	-
	16	0.27	± 0.02	-
18	18	0.15	± 0.02	-
	16	0.27	± 0.02	-
16	16	0.27	± 0.02	-

**Table 19
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-11	-
		WA22	5	M22520/2-11	-
		WA22LC	5	M22520/2-11	-
		WA27	2	M22520/1-02	Red
	16	M22520/1-01	5	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	5	M22520/1-02	Blue
22	20	M22520/1-01	3	M22520/1-02	Red
		M22520/2-01	6	M22520/2-11	-
		WA22	6	M22520/2-11	-
		WA22LC	6	M22520/2-11	-
		WA27	3	M22520/1-02	Red
	16	M22520/1-01	6	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	6	M22520/1-02	Blue

STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

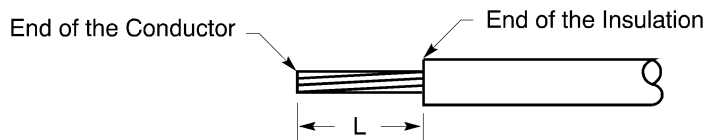
Table 19 (continued)

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-11	-
		WA22	7	M22520/2-11	-
		WA22LC	7	M22520/2-11	-
		WA27	4	M22520/1-02	Red
	16	M22520/1-01	4	M22520/1-02	Blue
		ST2220-1-Y	-	ST2220-1-2	-
		WA27F	4	M22520/1-02	Blue
	18	18	M22520/1-01	5	M22520/1-02
WA27			5	M22520/1-02	Red
16		M22520/1-01	5	M22520/1-02	Blue
		WA27	5	M22520/1-02	Blue
16	16	M22520/1-01	6	M22520/1-02	Blue
		WA27	6	M22520/1-02	Blue

(1) Remove the necessary length of insulation from the end of the wire.

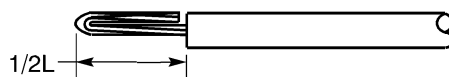
Refer to:

- Figure 17
- Table 18
- Subject 20-00-15 for the insulation removal procedures.



WIRE PREPARATION
Figure 17

(2) If it is specified, fold the conductor back. Refer to Figure 18.



CONDUCTOR FOLDED BACK
Figure 18

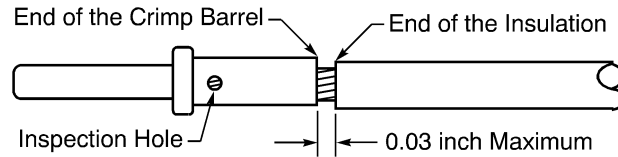
STANDARD WIRING PRACTICES MANUAL

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- (3) Make a selection of a crimp tool from Table 19.
- (4) Put the end of the wire into the crimp barrel of the contact. Refer to Figure 19.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is a maximum of 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 19

- (5) Crimp the contact.
- (6) Examine the contact assembly for these types of damage:
 - Broken strands of the conductor
 - Strands of the conductor on which the base metal can be seen
 - Cracks in the crimp barrel of the contact.
- (7) If the contact or the wire has damage, replace the contact.

B. Contact Insertion

Table 20
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
20	DAK83-20	-
	M81969/14-11	Red
	ST2220-2-28	-
18	91039-1	-
	DAK83-20	-
	M81969/14-11	Red
16	DAK83-16	-
	M81969/14-03	Blue
	ST2220-2-4	-
	ST2220-2-11A	-

- (1) Make a selection of a contact insertion tool from Table 20.

STANDARD WIRING PRACTICES MANUAL**S280W555-() TERMINAL JUNCTION SYSTEM**

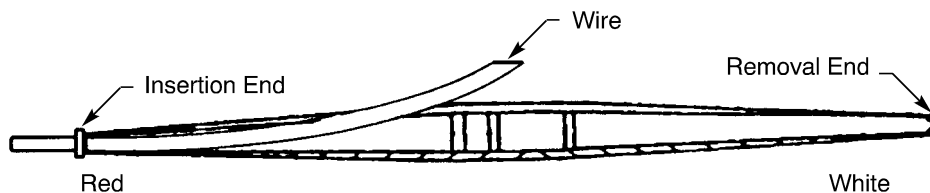
CAUTION: DO NOT USE A TOOL WITH A TIP THAT:

- IS BENT
- IS FLARED
- IS BROKEN
- HAS A CRACK.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS.

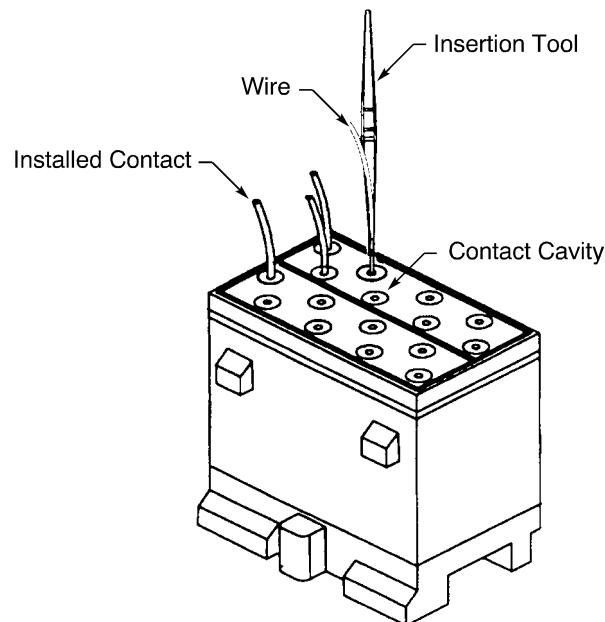
- (2) Put the contact in the insertion end of the insertion tool. Refer to Figure 20.



POSITION OF THE CONTACT IN THE INSERTION TOOL

Figure 20

- (3) Axially align the contact and the tool with the contact cavity. Refer to Figure 21.



POSITION OF THE CONTACT INSERTION TOOL AND THE CONTACT CAVITY

Figure 21

- (4) Carefully push the tool straight into the contact cavity until it stops.

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S280W555-() TERMINAL JUNCTION SYSTEM

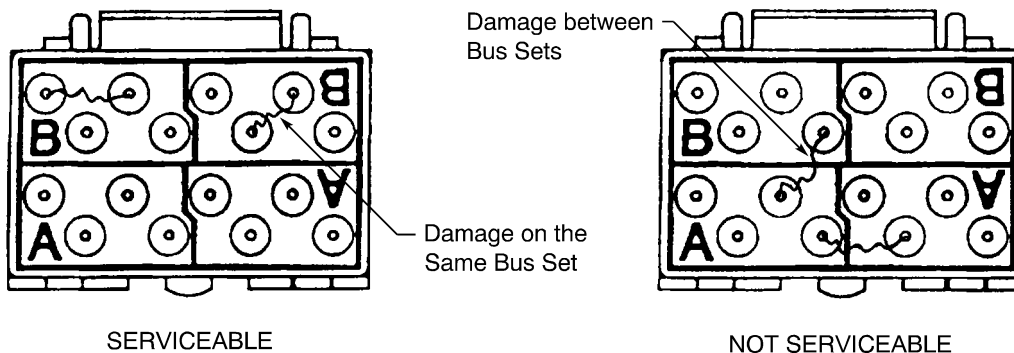
CAUTION: DO NOT TURN THE TOOL WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

- (5) Carefully pull the tool straight out of the contact cavity.
- (6) Lightly pull the wire to make sure that the contact is locked in position.

