TECHNICAL MANUAL

AVIATION UNIT AND INTERMEDIATE MAINTENANCE MANUAL

ARMY MODEL OH-58A AND OH-58C HELICOPTERS

"Approved for public release; distribution is unlimited."

This manual supersedes TM 55-1520-248-23-2 dated 4 August 1978, including changes 1 through 16.

HEADQUARTERS, DEPARTMENT OF THE ARMY

28 February 1989

CHANGE

NO. 13

HEADQUARTERS
DEPARTMENTS OF THE ARMY
WASHINGTON, D.C., 17 May 2002

Aviation Unit and Intermediate Maintenance Manual

ARMY MODEL OH-58A AND OH-58C HELICOPTERS

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Remove pages	Insert pages
A and B	A and B
C / (D blank)	C / (D blank)
10-2.1 / (10-2.2 blank)	10-2.1 / (10-2.2 blank)
10-5 and 10-6	10-5 and 10-6
10-12.1 / (10-12.2 blank)	10-12.1 / (10-12.2 blank)
11-3 and 11-4	11-3 and 11-4
11-4.1 / (11-4.2 blank)	11-4.1 / (11-4.2 blank)
11-5 through 11-10	11-5 through 11-10
11-13 through 11-16	11-13 through 11-16
11-21 through 11-26	11-21 through 11-26
11-33 and 11-34	11-33 and 11-34
11-45 and 11-46	11-45 and 11-46
17-1 and 17-2	17-1 and 17-2
A-1 and A-2	A-1 and A-2
———	A-3 / (A-4 blank)
B-13 and B-14	B-13 and B-14
D-17 and D-18	D-17 and D-18
D-53 and D-54	D-53 and D-54
D-77 through D-84	D-77 through D-84
E-1 and E-2	E-1 and E-2

2. Retain this sheet in front of manual for reference purposes.

By the Order of the Secretary of the Army:

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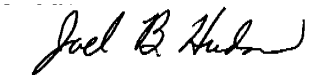

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Secretary of the Army
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URGENT

CHANGE

NO. 12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 19 April 2001

Aviation Unit and Intermediate Maintenace Manual
ARMY MODEL
OH–58A AND OH–58B
HELICOPTERS

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Remove pages	Insert pages
––––––	A and B
––––––	C/(D blank)
10–13 and 10–14	10–13 and 10–14

2. Insert List of Effective Pages (pages A through D blank) directly after Warning Pages (pages a and b).

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TM 55-1529-228-23-2
C11

CHANGE

NO. 11

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 12 January 1998

Aviation Unit and Intermediate Maintenance Manual

ARMY MODEL OH-58A AND OH-58C HELICOPTERS

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TM 55-1520-228-23-1, 28 February 1989, is changed as follows:

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Remove Pages	Insert Pages
i and ii	i and ii
C-3/(C-4 blank)	C-3/(C-4 blank)
D-1 through D-6	D-1 through D-6
D-95/(D-96 blank)	D-95 through D-102

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TM 55-1520-228-23-2
C10

CHANGE

NO. 10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 13 June 1997

Aviation Unit and Intermediate
Maintenance Manual

Army Model
OH-58A and OH-58C
Helicopters

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TM 55-1520-228-23-2, 28 February 1989, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
11-41 and 11-42	11-41 and 11-42

2. Retain these sheets in front of manual for reference purposes.

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CHANGE
NO. 9

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WASHINGTON, D.C., 28 February 1997

Aviation Unit and Intermediate
Maintenance Manual

Army Model
OH-58A and OH-58C
Helicopters

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TM 55-1520-228-23-2,28 February 1989, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
10-1 and 10-2	10-1 and 10-2
10-2.1/(10-2.2 blank)	10-2.1/(10-2.2 blank)
10-7 and 10-8	10-7 and 10-8
10-10.1/(10-10.2 blank)	10-10.1/(10-10.2 blank)
10-17 and 10-18	10-17 and 10-18
10-21 and 10-22	10-21 and 10-22
- - - - -	10-22.1/(10-22.2 blank)
10-23 through 10-26	10-23 through 10-26
11-1 through 11-4	11-1 through 11-4
- - - - -	11-4.1/(11-4.2 blank)
11-5 through 11-8	11-5 through 11-8
11-11 through 11-14	11-11 through 11-14
11-21 through 11-28	11-21 through 11-28
- - - - -	11-28.1 through 11-28.7/(11-28.8 blank)
11-29 and 11-30	11-29 and 11-30
11-39 through 11-44	11-39 through 11-44

TM 55-1520-228-23-2
C9

Remove pages	Insert pages
11-53 through 11-83/(11-84blank)	11-53 and 11-54
- - - - -	13-12.1/(13-12.2 blank)
13-13 and 13-14	13-13 and 13-14
16-7 and 16-8	16-7 and 16-8
A-1 and A-2	A-1 and A-2
A-2.1/(A-2.2 blank)	- - - - -
A-3 and A-4	A-3/(A-4 blank)
B-11 through B-14	B-11 through B-14
B-27 and B-28	B-27 and B-28
C-1 and C-2	C-1 and C-2
C-3/(C-4 blank)	C-3/(C4 blank)
D-1 through D-4	D-1 through D-4
D-11 and D-12	D-11 and D-12
D-23 ad D-24	D-23 and D-24
D-27 and D-28	D-27 and D-28
D-39 and D-40	D-39 and D-40
D-45 and D-46	D-46 and D-46
D-69 and D-70	D-69 and D-70
D-77 and D-78	D-77 and D-78
D-89 and D-90	D-89 and D-90
- - - - -	D-93 through D-95/(D-96 blank)
E-3 through E-10	E-3 through E-10
E-15 and E-16	E-15 and E-16
F-3 and F-4	F-3 and F-4
F-5 through F-8	F-5 through F-8
F-25(F-26 blank)	F-25/(F-26 blank)
F-31/(F-32 blank)	F-31/(F-32 blank)
- - - - -	F-56.1/(F-56.2 blank)
F-57 and F-58	F-57 and F-58
F-61/(F-62 blank)	F-61/(F-62 blank)
F-73(F-74 blank)	F-73/(F-74 blank)
FO-5(FO-6 blank)	FO-5/(FO-6 blank)
Index 1 and Index 2	Index 1 and Index 2
Index 5 through Index 10	Index 5 through Index 10
Index 11 through Index 14	Index 11 through Index 14

Remove pages	Insert pages
Index 17 through Index 26	Index 17 through Index 26
- - - - -	Index 28.1/(Index 28.2 blank)
Index 29 through Index 34	Index 29 through Index 34
Index 35 through Index 42	Index 35 through Index 42
Index 47 through Index 50	Index 47 through Index 50

2. Retain these sheets in front of manual for reference purposes.

By Order of the Secretary of the Army:

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TM 55-1520-228-23-2
C 8

CHANGE

NO. 8

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 30 May 1995

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL
OH-58A AND OH-58C
HELICOPTERS

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TM 55-1520-228-23-2, 28 February 1989, is changed as follows:

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Remove pages	Insert pages
16-8.1 and 16-8.2	16-8.1 and 16-8.2
16-30.1 and 16-30.2	16-30.1 and 16-30.2
16-31 through 16-34	16-31 through 16-34
16-37 through 16-40	16-37 through 16-40

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C7

CHANGE

NO. 7

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHlNGTON, D.C., 2 FEBRUARY 1994

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL
OH-58A AND OH-58C HELICOPTERS

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Remove pages	Insert pages
10-12.1/(10-12.2 blank)	10-12.1/(10-12.2 blank)
10-13 and 10-14	10-13 and 10-14
10-25 and 10-26	10-25 and 10-26

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TM 55-1520-228-23-2
C6

CHANGE
NO. 6

HEADQUARTERS
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WASHINGTON, D. C., 21 April 1993

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL
OH-58A AND OH-58C HELICOPTERS

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Remove pages	Insert pages
16-7 and 16-8	16--7 and 16-8
16-9 through 16-14	16--9 through 16–14
	16-30.1 and 16-30.2
16-31 through 16-40	16--31 through 16-40
E-1 and E-2	E-1 and E-2
	E-2. l/(E-2.2 blank)

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TM 55-1520-228-23-2
C 5

CHANGE E

NO. 5}

HEADQUARTERS
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WASHINGTON, D. C., 20 July 1992

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL
OH-58A AND OH-58C HELICOPTERS

TM 55-1520-228-23-2, 28 February 1989, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
10-1 and 10-2	10-1 and 10-2
- - -	10-2.1/10-2.2
- - -	10-10.1/10-10.2
10-11 and 10-12	10-11 and 10-12
D-5 and D-6	D-5 and D-6
D-91/D-92	D-91 and D-92

2. Retain this sheet in front of manual for reference purposes.

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TM 55-1520-228-23-2
C 4

CHANGE NO. 4

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WASHINGTON, D.C., 16 April 1992

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL
OH-58A AND OH-58C HELICOPTERS

TM 55-1520-228-23-2, 28 February 1989, is changed as follows:

1. Remove and. insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
10-21 and 10-22	10-21 through 10-26
C-2.1/C-2.2	C-2.1/C-2.21
D-5 and D-6	D-5 and D-6
—- —	D-91/9-92
F-1 through F-4	F-1 through F-4
F-31/F-32	F-31/F-32
F-73/F-74	F-73/F-74

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CHANGE NO. 3

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 September 1991

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL
OH-58A AND OH-58C HELICOPTERS

TM 55-1520-228-23-2, *28* February 1989, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
---- -	*16-8.1* and 16-8.2
16-9 through 16-12	16-9 through 16-12
A-3 and A-4	A-3 and A-4
Index 1. through Index 4	Index 1 through Index 4
Index 9 and [ndex 10	Index 9 and Index 10

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NOTE : THIS CHANGE HAS BEEN PRINTED AND DISTRIBUTED OUT OF SEQUENCE. IT SHOULD BE INSERTED IN THE MANUAL AND USED. UPON RECEIPT OF THE EARLIER SEQUENCED CHANGE, ENSURE A MORE CURRENT CHANGE PAGE IS NOT REPLACED WITH A LESS CURRENT PAGE.

TM 55-1520-228-23-2
C 2

CHANGE NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 6 September 1989

Aviation Unit and Aviation Intermediate
Maintenance Manual

ARMY MODEL OH-58A AND OH-58C HELICOPTERS

TM 55-1520-228-23-2, 28 February 1989, is changed as follows:

1. Cover. Supersession notice is changed to read: "This manual supersedes TM 55-1520-228-23-2, dated 4 August 1978, including Changes 1 through 16."

2. Retain this sheet in front of manual for reference purposes.

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CHANGE NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 February 1990

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL
OH-58A AND OH-58C HELICOPTERS

TM 55-1520-228-23-2, 28 February 1989, is changed as follows:

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Remove pages	Insert pages
a and b	a and b
11-15 and 11-16	11-15 and 11-16
----	11-16.1/11-16.2
11-19 and 11-20	11-19 and 11-20
----	11-20.1/11-20.2
16-1 and 16-2	16-1 and 16-2
-----	16-7 through 16-40
A-1 and A-2	A-1 and A-2
.....	A-2.1/A-2.2
A-3 and A-4	A-3 and A-4
B-25 and B-26	B-25 and B-26
----	B-26.1/B-26.2
B-27 and B-28	B-27 and B-28
C-1 and C-2	C-1 and C-2
----	C-2.1/C-2.2
F-3 and F-4	F-3 and F-4
----	F-4.1/F-4.2
F-11 and F-12	F-11 and F-12
Index 1 through Index 10	Index 1 through Index 10
----	Index 10.1/Index 10.2
Index 11 through Index 26	Index 11 through Index 26
----	Index 26.1/Index 26.2
Index 27 through Index 34	Index 27 through Index 34
----	Index 34.1/Index 34.2
Index 35 through Index 52	Index 35 through Index 52
----	FO-7 through F0-11/F0-12

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Brigadier General, United States Army
The Adjutant General

DISTRIBUTION :
To be distributed in accordance with DA Form 12-31, AVUM and AVIM Maintenance requirements for OH-58A and OH-58C Helicopters, Observation.

WARNING

Personnel performing operations, procedures, and practices which are included or implied in this technical manual shall observe the following instructions Disregard of these warnings and precautionary information can cause serious injury, death, or an aborted mission.

TOXIC POISONS

DANGEROUS CHEMICALS ARE USED IN NICKEL-CADMIUM BATTERIES

The electrolyte used in nickel-cadmium batteries contains potassium hydroxide (KOH), which is a caustic chemical agent Serious and deep burns of body tissue will result if the electrolyte comes in contact with the eyes or any part of the body. Use rubber gloves, rubber apron, and protective eye covering when handling the battery. If accidental contact with the electrolyte is made, use 0NLY clean water and immediately (seconds count) flush contaminated areas. Continue flushing with large quantities of clean water. Seek medical attention immediately. Before removing or installing the battery, ensure that the battery switch is off and the battery has cooled down if overheated. Removal or installation of the battery connector while the battery is under load may result in explosion, electrical arcing, and possible severe burns to personnel. Take every possible step to keep the nickel-cadmium battery **as** far away as possible from the lead-acid type of battery. Do not use the same tools and materials (screwdrivers, wrenches, gloves, apron, etc.) for both types of batteries. Anything associated with the lead-acid battery, even the air, must never come in contact with the nickel-cadmium battery or its electrolyte. Even a trace of sulfuric acid fumes from a lead-acid battery may result in damage to the nickel-cadmium battery, If sulfuric acid has been inadvertently mixed with the electrolyte in the battery, the upper areas of the cells will appear greenish in color. In such cases, the battery must be replaced.

Turbine fuels and lubricating oils contain additives which are poisonous and readily absorbed through the skin. Do not allow them to remain on skin longer than necessary.

HANDLING HYDRAULIC FLUID

Prolonged contact with liquid or mist can irritate eyes and skin After any prolonged contact with skin, immediately wash contact area with soap and water. If liquid contacts eyes, flush immediately with clear water. If liquid is swallowed, do not induce vomiting, get immediate medical attention. Wear rubber gloves when handling liquid. If prolonged contact with mist is likely, wear an appropriate respirator. When fluid is decomposed by heating, toxic gases are released.

NOISE

Sound pressure levels in this helicopter during some operation conditions exceed the Surgeon General hearing conservation criteria as defined in TB MED 501. Hearing protection devices, such as aviator helmets or ear plugs are required to be worn by all personnel in and around the helicopter during operation.

GROUND OPERATION

Engine will be started and operated only by authorized personnel Reference AR 95-1

FIRE EXTINGUISHER

Exposure to high concentrations of monobromotrifluoromethane (CF3BR) extinguishing agent or decomposition products should be avoided. The liquid should not be allowed to come into contact with the skin, as it may cause frost bite or low temperature burns.

When helicopter is to be parked where ambient temperature equals or exceeds 90°F (32°C), the fire extinguisher shall be removed until the next mission

ARMAMENT

Loaded weapons, or weapons being loaded or unloaded, shall be pointed in a direction which offers the least exposure to personnel or property in the event of accidental firing. Personnel should remain clear of hazardous area of all loaded weapons.

ANY ROTATION OF THE GUN ARMAMENT SUBSYSTEM BARRELS WILL CAUSE THE GUN TO FIRE. Upon landing, immediately alert personnel to probable presence of live rounds in the gun, Summon armament repairman to clear weapon.

FUELING AND DEFUELING

When refueling helicopter, the refueling vehicle or forward air refueling unit must be parked a minimum of 20 feet from the helicopter. Before starting the fueling operation, always insert fueling nozzle grounding chain of fuel truck ground wire into GROUND HERE receptacle located on the right side of the helicopter aft of the cabin area.

When defueling, turn off all electrical switches and disconnect external power from the helicopter. The helicopter must be electrically grounded prior to defueling.

RADIOACTIVE MATERIALS

Self-luminous dials and ignition units may contain radioactive materials. If such an instrument or unit is broken or becomes unsealed, avoid personal contact. Use forceps or gloves made of rubber or polyethylene to pick up contaminated material. Place materials and gloves in a plastic bag. Seal bag and dispose of it as radioactive waste in accordance with AR 755-15 and TM 3-261 (Refer to TB 55-1500-314-25). Repair procedures shall conform to requirements in AR 700-52.

CORROSION

During any inspection of the aircraft or components, the person making the inspection should pay particular attention to areas prone to corrosion. When corrosion is found, a prime consideration is to evaluate what corrective action will be required to correct the discrepancy. Corrosion repair and treatment can be time consuming, and for this reason, early evaluation is essential for good aircraft maintenance planning. This evaluation will assist in determining if sheet metal or aircraft mechanics will be necessary to make the needed repair. In cases where corrosion has exceeded the accept or reject criteria, material replacement will be necessary. For material replacement, refer to TM 55-1500-204-25/1, General Aircraft Maintenance Manual. For corrosion treatment, refer to TM 43-0105, Corrosion Control for Army Aircraft; and for painting, refer to TM 55-1500-345-23, Painting and Marking of Army Aircraft. If corrosion is found and not covered by applicable TM's submit a DA Form 2028, Recommended Changes to Equipment Technical Publications, or an Equipment Improvement Recommendation (EIR) where a design change is necessary.

EXPLOSIVES

The missile round contains explosives. All applicable safety regulations shall be strictly enforced. Explosive components containing electrical wiring must be protected at all times from stray voltages or induced electrical currents.

Handling operations should not be performed during electrical storms.

TOXIC MATERIALS

The basic stinger missile round and captive flight trainer (CFT) contain mercury thallium. If the IR dome should break, do not touch the basic stinger missile round or CFT in the vicinity of the IR dome. This material is toxic to unprotected skin. Avoid all contact with the released material unless protective equipment is being worn, such as a respirator, gloves, and chemical goggles. If the skin or eyes are exposed to the spilled material, immediately flush with large quantities of water. Any person exposed to the released material shound be promptly referred to a physician.

LIST OF EFFECTIVE PAGES

Insert latest changed pages; dispose of superseded pages in accordance with regulations.

NOTE: On a changed page, the portion of the text affected by the latest change is indicated by a vertical line, or other change symbol, in the outer margin of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original	0	28 February 1989	Change	7	02 February 1994
Change	1	01 February 1990	Change	8	30 May 1995
Change	2	06 September 1989	Change	9	28 February 1997
Change	3	30 September 1991	Change	10	13 June 1997
Change	4	16 April 1992	Change	11	12 January 1998
Change	5	20 July 1992	Change	12	19 April 2001
Change	6	21 April 1993	Change	13	17 May 2002

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 524, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.	Page No.	*Change No.
Cover	0	11-1	0
A – C	13	11-2 – 11-3	9
D blank	12	11-4	13
a	0	11-4.1	13
b	1	11-4.2 blank	9
i	11	11-5 – 11-6	13
ii	0	11-7	0
10-1 – 10-2	9	11-8 – 11-9	13
10-2.1	13	11-10 – 11-11	0
10-2.2 blank	9	11-12	9
10-3 – 10-4	0	11-13	13
10-5	13	11-14	9
10-6	0	11-15	0
10-7 – 10-8	9	11-16	13
10-9 – 10-10	0	11-16.1	1
10-10.1	9	11-16.2 blank	1
10-10.2 blank	9	11-17 – 11-19	0
10-11	5	11-20	1
10-12	0	11-20.1	1
10-12.1	13	11-20.2 blank	1
10-12.2 blank	7	11-21	9
10-13	12	11-22	13
10-14 – 10-17	0	11-23	0
10-18	9	11-24	13
10-19 – 10-20	0	11-25	13
10-21 – 10-22	9	11-26	0
10-22.1	9	11-27 – 11-28	9
10-22.2 blank	9	11-28.1 – 11-28.7	9
10-23	4	11-28.8 blank	9
10-24 – 10-26	9	11-29	0

*Zero in this column indicates an original page.

Page No.	*Change No.
11-30	9
11-31 – 11-32	0
11-33	13
11-34 – 11-38	0
11-39 – 11-40	9
11-41	10
11-42 – 11-43	9
11-44 – 11-45	0
11-46	13
11-47 – 11-52	0
11-53 – 11-54	9
12-1 – 12-2	0
13-1 – 13-12	0
13-12.1	9
13-12.2 blank	9
13-13	9
13-14 – 13-34	0
14-1	0
14-2 blank	0
15-1	0
15-2 blank	0
16-1	1
16-2 – 16-6	0
16-7	9
16-8	1
16-8.1	8
16-8.2	3
16-9	6
16-10 – 16-11	3
16-12	6
16-13 – 16-14	13
16-15 – 16-30	1
16-30.1 – 16-30.2	8
16-31	8
16-32 – 16-33	1
16-34	8
16-35 – 16-36	6
16-37 – 16-39	8
16-40	6
17-1	13
17-2	0
A-1 – A-3	13
A-4 blank	9
B-1 – B-10	0
B-11 – B-13	9
B-14	13
B-15 – B-25	0
B-26	1
B-26.1	1
B-26.2 blank	1
B-27	9
B-28	1
B-29	0
B-30 blank	0
C-1	0
C-2	9
C-2.1	1
C-2.2 blank	1
C-3	11
C-4 blank	11
D-1 – D-5	11
D-6 – D-11	0
D-12	9
D-13 – D-16	0
D-17	13
D-18 – D-23	0
D-24	9
D-25 – D-27	0
D-28	9
D-29 – D-38	0
D-39	9
D-40 – D-44	0
D-45 – D-46	9
D-47 – D-52	0
D-53	13
D-54 – D-68	0
D-69	9
D-70 – D-76	0
D-77	13
D-78 – D-79	0
D-80	13
D-81	0
D-82 – D-83	13
D-84 – D-89	0
D-90	9
D-91 – D-92	5
D-93 – D-95	9
D-96 – D-102	11
E-1	6
E-2	13
E-2.1	6
E-2.2 blank	6
E-3 – E-10	9
E-11 – E-14	0
E-15	9
E-16	0
F-1	0
F-2	4
F3 – F-4	9
F-4.1	1
F-4.2 blank	1
F-5	0
F-6 – F-7	9
F-8 – F-10	0
F-11	1
F-12 – F-15	0

*Zero in this column indicates an original page.

Page No.	*Change No.
F-16 blank	0
F-17	0
F-18 blank	0
F-19	0
F-20 blank	0
F-21 – F-24	0
F-25	9
F-26 blank	9
F-27 – F-29	0
F-30 blank	0
F-31	9
F-32 blank	9
F-33	0
F-34 blank	0
F-35	0
F-36 blank	0
F-37	0
F-38 blank	0
F-39	0
F-40 blank	0
F-41	0
F-42 blank	0
F-43	0
F-44 blank	0
F-45	0
F-46 blank	0
F-47 – F-49	0
F-50 blank	0
F-51	0
F-52 blank	0
F-53	0
F-54 blank	0
F-55	0
F-56 blank	0
F-56.1	9
F-56.2 blank	9
F-57	0
F-58 blank	9
F-59 – F-60	0
F-61	9
F-62 blank	9
F-63	0
F-64 blank	0
F-65	0
F-66 blank	0
F-67	0
F-68 blank	0
F-69	0
F-70 blank	0
F-71	0
F-72 blank	0
F-73	9
F-74 blank	9
F-75	0
F-76 blank	0
F-77	0
F-78 blank	0
F-79	0
F-80 blank	0
F-81 – F-86	0
FO-1	0
FO-2 blank	0
FO-3	0
FO-4 blank	0
FO-5	9
FO-6 blank	9
FO-7	1
FO-8 blank	1
FO-9	1
FO-10 blank	1
FO-11	1
FO-12 blank	1
Index 1	9
Index 2 – Index 3	3
Index 4	1
Index 5 – Index 8	9
Index 9	1
Index 10	9
Index 10.1	1
Index 10.2 blank	1
Index 11	0
Index 12 – Index 13	9
Index 14	1
Index 15	0
Index 16	1
Index 17 – Index 20	9
Index 21	1
Index 22 – Index 26	9
Index 26.1	1
Index 26.2 blank	1
Index 27 – Index 28	1
Index 28.1	9
Index 28.2 blank	9
Index 29 – Index 31	9
Index 32	1
Index 33 – Index 34	9
Index 34.1	1
Index 34.2 blank	1
Index 35 – Index 41	9
Index 42	0
Index 43 – Index 46	1
Index 47	9
Index 48	1
Index 49 – Index 50	9
Index 51 – Index 52	0

*Zero in this column indicates an original page.

TECHNICAL MANUAL
No. TM 55-1520-228-23-2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 28 February 1989

Aviation Unit and Intermediate Maintenance Manual

ARMY MODELS OH-58A AND OH-58C HELICOPTERS

NOTE:

This manual is printed in two volumes, as follows:

TM 55-1520-228-23-1, consisting of Table of Contents, Preface, Chapters 1 through 9.

TM 55-1520-228-23-2, consisting of Table of Contents, Chapters 10 through 17, Appendices A through F, and Index

The Preface, Appendices, and Index are applicable to the -1 and -2

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of any way to improve the procedures, please let us know. Mail your letter. DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Aviation and Missile Command. ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal. AL 35898-5230. A reply will be furnished to you. You may also send in your comments electronically to our e-mail address: ls-lp@redstone.army.mil or by fax 205-842-6546/DSN 788-6546. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT)

CHAPTER 10

FUEL SYSTEM

10-1. FUEL SYSTEM.

WARNING

Jet fuel is flammable; do not use near open flames, welding areas, or on hot surfaces. Do not handle or store near strong oxidants. e.g., liquid oxygen or hypochlorite. Do not smoke when using jet fuel and do not use it where others are smoking. Contact of eyes with liquid can cause severe irritation and blurred vision. Inhalation of vapor may cause irritation, headache, nausea, and dizziness if liquid contacts eyes, flush eyes thoroughly with water for a minimum of 15 minutes. Immediately remove fuel-saturated clothing. If vapors cause dizziness, go to fresh air. If liquid is swallowed, do not try to vomit. In all cases get immediate medial attention. When handling large quantities of liquid (more than one gallon) at an unexhausted workbench, wear approved respirator and goggles or faceshield. Dispose of liquid-soaked rags in approved metal container. Contaminated clothing shall be laundered prior to reuse. Metal containers of fuel must be closed and grounded to maintain electrical continuity.

10-2. General - Fuel System. The fuel system consists of a fuel cell containing related system components. The fuel system and related system components are crashworthy. An auxiliary fuel cell may be installed in the helicopter for added endurance, if required by mission planning.

SECTION I. FUEL CELLS

10-3. FUEL CELL - CRASHWORTHY FUEL SYSTEM.

10-4. Description - Fuel Cell (Crashworthy Fuel System). The fuel cell is constructed of self-sealing material and is a bladder type single unit installed in the fuselage cavity under passenger seats.

10-5 Inspection - Fuel Cell (Crashworthy Fuel System).

a. Inspect the exterior bottom of the fuselage beneath the fuel cell for indications of fuel leakage.

b. Inspect fuel drain valve for leaks.

c. Inspect fuel lines, fittings, and fuel cell covers for leakage, damage, and security. Remove fuel cap and check fuel hose clamp for security and damage. If any leaks are found, inspect the foam supports beneath the fuel cell for contamination.

d Inspect tank unit and electrical wiring for damage and security.

e. Inspect fuel shutoff valve for leaks, damage, and security.

10-5.1. Inspction and Cleaning - Fuel Cell (Crashworthy Fuel System).

a. Disconnect battery.

b. Defuel helicopter. Refer to paragraph 1-7.

c. Remove fuel sump retainer (23, figure 10-1). Remove lower fuel transmitter (20). Remove low level switch (11).

d. Remove 24 bolts (41) attaching sump assembly (61) to fuel cell. Lower sump assembly through opening and disconnect upper and lower fitting (106). Disconnect electrical interconnect wiring between lower transmitter (20) and upper transmitter (60). Remove sump assembly (61) and packing (39).

e. Remove refueling receiver (55). Refer to paragraph 10-30.

CAUTION

Do not use high pressure flushing, strong detergents, or solvents as damage to the fuel cell or airframe may result.

f. Clean fuel cell interior by removing sediments and other contaminants with low lint cleaning cloth, (C45.1) and warm water not exceeding 125 degrees fahrenheit.

g. Dry fuel cell using low lint cleaning cloth (C45.1).

h. Wipe clean with wiping rag (C119.1) moistened with denatured alcohol (C59).

i. Inspect interior of fuel cell for damage, deterioration or activation.

j. Install refueling receiver (55). Refer to paragraph 10-33.

NOTE

When connecting electrical wiring to components in the following steps, refer to figure F-18 A F-37 C (Wiring Diagram for Crashworthy Fuel System Cell), as necessary.

k. Position fuel sump assembly (61) in lower fuel cell opening. Connect upper and low fittings (106), hand tighten only. Connect electrical interconnect wiring between transmitter (20) and upper transmitter (60). Install sump assembly (61) and packing (39) with 24 bolts (41) and 24 washers (40). Torque bolts (41) 65 to 75 inch-pounds. Connect electrical wiring. Torque upper and lower fittings (106) 190 to 210 inch-pounds. Ensure that hose (107) does not twist or contact fuel cell.

l. Install fuel ceil sump retainer (23) with two screws (25) and two washers (24). Install lower fuel transmitter (20) and low level switch (11).

m. Perform fuel system functional and leak checks. Refer to paragraph 10-7, steps u. through ab.

10-6 Removal - Fuel Cell (Crashworthy Fuel System).

WARNING

When working on fuel cell in and around aircraft, make sure work area is clean and ventilated.

WARNING

All defueling operations will be performed in an area where fire hazards are reduced to a minimum with adequate ventilation.

CAUTION

Handle the fuel cell with extreme care during removal to avoid damage to cell. Cover all openings to prevent entry of foreign material.

a. Disconnect battery.

b. Defuel helicopter. Refer to paragraph 1-6.

c. Remove passenger seats. Refer to paragraph 2-93.

d. Remove soundproofing blankets (4, figure 2-27).

e. Remove access panel (12, figure 2-1 A or 2-2 C) above filler cap.

f. Remove fuel sump retainer (23, figure 10-1). Remove lower fuel transmitter (20). Remove low level switch (11).

g. Remove 24 bolts (41) attaching sump assembly (61) to fuel cell. Lower sump assembly through opening and disconnect fitting from (106) from fitting (50). Disconnect electrical interconnect wiring between lower transmitter (20) and upper transmitter (60). Remove sump assembly (61) and packing (29).

h. Remove closed circuit refueling receiver (55). Refer to paragraph 10-32.

i. Disconnect hoses (57 and 58) at fittings to fuel cell in access area above fuel filler cap.

j. Remove upper transmitter (60). (Refer to paragraph 8-245).

k. Remove fitting (8), packing (7), bolt (10), and washer (9).

k.1. Remove screw (72) and washer (73).

l. Remove two screws (1) and two washers (2) attaching seat back panel to fuel cell. Remove screws securing seat back panel and remove panel.

m. Remove 16 bolts (6) and 16 washers (5) attaching cover assembly (3) and packing (4) to permit access to inside of fuel cell.

n. Disconnect fitting (106) from breakaway valve (79). Remove tube assembly (59), hose (107), and hardware from interior of fuel cell.

o. Collapse fuel cell and remove from cavity through seat opening.

10-7. Installation — Fuel Cell (Crashworthy Fuel System).

CAUTION

Inspect fuel cell cavity for foreign objects before installation of fuel cell. Exercise extreme caution to preclude dropping of tools, hardware, etc., in the fuel cell cavity or the fuel cell. Ensure that all sharp edges, corners, and rivet heads are protected with tape and/or chafing strips. Do not fold a cold fuel cell. Folding may crack or damage a cold cell.

NOTE

Ensure all fuel cell fittings are removed and openings covered and that seat back panel and auxiliary fuel fitting cover plate on passenger seat forward bulkhead are removed. A work aid, consisting of a rope (8 to 10 feet long, 0.500 to 0.750 inch diameter) tied to a cut off broomstick (6 to 8 inches long with rounded ends), may be used to aid in installation of fuel cell.

CAUTION

For handling of the fuel cell prior to installation, refer to TM 1-1500-204-23.

a. Warm fuel cell to room temperature **72˚F to 85˚F** and not to exceed **125˚F**.

b. Dust fuel cell cavity and exterior of fuel cell with talcum powder (C135).

c. Remove protective covering from fuel cell openings.

d. Insert work aid into fuel cell and pull rope through opening in forward end of cell until broomstick stops against wall of cell.

e. Place a strap or rope on a clean ground cover and stretch fuel cell flat on ground cover (bottom and back of fuel cell down). Fold sides of fuel cell inboard and retain in position with strap.

f. Insert work aid rope through passenger seat back opening, through cavity, and out opening in passenger seat forward bulkhead.

g. Proceed to work fuel cell through seat back opening, while pulling on work aid rope to position forward section of fuel cell under passenger seat (considerable effort is required). Remove retaining

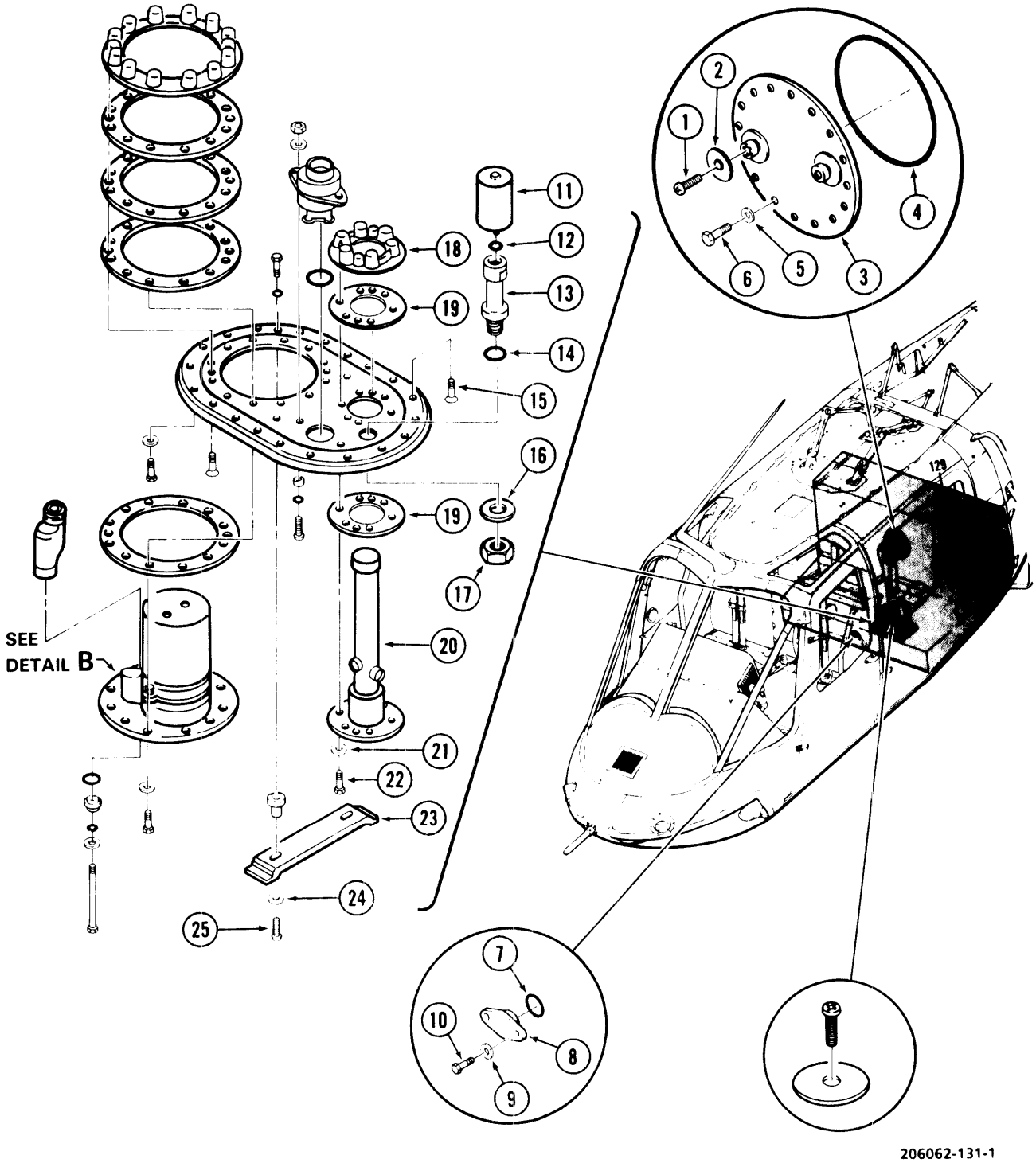


Figure 10-1. Fuel System – Crashworthy (Sheet 1 of 6)

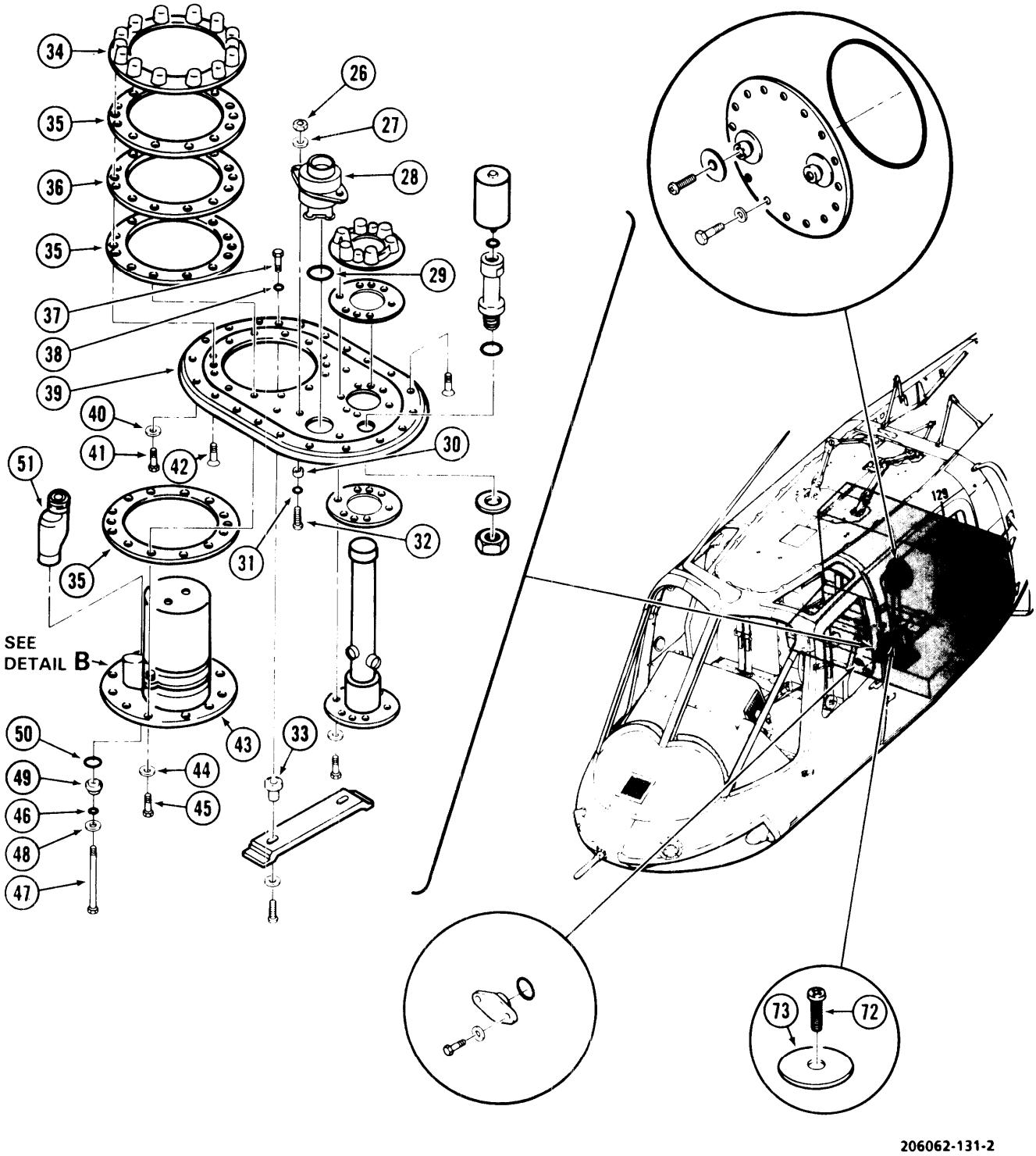


Figure 10-1. Fuel System – Crashworthy (Sheet 2)

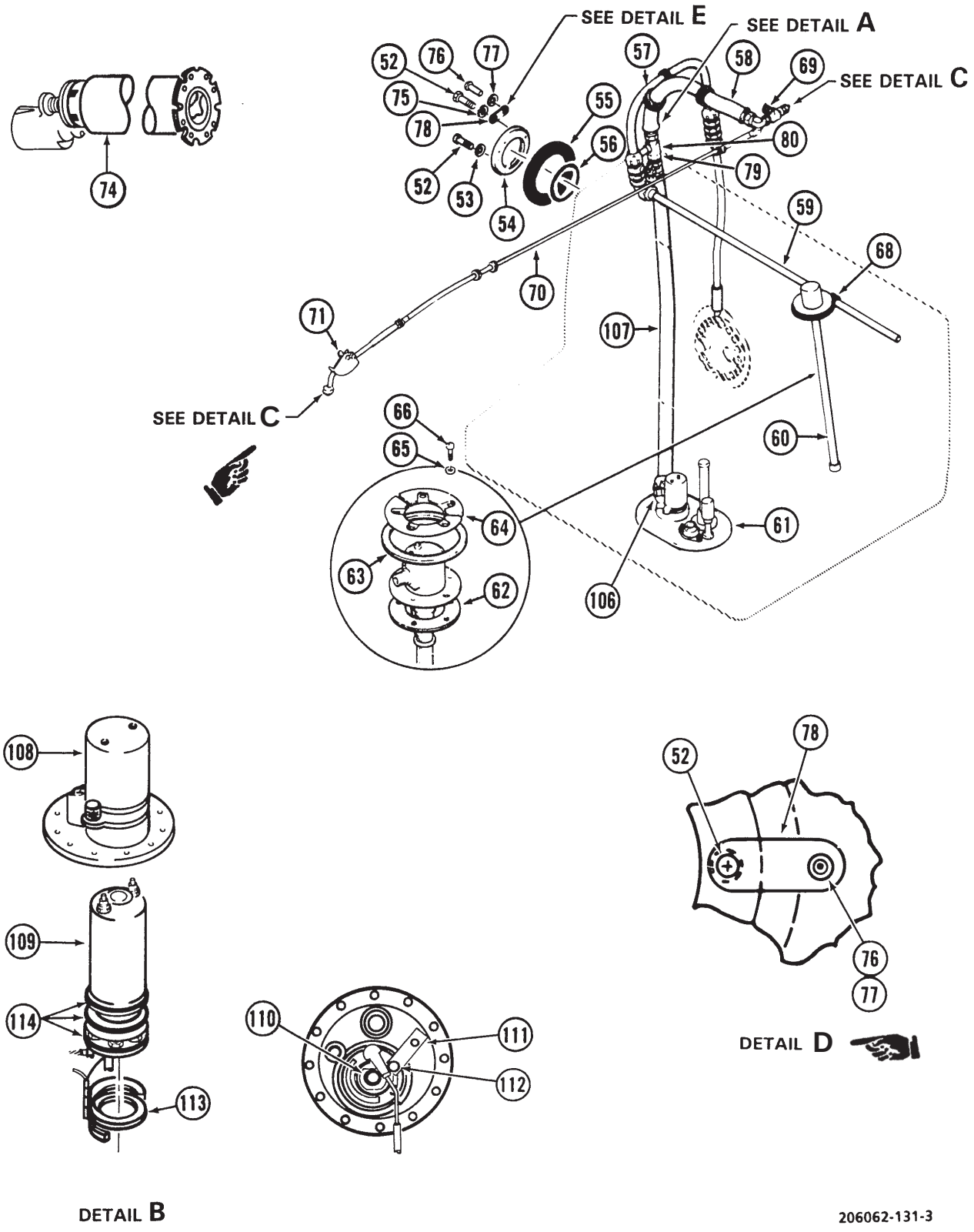


Figure 10-1. Fuel System — Crashworthy (Sheet 3 of 6)

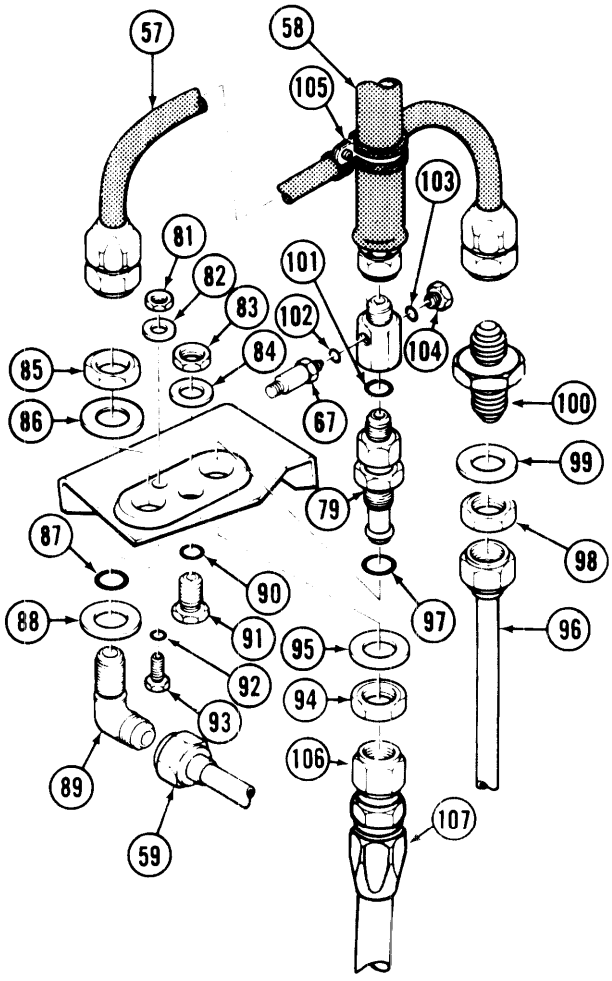


Figure 10-1. Fuel System – Crashworthy (Sheet 4)

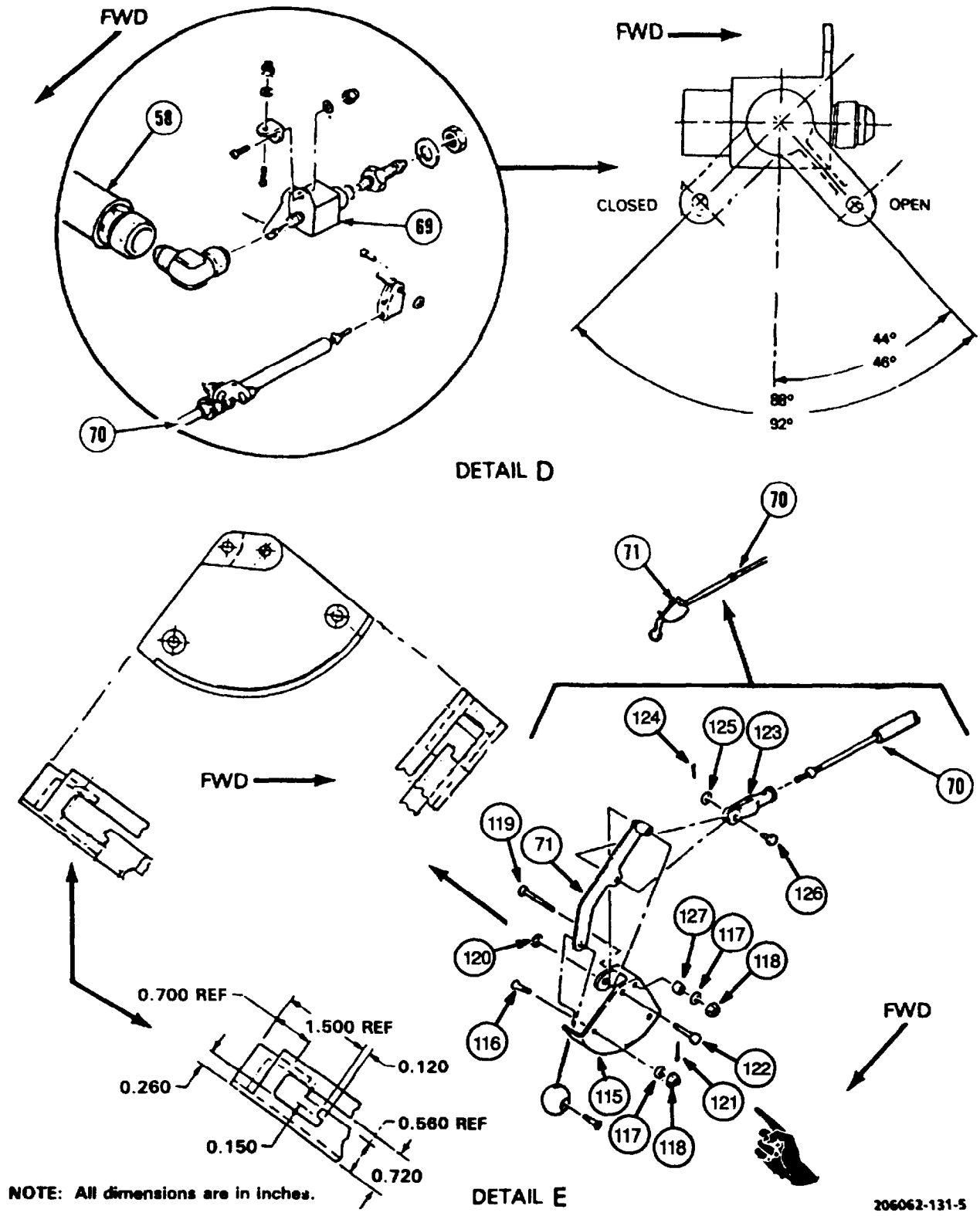


Figure 10-1. Fuel System - Crashworthy (Sheet 5)

1. Screw
2. Washer
3. Cover Assembly
4. Packing
5. Washer
6. Bolt
7. Packing
8. Fitting
9. Washer
10. Bolt
11. Low Level switch
12. Packing
13. Standpipe
14. Packing
15. Screw
16. Washer
17. Nut
18. Flange
19. Gasket
20. Lower Transmitter
21. Washer
22. Bolt
23. Retainer
24. Washer
25. Screw
28. Nut
27. Washer
28. Valve Assembly
29. Packing
30. Spacer
31. Packing
32. Screw
33. Insert
34. Flange
35. Gasket
36. Spacer
37. Bolt
38. Packing
39. Packing
40. Washer
41. Bolt
42. Screw
43. Boost Pump Assembly
44. Washer
45. Bolt
46. Packing
47. Bolt
48. Washer
49. Plug
50. Packing
51. Fitting
52. Screw
53. Washer
54. Retainer
55. Gasket
56. Packing
57. Hose
58. Hose
59. Tube Assembly
60. Upper Transmitter
61. Sump Assembly
62. Gasket
63. Seal
64. Retainer
65. Washer
66. Screw
67. Pressure Switch
68. Clamp, Bolt, and Washer
69. Fuel Shutoff Valve
70. Fuel Shutoff Cable
71. Fuel Shutoff Lever
72. Screw
73. Washer
74. Receiver
75. Washer
76. Rivet
77. Washer
78. Bonding Strap
79. Breakaway Valve
80. Adapter
81. Nut
82. washer
83. Nut
84. Washer
85. Nut
86. Washer
87. Packing
88. Washer
89. Elbow
90. Packing
91. Plug
92. Packing
93. Plug
94. Nut
95. Washer
96. Tube Assembly
97. Packing
98. Nut
99. washer
100. Nipple
101. Packing
102. Packing
103. Packing
104. Plug
105. Clamp
106. Fitting
107. Hose
108. Fuel Pump Housing
109. Fuel Pump Cartridge
110. Pump Drain Plug
111. Arm
112. Screw
113. Lockring
114. Packings
115. Support
116. Screws
117. Washers
118. Nuts
119. Screw
120. Washer
121. Cotter Pin
122. Pin
123. Clevis
124. Cotter Pin
125. Washer
126. Pin
127. Spacer

Figure 10-1. Fuel System - Crashworthy (Sheet 6)

strap when approximately one-half of fuel cell has been worked through seatback opening. Continue procedure until fuel cell is positioned in cavity.

h. Remove work aid from fuel cell.

i. Align insert in fuel cell with hole in seat and install washer (73, figure 10-1) and screw (72).

j. Install fitting (8) and packing (7) in forward section of fuel cell with two bolts (10) and two washers (9). Torque bolts to 65 TO 75 INCH-POUNDS.

k. Install fittings and hardware on top right side of fuel cell.

NOTE

When connecting electrical wiring to components in the following steps, refer to figure F-18 A or F-37 C (Wiring Diagram for Crashworthy Fuel System Cell), as necessary.

l. Install upper transmitter (60). (Refer to paragraph 8-247.)

m. Install tube assembly (59), hardware and hose (107) in interior of fuel cell. Torque tube assembly clamp bolt (66) 30 To 40 INCH-POUNDS.

n. Install closed circuit refueling receiver (55). Refer to paragraph 10-33.

o. Connect hoses (57 and 58) to fittings in fuel cell in access area above filler cap.

p. Position fuel sump assembly (61) in lower fuel cell opening. Connect upper and lower fittings (106) to breakaway valve (79) and fitting (50), hand tighten only. Connect electrical interconnect wiring between lower transmitter (20) and upper transmitter (60). Install sump assembly (61) and packing (39) with 24 bolts (41) and 24 washers (40). Torque bolts (41) 65 To 75 INCH-POUNDS. Connect electrical wiring. Torque upper and lower fittings (106) 190 TO 210 INCH-POUNDS. Ensure that hose (107) does not twist or contact fuel cell.

q. Install fuel cell sump retainer (23) with two screws (25) and two washers (24) Install lower fuel transmitters (20) and low level switch (11)

r. Install cover assembly (3) and packing (4) in opening in fuel cell with 16 bolts (6) and 16 washers (5). Torque bolts (6) **65 TO 75 INCH-POUNDS.**

s. Apply chromate putty (C119) to the inside peripheral edge of seatback cover and install on cover assembly (3).

t. Install two screws (1) and two washers (2) through seatback panel into fuel cell cover assembly (3).

u. Service fuel cells with 3 to 5 gallons of fuel

v. Ensure that master firewall shutoff valve is on (FWD)

w. With fuel boost pump operating, bleed fuel system at engine fuel pump.

x. Move aircraft to runup area then start engine with low fuel level

y. Pull fuel boost pump circuit breaker on overhead console, and continue to operate for two minutes

z. If engine continues to operate, push circuit breaker in and shut down engine

aa. If engine stops, shut down and bleed the system Check all fuel cell connections then repeat steps w through z as necessary

ab. After successful completion of functional check, fuel aircraft and check for leaks at all visible connections

ac. Install access panels, passenger seat cushions, (refer to paragraph 2-95) and soundproofing (refer to paragraph 2-168).

10-8. AUXILIARY FUEL CELL.

10-9. Description — Auxiliary Fuel Cell. The auxiliary fuel cell (2, figure 10-3) can be installed in the passenger compartment on the right half of the cargo platform The auxiliary fuel cell is a self supporting, crash-resistant, self-sealing, and a bladder type cell The cell is filled with orange-colored blocks of reticulated foam which serve as a fire suppressant. The capacity of the auxiliary fuel cell is **23.90** gallons The fuel flows from the auxiliary cell to the main cell by gravity only The pilot has no control over the flow of fuel into the main cell The auxiliary fue cell may be filled through the filler (3), or the main fuel filter (10, figure 1-1) When the auxiliary fuel cell is installed, the fuel calibration card (figure 10-5), must be used to determine the amount of fuel on board

10-10. Removal – Auxiliary Fuel Cell.

a. Defuel helicopter Refer to paragraph 1-7.

b. Unsnap upholstery cover From panel above and aft of passenger seats. Remove clamp (2, figure 10-4) from vent hose (3).

c. Disconnect vent hose (3) from coupling (14)

d. Install cap (25) on coupling (14)

e. Disconnect fuel outlet line (5) from coupling (8)

f. Install cap (25) on coupling (8) and Install cover (15) Refer to figure 10-4, view A

g. Loosen straps (4 and 6) and disconnect straps from ring fittings (11) and tiedown rings (12).

h. Remove auxiliary fuel cell (1) and straps from helicopter Install plugs in open ends of vent hose (3) and fuel line (5) Store fuel cell in a location where it will not be damaged

i. Install eight tiedown rings (12) in cargo platform

j. Fill main fuel cell with fuel and check for leaks at coupling (8).

10-11. Repair –- Auxiliary Fuel Cell (AVIM).

a. Remove vent hose (1) and fuel outlet line (5)

b. Remove filler cap (3, figure 10-3) and adapter (4) from fuel cell Remove orange-colored blocks of reticulated foam from fuel cell

c. Clean activated sealant from cavity where cell is leaking

d. Wash area around leaking area on the interior and exterior of the fuel cell with MEK (C107) and clean cloths. Ensure that area is thoroughly degreased and allow to dry.

e. Buff area **1.750** inches around damaged area on interior of cell. Buff area **2.250** inches around damaged area on exterior of cell. When buffing exterior of cell, remove block coat but do not damage ply cord, Wash buffed areas with MEK (C107) and allow to dry.

f. Cut a patch from fabric (C67) large enough to lap **2.250** inches beyond damaged area on exterior of cell.

g. Warm one container of accelerator (C1) and one container of cement (C35) and mix the accelerator into the cement thoroughly Pot life of mixed cement is **10 to 15** minutes

h. Apply one coat of cement over area to be repaired on the exterior of the cell. Apply the patch prepared in step f., to the wet cement

i, Plug damaged area cavity with same type cement prepared in step g. Fill cavity through opening on interior surface of cell and fill level with surrounding surface, but do not allow cement to smear buffed surface. Allow fuel cell to set **12 to 16** hours without moving.

j. Buff the damaged area on the interior surface and wash with MEK (C107) and allow to dry

k. Apply one coat of fuel barrier (C74) to buffed area on cell interior and allow to dry

l. Cut a patch from fabric (C68) large enough to lap dampened area on interior of cell **1.500 (±0.250)** inch.

m. Mix a batch of cement as described in step g and apply one coat to repair area on interior of cell Apply the patch, prepared in step I. to the wet cement

n. Apply one coat of cement over the patch; ensure that all the fabric patch is covered If necessary, due to short pot life of the cement prepare a second batch of cement Smooth the cement with fingers dampened with MEK (C107).

o. Allow cement to set anti apply one coat of fuel barrier (C74) Do not use any solvent near the repair area after the fuel barrier has been applied

p. Allow the fuel cell to set for 12 to 16 hours without moving.

q. Install adapter (4) and filler cap (3, figure 10-3).

r Install vent lines (1) and fuel outlet line (5) Cap or plug these lines to prevent entry of foreign material.

s. Store auxiliary fuel cell in area where it will not be damaged.

10-12. Installation – Auxiliary Fuel Cell.

a. Defuel helicopter Refer to paragraph 1-7.

b. Remove eight fittings (12, figure 10-4) from the right half of the cargo platform to leave a smooth surface for Installation of the auxiliary fuel cell. The fittings to be removed are; the three aft fittings, the two center fittings on each side and the forward center fitting The remaining six fittings are used to tiedown the fuel cell.

c. Unsnap upholstery cover from panel above and aft of passenger seats to gain access to coupling (14).

d. Remove cover (15) Remove cap (25) from coupling (8), Retain cap (25) and cover (15) for possible later reinstallation.

e. Install right half of cargo platform (7) in helicopter and secure to structure with pins provided.

f. Inspect the auxiliary fuel cell for evidence of damage and proper installation of vent hose (3), fuel outlet line (5), and strap assemblies (4 and 6) If these parts are not on the fuel cell, install them in position Illustrated Position the auxiliary fuel cell on the cargo platform (7) with the fuel outlet line (5) passed through the hole in the forward part of the cargo platform Attach the fuel outlet line (5) to coupling (8). Attach vent hose (3) to coupling (14) Secure straps (4 and 6) as Illustrated Secure vent hose (3) to support (10) with clamp (2)

g. Snap upholstery buttons in place It may be necessary to leave buttons on either side of vent hose (3) unsnapped.

h. Ensure that fuel calibration card (figure 10-5) is installed.

SECTION II. FUEL SYSTEMS

10-13. FUEL SYSTEM - CRASHWORTHY.

10-14. Description - Fuel System (Crashworthy). The fuel system incorporates a single bladder type, self-sealing cell with a total capacity of **71.5** gallons. The cell is located below and aft of the passenger seat. Mounted in the bottom of the cell is one boost pump, one fuel quantity low fuel transmitter, and one positive sealing fuel sump drain. Installed in the top of the cell is one fuel quantity transmitter and a breakaway vent line. The fuel quantity gage registers in pounds. The fuel filler cap and adapter is an integral part of the fuel cell located on the tight side just aft of passenger door. The fuel tiller cap is secured to the structure of the helicopter by a frangible ring which would breakaway in a crash condition. The fuel shutoff valve is mounted on the upper right side and is manually operated. Low level fuel warning and fuel boost caution lights are located on the caution panel. The main fuel line is a flexible self-sealing hose assembly.

10-15. General Maintenance - Fuel System (Crashworthy). Maintenance consists of visual inspections, ground operational check, specified adjustment of control linkage systems, and fuel control unit as required, the replacements of piping, fittings, seals, and units which are accessible without extensive disassembly. Observe the following systems when performing maintenance.

a. Conduct any defueling or drainage of fuel in accordance with applicable directives, and with extreme care to avoid fire hazards.

b. Before removing any line or hose, be sure it is properly identified and its route understood for replacement in same manner. Replace gaskets and packings with new like items.

c. Cap or cover any open lines, fittings, or exposed opening in units (other than normal vents and drains) to protect fuel system from contamination. Be sure vent lines are not obstructed.

d. Defuel helicopter for removal of any parts in the fuel cell area. Refer to paragraph 1-7.

10-15.1. Inspection and Cleaning - Fuel System (Crashworthy).

a. Disconnect battery.

b. Defuel helicopter. Refer to paragraph 1-7.

c. Remove fuel sump retainer (23, figure 10-1). Remove lower fuel transmitter (20). Remove low level switch (11).

d. Remove 24 bolts (41) attaching sump assembly (61) to fuel cell. Lower sump assembly through opening and disconnect upper and lower fitting (106). Disconnect electrical interconnect wiring between lower transmitter (20) and upper transmitter (60). Remove sump assembly (81) and packing (39).

e. Remove refueling receiver (55). Refer to paragraph 10-30.

NOTE

Do not disassemble the shutoff valve or breakaway valve.

f. Remove shutoff valve (69) and breakaway valve (79), hoses (57), (58) and (107).

g. Remove tubes (59) and (96), elbow (89) and nipple (100).

h. Thoroughly dean boost pump, shutoff valve and breakaway valve, hoses, tubes, and metal fittings by flushing with clean fuel.

i. Clean fuel cell. Refer to paragraph 10-5.1.

j. Replace any part which can not be adequately cleaned.

k. Inspect all components for damage, deterioration or activation.

l. Install fittings and hardware on top right side of fuel cell.

NOTE

When connecting electrical wiring to components in the following steps, refer to figure F-18 A or F-37 C (Wiring Diagram for Crashworthy Fuel System Cell), as necessary.

m. Install upper transmitter (60). Refer to paragraph 8-247.

n. Install tube assembly (59), hardware, and hose (107) in interior of fuel cell. Torque tube assembly clamp bolt (68) 30 to 40 inch-pounds.

o. Install refueling receiver (55). Refer to paragraph 10-33.

p. Connect hoses (57 and 58) to fittings in fuel cell in access area above filler cap.

q. Position fuel sump assembly (61) in lower fuel cell opening. Connect upper and lower fittings (106), hand tighten only. Connect electrical interconnect wiring between lower transmitter (20) and upper transmitter (60). Install sump assembly (61) and packing (39) with 24 bolts (41) and 24 washers (40). Torque bolts (41) 65 to 75 inch-pounds. Connect electrical wiring. Torque upper and lower fittings (106) 190 to 210 inch-pounds. Ensure that hose (107) does not twist or contact fuel cell.

r. Install fuel cell sump retainer (23) with two screws (25) and two washers (24). Install lower fuel transmitter (20) and low level switch (11).

s. Perform fuel system functional and leak checks. Refer to paragraph 10-7, steps u. through ab.

10-16. Troubleshooting — Fuel System (Crashworthy). Refer to table 10-1 for troubleshooting the fuel system.

NOTE

Prime the fuel system by pulling the engine ignition circuit breaker and disconnecting the ignition exciter input lead and the fuel line at the engine fuel spray nozzle. Open throttle and motor the engine until full flow of fuel is observed. Do not exceed starter operating limits.

Before using table 10-1, ensure all normal operational checks have been performed. If a malfunction exists which is not listed on table 10-1, notify the next higher level of maintenance.

Table 10-1. Troubleshooting - Fuel System

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

1. No fuel flow to engine driven fuel pump.

STEP 1. Check for loose, disconnected, ruptured, or broken fuel line or fittings.

Replace damaged lines or connect and tighten fittings and lines.

Table 10-1. Troubleshooting – Fuel System (Cont)

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
	STEP 2 Check for fuel in cell	**Service fuel cell. Refer to paragraph 1-5.**
	STEP 3 Check for defective fuel shutoff valve and/or fuel boost pump	**Replace defective fuel shutoff valve (paragraph 10-47) or boost pump (paragraph 10-20).**
2 Fuel flow to engine driven fuel pump restricted	STEP 1 Check for clogged line or filter	**Remove and replace fuel filter element. Clean or replace clogged line**
	STEP 2 Check for defective fuel shutoff valve	**Replace fuel shutoff valve.**

10-17. BOOST PUMP (CRASHWORTHY).

10-18. Description — Boost Pump (Crashworthy). Boost pump assembly (43, figure 10-1) IS electrically operated, mounted on a plate in the sump assembly and accessible under the fuselage The boost pump supplies a head pressure of fuel to the engine fuel pump The alternate fuel boost pump consists of a housing (108) and a pump cartridge (109). The pump cartridge (109) can be replaced without defueling the helicopter

10-19. Inspection — Boost Pump (Crashworthy). Inspect for leaks after fueling and operating

10-20. Removal — Boost Pump (Crashworthy).

NOTE

On underside of fuselage, mark position of fuel boost pump flange to sump plate before removal to aid in reassembly.

a. Defuel helicopter Refer to paragraph 1-7

b. Disconnect battery

c Disconnect electrical wiring from pump

d. Remove two screws (25, figure 10-1) and two washers (24) attaching fuel cell sump retainer (23)

e. Remove 12 bolts (45, figure 10-1), and washers (44) to detach boost pump (43) and gasket (35) from sump plate

f. Lower boost pump assembly (43) from fuel cell and remove bolt (47), washer (48), packing (46), plug (49), and packing (50) attaching fuel hose (107) and fitting (51) to pump

10-21. Removal — Boost Pump Cartridge (Crashworthy).

a. Disconnect electrical wiring form fuel pump cartridge (109, figure 10-1).

WARNING

A bent inlet shut-off valve arm may prevent the shut-off valve from completely opening causing a restricted fuel flow.

WARNING

To prevent engine surging/flame out when fuel level is below the top of cartridge type fuel boost pump housing with pump inoperative, ensure umbrella check valve (rubber plug) is installed in top center of boost pump housing. (TM 55-2915-335-30&P)

b. Remove lockwire and screw (112) while applying upward pressure to fuel shut-off lever arm, (111) to prevent binding of screw while removing.

c. Release pressure on fuel shut-off lever arm (111) and rotate 180˚ out of the way of cartridge (109).

WARNING

A bent inlet shut-off valve arm may prevent the shut-off valve from completely opening causing a restricted fuel flow.

CAUTION

Apply pressure directly over valve spring when opening or closing valve stem assembly. Trying to compress valve spring from free end of valve arm will cause valve arm to bend. When removing or installing shoulder screw, keep valve arm depressed.

NOTE

This lever shuts off fuel to pump cavity. Upon removal of cartridge, less than 1/2 cup of fuel will lost.

d. Remove fuel pump drain plug (110) and drain residual fuel from fuel pump into sutiable container.

e. Remove lockring (113) securing fuel cartridge (109) to fuel pump housing (108).

f. Remove fuel pump cartridge (109) from fuel pump housing (108) using cartridge removal tool (figure 1-2). Discard packings (114).

10-22. Installation - Boost Pump (Crashworthy).

CAUTION

Ensure fuel boost pump, P/N 206-062-687-101 (cartridge type), umbrella check valve (rubber plug in top center of boost pump housing) is installed. Refer to TM 55-2915-335-30&P if umbrella check valve is missing. If fuel bleed valve is not installed, engine surging/flame out will occur when fuel level is below the top of the fuel boost pump housing with the fuel boost pump inoperative.

a. Position gasket (35, figure 10-1), on boost pump (43). Connect fuel hose (107) and fitting (51), to boost pump with bolt (47), washer (48), packing (46), plug (49), and packing (50).

b. Position boost pump by alignment of marks on sump plate and install 12 bolts (45) and washers (44). Torque bolts **70 (±5) INCH-POUNDS**.

c. Install fuel cell sump retainer (23) with two screws (25) and two washers (24).

d. Connect electrical wiring, refer to paragraph 12-23, steps d through g.

10-23. Installation — Boost Pump Cartridge (Crashworthy).

WARNING

A bent inlet shutoff valve arm (lever) may prevent shut-off valve from completely opening causing a restricted fuel flow.

CAUTION

Apply pressure directly over valve spring when opening or closing valve stem assembly. Trying to compress valve spring from free end of valve arm will cause valve arm to bend. When removing or installing shoulder screw, keep valve arm depressed.

a. Install packings (114, figure 10–1), insert fuel pump cartridge (109) into fuel pump housing (108) ensuring arrows on fuel pump and fuel pump housing align.

b. Install lockring (113) securing fuel pump cartridge (109) to fuel pump housing (108).

c. Install fuel pump drain plug (110) into fuel pump.

d. Apply upward pressure on fuel shutoff valve, release pressure, and allow valve to close. Observe that the valve moves approximately 3/16 inch from open to closed position. Inspect shutoff lever. If lever is obvisously bent, straighten lever arm. If lever arm cannot be straightened or if there are any cracks present, remove the boost pump and replace lever. Refer to paragraph 10–20.

CAUTION

Installation of the electrical lead under the screw head will result in poor electrical contact and likely cause the arm to become bent. Excessive tightening of the shoulder screw will damage the electrical contact.

e. Position fuel shutoff lever arm to align with screw hole. Apply pressure to valve shaft (spring) end of arm. Install negative electrical lead between arm and cartridge. Install shoulder screw (112) with negative electrical lead between shoulder of screw and cartridge base. Tighten screw only enough to provide good electrical contact. Lockwire screw.

f. Inspect shutoff lever arm to ensure it is not bent. It is normal to have slight play (.010 – .030 inches) when pressure is applied to the valve stem (shaft).

g. Connect positive electrical lead to cartridge terminal.

10–24. LOW LEVEL SWITCH (CRASHWORTHY).

10–25. Description – Low Level Switch (Crashworthy). The low level switch (11, figure 10–1) is a float type switch located in the fuel sump and lights the 20 MIN FUEL warning in cabin when fuel level drops low enough to activate the switch.

10–26. Testing – Low Level Switch (Crashworthy).

WARNING

Refuel/defuel truck will be removed from area prior to connecting or disconnecting battery power.

a. Defuel helicopter. Refer to paragraph 1–7.

b. Attach battery cables and position BAT switch to ON.

c. Observe that 20 MIN FUEL warning lamp on caution panel is lit.

d. Begin fueling the helicopter and observe that 20 MIN FUEL warning lamp goes out when **12.5 (2.5**) gallons of fuel are loaded.

NOTE

If light does not extinguish at this time, replace low level switch.

e. Position BAT switch to OFF and disconnect battery cables.

10–27. Removal – Low Level Switch (Crashworthy).

NOTE

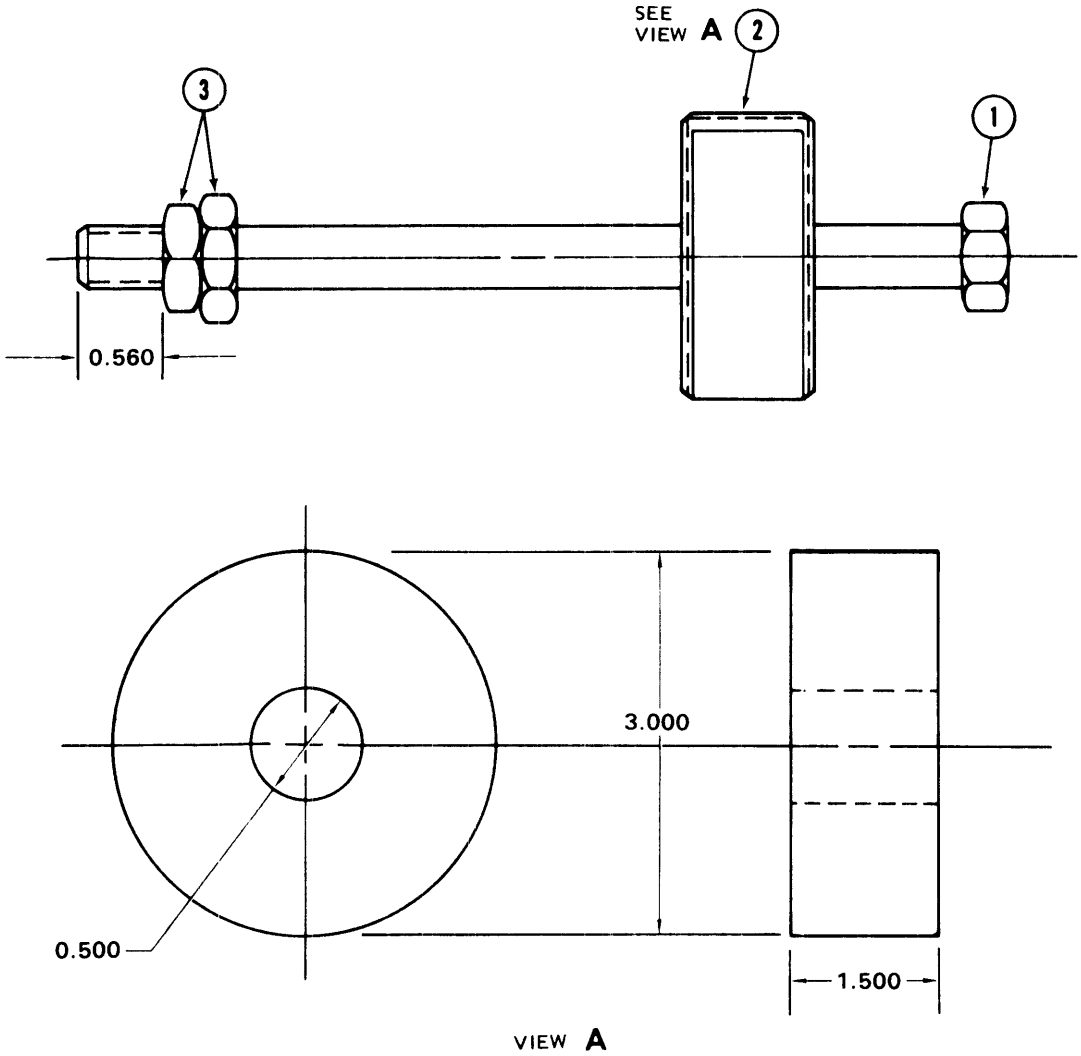
Refer to paragraph 10–6 for opening of fuel cell. Low level switch (11, figure 10–1) must be removed through either the fuel transmitter opening or boost pump opening.

a. Defuel helicopter. Refer to paragraph 1–7.

b. On underside of fuselage, disconnect electrical leads from low level switch (11, figure 10–1).

c. Remove nut (17) and washer (16) attaching switch standpipe (13) and remove low level unit from fuel cell.

10–28. Repair or Replacement – Low Level Switch (Crashworthy). Replace the switch if switch fails testing procedures in paragraph 10–26.



1. Bolt — 7/16-20 Hex Hd. x 6 in. long
2. Sliding weight — 7075 Aluminum Alloy
3. Nut — 7/16-20 Hex (2 ea)

NOTE: All dimensions are in inches.

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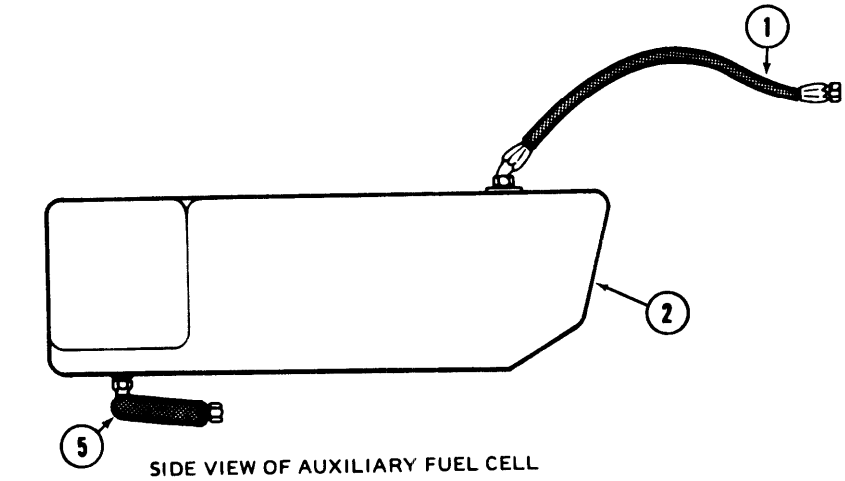
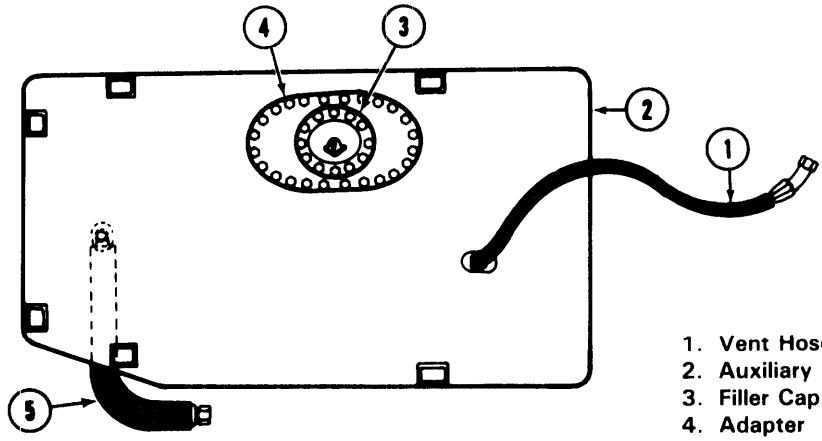
Figure 10-2. Work Aid for Fuel Pump Cartridge Removal



SIDE VIEW OF AUXILIARY FUEL CELL



TOP VIEW OF AUXILIARY FUEL CELL

1. Vent Hose
2. Auxiliary Fuel Cell
3. Filler Cap
4. Adapter
5. Fuel Outlet Line

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Figure 10-3. Auxiliary Fuel Cell

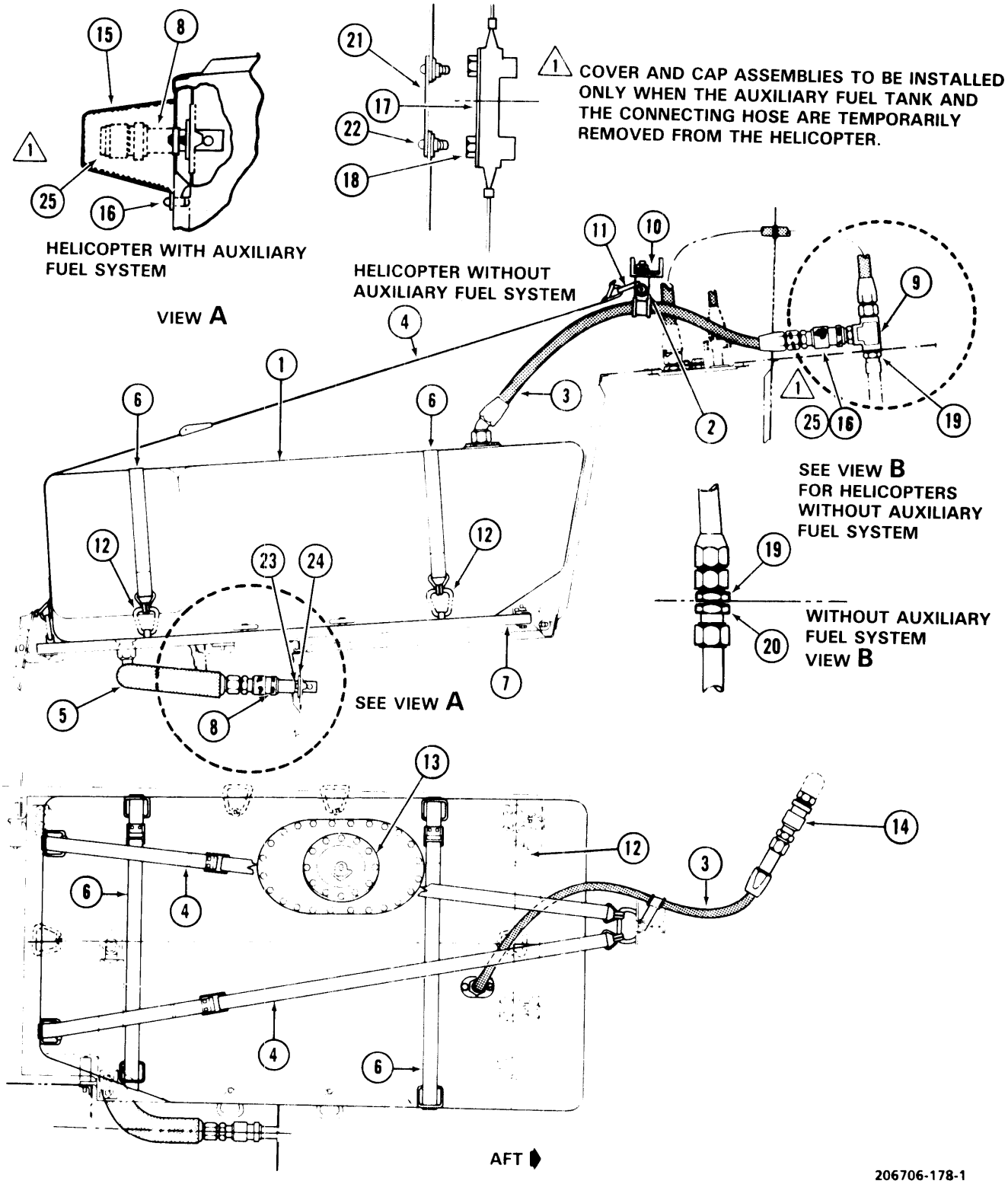

Figure 10-4. Auxiliary Fuel Cell Installation (Sheet 1 of 2)

1. Auxiliary Fuel Cell
2. Clamp
   Screw
   Washer
   Nut
3. Vent Hose
4. Restraint Strap
5. Fuel Outlet Line
6. Restraint Strap
7. Cargo Platform
8. Coupling (Self-Sealing)
9. Tee Fitting
10. Support
11. Ring Fitting
12. Tie-Down Rings
13. Filler Caps
14. Coupling (Self-Sealing)
15. Cover
16. Washer and Screw
17. Fitting and Packing
18. Bolt and Washer
19. Washer and Nut
20. Union
21. Cover
22. Screw
23. Screw
24. Packing
25. Cap Assembly

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Figure 10-4. Auxiliary Fuel Ceil Installation (Sheet 2)

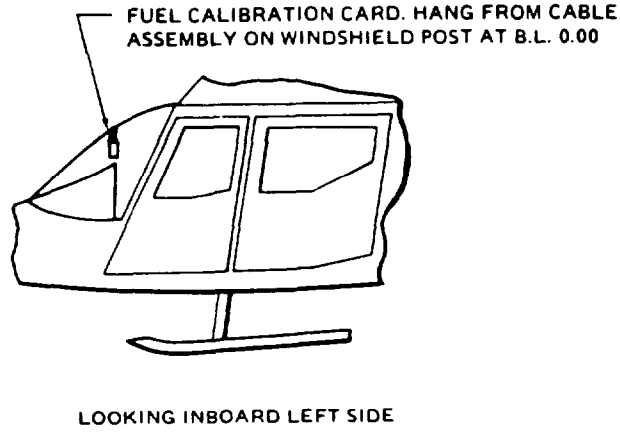


Figure 10-5. Fuel Calibration Card

10-29. Installation - Low Level Switch (Crash-wothy).

a. Install new packing (12 and 14, figure 10-1) on low level switch (11) and standpips (13). Install unit through opening and attach to sump plate with washer (16) and nut (17).

b. Lockwire standpipe (13) and nuts (17) to the nut on the drain valve assembly (28) using lockwire (C96).

c. Connect electrical leads to the switch.

10-30. CLOSED CIRCUIT REFUELING RECEIVER.

10-31. Description - Closed Circuit Refueling Receiver. Closed circuit refueling receiver (74, figure 10-1) is located on right side off fuselage aft of doors and provides for fueling and defueling access.

10-32. Removal - Closed Circuit Refueling Receiver. Remove twelve screws (52, figure 10-1) and washers (53 and 75). Remove retainer (54) receiver (74), gasket (55) and packing (56).

10-33. Installation - Closed Circuit Refueling Receiver. Install packing (56, figure 10-1), gasket (55), receiver (74) and retainer (54) with twelve screws (52), eleven washers (53), and one washer (75). Torque screws (52) 65 TO 75 INCH-POUNDS. When installing the dosed circuit refueling receiver, do not bend or damage the shield on the float assembly. Ensure that cap and receiver assembly is installed with the arrow on the assembly facing upward. Check refueling receiver and strap for proper ground.

10-34. SUMP VALVE - CRASHWORTHY.

10-35. Description - Sump Valve (Crashworthy). The sump valve (28, figure 10-1) is located on the lowest part of the fuel cell and is used for fuel sample and defuel purposes. The sump valve is used in determining fuel contamination levels.

10-36. Inspection - Sump Valve (Crashworthy).

a. To ensure water is not present in fuel cell, per-from the following steps:

NOTE

For additional fuel management and sampling procedures, refer to FM 10-68. Top off tank at night (or after each flight if possible).

(1) Prior to first flight each day, drain fuel from sump into a clean, dry, sample bottle.

(2) Visually examine fuel for color, cleanliness, brightness, cloud, or haze sediment, entrained water and fibrous materiel.

(3) If water is present, drain another sample into a dean, dry, sample bottle.

(4) Repeat until no free water is observed in sample bottle.

(5) If water, sediment or suspended matter is stiff evident after draining a quart or more, See FM 10-68.

b. Inspect sump valve for positive cutoff. If leakage is evident, replace sump valve.

10-37. Removal - Sump Valve (Crashworthy).

NOTE

If excessive torque is required to unscrew body of valve and the tank is not pliable due to coldness, warm fuel cell to room temperature of 72°F to 85°F and not to exceed 125°F.

a. Defuel helicopter. Refer to paragraph 1-7.

b. Remove fuel boost pump. Refer to paragraph 10-20.

NOTE

Completion of step b. not required when removing valve body.

c. Remove lockwire from sump valve.

d. unscrew body of valve.

e. Remove two screws (32, figure 10-1) packing (31), spacers (30) washers (27) and nuts (26)

f. Remove mounting flange through boost pump hole

10-38. Repair or Replacement - Sump Valve (Crashworthy).

a. Drain fuel cell and remove the drain cock assembly from the mounting plate attached to the fuel sump plate assembly Discard packing

NOTE

Be careful when removing retaining ring. Valve is spring-loaded.

b. Remove both rollpins and retaining ring (1, 4, and 5, figure 10-6).

c. Remove and discard both packings in valve assembly (2 and 3) Clean the valve seat and surfaces adjacent to both packings

d. Install new packings and reassemble the sump valve assembly

e. Reinstall the drain cock assembly using new packing

10-39. Inspection – Sump Valve (Crashworthy). Inspect sump valve for positive cutoff and thread conditions

10-40. Installation — Sump Valve (Crashworthy).

a. Position flange of new sump valve in sump

b. Install two screws (32, figure 10-1), packing (31), spacers (30), washers (27), and nuts (26)

c. Install packing (29) on body of valve and screw into mounting flange Tighten nut until nut contacts sump plate

d. Lockwire sump valve

e. Install boost pump. Refer to paragraph 10-22.

FUEL SHUTOFF VALVE – CRASHWORTHY.

10-42. Description — Fuel Shutoff Valve (Crashworthy). The fuel shutoff valve (69, figure 10-1), is manually operated by lever (71), and push-pull cable assembly (70) located along the top of the cabin The lever is accessible to both crew members The valve is mounted on cabin roof at front of engine pan

10-43. Removal — Fuel Shutoff Valve (Crashworthy).

a. Remove structural panel above electrical shelf.

b. Disconnect fuel inlet elbow fitting at valve (69, figure 10-1)

c. Remove pin, washers, and cotter pin attaching cable (70) to valve (69)

d. Remove screw, washer, and nut attaching valve (69) to mounting bracket

e. Turn valve (69) from firewall fitting. Cap all openings

10-44. Inspection — Fuel Shutoff Valve (Crashworthy).

a. Check valve for smooth operation for full travel of on off lever Check on-off lever for grooves, replace if grooves exceed 0.030 depth.

b. Inspect valve Internally for foreign objects to ensure fuel path is not restricted Valve does not have to be removed; instead, disconnect outlet fuel line near firewall and then remove elbow from the firewall fitting View the internal structure of valve

c. Inspect for fuel leaks at attaching hoses and fittings on Installation

d. Inspect for leakage in the off position in accordance with paragraph 10-45, step d.

10-45. Installation — Fuel Shutoff Valve (Crashworthy).

a. Install valve (69, figure 10-1)and new packing on firewall fitting

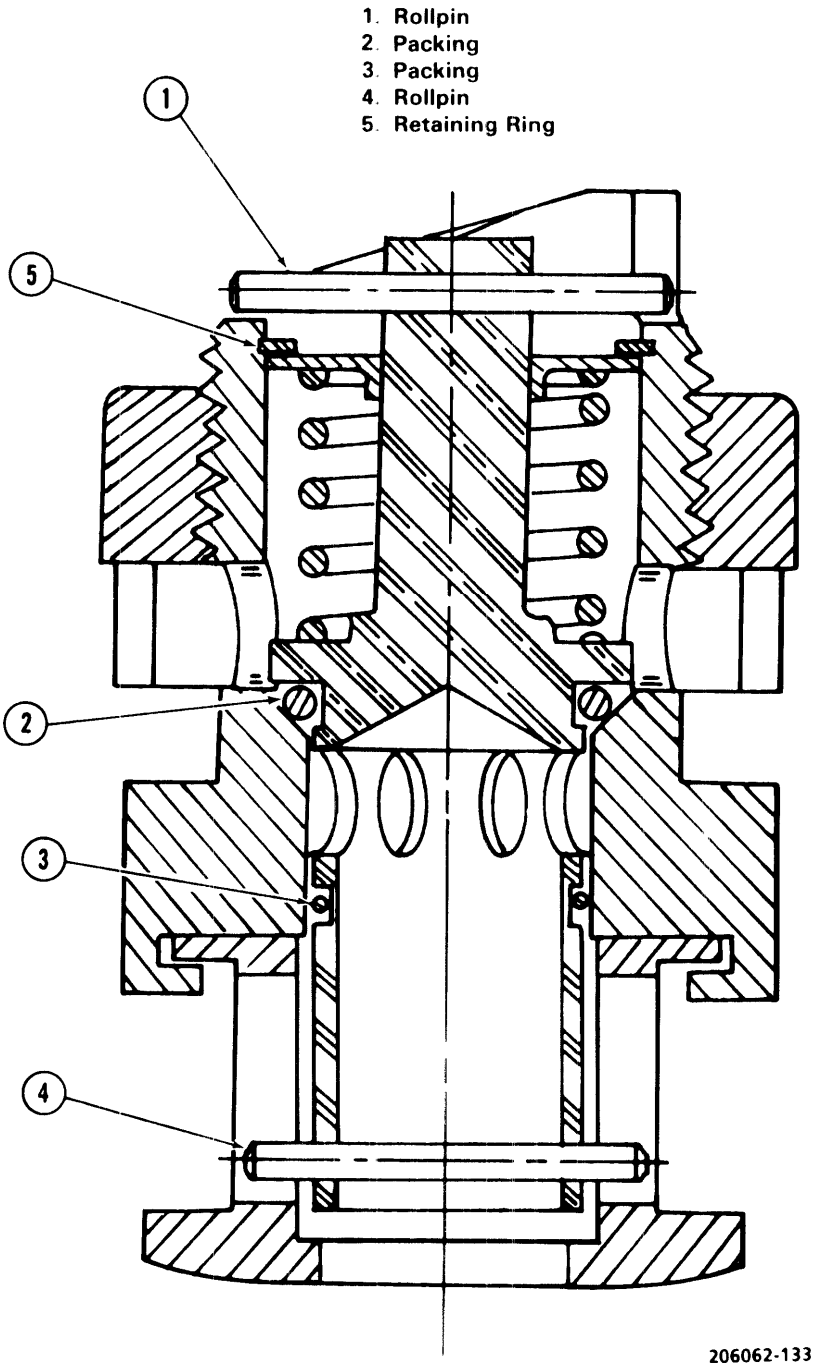


Figure 10-6. Fuel Drain Cock Assembly

b. Install screws, washers, and nut attaching valve (69) to mounting bracket.

c. Connect fuel hose (58) to shutoff valve (69).

WARNING

All cable adjustments shall be performed by removing clevis from hard points and screwing It onto the cable to prevent able from twisting.

d. The valve should be closed (arm on valve in extreme aft position) when the aft side of the fuel shutoff lever (71) is 0.3 inch from the aft end of the off position slot in its support. Adjust length of cable (70) at rod end clevis next to fuel shutoff valve. Attach cable (70) to valve (69) with headed pin, washer and cotter pin. Insert the headed pin from the outboard side of the clevis on the cable. Check for leakage through the outlet port of the valve as follows:

NOTE

If threaded end of cable (70) does not extend through clevis, check to assure that at least eight threads are engaged. Additional adjustment may be performed at clevis on forward end of cable, if necessary.

(1) Place the fuel shutoff lever in the notch on the aft slot (OFF position).

(2) Disconnect the fuel supply hose at approximately FS 134.0.

(3) Energize the fuel boost pump.

(4) Replace valve if leakage through the outlet port exceeds **2.000** ounces per minute (by volume) or **59.0** cubic centimeters per minute.

e. Inspect to assure the valve is open with the fuel shutoff lever in the ON position.

(1) Place the cockpit fuel shutoff valve lever aft towards the closed position until the fuel shutoff valve fully doses.

(2) Position the fuel shutoff lever in the notch on the forward slot (ON position).

(3) Measure the total range of travel of the lever on the fuel shutoff valve.

(4) The total travel of the lever on the fuel shutoff valve from full closed to full open is **88 to 92** degress.

(5) Disconnect fuel hose assembly from outlet side of fuel shutoff valve. Note that fuel shutoff valve is internally in the full open position. Move the cockpit fuel shutoff valve lever to the full aft, (closed) position. Note that the fuel shutoff valve is internally in the fully dosed position.

f. Install structural panel.

10-46. FUEL SHUTOFF LEVER.

10-46.1. Description - Fuel Shutoff Lever. The fuel shutoff lever (71) along with push cable (70) manually operates the fuel shutoff valve (69). The lever is accessible to both crew members.

10-46.2. Removal - Fuel Shutoff Lever.

a. Remove support (115, figure 10-1, detail E) by removing two screws (116) one screw (119) one spacar (127), three washers (117) and three nuts (118).

b. Separate lever (71) from support (115) by removing cotter pin (121), washer (120), and pin (122).

c. Disconnect clevis (123) by removing potter pin (124). washer (125), and pin (126).

10-46.3. Inspection - Fuel Shutoff Lever. Inspect fuel shutoff lever to assure detent position (notch) at the open and dosed position (notch) is not worn or deformad. The detent (notch) must positively retain the fuel shutoff lever in either the open or dosed position.

10-46.4. Installation - Fuel Shutoff Lever.

a. Install lever (71) on support (115) with pin (122), washer (120), and cotter pin (121).

b. Install support (115) in helicopter with two screws (116), one screw (119), one spacer (127), three washers (117), and three nuts (118).

NOTE

Shutoff valve must be connected before connection clevis (123) to lever (71).

10-47 BONDING STRAP - CRASH-WORTHY

10-48 Description - Bonding Strap (Crash-worthy). The bonding strap (78, figure 10-1) is installed to provide an electrical circuit bonding path between the fuel system filer and the aircraft. The strap is connected to the fuel receiver by a screw (52) and to the aircraft by rivet (76), into the metallic doubler of the honeycomb structure.

10-49. Inspection - Bonding Strap (Crash-worthy). Use a multimeter and check for continuity between retainer (54) of receiver (74) and the aircraft grounding point fitting (TM 1-1500-204-23).

10-50. Removal - Bonding Strap (Crash-worthy).

CAUTION

When drilling out rivet (76), use care not to puncture the fuel cell.

a Drill out rivet (76) and remove washer (77).

b. Remove screw (52) and washer (75).

10-51. Installation - Bonding Strap (Crash-worthy).

NOTE

If a hole must be drilled In the aircraft to Install rivet (76), use are not to puncture the fuel cell.

a. Position bonding strap (78) in place, position washer (77) in place and rivet (76) to airframe.

NOTE

Prior to Installing the rivet assure the fiberglass sidn has been removed Touch up the aluminum surface as required to prevent corrosion.

b. Install bonding strap to retainer (54) with washer (75) and screw (52).

10-52. Airframe Mounted Fuel Filter Assembly. After compliance with MWO 1-1520-228-50-48.

10-53 Description- Fuel Filter Assembly. The airframe mounted fuel filter has a micronic type element and electrical means of indicating any impending bypass condition which occur. Filter is a cylindrical unit mounts on the engine deck on the left side of the engine compartment. Piping connections to filter heads are: an inlet line from the fuel supply system and an outlet line to the engine fuel pump. If a clogging condition should develop in the filter element, a normally-open switch is closed by differential pressure, lighting FUEL FILTER caution panel as warning that further clogging may cause fuel to flow through bypass valve without filtration.

10-54. Removal - Fuel Filter Assembly.

NOTE

Position a suitable container under the aircraft engine deck drain for fuel leakage.

a. Open engine cowling at left side.

b. Drain fuel from fitter head (8, figure 10-7) by cutting lockwire and opening drain (11).

c. Disconnect fuel hose from outlet coupling (7) on filter head (8).

d Disconnect fuel hose from inlet coupling (13) on filter head (8).

e. Disconnecting electrical cable plug (9) on filter head (8).

f. Remove four bolts and washers which secure filter assembly to engine deck.

10-55. Removal - Fuel Filter Element.

NOTE

Position a suitable container under the aircraft engine deck drain for fuel leakage.

a. Cut lockwire and open coupling (5, figure 10-7).

b. Remove strainer body (1) with packing (6) and element (3) from filter head (8).

c. Separate element (3) and packing (2) and (4) from strainer body (1).

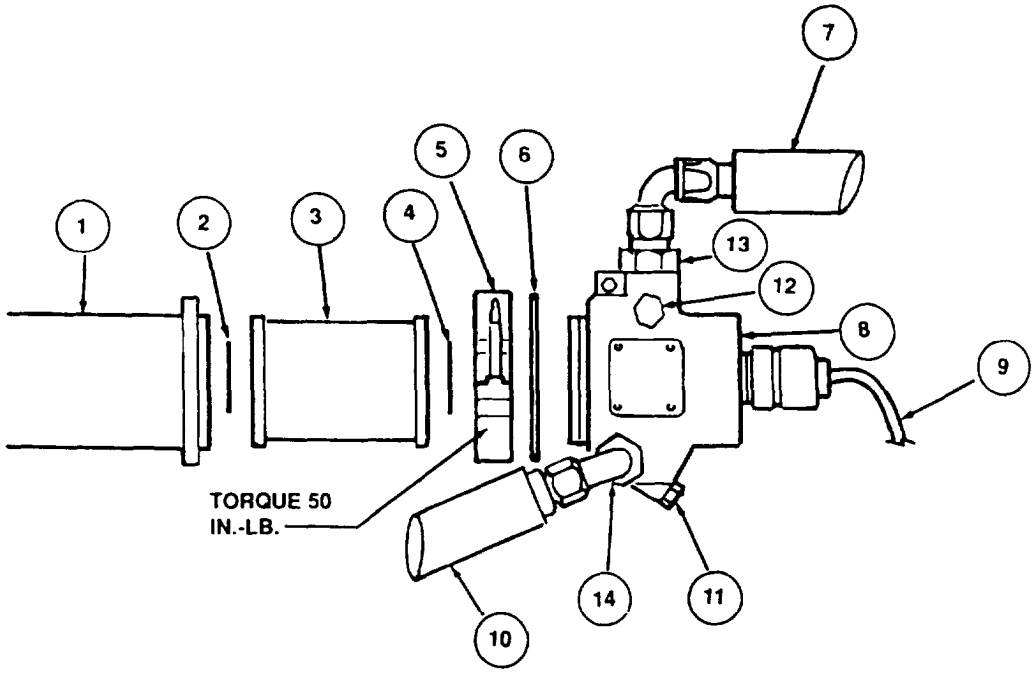
10-56. Inspection - Fuel Filter Element. Inspect filter element (3, figure 10-7) for contamination to determine if any corrective action is needed beyond replacement of element and packing.

10-57. Cleaning - Fuel Filter Assembly. Clean fuel filter assembly (figure 10-7) as necessary with cleaning solvent, (C62). Protect electrical connections when cleaning.

10-58. Repair - Fuel Filter Assembly.

a. Replace entire filter assembly (figure 10-7) if corrosion or damage exists.

b. Replace element (3) if unserviceable or damaged.



1. Strainer body
2. Preformed packing
3. Filter element
4. Preformed packing
5. Coupling
6. Preformed packing
7. Fuel outlet hose
8. Filter head
9. Electrical wiring to caution panel
10. Fuel inlet hose
11. Filter drain plug
12. Filter bleed plug
13. Outlet nipple fitting
14. Inlet nipple lining

Figure 10-7. Fuel Filter Assembly-Exploded View

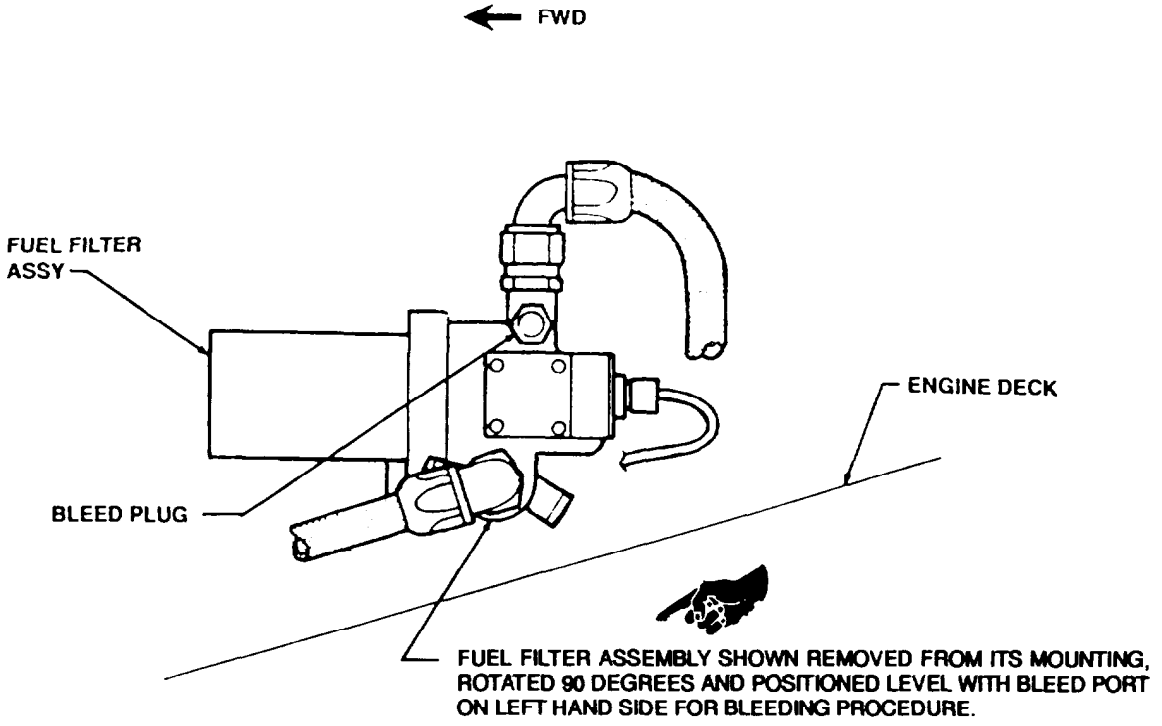


Figure 10-8. Bleeding Airframe Fuel Filter Assembly

10-59. Installation - Fuel Filter Assembly.

a. Install new packing and plug (11, figure 10-7) in filter assembly drain port finger tight.

b. Install new packing and nipple fitting (13), if removed, into fuel filter outlet port. Torque nipple fitting 380-405 inch-pounds.

c. Install new packing and nipple fitting (14), if removed, into fuel filter inlet port. Torque nipple fitting 380-405 inch-pounds.

d. Loosely install fuel filter assembly (figure 10-7) to engine deck with four bolts and washers.

e. Connect hose (7) from engine fuel pump to outlet nipple fitting (13). Torque coupling nut 330-360 inch-pounds.

f. Connect hose (10) from fuel supply to inlet nipple fitting (14). Torque coupling nut 330-360 inch-pounds.

g. Connect electrical cable plug (9) to filter head (8).

h. Install new packing and bleed plug (12) into filter assembly finger tight.

i. Bleed airframe mounted fuel filter, engine fuel pump and aircraft fuel system. Refer to paragraph 10-61.

10-60. Installation - Fuel Filter Element.

a. Place new packing (2, figure 10-7) on boss in bottom of strainer body (1).

b. Place clean filter element (3) in strainer body (1), seated firmly.

c. Place new packing (4) around center boss in filter head (8).

d. Install packing (6) around upper lip of filter body (1), next to flange.

e. Install body assembly (1) into filter assembly (8), pressing firmly to seat.

CAUTION

Do not overtorque damp to prevent leakage, use new packing or filter if leakage persists.

f. Install coupling (5) around mating flanges of filter head (8) and strainer body (1). Torque damp to 50 inch-pounds. Safety coupling with 0.032 lockwire.

g. Bleed airframe mounted fuel filter, engine fuel pump and aircraft fuel system. Refer to paragraph 10-61.

10-61. Bleeding - Airframe Mounted Fuel Filter, Engine Fuel Pump and Aircraft Fuel System.

NOTE

The following three bleeding procedures should be accomplished in sequential order without interruption.

a. Position suitable container under aircraft engine deck drain.

CAUTION

Ensure filter mounting bolt holes and mounting plate are adequately covered to prevent fuel seepage Into avionics and aft fuselage areas.

b. Remove the airframe fuel filter mounting bolts.

NOTE

Removal of additional hardware, such as hose supporting clamps, may be required for accessibility of filter assembly during bleeding process.

c. Cut lockwire, if installed, from drain plug (11, figure 10-7) and bleed plug (12).

d. Apply battery or external power to the aircraft.

CAUTION

Boost pump must remain on throughout the entire bleeding process

e. Turn the fuel boost pump switch ON.

CAUTION

Position of airframe fuel filter is critical during bleeding process to remove any possible air entrapment in the filter housing.

f. Rotate filter assembly (figure 10-7) until drain plug (11) on inlet side of filter is located at highest point.

NOTE

Careful adjustmemt of drain plug is required during bleeding process.

g. Slowly loosen drain plug (11) until fuel flow begins.

h. Monitor fuel flow until a solid stream flows from drain plug.

i. Slowly rotate filter assembly around several axis to relieve entrapped air.

j. Maintaining drain plug (11) at highest point, tighten drain plug to stop fuel flow.

k. Rotate filter assembly, ensuring filter is level, until bleed plug (12) on the outlet side of filter is located at highest point as per figure 10-8.

NOTE

Careful adjustment of bleed plug is required during bleeding procedures.

l. Slowly loosen bleed plug (12) until fuel flow begins.

m. Monitor furl flow until a solid stream flows from bleed plug.

n. Slowly rotate filter assembly around several axis to relieve entrapped air.

o. Maintaining bleed plug (12) at highest point, tighten bleed plug to stop fuel flow.

p. Place fiber back on engine deck in it's installed position.

NOTE

Do not turn off boost pump until the engine fuel hose has been reconnected to nozzle, disregard instructions to turn off boost pump in TM 55-2840-241-23 or TM 55-2840-231-23.

q. Bleed system at engine fuel pump filter housing. Refer to TM 55-2840-241-23 or TM 55-2840-231-23.

NOTE

When bleeding fuel system at engine nozzle, follow procedures as stated in TM 56-2840-241-23 or TM 55-2840-231-23, but open throttle to Idle detent, motor engine until as solid stream of fuel flows from disconnected hose and then close throttle while still motoring engine.

r. Bleed fuel system at engine nozzle. Refer to TM 55-2840-241-23 or TM 55-2840-231-23.

NOTE

If fuel becomes trapped during bleeding process, loosen fuel line prior to check valve (28, figure 52) (TM 55-2840-241-23 or TM 55-2840-231-23) to allow air to purge, retighten fuel line and continue bleeding procedures.

s. Turn fuel boost pump switch off.

t. Remove any residue fuel from engine deck and surrounding areas.

u. Torque drain plug (11), 95-110 inch-pounds. Safety plug with lockwire (C96).

v. Torque bleed plug (12) 50-70 inch-pounds. Safety plug with lockwire (C96).

w. Secure airframe fuel filter to engine deck.

x. If required, install any additional hardware removed for accessibility of filter assembly during bleeding process.

y. Check for clearance of drive system components prior to engine run-up.

z. Perform operational check of airframe fuel filter and engine fuel system. Check for leaks after first engine run-up.

CHAPTER 11

FLIGHT CONTROLS

11-1. COLLECTIVE PITCH CONTROL SYSTEM.

11-2. Description - Collective Pitch Control System. The collective pitch control system consists of a jackshaft assembly with dual control sticks. push-pull tubes and bellcranks, and a hydraulic servoactuator connected to a control lever on swashplate support Movement of either control stick is transmitted through linkage and servoactuator to main rotor pitch control mechanism, causing helicopter to ascend or descend or to remain at constant altitude. The servoactuator has an irreversible valve to reduce feedback forces and to provide for use of controls in event of hydraulic boost failure Refer to figure 11-1.

11-3. Troubleshooting - Collective Pitch Control System. Refer to table 11-1 for troubleshooting of the collective pitch control system.

NOTE

Before using table 11-1, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 11-1, notify the next higher level of maintenance.

Table 11-1. Troubleshooting - Collective Pitch Control System

CONDITION TEST OR INSPECTION **CORRECTIVE ACTION**
1. Collective stick light or heavy on downstroke.
STEP 1 Check friction clamp and/or friction nut for proper adjustment Refer to paragraph 11-20
If adjustments are not within limits, adjust friction clamp and nut. Refer to paragraph 11-20.
2. Collective pitch controls binding.
STEP 1. Check for obstructions or foreign objects
Reposition or remove obstructions. Remove foreign objects.
STEP 2. Isolate binding component in collective system by detaching tube assemblies from bellcranks and collective sticks. Actuate each component to detect binding part.
Remove, replace, or repair defective parts. Refer to figure 11-1.

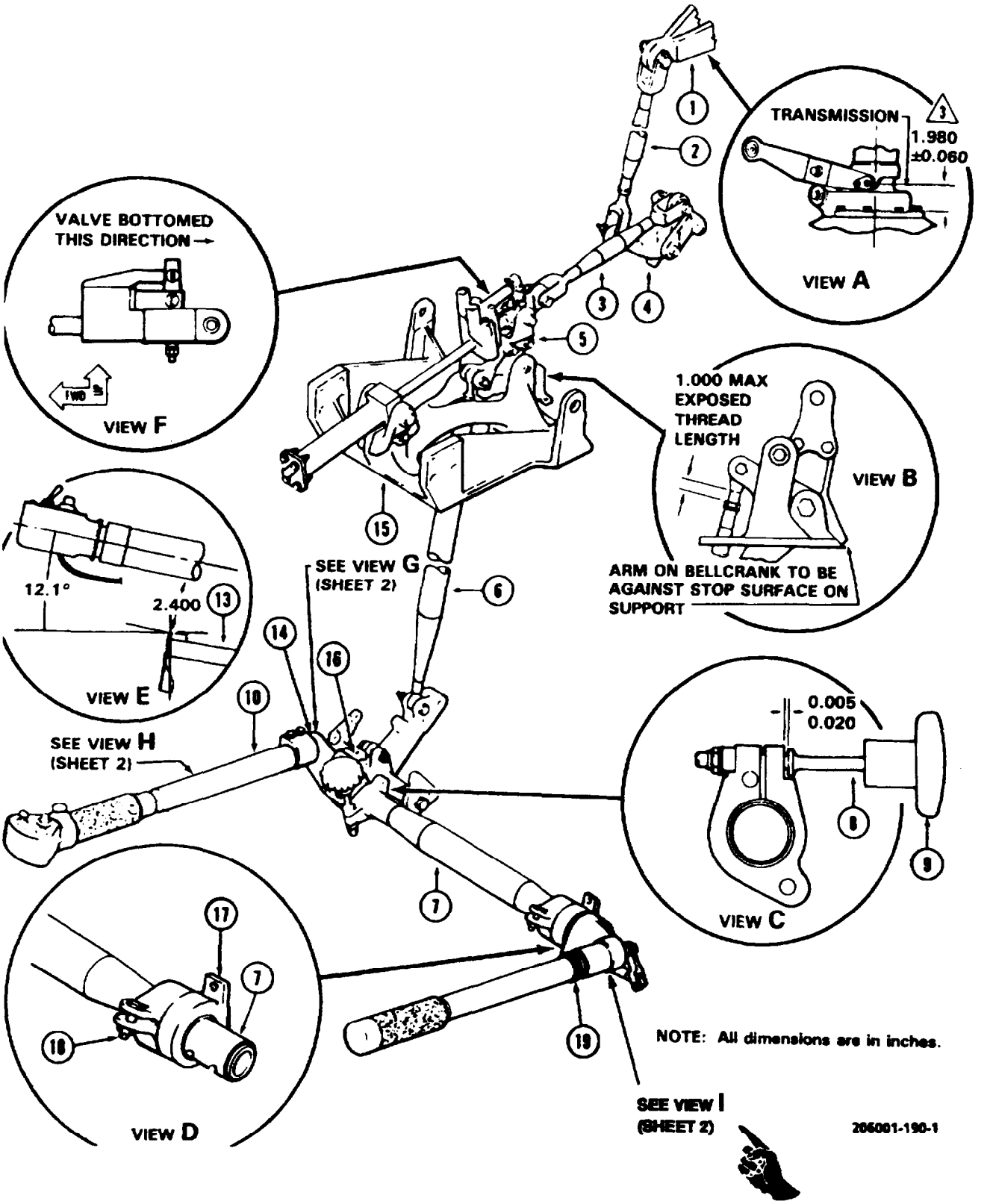
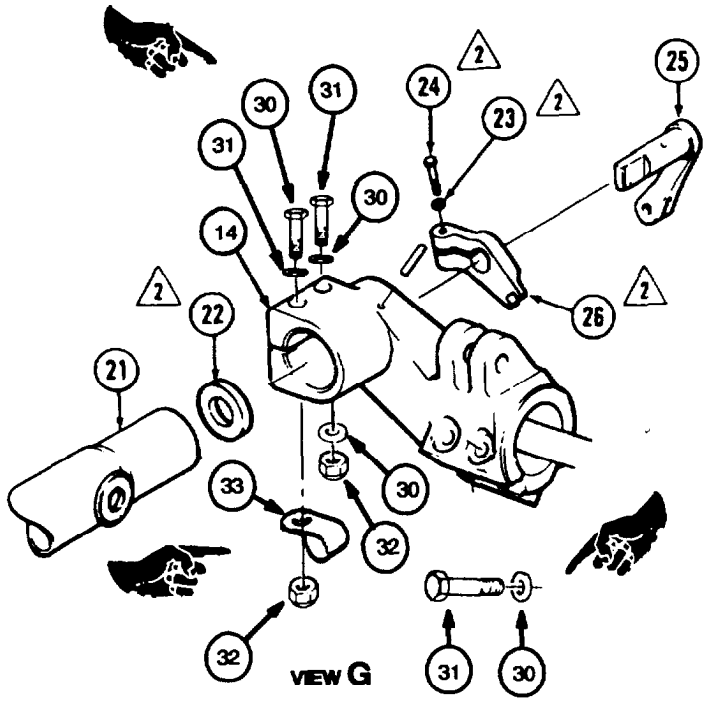
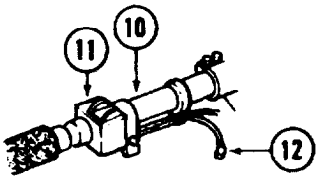


Figure 11-1. Collective Controls (Sheet 1 of 2)



VIEW G



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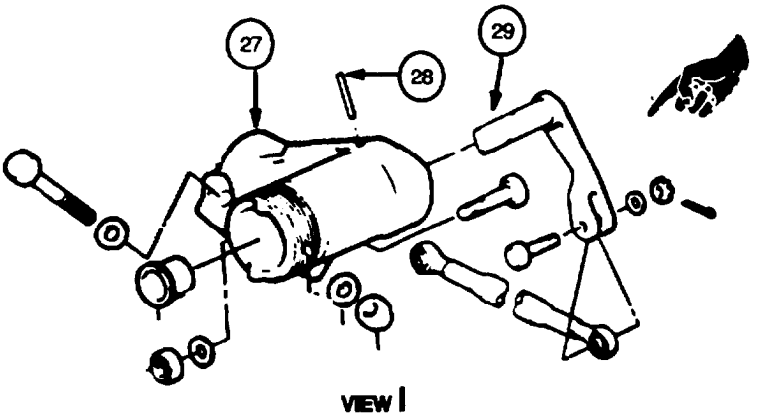


VIEW I

1. All dimensions are in inches

2 After accomplishment of MWO 55-1520-228-50-26.

3 Measure from the centerline of the pivot pin to the spot-faced area (under the nut) of the support assembly.

4 OH-58C only, prior to accomplishment of MWO 55-1520-228-50-30.

1. Collective Lever Assembly
2. Control Tube
3. Control Tube
4. Bellcrank
5. Bellcrank
6. Control Tube
7. Jackshaft
8. Friction Adjuster
9. Knob
10. Collective Stick-Pilot
11. Switch Box Assembly - V.R. Flight Control System 4
12. Electrical Connector - V.R. 4
13. Seat
14. Elbow Fitting
15. Cylinder Suppert Assembly
16. Link Assembly
17. Support
18. Nut
19. Knurled Nut
20. Clamp 4
21. Handle Assembly
22. Bushing 2
23. Washer 2
24. Screw 2
25. Throttle Arm
26. Friction Clamp 2
27. Elbow Fitting
28. Pin
29. Throttle Arm (Copilot)
30. Washer
31. Bolt
32. Nut
33. Clamp

Figure 11-1. Collective Controls (Sheet 2)

11-4. Adjustment (Rigging) — Collective Pitch Control System.

NOTE

Rig collective pitch controls with hydraulic boost OFF.

a. Install all fixed control tubes and links in the collective pitch control system (if removed) and disconnect all adjustable control tubes and links.text:

NOTE

Use AN5 bolt for rigging. To retain bolt while rigging, use tape (C143).

b. Position the pilot collective lever **2.400** inches above front seat support (figure 11-1, view E) and position bellcrank (5, view B).

c. Apply collective friction. Refer to figure 11-1 (8), view C.

d. Adjust cyclic friction to minimum with adjuster (18, figure 11-5, view D). Install rigging bolt (22) into pivot assembly (20) through cover plate (33) and apply maximum cyclic friction. Leave bolt (22) installed to preclude movement of cyclic stick while rigging procedure is being accomplished.

e. Adjust and install control tube (6, figure 11-1).

f. Hold the pilot collective lever against the low pitch stop and bottom the servoactuator valve. Refer to figure 11-1, view F.

WARNING

Maximum allowable exposed thread area on rod end fitting on control tubes (6 and 2) is 1.000 inch (view B). Ensure that rigging bolt (22, figure 11-5) is removed when rigging is complete.

g. Position the collective lever assembly (1, figure 11-1) to position shown in view A. Adjust and connect control tube (2).

h. Remove rigging bolt (22, figure 11-5).

i. Refer to paragraph 11-38 for completion of rigging.

11-5. COLLECTIVE STICKS.

11-6. Description — Collective Sticks A. Pilot and copilot collective pitch control sticks extend up and forward through flexible boots in floor at left side of each seat. Each stick incorporates a twist grip type power control for positive engine operation in cutoff, ground idle, and full open position. Switch boxes on top of pilot collective stick only, contain control switches for engine starter, governer rpm, landing lights, and idle stop release.

Premaintenance Requirements for Collective Sticks

Conditions	Requirements
Model	OH-58A/C
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Eddy Current Inspection Unit
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	None
References	TM 1-1520-254-23

11-7. Description — Collective Sticks C. Pilot and copilot collective pitch control sticks extend up and forward through flexible boots at left side of each seat. Each stick incorporates a twist grip type power control for positive engine operation in cutoff, ground idle, and full open position. Switch boxes on top of pilot collective stick only, contain control switches for engine starter, governor rpm, landing lights, and idle stop release. A switch box, located below throttle grip contains tail rotor vulnerability reduction flight control system switch (paragraph 11-132).

Premaintenance Requirements for Collective Sticks

Conditions	Requirements
Model	OH-58A/C
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Eddy Current Inspection Unit
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	None
References	TM 1-1520-254-23

11-8. Inspection — Collective Sticks. Inspect tubes for nicks, scratches, cracks, and security of attached parts. If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

11-9. Removal — Collective Sticks.

a. Remove boot from pilot collective stick (10, figure 11-1).

b. Remove pilot seat and seat panel (refer to paragraphs 2-83 and 2-126).

c. Remove seat belts (refer to paragraph 2-100).

d. Remove cotter pin and pin from knob of friction adjuster (8). Remove knob (9).

e. Remove cover from lower center console.

f. Disconnect electrical cable of pilot stick from terminal board.

g. Disconnect tail rotor vulnerability reduction flight control system (VR/FC) electrical connector (12) **C**.

h. Remove two nuts, washers, and bolts securing pilot collective stick in elbow fitting (14) of jackshaft (7). Remove stick.

i. Loosen knurled nut (19) at base of copilot stick. Remove copilot stick from elbow fitting.

j. Remove VR/FC switch box assembly (11) from pilot collective stick (10). Remove four screws to separate cover from VR/FC switch box assembly **C**.

11-10. Repair or Replacement — Collective Sticks.

a. Replace bearings if worn, rough, or damaged.

b. Replace electrical wires if frayed or broken.

c. Replace all parts that do not appear suitable for continued use.

d. Replace idle detent button if required. (Refer to paragraph 11-11.)

11-10.1. Pilots' Collective Stick Serviceability Verification.

a. Disconnect the throttle arm (item 25, figure 11-1) at the base of the collective stick.

b. Position the detent button in the idle stop hole of the collective stick tube; attempt to rotate the collective tube. There should be no free play.

c. If free play exists, remove the pilots' collective stick and inspect the collective tube for condition.

11-11. Installation — Collective Sticks.

a. Insert stick in elbow, ensuring engagement of throttle tube.

b. Install bolts, nuts, and washers to clamp stick in place (pilot stick only).

NOTE

When installing the copilot collective pitch control stick, ensure that the alignment notch on the stick is aligned with the alignment boss on the elbow before tightening the knurled nut to ensure full throttle travel.

c. Install knurled nut (15, figure 11-1) on copilot stick.

d. Connect electrical cable at terminal board (pilot stick only). Install boot.

e. Install VR/FC switch box assembly (11, figure 11-1) on pilot collective stick (10) **C**.

f. Connect VR/FC electrical connector (12) **C**.

g. Install cover to lower center console.

h. Install knob (9) to friction adjuster (8) and install pin through knob (9) and friction adjuster (8) shaft. Secure pin with cotter pin.

i. Install boot to collective stick.

j. Install seat belts (refer to paragraph 2-101.b.).

k. Install forward seat panel (refer to paragraph 2-130) and seats (refer to paragraph 2-88).

l. Apply thin layer of metalset (A4) or equivalent to bond surface of elbow assembly and collective jackshaft. Wipe off excess bonding material.

11-11.1. Removal — Pilot Collective Stick Elbow.

a. Remove pilots collective stick. (Refer to paragraph 11-9).

b. Disconnect throttle linkage from collective throttle arm (25, figure 11-1) by removing bolt, nut, washers and cotter pin.

c. Disconnect collective pitch link (16) from elbow (14) by removing bolt, nut, washer and cotter pin.

d. Remove elbow (14) from jackshaft by removing two bolts, nuts and four washers. Raise pilot collective stick to a vertical position to break existing bond between elbow fitting (14) and jackshaft (7). Tap elbow (14) with rubber mallet and apply heat, not to exceed 200 degrees Fahrenheit, as needed to break bond.

11-11.2. Repair or Replacement — Pilot Collective Stick Elbow.

a. Apply a thin layer of adhesive (C12) to bonding surface of elbow fitting (14) and jackshaft (7). Wipe off excess bonding material. Slide elbow fitting (14) onto end of jackshaft (7).

b. Lubricate attaching bolts with lubricant (C111) so that bolts do not bond to the elbow assembly.

c. Attach elbow to jackshaft with bolts, washers and nuts.

WARNING

Installation of the collective pitch link is a critical flight safety task. Ensure nut and cotter pin are secure.

d. Attach collective pitch link (16) to collective arm (25) with bolt, nut, washer and cotter pin.

e. Attach throttle linkage to collective throttle arm (25) with bolt, washer, nut and cotter pin.

11-11.3. Removal — Copilot Collective Stick Elbow.

a. Remove copilot collective stick assembly. (Refer to paragraph 11-9).

b. Disconnect throttle tube assembly from throttle arm (29) by removing cotter pin, nut, washer and bolt.

c. Remove elbow assembly (27) from jackshaft tube assembly (7) by removing two nuts, bolls and three washers.

d. Remove throttle arm (29) from elbow assembly (27) by removing pin (28).

e. Inspect jackshaft and elbow for wear and damage.

11-11.4. Replacement — Copilot Collective Stick Elbow.

a. Place throttle arm (29) into elbow assembly (27) and secure with pin (28) through hole in elbow.

b. Install elbow assembly (27) on to jackshaft tube assembly and secure with two bolts, nuts and three washers.

CAUTION

Self-locking castellated nuts shall be safe-tied with cotter pin.

c. Connect throttle tube assembly to throttle arm by installing bolt, washer and cotter pin.

d. Perform throttle rigging check. (Refer to paragraph 4-99).

11-12. DETENT BUTTON.

11-13. Description — Detent Button. The detent button is located on the pilot collective control stick. The detent button prevents complete shutdown of engine until detent button is depressed (figure 11-2).

11-14. Inspection — Detent Button.

a. Inspect detent button for faulty operation or any obvious damage.

b. Inspect detent button and spring for evidence of wear or binding.

11-15. Removal — Detent Button.

a. Knock out two retaining pins (1, figure 11-3) from either side with suitable punch.

b. Lift button (2) out of collective stick and remove spring (3) and bushings (4).

11-16. Repair — Detent Button. If detent button has faulty operation or obvious damage, replace switch.

11-17. Installation — Detent Button.

a. Install two bushings (4, figure 11-3) with chamfered side toward centerline of stick.

b. Install spring (3) in switch and push button (2) into hole.

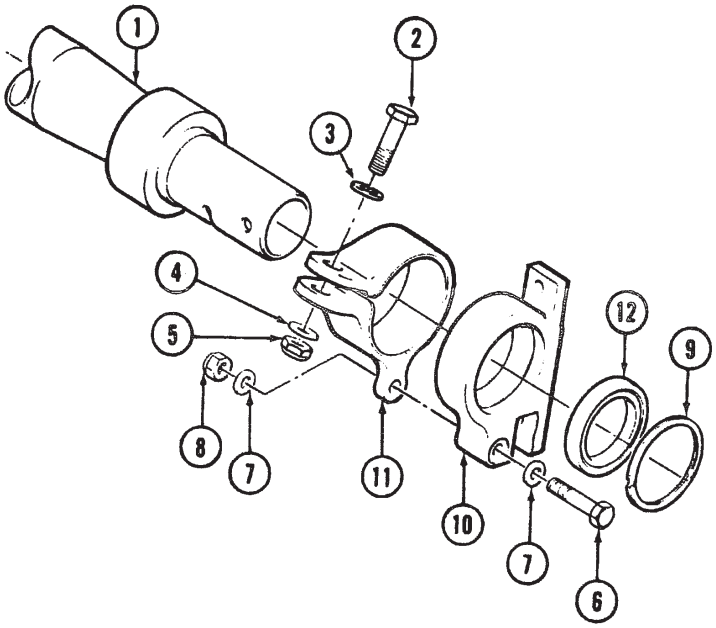
c. While holding button in place, press retaining pins (1) into place.

11-18. JACKSHAFT.

11-19. Description — Jackshaft. Collective control sticks are connected under the seals by a jackshaft assembly. The jackshaft is mounted laterally under the seat section and incorporates a friction device between the pilot and copilot seats to adjust drag on the stick operation and clamp for minimum (ground adjustable) friction.

Premaintenance Requirements for Jackshaft

Conditions	Requirements
Model	OH-58A/C
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Eddy Current Inspection Unit
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	None
References	TM 1-1520-254-23



1. Jackshaft
2. Bolt
3. Washer
4. Washer
5. Nut
6. Bolt
7. Washer
8. Nut
9. Ring, Retaining
10. Support
11. Friction Clamp
12. Bearing

Figure 11-2. Collective Support and Friction Clamp

12-19. Adjustment — Jackshaft.

a. Remove pedestal cover, seats, and seat panels (refer to paragraphs 2-87 and 2-127) to expose collective control friction adjuster (8, figure 11-1). Remove copilot seat and panel to expose left outboard end of jackshaft (7, view D), Shim to obtain maximum gap of 0.006 inch between P/N 206-001-124-1 and P/N 206-001-169-1 elbow.

b. Release friction on adjuster knob (9) and check for **0.005 to 0.020** inch clearance as illustrated in view C. Disconnect link assembly (16).

NOTE

Link assembly (16) is a fixed length link and is not to be adjusted in the field.

c. With collective stick on low stop, check for breakaway force of **3 to 5** pounds, which includes weight of collective stick. Measure breakaway force at center of throttle grip.

d. Connect link assembly (16). Ensure that cotter pins are installed.

e. Install cover, panels, and seats. (Refer to paragraph 2-138 and 2-88.)

11-20. Inspection — Jackshaft.

a. Inspect bearings for smoothness of operation and security in assemblies.

b. Inspect both friction adjustment surfaces for smooth surface and freedom of galling.

c. Inspect jackshaft tube for cracks, nicks, and damage. If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

d. Inspect support for cracks. If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

11-21. Removal — Jackshaft.