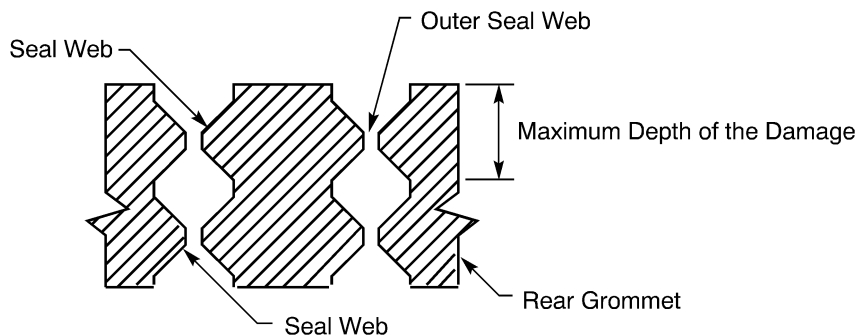
CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINAL MODULE OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 - (a) Pull the contact out of the cavity.
 - (b) Do Step (2) through Step (6) again.
- (8) Examine the grommet for these types of damage:
 - Damage between the bus sets; refer to Figure 22
 - Damage of the contact cavity that has a depth that is more than the outer seal web in the grommet; refer to Figure 23.



TYPES OF DAMAGE OF THE MODULE GROMMET
Figure 22



DAMAGE OF THE GROMMET IN RELATION TO THE OUTER SEAL WEB
Figure 23

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S280W555-() TERMINAL JUNCTION SYSTEM

C. Seal of an Empty Contact Cavity

These conditions are applicable:

- For a ground module, an empty contact cavity cannot be sealed
- For a terminal module in the pressurized area, the seal of an empty contact cavity is not necessary
- For a terminal module in the unpressurized area, an empty contact cavity must be sealed with a seal plug or a seal rod.

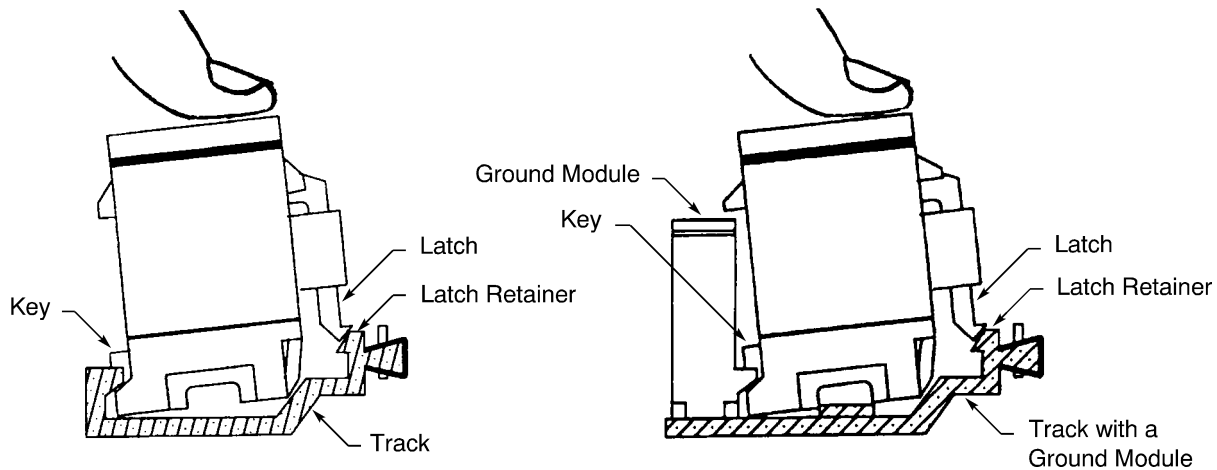
- (1) If it is applicable, install a seal plug or a seal rod in each empty contact cavity of the terminal module. Refer to Subject 20-60-08.

If a seal rod is installed, make sure that the length of the seal rod is 0.5 inch \pm 0.1 inch.

5. INSTALLATION OF THE TERMINAL JUNCTION SYSTEM

A. Installation of a Terminal Module on a Track

- (1) Align the key of the module with the applicable keyway on the track. Refer to Figure 24.



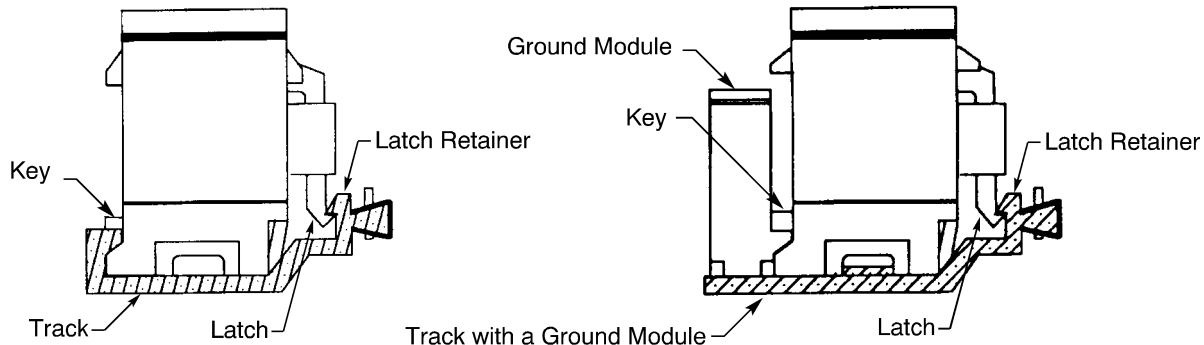
POSITION OF THE TERMINAL MODULE ON THE TRACK

Figure 24

- (2) Push the top of the module until it makes a click and the latch is locked in the latch retainer. Refer to Figure 25.

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S280W555-() TERMINAL JUNCTION SYSTEM



TERMINAL MODULE INSTALLED ON THE TRACK

Figure 25

(3) Examine the terminal module for these types of damage:

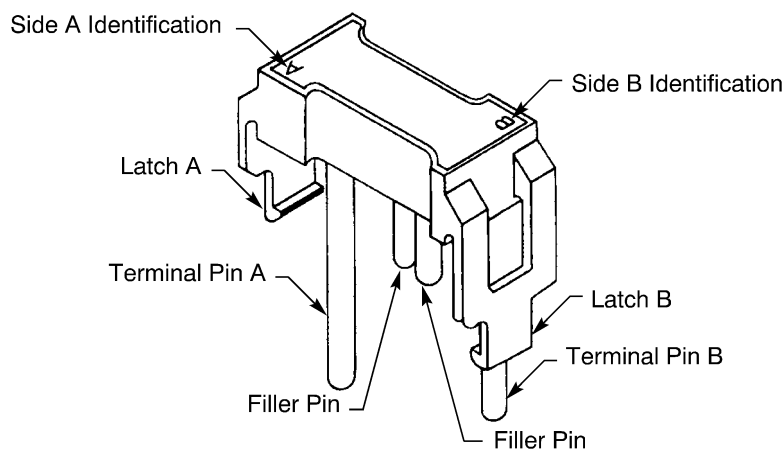
- A latch that is bent or broken
- A latch that has a crack
- A latch retention tab that is broken
- A module shell that has a crack
- A key that is broken.