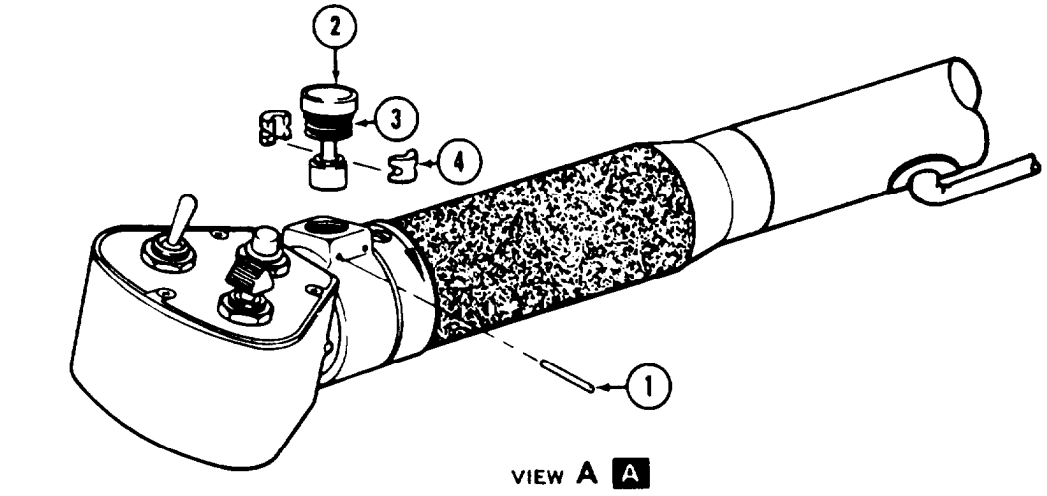
a. Remove forward seats and panels (refer to paragraph 2-83 and 2-126.c.).

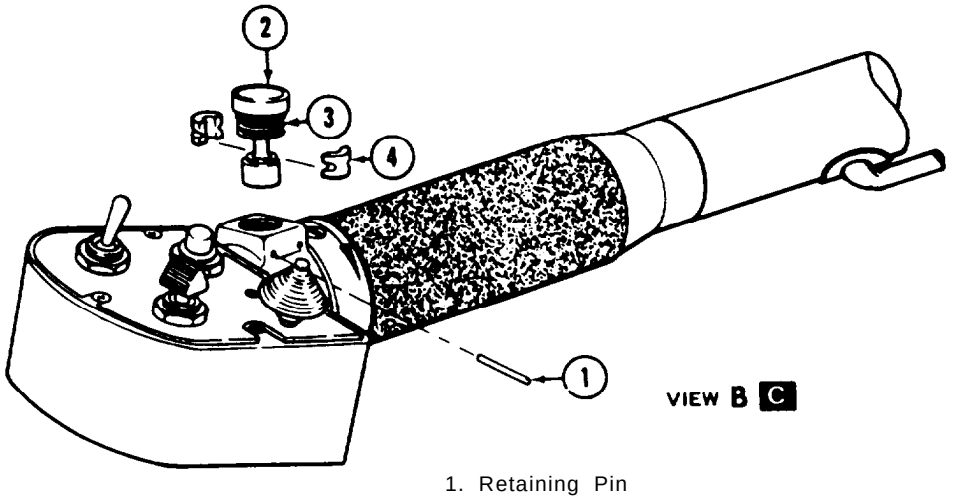
b. Remove friction adjuster knob (9, figure 11-1).

c. Remove center panel.

d. Disconnect VR/FC electrical connector (12) **C**.

e. Disconnect N1 fuel control linkage on right end of jackshaft.





1. Retaining Pin
2. Idle Detent Button
3. Spring
4. Bushings

206001-192

Figure 11-3. Idle Detent Replacement

f. Disconnect link assembly (16, figure 11-1).

g. Remove bolls attaching support (17) and friction clamp to airframe. Remove jackshaft (7).

11-22.1. Clean, Inspect, and Repair — Jackshaft.

a. Clean jackshaft with drycleaning solvent (C62).

b. Dry jackshaft with a dry wiping rag (C119(a)).

c. Inspect mechanical and corrosion damage may be **0.010** inch depth before repair, and **0.020** inch depth after repair.

(1) Maximum area per full depth repair not to exceed **0.50** square inch.

(2) Edge can be chamfer **0.050** inch radius to removed damage.

d. Remove scratches, nicks, and corrosion on jackshaft surface with 400-grit sandpaper (C126).

e. Remove sanding residue with wiping rag (C119.1) moistened with MEK (C107).

f. Touch up repaired areas of jackshaft with epoxy primer (C157).

g. Replace jackshaft if wear or damage limits are exceeded.

11-23. Disassemble — Jackshaft Support and Friction Clamp.

a. Remove nut (5, figure 11-2), bolt (2), and washers (3 and 4).

b. Remove support (10) and friction clamp (11) as assembly.

c. Remove nut (8), bolt (6), and washer (7).

d. Remove retaining ring (9) and bearing (12).

e. Inspection (refer to paragraph 11-21).

f. Reassemble by placing bearing (12) and retaining ring (9) in support (10).

g. Place bolt (6), and washer (7) through support (10) and friction clamp (11) and install nut (8).

h. Place support (10) and friction clamp (11) on jackshaft (1) as an assembly and install bolt (2), washers (3 and 4), and nut (5).

11-24. Installation — Jackshaft.

a. Position assembly in airframe and attach support (17, figure 11-1) and friction clamp to airframe.

b. Connect VR/FC electrical connector (12, figure 11-1) **C**.

c. Connect link assembly (16) and N1 fuel control linkage on right end of jackshaft. Refer to figure 4-18.

d. Install center panel.

e. Install friction adjuster knob (9, figure 11-1) with center panel.

f. Install seat panels and seats (refer to paragraphs 2-138 and 2-88).

11-25. COLLECTIVE PITCH LINKAGE.

11-26. Description — Collective Pitch Linkage. Linkage between collective pitch control jackshaft and collective sleeve lever on swashplate support consists of push-pull tubes, bellcranks, and hydraulic servoactuator assembly.

Premaintenance Requirements for Collective Pitch Linkage

Conditions	Requirements
Model	OH-58A/C
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Eddy Current Inspection Unit
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	None
References	TM 1-1520-254-23

11-27. Inspection — Collective Pitch Linkage.

a. Inspect linkage parts for wear, elongated bolt holes, cracks, nicks, or damage. If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

(1) Scratches and score marks at less than **45** degrees angle to lengthwise centerline of tube shall not exceed **0.010** inch depth.

(2) Scratches and score marks at more than **45** degrees angle to lengthwise centerline of tube shall not exceed **0.005** inch depth.

(3) Corrosion damage may be **0.005** inch depth before repair and **0.010** inch depth after repair.

(4) Width of repair areas at any section shall not exceed one-third of tube circumference for **0.005** inch depth repair, or one-sixth of tube circumference for **0.010** inch depth repair.

(5) No thread damage is acceptable, nor damage to any surface if repair will interfere with thread engagement.

b. Inspect bearings for wear or roughness. If looseness or play is evident in the flight control linkage, isolate source of play by bridging hand or fingers across the various hinge lines, pivot points, bushings, bearings, etc., to detect connections having the greatest amount of play Refer to table 11-5.

11-28. Removal — Collective Pitch Linkage. Remove control tubes (2, 3, and 6, figure 11-1) and bellcranks as required for inspection and replacement.

11-29. Installation — Collective Pitch Linkage.

a. Carefully check part numbers of control tubes to ensure cyclic control tubes are not inadvertently installed in collective system.

b. Ensure control tube (3, figure 11-1) is approximately **11.380** inches long measured from center to center of clevis holes and historical data is completed.

CAUTION

Install control tube (2) with adjustable end down.

c. Install control tubes and bellcranks as shown in figure 11-1 Safety attaching hardware with cotter pins.

d. Verify proper rigging. (Refer to paragraph 11-4).

11-30. COVER ASSEMBLY — BELLCRANK STOP.

11-31. Description — Cover Assembly — Bellcrank Stop. The cover assembly bellcrank stop is mounted on the actuator support of the flight control system. The cover assembly consists of a bolt, four washers, nut, cotter pin, and rubber flipper. Refer to figure 11-4.

11-32. Inspection — Cover Assembly — Bellcrank Stop.

a. Inspect the rubber flipper (5) to cover (4) bond. (Inspection may be made through the right access door of the transmission forward fairing.)

WARNING

If flipper is missing from the cover, or the helicopter is to be operated with the flipper removed, inspect the collective stop at the bottom of center support column to ensure the missing flipper is not fouling the controls. Inspect the collective stop and adjacent area daily for evidence of any foreign objects that could interfere with the stop until the flipper is reinstalled.

b. If the rubber flipper (5) is missing or separating from the cover (4), either of the following should be accomplished.

(1) Replace cover assembly or missing flipper or rebond loose flipper.

(2) Remove loose flipper from the cover and continue operations Reinstall flipper as soon as possible.

11-33. Removal — Cover Assembly — Bellcrank Stop.

a. Remove forward transmission fairing to gain access to flight controls. Refer to paragraph 2-39 **A** or 2-40 **C**.

b. Remove pivot bolt (1, figure 11-4), washers (2), and nut (3) attaching bellcrank (6) and cover (4) to actuator support (7).

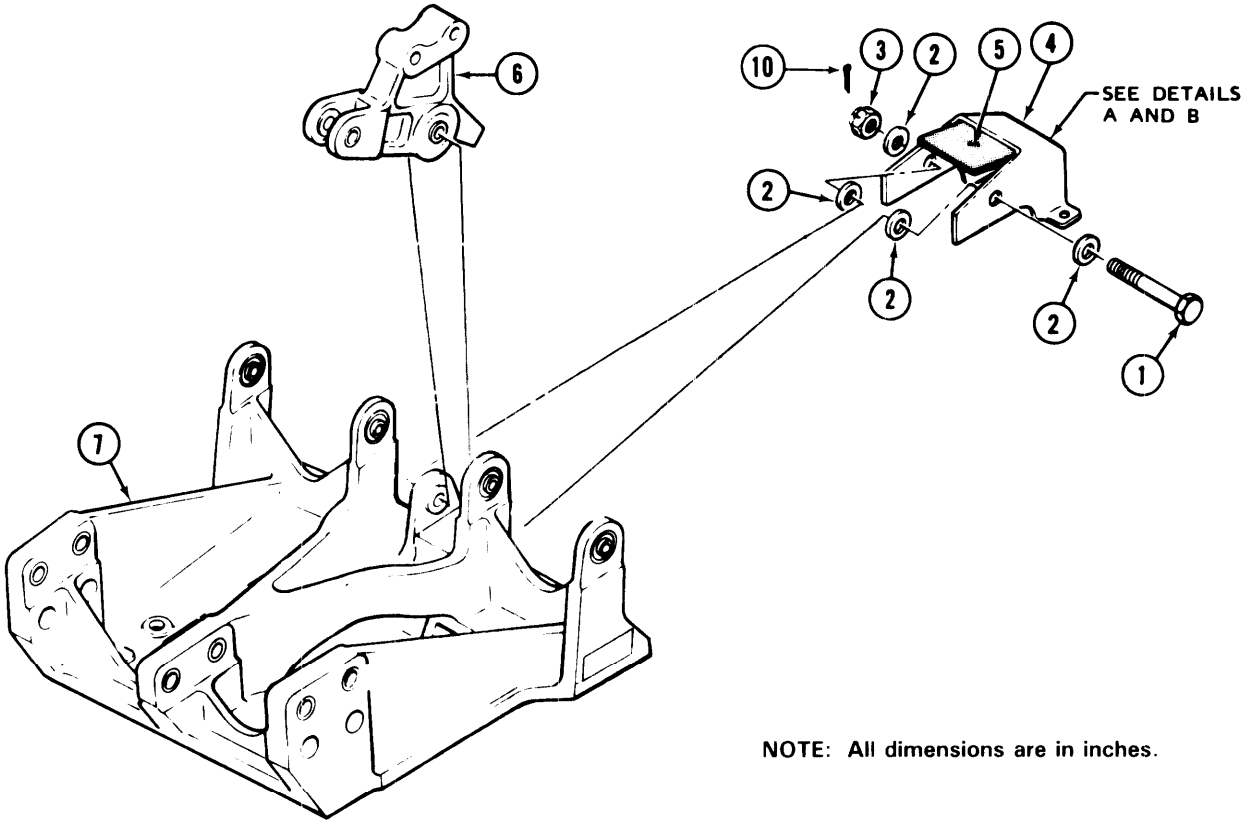
c. Remove screws attaching cover (4) to cabin roof and remove cover.

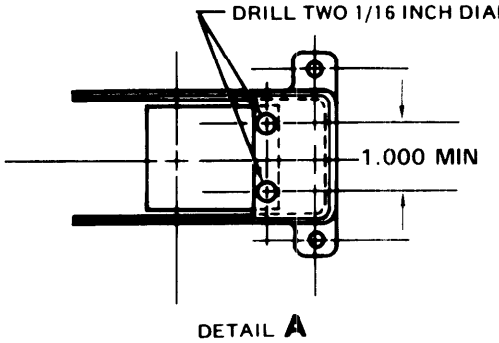
11-34. Repair — Cover Assembly — Bellcrank Stop.

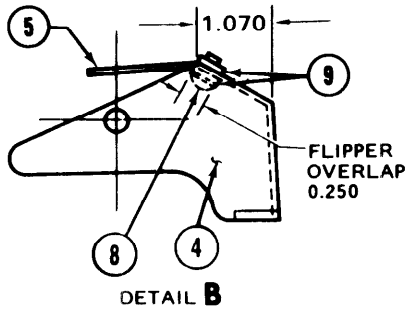
a. Sand area of rubber flipper (5, figure 11-4) and cover (4) to be rebonded with sandpaper (C125). Sand off all loose adhesive (removal of all old adhesive is not necessary). Wipe bonding areas with toluene (C150). Rebond rubber flipper to cover with cement (C36).

NOTE

If required, a new flipper may be made from 1/16 inch thick synthetic rubber (C164). Cut flipper 2.000 inches long and 1.500 inches wide.







1. Bolt
2. Washer
3. Nut
4. Cover
5. Rubber Flipper
6. Bellcrank
7. Actuator Support
8. Rivet
9. Washer
10. Cotter Pin

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Figure 11-4. Cover Assembly — Bellcrank Stop

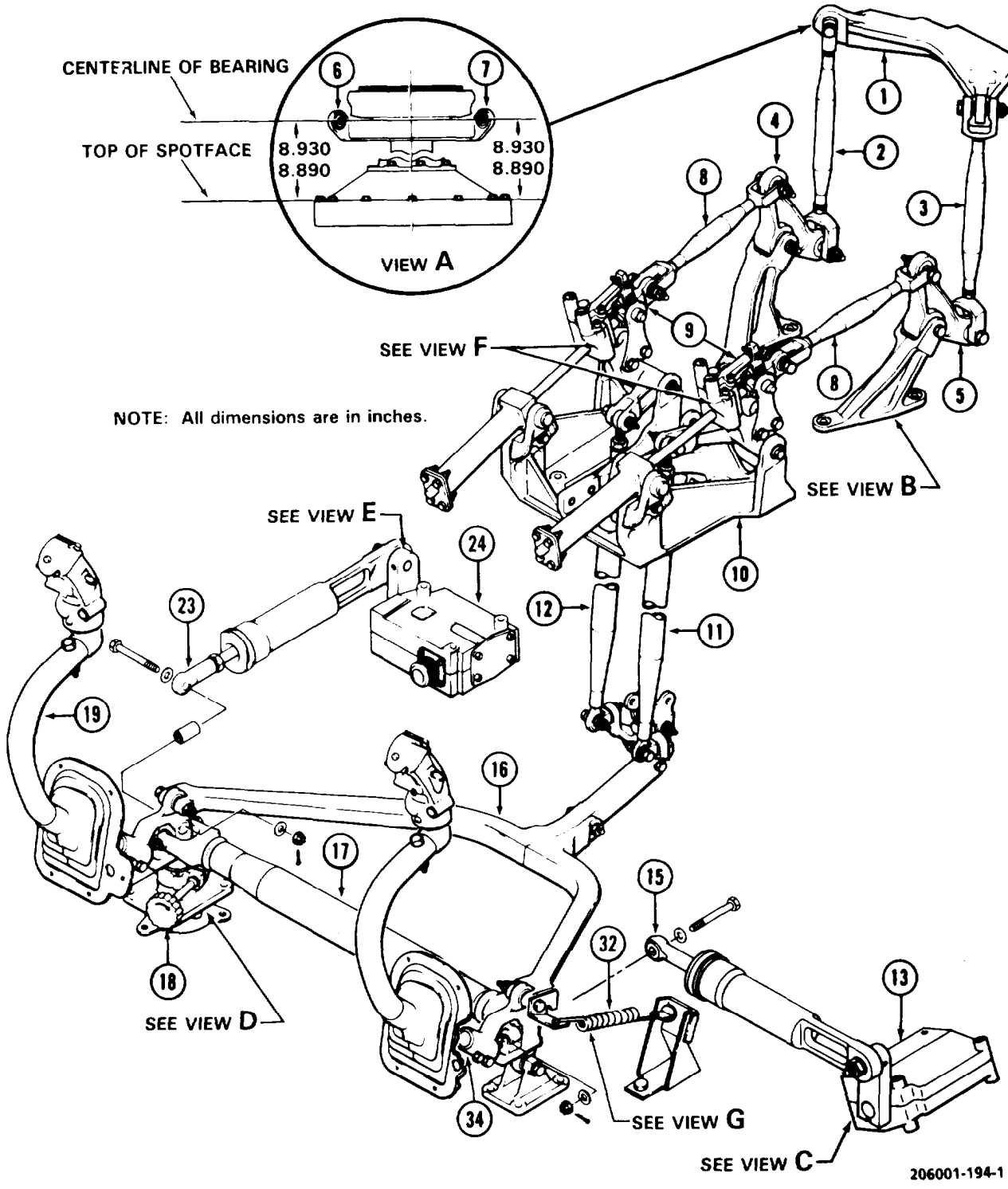


Figure 11-5. Cyclic Controls (Sheet 1 of 3) A

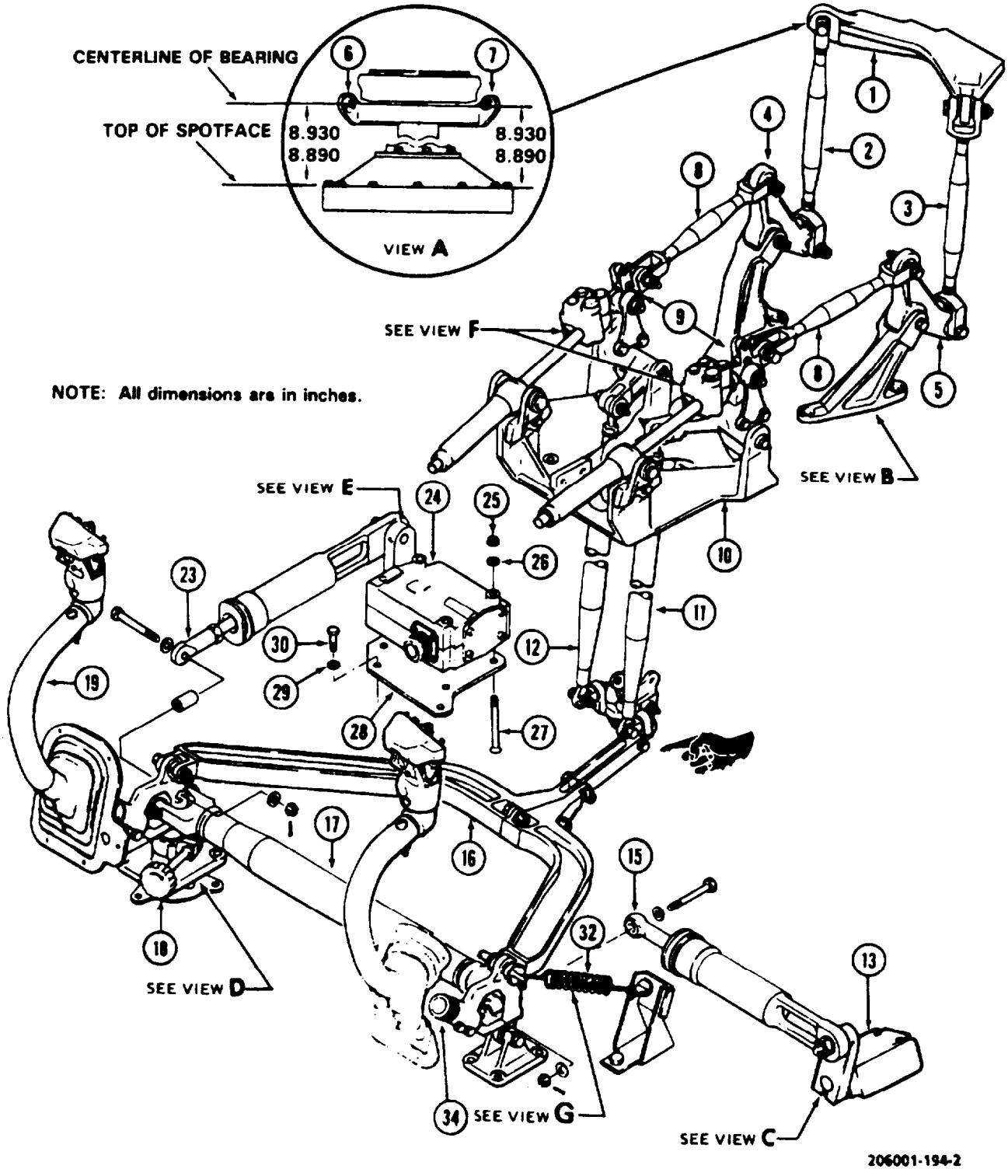
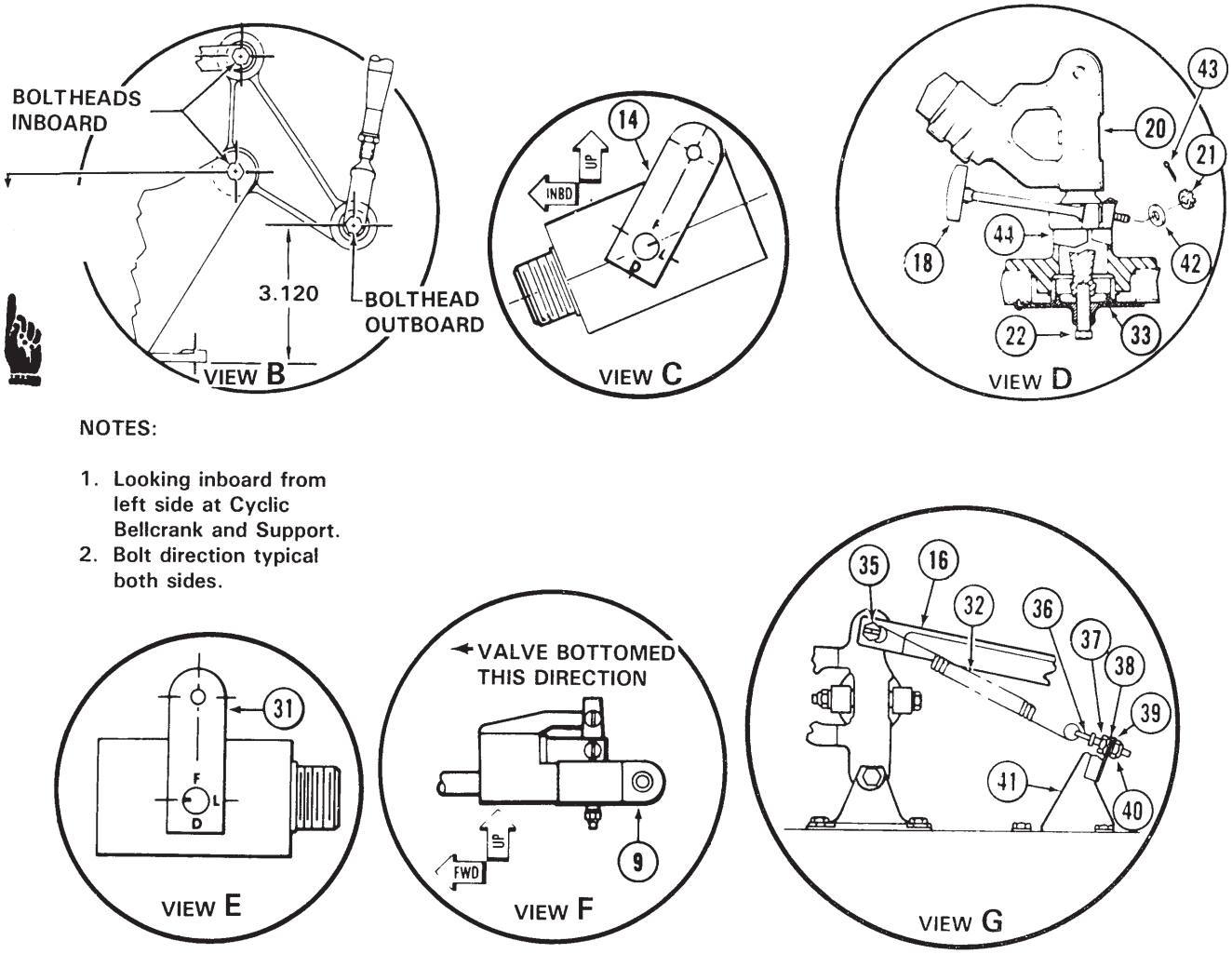


Figure 11-5. Cyclic Controls (Sheet 2) C



1. Swashplate Inner Ring
2. Control Tube
3. Control Tube
4. Bellcrank
5. Bellcrank
6. Right Horn
7. Left Horn
8. Tube
9. Cylinder Valve
10. Cylinder Support Assembly
11. Control Tube
12. Control Tube
13. Magnetic Brake
14. Arm
15. Rod End
16. Yoke
17. Torque Tube
18. Cyclic Friction Adjuster
19. Pilots Cyclic Control
20. Pivot Assembly
21. Nut
22. Bolt, Rigging
23. Rod End
24. Magnetic Brake
25. Nut (4)
26. Washer (4)
27. Screw (4)
28. Adapter Plate
29. Washer (3)
30. Bolt (3)
31. Arm
32. Cyclic Stick Balance Spring
33. Cover Plate
34. Knurled Nut
35. Eyebolt, Aluminum Washer, Nut and Cotter Pin
36. Eyebolt
37. Nut
38. Aluminum Washer
39. Aluminum Washer
40. Nut
41. Bracket
42. Washer
43. Cotter Pin
44. Support

Figure 11-5. Cyclic Controls (Sheet 3 of 3)

b. Drill two 1/16-inch diameter holes through the rubber flipper (5) and cover (4) as shown in figure 11-4. Install two rivets (8) through rubber flipper and cover (manufactured head down) with washer (9) under both manufactured and formed heads.

CAUTION

Damage to cover may result if rivet clamp-up is too tight. Upset rivets with a hammer and bucking bar and damp only sufficiently to hold washers tight.

11-35. Installation - Cover Assembly-Bellcrank Stop.

a. install two screws attaching cover (4, figure 11-4) to cabin roof.

b. Install pivot bolt (1), washers (2) and nut (3) attaching bellcrank (6) and cover (4) to actuator support (7). Torque nut (3) 30 TO 40 INCH-POUNDS and install cotter pin (10).

c. Install forward transmission faking. Refer to paragraph 2-43.

11-36. CYCLIC CONTROL SYSTEM.

11-37. Description - Cyclic control system.

a. A linkage system transmits movement from cyclic control sticks to swashplate which actuates rotating controls to main rotor, controlling direction of helicopter. Fore-aft lateral controls are independent linkages from control stick to an intermixing bellcrank From this point on to swashplate horns, linkage cannot be considered separately as to effect. Two hydraulic servoactuators are incorporated to reduce effort required for control and to reduce feedback of forces from main rotor. Two force gradient units, with magnetic brakes, are incorporated for artificial control feet and stabilization of controls (figure 11-5).

b. An "H" section cyclic control yoke (16, figure 16-5) has been incorporated to replace the "L" section yoke to reduce vulnerability from hostile projectiles.

11-38. Adjustment - Cyclic Control System.

NOTE

Rig cyclic control with hydraulic boost OFF.

a. Install all fixed control tubes and links in the cyclic pitch control system (if removed) and disconnect all adjustable control tubes and links.

b. Rig collective controls prior to rigging cyclic controls. Refer to paragraph 11-4.

c. Reduce cyclic friction to minimum. Install rigging boll (22, view D, figure 11-5) into pivot assembly (20) through cover plate (33) and apply sufficient friction to keep stick from being moved. Place collective control lever in full down position.

NOTE

Assure copilots cyclic stick is centered in relation to pilots, cyclic stick.

d Position two bellcranks (4 and 5) to **3.120** inches from deck (see view B).

WARNING

Maximum allowable exposed thread area on adjustable rod end fitting on control tubes (11, 12, 2, and 3) is 1.000 inch.

NOTE

When dissimilar control tubes are used, the new tube (P/N 206-001-096-1) will be approximately five (5) threads shorter than the old tube (P/N 206-001-022-43).

e. Bottom the two servoactuator valves (9 view F), adjust and connect control tubes (11 and 12). Tubes shall be equal in length.

f. Keep the two servoactuator valves bottomed as accomplished in step e. Position the swashplate inner ring (1) as shown in view A. Adjust and connect control tubes (2 and 3). Remove rigging bolt (22).

g. After rigging cyclic and collective systems check clearance between inner ring and sleeve assembly at extreme control positions.

(1) If contact between inner ring (7, figure 5-39) and pivot sleeve (2) is made on aft side, shorten tubas (2 and 3, figure 11-5) the same amount to obtain **0.010** to **0.030** inch clearance between parts.

(2) Actuate control to extreme position and check the forward side for contact. If contact is made, lengthen tubes (2 and 3) the same amount to obtain **0.010** to **0.030** inch clearance on the forward side of

sleeve or until the minimum clearance on aft side is reduced to **0.010** inch If minimum clearance cannot be obtained, check swashplatefor proper installation Refer to paragraph 5-110.

h. Rig force trim as follows:

(1) For lateral system place cyclic stick in neutral position with arm (14, view C); then adjust rod-end assembly (15) to fit and install nut and cotter pin.

(2) For fore and aft system place cyclic stick in neutral position with arm (31, view E) Adjust rod-end assembly (23) to fit and install nut and cotter pin.

i, Check for full cyclic travel by removing cover plate (33) under fuselage (pilots area) and rotating cyclic stick through extreme travel. Cyclic stop surfaces must touch in all extreme positions.

j. Adjust cyclic friction Refer to paragraph 11-92.

11-39. Troubleshooting -– Cyclic Control System. Refer to table 11 -2 for troubleshooting of the cyclic control system

NOTE

Before using table 11-2, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 11-2, notify the next higher level of maintenance.

Table 11-2. Troubleshooting Cyclic Control System

CONDITION TEST OR INSPECTION	**CORRECTIVE ACTION**
1. Cyclic feels loose.	
STEP 1. Check friction adjustment.	**Adjust friction. Refer to paragraph 11-92.**
STEP 2. Check tension on balance spring.	**If tension is weak, adjust spring. Refer to paragraph 11-88.**
2. Cyclic controls binding	
STEP 1. Check for obstructions or foreign objects.	**Reposition or remove obstructions. Remove foreign objects.**
STEP 2. Isolate binding component in cyclic system by detaching tube assemblies from bellcranks, cyclic stick, magnetic brakes and torque tube. Actuate each component to detect binding part.	**Remove, replace, or repair defective parts.**

11-40. CYCLIC CONTROL STICK ASSEMBLY.

11-41. Description — Cyclic Control Stick Assembly. The cyclic control sticks are mounted in front of pilots and copilots seat. Grip of pilots cyclic stick is equipped with a force trim release button, a RADIO/ICS switch, armament firing trigger switch, and a depress/elevate switch. (Refer to figure 11-6.) Copilot stick is linked to pilot stick both electrically and mechanically and is equipped with the same switches. The grip of the pilot cyclic stick is equipped with a night vision goggles switch (figure 11-7).

Premaintenance Requirements for Cyclic Control Stick Assembly

Conditions	Requirements
Model	OH-58A/C
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Eddy Current Inspection Unit
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	None
References	TM 1-1520-254-23

11-42. Stowage — Copilot Cyclic Stick.

a. For stowage in aircraft:

(1) Unscrew the knurled nut (34, figure 11-5) on the copilot stick.

CAUTION

Do not disconnect electrical connector when stowing copilots stick in aircraft: force trim is inactivated.

(2) Place the copilot stick in the stowage rack along the center console.

b. For stowage outside of aircraft:

(1) Unscrew the knurled nut (34) on copilot stick.

(2) Disconnect electrical connector.

(3) Remove copilot stick from aircraft.

(4) Manufacture a force trim jumper plug from connector part number MS3126F14-19P, by connecting a short jumper wire between pins R and S. To preclude moisture from shorting unused pins, pot plug with sealing compound (C130).

(5) Connect jumper plug to copilot cyclic stick connector in helicopter.

11-43. Inspection — Cyclic Control Stick Assembly. Inspect sticks for cracks, nicks, grip attachment and condition, and security of installation. If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

11-44. Removal — Cyclic Control Stick Assembly.

a. Disconnect electrical cables at connectors.

b. Remove pilot and copilot seats and panels to gain access to cyclic system. Refer to paragraph 2-83 and 2-126.

c. Remove screws (1, figure 11-8) attaching boot (2) to seat frame.

d. Remove bolts (3) securing stick (4) in lever (5) and knurled nut (34, figure 11-5) on copilot stick. Pull stick out of lever and work wires down through slot of lever, lay stick on floor and continue removing support.

e. Remove cotter pins (6), nuts (7), bolts (8), and washers (9), and spacer (10) attaching force gradient assembly (21), yoke (22), tube (23), and shaft (11) to lever (5) and support (13). Screw shaft (11) out of support (13).

f. Remove bolts (14) and washers (15) attaching support assembly (13) to fuselage and remove support.

g. Remove rivet (16) from lever (5). Screw lever and bearing (17) out of lever (5).

h. Remove screws (18) and washers (19), securing retainer plate to support (13).

11-45. Inspection — Acceptance/Rejection Criteria — Cyclic Control Stick Assembly.

a. Inspect bearings for wear, roughness, or damage. Refer to table 11-5 for limits.

b. Inspect electrical wires for frayed or broken insulation.

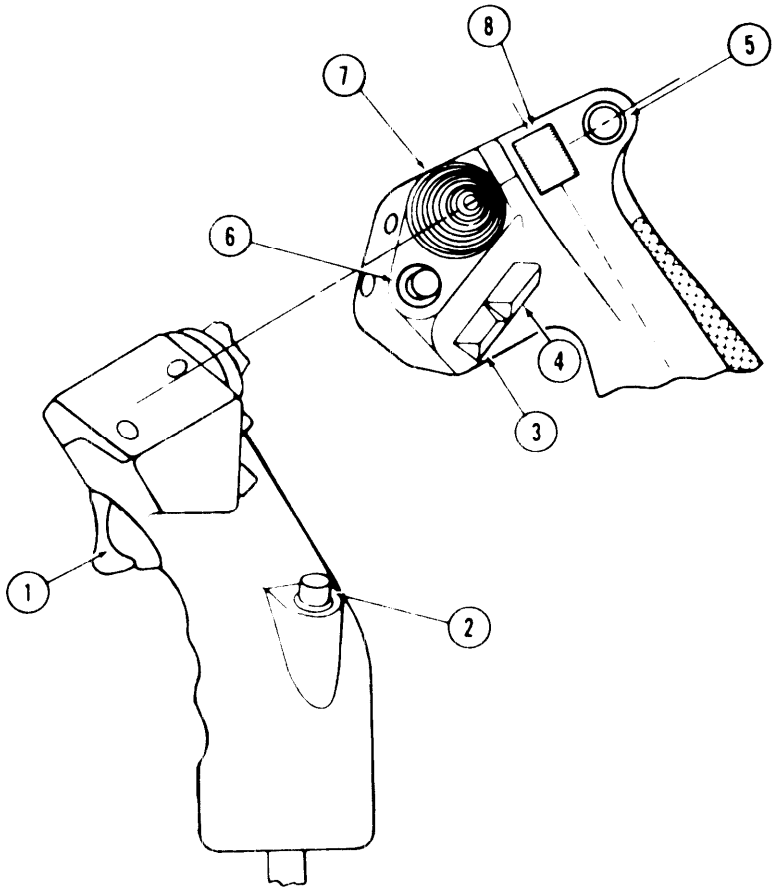
11-46. Repair — Cyclic Control Stick Assembly.

a. Replace bearings if worn or damaged.

b. Replace electrical wires if broken or frayed.

c. Replace all parts that do not appear suitable for continued use.

d. Repair grip assembly in accordance with paragraph 11-54.



1. Trigger Switch
2. Not Used
3. Radio Transmit
4. RADIO ICS
5. Force Trim
6. Not Used
7. Not Used
8. Depress/Elevate Gun Switch

Figure 11-6. Cyclic Stick Assembly A

11-47. Installation — Cyclic Control Stick Assembly.

CAUTION

Do not spread lug on support casting, since spreading can cause cracks in support base.

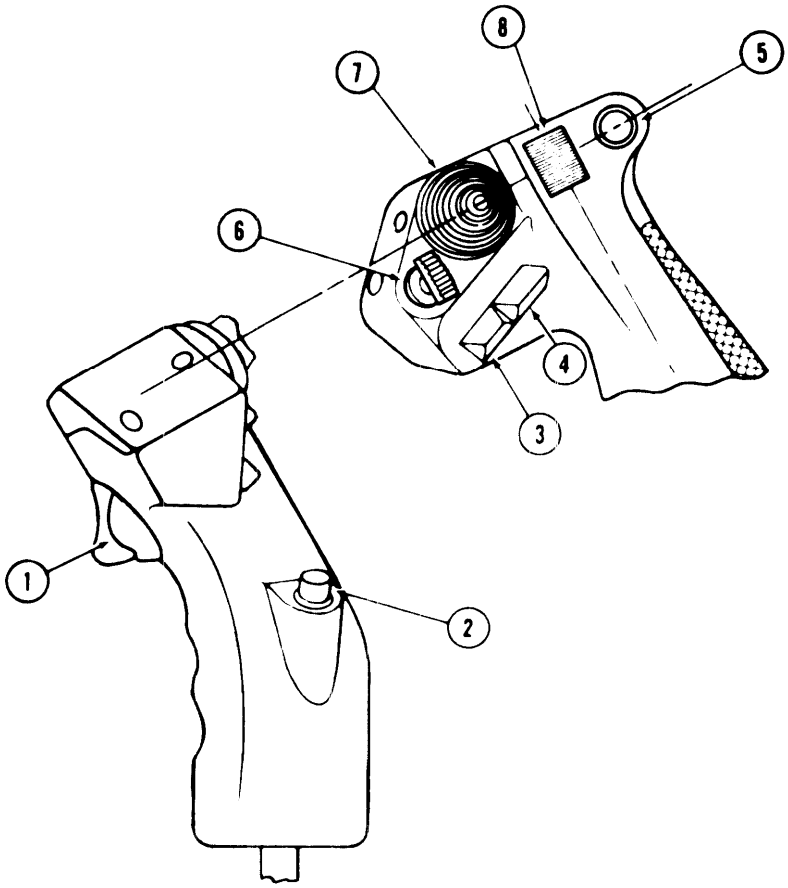
NOTE

To facilitate installation, clamp split race of bearing together with 2-inch clamp (AN737 type or equivalent), then install lever and bearing (17, figure 11-8) into support (13) with split in bearing outer race and retainer (20) aligned with split in pivot support assembly (13). Remove clamp.

a. Install screws (18, figure 11-8) and washer (19), securing retainer plate (20) to support (13)

b. Screw lever and bearing (17) into lever [5) Install rivet (16) into lever (5).

c. Install support assembly (13) to fuselage using bolts (14) and washers (15)



1. Trigger Switch
2. Not Used
3. Radio Transmit
4. RADIO ICS
5. Force Trim
6. Night Vision Goggles Switch (Pilot Station Only)
7. Not Used
8. Not Used

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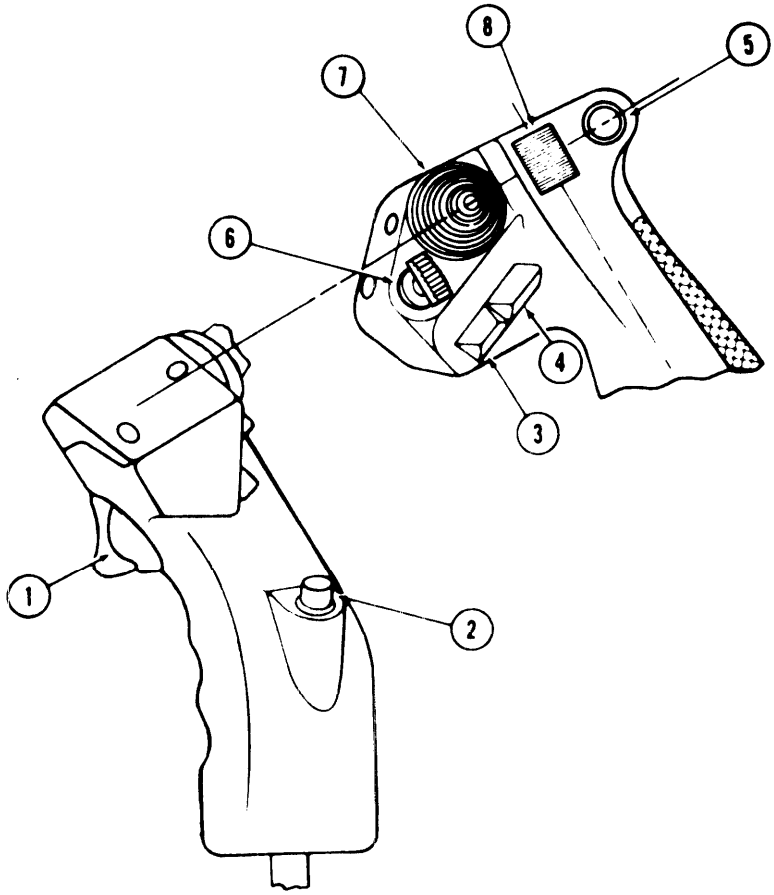
Figure 11-7. Cyclic Stick Assembly (Sheet 1 of 2) C
(Prior to compliance with MWO 55-1520-228-50-32)



1. Trigger Switch
2. Not Used
3. Radio Transmit
4. RADIO ICS
5. Force Trim
6. Not Used
7. Not Used
8. Not Used

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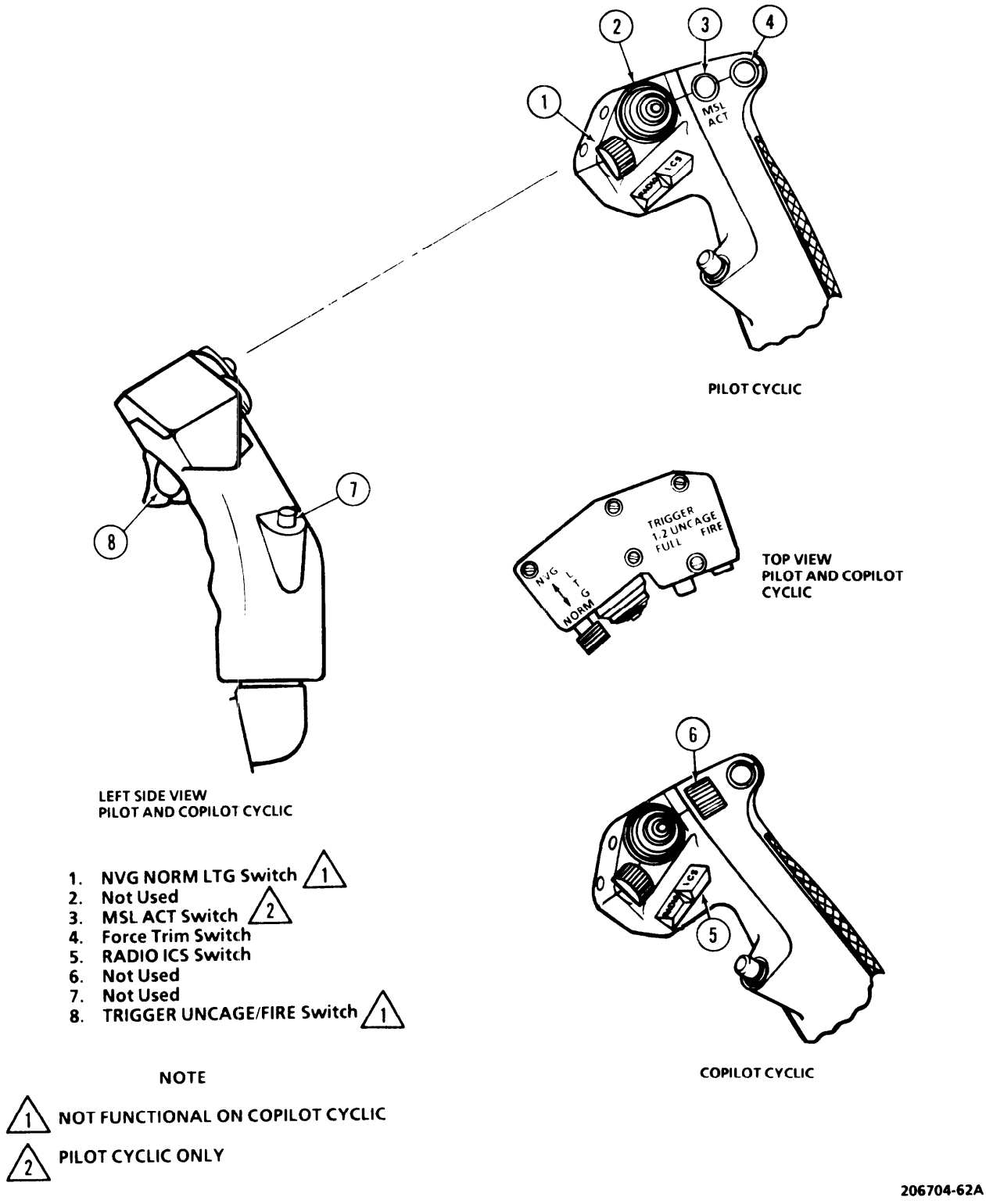
Figure 11-7. Cyclic Stick Assembly (Sheet 2) C
(After compliance with MWO 55-1520-228-50-32)



1. NVG NORM LTG Switch △1
2. Not Used
3. MSL ACT Switch △2
4. Force Trim Switch
5. RADIO ICS Switch
6. Not Used
7. Not Used
8. TRIGGER UNCAGE/FIRE Switch △1

NOTE

△1 NOT FUNCTIONAL ON COPILOT CYCLIC

△2 PILOT CYCLIC ONLY

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Figure 11-7.1. Cyclic Stick Assemb CS

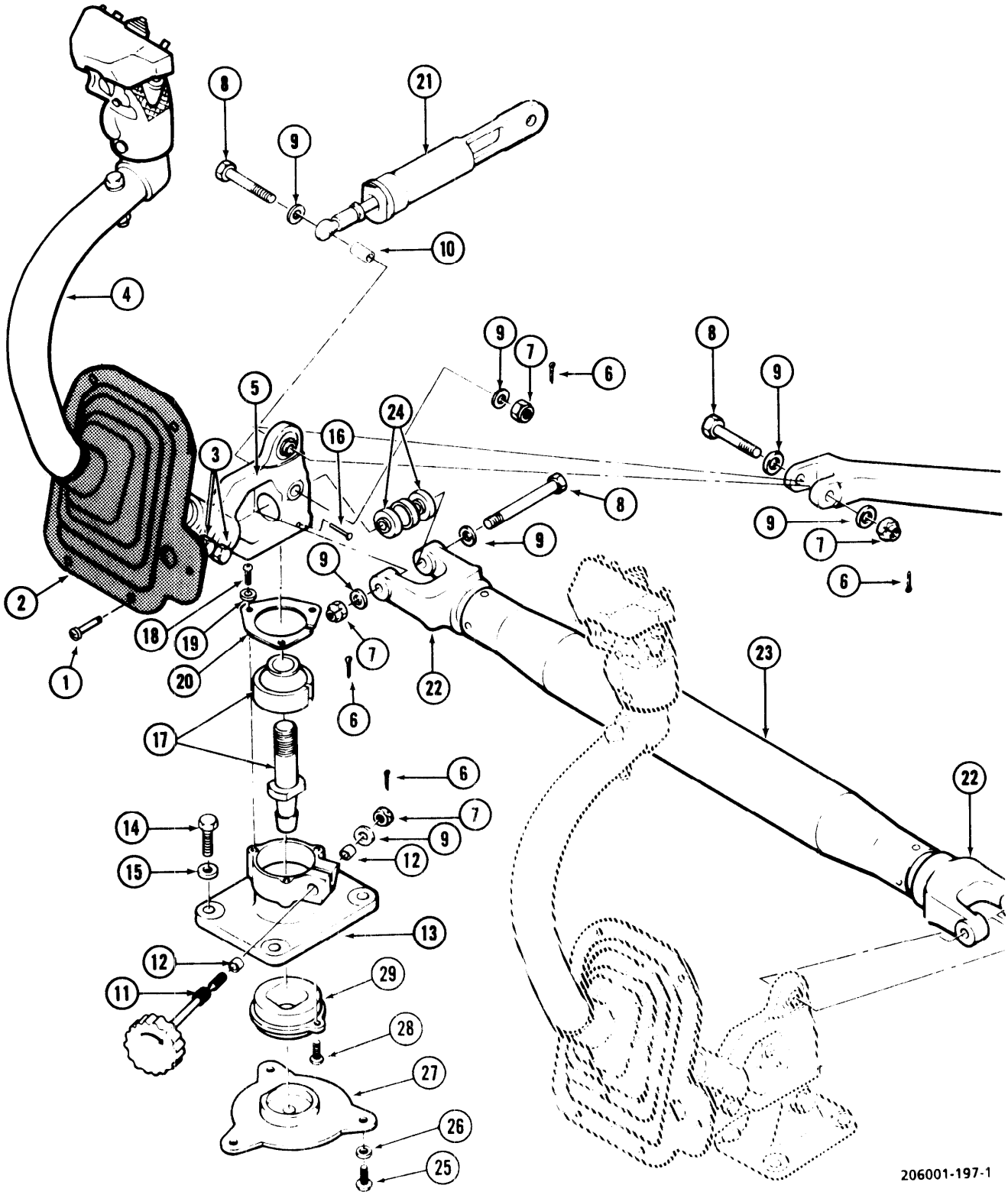

Figure 11-8. Cyclic Stick and Friction Control (Sheet 1 of 2)

1. Screws
2. Bolt
3. Bolts
4. Stick
5. Lever
6. Cotter Pins
7. Nuts
8. Bolts
9. washer
10. Spacer
11. Knob and Shaft
12. Helicoil
13. Support
14. Bolts
15. Washers
16. Rivet
17. Lever and Bearing
18. Screws
19. Washer
20. Retainer Plate
21. Gradient Assembly
22. Yoke
23. Tube
24. Bearing
25. Screw
26. Washer
27. Cover
26. Screw
29. Sleeve, Stick Support

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Figure 11-8. Cyclic Stick and Friction Control (Sheet 2)

NOTE

Lubricate threads at knob and shaft (11) with lubricant (C77) at Installation.

d. Screw shaft (11) into support (13). Install gradient (21), yoke (22), tube (23), and shaft (11) to lever (5) and support (13) using nuts (7) bolts (8), washers (9) spacer (10), and cotter pins (6).

NOTE

Assure cyclic sticks are centered in relation to each other prior to final installation.

e. Work electrical wires up through slot of lever and install bolts (3) securing pilots stick (4) to lever (5) and copilot stick with attaching nut (34, figure 11-5).

f. Install boot (2) to seat frame using screws (1).

g. Connect electrical cables at each stick.

h. Install pilot and copilot seats and access panels. Refer to paragraph 2-88 and 2-130.

NOTE

After installation and during ground run, with hydraulic boost ON, adjust friction knob (11) until a spring scale applied at center of grip indicates a breakaway force of 1.000 (±0.500) pounds. Torque nut (7) fingertight and secure with cotter pin (6). A maximum of six washers (9) may be used to position nut (7) for proper engagement with cotter pin (6).

11-48. CYCLIC CONTROL FRICTION ADJUSTER.

11-49. Description - Cyclic Control Friction Adjuster. The cyclic control friction adjuster is used to adjust the friction of the cyclic control system.

11-50. Inspection - Cyclic Control Friction Adjuster. Inspect knob and shaft for disorted threads or obvious damage.

11-51. Removal - Cyclic Control Friction Adjuster. Remove cotter pin, nut, and washer from cyclic control friction adjuster and remove knob and shaft.

11-52. Repair - Cyclic Control Friction Adjuster. Replace defective parts.

11-53. Installation - Cyclic Control Friction Adjuster. Install washer(s), nut, and cotter pin. Install nut fingertight. A maximum of six washers may be used to position nut for groper engagement with cotter pin. Refer to paragraph 11-92.

11-54. CYCLIC STICK GRIP.

Refer to paragraph 9-135.

11-55. Description - Cyclic Stick Grip. Refer to paragraph 9-136.

11-56. Inspection - Cyclic Stick Grip. Refer to paragraph 9-140.

11-57. Removal — Cyclic Stick Grip. Refer to paragraph 9-139.

11-58. Repair — Cyclic Stick Grip. Refer to paragraph 9-142.

11-59. Installation — Cyclic Stick Grip. Refer to paragraph 9-143.

11-60. FORCE GRADIENT ASSEMBLY.

11-61. Description — Force Gradient Assembly. The force gradient is a spring loaded link, connecting the magnetic brake to the control system. These are not interchangeable in position and must have spring preloaded for the particular location.

Premaintenance Requirements for Force Gradient Assembly

Conditions	Requirements
Model	OH-58A/C
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Eddy Current Inspection Unit
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	None
References	TM 1-1520-254-23

11-62. Inspection — Force Gradient Assembly. Inspect bearings for freedom of movement, housing for cracks, and shaft for thread condition. If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

11-63. Removal — Force Gradient Assembly.

CAUTION

Do not intermix force gradient assemblies. Replace with a like serviceable item.

a. Remove forward seats and panels to gain access to cyclic system. Refer to paragraph 2-83 and 2-126.

b. Remove bolts, nuts, and spacers from each end of force gradient. Remove force gradient.

11-64. Disassembly — Force Gradient Assembly.

a. Cut lockwire and unscrew threaded cap (1, figure 11-9) from cylinder assembly.

b. Remove spring assembly (3) from cylinder assembly (2).

11-65. Inspection — Force Gradient Assembly. Inspect threads on cap and in cylinder assembly.

11-66. Repair or Replacement — Force Gradient Assembly.

a. Replace cap and cylinder assembly if threads are stripped, worn, or otherwise damaged.

b. Replace cylinder assembly bearing (4, figure 11-9) if it is loose, rough, or binding. Center new bearing within **0.030** inch and using tool (T27) roll stake to cylinder assembly.

c. Check spring assembly (3) for **2.600 to 3.600** pounds of force for fore and aft gradient assembly and **3.700 to 4.700** pounds of force for lateral gradient assembly. If force cannot be obtained by adjusting check nut (5), replace spring (6) in either gradient

11-67. Reassembly — Force Gradient Assembly.

a. Adjust spring assembly (3, figure 11-9) for **2.600 to 3.600** pounds of force, by adjusting check nuts (5) for fore and aft gradient and **3.700 to 4.700** pounds for lateral gradient.

b. Position spring assembly (3) in cylinder assembly (2) and install cap (1). Screw cap (1) in until all noticeable end play of spring assembly is eliminated.

c. Install lockwire (C96) on cap (1) in both directions (figure 11-9).

d. Recheck for noticeable end play of spring assembly.

11-68. Installation — Force Gradient Assembly.

CAUTION

Ensure that the correct force gradient is installed. Due to spring preload and lengths, the units cannot be interchanged.

a. Install lateral force gradient as follows:

(1) Position magnetic brake arm as shown in view C, figure 11-5, install spacer on brake arm shaft; then position force gradient on shaft and secure with spacer, nut, and cotter pin.

(2) Place cyclic stick in neutral position, adjust rod end (15, figure 11-5) on the force gradient to align with controls and install bolt, washer, nut, and cotter pin.

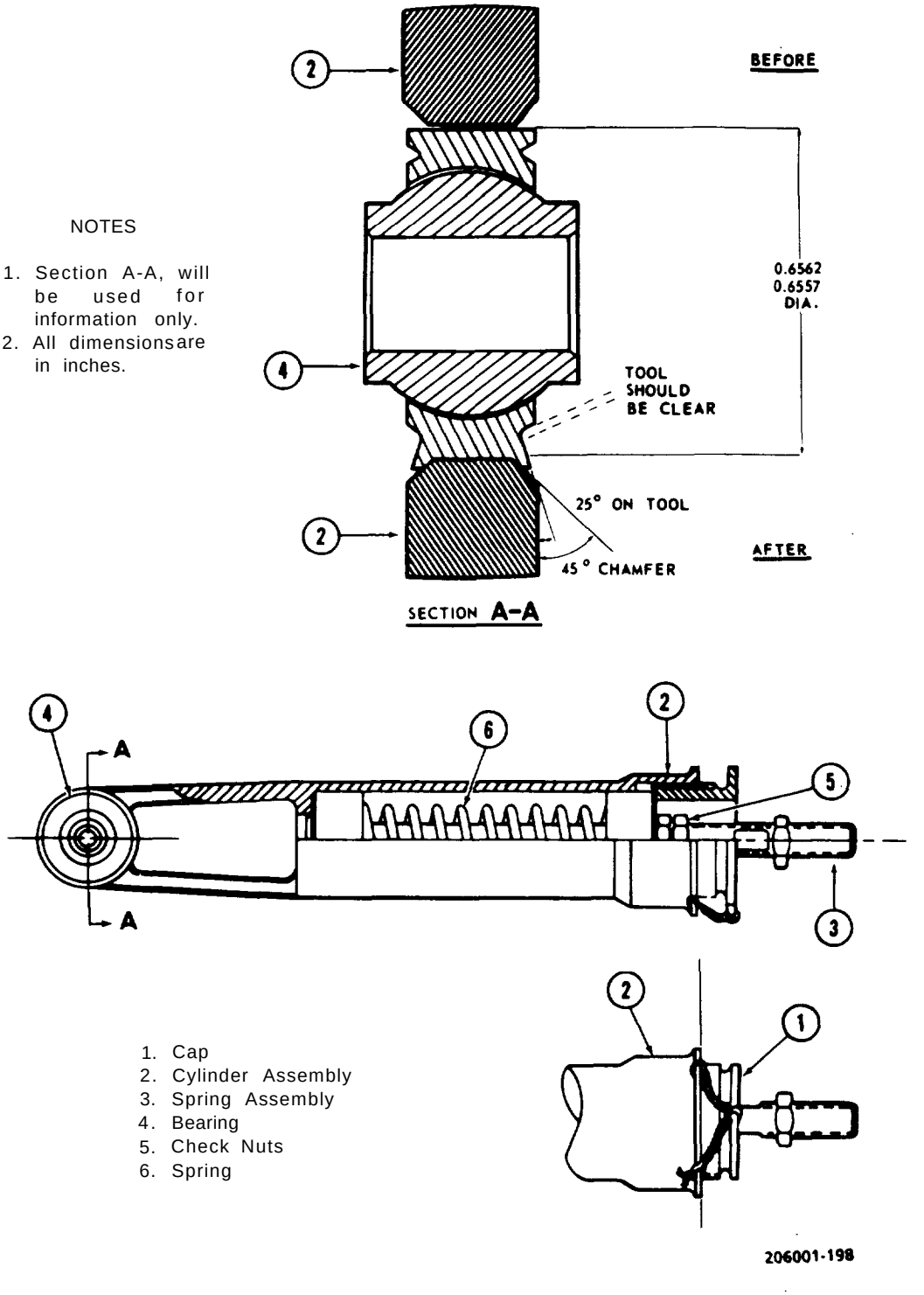


Figure 11-9. Force Gradient

b. Install fore and aft force gradient as follows:

(1) Position magnetic brake arm as shown in view E, figure 11-5, install spacer on brake arm shaft, position force gradient on shaft and secure with spacer, nut, and cotter pin.

(2) Place cyclic stick in neutral position and install rigging bolt (22, figure 11-5); then adjust rod end (15 or 23 as applicable) on the force gradient to align with controls and install bolt, washer, nut, and cotter pin.

c. Install seats and panels. Refer to paragraphs 2-88 and 2-130.

11-69. MAGNETIC BRAKE.

11-70. Description — Magnetic Brake. Electrically operated force trims are connected to the cyclic controls for stabilizing controls and force trim functions. The force trim button is located on the cyclic sticks. The magnetic brakes are identical assemblies except for the positioning of the arm on the brake shaft as illustrated in figure 11-5 (views C and E).

11-71. Inspection — Magnetic Brake.

a. Inspect magnetic brake (13 or 24, figure 11-5) for corrosion, unobstructed travel, security of electrical connector, and security of mounting.

b. Inspect adapter plate (28) and hardware for serviceability **C**.

11-72. Removal — Magnetic Brake.

a. Remove forward seats and access panels. Refer to paragraphs 2-83 and 2-126.

b. Disconnect electrical connection.

c. Disconnect force gradient from brake arm and remove bolts and washers attaching magnetic brake (13 or 24, figure 11-5) to airframe **A** **C**. Remove heater duct to allow magnetic brake removal **C**.

d. Disconnect force gradient from magnetic brake (24) arm and remove bolts (30) and washers (29) from adapter plate (28).

e. Remove nuts (25), washers (26), and screws (27) attaching adapter plate (28) to magnetic brake (24). Remove adapter plate (28) from brake (24) **C**.

11-73. Repair or Replacement — Magnetic Brake. Replace with like item and return removed component to AVIM.

11-74. Installation — Magnetic Brake.

a. Install arm on magnetic brake (13, figure 11-5) in relation to marks as shown in view C, figure 11-5 for each position.

b. Position magnetic brake (13) over mounting holes on airframe and install four bolts and washers.

c. Install arm on magnetic brake (24) in relation to marks shown in figure 11-5 (view E).

d. Position magnetic brake (24) over mounting holes on airframe and install four bolts and washers **A**.

e. Install adapter plate (28), screws (27), washers (26) and nut (25) on magnetic brake (24) **C**.

f. Position magnetic brake (24), with adapter plate (28), over mounting holes in airframe and install four bolts (30) and washers (29). Reinstall heater ducting **C**.

g. Connect brake arm to force gradient by installing spacer on arm shaft and positioning force gradient on arm shaft and securing with spacer, nut, and cotter pin.

h. Connect electrical lead to brake and install lockwire (C96).

i. Apply electrical power to brake and check operation.

j. Replace seats and panels. Refer to paragraphs 2-88 and 2-130.

11-75. CYCLIC CONTROL LINKAGE.

11-76. Description — Cyclic Control Linkage. Linkage between the cyclic control sticks and swashplate control horns includes control tubes, bellcranks, and jackshaft.

Premaintenance Requirements for Cyclic Control Linkage

Conditions	Requirements
Model	OH-58A/C
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Eddy Current Inspection Unit
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	None
References	TM 1-1520-254-23

11-77. Inspection — Cyclic Control Linkage.

a. Inspect control rods for chafed areas, cracks, scratches, and damage. If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

(1) Scratches and score marks at less than a **45** degree angle to lengthwise centerline of tube shall not exceed **0.010** inch depth.

(2) Scratches and score marks at more than a **45** degree angle to lengthwise centerline of tube shall not exceed **0.005** inch depth.

(3) Corrosion damage may be **0.005** inch depth before repair and **0.010** inch depth after repair.

(4) Width of repair areas at any section shall not exceed one-third of tube circumference for **0.005** inch depth repair, or one-sixth of tube circumference for **0.010** inch depth repair.

(5) No thread damage is acceptable, nor damage to any surface if repair will interfere with thread engagement.

b. Inspect rod ends and bellcranks for elongated holes, bearings for smooth operation and security of mounting, and castings for cracks and ware. If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

(1) No damage in excess of **0.020** inch, or corrosion in excess of **0.010** inch within a distance of one diameter from edge of a hole or a self-aligning bearing shell.

(2) Remainder of unit may not exceed **0.040** inch in damage and **0.020** inch for corrosion.

(3) Repair mechanical damage only to limits of damage, and repair corrosion only to twice the corrosion limits.

(4) Damage after cleanup shall not exceed **10%** of any surface or circumference of the affected part.

11-78. Removal — Cyclic Control Linkage.

NOTE

Parts of control system can be removed separately as need occurs, or completely in partial sequence. Take precautions against damage by accidental movement of linkage while disconnected.

a. Remove seats and panels to gain access to forward section of controls. Refer to paragraphs 2-83 and 2-126.

b. Open vertical panel on aft side center support column for access to control tubes and bellcranks.

NOTE

Do not change length of any adjustable tubes. System will require rigging if any tubes or tube lengths are changed.

c. Remove control rods and bellcranks as necessary for replacement if required.

11-79. Installation — Cyclic Control Linkage.

a. Accomplish installation of controls in any sequence by positioning the control unit and installing bolts, washers, nuts, and cotter pins.

b. Carefully check part numbers of control tubes to ensure collective control tubes have not been inadvertently mixed with cyclic control tubes.

c. Ensure cylinder extension tube (8, figure 11-5) are both approximately **10.500** inches long when measured from center to center of clevis holes.

CAUTION

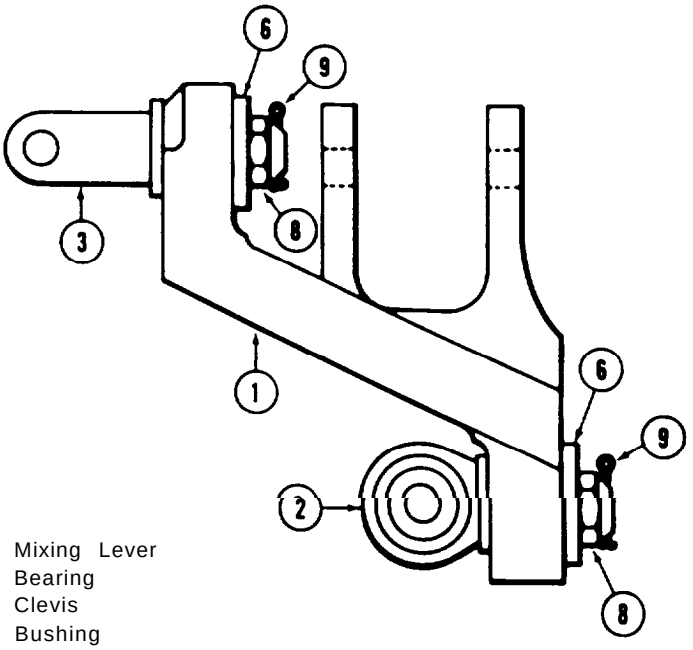
Install control tubes (2 and 3) with adjustable end down.

d. Install control rods, bellcranks, and bolts as shown in figure 11-5. Safety attaching hardware with cotter pins. Move controls through full range of travel to ensure there is no binding.