B. Installation of the Diode or Resistor Module

(1) Refer to the Wiring Diagram to find the position of the diode or the resistor module in the terminal module.

(2) Examine the module. Refer to Figure 26.

Make sure that the terminal pins and the alignment pins are straight.



CONFIGURATION OF THE DIODE MODULE OR THE RESISTOR MODULE

Figure 26

(3) Align the pins of the diode or resistor module with the sockets of the terminal module. Refer to Figure 27.

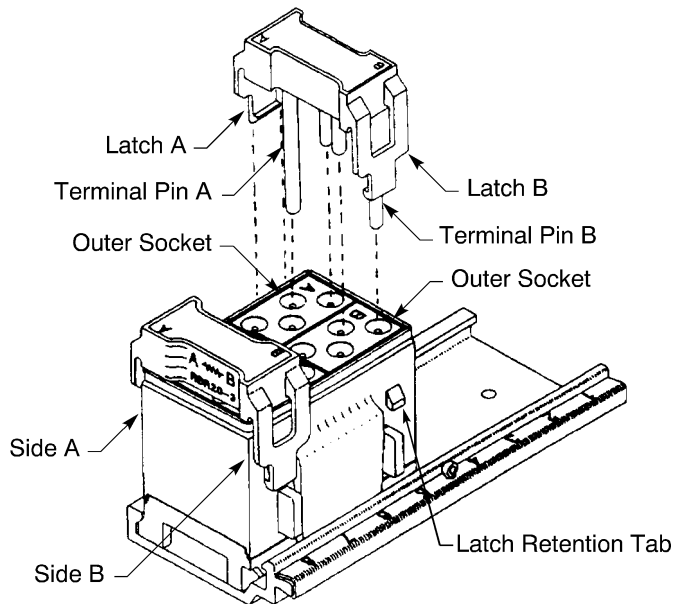
STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

Make sure that:

- Latch A is aligned with side A of the terminal module
- Terminal Pin A is aligned with the outer socket on Side A
- Latch B is aligned with side B of the terminal module
- Terminal Pin B is aligned with the outer socket on Side B
- The two filler pins of the module are aligned with the corresponding inner sockets in the terminal module.

CAUTION: IF THE LATCHES ARE NOT ALIGNED WITH THE APPLICABLE SIDE OF THE TERMINAL MODULE, INCORRECT OPERATION OF THE SYSTEM CAN OCCUR.



ALIGNMENT OF THE DIODE OR RESISTOR MODULE AND THE TERMINAL MODULE
Figure 27

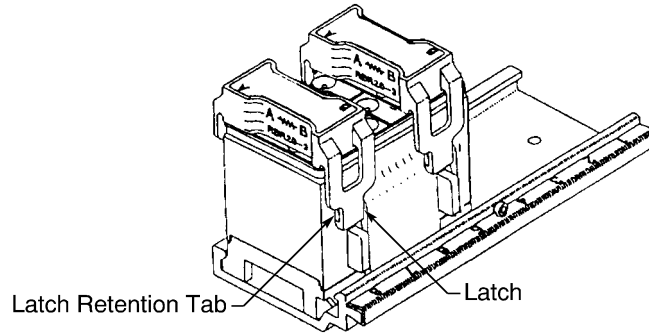
(4) Push the module down into the terminal module. Refer to Figure 28.

Make sure that:

- The two terminal pins engage the two sockets
- The two latches are fully engaged with the two latch retention tabs.

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POSITION OF THE DIODE OR RESISTOR MODULE IN THE TERMINAL MODULE
Figure 28

- (5) Examine the diode or resistor module for these types of damage:
- A module shell that has a crack
 - A latch that has a crack or a bend
 - A latch that is broken
 - A pin that is bent.

C. Installation of a Track on an Assembly or the Structure

CAUTION: A RIVET MUST NOT BE INSTALLED IN AN OLD HOLE IN THE STRUCTURE. THE ELECTRICAL BOND BETWEEN THE RIVET IN AN OLD HOLE AND THE STRUCTURE CAN CAUSE UNSATISFACTORY PERFORMANCE.

- (1) Make a selection of a rivet that:
- Is aluminum
 - Has an alodine finish
 - Has a 0.125 inch diameter
 - Has the necessary length for the installation.
- (2) Drill a hole in the assembly or the structure for each hole in the track.
 Make sure that the hole has the correct diameter for the rivet.
- (3) Install a rivet in each hole of the track and the assembly or structure.

6. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

Table 21
CONTACT REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
ATR 2079 BAC	Astro
ATR 2080 BAC	Astro
ATR 2106 BAC	Astro
ATR 2112 BAC	Astro
DRK83-20	Daniels

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S280W555-() TERMINAL JUNCTION SYSTEM

Table 21 (continued)

Removal Tool	Supplier
DRK-110-1SA	Daniels
DRK-20-2	Daniels
DRK-16-2	Daniels
M81969/14-03	QPL
M81969/14-11	QPL
RRX16B	Russtech
RRX20B	Russtech

B. Terminal Module Removal Tools

**Table 22
MODULE REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
RDW20-4	Russtech

C. Contact Insertion Tools

**Table 23
CONTACT INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
91039-1	AMP
DAK83-16	Daniels
DAK83-20	Daniels
M81969/14-03	QPL
M81969/14-11	QPL
ST2220-2-4	Boeing
ST2220-2-11A	Boeing
ST2220-2-28	Boeing



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STANDARD WIRING PRACTICES MANUAL

S280W555-() TERMINAL JUNCTION SYSTEM

D. Contact Crimp Tools

Table 24
CONTACT CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL
M22520/2-01	QPL
M22520/2-11	QPL
ST2220-1-2	Boeing
ST2220-1-Y	Boeing
WA22	Daniels
WA22LC	Daniels
WA27	Daniels
WA27F	Daniels

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STANDARD WIRING PRACTICES MANUAL

BURNDY RBDSC-() PROGRAM SWITCH MODULE

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	B. Security Cover Assembly Part Numbers	3
	C. Contact Part Numbers	3
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	E. Recommended Tools	4
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	B. Switch Seal Plug Removal	5
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STANDARD WIRING PRACTICES MANUAL

BURNDY RBDSC-() PROGRAM SWITCH MODULE

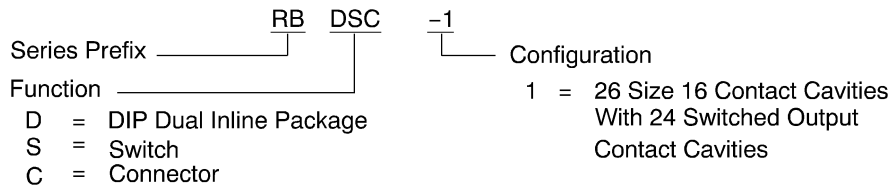
This Subject gives the procedures to assemble, connect, disconnect, and install the Burndy RBDSC-() Program Switch Module.

1. PART NUMBERS AND DESCRIPTION

A. Program Switch Module Part Numbers

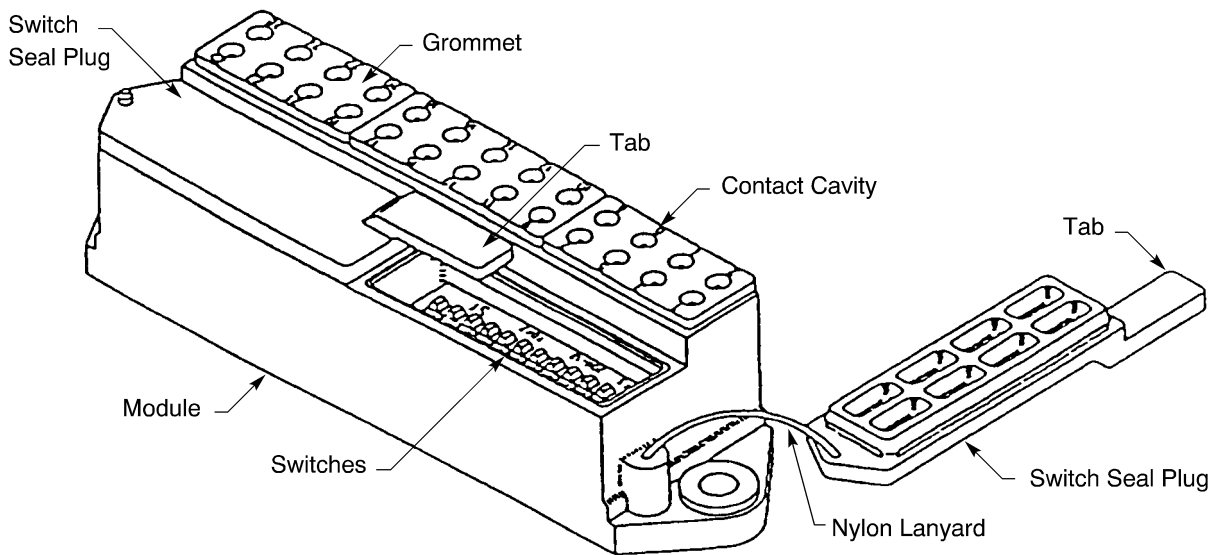
Table 1
PROGRAM SWITCH MODULE ASSEMBLY PART NUMBERS

Part Numbers	Configuration	Supplier
RBDSC-1	26 Size 16 Contacts with 24 Switched Outputs	Burndy