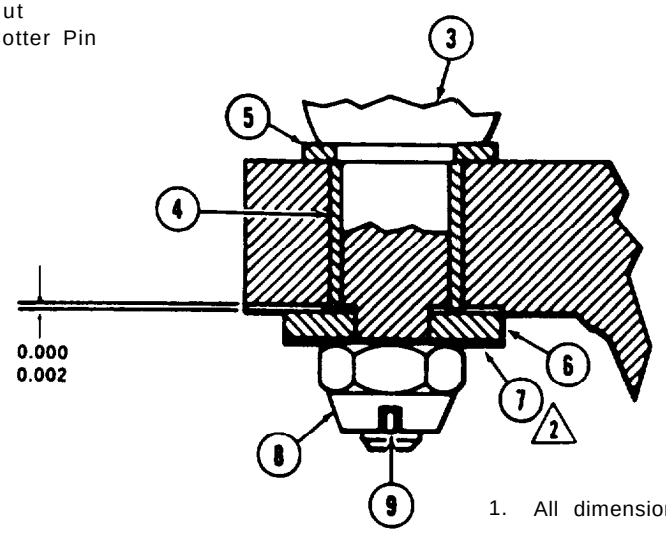
e. Verify proper rigging. Refer to paragraph 11-38.

f. Install seats and panels which were removed for access. Refer to paragraph 2-88 and 2-130.

11-80. Cyclic Control Linkage. Refer to figure 11-10.



1. Mixing Lever
2. Bearing
3. Clevis
4. Bushing
5. Washer
2 6. Thrust Washer
7. Shim
8. Nut
9. Cotter Pin



NOTES

1. All dimensions are in inches.

2 Shim to 0.002 inch maximum gap measured between thrust washer (6) and lever (1). Assure washer (5) is against shoulder of clevis (3). Torque nut so that breakout force required at bushing is 18 inch-ounce max. Install cotter pin (19).

206001-199

Figure 11-10. Cyclic Controls Mixing Lever

11-81. Removal and Disassembly - cyclic Control Linkage.

a. Gain access to controls area of center post between the seats.

b. Removal of the cyclic control linkage may be accomplished by disconnecting appropriate attaching hardware.

c. Disassembly of the cyclic control linkage may be accomplished disconnecting appropriate attaching hardware.

11-81.1. Removal - Trunnion and Mixing/Lever Assembly.

a. Disconnect link assembly (26, figure 11-11) by removing cotter pin (27), nut (18), two washers (9), and bolt (8). Discard cotter pin (27).

b. Disconnect tube assembly (12) by removing cotter pin (10A), nut (10), two washers (11), and bolt (13). Discard cotter pin (10A).

c. Remove cotter pin (14A), nut (14), washers (15) and bolt (17) to separate cyclic mixing lever (16) from trunnion and lever (25).

d. Remove lever assembly (25) from support assemblies (5 and 19) by removing cotter pin (2A), nut (2), washers (1, 7, and 20). and bolt (21). Discard cotter pin (2A).

e. Remove right support assembly (5) by removing four screws (3), eight washers (4), and four nuts (6).

f. Remove left support assembly (19) by removing three screws (22), six washers (23), and three nuts (24).

g. Disconect plate assemblies (3 and 6, figure 11-11.1) from trunnion bearing assembly (5) by removing two cotter pins (13), two nuts (2), and two washers (4). Discard cotter pins (13).

h. Disconnect and remove plate assemblies (3 and 6) two washers (7 and 10) and retain shims (1 and 11) from mixing lever (12) by removing lockwire, two bolts (8 and 9).

i. Remove trunnion bearing assembly (5).

11-81.2. Inspection - Trunnion and Lever Assembly.

a. Inspect plates (3 and 6, figure 11-11.1) for damage and worn or rough bearings. Replace plates if play in bearing exceeds **0.005** inch radial or **0.030** inch axial, or if bearings are rough.

b. Inspect trunnion bearing (5) for damage and worn or rough bearing. Clean trunnion bearing surface with dry cleaning solvent. Replace trunnion bearing if play in bearing exceeds **0.005** inch radial or **0.030** inch axial or if bearing is rough.

c. Inspect lever assembly. If bushings in ends of lever are elongated in excess of **0.005** inch, replace as follows:

(1) Support lever assembly and press out old bushing.

(2) Clean aged primer from bushing bore of lever assembly.

(3) Coat new bushings with primer (C116). Press bushings into lever while primer is still wet.

(4) Line ream bushings **0.312 to 0.313** inch (see figure 11-11.2).

d. Inspect supports (5 and 19, figure 11-11) for damage and worn or rough bearings. Replace bearings if play exceeds **0.005** inch radial or **0.030** inch axial.

11-81.3. Reassembly - Trunnion and Lever Assembly.

a. Position trunnion bearing (5, figure 11-11.1) with thin washers (4) on each between plates (3 and 6).

b. Install nuts (2) and secure nuts. Install cotter pins (13).

c. Position plates (3 and 6) over end of lever assembly (12) with shims (1 and 11) under each side. Adjust shims as necessary for a maximum total gag of **0.002** inch between lever (12) and plates (3 and 6). Shims (1 and 11) must be equal in thickness within **0.009** inch.

d Install bolt (9) with washer (10) and bolt (8) with washer (7). Torque bolt (9) to **30 and 40** inch-pound-

e. Check trunnion bearing (5) for a maximum breakout torque of **24** inch ounces along its mounting axis. If breakout torque is excessive, ensure that shims (1 and 11) are of correct thickness. If shims are correct then check bearings in plates (3 and 6) for roughness.

f. Lockwire bolts (8 and 9) together with lockwire.

11-81.4. Installation - Trunnion and Mixing/ Lever Assembly.

a When installing trunnion and lever assembly use washer as required with a maximum of four washers two on each side between support assemblies and lever assembly. Maximum end play More applying torque is **0.060** inches.

b. Position support (5, figure 11-11) to mounting structure and install four screws (3) with washers (4) and nuts (6). Secure nuts.

c. Position support (19) to mounting structure and install three screws (22) with washers (23) and nuts (24). Torque nuts.

d. Position trunnion and lever (25) between supports (5 and 19). Install bolt (21) with washer (20) under heed. Use washers (7), maximum of two each side, to limit clearance between supports and lever to **0.060** inch maximum. (Refer to Detail A, figure 11-11). Install washer (1) and nut (2). Secure nut and install cotter pin (2A).

e. Install bolt (17) with washers (15) and nut (14) to connect trunnion and lever (25) to cyclic mixing lever (16). Secure nut (14) and install cotter pin (14A).

f. Connect tube assembly (12) to trunnion and lever assembly (25) with bolt (13), washers (11), and nut (10). Secure nut (10) and install cotter pin (10A).

g. Connect link (26) to clevis of trunnion and lever (25) with bolt (8), washers (9), and nut (18). Secure nut and install cotter pin (27).

h. Operational check of a collective and cyclic control system.

i. Install lower access door on center support column.

11-82. Inspection - Cyclic Control Linkage.

a. Inspect entire assembly for damage.

b. Check bearing (2, figure 11-10), and devises (3) for freedom of operation.

11-83. Repair or Replacement - Cyclic Control Linkage.

a. Replace all worn or damaged parts exceeding repair criteria in paragraph 11-77.

b. Replace bearings and devises that do not operate freely.

11-84. Reassembly - Mixing Lever/Trunnion and Lever - Cyclic Control Linkage. Reassemble the unit or either portion as shown in figures 11-10 and 11-11.3. Ensure shimming installation provides correct gaps.

NOTE

Ensure that teflon surface of thrust washer is installed facing toward mixing lever surface.

11-85. Installation - Cyclic control Linkage.

a Locate unit in center post and connect control linkage. Refer to paragraph 11-79.

b. Deleted.

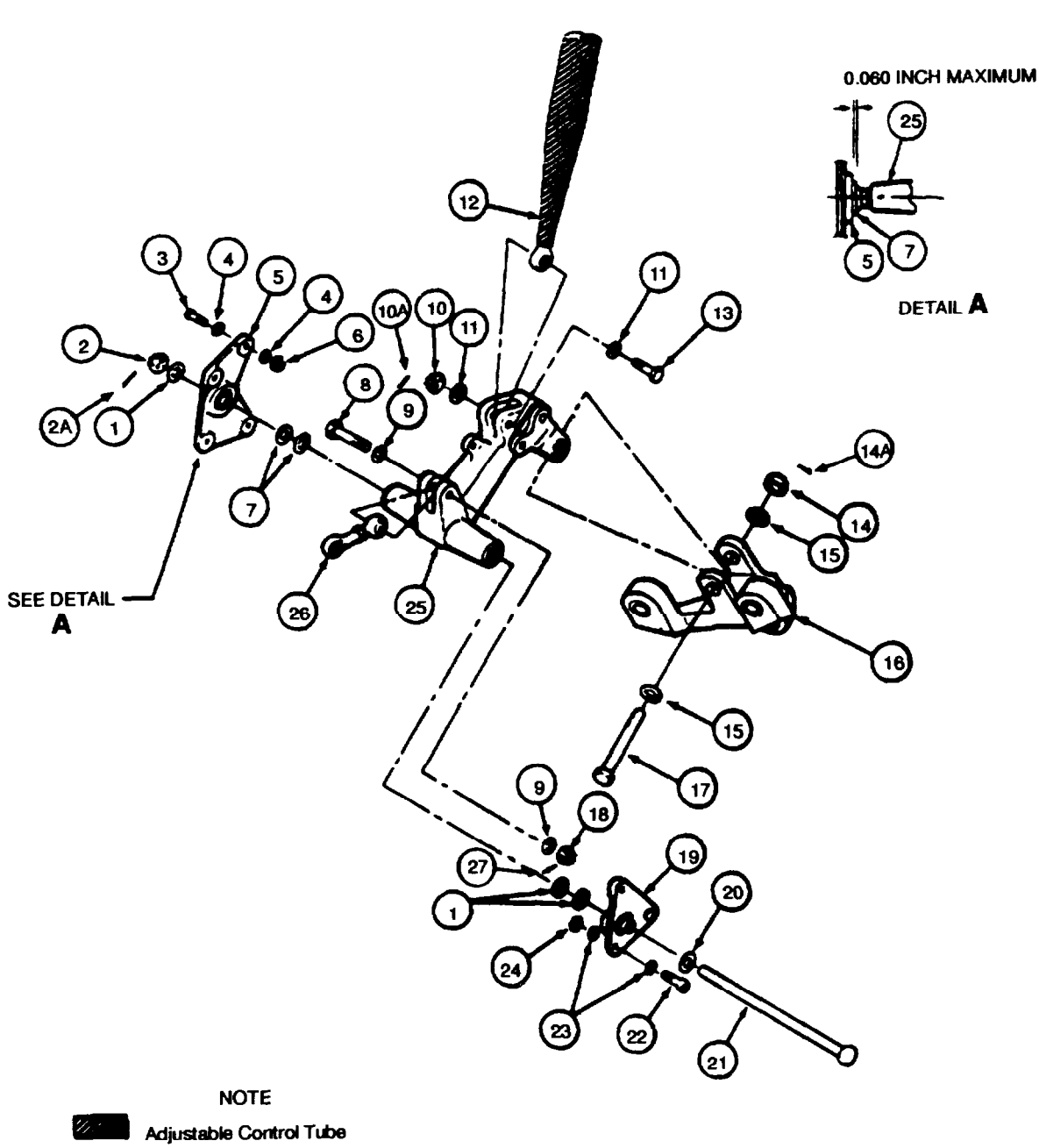
CAUTION

To avoid machine screw damage to tail rotor connecting link do not reinstall the screw which secures the center post cover assembly and cover at water line 37.55 (third screw up from bottom left side of pedestal).

To prevent any inadvertent future installation of the screw, the nut plate should be permanently removed and a 1/2 inch square of 0.023 inch thick aluminum bonded over the exterior of the holes with two-part adhesive (C19). On OH-58C aircraft the lower left screw hole has been deleted from the heater duct on the center post to prevent inadvertent installation of a screw in this location.

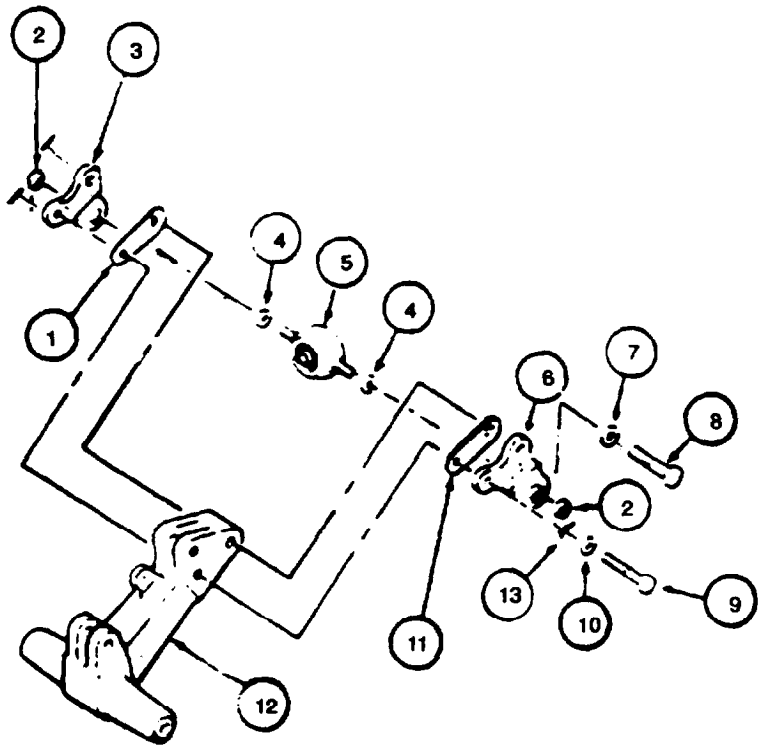
c. Close access panels on center post.

d. Perform operational check of the cyclic control system.



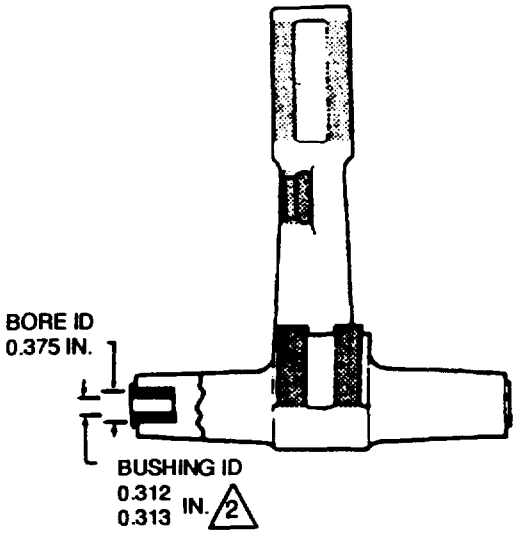
1. Washer
2. Nut
2A. Cotter Pin
3. Screw
4. Washer
5. Support
6. Nut
7. Washer
8. Bolt
9. Washer
10. Nut
10A. Cotter Pin
11. Washer
12. Control Tube
13. Bolt
14. Nut
14A. Cotter Pin
15. Washer
16. Mixing Lever (Cyclic)
17. Bolt
18. Nut
19. Support
20. Washer
21. Bolt
22. Screw
23. Washer
24. Nut
25. Trunnion and Lever
26. Link
27. Cotter Pin

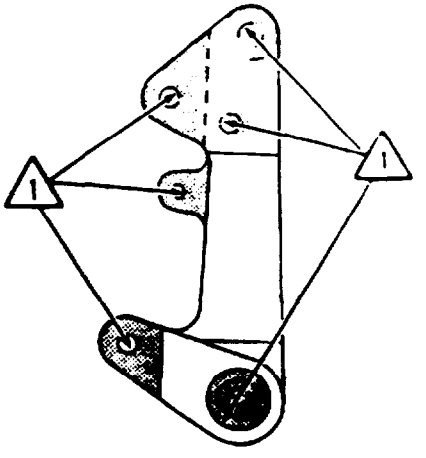
Figure 11-11. Collective Trunnion and Lever



1. Shim
2. Nut
3. Plate
4. Thin Steel Washer
5. Trunnion Bearing
6. Plate
7. Aluminum Washer (2)
8. Bolt
9. Bolt
10. Aluminum Washer (2)
11. Shim
12. Lever Assembly
13. Cotter Pin

Figure 11-11.1 Trunnion and Lever- Disassembled





206-001-155 LEVER

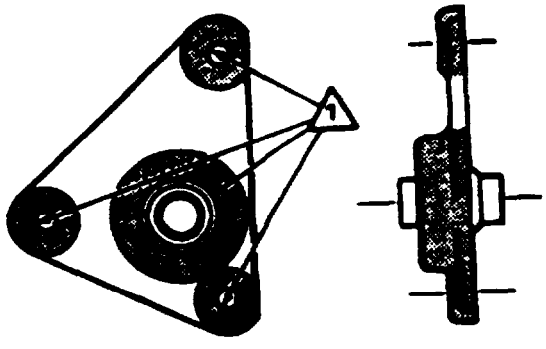
DAMAGE LOCATION SYMBOLS

TYPE OF DAMAGE	MAXIMUM DAMAGE AND REPAIR DEPTH	
MECHANICAL	0.020 in. before and after repair	0.040 in. before and after repair
CORROSION	0.010 in. before and 0.020 in. after repair	0.020 in. before and 0.040 in. after repair
MAXIMUM AREA PER FULL DEPTH REPAIR	0.10 sq. in.	0.25 sq. in.
NUMBER OF REPAIRS	One per area	Not critical
EDGE CHAMFER	0.030 in. by 45 degrees	0.060 in. by 45 degrees

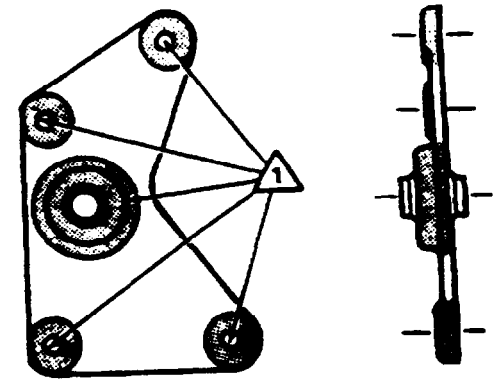
NOTES:

1. Bore damage not to exceed 0.002 inch for one-fourth circumference. Limit one repair per bore.
2. Bushing bores shall be in line and concentric with bushing holes.
3. Axial bearing shall not exceed 0.030 inch; radii bearing wear shall not exceed 0.005 inch.

Figure 11-11.2 Collective Pitch Control Parts Damage Limits (Sheet 1 of 3)



206-001-139 SUPPORT



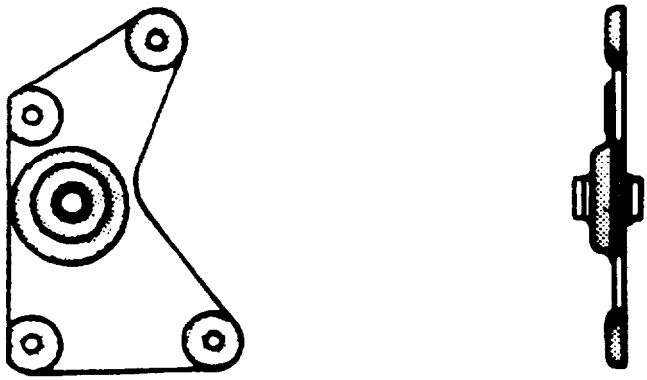
206-001-140 SUPPORT

DAMAGE LOCATION SYMBOLS

TYPE OF DAMAGE	MAXIMUM DAMAGE AND REPAIR DEPTH	
MECHANICAL	0.020 in. before and after repair	0.040 in. before and after repair
CORROSION	0.010 in. before and 0.020 in. after repair	0.020 in. before and 0.040 in. after repair
MAXIMUM AREA PER FULL DEPTH REPAIR	0.10 sq. in.	0.25 sq. in.
NUMBER OF REPAIRS	One per area	Not critical
EDGE CHAMFER	0.030 in. by 45 degrees	0.060 in. by 45 degrees

NOTES: 1 Bore damage not to exceed 0.002 inch-fourth circumference. Limit one repair per bore.

Figure 11-11.2 Collective Pitch Control Parts Damage units (Sheet 2 of 3)



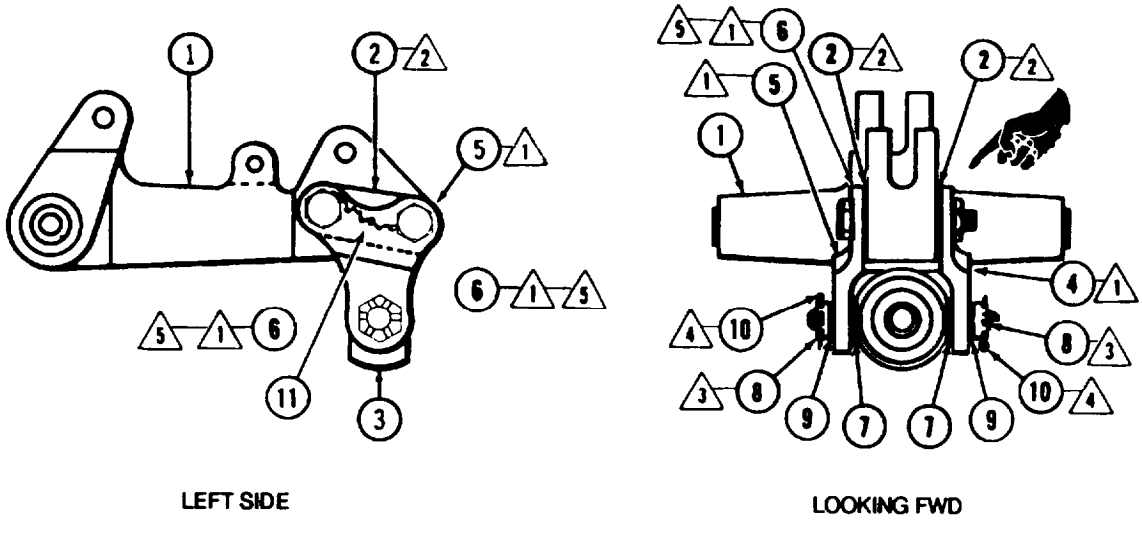
206-001-140-1 SUPPORT ASSEMBLY

DAMAGE LOCATION SYMBOLS


TYPE OF DAMAGE	MAXIMUM DAMAGE AND REPAIR DEPTH	
MECHANICAL AND CORROSION	0.020 in. before and after repair	0.040 in. before and after repair
NUMBER OF REPAIRS	One per area	Not critical
MAXIMUM AREA FOR FULL DEPTH REPAIR	0.10 sq. in.	0.25 sq. in.
MAXIMUM EDGE CHAMFER	0.030 in. x 45°	0.060 in. x 45°
MAXIMUM BORE DAMAGE	0.002 in. on 25% of the circumference. One damaged area per bore.	

Figure 11-11.2 Collective Pitch Control Parts Damage Limits (Sheets 3 of 3)

1. Trunnion and Lever Assembly
2. Shim
3. Trunnion Bearing
4. Plate, Steel, Threaded
5. Plate, Aluminum
6. Bolls (Two Sizes) end Washers
7. washers
8. Nuts
9. Washers
10. Cotter Pins
11. Lockwire



NOTES

1. Bolts (6) and plates (4 and 5) will be reversed with part number 206-001-185-1, -5 and -188-1 plates installed.

2. Shim to 0.002 inch maximum total gap between plates (4 and 5) and lever (1). Peel shim equally within 0.009 inch on each side.

3. Torque nuts (8) 20 TO 35 INCH-POUNDS.

4. Maximum torque breakout along trunnion axis to be 24 inch-ounce.

5. Use standard torque on bolts (6) and lockwire (11) heads of bolts (6) together.

206001-200

Figure 11-11.3 Trunnion and Lever Assembly

11-86. CYCLIC STICK BALANCE SPRING.

11-87. Description - Cyclic Stick Balance Spring. The cyclic stick balance spring (32, figure 11-5) serves to offset cyclic stick mass imbalance forces so that the stick has no tendency to move either forward or aft at any point in its range of fore and aft movement.

11-88. Adjustment - cyclic stick Balance Spring. Adjust preload on spring (32) as follows:

CAUTION

Be extremely careful when releasing the cyclic controls to avoid loss of control.

a. Ground run helicopter at **97% A ,98% C**. Refer to TM 55-1520-228-10.

b. Position hydraulic boost to ON.

c. Position forced trim to OFF.

d. Adjust cyclic friction control for minimum friction.

e. Center cyclic control stick and form circle with hands around stick. Tap cyclic stick forward and then aft If cyclic creeps or motors forward, adjust preload on spring (32) as outlined in step f. If cyclic creeps or motors aft, adjust preload on spring (32) as outlined in step g.

f. Adjustment to correct forward motoring. Back off nut (37) **0.250 to 0.500 inch.** Tighten nut (40) until balance is obtained, tighten nut (37) to standard torque.

g. Adjustment to coned aft motoring. Back off nut (40) until balance is obtained. Tighten nut (37) to standard torque.

h. Increase or decrease tension of balance spring as required to eliminate any tendency for cyclic controls to move fore or aft when cyclic controls are released by pilot.

NOTE

If balance cannot be obtained by procedure outlined in steps f. and g., remove spring (32) and check spring tension as outlined In step b. of paragraph 11-89.

I. Inspect work area for security of attaching hardware, interference, loose took, etc. Install honeycomb panel and seat cushions (if removed).

j. Perform maintenance operation check (MOC) and Limited Test flight of the helicopter.

k Readjust spring as required.

11-89. Inspection - Cyclic Stick Balance Spring.

a. Inspect spring (32, figure 11-5) and eyebolts (35 and 36) visually for obvious damage.

b. If there is any reason to suspect that spring (32) has lost some tension, measure the overall length of the spring. It should be **5.212 to 5.512** inches long. Record the length of the spring. Support in a suitable fixture and apply a load to extend the spring **1.120** inches. The load required to extend spring **1.120** inches must be **1.490 (±0.15)** pounds. Replace the spring and/or eyebolts if they do not pass these inspections.

11-90. Remove - Cyclic Stick Balance Spring.

a. Remove copilots seat and access panel. Refer to paragraphs 2-86 and 2-126.

b. Remove nut (40, figure 11-5) washer (39). and eyebolt (36) from bracket (35). Remove spring (32) from eyebolt (35).

11-91. Installation - Cyclic Stick Balance Spring.

a. Install spring (32, figure 11-5) in eyebolt (35).

b. Install eyebolt (36) on aft end of spring (32). Thread nut (37) on eyebolt (36). Position eyebolt (36) in bracket (41) with aluminium washers (38 and 39) on either side of bracket and install nut (40).

c. Install seat panels and seats. Refer to paragraphs 2-88 and 2-130.

11-92. Cyclic Control Friction Adjustment.

a. Check the cyclic controls friction adjuster (18 figure 11-5) for correct minimum friction adjustment after maintenance procedures on the cyclic controls and/or when pilots report incorrect friction.

(1) Ground run helicopter at 97% A , 98% C N2 with hydraulic boost ON. Refer to TM 55-1520-228-10.

(2) Set friction adjuster (18) to minimum friction.

CAUTION

Move cyclic stick just far enough to check breakout forces. Excessive movement an result In severe blade droop and pylon rock Excessive spreading or squeezing of pivot will cause cracking at bottom of damping slot

(3) Measure friction breakout at center of cyclic grip. The friction breakout force will be 1.000 (±0.500) pounds. If friction is not within limits, stop helicopter engine, proceed with step b.

NOTE

During accomplishment of step b, do not remove friction adjuster (18) from support (44). If friction adjuster (18) threads do become disengaged, It may be necessary to spread the slot in support (44) slightly to permit engagement of the fine thread. If engagement cannot be accomplished by spreading, squeeze the slot a maxi mum of 0.020 Inch. Make the measurement at the upper, Inboard corner of the slot. Visually Inspect pivot support for cracking whenever adjustments are made. No cracking permitted.

b. Remove seats and seat panel (refer to paragraphs 2-83 end 2-126).

c. Adjust friction adjuster (18, figure 11-5) that does not meet inspection requirements as follows:

(1) Remove cotter pin (43), nut (21), and washer(s) (42).

(2) Ground run helicopter at**97%** A, , **98%** C N2 with hydraulic boost ON. Refer to TM 55-1520-228-10.

(3) Adjust friction adjuster (18) to obtain friction breakout force specified in step a. (3). Stop helicopter engine.

NOTE

A maximum of six washers (42) maybe used to position nut (21) for proper engagement with cotter pin (43).

(4) Install nut (21) and cotter pin (43). Shim as required with washers (42) between nut (21) and support (44) to maintain the friction set in step a. (3) and ensure proper engagement of cotter pin.

(5) Repeat friction adjustment check outlined in step a. If minimum friction cannot be obtained, refer to paragraph 11-40, for cyclic control stick assembly.

11-93. TAIL ROTOR CONTROL SYSTEM.

NOTE

Helicopters incorporating MWO 55-1520-228-50-18 (VR/FC) require additional maintenance instructions Refer to paragraph 11-131 C. .

WARNING

Tall rotor control system rigging must be checked if any of the tail rotor control system is removed replaced or adjusted for my reason.

11-94. Description- Tall Rotor Control System. The tail rotor control system includes control pedals, pedal adjusters, push-pull tubes, bellcranks, and a pitch control mechanism mounted through the tail rotor shaft. Actuation of pedals causes pitch change of tail rotor blades to offset main rotor torque and control directional heading of helicopter.

CAUTION

Possible Interference exists between bolt (10, figure 11-12) and/or cotter pin and mixing lever. Ensure an AN174-12 bolt is Installed.

11-95. Removal - Tail Rotor Control Linkage.

a. Remove center post cover assembly, cover, forward fairing, tailboom, and/or tail cone to gain access to tail rotor control tubes and bellcranks.

b. Remove components in any sequence as required. Refer to paragraph 11-109, 11-119, and 11-124.

11-96. Inspection - Tall Rotor Control Linkage. Inspect components in accordance with paragraphs 11-114,11-119,11-125, and 11-128.

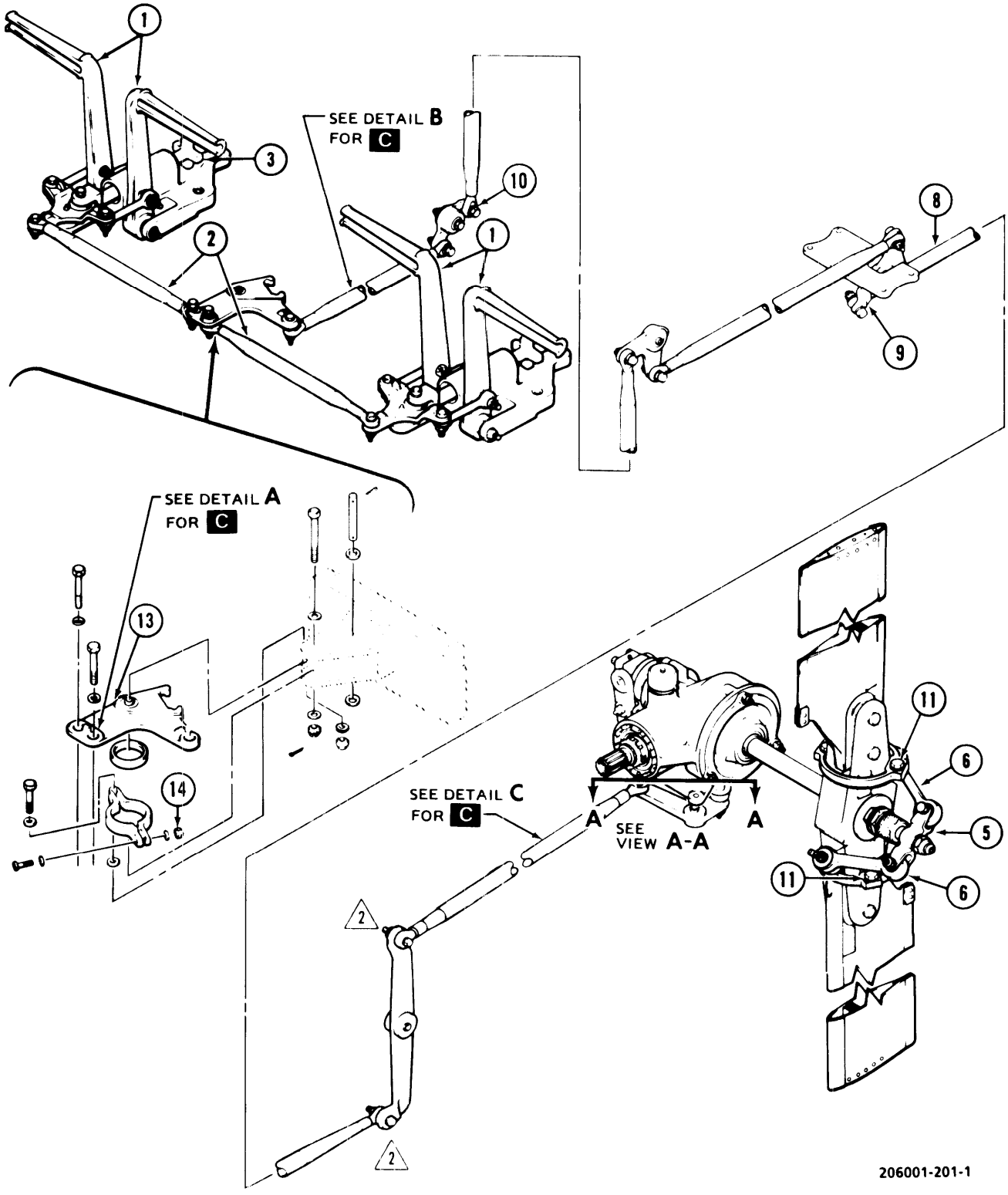
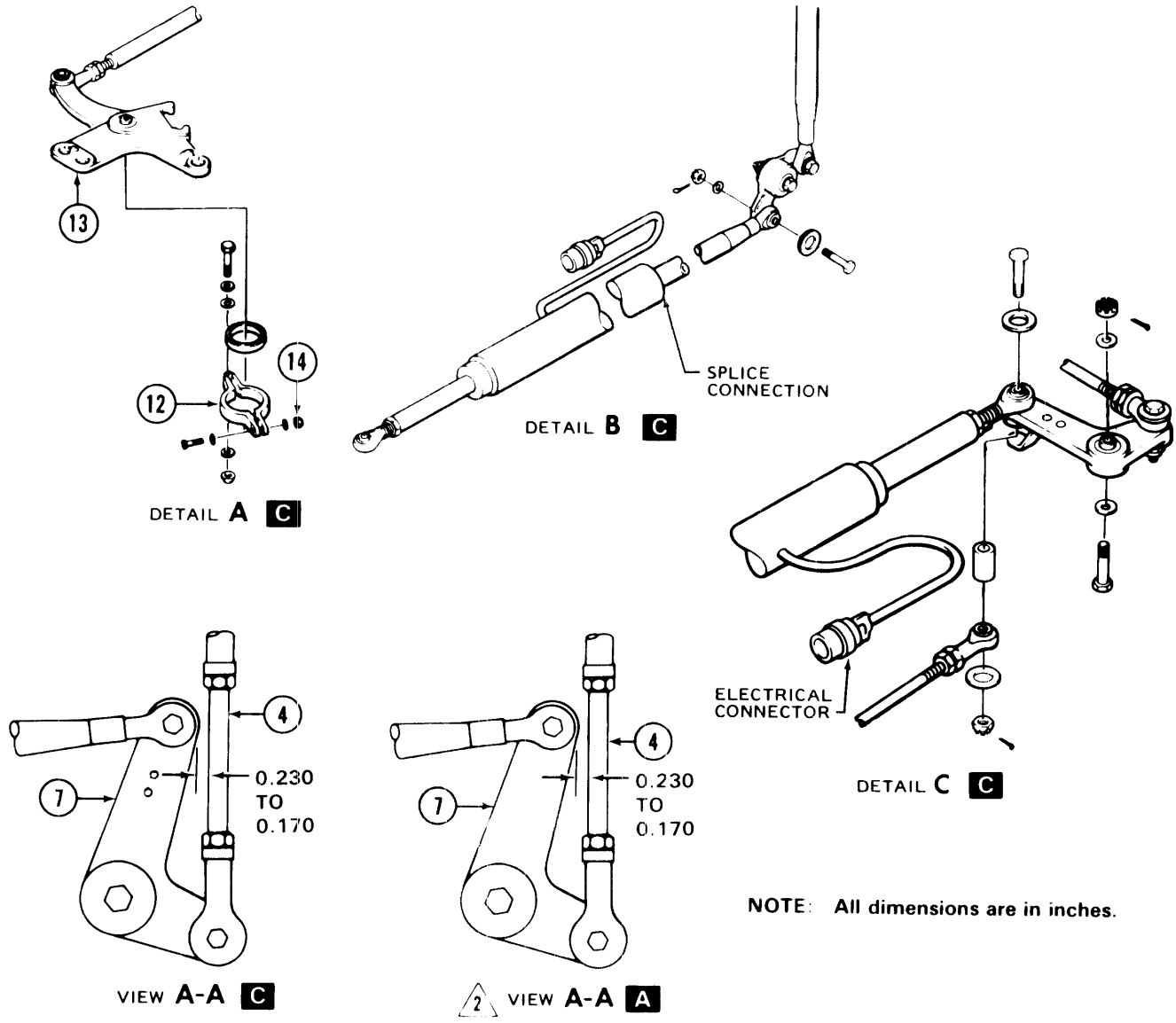


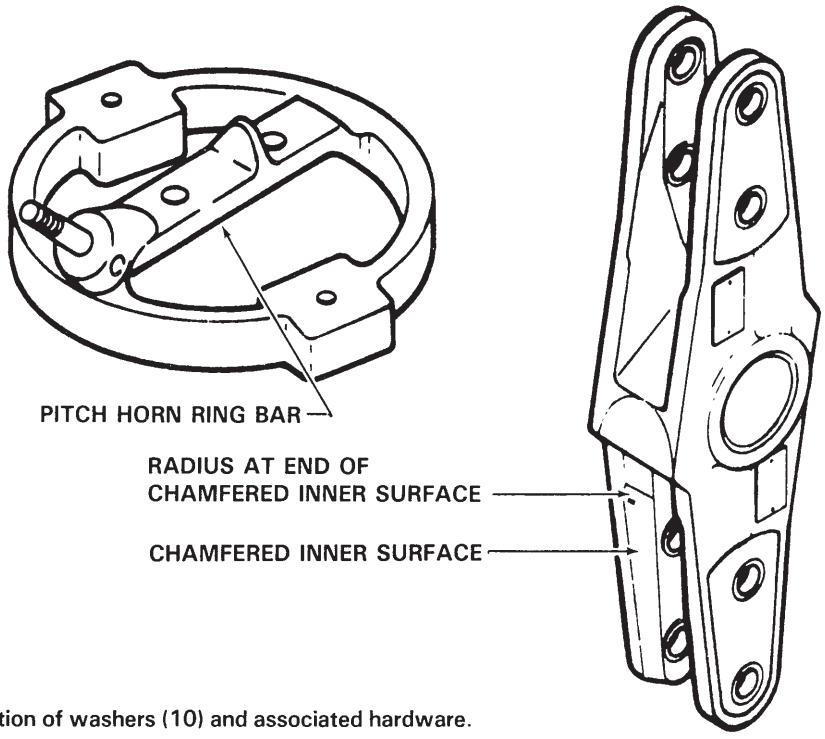
Figure 11-12. Tail Rotor Control System (Sheet 1 of 3)



1. Pedal Assembly
2. Control Tubes
3. Adjuster Knob
4. Rod Assembly
5. Crosshead
6. Pitch Links
7. Bellcrank
8. Control Tube
9. Bellcrank
10. Bolt
11. Washer(s)
12. Friction Clamp
13. Bellcrank
14. Nut

206001-201-2

Figure 11-12. Tail Rotor Control System (Sheet 2)



NOTES:

1. Refer to figure 5-60 for installation of washers (10) and associated hardware.
2. To provide clearance bolts may be installed in either direction.
3. In view A-A the 0.170 to 0.230 inch measurement is taken from end of bellcrank to rod assembly.
4. All dimensions are in inches.

206001-201-3

Figure 11-12. Tail Rotor Control System (Sheet 3 of 3)

11-97. Installation — Tail Rotor Control Linkage.

CAUTION

To avoid machine screw damage to tail rotor connecting link do not reinstall the screw which secures the center post cover assembly and cover at water line 37.55 (third screw up from bottom left side of pedestal).

To prevent any inadvertent future installation of the screw, the nut plate should be permanently removed and a 1/2 inch square of 0.023 inch thick aluminum bonded over the exterior of the holes with two-part adhesive (C19).On OH-58C aircraft the lower left screw hole has been deleted from the heater duct on the center post to prevent inadvertent installation of a screw in this location.

CAUTION

All washers with P/N 50712-9-2 are considered safety washers and must be installed on the outer surface of the rod ends to prevent bearing loss.

NOTE

It is recommended that those control tubes that have adjustable rod ends be connected but not secured until the rigging procedure, reference paragraph 11-100, is accomplished. Install components in any sequence as required. Refer to paragraphs 11-110, 11-120, and 11-126.

11-98. Troubleshooting — Tail Rotor Control System. Refer to table 11-3.

NOTE

Before using table 11-3, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 11-3, notify the next higher level of maintenance.

11-99. Troubleshooting Vulnerability Reduction Flight Control System — Tail Rotor Contro. Refer to table 11-4.. C

NOTE

Before using table 11-4, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 11-4, notify the next higher level of maintenance.

Table 11-3. Troubleshooting — Tail Rotor Control System

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Tail rotor controls binding	STEP 1. Check for obstructions or foreign objects.	**Reposition or remove obstructions. Remove foreign objects.**
	STEP 2. Isolate binding components In tail rotor system by detaching tube assemblies from bellcranks, pitch change mechanism, pedals, pitch horn, and friction adjuster Actuate each component to detect binding part.	**Replace defective component(s) as required**

Table 11-4. Troubleshooting – Vulnerability Reduction Flight Control System (VR/FC) – Tail Rotor Control C

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
1 Tail rotor controls rough or binding	STEP 1 Check for obstructions or foreign objects	**Reposition or remove obstructions Remove foreign objects.**

Table 11-4. Troubleshooting — Vulnerability Reduction Flight Control System (VR/FC) – Tail Rotor Control C (Cont)

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
STEP 2 Check VR/FC system for roughness or binding		**Isolate control cable assemblies from primary system by disconnecting forward control cable assembly from forward bellcrank and aft control cable assembly from bellcrank in tip end of tailboom. (Paragraph 11-134.) Move each system (primary and VR/FC) independently to full travel in each direction to determine which control path is rough or binding.** **Detach forward and aft control cable assemblies from idler at tailboom splice. (Paragraph 11-134.) Move each control cable assembly full travel in each direction to determine which control cable assembly is rough or binding.** **Inspect control cable assemblies for sharp or compound bends.** **Adjust or replace component(s) as necessary to relieve roughness or binding. (Paragraph 11-127 or 11-134 and11-138.)**
STEP 3 Check idler rod end beatings of control cable assemblies and swivels for dry or seizing bearings		**Replace idler, control cable assembly, rod end(s), or swivel(s) as necessary. (Paragraphs 11-134 and 11-138.)**
STEP 4 Check primary (control system for roughness or binding		**Isolate components in primary control system by detaching control tubes from pilot and copilot control pedals and detaching tail rotor pitch link from aft tail boom bellcrank. (Paragraph 11-134.) Move primary control to full travel, in each direction and check for roughness or binding.** **Adjust or replace component(s) as necessary to relieve roughness or binding. (Paragraph 11-100, steps a. through f. or 11-95, 11-97, and 11-128.)**
STEP 5 Check primary control system for bent control tubes.		**Inspect and replace control tubes as necessary.**
STEP 6 Check bearings in bellcranks levers, and walking beam In primary control system for dryer seized bearing		**Inspect anti replace bearings as necessary. (Paragraphs 11-128, 11-129, 11-130, and table 11-5.)**
STEP 7 Check ground adjustable friction clamp located on lower side of forward bellcrank, for binding		**Inspect for dirt, corrosion or uneven wear.** **Clean and adjust or repair as necessary.**

Table 11-4. Troubleshooting — Vulnerability Reduction Flight Control System (VR/FC) – Tail Rotor Control C (Cont)

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
2 Tail rotor controls have excessive free play or looseness	STEP 1. Check adjustable friction clamp, Iocated on lower side of forward bellcrank, for wear or adjustment.	**Inspect, adjust, or repair as necessary.**
	STEP 2. Check primary and VR/FC systems for broken of lost bellcrank pivot bolt, or replace rod end bolts. Check for loose supports.	**Replace bolts as necessary.** **Repair or replace supports as necessary.**
	STEP 3. Check primary and VR/FC systems for worn bearings	**Inspect and replace bearings as necessary. (Paragraphs 11-123 and 11-126.)**
	STEP 4. Check primary control system for broken control tubes	**Replace control tubes as necessary. (Paragraph 11-117.) Re-rig system as necessary, (Paragraph 11-100.)**
	STEP 5. Check forward and aft electromechanical disconnect control tubes in primary system for end play between rod ends. Purpchase to ensure that disconnect has not unlocked There will be some end play. Any end play over **0.005** inch is not allowed	**Inspect and replace as necessary.**
3 Tail rotor pedal adjustment rough or binding	STEP 1. Check for dirt, corrosion, or foreign material in pedal adjuster components	**Inspect components and clean as necessary.**
4. VR/FC system inoperative	STEP 1. Check shear link terminal in forward end of the forward control cable assembly, and aft shear link terminal in aft end of the aft control cable assembly, by pulling on each rod end to determine if shear pin is intact or sheared.	

11-100. Adjustment (Rigging) – Tail Rotor Control (Prior to compliance with MWO 55-1520-228-50-25).

a. Install all parts of the tail rotor control system Adjustable rod ends may be connected but need not be secured until adjustment is accomplished.

WARNING

Interference between tail rotor blade pitch horn tang and yoke or contact of the pitch horn bar in the radius area of the yoke inner chamfer surface can occur due to manufacturing tolerances on yoke assembly P/N 206-011-802-1, NSN 1615-00-121-6464, used on OH-58A only. These conditions can severely limit available tail rotor control. Yoke assembly P/N 206-011-802-105, NSN 1615-01-058-0153, which has been modified to eliminate this condition is required on the OH-58C. Individual tolerances can result in interference on either yoke.

b. Temporarily disconnect control tube (8, figure 11-12) at bellcrank (9), then depress tail rotor crosshead toward tailboom until tail rotor pitch horn bottoms in tail rotor yoke. Look for interference between pitch horn tangs (ears), balance weights, and yoke assembly. Pitch horn ring bar must contact chamfered inner surface of yoke assembly either at forward or aft surface of blade assembly. Pitch horn ring bar must not first contact radius at end of machined surface. Ensure that lockwire on pitch horn to blade bolts or sealant between blade and pitch horn does not prevent contact between pitch horn bar and flat twenty degree inner chamfer surface of yoke.

c. Adjust rod assembly (4) to orient bellcrank (7) as shown in view AA Secure with bolt washers, locknut, and cotter pin.

WARNING

Maximum allowable exposed thread area on adjustable end of control tube (8) is 1.000 inch.

d. With the tail rotor blade pitch horns still bottomed in the tail rotor yoke, depress and hold left pedal against stop. Adjust control tube (8) to fit and ensure that bore of bearing on control tube (8) is correctly aligned (square) with bellcrank (9) so that the attaching bolt is correctly aligned. Misalignment can result in improper rigging. Secure control tube(8) to bellcrank (9) with bolt, washers, and nut.

e. Cycle tail rotor control pedals through full range of travel then apply and hold left pedal full forward against stop.

(1) Check to ensure that tail rotor blade pitch horn is still bottomed against inside chamfer surface of yoke.

(2) Disconnect control tube (8) from bellcrank (9) Lengthen control tube (8)one-half turn. Reinstall to bellcrank (9) and secure with bolt, washers, nut and cotter pin.

(3) Check for freedom of operation of each pitch link with blade flapped to both extreme positions Check with left pedal full forward and then with right pedal full forward.

f. Check rigging to assure maximum left pedal tail rotor thrust is available as follows:

WARNING

Interference of lockwire on bolts securing pitch horn to tail rotor blades, excess sealant between pitch horn and tail rotor blade, contact of the pitch horn in the radius area of the yoke, or misalignment of bolt securing control tube (8) can cause error in rigging checks. The tail rotor blades can be manually deflected to positions other than possible by pedal movements. When checking clearance at tail rotor yoke assure that excessive force does not cause error in the result.

(1) Apply and hold left pedal full forward against stop.

(2) Check clearance between tail rotor pitch horn bar and inner chamfer surface of yoke. The clearance must be checked on both blades on both

sides (four locations) where pitch bar and yoke are close with full left pedal applied. The clearance is between the flat **20** degree chamfer on inner surface of tail rotor yoke and the straight bar of the blade pitch horn. Clearance in the radius area where the **20** degree chamfer fairs into the yoke towards the center is not of concern so long as there is visually determined clearance.

(3) There must be a slight clearance visually determined at all four locations if visual determination is not satisfactory, a strip of ordinary bond paper may be used as approximately **0.002** to **0.003** inch (reference used as an aid not as a requirement) including the radius area. Clearance on the flat **20** degree chamfer surface may be checked with a feeler gage. Do not insert feeler gage into radius area since an inaccurate measurement will result because of the curved surface.

(4) In the location where the blade pitch horn bar and the flat **20** degree chamfer surface of the yoke are closest (smallest clearance of four locations checked) the clearance must be **0.012** inch or less. At least one of the four locations must have a clearance of **0.012** inch or less.

(5) If there is a clearance between the tail rotor blade pitch horn bar and the yoke in all four locations and if at least one location has a clearance of **0.012** inch or less between the pitch horn bar and the flat **20** degree inner chamfer surface of the yoke, no further action is required.

(6) If there is contact at any location or if at least one location does not have a clearance of 0.012 inch or less, the tail rotor control system will be completely adjusted (rigged). The clearance need not be identical Repeat rigging procedures until correct clearance is obtained.

NOTE

Contact between pitch horn ring bar and chamfer of yoke assembly resulting from manual deflection of the tail rotor blade assemblies is of little concern except for long-term effects on normal wear to yoke assembly provided contact is not the direct result of pedal movements. The closer rigging procedures now required may result in increased wear between the tail rotor blade pitch horn and yoke. Such wear will be accepted within repair limits for these parts in order to obtain maximum possible tail rotor control power. The wear can be minimized by maintaining closer wear tolerances on all linkage. However, the installation is serviceable if rigging requirements and individual part wear tolerances are met.

g. On OH-58C adjust rigging of VR/FC backup system Refer to paragraph 11-133.

h. Balance tail rotor pedal forces as follows:

WARNING

The VR/FC backup system must be connected and rigged prior to performing the following steps. Refer to paragraph 11-133.

NOTE

Washers (11, figure 11-12) are installed on the tail rotor pitch horns as counterweights to compensate aerodynamic blade pitch forces.

(1) Loosen friction clamp nut (14) to remove friction from tail rotor pedals

(2) Ground run helicopter 103% A, 100% C. Refer to TM 55-1520-228-10.

(3) Place tail rotor pedals in neutral position and observe if pedals creep when not held by foot pressure If left pedal creeps forward, counterweight washers (11) are too heavy. Displace pedals one inch from center and observe for creep.

CAUTION

To prevent unbalancing tail rotor, measure each washer as it is removed to ensure an equal thickness of washer is removed at all four points on the pitch horn.

(4) After ground run, adjust by adding or removing counterweight washers (11) equally at four

positions on pitch horns, and replacing with filler washers until pedal forces are balanced.

WARNING

After pedal forces adjustment, cycle tall rotor pedals and flap blades through full range and check for Interference.

NOTE

Normally, there are 16 washers per pitch horn; 8 Inboard and 8 outboard. If additional washers are required to achieve balanced pedal forces, a maximum of 2 extra washers may be added equally to the Inboard positions only (figure 589). A maximum of 20 filler or balance washers are permitted per pitch horn. One additional thin washer AN960-10L or AN960PD-10L, may be added under the nut of each bolt to align the cotter pin holes. Five different bolt lengthsare available to attach the counterweight washers to the tall rotor pitch horn, depending on the number of washers used. The same quantity and type of washers and same bolt length must be used on all four locations on the pitch horns.

(5) A friction damp (12) is installed on the bellcrank (13) between pedal assemblies. This can be adjusted by removing a cover plate under the forward fuselage below the instrument console and tightening or loosening damp nut (14). With the complete system installed and pedals at midadjustment and midtravel, check break away force by installing a spring scale perpendicular to the center of the left pedal; break away force should not exceed 5 pounds. Maximum torque on nut (14) must not exceed**15 INCH-POUNDS.**

(8) Perform test flight. If pedal forces are not balanced at normal cruise speed, continue adjustment as in step (4) until pedal forces are balanced.

(7) Readjust tail rotor pedal friction as in step (5) as required.

NOTE

After installation of MWO 55-1520-228 50-25 with pilot pedals centered, tall rotor pedals on observers Side will be offset

WARNING

Do not Install the Improved tall rotor assembly (206-011-810-serles) on helicopters which have not been modified by MWO 55-1520-228-25. Associated parts although similar, are not Interchangeable. The following parts shall be used on helicopters without MWO 55-1529-228-25:

Tail Rotor Hub and Blade Assembly	206-011-601 -series
Yoke Assembly	206-011-802-1 or -105
Blade Assembly	206-010-756-5 or -109
Cross Head	206-010-741-3
Static Stop	206-010-742-1

(The above items can be visually identified while installed on the aircraft.)

WARNING

The checks In paragraph 11-96 are an Integral part of the rigging procedure. All references to full pedal travel or pedal against stop mean that bellcrank (5, figure 11-16) Is In contact with stop (7).

CAUTION

TB 55-1520-228-20-29 required all yoke assemblies, P/N 206-011-802-1, to be modified prlor to Issue. Thus only P/N 206-011-802-105 should be received from supply. If yoke (-1 series) or tall rotor assembly which includes a yoke (-1 series) Is received from supply, return It citing the TB.

11-101. Rigging - Tall Rotor Control System (After MWO 55-1520-228-50-25).

a. Install all parts of the tail rotor control system. Adjustable rod ends may be connected but need not be secured until adjustment is accomplished.

WARNING

Do not Install the standard tall rotor (206-011-801-series) on helicopters which have been modified by MWO 55-1520-228-50-25. Associated parts, although similar, are not Interchangeable. The following parts shall be used on helicopters with MWO 55-1520-228-50-25:

Tail Rotor Hub and Blade Assembly	206-011-81 O-series
Yoke Assembly	206-011-819-101
Blade Assembly	206-016-201-111
Cross Head	206-011-857-1
static stop	206-010-742-3

(The above items can be visually identified while installed on the aircraft.)

WARNING

The checks in paragraph 11-102 are an integral part of the rigging procedure. All references to full pedal travel or pedal against stop mean that bellcrank (5, figure 11-16) is in contact with stop (7).

NOTE

After installation of MWO 55-1520-228-50-25 with pilot pedals centered tail rotor pedals on observers side will be offset.

b. Temporarily disconnect control tube (1, figure 11-15) at walking beam (2); depress tail rotor crosshead (3) toward tailboom until tail rotor blade contracts the chamfered surface of the yoke (5).

NOTE

It is permissible for the blade leading edge doubler to contact the chamfered surface of the yoke, since the 206-016-201-111 blade is thicker than 206-010-750-109 blade used prior to the MWO.

NOTE

Insure that the blade remains In contact with the chamfered surface of the yoke through step h.

c. Check tar the following conditions:

(1) No interference between pitch horn tangs (ears), balance weights, and yoke assembly.

(2) Deleted.

(3) Pitch horn ring does not contact radius end of machined surface.

NOTE

Contact, if present, may be eliminated by minor rework, not to exceed the limitations contained in figure 5-49, Inspection and repair limits - tail rotor pitch horn, area B, page 5-98B.

(4) Lockwire on blade retention bolts or sealant between blade root and pitch horn does not contract yoke during deflection or prevent contact between the blade and flat twenty degree chamfered surface of the yoke.

d. Disconnected rod assembly (6) at lever assembly (12): See detail C.

e. Adjust rod assembly (6) to provide **0.170** to **0.230** inch clearance at bellcrank (7) as shown in view A-A. Secure with bolt (8), washers (9), locknut (10), and cotter pin (11).

NOTE

Rod assembly clearance 0.170 to 0.230 inch at bellcrank is an initial setting. Clearance can change after completion of the rigging procedures.

f. Using pilots, pedals, apply full left pedal to ensure bellcrank (5) contacts stop (7, figure 11-16).

WARNING

Maximum allowable exposed thread area on adjustable end of control tube (1) is 1.000 Inch. See detail A.

Bore of bearing on control tube (1) must be correctly aligned (square) with walking beam (2) so that attaching bolt (13) is correctly aligned Misalignment can result in Improper rigging.

g. Adjust control tube (1, figure 11-15) to fit walking beam (2).

h. Secure control tube (I) to walking beam (2) with bolt (13). washers (14), and nut (15). See detail A.

I. Cycle tail rotor control pedals through full range of travel, then apply full left pedal to ensure bellcrank (5) contacts stop (7, figure 11-16).

NOTE

Ensure that pedal remains full against stop through step v.

For maximum accuracy, the aircraft should be on a level surface and tail rotor blades positioned horizontally.

J. Stretch bumper (16, figure 11-14) over static (flapping) stop (17).

k Install tool (19) (T35) between tail rotor hub and static (flapping) stop (17) to hold tail rotor blades perpendicular to the tail rotor gearbox within 1/2 degree.

l. Install rigging tool (18) (T34) on one of the tail rotor blades between **4.000** and **6.000** inches from the blade tip. See detail E.

m. Level the blades horizontally within 1/2 degree.

CAUTION

Using either maintenance personnel or some fixed work aid to support the blade, maintain the horizontal black setting through step x. Variance of blades from horizontal position will give you inaccurate blade angle reading.

Ensure that the left pedal is still full against the forward stop.

n. Push the tail rotor crosshead full inboard until the pitch horn ring bar touches the inside of the hub clevis.

o. Zero the propeller protractor on a level surface (calibrate to ensure accurate reading).

P. Ensure that the following preset conditions exist:

(1) Crosshead full inboard in accordance with step n.

(2) Protractor calibrated in accordance with step o.

(3) Tail rotor blades horizontal in accordance with step m.

(4) Tail rotor blades held fixed in accordance with caution following step m.

q. Position the propeller protractor (21) on rigging tool, as shown in view C, and measure and record the blade angle.

r. Adjust control tube (1, figure 11-15) to set the blade angle at **22 to 23** degrees; record the exact reading.

s. Maintain the present conditions of step p. and:

(1) Install rigging tool (18) on opposite blade at exact same blade station.

(2) Measure and record the blade angle reading.

t. Calculate the average (mean) blade angle as follows:

(1) Add both blade angles obtained in steps r. and s (2).

(2) Devide the sum of both blade angles by 2.

(3) Record the average (mean) angle.

(4) The calculated average (mean) angle must be between **22 and 23** degrees.

U. If the blade angle determined in step t. is not within **22 to 23** degrees, repeat steps q., r., s., and t. until the reading is within tolerance. Record all readings.

v. Apply pilots right pedal full against forward stop.

NOTE

Ensure that pedal remains full against stop through step x.

w. Maintain the preset conditions of step p. (2) p. (3), p. (4), and:

(1) Position the propeller protractor (21) on rigging tool (18), as described in step q., and measure and record the blade angle.

(2) Install rigging tool (18) on opposite blade at exact same blade station.

(3) Measure and record the blade angle reedings.

x. Calculate the average (mean) Made angle as follows:

(1) Add both blade angles obtained in step w.

(2) Divide the sum of both Made angles by 2.

(3) Record the average (mean) angle.

(4) The calculated average (mean) angle must be 7 degrees or greater.

y. If the blade angle determined in step x. is not 7 degrees or greater, repeat steps r. through x. until the readings are within tolerance. Record all readings.

WARNING

Ensure that the following limits are met:

- **Left pedal minimum mean blade angle - 22 degrees**
- **Left pedal maximum mean blade angle - 23 degrees**
- **Right pedal minimum mean blade angle - 7 degrees**

WARNING

If tall rotor blade angles do not remain the same when moved through the full spectrum after tail rotor control pedals are repositioned, notify ATCOM Engineering. DO NOT RELEASE HELICOPTER FOR FLIGHT.

z. Remove tools (18 and IS).

aa. Place bumper (16, figure 11-15) into proper position inboard of static stop (I 7).

ab. Install cotter pins and lockwire as required.

WARNING

The tall rotor blades an be manually deflected to positions other than pos sible by pedal movements When checking clearance at tall rotor yoke+ ensure that excessive force does not cause error In the result

ac. Check for freedom of operation of each pitch link with blade flapped to both extreme positions. Check with left pedal full forward and then with right pedal full forward.

ad. Perform functional check in accordance with paragraph 11-102.

11-102. Functional Check - Tall Rotor Control.

a. Move pilots pedal adjustment full forward.

b. Operate pedal through entire range of travel. Bellcrank (5, figure 11-16) must contact stop (7) at both right and left pedal extremes.

C. Move pedal adjustment full aft and repeat step b.

d. Repeat a. through c. on copilot/observer side pedals.

e. Perform balance forces check in accordance with paragraph 11-103c.

WARNING

If pedal travel is limited by pedal contact with the linkage or pedal support, check control rods for proper configuration. If pedal travel Is limited by any linkage or by contact other than the bellcrank (5) against stop (7), the problem must be corrected prior to releasing the aircraft for flight.

11-103. Balance Forces - Tall Rotor Control.

NOTE

Washer (20, figure 11-15) are Installed on the tall rotor pitch horns as counterweights to compensate for aerodynamic blade pitch forces.

a. Loosen friction damp nut (4, figure 11-16) to remove friction from tail rotor blade.

b. Ground run helicopter **(103%A.,100%C)**. Refer to TM 55-1520-228-10.

c. Place tail rotor pedals in neutral position and ob serve if pedals creep when not held by foot pressure. If left pedal creeps forward, counterweight washers (20) are too heavy. Displace pedals one inch from center and observe for creep.

WARNING

After pedal forces adjustment, cycle tall rotor blades and flap blades through full range and check for Interference.

CAUTION

To prevent unbalancing tall rotor, measure each washer as It Is removed to ensure an equal thickness of washer Is removed at all four points on the pitch horn.

d. After ground run, adjust by adding or removing counterweight washers (20) equally at four positions on pitch horn, and replacing with filler washers until pedal forces are balanced.

NOTE

Normally, there are 16 washers per pitch horn; 8 Inboard and 8 outboard. If additional washers are required to achieve balanced pedal forces, a maximum of 2 extra washers per hub may be added equally to the outboard positions only (figure 5-57). A maximum of 20 filler or balance washers are permitted per pitch horn. One additional thin washer, AN960-1OL or AN96OPD-10L, may be added under the nut of each bolt to align the cotter pin holes. Five different bolt lengths are avaliable to attach the counterweight washers to the tall rotor pitch horn, depending on the number of washers used. The same quantity and type of washers and same bolt length must be used on all four locations on the pitch horns.

e . A friction damp (6, figure 11-16) is installed on bellcrank (5) between the pedal assemblies. This can be adjusted by removing a cover plate under the forward fuselage below the instrument console and tightening or loosening damp nut (4). With the complete system installed and pedals at midadjustment and midtravel, check break away force by installing a spring scale perpendicular to the center of the left pedal; break away force should not exceed 5 pounds. Maximum torque on nut (4) must not exceed **15 INCH-POUNDS.**

CAUTION

If any linkage adjustments are required as a result of the test flight; the entire rigging procedure must be performed.

f. Perform test flight. If pedal forces are not balanced at normal cruise speed, continue adjustment as in step d. above until pedal forces are balanced.

g. Readjust tail rotor pedal friction as in step e. as required.

11-104. TAIL ROTOR PEDAL ASSEMBLY.

11-105. Description - Tall Rotor Pedal Assembly.

Two sets of control pedals (1, figure 11-12) mounted on the crew compartment deck are connected under the center console to a bellcrank Each pedal sat has an adjuster knob (3) for manual adjustment of pedal position according to pilots or copilots needs.

11-106. Inspection - Tall Rotor Control Pedals and Adjuster.

a. Inspect bearings and bushings in right and left pedals (1 and 4, figure 11-13) support (11), clevis (16) tuba assembly (21) bellcrank (28) and links (34) for wear and roughness.

b. Operate pedal adjuster by use of knob (10, figure 11-13) through full travel and check for corrosion and binding. Knob should turn freely.

c. Inspect pedal assembly and pedal support for nicks, scratches, and cracks. Refer to figure 11-14 for damage limits.

11-107. Removal - Tail Rotor Control Pedals and Adjuster.

a. Disconnect links (34, figure 11-13) on right and left pedals (1 and 4) by removing cotter pins (15) nuts (3) washers (2) washers (35), and bolts (36).

b. Disconnect right and left pedals (1 and 4) by removing cotter pin (12), nut (13), washers (14), and bolt (33). Lift pedals dear of support (11).

c. Disconnect tube assembly (21) from bellcrank (28) by removing cotter pin (25), nut (26), washer (27), washer (29), and bolt (30),

d. Remove support (11) from cockpit floor by removing bolts (5) and washers (6).

e. Remove bellcrank (28) from clevis (16) by removing cotter pin (19), nut (18), washers (17), and bolt (32). II required remove links (34) from bellcrank (28) by removing cotter pins (23), nuts (24), washers (22), washer (37) and bolt (38).

f. Remove pedal adjuster from support (11) by removing cotter pin (31), nut (20). washers (9) and pulling bolt (8) from knob (10). Remove washer (9) and two spring tension washer (7) from bolt (8). Remove knob (10) and clevis (16).

11-108. Installation - Tall Rotor Control Pedals and Adjuster.

a. Install pedal adjuster in support (11, figure 11-13) as follows:

(1) Install clevis (16) into forward side of support (11).

(2) Thread knob (10) onto aft side of support (11) until bottomed out and contacting clevis.

(3) Insert two spring tendon washers (7) with only outside diameters touching, and washer (9) under head of bolt (8). Insert bolt (8) with washers (7 and 9) through knob (10) and clevis (16).

(4) Install additional washer (9) and nut (20) on bolt (8) at end of clevis (16). Tighten nut (20) until all free play is removed, than tighten one additional nut castellation and install cotter pin (31). (See figure 11-13 view A-A.)

b. If filler pads in support (11) are loose or removed, bond with adhesive (C14).

c. Install bellcrank (28) on support (11) and secure with bolt (32), washers (17), nut (18), and cotter pin (19).

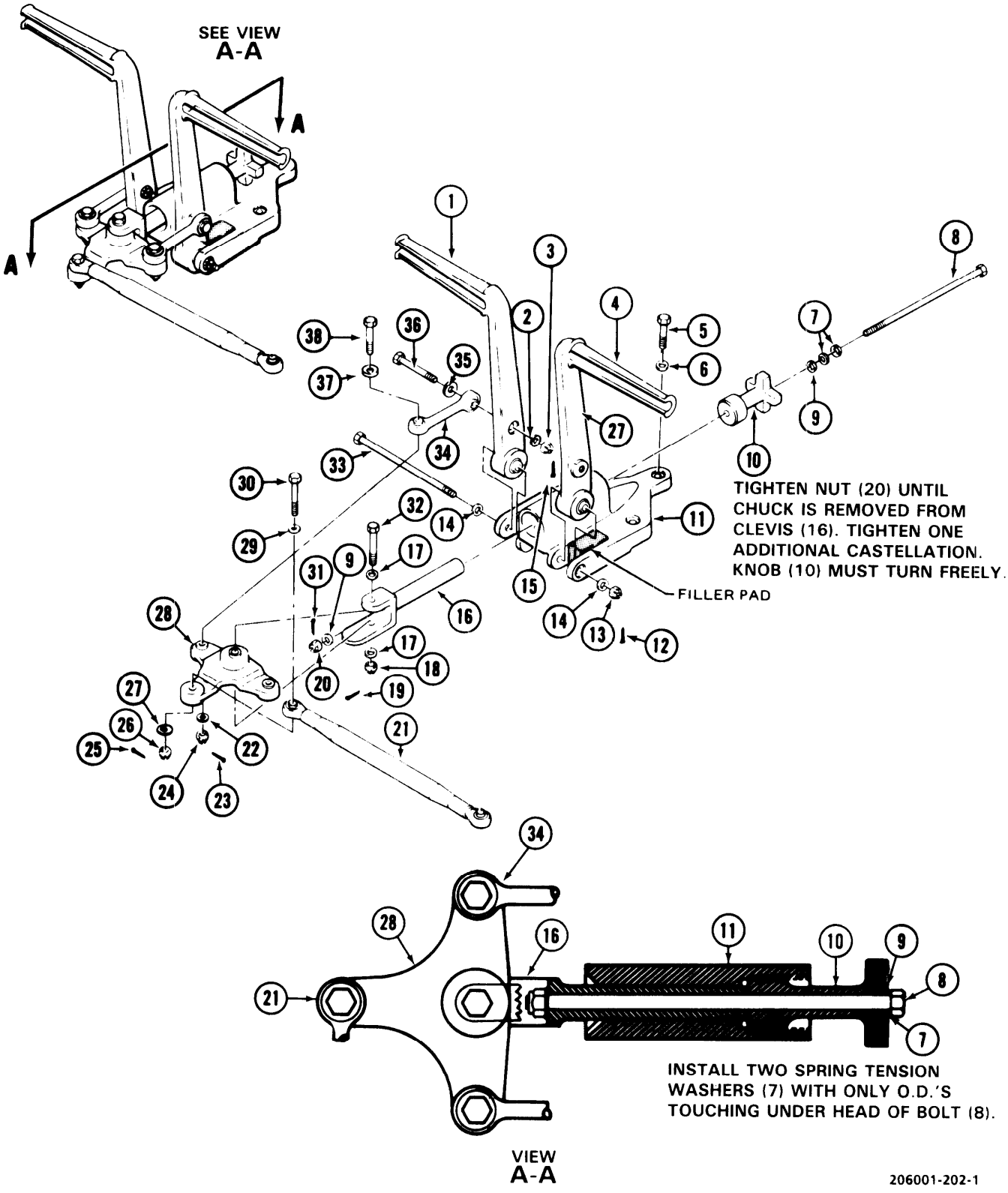
d. Install right and left pedals (1 and 4) to support (11) and secure with (33), washers (14), nut (13), and cotter pin (12).

e. Connect links (34) to bellcrank (28). Align finks to top surface of bellcrank and secure bolts (38), washers (37), washers (22), nuts (24), and cotter pins (23).

f. Connect links (24) to right and left pedals (1 and 4). Align links to pedals and secure with bolts (36) washers (35), washers (2). nut (3), and cotter pins (15),

g. Position and align assembled pedals and adjuster assembly to mounting holes in cockpit floor and secure with bolts (5) and washers (6).

h. Connect tube assembly (21) to top surface of bellcrank (28) and secure with bolt (30). washers (29), washer (27), nut (26), and cotter pin (25).



Figiure 11-13. Tail Rotor Pitch Control Pedal Installation (Sheet 1 of 2)

1. Pedal, Right
2. Washer
3. Nut
4. Pedal
5. Bolt
6. Washer
7. Washer, Spring Tension
8. Bolt
9. Washer
10. Knob
11. Support
12. Cotter Pin
13. Nut
14. Washer
15. Cotter Pin
16. Clevis, Rod End
17. Washer
18. Nut
19. Cotter Pin
20. Nut
21. Tube Assembly
22. Washer
23. Cotter Pin
24. Nut
25. Cotter Pin
26. Nut
27. Washer
28. Bellcrank
29. Washer
30. Bolt
31. Cotter Pin
32. Bolt
33. Bolt
34. Connecting Link
35. Washer
36. Bolt
37. Washer
38. Bolt

Figure 11-13. Tail Rotor Pitch Control Pedal Installation (Sheet 2 of 2)

11-109. Removal — Tail Rotor Pedal Assembly.

a. Remove bolts and washers attaching pedal assembly (1, figure 11-16) to airframe.

b. Remove bolts, nuts, and washers from pedal end of control tubes (2). Remove pedals.

11-110. Installation — Tail Rotor Pedal Assembly.

a. Position pedal assembly (1, figure 11-16) in airframe and attach with bolts, nuts, and washers.

b. Connect control tubes (2) to pedal assembly bellcrank with bolts, nuts, and washers.

11-111. TAIL ROTOR PITCH CHANGE MECHANISM.

Refer to paragrpah 5-204 for all information relevant to maintenance of the tail rotor pitch change mechanism.

11-112. BELLCRANKS, LEVERS, AND WALKING BEAMS.

11-113. Description — Bellcranks, Levers, and Walking Beams. Bellcranks, levers, and walking beams are used throughout the collective, cyclic, and tail rotor control systems. These transmit or change movement in the particular system in which they are installed.

Premaintenance Requirements for Bellcranks, Levers, and Walking Beams

Conditions	Requirements
Model	OH-58A/C
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Eddy Current Inspection Unit
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	None
References	TM 1-1520-254-23

11-114. Inspection — Bellcranks, Levers, and Walking Beams.

a. Inspect for cracks, scratches, corrosion, and damage to surfaces: If a crack is suspected, refer to TM 1-1520-254-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for OH-58 Helicopter Series.

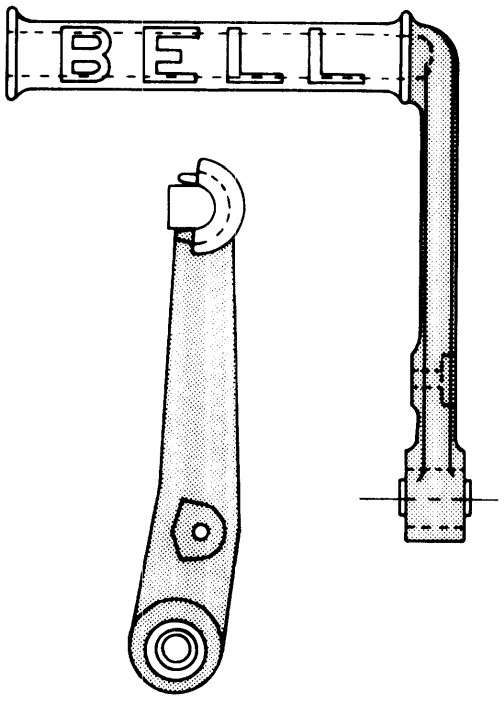
(1) Area surrounding a hole or self-aligning bearing shell within a distance of one diameter from the edge of the hole, should not have damage in excess of **0.020** inch nor corrosion in excess of **0.010** inch.

(2) Remainder of unit may not exceed **0.040** inch in damage nor **0.020** inch for corrosion.

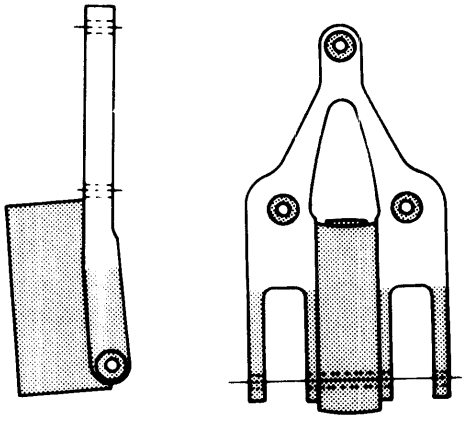
(3) Repair mechanical damage only to limits of damage and repair of corrosion. Repair may only extend to twice the corrosion limits.

b. Inspect for elongated holes and wear in contact areas. Elongation of bolt or bushing holes shall not exceed **0.005** inch.

c. Inspect bearings for axial and/or radial wear. Refer to table 11-5 for limits.



PEDAL ASSEMBLY



PEDAL SUPPORT

DAMAGE LOCATION SYMBOLS

TYPE OF DAMAGE	MAXIMUM DAMAGE AND REPAIR DEPTH	
MECHANICAL AND CORROSION	0.020 in. before and after repair	0.040 in. before and after repair
MAXIMUM AREA OF FULL DEPTH REPAIR	0.100 sq. in	0.250 sq. in.
NUMBERS OF REPAIRS	One per lug	Not critical
EDGE CHAMFER	0.030 in. x 45°	0.060 in. x 45°
BORE	0.002 in. on 1/4 of circumference: one repair per bore	

206001-203

Figure 11-14. Tail Rotor Pitch Control Pedal — Damage Limits

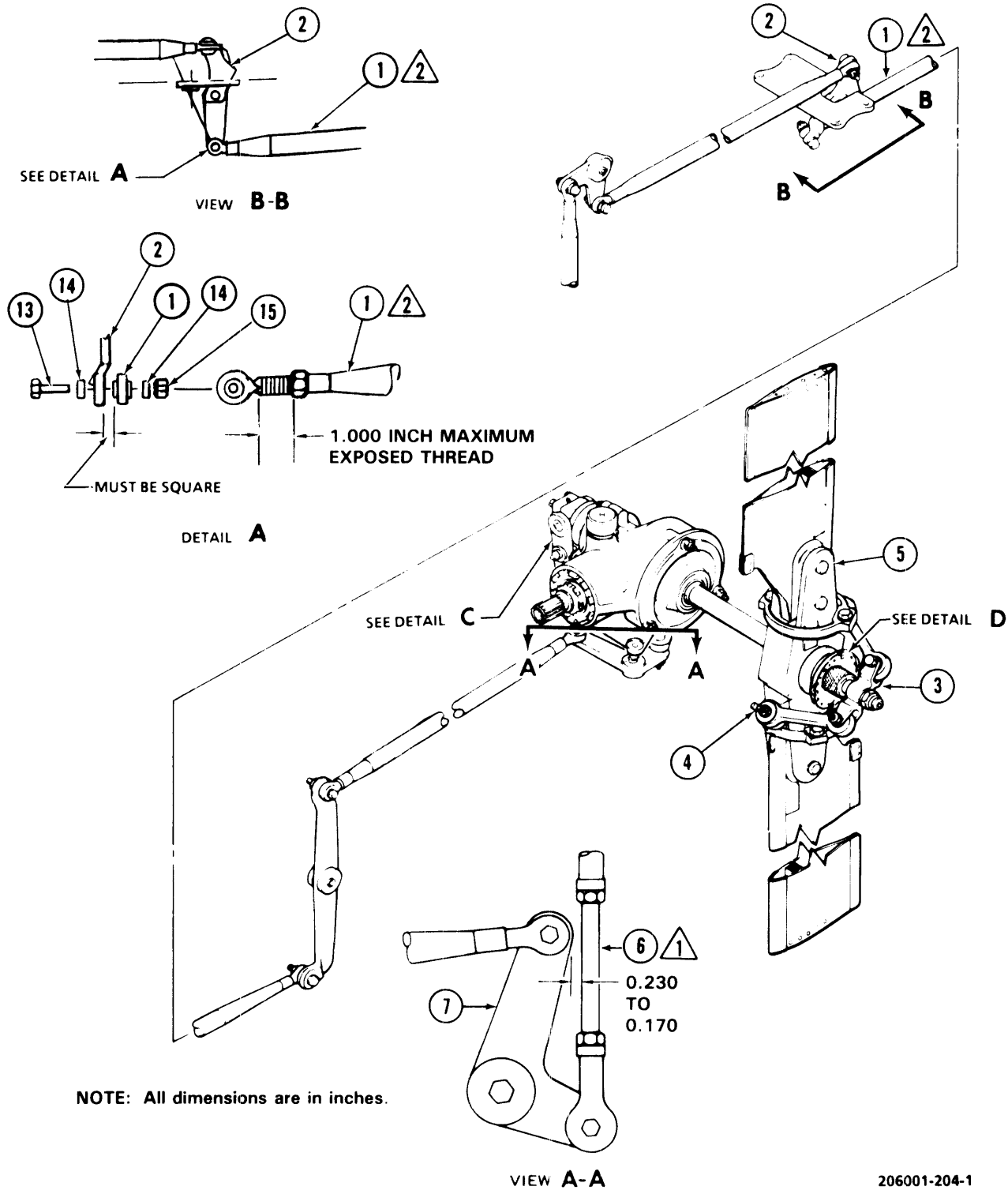


Figure 11-15. Tail Rotor Controls Rigging (Sheet 1 of 3)
(After compliance with MWO 55-1520-228-50-25)

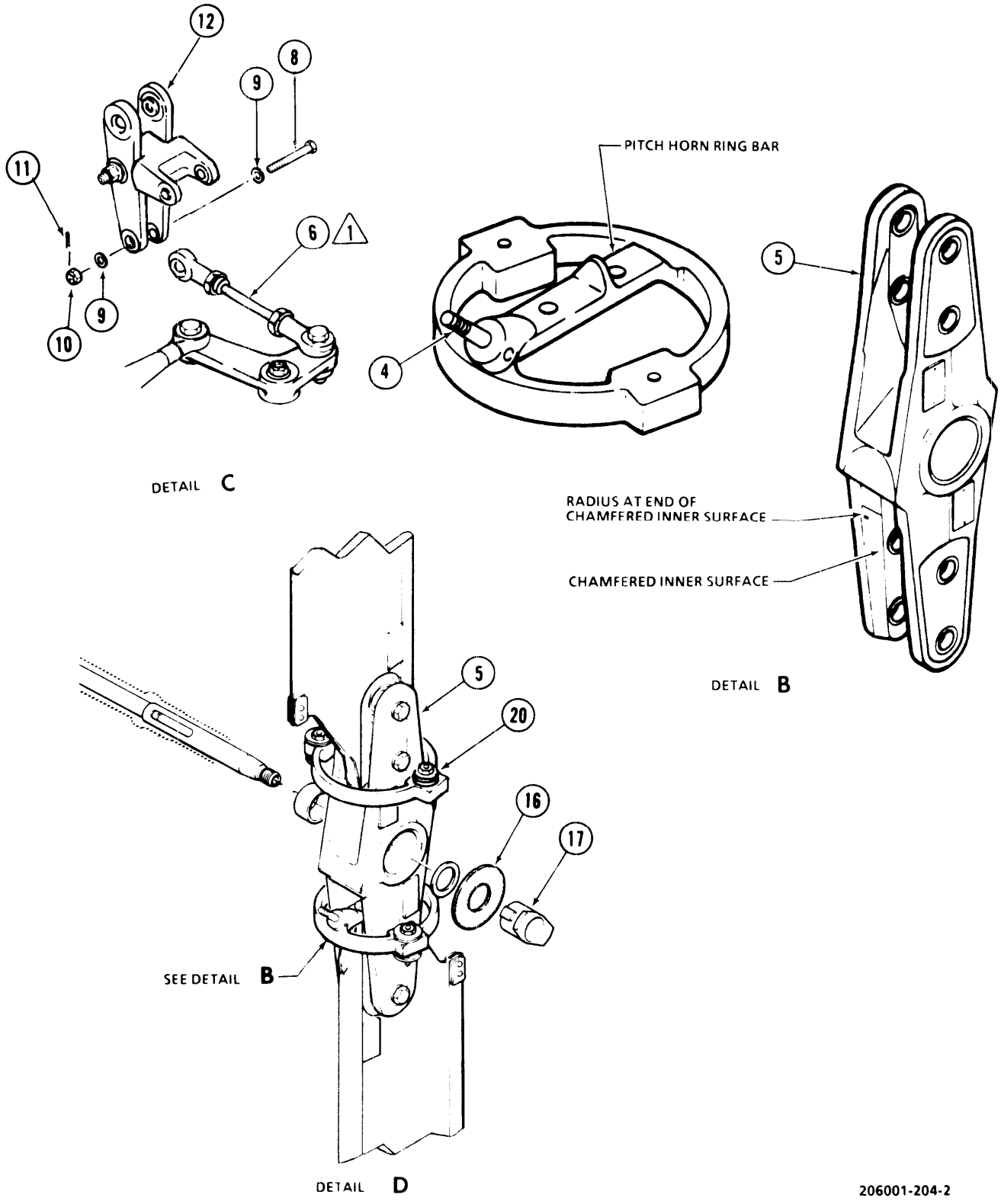
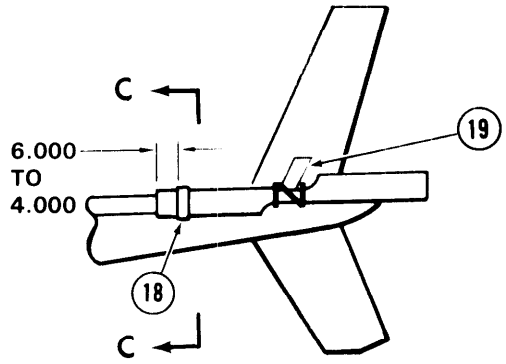
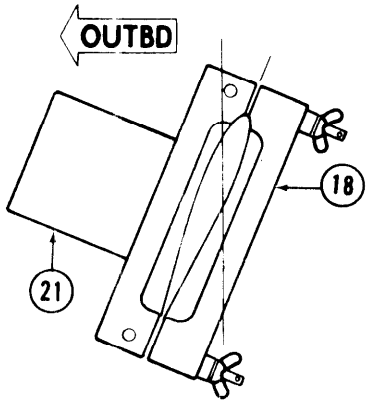


Figure 11-15. Tail Rotor Controls Rigging (Sheet 2)
(After compliance with MWO 55-1520-228-50-25)



DETAIL E



VIEW C

1. Control Tube, 206-001-096-25 ⚠2
2. Walking Beam, 206-001-735-5
3. Crosshead, Tail Rotor
4. Pitch Horn, Tail Rotor
5. Yoke, Tail Rotor
6. Rod Assembly, 206-011-725-1 ⚠1
7. Bellcrank
8. Bolt
9. Washer
10. Nut
11. Cotter Pin
12. Lever Assembly
13. Bolt
14. Washer
15. Nut
16. Bumper
17. Static (flapping) Stop
18. Tool, T101740
19. Tool, T101741
20. Balance Washers
21. Propeller Protractor

NOTES:

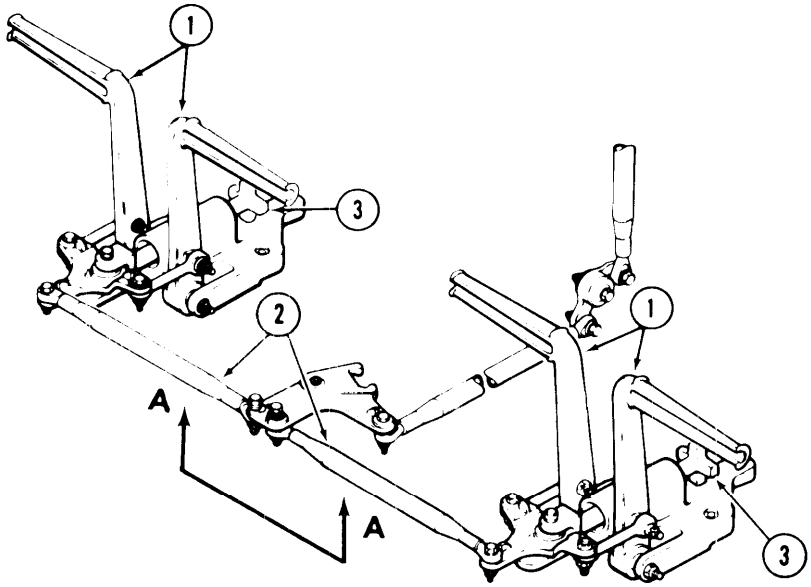
⚠1 Rod assy, 206-011-725-1, has riveted rod end on outboard side. Inboard rod end is adjustable. A "witness hole" is provided on inboard end — rod end threads must appear in "witness hole".

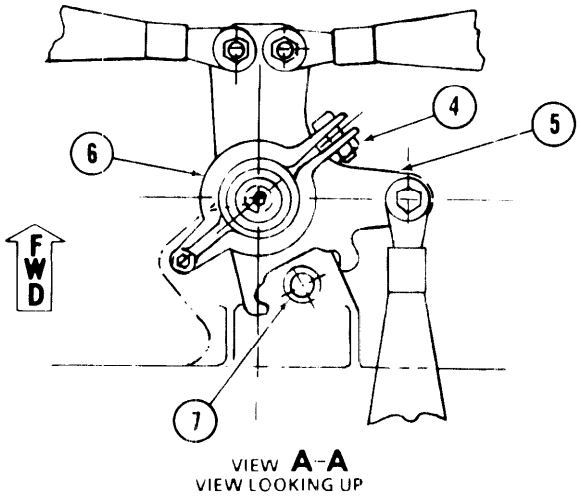
⚠2 Forward end at control tube, 206-001-096-25 is adjustable; Aft end is bonded. When adjustment is completed, apply corrosion preventive compound, (C51), to forward rod end threads.

3. All dimensions are in inches.

206001-204-3

Figure 11-15. Tail Rotor Controls Rigging (Sheet 3)
(After compliance with MWO 55-1520-228-50-25)





VIEW A-A
VIEW LOOKING UP

1. Pedal Assembly
2. Tube Assembly
3. Adjuster Knob
4. Nut, Friction Clamp
5. Bellcrank
6. Friction Clamp
7. Stop

206001-205

Figure 11-16. Tail Rotor Controls Friction Adjustment (After compliance with MWO 55-1520-228-50-25)

11-115. Removal –- Bellcranks, Levers, and Walking Beams. Unit may be removed by removing attaching bolts, washers, nuts, and cotter pins. Retain all attaching hardware for reuse or replace as necessary.

11-116. Installation — Bellcranks, Levers, and Walking Beams.

a. Position unit in proper place and attach with bolts, washers, nuts, and cotter pins as applicable,

b Actuate controls through full cycle and inspect for sufficient clearance between components

11-117. CONTROL TUBES,

11-118. Description — Control Tubes. Control tubes consist of all non-rotating tubes in the control system excluding the cyclic stick and torque tube

11-119. Inspection — Control Tubes. Minor nicks, scratches, corrosion pits, and joint wear of flight control tubes shall be classified for repair or replacement according to the following limits

a. Scratches and score marks at less than **45** degree angle to lengthwise centerline of tube shall not exceed **0.010** inch depth,

b. Scratches and score marks at more than **45** degree angle to lengthwise centerline of tube shall not exceed **0.005** inch depth.

c. Corrosion damage may be **0.005** inch depth before repair, and **0,010** inch depth after repair

d. Width of repair areas at any section shall not exceed one-third of tube circumference for **0,005** depth repair or 1/6 of tube circumference for **0.010** depth repair.

e. No thread damage is acceptable, nor damage to any surface if repair will interfere with thread engagement.

11-120. Removal — Control Tubes. Remove attaching hardware from each end of control tube and remove control tube from support assembly.

11-121. Repair or Replacement -– Control Tubes.

a. Repair minor surface damage on control tubes by polishing out nicks, scratches, or corrosion pits within specified limits. Refer to paragraph 11-119.

(1) Remove no more material than necessary to blend and repair smoothly into surrounding surface. Use fine to medium grades of abrasive paper or cloth (C45), and polish to smooth scratch-free surface with crocus cloth (C55) Do not attempt repair by use of grinding wheel.

(2) Mechanical damage (scratches or nicks) should be polished out only deep enough to remove traces of damage Corrosion should be polished out twice as deep as deepest pit

(3) Where protective surface coating is removed, apply lubricant solid film (C100) on worn surface of anodized surfaces or zinc chromate primer (C118) on other surfaces Reapplication of dry film lubricant is only required at periodic intervals

b. Replace threaded rod-ends when bearings are worn enough to allow radial or axial play beyond specified limits (table 11-5)

c. Replace any bent, dented, or distorted control tubes, and any parts having cracks or loose or missing rivets

11-122. Installation — Control Tubes. Place each end of the control tube in position on the support assembly and install the attaching hardware.

11-123. BONDED ROD ENDS AND BEARINGS.

11-124. Description — Bonded Rod Ends and Bearings. Bonded rod ends are used on non-adjustable control rods These are not removable from the control rod.

11-125. Inspection — Bonded Rod Ends and Bearings. Inspect rod ends for scored bearing surfaces, elongated holes, and positive seating in control tube. Scratches and nicks may be repaired up to **0.010** inch in depth after repair Corrosion damage of **0.005** inch in depth before repair and **0.010** inch after repair is allowable. Inspect bearings for axial and/or radial wear. Elongation of bolt or bushing

holes shall not exceed **0.005** inch. Damage on surface surrounding a hole, within distance of one diameter from edge of hole, shall not have repair exceeding **25%** of this area Refer to table 11-5 for bearing maximum allowable play.

Table 11-5. Bearings - Maximum Allowable Play

NOMENCLATURE	RADIAL	AXIAL
CONTROLS, CYCLIC		
Plain Rod End Bearings	0.012	0.030
shouldered spherical Bearings	0.012	0.030
CONTROLS, ANTI-TORQUE		
Plain Rod End Bearings	0.012	0.030
AIRFRAME, PYLON SUPPORT		
Spherical Bearings	0.008	0.010
Drag Pin Bearings	0.008	0.010
BELLCRANKS, LEVERS, AND WALKING BEAMS		
Pivot Bearings	0.005	0.030

11-126. ROLL STAKED BEARINGS.

11-127. Description - Roll Staked Bearings. Roll staked bearings allow movement of various components and are secured in place by use of a special tool.

11-128. Inspection - Roll Staked Bearings. Inspect bearing for obvious damage and freedom of movement.

NOTE

Maximum allowable wear is 0.010 Inch axial or radial unless a specific wear tolerance is stated In text.

11-129. Removal- Roll Staked Bearings (AVIM). To remove old bearing, support the assembly in an arbor press. Using a suitable sized sleeve (I.D. slightly larger than the O.D. of bearing being removed). Press bearing using sleeve slightly smaller than bearing outer race O.D.

11-130. Installation - Roll Staked Bearings (AVIM).

a. The took (T27) are two pieces each, an anvil and a spinning tool. The anvil receives the bearing inner race and supports the outer race for staking operations. The spinning tool has a pilot on the lower end which inserts into the bearing inner race, two roller wheels which contact the groove in the bearing outer race and a shank which mounts in a drill press.

NOTE

When Installing a new bearing, cost outer surface with zinc chromate primer (C118).

b. Press new bearing into assembly using anvil.

c. To stake or restake a bearing, center bearing (assembly) on drill press with bearing supported on drill.

d. With drill press turning at **250 to 350** rpm, apply sufficient hand pressure to drill press feed in 10 second increments so roller wheels of the spinning tool roll without interruption around pregrooved bearing outer races. After each 10 second increment, inspect for correct displacement of outer race metal into hole chamfer of parent assembly.

e. Turn assembly over and repeat step d. on other side of bearing.

f. The breakout or misalignment torque on 206-010-469-1 and 206-001-053-5 beatings should be checked after installation. An accurate check of this torque can be made by installing a bolt and nut on the bearing inner race and rotating the race with a torque wrench. If the torque reading k excessive, the bearing may be burnished by spinning at **60 to 100** rpm for **one, to two** minute periods until satisfactory torque reading is obtained. Do not allow assembly to overheat (the staked area is not uncomfortable to touch due to heat). Satisfactory torque readings are **10 INCH-POUNDS** maximum for the 206-010-469-1 bearing and **4 to 24 INCH-POUNDS** for the 206-001-053-5 bearing.

Paragraphs 11-131 through 11-144 (pages 11-55 through 11-83) have been deleted including all figures

CHAPTER 12

UTILITY SYSTEM

12-1. ENGINE ANTI-ICING SYSTEM.

12-2. Description — Engine Anti-Icing System, The engine anti-icing system provides distribution of heated air to prevent engine icing and is comprised of; The ENG DE-ICE switch (S8), the engine de-ice control (64), and is protected by a 5 ampere ENG DE-ICE circuit breaker. Refer to figure 4-10 and F-10.

12-3. Testing — Engine Anti-Icing System.

a. Close ENG DE-ICE circuit breaker. Set ENG DE-ICE switch (S8) to DE-ICE. Check that the de-ice valve actuator arm moves aft, opening the de-ice valve.

b. Place ENG DE-ICE switch (S8) to OFF Check that the de-ice valve actuator arm moves forward closing the de-ice valve. Replace if actuator fails to operate Refer to paragraph 4-49.

NOTE

For maintenance of engine de-ice actuator refer 'to paragraph 4-49.

12-4. Troubleshooting — Engine Anti-Icing System. Refer to figure F-10 and table 12-1.

12-5. CONNECTING LINK ASSEMBLY.

12-6. Description — Connecting Link Assembly. The connecting link (7, figure 4-10) is a rigid assembly. It provides a mechanical means, through levers, to open and close the anti-icing valve when the anti-icing control actuator is operated. Refer to figure 4-10.

12-7. Inspection — Connecting Link Assembly. Inspect for cracks, wear, evidence of corrosion, and security.

NOTE

Before using table 12-1, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 12-1, notify the next higher level of maintenance.

Table 12-1. Troubleshooting — Engine Anti-Ice System

CONDITION TEST OR INSPECTION	CORRECTIVE ACTION
1. Actuation of ENG DE-ICE toggle switch fails to operate control.	
STEP 1 Check for defective or open circuit breaker in engine de-ice control circuit	**Close circuit breaker if open and/or replace circuit breaker, if defective.**
STEP 2. Check for defective ENG DE-ICE toggle switch	**Replace ENG DE-ICE toggle switch, if defective.**
STEP 3. Check for loose connections or faulty wiring.	**Tighten connections and/or replace faulty wiring**

Table 12-1. Troubleshooting — Engine Anti-Ice System (Cont)

CONDITION TEST OR INSPECTION **CORRECTIVE ACTION**
STEP 4. Check for defective de-ice control. **Replace de-ice control if defective.**
2. De-ice control operates in reverse order.
STEP 1. Check for reversed wiring between switch and control **Refer to wiring diagram F-10, and correct as necessary.**
3. Circuit breaker trips.
STEP 1. Check for shorted wiring **Repair wiring as necessary.**
STEP 2. Check for shorted control. **Replace control if shorted.**

12-8. Removal — Connecting Link Assembly. Refer to paragraph 4-52, steps c. and d.

12-9. Repair/Replacement — Connecting Link Assembly. Repair is limited to removal and replacement of authorized parts as outlined in TM 55-1520-228-23P.

12-10. Installation and Rigging — Connecting Link Assembly. Refer to paragraph 4-53.

12-11. ANTI-ICING LEVER.

12-12. Description — Anti-Icing Lever The anti-icing lever (16, figure 4-10) attached to the anti-icing valve is a component part of the mechanical linkage to open and close the anti-icing valve when the anti-icing control actuator is operated

NOTE

For maintenance of anti-icing valve, refer to TM 55-2840-231-23 A TM 55-2840-241-23 C

12.13. Inspection — Anti-Icing Lever. Inspect lever for cracks, wear, evidence of corrosion, and security.

12-14. Removal — Anti-Icing Lever. Refer to paragraph 4-52 and TM 55-2840-231-23 A ,TM 55-2840-241-23 C .

12-15. Repair/Replacement — Anti-Icing Lever. Repair is limited to removal and replacement of authorized parts as outlined in TM 55-1520-228-23P.

12-16. Installation — Anti-Icing Lever. Refer to paragraph 4-53 and TM 55-2840-231-23 A ,TM 55-2840-241-23 C .

CHAPTER 13
ENVIRONMENTAL CONTROL SYSTEM
SECTION I. HEATING AND VENTILATING SYSTEM

13-1. HEATING AND VENTILATING SYSTEM.

13-2. Description -- Heating and Ventilating System. The bleed air heating system and the ventilating and defogging system (figures 13-1 through 13-4) are interconnected with ducts. The bleed air heater is Installed in the equipment compartment aft of the passenger seats. Ii consists of a bleed air mixing valve, remote temperature sensor with manual control, connecting ducts and tubing The bleed air system is turned on or off by a solenoid valve which is actuated by a circuit breaker switch in the overhead console. When the heater switch is in the on position, air from the engine compressor section passes through the bleed air nozzle Aventur working in conjunction with the bleed air nozzle draws in outside air through the outside air vent Bleed air and outside air are fed into the mixing valve where a sensor determines the mixing ratio to produce the desired temperature The force of the bleed air forces healed air through the duct system to air distribution valves under the seat and/or to defroster nozzles under windshields Temperature is regulated by a manual control knob and flexible cable connected to a remote sensor in the heate compartment. The variable sensor has a bimetallic element which regulates the mixing valve. The ventilating and defogging system IS installed in the nose and consists of a ram air intake, two blower fans defroster nozzles, and ducts. The bleed air system is also connected to the ventilating anti defogging system. Outside air flow to the cabin and defogging nozzles is controlled by manual push-pull type controls located below the instrument panel. The blowers direct air to the defogging nozzles and are controlled by an ON-OFF switch in the overhead console.

13-3. Inspection -- Heating and Ventilating System.

a. Check heater ducts for cracks, fraying, and **wear.**

b. Check clamps for security and condition.

c. Check defroster nozzles and under seat air distribution valves for cleanliness and freedom from obstructions.

d. Check manual control push-pull levers below instrument panel for operation and freedom of movement. Check manually controlled heat selector switch on center column for operation and freedom of movement.

e. Check electrical connections on all switches and connectors for security.

f. Check remote sensor (7) for security of attachment. Refer to figure 13-1 **A** or 13-2 **C**.

g Functional test bleed air mixing valve while installed on helicopter by changing temperature sensor setting from low to high and back to low. Valve should move back and forth.

h. Check solenoid on mixing valve for operation while installed on helicopter.

i, Check bleed air tube and remote sensor tube for security.

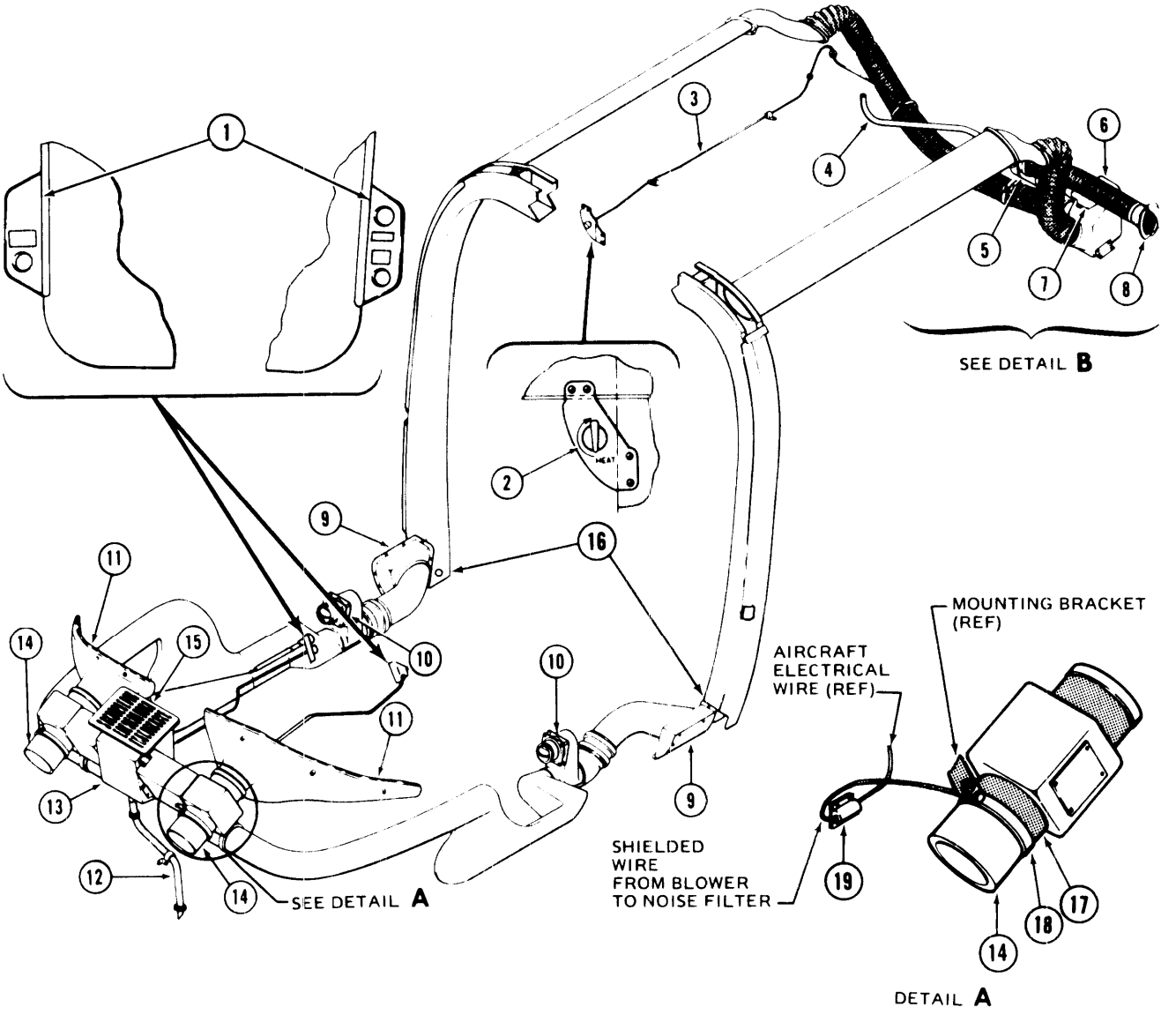
j Check blower fans for operation and security of attachment.

k. Check plenums for damage and security of mounting.

13-4. Troubleshooting — Heating and Ventilating System. Troubleshoot heating and ventilating system in accordance with table 13-1.

NOTE

Before using table 13-1, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 13-7, notify the next higher level of maintenance.



1. Vent and Defog Control
2. Heat Control
3. Heat Control Cable
4. Bleed Air Tube
5. Mixing Valve
6. Plenum
7. Remote Sensor
8. Fresh Air Inlet
9. Post Plenum
10. Air Distribution Valves
11. Windshield Defog Nozzle
12. Plenum Drain
13. Plenum Valve Assembly
14. Ventilating and Defogging Blower
15. Ram Air Intake Grill
16. Air Distribution Vents Cargo/Passenger Area
17. Coupling
18. Clamp
19. Noise Filter
20. Tube

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Figure 13-1. Heating and Ventilating System (Sheet 1 of 2) A

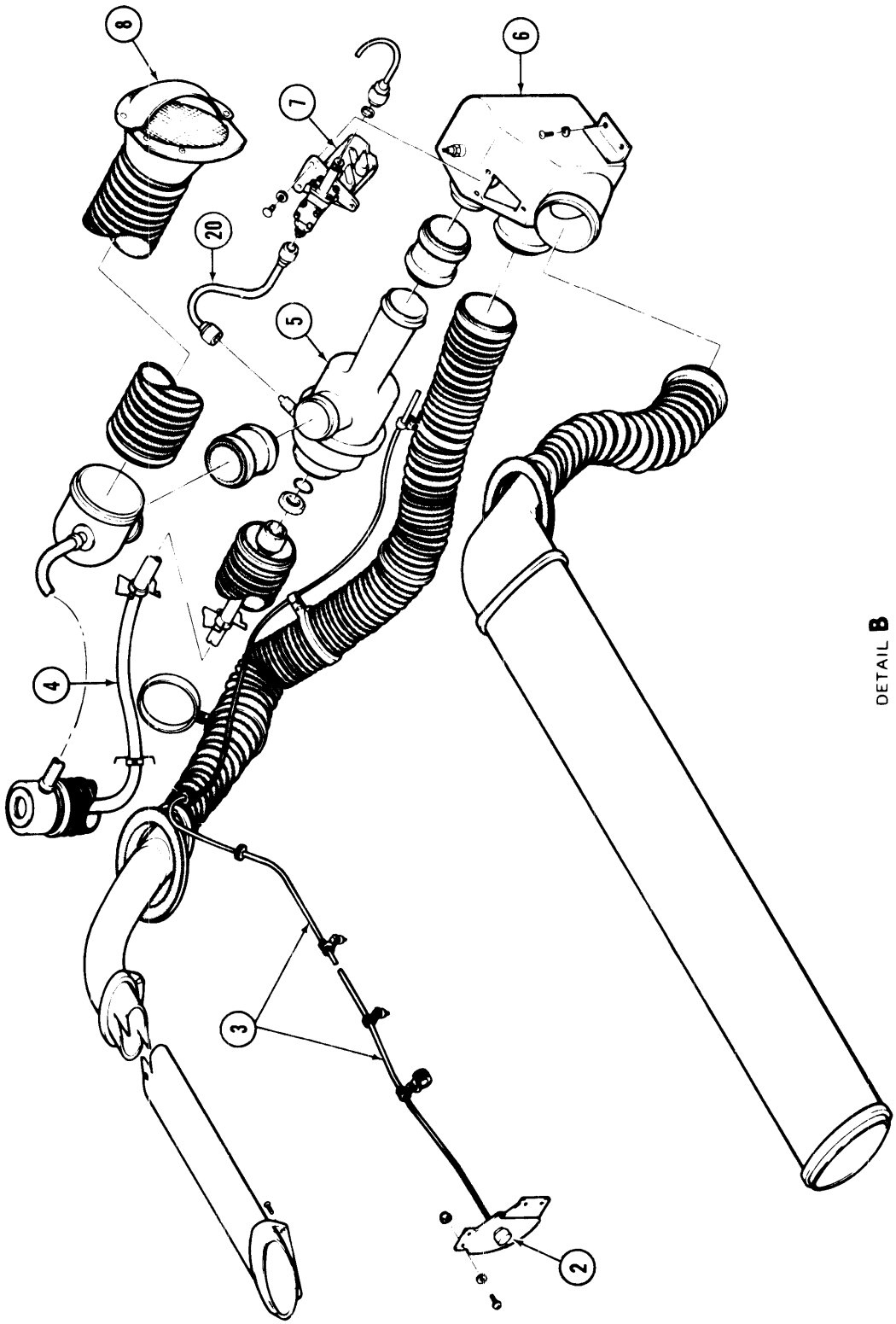
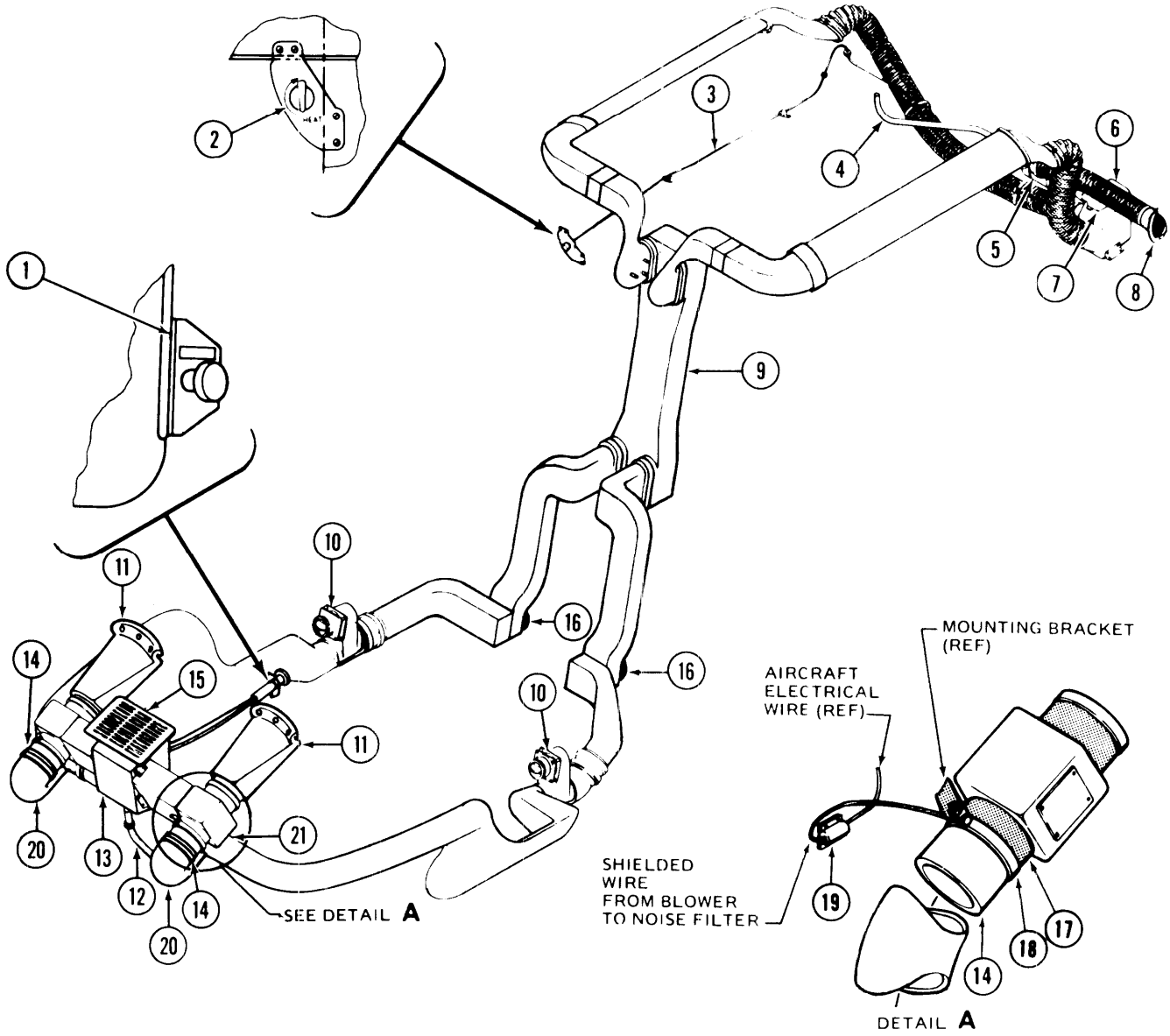


Figure 13-1. Heating and Ventilating System (Sheet 2) A



1. Vent Control
2. Heat Control
3. Heat Control Cable
4. Bleed Air Tube
5. Mixing Valve
6. Plenum
7. Remote Sensor
8. Fresh Air Inlet
9. Center Post Duct
10. Air Distribution Valves
11. Windshield Defog Nozzle
12. Plenum Drain
13. Plenum Valve Assembly
14. Ventilating and Defogging Blower
15. Ram Air Intake Grill
16. Air Distribution Valves Cargo/Passenger Area
17. Coupling
18. Clamp
19. Noise Filter
20. Blower Inlet Duct
21. Tee Valve

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Figure 13-2. Heating and Ventilating System (Sheet 1 of 2) C

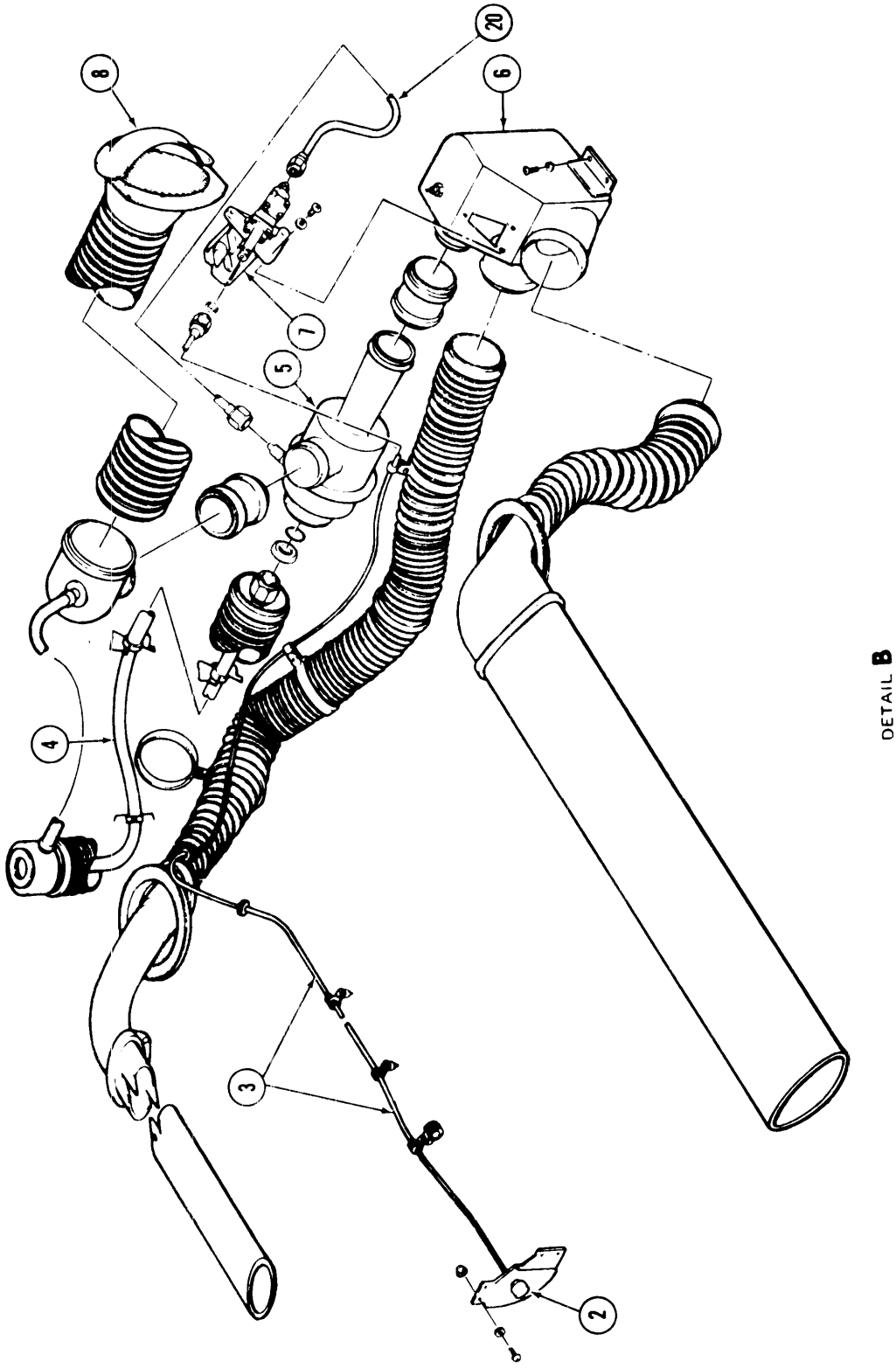


Figure 13-2. Heating and Ventilating System (Sheet 2) C

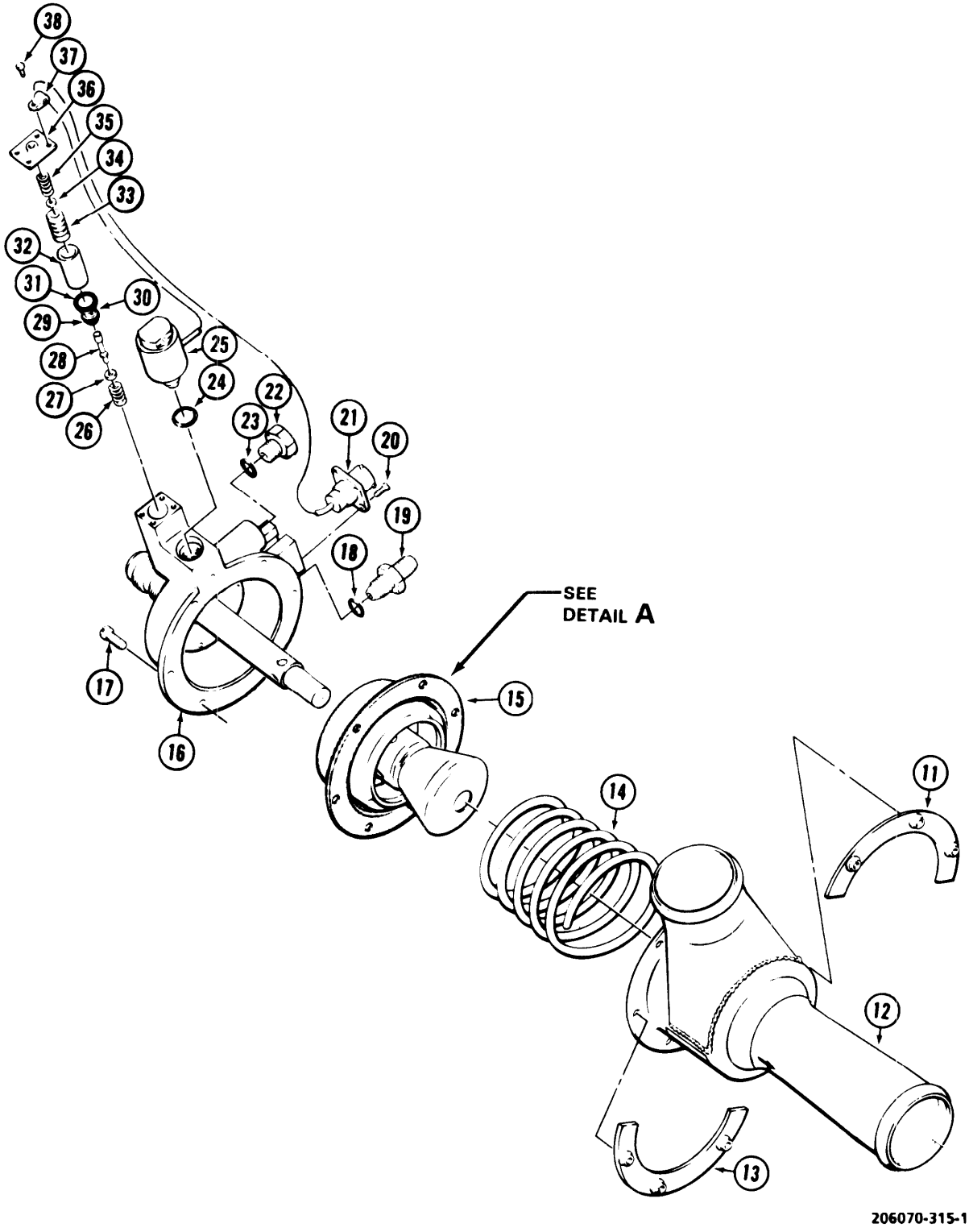
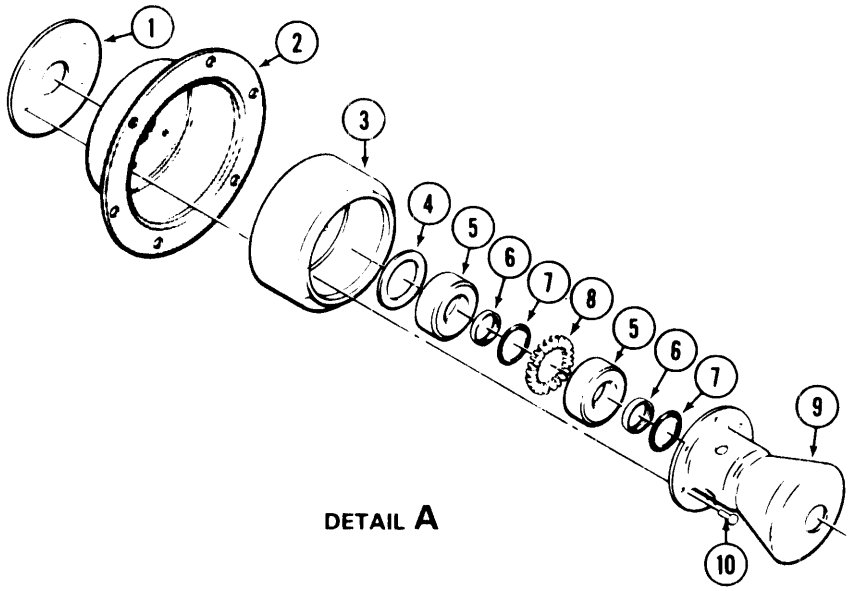


Figure 13-3. Bleed Air Valve Assembly — Bleed Air Heater (Sheet 1 of 2)



1. Plate
2. Diaphragm
3. Cup
4. Shim
5. Bushing
6. Seal Retainer
7. Packing
8. Spacer
9. Valve
10. Rivet
11. Ring Half
12. Housing
13. Ring Half
14. Spring
15. Diaphragm Assembly
16. Control Valve
17. Screw
18. Packing
19. Fitting, Nipple
20. Screw
21. Connector, Electrical
22. Fitting, Plug
23. Packing
24. Packing
25. Solenoid
26. Spring
27. Washer
28. Stem
29. Packing
30. Seat
31. Packing
32. Spacer
33. Piston
34. Shim
35. Spring
36. Plate
37. Clamp
38. Screw

206070-315-2

Figure 13-3. Bleed Air Valve Assembly — Bleed Air Heater (Sheet 2)

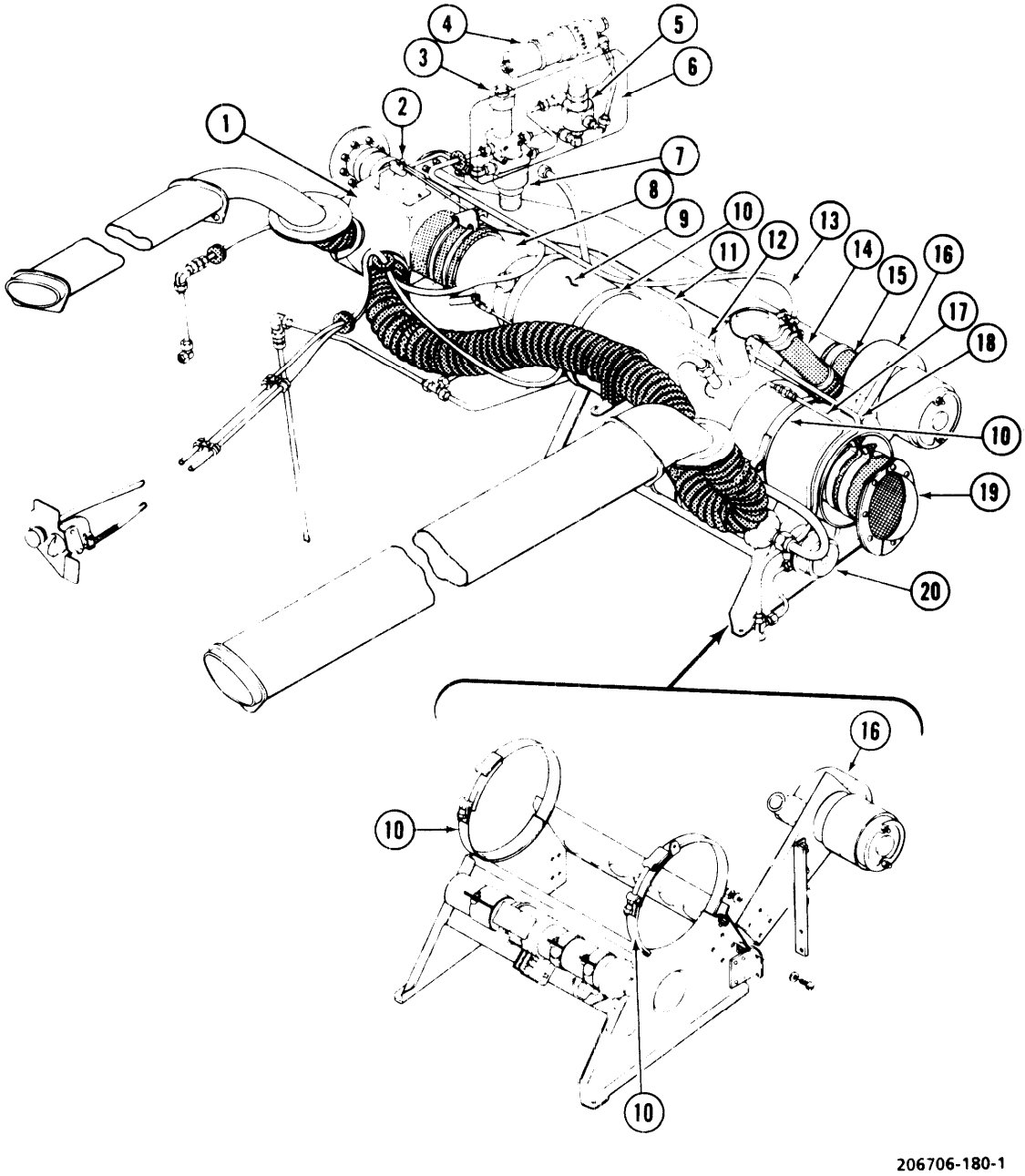


Figure 13-4. Combustion Heater System (Sheet 1 of 2)

1. Combustion Heater Plenum
2. Temperature Control Cable
3. Fuel Shutoff Valve
4. Fuel Pump
5. Fuel Pressure Relief Valve
6. Mounting Plate
7. Fuel Filter
8. Firewall Shutoff Valve Assembly
9. Heater
10. Clamp
11. Exhaust
12. Terminal Board
13. Fuel Inlet Line
14. Duct
15. Duct
16. Combustion Blower
17. Pneumatic Line
18. Pneumatic Line
19. Air Scoop
20. Combustion Air Pressure Switch
21. Igniter Plug
22. Clamp
23. Duct
24. Fuel Drain Line
25. Heat Control Cable
26. Clamp
27. Coupling
28. Duct
29. Clamp
30. Firewall Shut-Off Control
31. Temperature Control
32. Clamp
33. Nut
34. Washer
35. Combustion Blower Brace
36. Screw
37. Vent Blower Assembly
38. Combustion Heater Support Bracket
39. Relay
40. Relay
41. Ignition Assembly

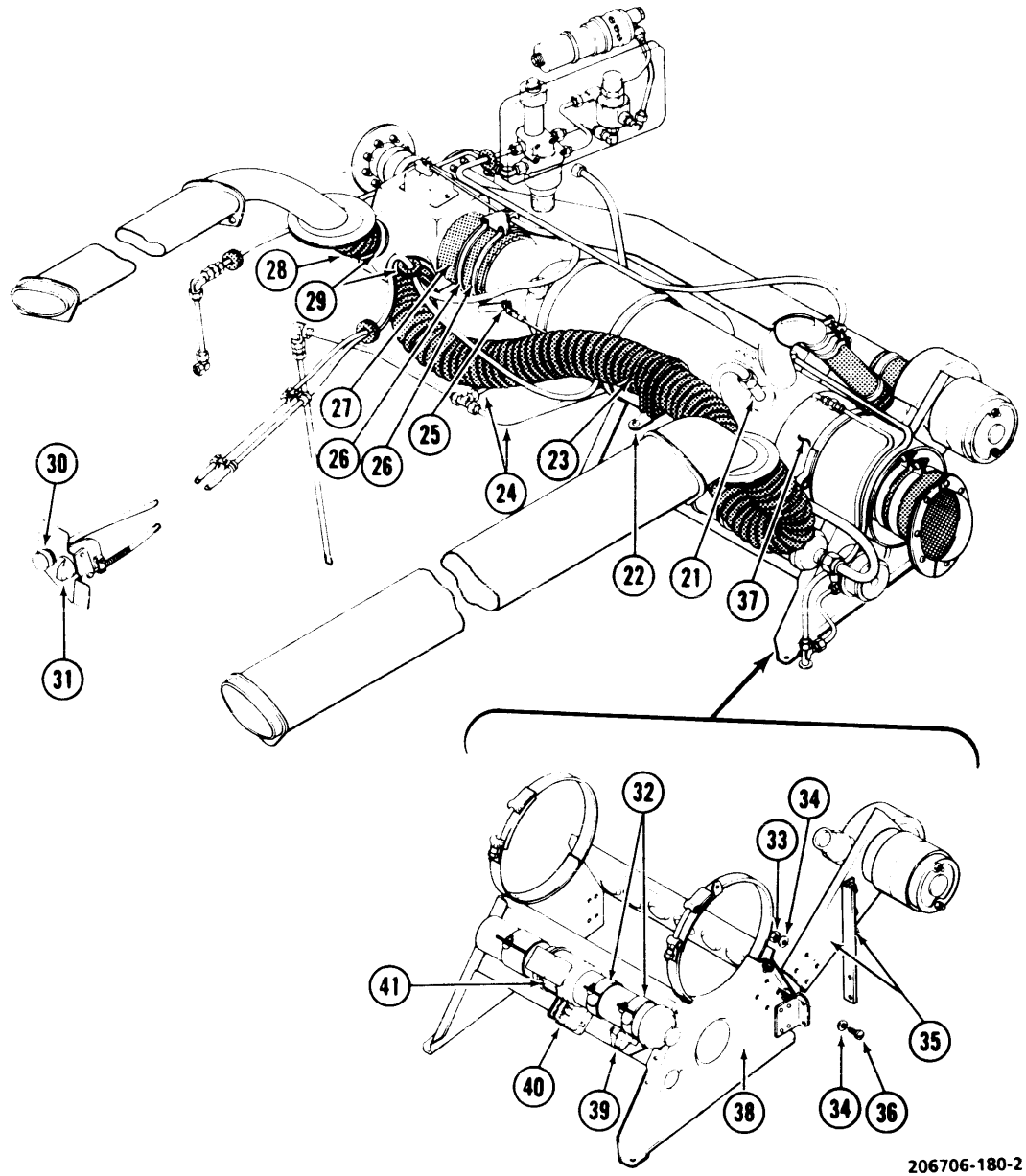


Figure 13-4. Combustion Heater System (Sheet 2)

Table 13-1. Troubleshooting — Heating and Ventilating System

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
1. No heated air.	STEP 1. Check for defective heat switch.	**Replace heat switch if defective.**
	STEP 2. Check position of temperature selection switch	**If set at lowest position, turn knob clockwise to increase temperature.**
	STEP 3. Check to ensure bleed air line IS connected	**If not connected, connect line.**
	STEP 4. Check for defective solenoid on mixing valve electrical lead not connected, or dirty solenoid plunger.	**Replace solenoid, connect lead, or clean plunger using MEK (C107). Refer to paragraphs 13-7, 13-8, and 13-9.**
	STEP 5. Check to ensure remote sensor is operative and control cable is connected. Refer to paragraph 13-16.	**Replace remote sensor if inoperative or connect control cable. Refer to paragraphs 13-15 and 13-17.**
2. Restricted warm air supply.	STEP 1. Check for leaks or obstruction in ducts. Refer to paragraph 13-32.	**Repair or replace ducts or remove obstructions. Refer to paragraph 13-37.**
	STEP 2. Check mixing valve for malfunction.	**Replace valve. Refer to paragraph 13-12.**
	STEP 3. Check setting of heat outlet valve.	**Adjust valve if improperly set.**
3. Outlet temperature too high.	STEP 1. Check position of temperature selection switch	**If set too high, turn knob counterclockwise to decrease temperature.**

Table 13-1. Troubleshooting – Heating and Ventilating System (Cont)

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
	STEP 2. Check for inoperative remote sensor or mixing valve.	**Replace valve or sensor if inoperative. Refer to paragraphs 13-10 and 13-17.**
4. Heater cycles from hot to no heat and back to hot		
	STEP 1. Check for malfunction in remote sensor Refer to paragraph 13-16.	**Replace remote sensor if malfunctioning, Refer to paragraph 13-17.**
	STEP 2. Check mixing valve for malfunction. Refer to paragraph 13-5.	**Replace valve, if malfunctioning. Refer to paragraphs 13-7 and 13-12.**

13-5. AIR MIXING VALVE.