BURNDY RBDSC-() PROGRAM SWITCH MODULE PART NUMBER STRUCTURE

Figure 1

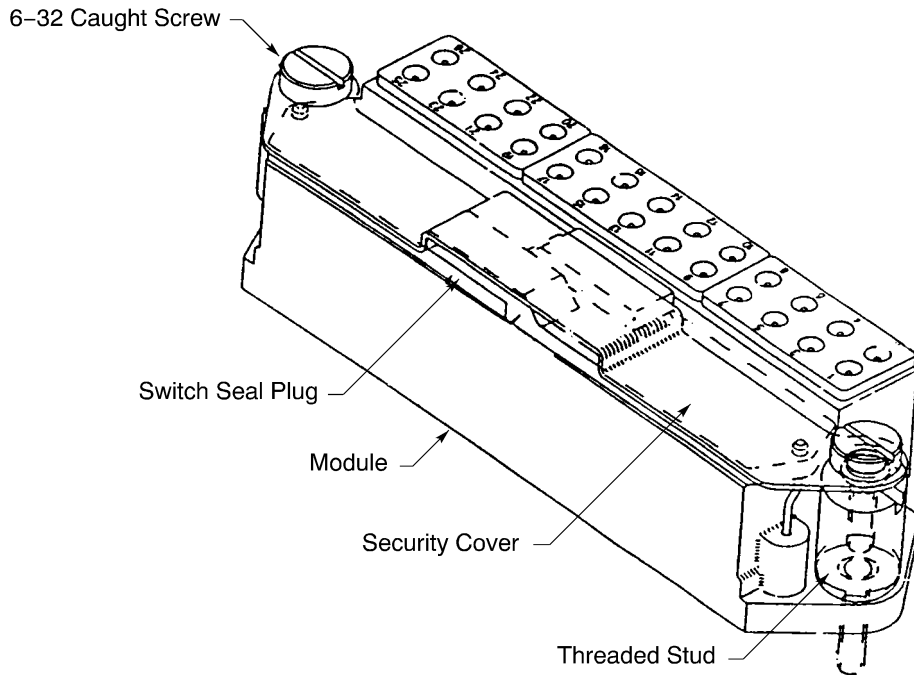


BURNDY RBDSC-1 PROGRAM SWITCH MODULE

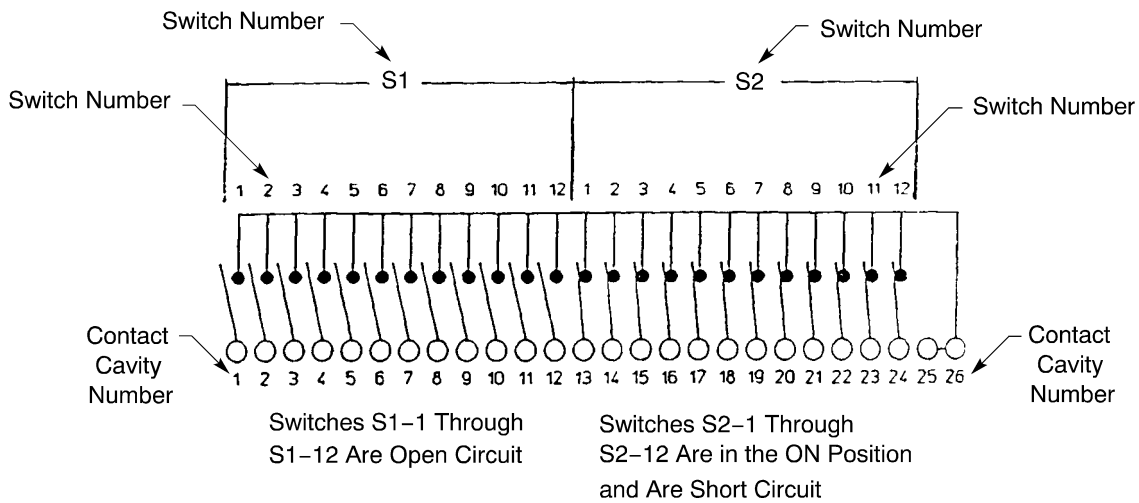
Figure 2

STANDARD WIRING PRACTICES MANUAL

BURNDY RBDSC-() PROGRAM SWITCH MODULE



BURNDY RBDSC-1 PROGRAM SWITCH MODULE WITH A SECURITY COVER
Figure 3



ELECTRICAL CONFIGURATION OF THE SWITCH MODULE
Figure 4

STANDARD WIRING PRACTICES MANUAL

BURNDY RBDSC-() PROGRAM SWITCH MODULE

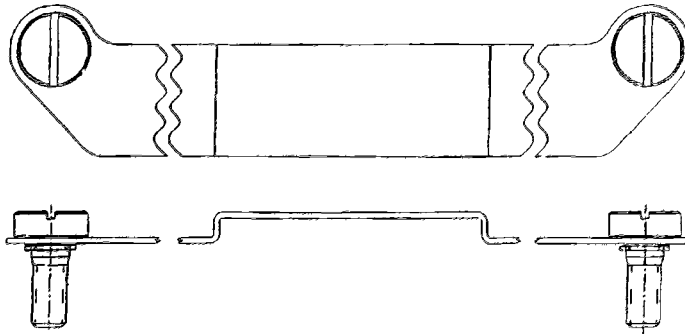
The Burndy RBDSC-() program switch module have these technical features:

- 24 switched outputs
- Captive switch seal plugs
- Security covers to protect switch positions
- Standard MIL-C-39029/1-101 size 1620 contacts.

B. Security Cover Assembly Part Numbers

**Table 2
SECURITY COVER ASSEMBLY PART NUMBERS**

Description	Part Number	Supplier	Note
Security Cover	RBDSC-1P15	Burndy	Held in position by the RBDSC-1P12 threaded stud
Threaded Stud	RBDSC-1P12	Burndy	Holds the security cover on the program switch module and the module on the structure



**BURNDY RBDSC-1P15 SECURITY COVER
Figure 5**

The Burndy RBDSC-1P15 security cover:

- Gives protection from accidental change of the position of the switch
- Locks the switch seal covers into position
- Prevents the contamination of the switches.

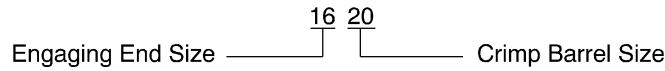
C. Contact Part Numbers

**Table 3
CONTACT PART NUMBERS**

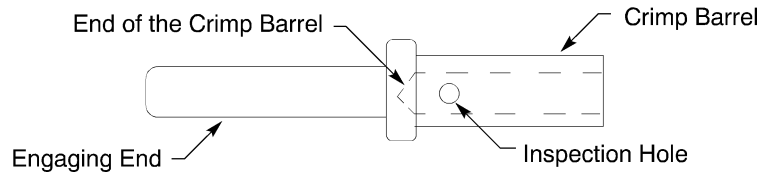
Contact Size		Contact Type	Part Number	Color Code		Supplier
Engaging End	Crimp Barrel			Band	Color	
16	20	Pin	MIL-C-39029/1-101	1	Brown	QPL
				2	Black	
				3	Brown	

STANDARD WIRING PRACTICES MANUAL

BURNDY RBDSC-() PROGRAM SWITCH MODULE



EXAMPLE OF A CONTACT SIZE
Figure 6



MIL-C-39029() PIN CONTACT
Figure 7

The contacts have these technical features:

- A size 20 crimp barrel
- A gold finish.

D. Necessary Materials

Table 4
NECESSARY MATERIALS FOR ASSEMBLY

Material	Specification	Supplier	Note
Seal Plug	MS27488-16	QPL	Blue
Seal Rod	AMS 3656	QPL	Cut to the necessary length

E. Recommended Tools

NOTE: The satisfactory alternatives to the tools in Table 5 are:

- In Table 6 for contact removal tools
- In Table 8 contact crimp tools
- In Table 9 contact insertion tools.

Table 5
RECOMMENDED TOOLS

Procedure	Contact Size		Tool	
	Engaging End	Crimp Barrel	Type	Part Number
Contact Removal	16	20	Removal	M81969/14-11
Contact Assembly	16	20	Crimp	M22520/1-01
			Locator	M22520/1-02
Contact Insertion	16	20	Insertion	M81969/14-11

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BURNDY RBDSC-() PROGRAM SWITCH MODULE

Table 5 (continued)

Procedure	Contact Size		Tool	
	Engaging End	Crimp Barrel	Type	Part Number
Switch Configuration	16	20	Insertion	M81969/14-02

2. DISASSEMBLY OF THE PROGRAM SWITCH MODULE

A. Security Cover Removal

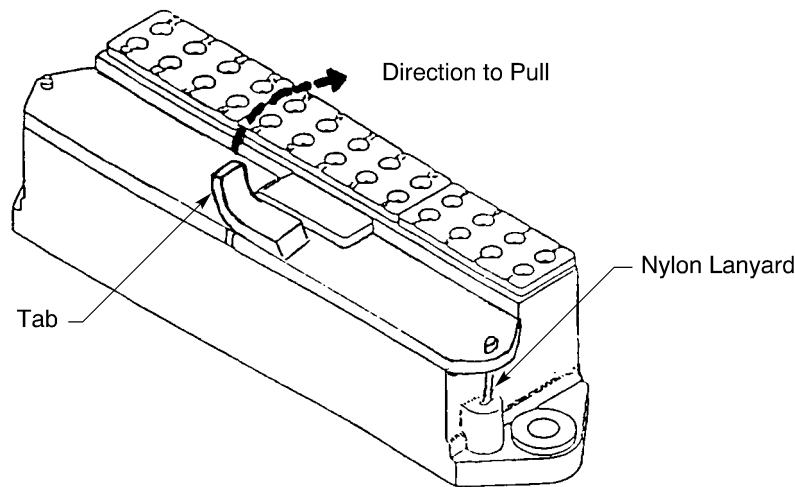
- (1) Loosen the screws that hold the cover to the module.
- (2) Remove the cover.

B. Switch Seal Plug Removal

- (1) Carefully pull the tab of the applicable switch seal plug up and away from the module. Refer to Figure 8.

Make sure to pull the tab lightly so that the nylon lanyard at the other end of the plug does not break.

CAUTION: THE NYLON LANYARD AT THE ONE END OF THE SWITCH SEAL PLUG KEEPS THE SEAL PLUG ATTACHED TO THE MODULE SO THAT THE PLUG IS ALWAYS AVAILABLE TO GIVE PROTECTION TO THE SWITCHES. DO NOT DISCONNECT THIS END OF THE PLUG.



SWITCH SEAL PLUG REMOVAL
Figure 8

C. Switch Module Removal from the Structure

- (1) Loosen the two nuts that attach the switch module to the structure until each nut is free from each screw.
- (2) Remove the switch module from the structure.

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D. Contact Removal

**Table 6
CONTACT REMOVAL TOOLS**

Crimp Barrel Size	Removal Tool	
	Part Number	Color
20	ATR 2079 BAC	-
	ATR 2080 BAC	-
	M81969/14-11	White
	RRX20B	-

(1) Make a selection of a contact removal tool from Table 6.