13-6. Description -– Air Mixing Valve. Bleed air and outside air are fed into the mixing valve where a sensor determines the mixing ratio to produce the desired temperature.

13-7. Removal — Air Mixing Valve.

a. Remove access cover in aft cabin above passenger seats to gain access to mix ng valve

b. Disconnect ambient air duct and coupling including outlet end support clamp, connecting air mixing valve (5, figure 13-1) to plenum (6).

c. Disconnect shroud at mixing valve end

d. Disconnect bleed air tube (4), electrical connector, and sense port tube, and remove mounting nut; remove air mixing valve.

13-8. Disassembly – Air Mixing Valve (AVIM).

CAUTION

Diaphragm assembly is spring loaded. Exercise caution when removing screws (17, figure 13-3).

NOTE

Tag or identify parts to aid in reassembly.

a. Remove six screws (17 figure 13-3) and disengage ring halves (11 and 13), housing (12), spring (14), diaphragm assembly (15), and control valve (16).

CAUTION

Plate (36) is spring loaded. Exercise caution when removing screws (38).

b. Remove four screws (38) that attach plate (36) to control valve (16). Remove clamp (37).

c. Remove plate (36), spring (35), shim (34), piston (33), spacer (32), packing (31), seat (30), packing (29), stem (28), washer (27), and spring (26).

d. Remove plug fitting (22) and packing (23).

e. Remove nipple fitting (19) and packing (18).

f. Remove four screws (20) from electrical connector (21). Disconnect electrical lead and remove connector (21).

g. Remove solenoid (25) and packing (24) from control valve (16).

h. Disassemble diaphragm assembly (15) as follows:

(1) Remove six rivets (10) and remove plate (1), diaphragm (2), and cup (3) from valve (9).

(2) Remove shim (4), bushings (5), seal retainers (6), packings (7), and spacer (8) from valve (9).

13-9. Inspection – Air Mixing Valve (AVIM).

a. Inspect all parts for damage, corrosion, and serviceability.

b. Inspect all orifices and ports for blockage and corrosion.

c. Inspect diaphragm for rips, tears, cracks, and serviceability.

d. Inspect housing for dents, breaks and deformation.

e. Inspect for broken springs.

13-10. Repair or Replacement — Air Mixing Valve (AVIM). Repair is limited to replacement of parts not meeting inspection requirements.

13-11. Reassembly – Air Mixing Valve (AVIM).

NOTE

Replace all packings and seal retainers upon reassembly and ensure all parts are clean.

a. Reassemble diaphragm assembly (15, figure 13-3) as follows:

(1) Install packing (7) and seal retainers (6} in bushings (5).

(2) Install bushings (5), spacer (8), and shim (4) in valve (9). Spacer (8) separates bushings (5)

(3) Assemble valve (9), cup (3), diaphragm (2), and plate (1) and secure together with six rivets (10).

b. Install solenoid (25) and packing (24) to control valve (16).

c. Connect electrical lead to connector (21) and install connector with four screws (20).

d. Install nipple fitting (19) and packing (18).

e. Install plug fitting (22) and packing (23).

f. Apply dry lubricant (C99) to I.D. of spacer (32). Pass piston (33) through spacer (32) several times. Remove excess lubricant.

g. install packing (29 and 31) on seat (30) and install spring (26), washers (27), stem (28), seat (30), spacer (32), piston (33), shim (34), and spring (35) in control valve (16)

h. Position clamp (37) on electrical lead. Install clamp and plate (36) with four screws (38).

i. Lubricate stem of nozzle on control valve 16) with dry Iubricant (C99). Rub in and wipe off excess lubricant,

j. Install diaphragm assembly (15) on control valve (16). Position spring (14) and housing (12) on diaphragm assembly. Compress spring, exercising caution to preclude cutting or deforming diaphragm, and secure housing (12) to control valve (16) with six screws (17) and ring halves (11 and 13).

13-12. Installation --- Air Mixing Valve.

a. Position air mixing valve (5, figure 13-1) on plenum intake and install coupling,

b. Install bleed air tube

c. Install electrical connector and connect tube to sense port,

d. Install ambient air duct,

13-13. REMOTE SENSOR.

13-14. Description — Remote Sensor. The variable remote sensor located in the heater compartment has a bimetallic element which regulates the mixing valve. Temperature is regulated by a manual control knob and flexible cable connected to the remote sensor.

13-15. Removal - Remote Sensor.

a. Disconnect control cable (3. figure 13-1 A or 13-2 C) and tube from remote sensor (7, figure 13-2).

b. Remove screws and washers securing sensor to plenum (6) and remove sensor.

13-16. Inspection - Remote Sensor. Inspect remote sensor for cracks, breaks, and faulty operation.

13-17. Repair or Replacement - Remote Sensor. Repair is limited to replacement of parts not meeting inspection requirement.

13-18. Installation - Remote Sensor.

a. Position sensor on plenum and secure with three screws and washers.

b. Connect control cable (3, figure 13-2) one washer, and tube.

13-19. BLEED AIR HEATER PLENUM.

13-20. Description - Bleed Air Heater Plenum. The bleed air heater plenum is located in the area aft of the passenger seats. The plenum contains space for mixing of bleed air and outside air prior to distribution and is the primary point for attachment of the ducts and the mxing valve and sensor.

13-21. Inspection - Bleed Air Heater Plenum. Inspect plenum for cracks, breaks, or corrosion.

13-22. Removal - Bleed Air Heater Plenum.

a. Remove remote sensor (7, figure 13-1). Refer to paragraph 13-15.

b. Remove coupling connecting air mixing valve (5) to bleed air heater plenum (6) and remove sensing tube.

c. Remove damps and remove outlet ducts from plenum.

d. Remove four screws and washers and remove plenum.

13-23. Repair - Bleed Air Heater Plenum. Replace plenum if cracked or broken. Refer to TM 1-1500-204-23.

13-24. Installation - Bleed Air Heater Plenum.

a. Position plenum over mounting holes and install four screws and washers.

b. Install coupling connecting plenum to air nixing valve.

c. Install remote sensor. Refer to paragraph 13-18.

d. Install outlet ducts and damps.

13-24.1. OVERHEAT SWITCH.

13-24.2. Description - Overheat switch. The overheat switch is temperature sensitive and serves to actuate the overheat relay, thus turning heater off should an overheat condition occur.

13-24.3. Removal - Overheat Switch.

a. Disconnect electrical connector.

b. Remove switch.

13-24.4. Inspection - Overheat Switch.

a. Visually inspect switch for loose wires, corrosion and any damage to case that could impair normal operation.

b. Inspect for proper switch actuation points as follows:

(1) To verify that switch contacts dose at 260°F ± 6°F, submerge switch up to the threaded portion of the sensor probe in a well agitated high NSN 9150-00-180-6266. See figure 13-4.1 for a suggested set-up. Heat container on and electrical hot plate, such as PN W-H-636, NSN 7310-00-782-0005 or other suitable heat source. Use a currently calibrated thermometer such as PN 21302, NSN 6685-00-566-8666. Slowly increase temperature of the liquid no more than 3° par minute when approaching the switch trip point to ensure stabilization.

(2) Allow switch to cool and verify that switch contacts open at 225°F ± 8° F.

13-24.5. Replacement Overheat Switch. Replace switch if it fails to meet inspection requirements.

a Replace switch.

b. Connect electrical leads.

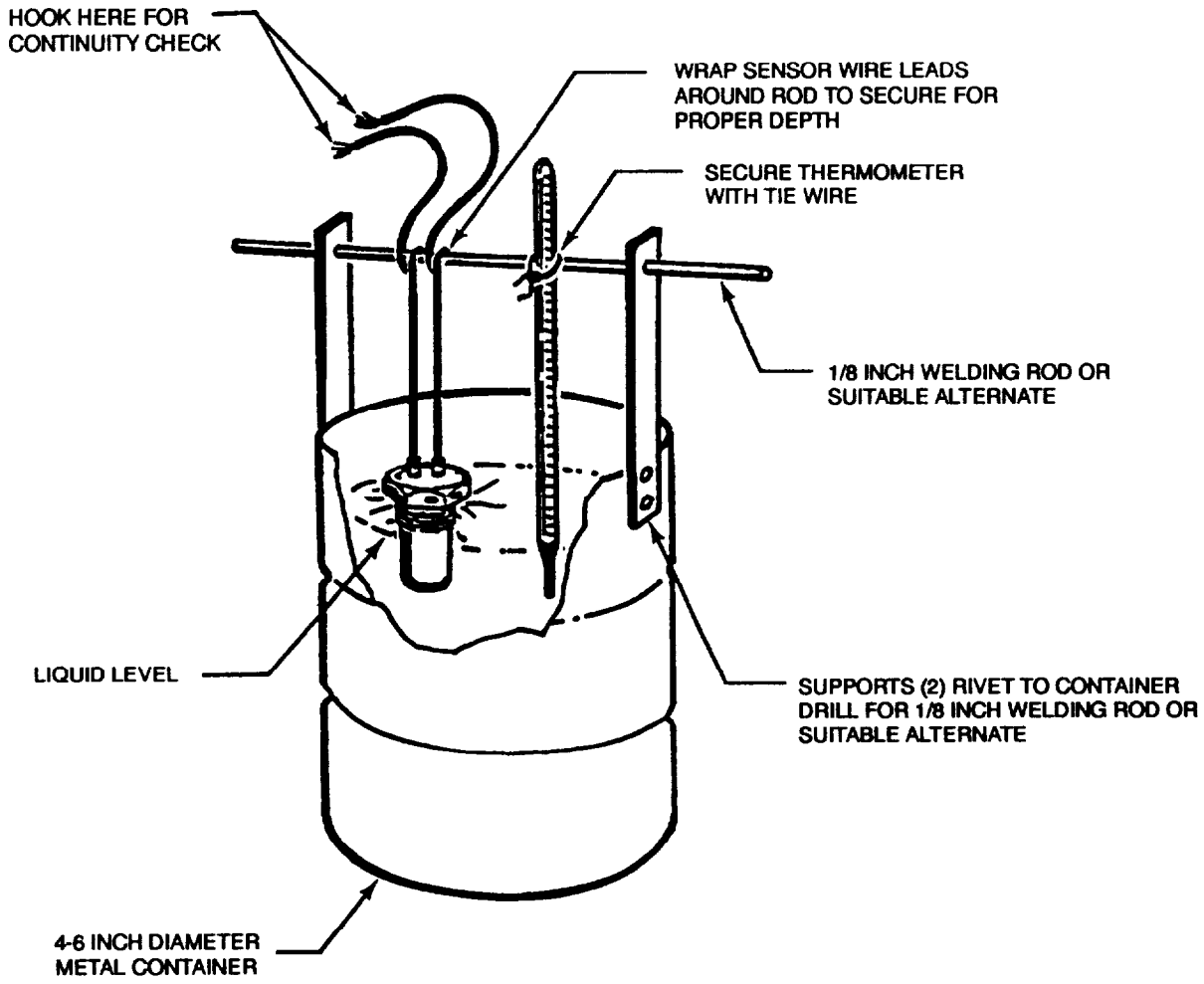


Figure 13-4.1 Setup for Heat Sensor Test

13-25. VENTILATING AND DEFOGGING BLOWER.

13-26. Description - Ventilating and Defogging Blower A. The ventilating and defogging blower (14, figure 13-1) is partially inserted in the forward coupling (17) connected to the windshield defogging nozzle (11). A damp (18) attaches the blower to coupling and to helicopter structure. A single shielded wire is connected to a noise filter (19) which attaches to the helicopter structure. Electrical ground for the blower motor is furnished by way of shield on wire to noise filter case to helicopter structure.

13-27. Description - Ventilating and Defogging Blower C. The ventilating and defogging blower (14, figure 13-2) is inserted between the blower inlet duct (20) and coupling (17). Coupling damp (18) is attached to helicopter structure by a mounting bracket A shielded wire is connected to a noise filter (19) on the console structure. Electrical ground far the blower motor is furnished by wire shield to noise filter case to console structure.

13-28. Removal - Ventilating and Defogging Blower A.

a. Unsolder helicopter electrical wire from noise filter (19).

b. Remove screws attaching noise filter (19) to structure.

c. Remove screw, washer, nut, and damp (18) attaching blower (14) and coupling (17).

d. Remove blower (14) from coupling (17).

13-29. Removal - Ventilating and Defogging Blower C.

a. Remove blower inlet duct (20, figure 13-2).

b. Unsolder helicopter electrical wire from noise filter (19).

c. Remove screws attaching noise filter (19) to structure.

d. Remove screw, washer, nut, and clamp (18) attaching blower (14) and coupling (17).

e. Remove blower (14) from coupling (17).

13-30. Installation - Ventilating and Defogging Blower A.

a. Partially insert blower (14, figure 13-1) in coupling (17).

b. Position clamp (18) on coupling (17) and blower (14). Attach clamp (18) to mounting provision on structure with screw, washer, and nut.

C. Install noise filter (19) on nose structure with four screws, washers, and nuts.

NOTE

Make sure a good electrical bond is made between noise filter (19) case and bare structure.

d. Solder helicopter electrical wire to noise filter (19) using solder (Cl 33).

13-31. Installation - Ventilating and Defogging Blower C.

a. Partially insert blower (14, figure 13-2) in coupling (17).

b. Position clamp (18) on coupling (17) and blower (14). Attach clamp (18) to mounting provision on structure with screw, washer, and nut.

C. Install noise filter (19) on nose structure with four screws, washers, and nuts.

NOTE

Make sure a good electrical bond is made between noise filter (19) case and bare structure.

d. Solder helicopter electrical wire to noise filter.

e. Position clamps on blower inlet duct (20) coupling, valve (21) coupling, and install duct (20).

13-32. VENTILATING AND DEFOGGING DUCTS.

13-33. Description - Ventilating and Defogging Ducts. Ventilating and defogging ducts are composed of flexible fiberglass, rigid fiberglass, and/or rubber. The ducts are connected to the ventilating and defogging blower and to the defogging vent.

13-34. Inspection - Ventilating and Defogging Ducts.

a. Inspect ducts for cracks, breaks, tears, and security.

b. Inspect attaching hardware for missing parts.

13-35. Removal - Ventilating and Defogging Ducts.

a. Remove blower. Refer to paragraph 13-2A or 13-29 C.

b. Remove clamps and disconnect bleed air heater and defogging nozzle ducts.

C. Remove pin and disconnect manual control cable.

d. Remove six screws and washers securing each inboard duct to center plenum (13, figure 13-2) and remove duct assemblies.

13-36. Repair - Ventilating and Defogging Ducts. Repairs to the heating and ventilating ducting will depend on the type of material used in construction of the piece to be repaired. Rubber hose or flexible fiberglass ducts which are torn, flattened, or deteriorated should be replaced. Rigid fiberglass sections except polycarbonate may be patched in accordance with proceduresoutlined in TM 55-1500-204-25/1.

a. Repair - Cracks in polycarbonate material.

(1) Stop drill at each end of crack using a No 40 drill.

(2) Lightly sand area to be repaired with medium grit sandpaper (C126).

(3) Wipe area with dry, clean cloth to remove all residue.

(4) Apply urethane adhesive (C20) to repair area using a brush or spatula.

(5) Accelerated cure time using a heat lamp is 3 hours at 150°F (65°C). Standard cure time is 3 days at 70° to 80°F (21° to 26°)

b. Repair — Breaks or torn areas in polycarbonate material.

(1) Use same procedure as outlined in paragraph a., (l), (2), and (3) above.

(2) Cut section of 120 to 127 weave fiberglass (C71) to extend a minimum of 1/2 inch around periphery of crack or repair area.

(3) Apply one brush coat of urthane adhesive (C20) to polycarbonate repair area.

(4) Lay fiberglass over repair area and rub lightly to adhere fiberglass to repair.

(5) Apply brush coat of urethane adhesive (C20) over fiberglass repair area.

(6) Accelerated cure time using a heat lamp is 3 hours at 65°C (150°F). Standard cure time IS 3 days at 70° to 80°F (21° to 26°C).

13-37. Installation — Ventilating and Defogging Ducts.

a. Secure each inboard duct to center plenum with six screws and washers.

b. Secure bleed air ducts to defogging nozzle ducts with clamps and attaching hardware.

c. Install blower. Refer to paragraph 13-30,

d. Connect manual control cable to center plenum (13, figure 13-2) with pin.

13-38. COMBUSTION HEATER SYSTEM.

NOTE

Helicopters incorporating MWO 55-1520-228-50/1 have combustion heater system in lieu of bleed air heater system.

13-39. Description — Combustion Heater System. The combustion heater (auxiliary kit, figure 13-4) is provided as optional equipment and is installed in the equipment compartment aft of passenger seats. Fuel for heater operation is supplied by the helicopter fuel system and routed through the heater fuel filter, pump, relief valve, and shut off valve. Ignition IS supplied by a heater mounted ignition assembly which converts the 28 volts dc to high voltage, producing a continuous spark during heater operation. Combustion air is supplied by a blower through a port on right side of the helicopter and routed to the combustion chamber. Heater exhaust gases are piped overboard through a shrouded exhaust flue. Heat distribution is accomplished by a heater mounted ventilating air blower and routed through ducts to the forward aft cabin compartments. Two adjustable distribution valves are provided in the pilot compartment and two fixed openings for the passenger compartment. Controls for heater starting are located on the overhead panel and two controls are mounted on the vertical column on pilot seat back. The left side control is for temperature and the right side control operates the heater shut off valve in the event of fumes, fire, or heater malfunction A heater fail light is mounted on the console and will indicate heater malfunction.

13-40. Inspection — Combustion Heater System.

a. Check manually controlled heat selector switch and firewall shutoff control on the canted center post for operation and freedom of movement.

b. Check fittings for fuel leaks.

c. Check electrical connections on all switches and connectors for security.

d. Check heater air intakes and exhaust for freedom from obstructions.

e. Check combustion blower for security of attachment.

f. Check combustion heater and attaching hardware for security.

g. Check heater ducts for cracks, fraying, and wear, and air distribution valves for cleanliness and freedom of movement.

13-41. Test — Combustion Heater System.

a. Operational Check.

(1) Close heater power and heater control circuit breakers. Place heater switch to HEAT and press start switch.

(2) Check or verify that both blowers are operating.

(3) Check heater fuel inlet pressure for a reading of 100 psi.

(4) Verify ignition power to ignition plug.

b. The following steps are provided as diagnostic information.

NOTE

The following items must function for heater to have air.

(1) Heater power circuit breaker

(2) Heater heat-off vent switch

(3) Blower relay

(4) Combustion air blower

(5) Ventilating air blower.

NOTE

The following items must function for heater to have fuel.

(6) Heater control circuit breaker

(7) Heater heat-off vent switch

(8) Heater start switch

(9) Heater control relay

(10) Overheat switch

(11) Heater power circuit breaker

(12) Blower relay

(13) Combustion air blower

(14) Combustion air pressure switch

(15) Heater fuel pump

(16) Heater fuel shutoff valve

(17) Adjustable duct switch

(18) Heater cycling switch

(19) Heater fuel solenoid valve

NOTE

The following items must function for heater to have ignition.

(20) Heater control circuit breaker

(21) Heater power circuit breaker

(22) Heater heat-off vent switch

(23) Heater start switch

(24) Heater control relay

(25) Overheat switch

(26) Blower relay

(27) Combustion air blower

(28) Combustion air pressure switch

(29) Ignition unit

(30) Ignition lead

(31) Heater igniter plug

13-42. Troubleshooting — Combustion Heater System. The following procedure outlines a quick method of determining when system or subsystems are faulty. Troubleshooting is shown for the subsystems on table 13-2 through 13-5.

CAUTION

High electrical voltages are present in the combustion heater ignition system.

NOTE

At any point that no voltage condition is found, always verify continuity of wiring back to the last point where voltage was present before replacing a component.

Before using table 13-2, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 13-2, notify the next higher level of maintenance.

Table 13-2. Troubleshooting — Ventilation Air System

CONDITION TEST OR INSPECTION	**CORRECTIVE ACTION**
1. No voltage to blower (electrical).	
STEP 1. Check for defective heater power circuit breaker.	**Replace circuit breaker if defective.**
STEP 2. Check for defective heat-off vent switch	**Replace switch if defective.**
STEP 3. Check for defective blower relay,	**Replace relay if defective.**
2. No air flow (mechanical)	
STEP 1. Check firewall shutoff valve to determine if closed due to faulty operation. Ensure control is in correct operating position (valve open).	**Replace control if damaged and preventing control function.**
STEP 2. Check duct for damage and connections for proper installation.	**Make proper duct connections and/or replace duct if damaged. Refer to paragraph 13-32.**

Table 13-2. Troubleshooting – Ventilation Air System (Cont)

CONDITION TEST OR INSPECTION	**CORRECTIVE ACTION**
3. Vent blower vibration (mechanical).	
STEP 1. Check blades for proper balance.	**Replace blower wheel if blades are out of balance,**
STEP 2. Check motor for loose bearings.	**Replace motor for loose bearings.**
4. Vent blower not running (electrical).	
STEP 1. Check for defective motor.	**Replace motor if defective.**
STEP 2. Check for faulty wiring to motor.	**Replace faulty wiring.**
STEP 3. Check for worn brushes in motor.	**Replace worn brushes.**

NOTE

Before using table 13-3, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 13-3, notify the next higher level of maintenance.

Table 13-3. Troubleshooting — Combustion Air System

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

1. No voltage to blower (electrical).

   STEP 1. Check for defective heater power circuit breaker.

   Replace circuit breaker if defective.

   STEP 2. Check for defective heat-off vent switch

   Replace switch if defective.

   STEP 3. Check for defective blower relay

   Replace relay if defective.

2. No air flow (mechanical).

   STEP 1. Check for defective blower duct.

   Replace duct if defective.

   STEP 2. Check for water trapped in air line to air pressure switch and for possible ice.

   Remove cap from sump line and drain water. Heat line if icing is suspected.

   STEP 3. Check for inoperative air pressure switch.

   Replace switch if defective.

   STEP 4. Check for loose air pressure line.

   Make proper air line installation.

3. Combustion blower not running (electrical).

   STEP 1. Check for defective motor.

   Replace motor if defective.

   STEP 2. Check for faulty wiring to motor.

   Replace faulty wiring.

   STEP 3. Check for worn brushes in motor.

   Replace worn brushes.

Table 13-3. Troubleshooting — Combustion Air System (Cont)

CONDITION TEST OR INSPECTION	**CORRECTIVE ACTION**
4. Combustion blower vibration (mechanical).	
STEP 1. Blower wheel out of balance.	**Replace blower wheel.**
STEP 2. Loose bearings in motor	**Replace blower wheel.**

NOTE

Before using table 13-4, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 13-4, notify the next higher level of maintenance.

Table 13-4. Troubleshooting -– Fuel System

CONDITION TEST OR INSPECTION	**CORRECTIVE ACTION**
1. No voltage at terminal 1 on heater terminal block with heater start switch depressed and held.	
STEP 1. Check for defective heater control circuit breaker.	**Replace circuit breaker if defective.**
STEP 2. Check for defective heater start switch.	**Replace switch if defective.**
STEP 3. Check for faulty wiring.	**Replace faulty wiring.**

Table 13-4. Troubleshooting — Fuel System (Cont)

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

2. No voltage at terminal 3 on heater terminal block with heater start switch depressed and held.

STEP 1. Check for defective overheat switch.

Replace switch if defective.

STEP 2. Check for defective combustion air switch (combustion air blower is running).

Replace switch if defective.

STEP 3. Check for defective duct switch

Replace switch if defective.

STEP 4. Check to ensure duct switch is not set below ambient temperature.

If switch setting is below ambient temperature, adjust duct switch to maximum or HIGH position,

STEP 5. Check for faulty wiring

Replace faulty wiring.

NOTE

To perform the following troubleshooting checks the power must be disconnected to ignition unit. With heater heat-off vent switch placed in HEAT position, press heater start to ON and release.

3. Heater fail light stays on.

STEP 1. Check for defective heater control relay.

Replace relay if defective.

4. No voltage to pin A on remote fuel shutoff valve.

STEP 1. Check for faulty wiring

Replace faulty wiring.

STEP 2. Check for defective remote fuel shutoff valve.

Replace remote fuel shutoff valve if defective.

Table 13-4. Troubleshooting – Fuel System (Cont)

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

5. Fuel pump not running.

STEP 1. Check for faulty wiring.

Replace faulty wiring.

STEP 2. Check for defective fuel pump.

Replace fuel pump if defective.

6. No voltage through cycling switch.

STEP 1. Check for faulty wiring.

Replace faulty wiring.

STEP 2. Check for defective cycling switch.

Replace cycling switch if defective.

7. Insufficient fuel pressure (90 to 110 psi), normal at heater inlet connection.

STEP 1. Check for clogged fuel filter.

Clean or replace filter element.

STEP 2. Check for improper fuel pump operation.

Replace fuel pump if improperly operating.

STEP 3. Check pressure regulator.

Adjust or replace pressure regulator as required.

STEP 4. Check for clogged fuel line. Inspect all lines and connections.

Remove restriction if existent.

STEP 5. Check for defective remote fuel shutoff valve.

Replace remote fuel shutoff valve if defective.

Table 13-4. Troubleshooting — Fuel System (Cont)

CONDITION TEST OR INSPECTION	**CORRECTIVE ACTION**
8. Insufficient fuel flow into heater.	
STEP 1. Check for defective fuel shutoff valve mounted in heater.	**Replace fuel shutoff valve mounted in heater, if defective.**
STEP 2. Check. for clogged fuel nozzle orifice in heater.	**Remove fuel nozzle and clean or replace orifice.**
STEP 3. Check. for faulty wiring	**Replace faulty wiring.**

NOTE

Before using table 13-5, ensure all normal operational checks have been performed. If a malfunction exists which is not listed in table 13-5, notify the next higher level of maintenance.

Table 13-5. Troubleshooting — Ignition System

CONDITION TEST OR INSPECTION	**CORRECTIVE ACTION**
1. No voltage at input of ignition unit (electrical)	
STEP 1. Check for faulty wire No. H54B20.	**Replace faulty wire.**

Table 13-5. Troubleshooting — Ignition System (Cont)

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

2. With ignition high tension lead at igniter plug disconnected, no ignition high voltage.

STEP 1. Check for defective vibrator.

Replace vibrator if defective.

STEP 2. Check for defective ignition unit

Replace ignition unit if defective.

STEP 3. Check for defective ignition lead

Replace ignition lead if defective.

3. No fire in combustion chamber (mechanical).

STEP 1. Check for defective igniter plug.

Replace igniter plug if defective.

13-43. COMBUSTION HEATER ASSEMBLY.

13-44. Description — Combustion Heater Assembly. The combustion heater assembly (9, figure 13-4) is an integral part of the bleed airheating system. Refer to paragraph 13-38 for additional information and operation.

13-45. Removal — Combustion Heater Assembly.

a. Loosen clamp (26, figure 13-4) and disconnect coupling (27) at valve assembly (8).

b. Disconnect heat control cable (25) at firewall shutoff valve assembly (8).

c. Disconnect two fuel drain lines (24) from lower side of heater (9).

d. Disconnect fuel inlet line (13) from heater (9).

e. Remove igniter plug (21) at heater (9)

f Disconnect two pneumatic lines (17 and 18) at heater (9).

g. Remove electrical wiring as follows:

NOTE

Tag all removed wires for location to assist in reinstallation.

(1) Remove two clamps attaching electrical cable assembly to heater.

(2) Remove screws attaching terminal board (12, figure 13-4) to heater.

(3) Cut cable ties toward the combustion blower (16) to free two combustion blower wires.

(4) Remove combustion blower (16) and vent blower (37) wires from terminal board (12) (terminals 5 and 6).

(5) Remove wires from three switches on heater (9) and valve assembly (8).

h. Disconnect combustion blower duct (14) at heater (9).

i. Disconnect exhaust (11) at heater.

j. Disconnect combustion blower brace (35) from combustion heater support bracket (38).

k, Remove air scoop (19) and access panel from left side of helicopter.

1. Loosen two clamps (10) attaching heater (9) to heater support bracket (38) and remove heater (9) through access opening. on left side of helicopter.

13-46. Installation — Combustion Heater Assembly.

a. Position heater (9, figure 13-4) through access opening on helicopter and secure to heater support bracket (38) with two clamps (10)

b. Install access panel on left side of helicopter and secure air scoop (19) to access panel and air intake on combustion heater assembly.

c. Connect combustion blower brace (35) to combustion heater support bracket (38) with four screws (36), eight washers (34), and four nuts (33).

d. Connect exhaust (11) to heater (9) with two screws.

e. Connect combustion blower duct (14) to heater (9).

f. Install electrical system as follows:

(1) Connect electrical wires to three switches on heater (9, figure 13-4) and firewall shutoff valve assembly (8).

(2) Connect combustion blower (16) and vent blower (37) wires to terminal board (12) (terminals 5 and 6).

(3) Install terminal board (12) and cover on heater (9) with two screws and washers.

(4) install two electrical cable assembly clamps on heater (9).

(5) Dress and tie electrical cable assembly.

g. Connect two pneumatic lines (17 and 18) at heater (9).

h. Install igniter plug (21).

i. Connect fuel inlet line (13) at heater (9).

j. Connect two fuel drain lines (24) at lower side of heater (9).

k. Connect heat control cable (25) at valve assembly (8).

l. Connect coupling (27) and tighten clamp (26) at valve assembly (8).

13-47. COMBUSTION HEATER PLENUM.

13-48. Description — Combustion Heater Plenum. The combustion heater plenum (6, figure 13-1) is located downstream from the mixing valve (5) and distributes heated air, through the duct system, to registers under seat or to defroster nozzles. The remote sensor (7) and heat control cable (3) are attached to the plenum to control desired air temperature. Refer to paragraph 13-38 for additional information and operation.

13-49. Removal — Combustion Heater Plenum.

a. Loosen two clamps (29, figure 13-4) and remove two ducts (23 and 28) from forward side of plenum assembly (1).

b. Loosen clamp (26) and disconnect coupling (27) at plenum assembly (1).

c. Disconnect temperature control cable (2) at plenum assembly (1).

d. Disconnect two electrical wires at plenum assembly

e. Remove two screws, washers, and nuts attaching plenum assembly (1) to seatback electrical shelf and remove plenum assembly.

13-50. Installation — Combustion Heater Plenum.

a. Position plenum assembly (1, figure 13-4) on seatback electrical shelf and secure with two screws, washers, and nuts.

b. Connect electrical wires.

c. Connect temperature control cable (2).

d. Connect coupling (27) at plenum assembly (1) and tighten clamp (26).

e. Connect two ducts (23 and 28) to forward side of plenum assembly (1) with two clamps (29).

13-51. COMBUSTION HEATER SUPPORT BRACKET.

13-52. Description — Combustion Heater Support Bracket. The support bracket (38, figure 13-4), an integral part of the combustion heater system, supports the heater assembly (9). A brace (35) attached aft of the bracket (38) supports the combustion blower (1 6). Refer to paragraph 13-38 for additional information and operation.

13-53. Removal — Combustion Heater Support Bracket.

a. Remove combustion heater assembly. Refer to paragraph 13-45.

b. Disconnect electrical wiring at combustion air pressure switch (20, figure 13-4).

c. Remove two relays (39 and 40), thermocouple resistor, and ignition assembly (41). Refer to paragraph 13-71 for ignition assembly removal.

d. Remove six screws and washers securing heater support bracket (38) and remove bracket.

e. Remove combustion air pressure switch (20). Refer to paragraph 13-57 for removal.

13-54. Installation — Combustion Heater Support Bracket.

a. Install combustion air pressure switch (20) on heater support bracket (38). Refer to paragraph 13-58.

b. Position heater support bracket (38) on seatback electrical shelf and secure with six screws, washers, and nuts

c. Install two relays (39 and 40) and thermocouple resistor on heater support bracket (38).

d. Connect electrical wiring to combustion air pressure switch (20).

13-55. COMBUSTION HEATER COMBUSTION AIR PRESSURE SWITCH.

13-56. Description — Combustion Heater Combustion Air Pressure Switch. The combustion air pressure switch (20, figure 13-4) is mounted on the combustion heater support bracket (38). Refer to paragraph 13-38 for functional operation and additional information,

13-57. Removal — Combustion Heater Combustion Air Pressure Switch.

a. Remove combustion heater support bracket (3) figure 13-4). Refer to paragraph 13-53.

b. Remove two pneumatic lines (17 and 18) at air pressure switch (20).

c. Remove lockwire and two screws and washers attaching pressure switch (20) to heater support bracket (38). Remove pressure switch (20).

13-58. Installation — Combustion Heater Combustion Air Pressure Switch.

a. Position pressure switch (20) on heater support bracket (38) and secure with two screws and two washers. Lockwire screws using lockwire (C96).

b. Install two pneumatic lines (17 and 18) to pressure switch (20).

13-59. COMBUSTION HEATER IGNITION ASSEMBLY.

13-60. Description — Combustion Heater Ignition Assembly. The Ignition unit converts 28 Vdc to high voltage, oscillating current and produces a continuous spark during heater operation. It contains a condenser, radio noise shield, relay, vibrator socket

and, mounted externally, a vibrator and ignition coil. Refer to paragraph 13-48 for additional information and operation.

13-61. Removal -- Combustion Heater Ignition Assembly.

a. Remove igniter plug (21, figure 13-4) at heater (9)

b. Disconnect electrical wire and ground strap.

c. Remove clamp (22) attached to ignition assembly (41) and duct (23).

d. Loosen two clamps (32) attaching ignition assembly (41) to heater support bracket (38) and remove ignition assembly.

13-62. Disassembly – Combustion Heater Ignition Assembly,

a. Remove lockwire and front clamp assembly (1, figure 13-5) by removing screw (2)

b. Remove back clamp assembly (7) by removing screw (8) and washer (9).

c. Remove vibrator (3) and radio noise shield (4) from coil and body assembly (5)

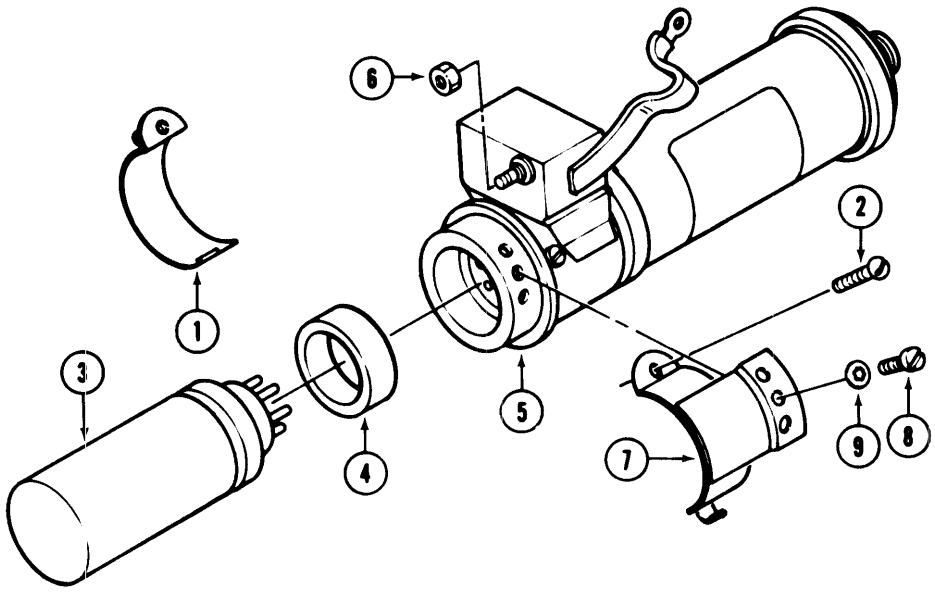
13-63. Inspection and Replacement — Combustion Heater Ignition Assembly.

a. Inspect vibrator, ignition coil, and body assembly for damage. If damage is found, replace defective part.

b. Remove dirt contaminated ignition sealing compound from coil outlet with a clean cheesecloth (C37).

CAUTION

Do not use carbon tetrachloride, trichlorethylene or other chlorinated solvents.



1. Front Clamp Assembly
2. Screw
3. Vibrator
4. Radio Noise Shield
5. Coil and Body Assembly
6. Nut
7. Back Clamp Assembly
8. Screw
9. Washer

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Figure 13-5. Ignition Unit Assembly

13-64. Reassembly — Combustion Heater Ignition Assembly.

a. Install radio noise shield (4, figure 13-5), and vibrator (3) into coil and body assembly (5).

b. Install back clamp assembly (7) on coil and body assembly (5) with screw (8) and washer (9).

c. Attach front clamp assembly (1) to back clamp assembly (7) with screw (2).

d. Lockwire screws using lockwire (C96).

e. Coat the coil outlet with ignition sealing compound (C83) to prevent corona discharge.

13-65. Operational Test -- Combustion Heater Ignition Assembly.

a. The following test equipment is required.

(1) A 28 Vdc power supply.

(2) A voltmeter with 0 to 30 volt range.

(3) A lead from the 28 Vdc power supply to the ignition unit, including an ammeter with a 0 to 3 ampere range and a normally open, momentary closed switch. Total resistance of the lead, ammeter and switch must not exceed 0.30 ohm.

(4) A shielded lead assembly.

(5) Igniter plug.

(6) Igniter plug gap fixture.

NOTE

A convenient means of obtaining the proper igniter gap is to install the igniter plug into a combustion tube. If tube is not available fabricate a gap fixture per figure 13-8. Gap between igniter plug electrode and gap fixture to be 5/16 inch (plus 0-minus 1/32 inch).

b. Set up test circuit per figure 13-7.

c. Install igniter plug into gap fixture (figure 13-8). Electrode of gap fixture must be grounded to the ignition unit.

d. Connect shielded lead assembly to ignition unit and igniter plug.

e. Close the momentary switch and read the voltmeter and ammeter. Release the momentary switch immediately.

f. The amperage reading in relation to the voltage reading must fall within the limits shown on the vibrator performance chart (figure 13-6). Install a new vibrator if the one being tested fails to fall within the acceptable range.

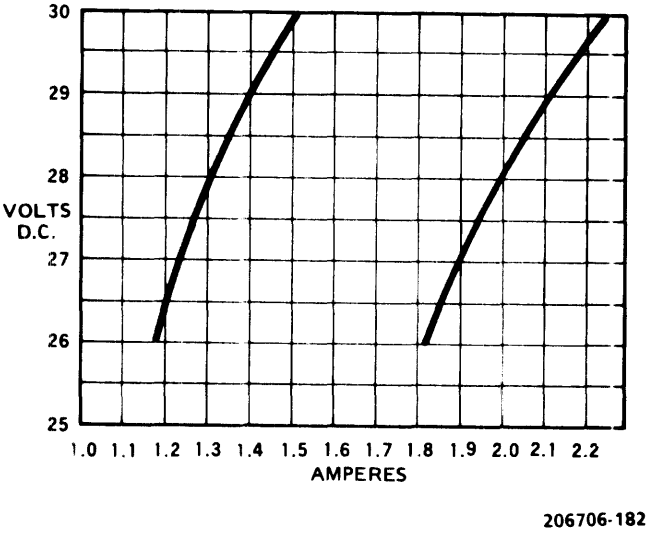


Figure 13-6. Vibrator Performance Chart

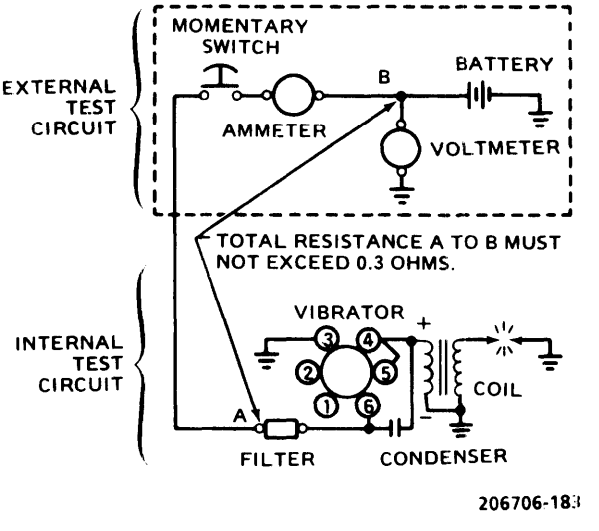


Figure 13-7. Operational Test Circuit

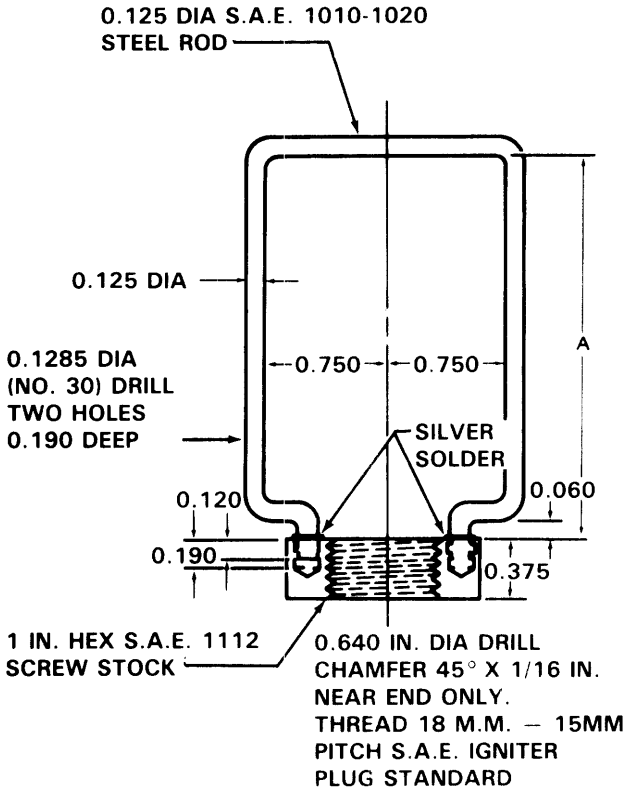


Figure 13-8 Igniter Plug Gap Fixture

13-66. Installation — Combustion Heater Ignition Assembly.

a. Position ignition assembly (41, figure 13-4) in clamps (32) on heater support bracket (38) and secure with two screws, washers, and nuts

b. Install clamp (22) attaching Ignition assembly (41) and duct (23).

c. Connect electrical wire and ground strap.

d. Install igniter plug (21) in heater (9).

13-67. VIBRATOR.

13-68. Description — Vibrator. The vibrator is located in the ignition unit assembly. Refer to paragraph 13-60.

13-69. Inspection — Vibrator.

a. Inspect vibrator for faulty operation.

b. Inspect vibrator for any obvious damage.

13-70. Removal — Vibrator.

a. Remove front clamp assembly (1, figure 13-5) by removing screw (2).

b. Remove back clamp assembly (7) by removing screw (8) and washer (9).

c. Remove vibrator from body assembly.

13-71. Repair – Vibrator. If vibrator has faulty operation or any obvious damage, replace vibrator.

13-72. Installation — Vibrator,

a. Install radio noise shield (4, figure 13-5) and vibrator into coil and body assembly (5).

b. Install back clamp assembly (7) on coil and body assembly (5) with screw (8) anti washers (9).

c. Attach front clamp assembly (1) to back clamp assembly (7) with screw (2).

d. Install lockwire (C96) in screws.

e. Coat the coil with ignition sealing compound (C83) to prevent corona discharge.

13-73. Test – Vibrator. Refer to paragraph 13-65.

13-74. COIL AND BODY ASSEMBLY.

13-75. Inspection — Coil and Body Assembly. Refer to paragraph 13-63.

13-76. Test — Coil and Body Assembly. Refer to paragraph 13-65.

13-77. SHIELDED IGNITION LEAD ASSEMBLY.

13-78. Description — Shielded Ignition Lead Assembly. The shielded cable assembly (6, figure 13-9) carries the converted high voltage current from the ignition coil to the igniter plug installed on the heater assembly.

13-79. Inspection — Acceptance/Rejection Criteria — Shielded Ignition Lead Assembly.

NOTE

When the end of the ignition lead installed in the igniter plug well has failed, both the lead and the plug should be replaced because the failure has seriously damaged the plug as well as the lead. Damage to the plug may not be readily apparent. However, the spark has traveled along the porcelain surface of the plug and broken down its electrical resistance to a critical extent. Further lead failures would occur if this plug were to be reused.

a. Examine the spring on the spring connector assembly (2) for evidence of burning or loss of tensile strength. Replacement is necessary if such is the case.

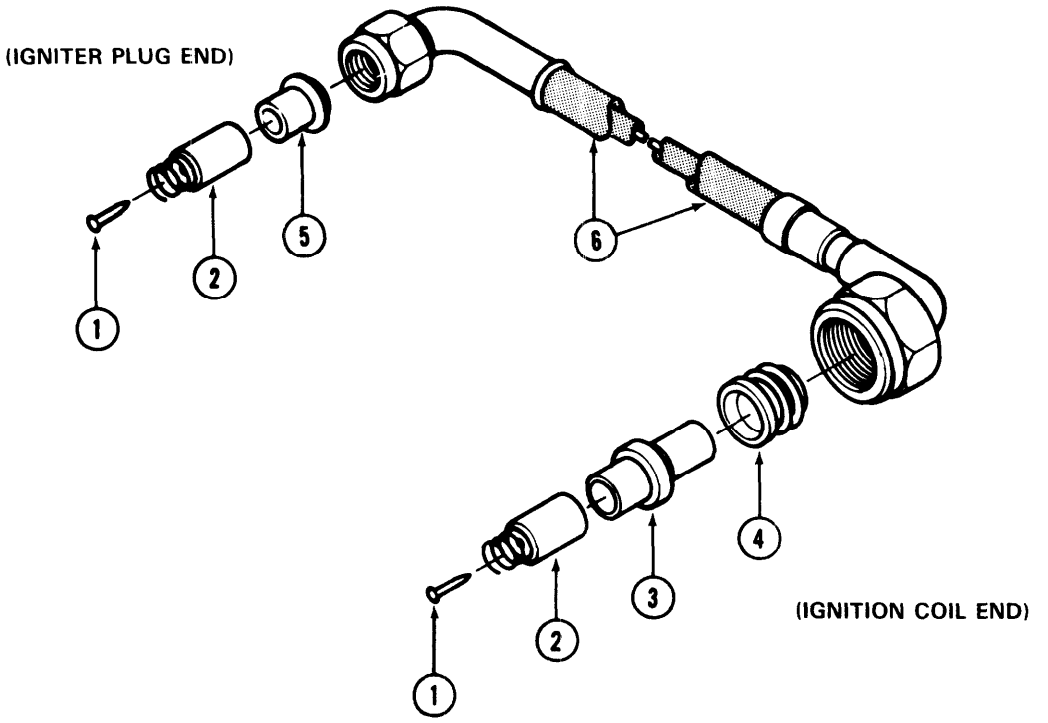
b. Look for carbon tracks or punctures on the spring connector assembly and both insulating sleeves. Items showing such damage must be replaced.

c. See that the compression spring is not broken. If the spring is broken, the compression spring and retainer assembly (4) must be replaced.

d. See that the shielded cable assembly (6) is not damaged. If damaged, replace the complete lead assembly.

e. Examine the shielded cable assembly for breaks in the outer layer of radio noise shield. If breaks exist, replace the complete lead assembly.

f. See that the shielded cable assembly elbows are not damaged. If either elbow is damaged, the complete assembly should be replaced.



1. Escutcheon Pin
2. Spring Connector Assembly
3. Insulating Sleeve
4. Spring and Retainer Assembly
5. Grommet
6. Shielded Cable Assembly

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Figure 13-9. Shielded Lead Assembly

g. Inspect the connecting nuts for worn threads. If threads are worn, the complete assembly should be replaced.

13-80. Operational Test -- Shielded Ignition Lead Assembly.

CAUTION

Do not conduct the operational test without the use of igniter plug set at the proper spark gap. Failure to comply with the above will result in damage to ignition assembly, lead assembly, or both .

NOTE

The following operational test may be conducted in conjunction with operational test in paragraph 13-65.

a. Connect one end of shielded lead assembly to an ignition unit and the other end to igniter plug installed in igniter gap fixture set to provide a 1 /2 inch gap (fixture electrode must be grounded to ignition unit).

NOTE

Igniter gap fixture may be fabricated per figure 13-7 to provide a 1 /2 inch igniter gap.

b. Apply a 28 Vdc power source to ignition unit and fire spark plug for a minimum of two minutes. The lead assembly must evidence no electrical breakdown or leakage

c. If the lead assembly passes the operational test apply a thin coating of ignition sealing compound (C83) to the spring connectors and return to service

d. If the lead fails to pass the operational tests, it must be disassembled for further inspection to discover the damaged component. Inspect each part carefully as it is removed.

13-81. Removal — Shielded Ignition Lead Assembly. Disconnect the lead assembly from the ignition coil and igniter plug and remove from helicopter. Refer to figure 13-9

13-82. Disassembly — Shielded Ignition Lead Assembly. Complete disassembly may not be necessary In some cases. Disassemble only so far as is necessary to Inspect and replace damaged parts.

a. Remove the escutcheon pin (1, figure 13-9) from each end of the lead by prying it loose with a knife blade.

b. Straighten the spread wires at the bushing of the spring connector assembly (2). Then grasp the spring connector assembly and pull it from cable assembly (6). Be careful not to snag the spring.

c. Slide the insulating sleeve (3) off the ignition coil end of the cable.

d. Remove the compression spring and retainer assembly (4).

e. Remove grommet (5)

13-83. Repair or Replacement — Shielded Ignition Lead Assembly. Repair is limited to replacement of worn or damaged components with like, serviceable items.

13-84. Reassembly — Shielded Ignition Lead Assembly,

NOTE

A thin coating of ignition sealing compound (C83) will facilitate installation of components.

a. Install grommet (5, figure 13-9) into igniter plug end of cable assembly (6).

b. Install compression spring and retainer assembly (4) into Ignition coil end of cable assembly (6).

c. Install insulating sleeve (3).

d. Install spring connector assembly **(2).**

e. Spread wire strands over bushing of spring connector assembly (2) and install escutcheon pin (1).

f. Apply a thin coating of ignition sealing compound (C83) to the spring connector assemblies (2).

13-85. Installation — Shielded Ignition Lead Assembly.

CAUTION

Use extreme care during installation to prevent damage to the shielded lead assembly. If either cable assembly elbow is damaged, the complete assembly should be replaced.

Connect one end of the shielded lead assembly to the ignition coil unit and the other end to the igniter plug installed on the heater assembly. Refer to figure 13-9.

13-86. COMBUSTION HEATER COMBUSTION BLOWER.

13-87. Description — Combustion Heater Combustion Blower. Combustion air is supplied by a motor driven blower (16, figure 13-4) through a port on the right side of the helicopter and routed to the combustion chamber of the heater assembly.

13-88. Removal — Combustion Heater Combustion Blower.

a. Remove two air ducts (14 and 15, figure 13-4) from combustion blower (16).

b. Disconnect two combustion blower electrical wires at terminal board (12),

c. Loosen screws, washers, and nuts attaching combustion blower brace (35) to heater support bracket (38).

d. Remove combustion blower (16),

13-89. Repair — Combustion Heater Combustion Blower. Repair is limited to brush replacement.

a. Removal — Brushes:Remove the end of motor housing opposite drive shaft end Disconnect brushes and remove.

b. Inspection — Brushes: Inspect electrical leads for damage. Inspect brushes for cracks or breaks. Replace if broken, cracked, or worn to a length of 1/8 inch or less measured on shorter side of brush.

NOTE

If the same brushes are reused, be certain they are reinstalled in the same position as they were before removal, to ensure curved ends fit the curvature of the commutator.

c. Installation — Brushes:

(1) Connect brush electrical leads and install brushes so that curved end of the brush matches the curvature of the commutator.

(2) Install end of motor housing on motor.

d. Run-in-Brushes: Connect the motor to a controlled voltage supply (a rheostat in a 28Vdc line). Operate the motor at approximately one-half normal operating speed for four hours, then, gradually increase to normal operating speed to properly seat the brushes before installing the blower in the aircraft.

13-90. Installation — Combustion Heater Combustion Blower.

a. Position combustion blower (16, figure 13-4) on aft left side of heater support bracket (38) and secure combustion blower brace (35) to heater support bracket (38) with screws, washers, and nuts

b. Connect combustion blower electrical wires at terminal board (12).

c. Connect two air ducts (14 and 15) to combustion blower (16).

13-91. COMBUSTION HEATER FUEL FILTER.

13-92. Removal — Combustion Heater Fuel Filter.

a. Remove access panel on right side of helicopter.

b. Disconnect two fuel lines at fuel filter (7, figure 13-4) and cap fuel lines

c. Remove two screws, two spacers, and four washers attaching fuel filter (7) to mounting plate {6).

d. Remove fuel filter (7).

13-93. Installation — Combustion Heater Fuel Filter.

a. Position fuel filter (7, figure 13-4) and Install on mounting plate (6) with two screws, two spacers, and four washers.

b. Connect two fuel lines to fuel filter

13-94. COMBUSTION HEATER FUEL PRESSURE RELIEF VALVE.

13-95. Removal -– Combustion Heater Fuel Pressure Relief Valve.

a. Remove access panel from right side of helicopter

b. Disconnect four fuel lines attached to fuel pressure relief valve (5, figure 13-4) and cap fuel lines.

c. Remove fuel pressure relief valve (5).

13-96. Installation — Combustion Heater Fuel Pressure Relief Valve, Connect four fuel lines to fuel pressure relief valve (5, figure 13-4).

13-97. Adjustment — Combustion Heater Fuel Pressure Relief Valve. Remove fuel outlet line from the relief valve and attach a direct reading pressure gage. Start the fuel pump. If fuel pressure is not 90 to 110 psi, proceed as follows:

a. Loosen cap from locknut.

b. Adjust cap clockwise to increase pressure and counterclockwise to reduce pressure

c. Adjust pressure to 90 to 110 psi.

d. Secure locknut against cap

e. Turn off pump.

f. Disconnect pressure gage and connect fuel line.

13-98. COMBUSTION HEATER FUEL PUMP.

13-99. Removal — Combustion Heater Fuel Pump.

a. Remove access panel on right side of helicopter.

b. Disconnect electrical connector at fuel pump (4, figure 13-4).

c. Disconnect two fuel lines at fuel pump (4) and cap fuel lines.

d. Remove lockwire, four screws, and washers attaching fuel pump (4) to mounting bracket. Remove fuel pump (4).

13-100. Installation — Combustion Heater Fuel Pump.

a. Position fuel pump (4) on mounting bracket and install with four screws and washers. Lockwire screws using lockwire (C96).

b. Connect two fuel lines to fuel pump (4).

c. Connect electrical connector to fuel pump (4).

13-101. COMBUSTION HEATER FUEL SHUTOFF VALVE.

13-102. Removal — Combustion Heater Fuel Shutoff Valve.

a. Remove access panel from right side of helicopter

b. Disconnect electrical connector from fuel shutoff valve (3, figure 13-4).

c. Disconnect two fuel lines at fuel shutoff valve (3) and cap fuel lines.

d. Remove two bolts and washers attaching fuel shutoff valve (3) to mounting plate (6). Remove fuel shutoff valve (3).

13-103. Installation — Combustion Heater Fuel Shutoff Valve.

a. Position fuel shutoff valve (3) on mounting plate (6) and install with two bolts and washers.

b. Connect two fuel lines to fuel shutoff valve (3).

c. Connect electrical connector to fuel shutoff valve (3).

13-104. Removal — [Combustion Heater Ventilation Air Blower.

a. Disconnect electrical leads.

b. Remove clamp (10, figure 13-4) from vent blower assembly (37, figure 13-4).

c. Remove motor from heater housing.

13-105. Repair — Ventilating Blower. Repair is limited to brush replacement.

13-106. Removal — Brushes. Remove brush cap (1, figure 13-10) and inspect brush (2). Replace brushes if they are worn to a length of 3/16 inch or less or are broken or cracked.

13-107. Installation — Brushes.

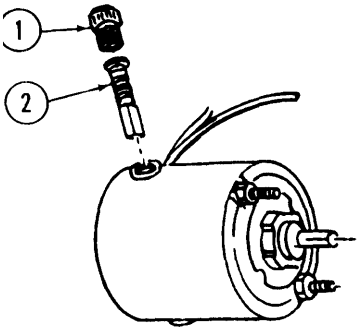
a. Insert new brush into motor making certain the curved end of the brush matches the curvature of the commutator.

b. Install brush cap and tighten to a snug fit.

13-108. Brushes — Run-in.

a. Connect the motor to a controlled voltage supply (a rheostat in a 28 Vdc line)

b. Operate the motor at approximately one-half normal operating speed for one hour.



1. Brush Cap
2. Brush

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Figure 13-10. Ventilation Blower Brush Replacement

c. Gradually increase the operating speed in increments until normal operating speed is reached. Continue run-in at normal operating speed for at least two hours to properly seat the brushes before installing the blower in the aircraft.

13-109. Installation — Ventilation Blower.

a. Install motor in heater housing.

b. Install clamp (10, figure 13-4) securing vent blower assembly (37) to heater.

c. Connect electrical leads.

SECTION II. AIR COOLING SYSTEMS

(Not Applicable)

SECTION III. WINTERIZATION EQUIPMENT

(Not Applicable)

CHAPTER 14

HOISTS AND WINCHES

(Not Applicable)

CHAPTER 15

AUXILIARY POWER PLANTS

(Not Applicable)

CHAPTER 16

MISSION EQUIPMENT

16-1. General. This chapter provides information and instructions required by organizational maintenance personnel to perform maintenance on the M27E 1 armament subsystem A and the ATAS missile system CS.

16-2. ARMAMENT SUBSYSTEM M27E1 A

16-3. Description – Armament Subsystem M27E1. The armament subsystem M27E1 is used on the left side of the helicopter. The subsystem can be completely removed or installed in a minimum amount of time to allow helicopter deployment in a different mode of operation. The description, installation, operation, and organizational maintenance of this armament system is covered in TM 9-1005-298-12 Operator and Organizational Maintenance Manual, Armament Subsystem, Helicopter, 7.62 Millimeter Machine Gun: High Rate, M27E1,

16-4. Removal – Armament Subsystem M27E1. A

CAUTION

Ensure that passenger door is supported during removal to prevent damage.

a. Remove left passenger door (31, figure 2-3). Refer to paragraph 2-8.

b. Remove the removal door seal panel (figure 16-1). Retain the 11 screws, nuts, and washers.

c. Install filler door assembly with 11 screws, nuts, and washers, and reinstall passenger door after gun and mount assembly are removed.

d. Install inside door handle and guard.

e. Remove sight control rod assembly (figure 16-1) by pulling quick-release pins.

f. Remove sight assembly electrical cable and sight assembly from airframe mount. Refer to detail G, figure 16-1.

g. Remove mount assembly upper support rod (figure 16-1) by pulling quick-release pins.

h. Remove main adapter cable electrical connector from receptacle on bulkhead.

i. Remove mount assembly (detail F, figure 16-1) by pulling quick-release pins at seat hardpoints and remove assembly.

16-5. Installation -- Armament Subsystem M27E1. A

NOTE

Gun installation and boresighting must be accomplished prior to passenger door reinstallation.

a. Remove left passenger door (31, figure 2-3) if installed on the helicopter in accordance with procedures outlined in paragraph 2-8.

b. Position the mount assembly in the helicopter for attachment to hardpoint fittings (details A and B, figure 16-1) and to the upper support rod (detail C).

CAUTION

Ensure mount assembly engages stop assembly fitting (detail E, figure 16-1) on seat hardpan.

c. Install quick-release pins to attach mount to hardpoints on seat pan. Install quick-release pins to attach upper support rod to seat back shelf bracket.

NOTE

All items removed in steps d., g., j., k., and l. shall be stored as loose equipment.

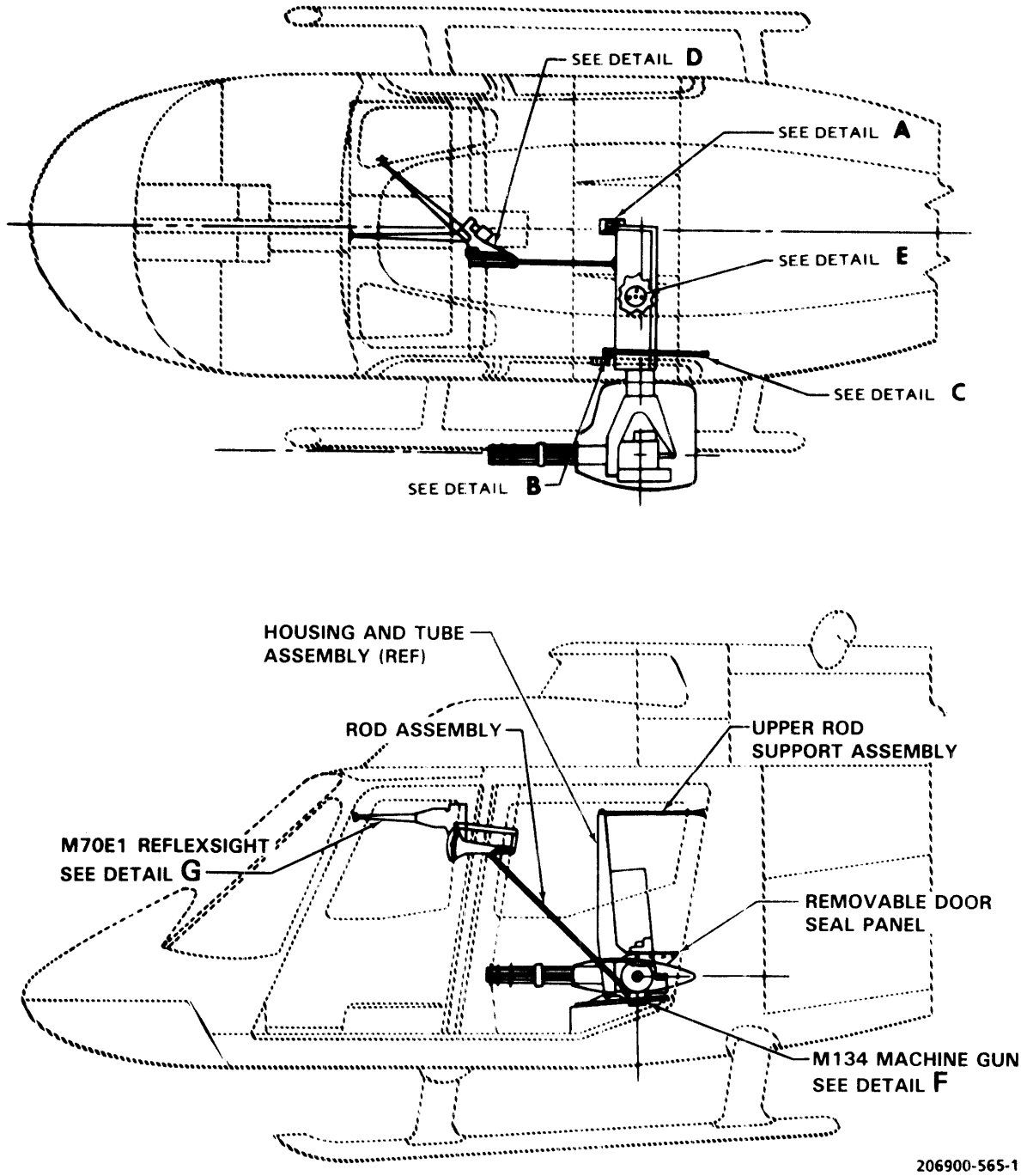


Figure 16-1. Armament Installation (Sheet 1 of 4) A

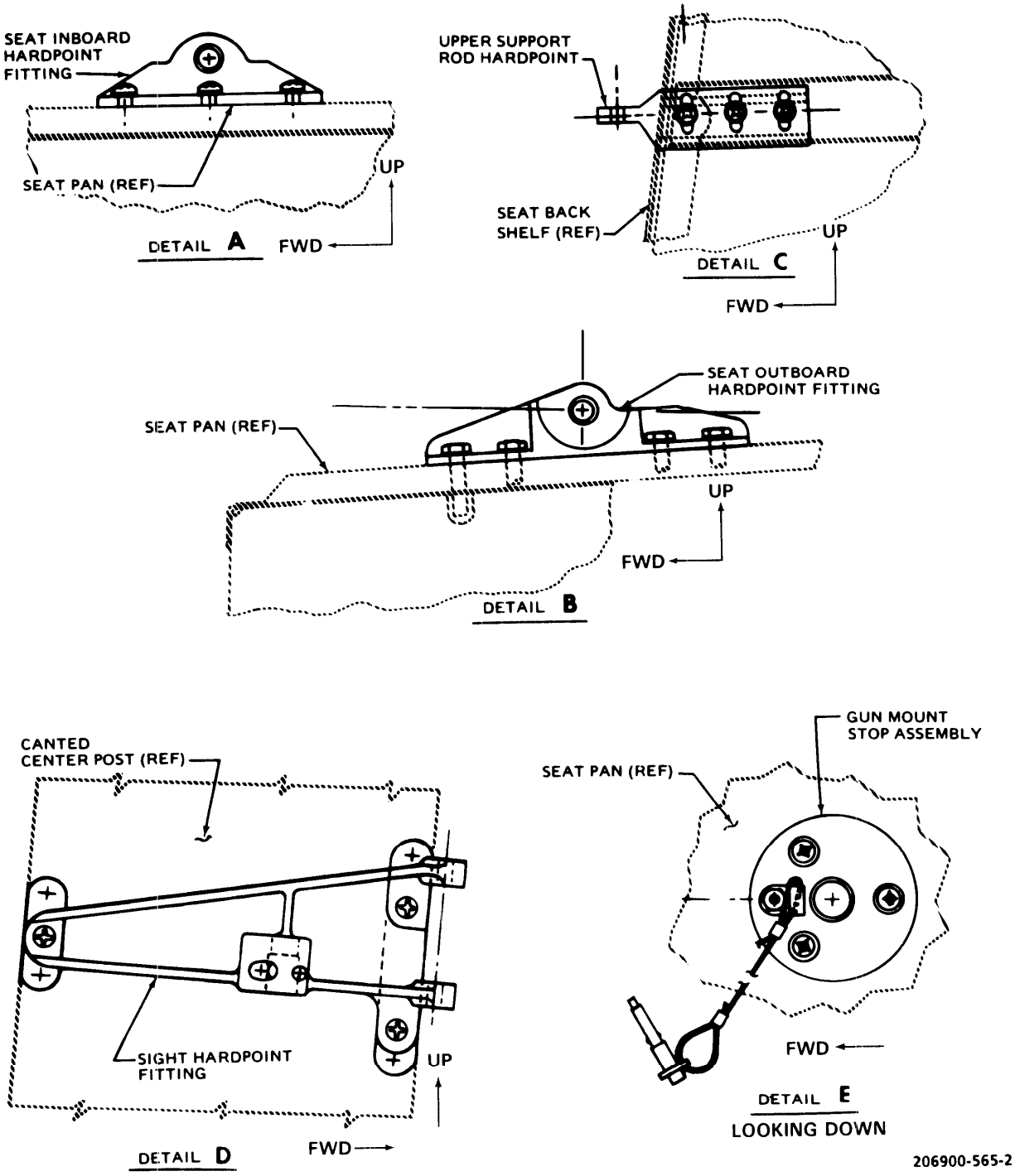


Figure 16-1. Armament Installation (Sheet 2) A

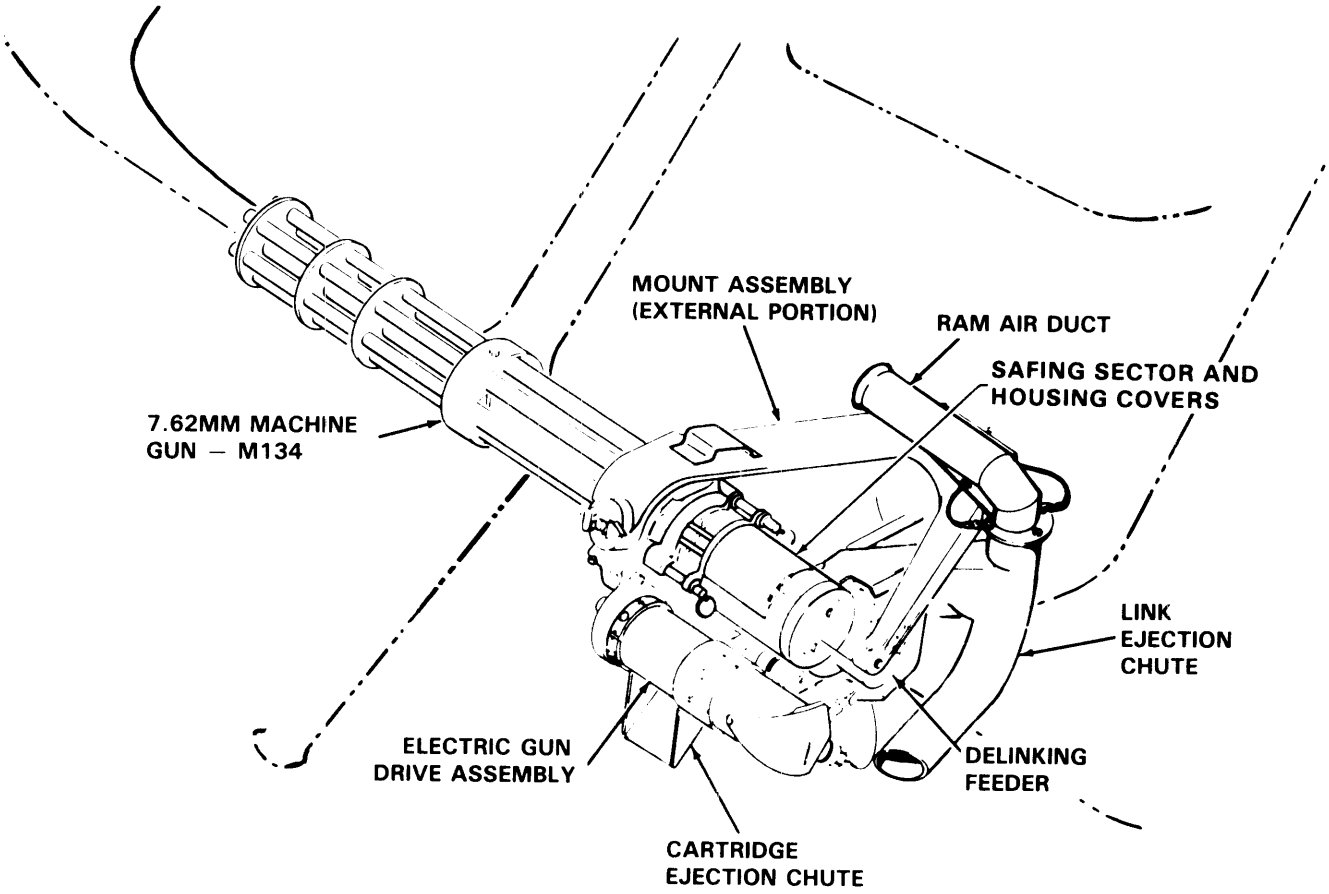


Figure 16-1. Armament Installation (Sheet 3) A

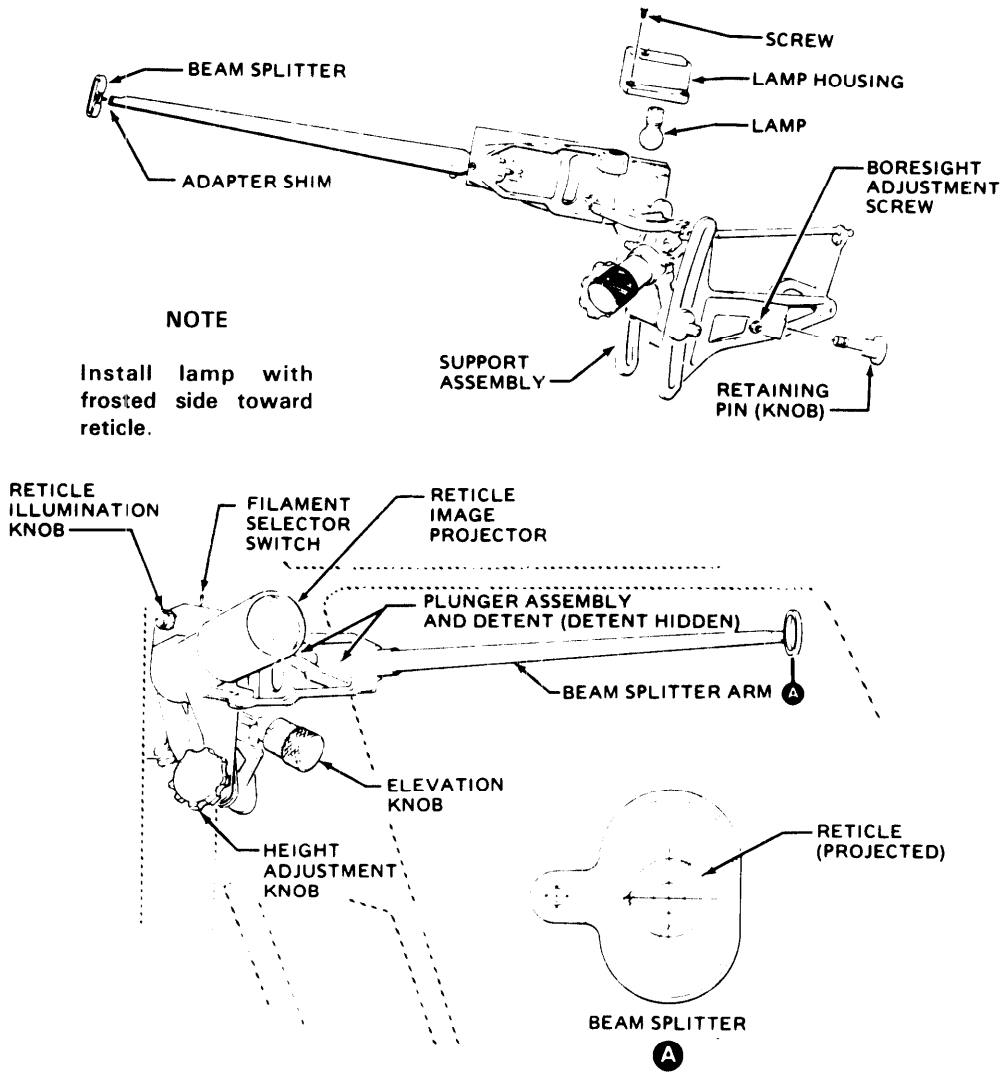


Figure 16-1. Armament Installation (Sheet 4) A

d. Prior to mating upper rod support assembly with M27E1 armament subsystem, remove existing pin and link from housing and tube assembly (figure 16-1). Position upper rod support assembly in clevis and reinstall supplied bolt and nut.

CAUTION

Care should be taken when handling the sight to avoid bending the beamsplitter arm or damaging the projector.

NOTE

Ensure that the adapter shim leg marked 58A and not the leg marked 6A is installed between the beamsplitter assembly and arm. If not, remove screw and beamsplitter, position adapter shim properly, and reinstall beamsplitter and screw.

e. Lift the M70E1 gun sight assembly into position on control tunnel mount at pin mounts and engage the two pins in the helicopter canted frame sight hardpoint fitting.

f. Depess the pushbutton in the knob of the sight retaining pin and Insert in the helicopter fitting. Release the pushbutton, then tighten the knob (detail G, figure 16-1).

NOTE

The setscrew adjacent to retaining pin is adjusted during boresighting procedure. The retaining pin knob will require final adjustment and tightening at that time

g. Remove existing control rod assembly from M27E1 armament subsystem and install supplied sight control rod assembly between sight and mount assembly using two quick-release pins attached to rod. The rod end marked UP shall connect to the sight bellcrank.

h. Route sight electrical harness through the spring clips on control rod and connect electrical plug to mount assembly function box receptacle

i. Connect one end of short adapter cable to main electrical harness connector from mount assembly. Connect remaining end of short adapter cable to bulkhead connector.

j. Remove existing door filler assembly from M27E1 armament subsystem.

k. Remove filler door assembly from the left passenger door by removing 11 screws, nuts, and washers

l. Remove Inside door handle and guard.

m. Install left passenger door (31, figure 2-3) in accordance with procedures outlined in paragraph 2-12

n. Install removable door seal panel to passenger door using 11 screws, nuts, and washers

CAUTION

Door assembly may open in flight if latch assembly is improperly adjusted. Armament system will fire through door when door is open.

o. Inspect door latch assembly for proper adjustment. Refer to paragraph 2-6, for proper adjustment.

16-6. RAM AIR DUCT. A

16-7. Description — Ram Air Duct. A A ram air duct is provided to facilitate safe ejection of spent armament belt links. The duct is connected to the link ejection chute with three fasteners. A safety lanyard on the front of the duct connects to the gun mount.

16-8. Inspection — Ram Air Duct. A Inspect ram air duct for security of mounting, wear, cracks, and other damage.

16-9. Removal -– Ram Air Duct. A Loosen three fasteners and detach safety lanyard from gun mount. Remove duct.

16-10. Repair or Replacement — Ram Air Duct. A Refer to TM 55-1500-204-25/1 for standard repairs

16-11. Installation — Ram Air Duct. A Position duct on link ejection chute, tighten three fasteners, and install safety lanyard to gun mount.

16-12. ATAS MISSILE SYSTEMS

16-13. Description - ATAS Missile System. The ATAS missile system major components are pilot display unit (PDU), PDU mount assembly, launcher assembly, ejector rack, pylon assembly, electronics unit (EU), interface electronics assembly (IEA), control panel, and cyclic stick switches.

16-14. PILOT DISPLAY UNITS

16-15. Description - Pliot Display Unit. The pilot display unit (PDU) (figure 16-2) is mounted to helicopter airframe above pilot windshield. The PDU has a control panel for display brightness adjustment and for testing system. The PDU displays system status and all symbology required for target engagement and missile firing.

16-16. Removal - pilot Display Unit.

WARNING

Ensure missiles are downloaded and battery is disconnected prior to performing any maintenance or tests.

CAUTION

The PDU is sensitive to electrostatic discharge (ESD). Use ESD precautionary procedures when removing PDU. Refer to DOD-HDBK-263 and ML-STD-1686.

a. Disconnect electrical connector (1, figure 16-2.

b. Remove nuts (9) and screws (8) securing electrical cable (10) to windshield frame. Secure remaining hardware.

CAUTION

Equipment failure may occur if height adjustment levers are overtightened

c. Support PDU (4) using height adjustment lock release levers (3) located on each side of PDU.

d. Remove cap screw (7) and down stop (6) from front post (5).

e. Loosen height adjustment lock release levers (3) and remove PDU (4) from mount assembly (2).

16-16.1. Cleaning - Pilot Display Unit. Use lens cleaning tissue (C93.1) to dean the transparent surfaces. To remove oil or grease, apply the optical cleaning compound (C108.2) sparingly with the lens cleaning tissue. Wipe the cleaned area thoroughly dry.

16-17. Installation - Pilot Display Unit.

CAUTION

The PDU is sensitive to electrostatic discharge (ESD). Use ESD precautionary procedures when Installing PDU. Refer to DOD-HDBK-263 and MIL-STD-1686.

CAUTION

Equipment failure may occur If height adjustment levers am overtightened.

a. Install PDU (4, figure 16-2) by raising unit onto front and rear posts of mount assembly (2). Supportby locking height adjustment lock release levers (3).

b. Secure PDU (4) to front post (5) using down stop (6) and cap screw (7).

c. Secure electrical cable (10) to windshield frame with screws (8) and nuts (9).

WARNING

A poor electrical bond can cause a severe shock hazard for personnel.

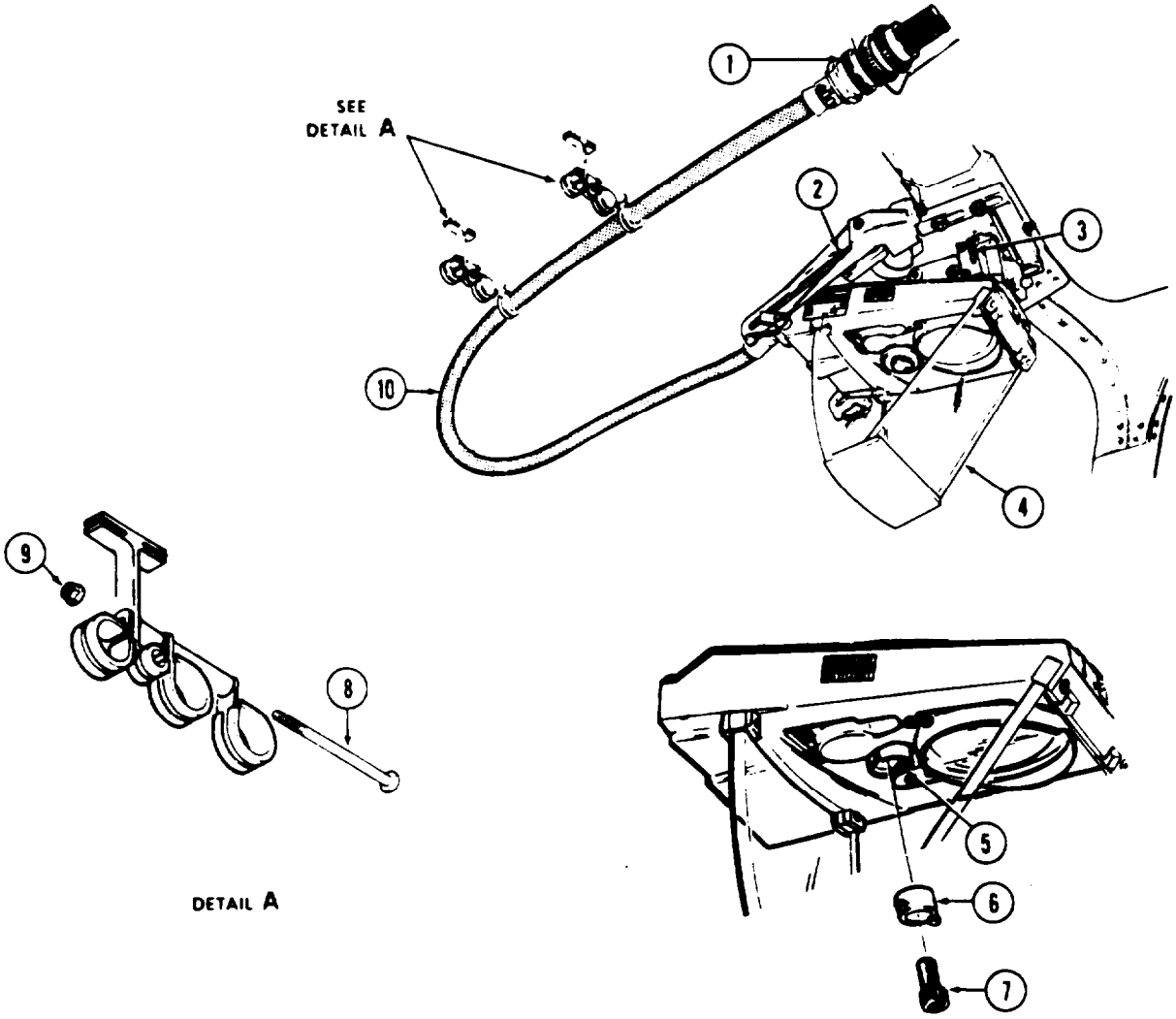
d Check for an electrical bond, 100 milliohm maximum, between PDU and airframe.

e. Connect electrical connector (1).

f. Check clearance (min. **0.30** inch) between PDU and windshield in breakaway position.

NOTE

If minimum clearance does not exist, readjust PDU mount (paragraph 16-27).



1. Electrical Connector
2. Mount Assembly
3. Height Adjustment Lock Release Lever
4. Pilot Display Unit (PDU)
5. Front Post
6. Down Stop
7. Cap Screw
8. Screw
9. Nut
10. Electrical Cable

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Figure 16-2. Pilot Display Unit (PDU) CS

16-18. PILOT DISPLAY UNIT MOUNT ASSEMBLY

16-19. Description - Pilot Display Unit Mount Assembly. The pilot display unit (PDU) mount assembly provides a means for mounting the PDU to the helicopter and for PD U breakaway in the event of a hard nose down impact.

16-20. Removal - Pilot Display Unit Mount Assembly.

a. Remove pilot display unit (paragraph 16-16).

b. While holding bracket and track assembly (8, Figure 16-3), remove top two bolts(4) and washers(3) securing bracket and track assembly (8) to support assembly(5).

c. Remove bracket and track assembly (8) from support assemble (5).

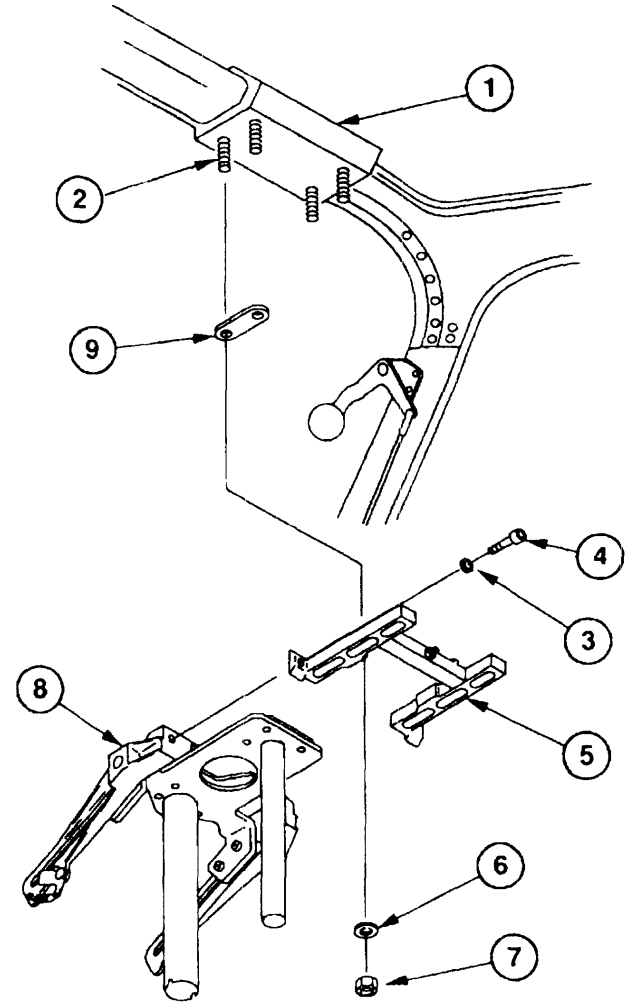
d. Reinstall bolts (4) and washers (3) on bracket and track assembly (8) for storage.

NOTE

Unless damaged, support assembly is not normally removed. If removed, entire system will have to be boresighted.

e. Hold pin (2) with hex wrench and remove four nuts (7) and washers (6) securing support assembly (5) and spacer (9) to PDU fitting(1).

f. Remove support assembly (5) from pins (2).



1. PDU Fitting
2. Pin
3. Washer
4. Bolt
5. Support Assembly
6. Washer
7. Nut
8. Bracket and Track Assembly
9. Spacer

Figure 16-3. Pilot Display Unit Mount Assembly CS

16-21. Cleaning - Pilot Display Unit Mount Assembly.

WARNING

Drycleaning solvent is combustible; do not use near open flames welding areas, or on hot surfaces. Prolonged contact of skin with liquid can cause skin irritation. Repeated inhalation of vapor can irritate nose and throat and cause dizziness if any liquid contacts skin or eyes, immediately flush affected area thoroughly with water. Remove solvent saturated clothing. If vapors cause dizziness, go to fresh air. In all cases get immediate medical attention. When handling liquid or when applying it in an air-exhausted, partially covered tank wear approved gloves. When handling liquid or when applying it at an unexhausted, uncovered tank or workbench, wear approved respirator and gloves.

a. Clean parts with wiping rag (C119.1) dampened with drycleaning solvent (C62).

b. Dry parts thoroughly.

16-22. Disassembly - Pilot Display Unit Mount Assembly.

a. Remove pilot display unit (PDU) (paragraph 16-16).

b. Remove PDU mount assembly (paragraph 16-20).

c. Remove springs (6, figure 16-4).

d. Remove screws (5), bushings (4), latches (3), and washers (2).

e. Remove spring plungers (8).

f. Remove lockwire securing jamnuts (9).

g. Loosen jamnults (9).

h. Support bracket assembly (10) and remove pins. (7).

i. Slide bracket assembly (10) from support (13).

j Remove jamnuts (9) from pins (7).

k Support track (1) and remove bolts (12) and washers (11).

l. Pull track(1) from support (10).

m. Remove lockwire securing jamnut (14).

n. Loosen jamnut (14) and remove setscrew (15).

o. Remove jamnut(14) from setscrew (15).

16-23. Inspection - Pilot Display Unit Mount Assembly.

a. Visually inspect for cracks or damage. Replace any cracked or damaged part which effects the visual interpretation of PDU (displayed information, operation or Safety of Flight.

b. Inspect for corrosion.

16-24. Repair - Pilot Display Unit Mount Assembly.

a. Replace any cracked, damaged, or unserviceable parts.

b. Remove any corrosion from mount assembly using crocus cloth (C55).

16-25. Assembly - Pilot Display Unit Mount Assembly.

Install setscrew (15, figure 16-4) into support (13)

b. Install jamnut (14) fingertight.

c. Place track (1) on support (1 3).

d. Attach support (13) to track(1) with bolts(12) and washers (11).

e. Install latches (3) to track (1) with screws (5), bushings (4), and washers (2).

NOTE

The washers are installed between the track and latches.

f. Attach springs (6) to latches (3) and track(1).

g. Slide bracket assembly (10) into support (1 3).

h. Place pins (7) into slots in track (1).

NOTE

Pin heads should be on the outboard side of the track and jamnuts on the inboard side.

i. Install jamnuts (9) on pins (7).

NOTE

Jamnuts should be threequarter way up the pin threads.

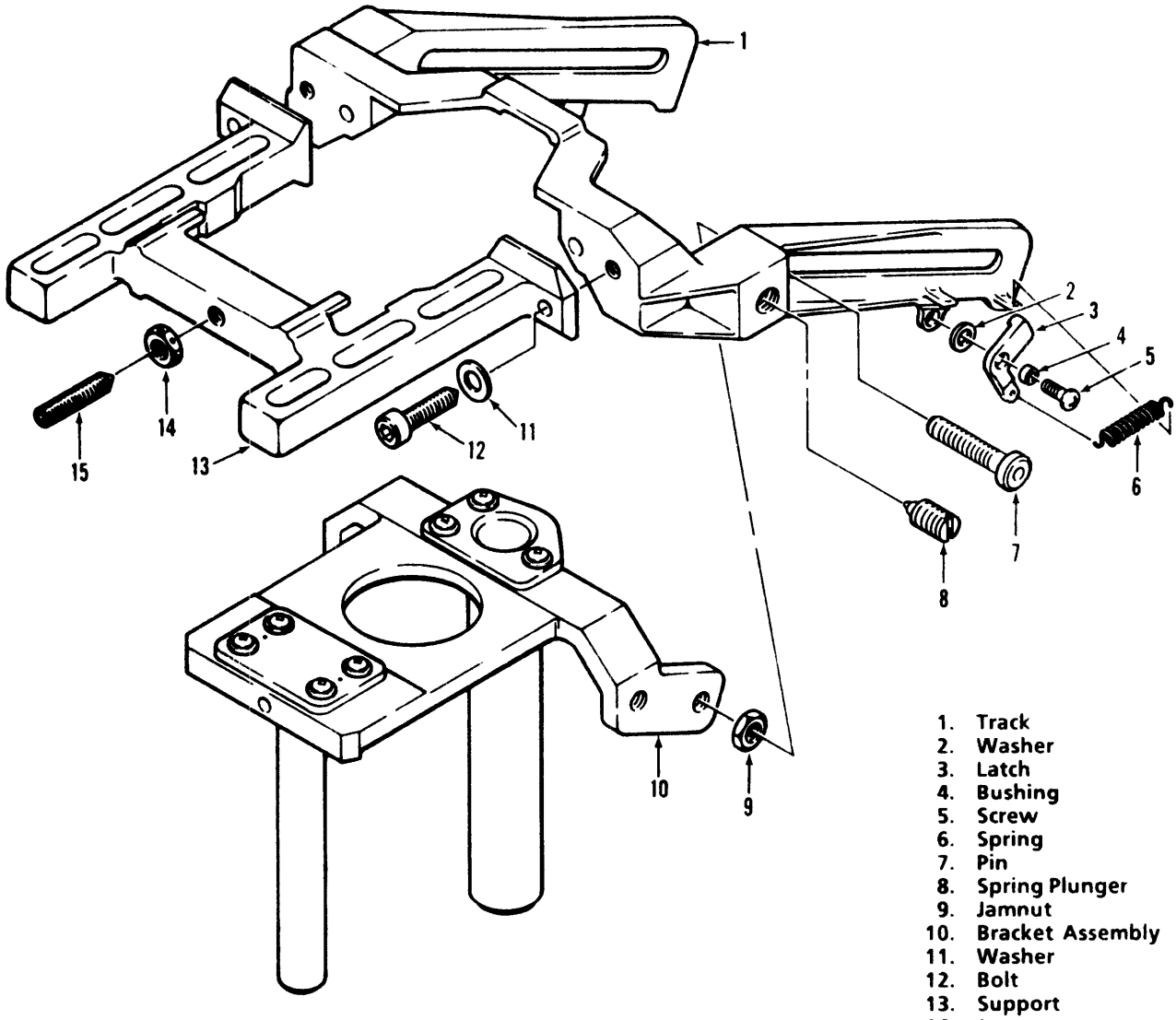
j. Align pins (7) with holes in bracket assembly (10) and install.

NOTE

Slotted end of pins should protrude through bracket assembly.

k Install spring plungers (8) fingertight.

l. Adjust breakaway force (paragraph 16-26).



1. Track
2. Washer
3. Latch
4. Bushing
5. Screw
6. Spring
7. Pin
8. Spring Plunger
9. Jamnut
10. Bracket Assembly
11. Washer
12. Bolt
13. Support
14. Jamnut
15. Setscrew

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Figure 16-4. Disassembly/Assembly of PDU Mount Assembly CS

16-26. Adjustment Breakaway Force – Pilot Display Unit Mount Assembly.

a. Adjust setscrew (9, figure 16-5) so the point extends 0.20 ± 0.03 inch through support assembly (7).

b. Place bracket assembly (5) against setscrew (9 and center bracket assembly within track (6).

NOTE

Hold PDU mount assembly with setscrew down and posts facing toward YOU.

c. Adjust pins (2) to ensure 0.020 to 0.030 inch clearance exists between backside of pinhead and track 16). Tighten jamnuts (1)

d. Place PDU mount assembly in vise that has padded jaws. See figure 16-5.

e. Attach spring scale (4) to bracket assembly (5).

f. Equally tighten spring plungers (3) until a force of 30± 5 pounds must be exerted along pull axis to cause bracket assembly (5) to move relative to track (6).

g. Back out setscrew (9) several turns and check alinement with bracket assembly (5). If alinement is off, adjust pins (2) an equal number of turns until setscrew IS alined. Turn setscrew (9) until contact is made with bracket assembly (5).

h. Tighten jamnuts (1 and 8).

i. Recheck pin clearance and breakaway force for proper limits.

j. Secure jamnut (8) to support assembly (7) using lockwire (C96).

k. Secure jamnuts (1) in pairs using lockwire (C96).

16-27. Installation -- Pilot Display Unit Mount Assembly.

a. Adjust breakaway force (paragraph 16-26).

b. Position support assembly (5, figure 16-3) and spacers (9) in place on pins (2).

c. Slide support assembly (5) as far aft as possible on PDU fitting (1).

d. Secure support assembly (5) to PDU fitting (1) and pins (2) using nuts (7) and washers (6),, Fingertighten nuts (7).

e. Remove bolts (4) and washers (3) from bracket and track assembly (8).

f. Install bracket and track assembly (8) on support assembly (5).

g. While holding bracket and track assembly (8), install bolts (4) and washers (3) securing bracket anti track assembly (8) to support assembly (5).

h. Slide support assembly (5) with bracket anti track assembly (8) forward.

i. Check clearance, minimum 0.30 inch between bracket and track assembly (8) and windshield. Adjust support assembly (5) on PDU fitting (1) as necessary.

j. Hold pins (2) with hex wrench and secure support assembly (5) to PDU fitting (1) using nuts (7) and washers (6).

k. Boresight ATAS missile system (paragraph 16-58), if support assembly was removed.

l. Install pilot display unit (PDU) (paragraph 16-17).

16-28. IMPULSE CARTRIDGES. CS

16-29. Description – Impulse Cartridges. Impulse cartridges are used as a power source to force the ejector rack suspension hooks open and actuate an outward force on the ejector foot to eject stores clear of the helicopter. The ejector rack contains two cartridges that are fired electrically by the jettison switch.

16-30. Removal - Impulse Cartridges.

a. Disconnect battery.

b. Position all armament circuit breakers and switches to OFF.

c. Install ground safely pins.

d. Cut and remove lockwire (1, figure 16-6) from retainers (2).

e. Remove sealant (if present) from the two retainers (2) and ejection rack breech (4).

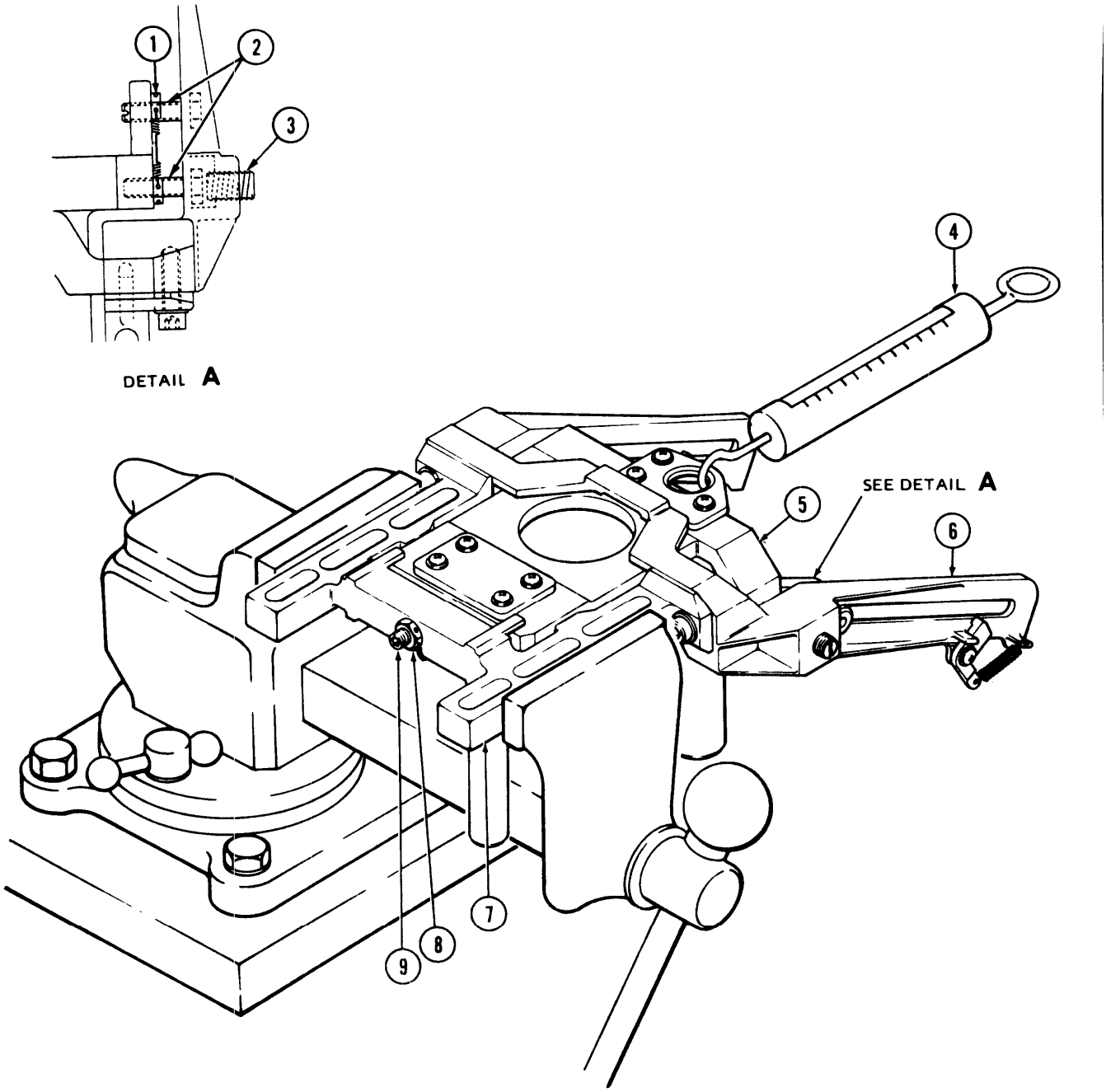
f. Remove cartridge retainers (2) and cartridges (3) from ejector rack breech (4).

16-31. Inspection - Impulse Cartridges.

a. Inspect cartridges for damage and corrosion.

NOTE

A cartridge is considered unserviceable after ten insertions and removals from ejector rack. Each time a cartridge is removed, place a radial mark on the base of the cartridge with indelible ink. Monitor the service life by a record of inked markings and expiration date on cartridge case.



1. Jamnut
2. Pin
3. Spring Plunger
4. Spring Scale
5. Bracket Assembly
6. Track
7. Support Assembly
8. Jamnut
9. Setscrew

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Figure 16-5. PDU Mount Assembly Adjustment CS

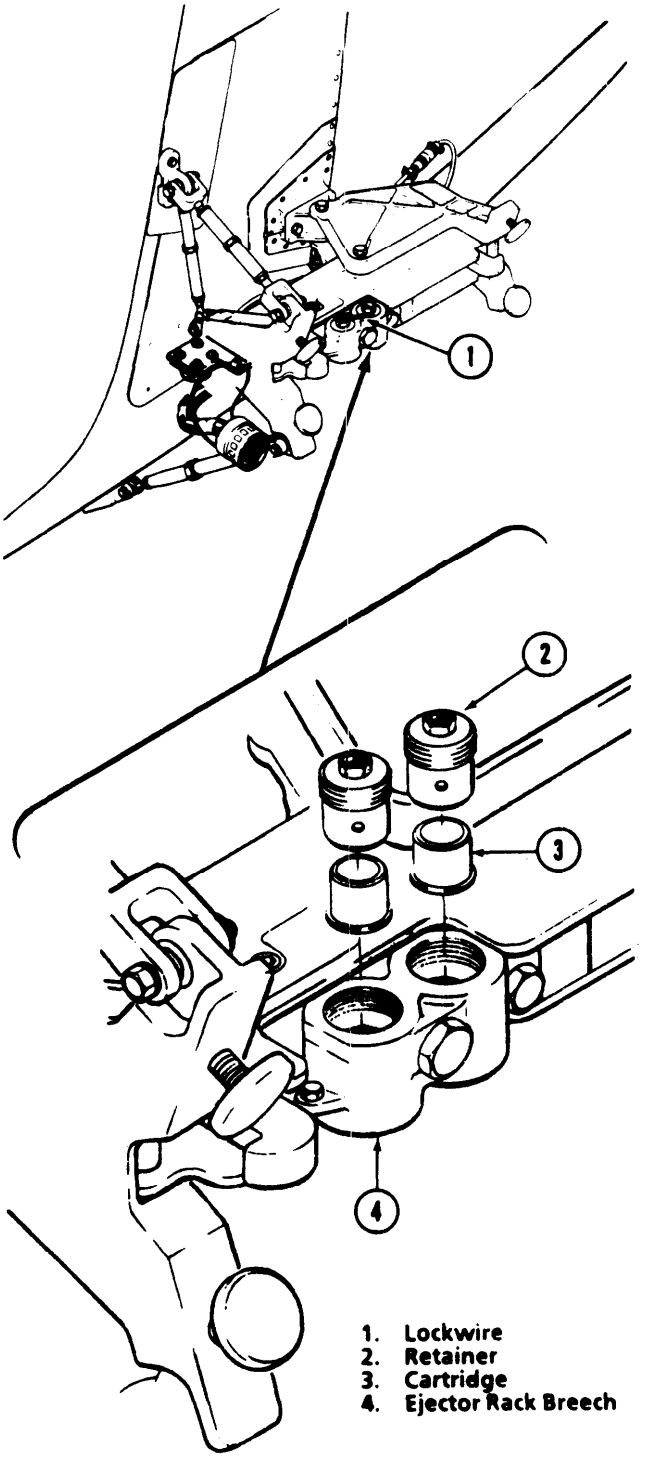


Figure 16-6. Impulse Cartridge Removal CS

NOTE

The maximum shelf life for a cartridge is 8.5 years from date of manufacture stamped on the cartridge. Cartridge life expires 36 months from date of opening hermetically sealed shipping container. When opening a container, the service life expiration date (month and year) shall be marked on the side of the cartridge with indelible ink.

b. Inspect cartridges for service life requirements.

c. Inspect cartridges for shelf life (storage life) requirements.

16-32. Installation - Impulse Cartridges.

a. Visually inspect ejector rack to determine rack condition.

b. Place a cartridge (3, figure 16-6) into each of two cartridge retainers (2) and screw into ejector rack breech (4). Torque retainers **40 TO 60 FOOT-POUNDS** and lockwire (C96) cartridge retainers together.

c. Apply sealant (C161) to area between cartridge retainers (2) and breech (4) to prevent water entrapment/penetration.

16-33. LAUNCHER ASSEMBLY. CS

16-34. Description - Launcher Assembly. The launcher assembly consists of a launcher and adapter. The launcher contains the electronic circuitry to fire the missiles. The adapter is a mechanical device used to attach the launcher to the pylon ejector rack For maintenance of launcher assembly, refer to TM 9-1440-431-23.

16-35. Removal - Launcher Assembly.

a. Remove impulse cartridges (paragraph 16-30).

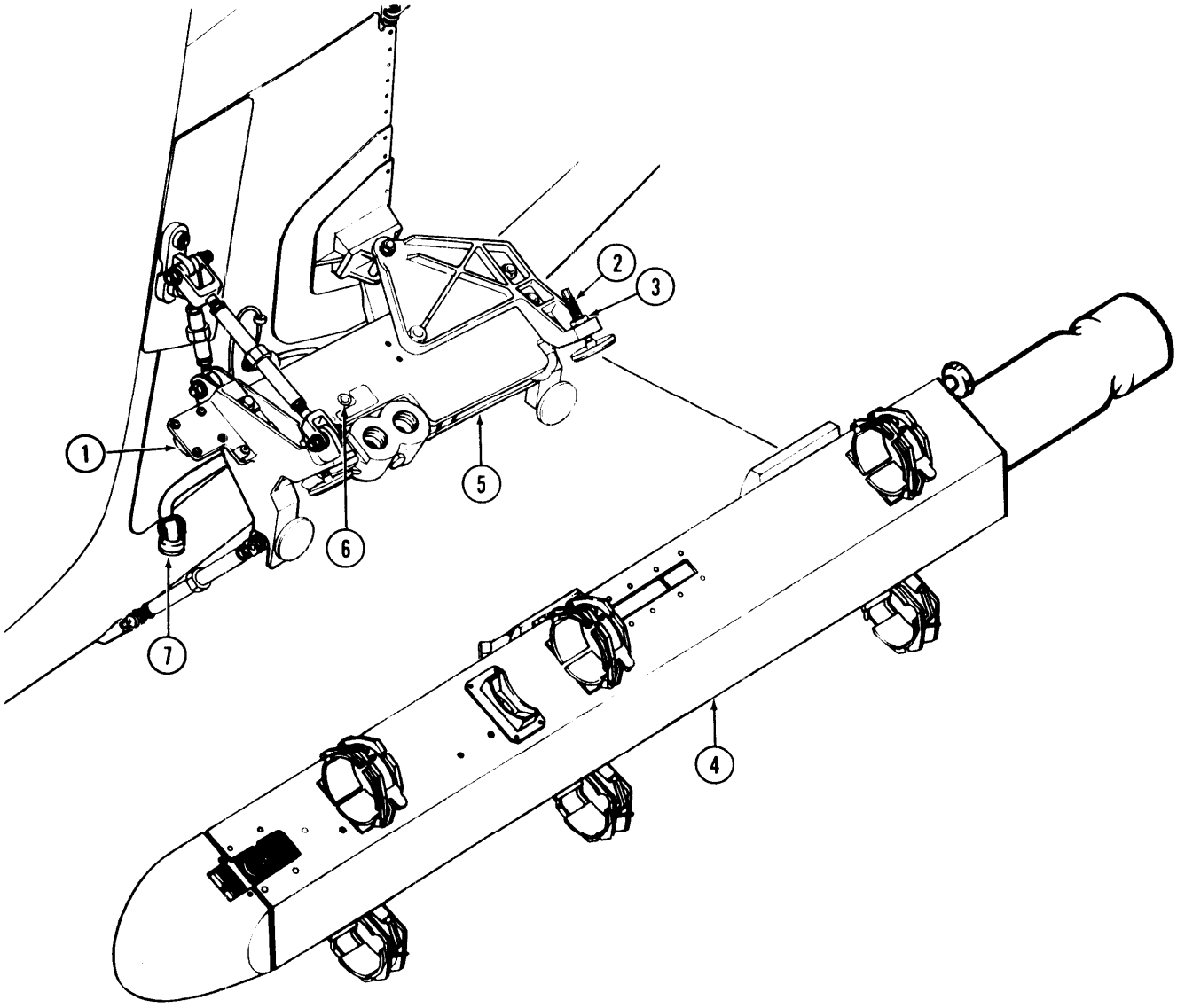
b. Remove coolant reservoir (TM 9-1440-431 -23).

c. Disconnect electrical cable (7, figure 16-7) and stow on dummy receptacle (1).

d. Loosen jamnuts (3).

e. Back out pads (2).

f. Support launcher assembly (4).



1. Dummy Receptacle
2. Pad
3. Jamnut
4. Launcher Assembly
5. Ejector Rack
6. Manual Release Slot
7. Electrical Cable

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Figure 16-7. Removal/installation of Launcher Assembly

g. Insert hex wrench into manual release slot (6) and turn in direction of arrow.

h. Remove launcher assembly (4).

16-36. Installation – Launcher Assembly.

NOTE

Release levers should be in the open position.

a. Hold launcher assembly (4, figure 16-7) in position on ejector rack (5).

b. Insert hex wrench into manual release slot (6) and turn in direction of arrow.

c. Adjust pads (2) equally to secure launcher assembly (4) in ejector rack (5).

d. Tighten jamnuts (3) fingertight.

e. Connect electrical cable (7) to launcher assembly (4).

f. Boresight launcher assembly (paragraph 16-73).

g. Install coolant reservoir (TM 9-1440-431-23

16-37. PYLON INSTALLATION. CS

16-38. Description – Pylon Installation. The pylon Installation provides a mounting location for the ATAS launcher assembly. The installation consists of a pylon assembly and ejector rack.

The pylon assembly has a forward sway brace assembly, an aft sway brace and step assembly, and three strut assemblies. The strut assemblies support the forward sway brace assembly and provide for boresighting the pylon assembly.

The ejector rack is a self-contained assembly that mates the launcher assembly to the pylon assembly. The ejector rack also provides the pilot with a means to jettison the launcher assembly should an emergency situation arise.

16-39. Removal – Pylon Installation.

Remove impulse cartridge retainers (14, figure 16-8) (paragraph 16-30).

b Remove launcher assembly (paragraph 16-35).

c. Loosen screw (15) and remove lanyard (18) from under clip (16).

d, Disconnect electrical cable 19) from dummy receptacle (1 7).

e Disconnect electrical cable (26) and remove clamp (1).

f. Remove cotter pins (7, 12, and 25), nuts (6, 13, and 24), and washers (5, 11, and 23).

g. Remove bonding strap (2 from bolt (8).

NOTE

Flanged bushings may come out when bolts (3, 8, and 20) are removed.

h. Support pylon installation and remove bolts (20, 3, and 8), chamfered washers (21, 4, and 9), and floating bushings (22 and 10).

16-40. Disassembly – Pylon Installation.

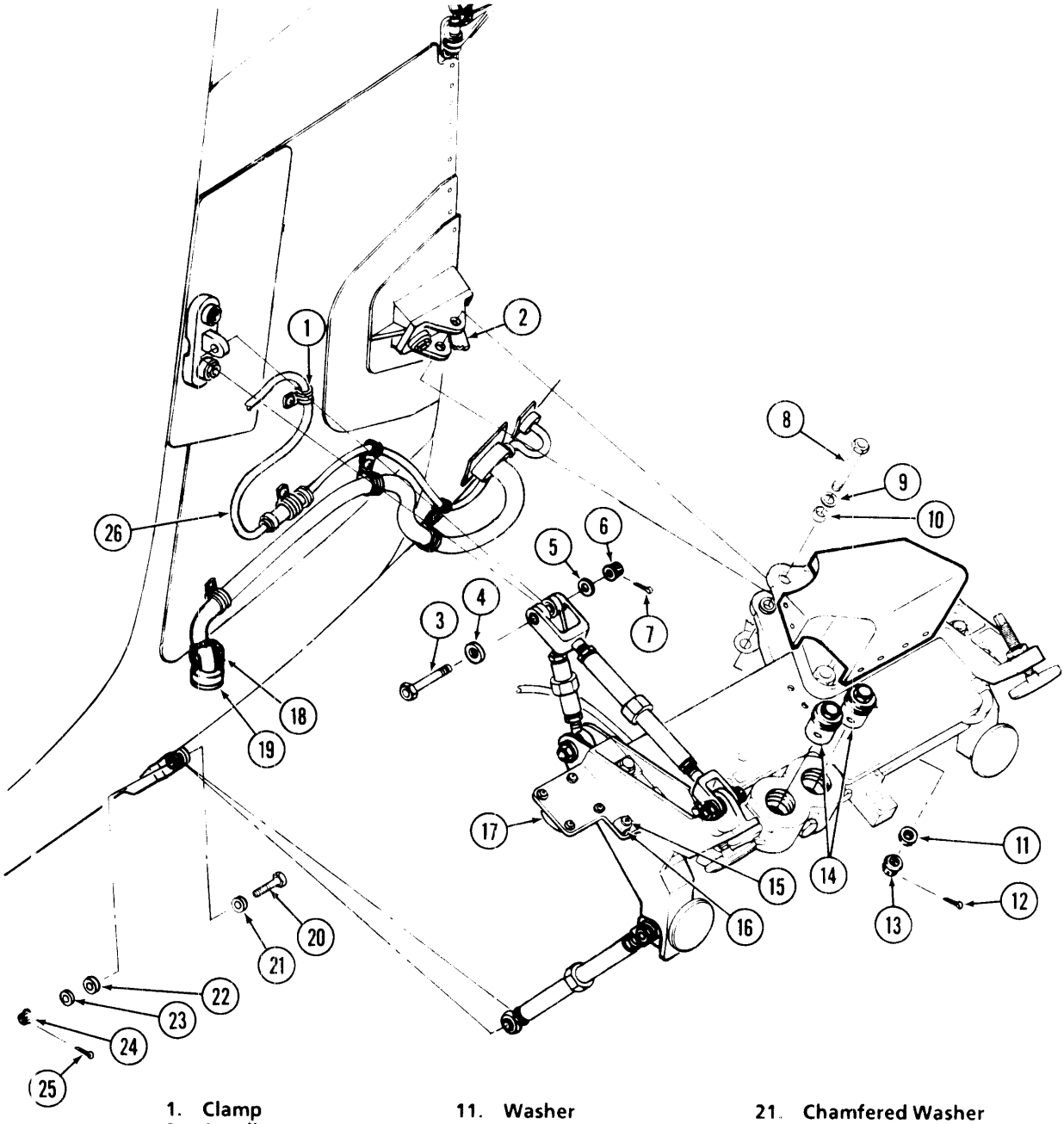
a. Remove strut assemblies as follows:

(1) Remove lower strut assembly (18, figure 16-9) by removing cotter pin (12), nut (13), washer (14), bushing (5), bolt (17), and chamfered washer (16).

(2) Separate upper strut assembly (3) and middle strut assembly (23) by removing flanged bushing (1) and bushing (2).

(3) Remove upper strut assembly (3) by removing cotter pin (8), nut (9), washer (10), bushing (11, bolt (19), and chamfered washer (20).

(4) Remove middle strut assembly (23) by removing cotter pin (4), nut (6), washer (5), bushing (7), bolt (2), and chamfered washer (22). Discard cotter pin.



1. Clamp
2. Bonding Strap
3. Bolt
4. Chamfered Washer
5. Washer
6. Nut
7. Cotter Pin
8. Bolt
9. Chamfered Washer
10. Floating Bushing
11. Washer
12. Cotter Pin
13. Nut
14. Cartridge Retainers
15. Screw
16. Clip
17. Dummy Receptacle
18. Lanyard
19. Electrical Cable
20. Bolt
21. Chamfered Washer
22. Floating Bushing
23. Washer
24. Nut
25. Cotter Pin
26. Electrical Cable

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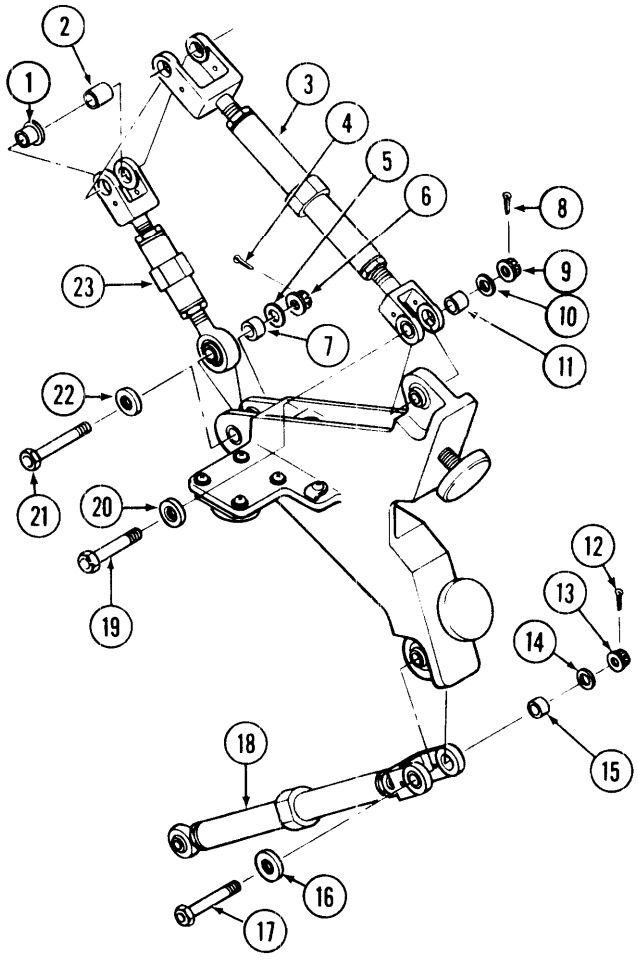
Figure 16-8. Removal/installation of Pylon Installation CS



1. Flanged Bushing
2. Bushing
3. Upper Strut Assembly
4. Cotter Pin
5. Washer
6. Nut
7. Bushing
8. Cotter Pin
9. Nut
10. Washer
11. Bushing
12. Cotter Pin
13. Nut
14. Washer
15. Bushing
16. Chamfered Washer
17. Bolt
18. Lower Strut Assembly
19. Bolt
20. Chamfered Washer
21. Bolt
22. Chamfered Washer
23. Middle Strut Assembly

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Figure 16-9. Removal/installation of Strut Assemblies CS

b. Remove ejector rack as follows:

(1) Remove cotter pins (17, figure 16-10), nuts (18), washers (19 and 2), and bolts (1) attaching ejector rack (14) to forward sway brace (16)

(2) Remove cotter pins (8), nuts (9), washers (10 and 6), and bolts (5) attaching ejector rack (14) to aft sway brace and step assembly (11).

(3) Remove cotter pin (15), nut (13), washers (12 and 4), and bolt (3) attaching ejector rack (14) to aft sway brace and step assembly (11).

(4) Remove ejector rack (14) and bushing (7) from aft sway brace and step assembly (11) and foward sway brace (16).

16-41. Disassembly - Ejector Rack.

a. Remove and discard Iockwire. Remove retainer (20, figure 16-11), piston (24), and spring (29) from breech (28).

b. Pull piston (24) cut of retainer (20); remove and discard packings (21, 22, and 23).

c. Remove ejection cylinder (17), ejection piston (16), foot (19), and packing (18) from breech (28) as an assembly.

d. Unscrew foot (19) from ejection piston (16); push ejection piston up and out of ejection cylinder (17). Remove and discard packing (18) from inside lower end of ejection cylinder.

CAUTION

When left sideplate (9) is removed from ejector rack, shackles and linkage will fall out if ejector rack is inverted. During disassembly, remove required hardware from right sideplate (5) first so that ejector rack will not have to be inverted after left sideplate is removed.

e Remove screw (3) securing cylinder cap (4) to right sideplate (5).

f. Remove nut (1), two washers (2 and 13), and bolt (12); place ejector rack on workbench with left sideplate up for remainder of disassembly.

g. Remove nut (26), washer (25), and screw (15) securing left sideplate (9) to forward end of breech (28).

h. Remove four screws (14) securing left sideplate (9) to spacers (27).

i. Remove four screws (11) securing left sideplate (9) to mounting column (8).

j. Remove seven screws (10) securing left sideplate (9) to two bumper pads (6), two closeouts (7), and cylinder cap (4).

k. Remove left sideplate (9) ensuring loose parts remain with ejector rack.

16-42. Disassembly – Cylinder Cap.

a. Move cylinder cap (1, figure 16-12) out slightly from right sideplate (5) and lift cylinder cap off gas tube (3). Remove and discard packings (2 and 12) from inside cylinder cap.

b. Remove gas tube (3) from breech (6). Remove and discard packing (4) from end of gas tube.

c. Clamp cylinder cap (1) in a vise (11) that has padded jaws. Cut Iockwire and remove orifice holder (7). Remove and discard packings (8 and 10) and backup ring (9) from orifice holder.

16-43. Cleaning and Impaction – Ejector Rack.

NOTE

After removal from the ejector rack, the ballistic components and the breech and ejection cylinder in the partially assembled ejector rack are cleaned. Removing residue from the fired cartridges permits visual inspection for evidence of damage. The opening in the orifice is critical and must be checked for size as well as carefully cleaned. When visual inspection indicates evidence of wear or damage, send ejector rack to next higher maintenance level.

1. Bolt
2. Washer
3. Bolt
4. Washer
5. Bolt
6. Washer
7. Bushing
8. Cotter Pin
9. Nut
10. Washer
11. Aft Sway Brace and Step Assembly
12. Washer
13. Nut
14. Ejector Rack
15. Cotter Pin
16. Forward Sway Brace
17. Cotter Pin
18. Nut
19. Washer

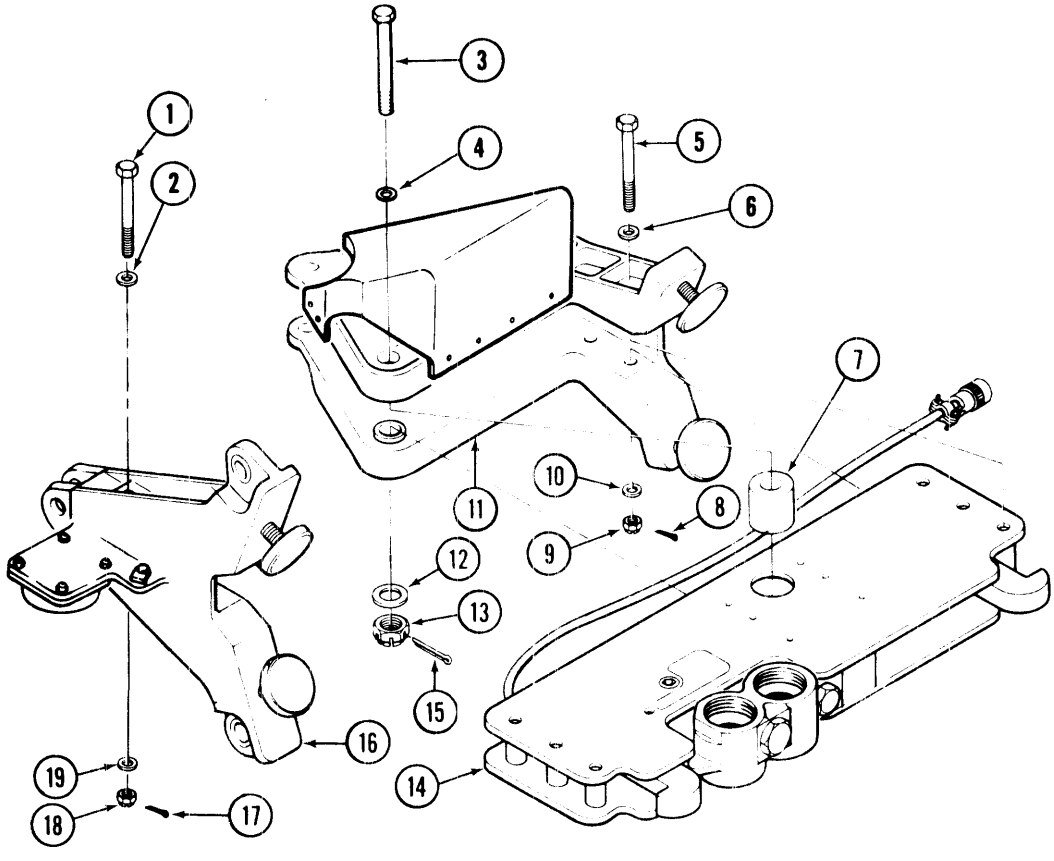


Figure 16-10. Removal/installation of Ejector Racks CS

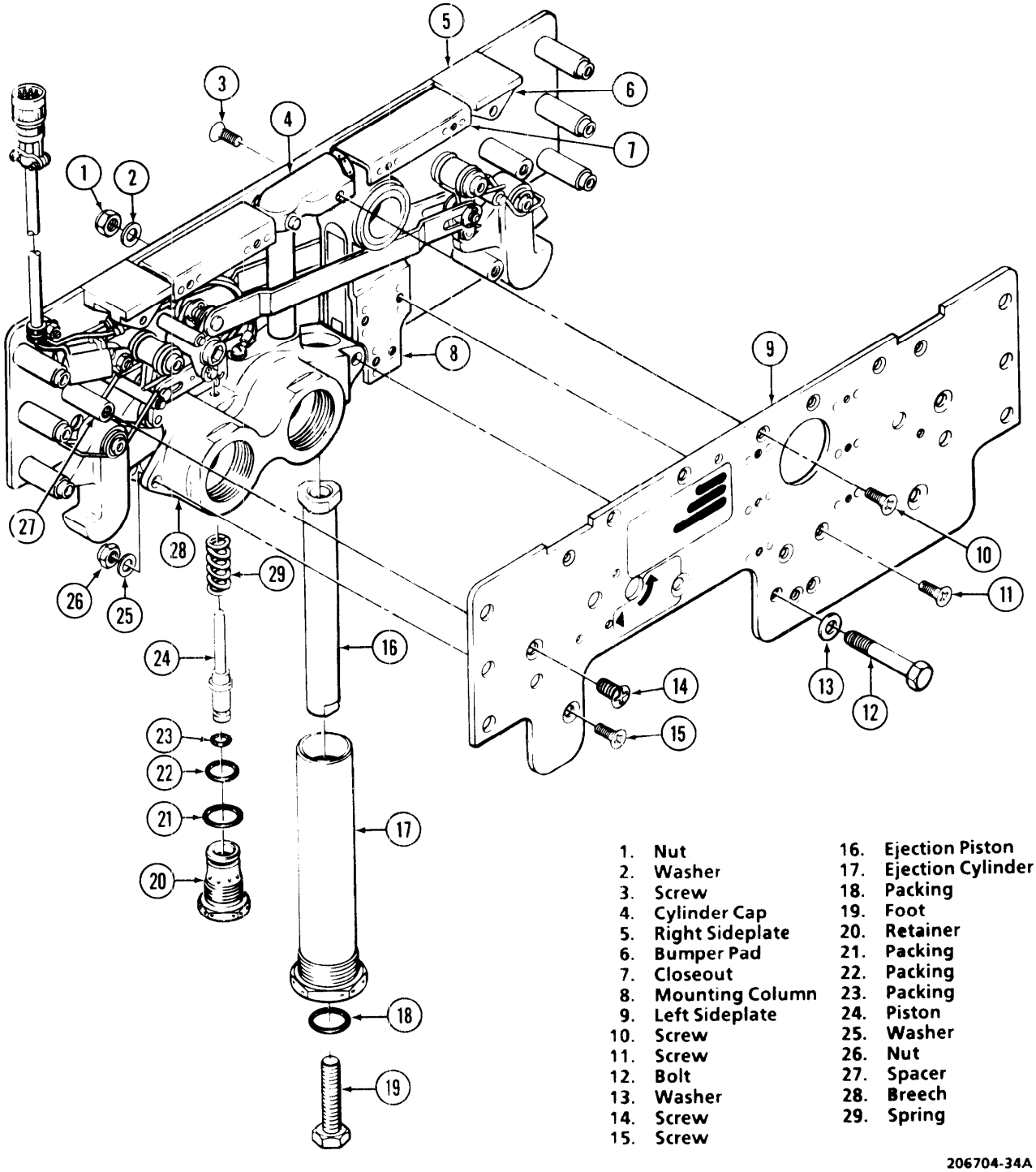


Figure 16-11. Disassernbly/Assembly of Ejector Rack CS

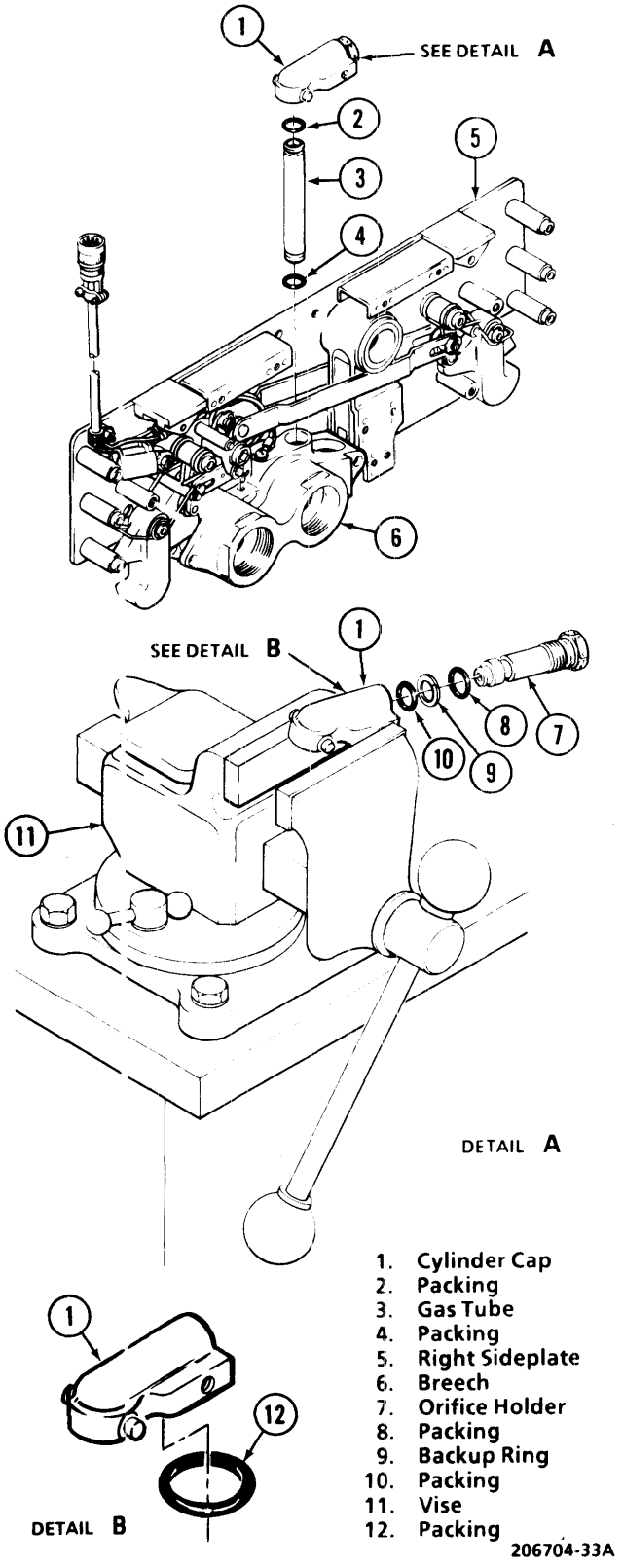


Figure 16-12. Disassembly/Assembly of Cylinder Cap Assembly CS

a. Clean components of the ballistic system using a solution of warm water and mild soap (C132.1). Use a soft bristle brush to loosen any caked residue.