- CAUTION:** DO NOT USE A TOOL WITH:
- A TIP THAT IS BENT
 - A TIP THAT IS FLARED
 - A TIP THAT IS BROKEN
 - A TIP THAT IS CRACKED.

WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS, OR BOTH.

- (2) Put the tip of the tool on the wire near the grommet.
- (3) Carefully push the tip of the tool into the contact cavity until it stops.
- (4) Pull the wire and the tool out of the contact cavity at the same time.
- (5) If the contact does not release:
 - (a) Carefully pull the tool out of the contact cavity.
 - (b) Turn the tool 90 degrees.
 - (c) Do Step (2) through Step (4) again.

3. ASSEMBLY OF THE PROGRAM SWITCH MODULE

A. Contact Assembly

**Table 7
INSULATION REMOVAL LENGTH**

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)		Special Instructions
		Target	Tolerance	
24	20	0.15	± 0.02	-
22	20	0.15	± 0.02	-
20	20	0.15	± 0.02	-

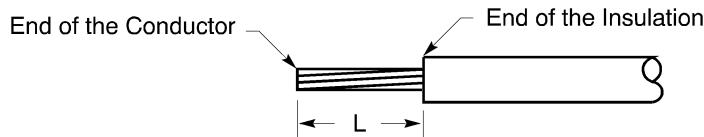
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**Table 8
CONTACT CRIMP TOOLS**

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool			
		Basic Unit		Locator	
		Part Number	Setting	Part Number	Color
24	20	M22520/1-01	2	M22520/1-02	Red
		M22520/2-01	5	M22520/2-11	-
		WA22	5	M22520/2-11	-
		WA22LC	5	M22520/2-11	-
		WA27	2	M22520/1-02	Red
22	20	M22520/1-01	3	M22520/1-02	Red
		M22520/2-01	6	M22520/2-11	-
		WA22	6	M22520/2-11	-
		WA22LC	6	M22520/2-11	-
		WA27	3	M22520/1-02	Red
20	20	M22520/1-01	4	M22520/1-02	Red
		M22520/2-01	7	M22520/2-11	-
		WA22	7	M22520/2-11	-
		WA22LC	7	M22520/2-11	-
		WA27	4	M22520/1-02	Red

- (1) Make a selection of a crimp tool from Table 8.
- (2) Remove the necessary length of insulation from the end of the wire. Refer to:
 - Table 7 for the insulation removal length
 - Figure 9
 - Subject 20-00-15 for the insulation removal procedure.



INSULATION REMOVAL LENGTH
Figure 9

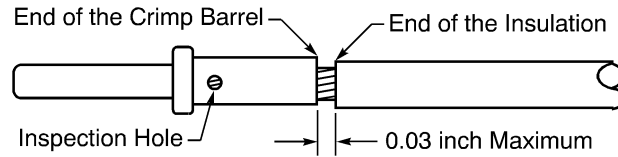
- (3) Put the end of the wire the crimp barrel of the contact. Refer to Figure 10.

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Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The strands of the conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is less than or equal to 0.03 inch.



POSITION OF THE WIRE IN THE CRIMP BARREL
Figure 10

- (4) Crimp the contact.
- (5) Examine the contact assembly for these types of damage:
 - Broken strands of the conductor
 - Strands of the conductor on which the base metal can be seen
 - Cracks in the crimp barrel of the contact.

B. Contact Insertion

Table 9
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool	
	Part Number	Color
20	DAK83-20	-
	M81969/14-11	Red
	ST2220-2-28	-

- (1) Make a selection of a contact insertion tool from Table 9.

CAUTION: DO NOT USE A TOOL WITH:

- A TIP THAT IS BENT
- A TIP THAT IS FLARED
- A TIP THAT IS BROKEN
- A TIP THAT IS CRACKED.

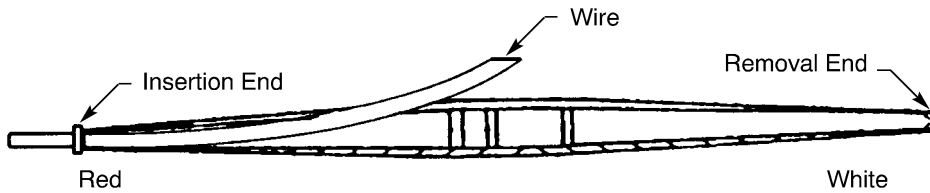
WARNING: A DEFECTIVE TOOL CAN CAUSE INJURY TO THE OPERATOR.

CAUTION: A DEFECTIVE TOOL CAN CAUSE DAMAGE TO THE GROMMET OF THE CONNECTOR OR THE CONTACT RETENTION CLIPS, OR BOTH.

- (2) Put the wired contact into the end of the insertion tool. Refer to Figure 11.

STANDARD WIRING PRACTICES MANUAL

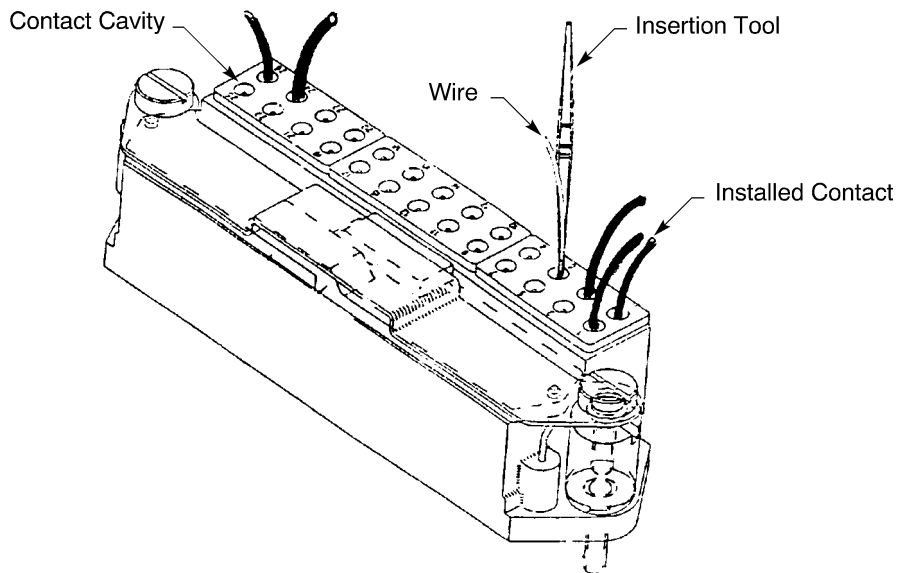
BURNDY RBDSC-() PROGRAM SWITCH MODULE



POSITION OF THE WIRED CONTACT IN THE M81969/14-11 INSERTION TOOL

Figure 11

- (3) Axially align the contact and the tool with the correct contact cavity. Refer to Figure 12.



POSITION OF THE CONTACT INSERTION TOOL AND THE CONTACT CAVITY

Figure 12

- (4) Push the tool straight into the contact cavity until the tool stops.
 (5) Carefully remove the tool from the contact cavity.
 (6) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE MODULE OR THE CONTACT, OR BOTH.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE AND RELIABILITY OF THE WIRE.

- (7) If the contact is not locked in the contact cavity:
 (a) Pull the wired contact out of the cavity.
 (b) Do Step (2) through Step (6) again.

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BURNDY RBDSC-() PROGRAM SWITCH MODULE

- (8) Examine the grommet for these types of damage:
- A crack or a hole in the grommet that extends from one contact cavity to another contact cavity
 - A contact cavity that does not have a number.

C. Installation of Spare Contacts

Refer to Subject 20-60-08.

If it is necessary to install a spare contact in the contact cavities that are not used:

- (1) Make a selection of a contact insertion tool from Table 9.
- (2) Put the contact in the contact cavity.
- (3) Axially align the tool and the contact.
- (4) Push the tool straight into the contact cavity until the tool stops.
- (5) Carefully remove the tool from the contact cavity.

D. Installation of Seal Plugs or Seal Rods

Refer to Subject 20-60-08.

If it is necessary to install a seal plug or a seal rod in the contact cavities that are not used:

- (1) Make a selection of a seal plug or a seal rod from Table 4.
- (2) Push the plug or the rod into the contact cavity.
Make sure that the distance from the end of the plug or the rod to the grommet is less than 0.1 inch.

E. Configuration of the Switches

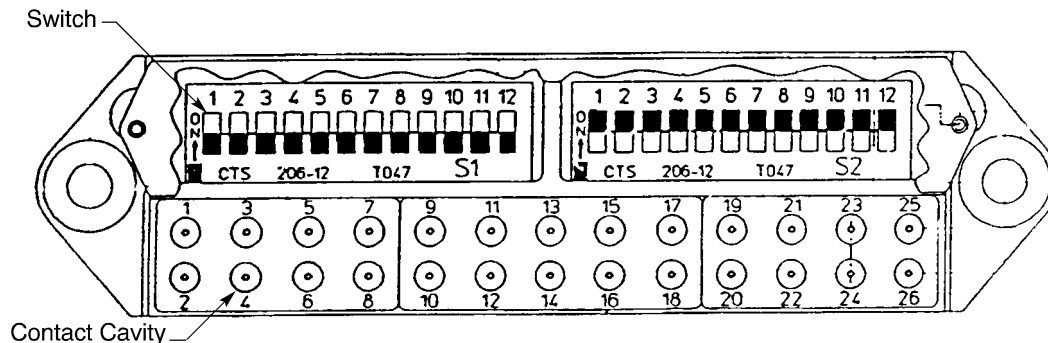
- (1) Remove the switch seal plugs from the module. Refer to Paragraph 2.B.
- (2) Make a selection of a contact insertion tool from Table 5.

NOTE: A plastic awl is a satisfactory alternative.

- (3) Set the switches to the correct position. Refer to Figure 4 and Figure 13.

NOTE: The Wiring Diagram gives the correct position for each switch.

NOTE: The ON position of the switch is an electrical short circuit. The opposite position of the switch is an electrical open circuit.

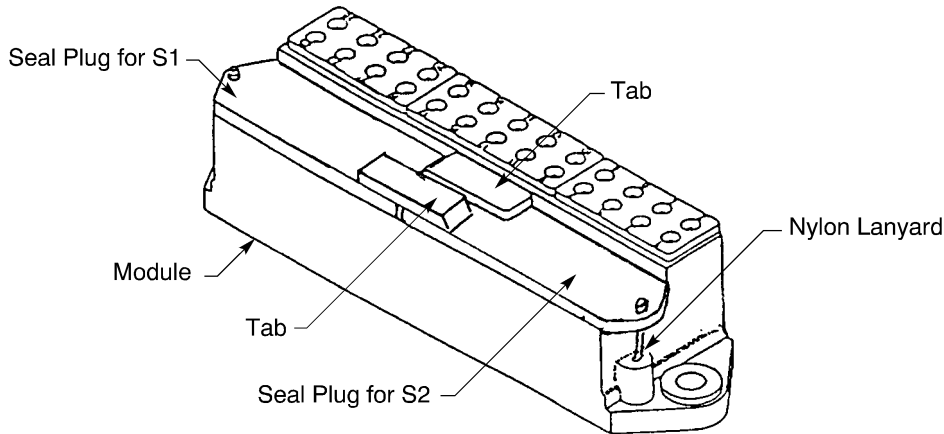


CONFIGURATION OF THE SWITCHES
Figure 13

STANDARD WIRING PRACTICES MANUAL

BURNDY RBDSC-() PROGRAM SWITCH MODULE

- (4) Put the each switch seal plug in the correct position over the switches.
Make sure that each switch operates correctly.
- (5) Carefully push the seal plug into the module so that each seal plug is locked into position. Refer to Figure 14.



POSITION OF THE SEAL PLUGS IN THE PROGRAM SWITCH MODULE
Figure 14

4. INSTALLATION OF THE PROGRAM SWITCH MODULE

A. Installation of the Security Cover on the Module

Refer to Figure 3.

- (1) Put the security cover in the correct position on the switch seal plugs.
- (2) Align the screws in the security cover with the holes in the threaded studs.
- (3) Put each screw into the top end of each threaded stud.
- (4) Tighten the screws equally until the bottom of the security cover touches the top of the threaded studs.

B. Installation of the Switch Module on the Structure

- (1) If necessary, remove the 6-32 nuts and the 6-32 screws from the flanges on the module.
- (2) If a security cover is installed on the module:
 - (a) Put the threaded stud in each hole in the flange of the module.
Make sure that the two threaded studs on the base of the module are aligned with the holes on the structure.
 - (b) Put the module on the structure so the threaded studs go through the holes in the structure.
- (3) If a security cover is not installed on the module:
 - (a) Align the holes in the flange of the module with the holes in the structure.

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BURNDY RBDSC-() PROGRAM SWITCH MODULE

- (b) Put the 6-32 screws through:
 - The holes in the flanges of the module
 - The two holes in the structure.
- (4) Put the 6-32 elastic lock nuts on the end of each threaded stud.
- (5) Tighten the screws so that the module does not move on the structure.
- (6) If the module moves, tighten the screws again.
- (7) Examine the switch module for these types of damage:
 - Any cracks in the shell of the switch module
 - Any cracked or broken flanges of the switch module
 - Any cracked or broken switch seal plugs
 - A worn nylon lanyard
 - A broken nylon lanyard.

5. APPROVED TOOL SUPPLIERS

A. Contact Removal Tools

**Table 10
REMOVAL TOOL SUPPLIERS**

Removal Tool	Supplier
ATR 2079 BAC	Astro
ATR 2080 BAC	Astro
M81969/14-11	QPL
RRX20B	Russtech

B. Contact Insertion Tools

**Table 11
INSERTION TOOL SUPPLIERS**

Insertion Tool	Supplier
DAK83-20	Daniels
M81969/14-11	QPL
ST2220-2-28	Boeing

C. Contact Crimp Tools

**Table 12
CRIMP TOOL SUPPLIERS**

Crimp Tool	Supplier
M22520/1-01	QPL
M22520/1-02	QPL



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BURNDY RBDSC-() PROGRAM SWITCH MODULE

Table 12 (continued)

Crimp Tool	Supplier
M22520/2-01	QPL
M22520/2-11	QPL
WA22	Daniels
WA22LC	Daniels
WA27	Daniels

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STANDARD WIRING PRACTICES MANUAL

FUSE DIODE MODULE AND LAMP REPLACEMENT

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	B. Lamp Part Numbers	1
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STANDARD WIRING PRACTICES MANUAL

FUSE DIODE MODULE AND LAMP REPLACEMENT

This Subject gives the procedures to remove and replace lamps and fuse diode modules.

1. PART NUMBERS AND DESCRIPTION

A. Part Numbers of Assemblies that Require Fuse Module and Lamp Replacement

Table 1
ASSEMBLY PART NUMBERS

Part Number	Description	Supplier
S231T290	Lighted Pushbutton Switch	Boeing
S231T300	Lighted Indicator	Boeing
S231T301	Lighted Indicator	Boeing

B. Lamp Part Numbers

Table 2
LAMP PART NUMBERS

Boeing Specification	Voltage	Military Part Number	Supplier
S231T290	28	MS25237-387 AS15	QPL
	5	MS24515-685 AS15	QPL
S231T300	28	MS25237-387 AS15	QPL
S231T301	28	MS25237-387 AS15	QPL

Table 3
SUPPLIER PART NUMBERS FOR MILITARY PART NUMBERS

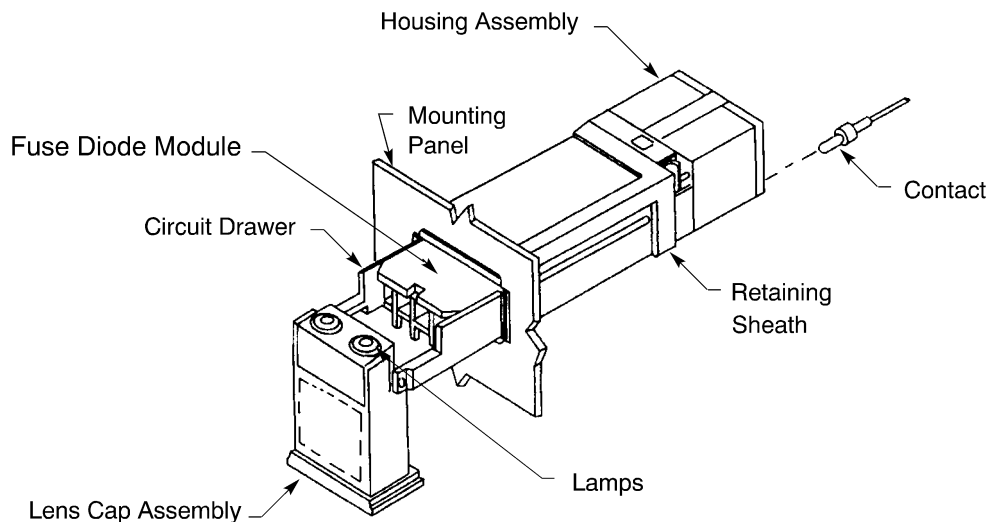
Military Part Number	Supplier Part Number	Supplier
MS25237-387 AS15	000-0040-0053	Korry Electronics

2. LAMP AND FUSE DIODE MODULE DISASSEMBLY

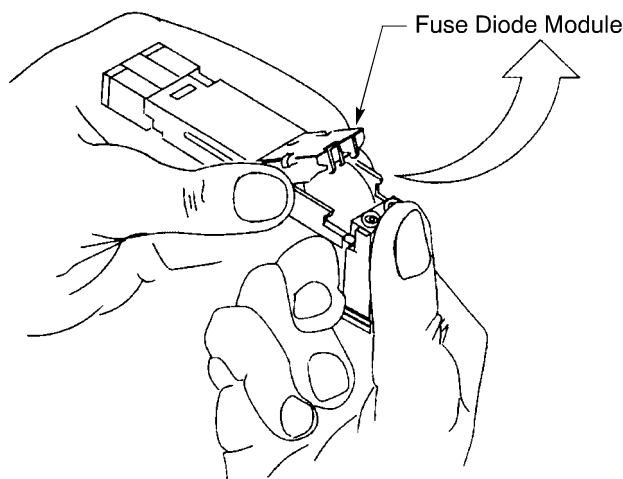
A. Lamp and Fuse Diode Module Removal

- (1) Pull the lens cap assembly out of the mounting panel as far as it will go.
- (2) Turn the lens cap assembly to make it point down. Refer to Figure 1.

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STANDARD WIRING PRACTICES MANUAL**FUSE DIODE MODULE AND LAMP REPLACEMENT****LIGHTED PUSHBUTTON SWITCH INDICATOR****Figure 1**

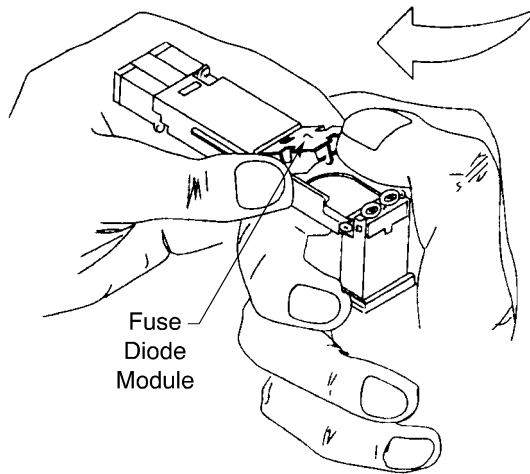
- (3) If it is necessary to replace the lamp, hold the circuit drawer and at the same time, pull the lamps out of the lens cap assembly.
- (4) If it is necessary to replace the fuse diode module:
 - (a) Pull the fuse module straight back out of the drawer, until it stops.
 - (b) Hold the drawer with the index finger, and at the same time, turn the fuse diode module up. Refer to Figure 2.

**FUSE DIODE MODULE REMOVAL****Figure 2**

STANDARD WIRING PRACTICES MANUAL**FUSE DIODE MODULE AND LAMP REPLACEMENT****3. LAMP AND FUSE DIODE MODULE ASSEMBLY****A. Lamp and Fuse Diode Module Installation**

- (1) If it is necessary to install a new lamp:
 - (a) Make a selection of a lamp from Table 2.
 - (b) Remove the broken lamp. Refer to Paragraph 2.A.
 - (c) Insert the new lamp into the lens cap assembly cavity.
- (2) If it is necessary to install a new fuse diode module:
 - (a) Remove the broken fuse diode module. Refer to Paragraph 2.A.
 - (b) Support the bottom of the drawer with the index finger and push the new fuse diode module into the drawer with the thumb.

Refer to Figure 3.



FUSE DIODE MODULE INSTALLATION
Figure 3

- (3) Rotate the lens cap assembly up.
- (4) Push the lens cap assembly into the housing assembly until it clicks.