WARNING

Drycleaning solvent is combustible; do not use near open flames, near welding areas, or on hot surfaces. Prolonged contact of skin with liquid can cause skin irritation. Repeated inhalation of vapor can irritate nose and throat and can cause dizziness. If any liquid contacts skin or eyes, immediately flush affected area thoroughly with water. Remove solvent-saturated clothing. If vapors cause dizziness, go to fresh air. In all cases get immediate medical attention. When handling liquid or when applying it in an air-exhausted, partially covered tank, wear approved gloves. When handling liquid or when applying it at unexhausted, uncovered tank or workbench, wear approved respirator and goggles.

b. Rinse parts using drycleaning solvent (C62) to remove moisture.

WARNING

When using compressed air for any cleaning or drying operation, do not exceed 30 psig at the nozzle. Eyes can be permanently damaged by contact with liquid or large particles propelled by compressed air. Inhalation of air-blown particles or solvent vapor can damage lungs. If injury occurs, get immediate medical attention. When using air for drying or cleaning at an air-exhausted workbench, wear approved goggles or faceshield. When using air for drying or cleaning at an unexhausted workbench, wear approved respirator and goggles.

c. Dry all parts, particularly passages in breech and retainers, using a clean, lint-free cloth (C45.1) and filtered, low pressure air.

d. Ensure all loose matter is removed after cleaning and drying.

CAUTION

The sizes of openings in orifice holder (7, figure 16-12) are critical, and sharp objects such as drill bits shall not be used for cleaning out these openings. An increase in the 0.0370 ± 0.005 inch diameter of center orifice will increase thrust applied to the ejector piston. An increase of 0.002 inch above maximum can increase the thrust as much as 20 percent.

NOTE

When necessary, use the shank of a drill bit 0.0370 inch in diameter to open center orifice and the shank of a drill bit 0.060 inch in diameter for side orifices.

e. Use a soft wire (copper or brass) 0.0370 inch in diameter to clean orifice in orifice holder (7). Ensure center and side openings are clear (0.060 inch diameter).

f. Inspect parts as follows

(1) Visually examine all parts for cleanliness, evidence of corrosion, cracks, and damaged threads.

(2) Visually examine openings in orifice holder (7) for obstruction and obvious distortion such as dents or cuts in area around openings. If damage IS suspected, send ejector rack to next higher level of maintenance.

(3) Roll spring (29, figure 16-11) across a flat surface to check for distortion.

(4) If dimensional or thread damage is suspected, send ejector rack to next higher level of maintenance.

16-44. Assembly – Cylinder Cap.

NOTE

A light coating of silicone grease (C81.1) shall be applied to each packing prior to assembly.

a. Install packings (10 and 8, figure 16-12) and backup ring (9) on orifice holder (7).

b. Clamp cylinder cap (1) in a vise (11) that has padded jaws. Install orifice holder (7) in cylinder cap (1) and torque **95 TO 115 INCH-POUNDS.** Secure orifice holder with lockwire (C96).

c. Remove cylinder cap (1) from vise (11) and install packings (2 and 12) in cylinder cap.

d. Install packing (4) on end of gas tube (3) and Install gas tube in breech (6).

e. Install cylinder cap (1) so that ear of cylinder cap mates with hole in right sideplate (5) and cylinder cap fits over gas tube (3).

16-45. Assembly – Ejector Rack.

CAUTION

Ensure that left sideplate mates properly with remainder of ejector rack and no internal parts are binding prior to installing screws.

a. Install left sideplate (9, figure 16-11) on ejector rack and secure to cylinder cap (4), two closeouts (7), and two bumper pads (6) with seven screws (10).

b. Install four screws (11) securing left sideplate (9) to mounting column (8).

c. Install four screws (14) securing left sideplate (9) to spacers (27).

d. Install screw (15), washer (25), and nut (26) securing left sideplate (9) to forward end of breech (28). Torque nut **50 TO 70 INCH-POUNDS.**

e. Install bolt (12), two washers (2 and 13), and nut (1). Torque nut **95 TO 115 INCH-POUNDS.**

f. Instal screw (3) securing cylinder cap (4) to right sideplate (5) .

g. Install packing (18) inside bottom end of ejection cylinder (17).

h. Install ejection piston (16) into ejection cylinder (17) and screw foot (19) into ejection piston.

i. Install ejection cylinder (17), ejection piston (16), foot (19), and packing (18) into breech (28) as an assembly. Torque ejection cylinder **290 TO 310 INCH-POUNDS.**

j. Install packings (21 and 22) on retainer (20) and packing (23 on piston (24).

k. Instal spring (29) on piston (24); insert piston into retainer (20) and screw retainer into breech (28). Torque retainer **95 TO 115 INCH-POUNDS.**

l. Lockwire (C96) retainer (20) to ejection cylinder (17).

16-46. Disassembly – Forward Sway Brace, Aft Sway Brace and Step Assembly, and Struts.

a. Disassemble forward sway brace (8, figure 16-13) as follows:

(1) Remove dummy receptacle (11) by removing nuts (2), washers (1), and screws (12).

(2) Remove clip (5) and spacer (6) by removing nut (10), washers (4), and screw (3),

(3) Re move jamnuts (9) and pads (7).

b. Disassemble aft sway brace and step assembly (13) by removing jamnuts (15) and pads (14).

c. Disassemble strut assemblies as follows:

(1) Remove and discard lockwire securing jamnuts (2, figure 16-14) (6 places). Loosen jamnuts.

NOTE

Clevises (1) have left hand threads.

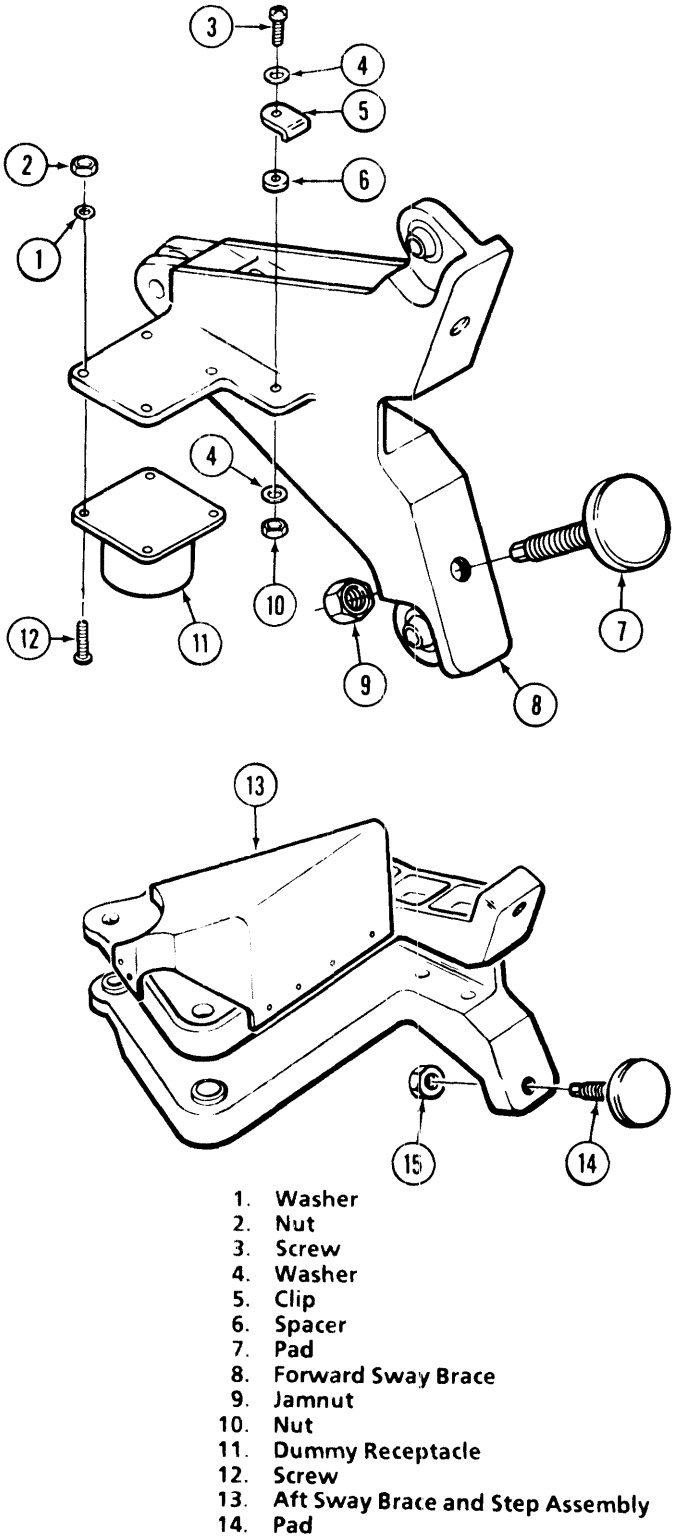


Figure 16-13. Disassembly/Assembly of Forward Sway Brace and Aft Sway Brace and Step Assembly CS

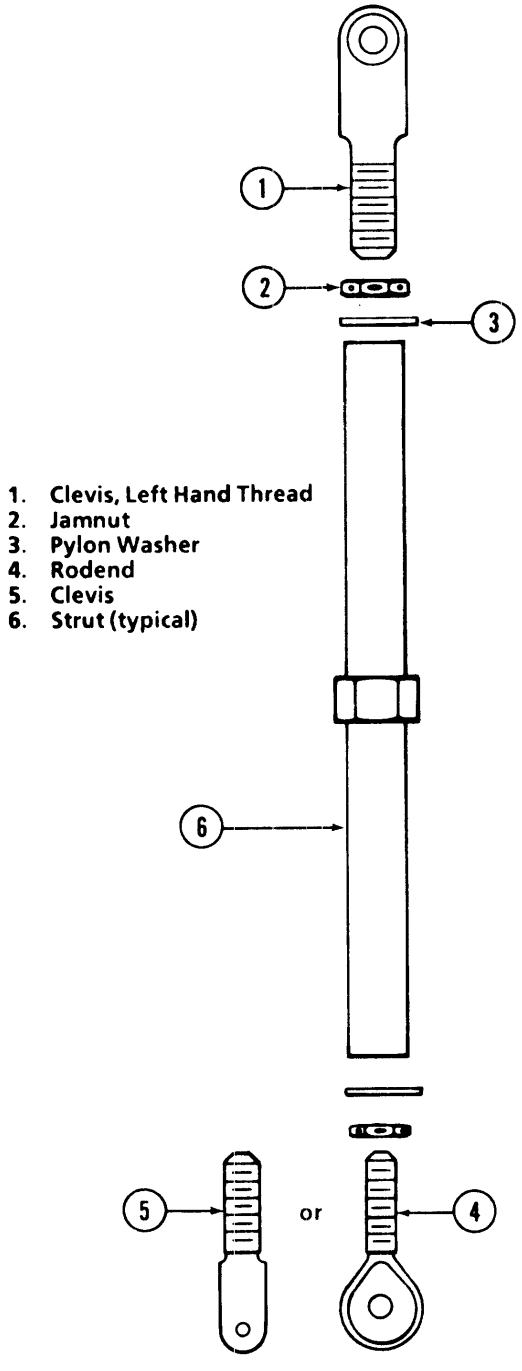


Figure 16-14. Disassembly/Assembly of Strut Assembly CS

(2) Remove clevises (1 and 5), rodend (4), and pylon washers (3).

16-47. Cleaning – Sway Braces and Struts.

WARNING

Drycleaning solvent is combustible; do not use near open flames, near welding areas, or on hot surfaces. Prolonged contact of skin with liquid can cause skin irritation. Repeated inhalation of vapor can irritate nose and throat and can cause dizziness. If any liquid contacts skin or eyes, immediately flush affected area thoroughly with water. Remove solvent-saturated clothing. If vapors cause dizziness, go to fresh air. In all cases get immediate medical attention. When handling liquid or when applying it in an air-exhausted, partially covered tank, wear approved gloves. When handling liquid or when applying it at unexhausted, uncovered tank or workbench, wear approved respirator and goggles.

a. Clean pylon assembly components with a stiff bristle brush (C31) and dry cleaning solvent (C62).

b. Dry pylon assembly components with a wiping rag (C119.1).

16-48. Inspection – Sway Braces and Struts.

a. Inspect struts for bends, corrosion, cracks, dents, nicks, and scratches. No bends, sharp dents, or cracks allowed.

b. Inspect clevises for bent shafts, corrosion, cracks, dents, nicks, scratches, and thread damage. No thread damage allowed in area of jamnut. No cracks or bent shafts allowed.

c. Inspect flanged bushings for bonding, corrosion, and wear. Refer to figure 16-15 for bushing wear limits. Replace bushings that exceed wear limits or are corroded.

NOTE

Flanged bushing (1) is not a bonded bushing .

d. Inspect bushings for corrosion and wear. Refer to figure 16-15 for bushing wear limits. Replace bushings that exceed wear limits or are corroded.

e. Inspect rodend for radial play in bearing, bent shaft, corrosion, cracks, dents, nicks, scratches, and thread damage. No thread damage allowed in area of jamnut, No cracks or bent shafts allowed.

f. Inspect sway braces for corrosion, cracks, and mechanical damage. Refer to figure 16-16 for corrosion and mechanical damage limits Replace sway braces if limits are exceeded or sway braces are cracked. No sharp dents or creases are allowed.

g. Penetrant inspect suspected cracks in sway braces, struts, clevises, and rodend (TM 55-1500-335-23).

h. Inspect bearings. Replace bearings that exceed limits of TM 55-405-3.

i. Inspect dummy receptacle for corrosion and fit and function. Replace dummy receptacle if it fails fit and function or is severely corroded.

16-49. Repair – Forward Sway Brace, Aft Sway Brace and Step Assembly, and Struts.

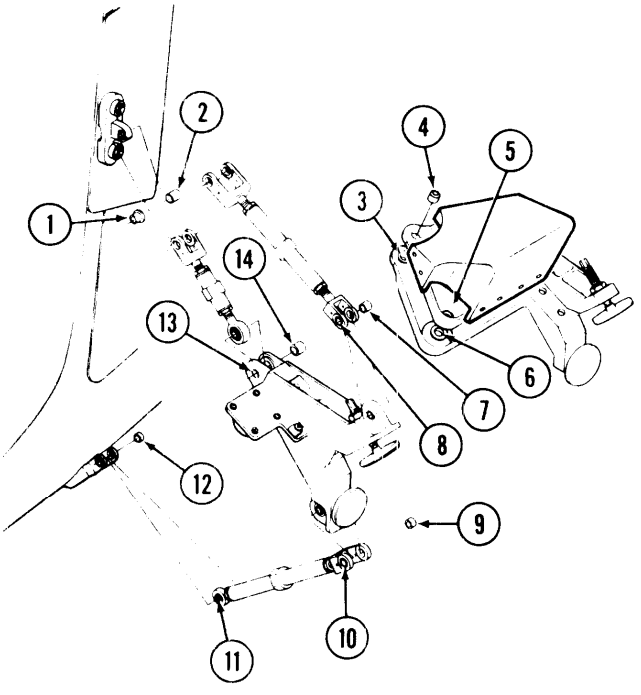
a. Repair corrosion on sway braces not exceeding limits of figure 16-16 (TM 43-0105).

b. Repair mechanical damage on sway braces to limits shown in figure 16-16 using a rotary file.

c. Repair corrosion on struts not to exceed 0.010 inch after repair (TM 43-0105).

d. Repair mechanical damage on struts not to exceed 0.010 inch after repair using a rotary file.

e. Dress damaged threads not to exceed two threads with a fine India stone (C84).



BUSHING	LIMIT IN INCHES	
	I.D.	O.D.
1.	0.3135	
2.	0.3138	0.4355
3.	0.3760	
4.	0.3760	0.4482
5.	0.5010	
6.	0.5010	
7.	0.3760	0.4482
8.	0.3760	
9.	0.3138	0.4355
10.	0.3135	
11.	0.2510	
12.	0.2510	0.3746
13.	0.3760	
14.	0.3760	0.4482

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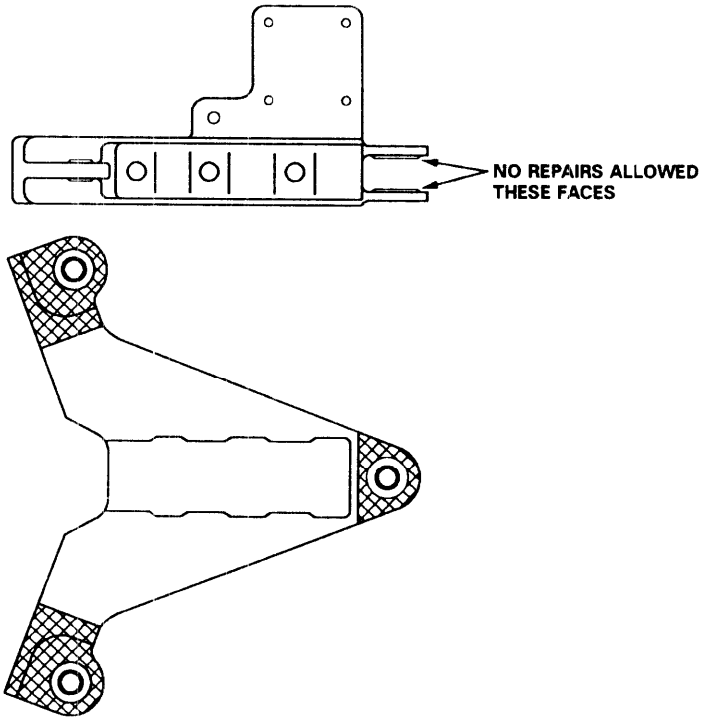
Figure 16-15. Bushing Wear Limits CS



FORWARD SWAY BRACE

TYPE OF DAMAGE	DAMAGE AREA REPAIR SYMBOLS MAXIMUM DAMAGE DEPTHS	
MAXIMUM REPAIR DEPTH FOR MECHANICAL DAMAGE	0.020 in.	0.020 in.
MAXIMUM DEPTH OF CORROSION	0.010 in.	0.010 in.
MAXIMUM DEPTH OF CORROSION REPAIR	0.020 in.	0.020 in.
EDGE CHAMFER TO REMOVED DAMAGE	0.040 in. x 45°	0.040 in. x 45°
BORES	0.005 in. for 1/4 of circumference	
THREAD DAMAGE	2 Threads	2 Threads
DENTS:		
DEPTH	0.050 in.	NONE
MINIMUM DIAMETER	10 x DEPTH	
MINIMUM SPACING	1 in. between edges of dents	

NOTES:

1. No cracks allowed.
2. Total depth of repeated repairs not to exceed limits shown.
3. No sharp dents or creases allowed.

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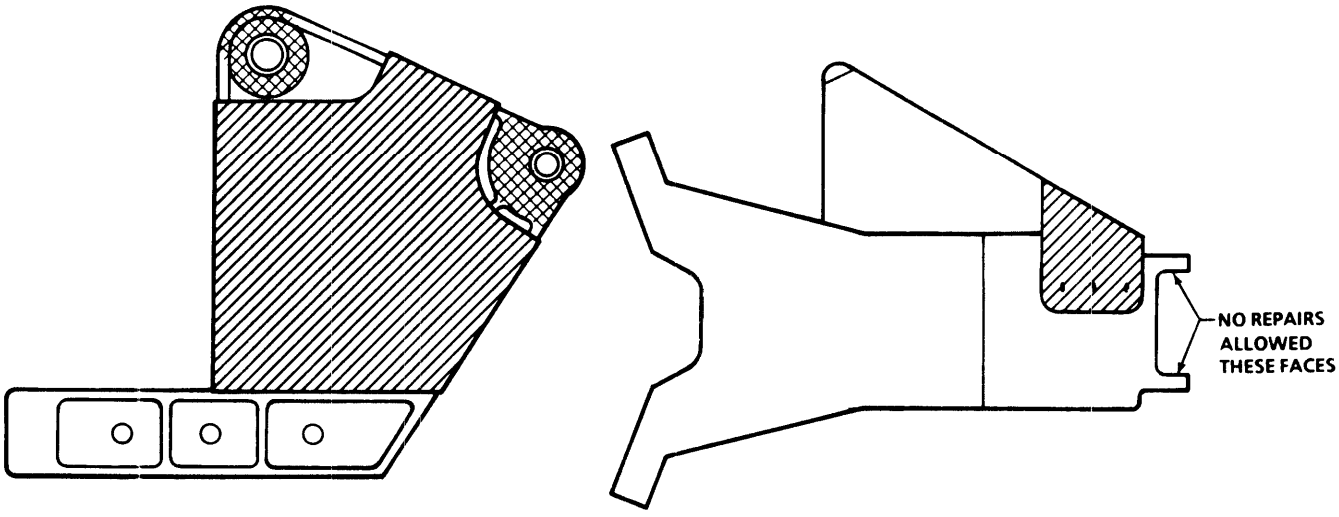
Figure 16-16. Damage Limits – Sway Braces CS (Sheet 1 of 2)



AFT SWAY BRACE AND STEP ASSEMBLY

TYPE OF DAMAGE	DAMAGE AREA REPAIR SYMBOLS		
	MAXIMUM DAMAGE DEPTHS		
MAXIMUM REPAIR DEPTH FOR MECHANICAL DAMAGE	0.020 in.	0.020 in.	0.005 in.
MAXIMUM DEPTH OF CORROSION	0.010 in.	0.010 in.	0.003 in.
MAXIMUM DEPTH OF CORROSION REPAIR	0.020 in.	0.020 in.	0.005 in.
EDGE CHAMFER TO REMOVED DAMAGE	0.040 in. x 45°	0.040 in. x 45°	0.040 in. x 45°
BORES	0.005 in. for 1/4 of circumference	N/A	N/A
THREAD DAMAGE	2 Threads	N/A	N/A
DENTS:			
DEPTH	0.100 in.	NONE	0.250 in.
MINIMUM DIAMETER	10 x DEPTH		5 x DEPTH
MINIMUM SPACING	1 in. between edges of dents		1 in. between edges of dents

NOTES:

1. No cracks allowed.
2. Total depth of repeated repairs not to exceed limits shown.
3. No sharp dents or creases allowed.
4. No loose rivets allowed.
5. No looseness in block allowed (broken bond).

206704-80

Figure 16-16. Damage Limits -- Sway Braces CS (Sheet 2)

f. Repair corrosion on rodend and clevises not to exceed 0.020 inch after repair (TM 55-1500-335-23).

9 Repair mechanical damage on rodend and clevises not to exceed 0.020 inch after repair with a rotary file.

h. Bond loose hanged bushings with retaining compound (C120).

NOTE

Flanged bushing in upper and middle strut assembly is not a bonded bushing.

i. Replace corroded or mechanically damaged hardware.

j. Apply nonslip walking compound (C108.1) to step.

k. Apply protective coating to repaired areas (TM 55-405-3).

16-50. Assembly -- Forward Sway Brace, Aft Sway Brace and Step Assembly, and Struts.

a. Assemble strut assemblies as follows:

NOTE

Clevises (1, figure 16-14) have left hand threads.

(1) Install jamnuts (2) and pylon washers (3) on clevises (1 and 5) and rodends {4).

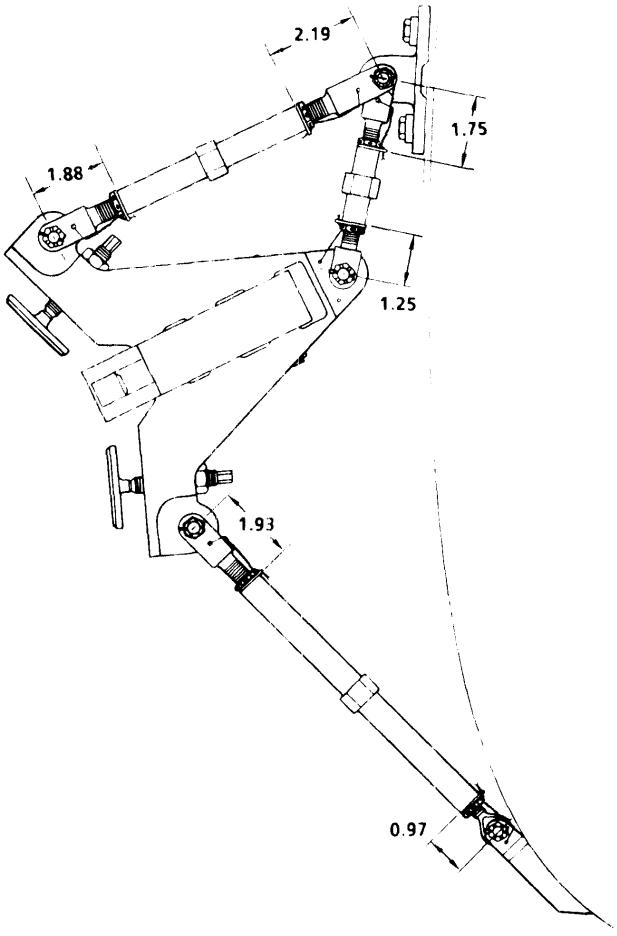
(2) Install clevises (1 and 5) and rodends (4). Set nominal length as shown in figure 16-17. Finger tighten jamnuts (2, figure 16-14).

b. Assemble forward sway brace as follows

(1) Install dummy receptacle (11, figure 16-13). Secure with screw (12), washers (1), and nut (2).

(2) Attach clip (5) and spacer (6) to forward sway brace (8) with screw (3), washers (4), and nut (10).

(3) Install pads (7) to nominal center of threaded portion.



NOTE

DIMENSIONS SHOWN ARE IN INCHES AND ARE MEASURED FROM CENTERLINE OF BOLT HOLE TO END OF STRUT.

206704-79

Figure 16-17. Nominal Strut Dimensions CS

(4) Install jamnuts (9) fingertight.

c. Instal pads (14) in aft sway brace and step assembly (13) to nominal center of threaded portion. Install jamnuts (15) fingertight.

16-51. Assembly - Pylon Installation.

a. Install bushing (7) figure 16-10 in ejector rack (14).

b. Install ejector rack (14) in forward sway brace (16) and aft sway brace and step assembly (11).

c. Install bolt (3), washers (4 and 12), nut (13), and cotter pin (15) securing ejector rack (14) to aft sway brace and step assembly (11).

d. Install bolts (5), washers (6 and 10), nuts (9), and cotter pins (8) securing ejector rack (14) to aft sway brace and step assembly (11).

e. Install bolts (1), washers (2 and 19), nuts (18), and cotter pins (17) securing ejector rack (14) to forward sway brace (16).

NOTE

Strut assemblies are installed on the forward sway brace assembly with flanged bushings forward.

f. Attack lower strut assembly (18, figure 16-9) with bolt (17), chamfered washer (16), bushing (15), washer (14), and nut (13).

g. Tighten nut (13) to remove axial play. Secure with cotter pin (12).

h. Attach middle strut assembly (23) with bolt (21), chamfered washer (22), bushing (7), washer (5), and nut (6).

i. Tighten nut (6) to remove axial play. Secure with cotter pin (4).

j. Attach upper strut assembly (3) with bolt (19), chamfered washer (20), bushing (11), washer (10), and nut (9).

k. Tighten nut (9) to remove axial play. Secure with cotter pin (8)

l. Install flanged bushing (1) and bushing (2).

WARNING

A poor electrical bond can cause the impulse cartridges to fire.

m. Check for an electrical bond, 2.5 milliohm maximum, between ejector rack (14, figure 16- 10) and aft sway brace (11).

16-52. Installation – Pylon Installation.

a. Attach pylon installation to airframe with bolts (8, 3, and 20, figure 16-8), chamfered washers (9, 4, and 21), and floating bushings (10 and 22).

NOTE

Floating bushing (10) is installed with bolt (8). Floating bushing (22) is installed with bolt (20).

b. Place bonding strap (2) on bolt (8).

c. Install washers (5, 11, and 23) and nuts (6, 13, and 24). Secure with cotter pins (7, 12, and 25).

d. Connect electrical cable (26) and attach to fuselage with clamp (1).

e. Connect electrical cable (19) to dummy receptacle (17).

f. Place lanyard (18) under clip (16) and tighten screw (15).

g. Install launcher assembly (paragraph 16-36),

h. Boresight ATAS missile system (paragraph 16-58).

16-53. ATAS MISSILE SYSTEM FITTING ASSEMBLIES AND CLEVIS. CS

16-54. Description – ATAS Missile System Fitting Assemblies and Clevis. The fitting assemblies and clevis provide a means to attach the pylon assembly to the airframe.

16-55. Remove - ATAS Missile System Fitting Assemblies and Clevis.

a. Remove pylon assembly. Refer to paragraph 16-39

b. Remove fitting assembly (1, figure 16-18) from fuselage by removing lockwire, bolts (3), and washers (2).

NOTE

Fitting (4) is permanently installed on fuselage.

c. Remove fitting (5) from fitting (4) by removing lockwire, bolts (7), washers (8), and bonding strap (6).

d. Remove clevis (11) from fuselage by removing lockwire, bolts (9), and washers (10).

16-56. inspection, Cleaning, Repair or Replace - ATAS Missile System Fitting Assemblies and Clevis.

a. Inspect fitting assembly (1, figure 16-18), fittings (4 and 5) and clevis (11) for nicks, dents, scratches and corrosion. inspect bearing for wear and roughness. Replace bearing if it exceeds limits of TM 55-405-3.

b. Clean all parts with solvent (C62). Dry with filtered compressed air.

c. Replace any part that does not meet inspection requirements.

NOTE

If bushings/bearings do not meet inspection requirements replace as follows:

(1) Press out failed bushing/bearing. Apply unreduced primer (C118) to faying surface and install bushing/bearing.

(2) Reinstall new bushings/bearings using a suitable press.

d. Prime and paint fitting assembly, fitting, and clevis in accordance with TM 55-1500-345-23.

16-57. Installation - ATAS Missile System Fitting Assembly and Clevis.

a. Install clevis (11, figure 16-18) on fuselage by installing bolts (9) and washers (10). Secure Bolts (9) with lockwire (C96).

b. Install fitting (5) on fitting (4) by installing bolts (7), washers (8), and bonding strap (6). Secure bolts (7) with lockwire (C96).

NOTE

Fitting assembly (1) shall be installed with bevel side forward

c. Install fitting assembly (1) on fuselage using bolts (3) and washers (2). Secure bolts (3) with lockwire (C96).

d. Install pylon installation. Refer to paragraph 16-52.

16-58. ATAS Boresight and Alignment Procedures. CS

a. ATAS boresight and alignment procedures are presented in five operations: confirmation; preliminary Pilot Display Unit (PDU); launcher; and boresight completion.

(1) Boresight confirmation is accomplished to determine if adjustment to a previously instailed/foresighted system is necessary. Pitch setting is not checked during confirmation because a coincident sight picture on the PDU and launcher borescope assures that pitch settings are correct

(2) Preliminary procedures are accomplished whenever any portion of the ATAS missile system is boresighted. Preliminary procedures pertain to safety precautions and boresight preparation.

(3) PDU procedures are accomplished whenever a PDU mount or PDU mount and launcher are installed.

(4) Launcher procedures are accomplished whenever a launcher is installed.

(5) Boresight completion procedures are accomplished at the end of PDU and launcher boresight procedures.

b. Reference planes of each three units PDU pylon, and launcher) must be aligned relative to each other. This is accomplished by sighting on a common target placed a short distance (1000 inches) in front of helicopter. Pitch and roll planes of launcher are adjusted relative to an airframe reference plane.

16-58.1. Boresight Confirmation Procedures-

16-58.2. Safety Procedures.

a. Ground helicopter.

b. Remove impulse cartridges refer to paragraph 16-30.

16-58.3. Target Placement.

a. Locate pitot tube (1, figure 16-19) on nose of helicopter. Measure from center of pitot tube inboard 3.5 inches to locate centerline of helicopter and suspend plum bob (2) from this point. When plumb bob stabilizes, mark plumb bob point (3) on ground.

b. Extend 100 foot tape (4) out forward of plumb bob point (3) and measure 1000 inches (83 feet 4 inches).

c. At 1000 inch distance, attach target assembly (5) to a suitable metal device (6).

16-58.4. PDU Set-up.

WARNING

Care should be taken when leaning into cockpit to ensure head injury does not result from contacting PDU, PDU mount assembly, or PDU alignment assembly.

NOTE

During following procedures, all steps must be accomplished from outside of helicopter.

a. Remove PDU, if installed. Refer to paragraph 16-16.

b. Install PDU alignment assembly (3, figure 16-21) on PDU mount (1) as high as it will go and secure with wingnut **(4).**

16-58.5. Launcher Set Up.

a. Remove fastener (12, figure 16-20) on tube assembly (11) Install tube assembly (11) on launcher using forward and center clamps (14).

b. Install tube (13) using center inboard clamp (10). Rotate tube assembly (11) and align with tube (13).

NOTE

Allow tube assembly (11) to rotate in outboard clamp (14) while securing fastener (12).

c. Install fastener (12).

d. Secure inboard and outboard damps (10) and (14) and install damp retaining pins (9).

e. Install borescope (15) in tube assembly (11).

f. Sight through borescope (15) and move target assembly (5, figure 16-19) to center of pylon borescope.

g. Perform borescope accuracy check: Remove borescope and rotate it approximately 180 degrees and reset. Verify no more than 1 MIL deviation from target. if more than 1 MIL deviation exists, replace borescope. Perform check on new borescope.

16-58.6. Pitch/Yaw Confirmation.

NOTE

The small circle of borescope sight picture is 2 MILs wide.

a. Install borescope (2) inPDU alignment assembly (3).

b. Sight through PDU borescope and check that crosshair superimposes on crosshair of target assembly within 2 MIL for pitch and 1 MIL for yaw. If pitch is not within tolerance, borescope launcher (paragraph 16-68 through 16-71). If yaw is not within tolerance, proceed to paragraph 16-67 for adjustment

16-58.7. Roll Confirmation.

NOTE

Ensure that GQ is positioned squarely on machined surface of reference pad against all three alignment pins. Diagonal placement will result in an error in roll.

a. Position gunner quadrant (GQ) (4, figure 16-23) on roll (side to side) reference pad (5) of PDU alignment assembly (3, figure 16-21).

b. Raise bubble beam (6, figure 16-23) as required to center bubble between lines. If bubble (6) fails to show between lines, reverse GQ orientation and adjust bubble beam until bubble centers between ines. Use vernier knob for fine adjustment. After adjustment remove roll GQ.

NOTE

Ensure that GQ is positioned squarely on machined surface of reference pad against all three alignment pins. Diagonal placement will result in an error In roll.

c. Place roll GQ (1, figure 16-25) on roil reference pads of launcher alignment assembly (4). Ensure orientation (left and right) of GQ remain the same as when used on PDU alignment assembly.

NOTE

Each mark on GQ level equals 2 MIILs.

d. Check that bubble of GQ is centered within 2 MILs. If roll adjustment is required boresight launcher (paragraph 16-68 through 16-71).

16-58.8. Boresight Confirmation Completion.

a. Remove borescope (15, figure 16-20) from launcher alignment assembly.

b. Remove launcher alignment assembly (4, figure 16-25) from launcher assembly by removing damp retaining pins and loosening clamps.

c. Close clamps on launcher assembly and secure with ret aining pins.

d. Remove borescope (2, figure 16-21) and PDU alignment assembly (3) from PDU mount (1).

e. Install PDU. Refer to paragraph 16-17.

f. Secure boresight kit components.

g. Install impulse cartridges. Refer to paragraph 16-32.

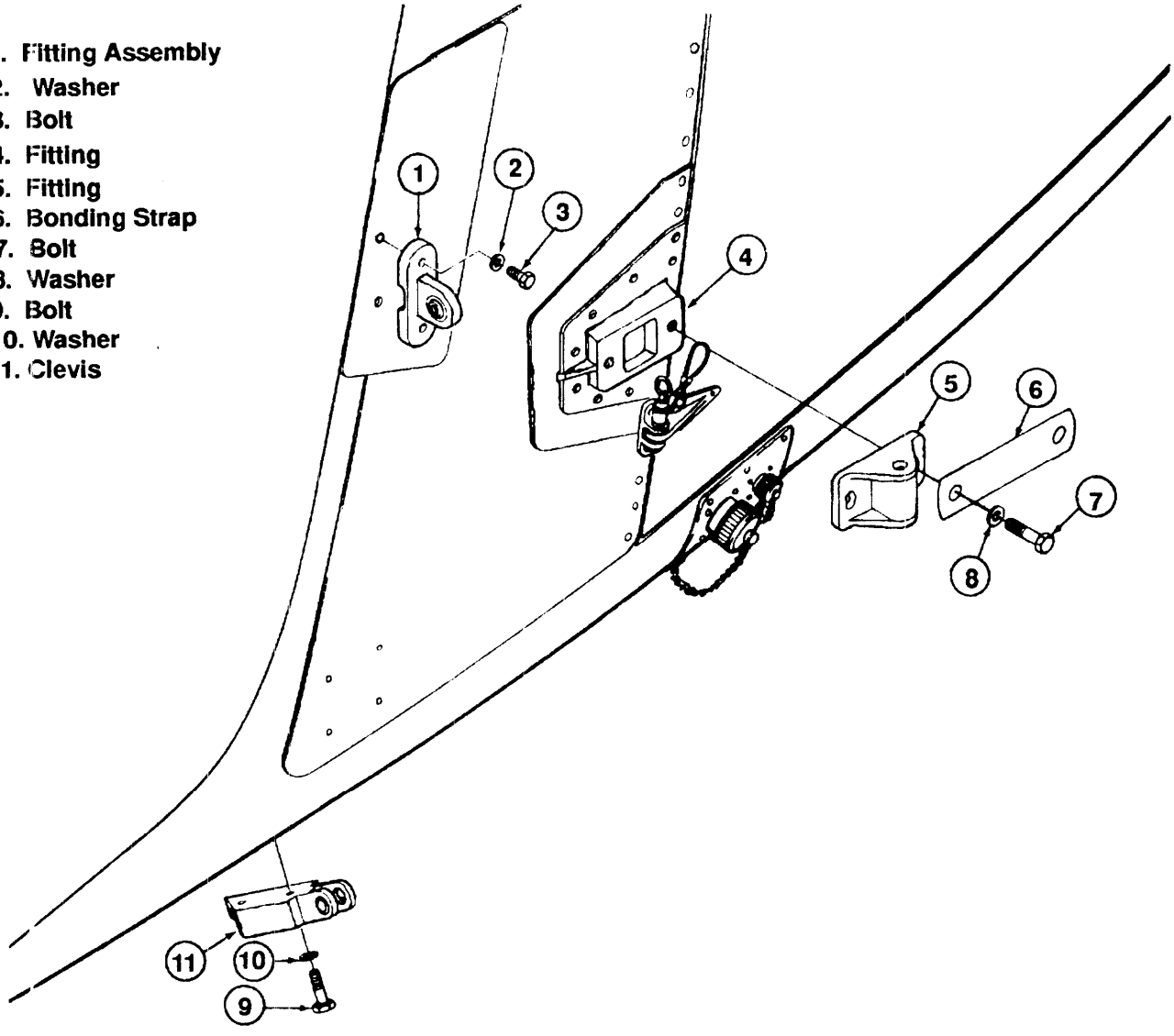


Figure 16-18. ATAS Fitting Assembly CS

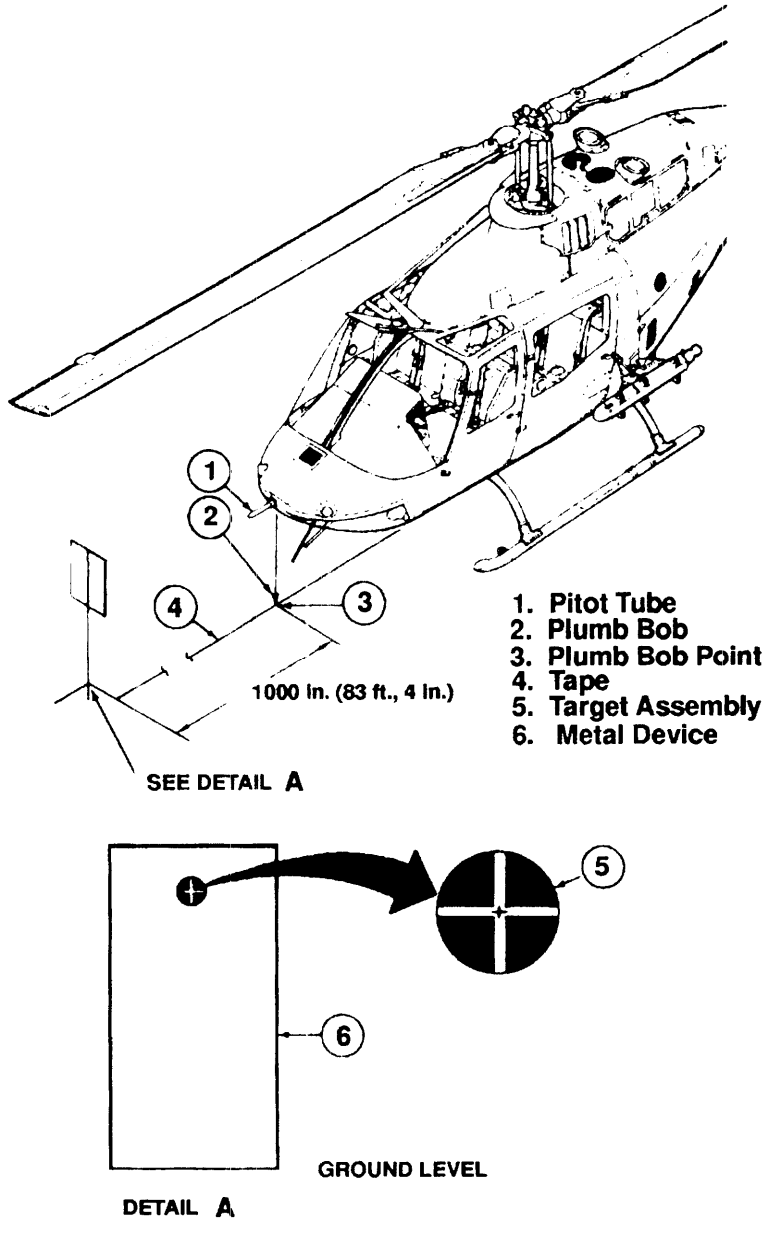


Figure 16-19. Target Placement CS

16-59. PRELIMINARY BORESIGHT PROCEDURES. CS

16-60. Safety Procedures.

a. Ground helicopter.

b. Remove impulse cartridges. Refer to paragraph 16-30.

16-61. Target Placement.

a. Locate pitot tube (1, figure 16-19) on nose of helicopter. Measure from center of pitot tube inboard 3.5 inches to locate center of helicopter and suspend plumb bob (2) from this point. When plumb bob stabilizes, mark plumb bob point (3) on ground.

b. Extend 100 foot tape (4) forward of plumb bob point (3) and measure 1000 inches (83 feet, 4 inches).

c. At 1000 inch distance, attach target assembly (5) to suitable metal device (6).

16-62. Launcher Alignment Assembly Installation.

a. Delete.

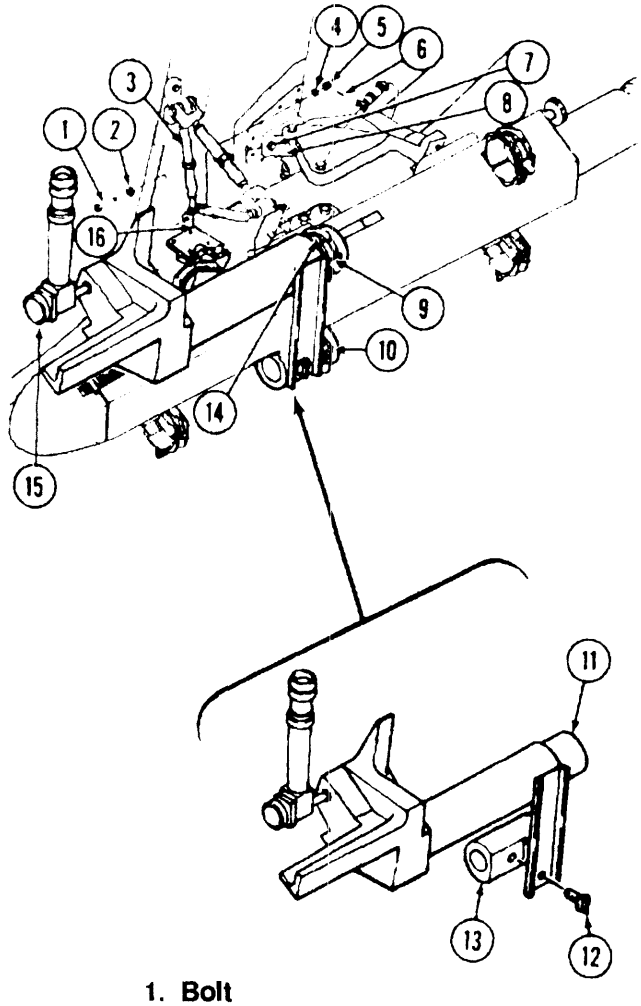
b. Delete.

c. Remove bolt (1), chamfered washer (2), washer (4), nut (5), and cotter pin (6) that secure strut (3) to forward sway brace (16).

NOTE

Adjustment of devices and rod ends to match dimensions in figure 16-17 is only required when maintenance or repair to pylon strut has been performed, or when boresight procedures are performed as part of completing initial system installation.

d. Adjust clevises and rod ends on strut to dimensions shown in figure 16-17.



1. Bolt
2. Chamfered Washer
3. Strut
4. Washer
5. Nut
6. Cotter Pin
7. Bolt
8. Fitting
9. Clamp Retainer Pin
10. Inboard Clamp
11. Tube Assembly
12. Fastener
13. Tube
14. Outboard Clamp
15. Borescope
16. Forward Sway Brace

Figure 16-20. Launcher Alignment Assembly Installation. CS

e Remove fastener (12, figure 16-20) on tube assembly (11). Install tube assembly (11) onto launcher using the forward and center outboard clamps (14).

f. Install tube (113) using center inboard clamp (10) Rotate tube assembly (11) and align with tube (13)

NOTE

Allow tube assembly (11) to rotate in outboard clamp (14) while securing fastener (12).

g. Install fastener (12)

h. Secure inboard and outboard clamps (10 and 14) and install clamp) retaining pins (9).

i. Install borescope (15) in tube assembly (11).

16-63. PDU Alignment Assembly Installation.

WARNING

Care should be taken when leaning into the cockpit to ensure head injury does not result from contacting the PDU, PDU mount assembly, or PDU alignment assembly.

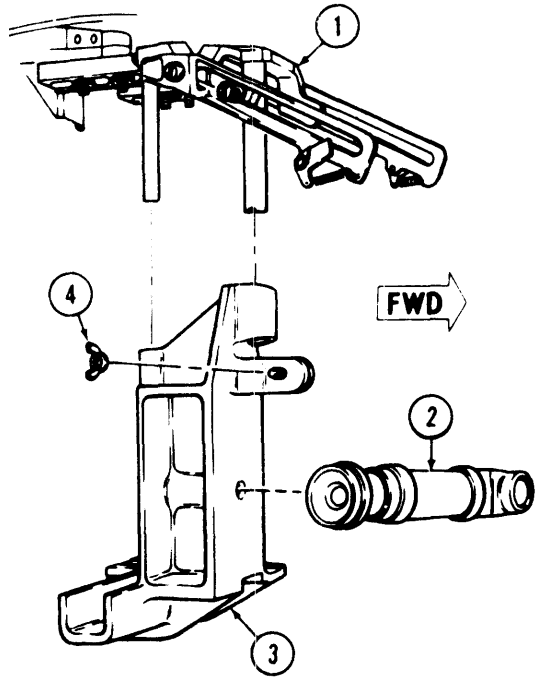
NOTE

During the following procedures, all steps must be accomplished from outside the helicopter.

a. Remove the PDU, if installed. Refer to paragraph 16-16.

b. Install PDU alignment assembly (3, figure 16-21) on the PDU mount (1) as high as it will go and secure with wingnut (4).

c. Install borescope (2) in PDU alignment assembly (3).



1. PDU Mount
2. Borescope
3. PDU Alignment Assembly
4. Wingnut

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Figure 16-21. PDU Alignment Assembly Installation CS

16-64. PDU BORESIGHTING PROCEDURES. CS

NOTE

PDU boresighting procedures are used when a PDU mount or PDU mount and launcher are installed.

16-65. PDU Pitch Adjustment. None required.

16-66. PDU Roll Adjustment. None required.

16-67. PDU Yaw Adjustment.

a. Sight through the borescope (15, figure 16-20) and move the target assembly (5, figure 16-19) to the center of the pylon borescope.

NOTE

Due to potential damage to the pins and nuts (items 3 and 4, figure 16-22) it is important that the PDU mounting hardware remain undisturbed unless pylon adjustments are insufficient to accomplish boresight.

b. Hold pins (3, figure 16-22) with hex wrench and loosen nuts (4) securing the PDU mount assembly (1) to the eyebrow casting.

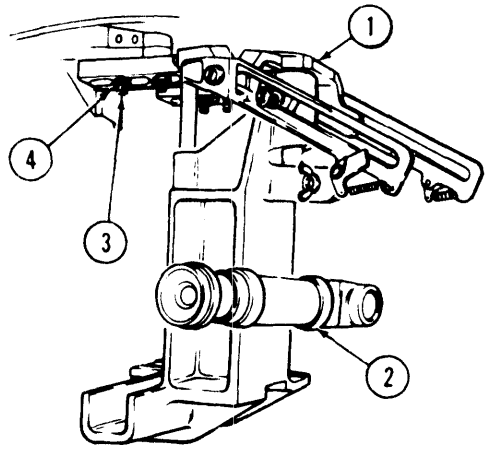
c. Adjust the PDU mount assembly (1) so that the vertical (up and down) crosshair of the borescope (2) is superimposed upon the vertical portion of the cross-mark on the target assembly within 1 roil.

NOTE

The small circle of the borescope sight picture is 2 roils wide.

Recheck to ensure there is 0.30 inch minimum clearance between PDU mount assembly and windshield. If minimum clearance does not exist, readjust PDU mount (paragraph 16-27).

d. Hold pins (3) with hex wrench and tighten nuts (4) securing the PDU mount assembly (1) to the eyebrow casting.



1. PDU Mount Assembly
2. Borescope
3. Pin
4. Nut

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Figure 16-22. PDU Yaw Adjustment CS

e. Adjust target assembly vertically until horizontal crosshair of borescope (2) is superimposed on horizontal position of crossmark on target assembly within 1 MIL.

NOTE

Small circle of borescope sight is 2 MILs. wide.

16-68. Gunner Quadrant Setting.

a. Identify one gunner quadrant (GQ) for pitch adjustment and the other GQ for roll adjustment.

b. Position pitch GQ (1, figure 16-23) on pitch (fore and aft) reference pad (2).

c. Raise bubble beam (3) as required to center bubble between lines. if bubble fails to show between lines, reverse GQ orientation and adjust bubble beam until bubble centers between lines. Use vernier knob for fine adjustment.

NOTE

Ensure GQ is positioned squarely on machined surface of reference pad against all three alignment pins. Diagonal placement will result in an error in roll alignment.

d. Position roll GQ (4) on roll (side to side) reference pad (5).

e. Raise bubble beam (6) as required to center bubble between lines. If bubble fails to show between lines, reverse GQ orientation and adjust bubble beam until bubble centers between lines. Use vernier knob for fine adjustment.

16-69. Missile Launcher Pitch Adjustment.

NOTE

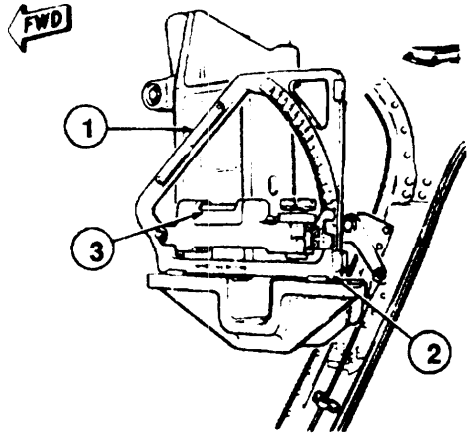
After any adjustment is completed; pitch, roll, and yaw alignment must be checked and adjusted to ensure no change has occurred. Proper boresight requires constant checking between pitch, roll, and yaw.

a. Place pitch GQ (1, figure 16-24 on pitch (fore and aft) reference pads of launcher alignment assembly (4) Ensure orientation of GQ remains the same as when used on PDU alignment assembly.

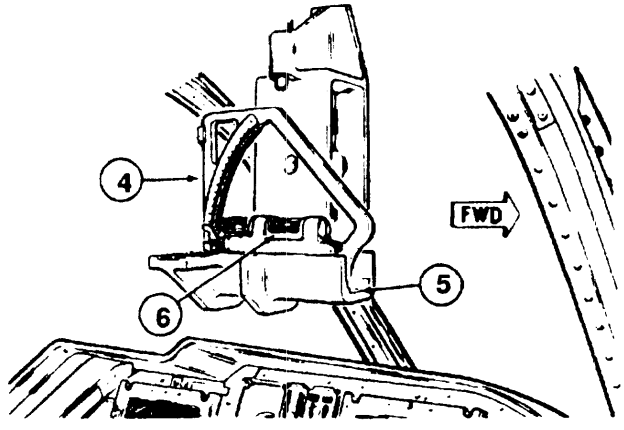
NOTE

Pitch up is adjusted by shortening up per strut (2) while lengthening lower strut (3) simultaneously. Pitch down is adjusted in the opposite manner.

Each mark on GQ level equals 2 MILs



PITCH

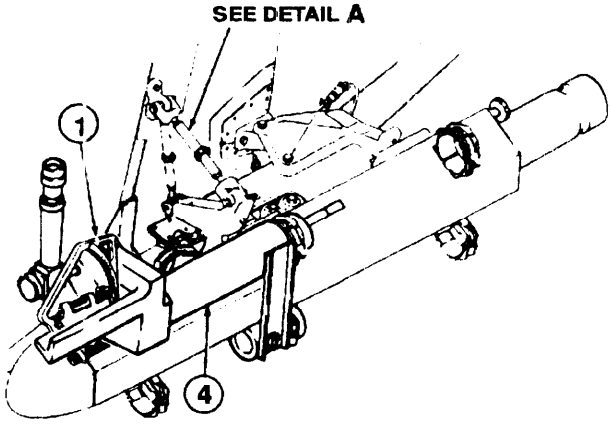


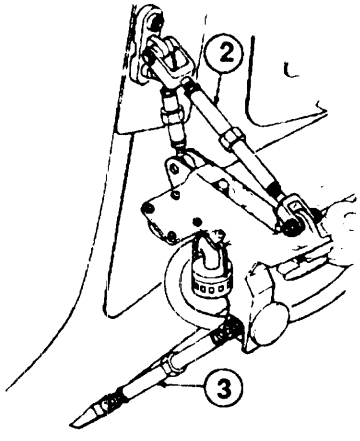
ROLL

1. **Pitch GQ**
2. **Pitch Reference Pads**
3. **Bubble Beam**
4. **Roll GQ**
5. **Roll Reference Pads**
6. **Bubble Beam**

Figure 16-23. Gunner Quadrant Settings

CS





DETAIL A

1. Pitch GQ
2. Upper Strut
3. Lower Strut
4. Launcher Alignment Assembly

Figure 16-24. Missile Launcher Pitch and Yaw Adjustment CS

b. Adjust struts (2) and (3) as necessary to center bubble of GQ within ± 2 MILs.

16-70. Missile Launcher Roll Adjustment.

NOTE

Ensure GQ is positioned squarely on machined surface of reference pad against all three alignment pins. Diagonal placement will result in an error in roll alignment.

a. Place roll GQ (1, figure 16-25 on roll reference pads of launcher alignment assembly (4). Ensure orientation of GQ remains the same as when used on PDU alignment assembly.

b. Loosen locknut (2) on each sway brace pad (3).

CAUTION

Sway brace pads shall be tightened in opposing pairs to prevent twisting of adapter assemblies.

NOTE

Roll up adjustment is accomplished by extending lower sway brace pads while shortening upper sway brace pads Roll down adjustment is accomplished in the opposite manner.

Each mark on GQ level equals 2 MILs.

NOTE

If roll adjustment cannot be accomplished while allowing at least two threads above jam nuts (when tightened) check TM 9-1440-431-23 for adjustment of bomb lugs in adapter

c. Adjust (finger tight) sway brace pads (3) as necessary to center bubble on GQ within 4 MILs.

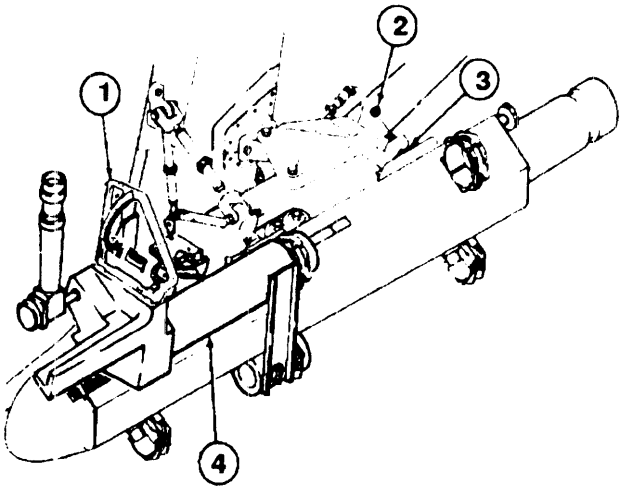
16-71. Missile Launcher Yaw Adjustment.

NOTE

Outboard yaw is adjusted by extending both struts at the same time. Inboard yaw is adjusted in the opposite manner.

The small circle of borescope sight picture is 2 MILs wide.

Adjust strut (2 and 3, figure 16-24) until vertical crosshair of borescope superimposes on vertical portion of crossmark on target assembly within one MIL.



1. Roll GQ
2. Locknut
3. Sway Brace Pad
4. Launcher Alignment Assembly

Figure 16-25. Missile Launcher Roll Adjustment CS

NOTE

Horizontal crosshair of borescope may not superimpose on horizontal cross-mark of target assembly. It is acceptable for this to occur.

After any adjustment is completed; pitch, roll, and yaw alignment must be checked and adjusted to ensure no change has occurred. Proper boresight requires a constant check between pitch, roll, and yaw.

16-72. Boresight Completion. CS

NOTE

During boresight completion steps, ensure previous adjustments are not changed. All torques are standard (see TM 1-1500-204-23 series).

a. Delete

b. Tighten sway brace pads (3, figure 16-25) as follows:

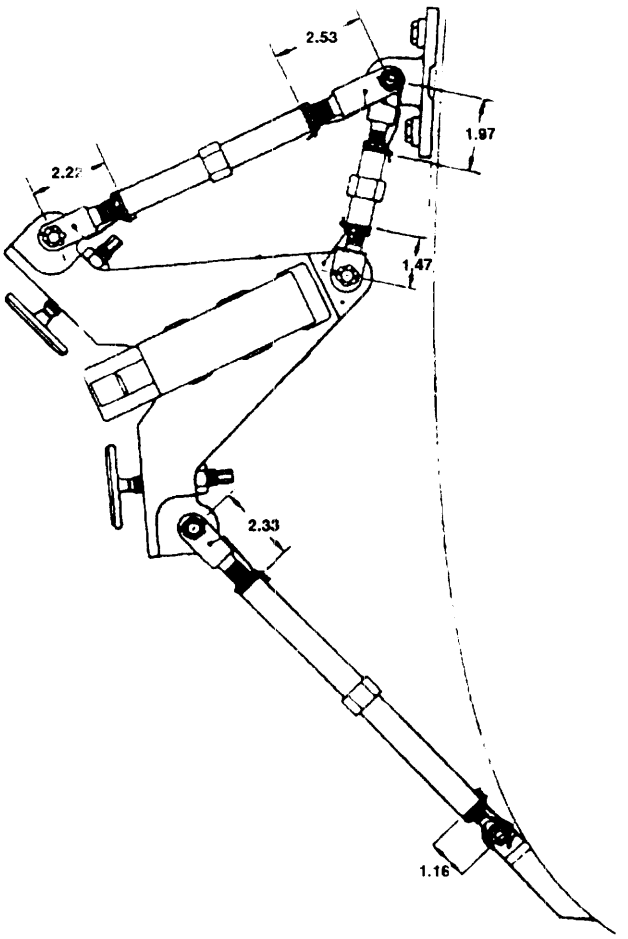
(1) Tighten each sway brace pad 1/2 turn from finger tight in 1/4 turn increments, rotating between sway brace pads in diagonal, crisscross pattern.

CAUTION

Sway brace pads shall have a minimum of two threads protruding above top of locknuts.

(2) Hold sway brace pads in this position and tighten locknuts (2).

c. Adjust strut (3, figure 16-20) and secure to forward sway brace with bolt (1), chamfered washer (2), washer (4), and cotter pin (6).



NOTE

DIMENSIONS SHOWN ARE IN INCHES AND ARE MEASURED FROM CENTERLINE OF BOLT HOLE TO END OF STRUT.

Figure 16-26. Maximum Strut Dimensions CS

d. Check to ensure clevis and rod ends on struts do not exceed maximum dimensions shown in figure 16-26.

e. tighten jam nuts (2, figure 16-14) at each end of the three struts. Double safety jam nuts (2) with lockwire (C96).

f. Remove borescope (15, Figure 16-14) from launcher alignment assembly.

g. Remove launcher alignment assembly (4, Figure 16-25) from launcher assembly by removing clamp retaining pins and loosening clamps.

h. Close clamps on launcher assembly and secure with retaining pins.

i. Remove borescope (2, Figure 16-21) and PDU alignment assembly (3) from PDU mount (1).

j. Install PDU. Refer to paragraph 16-17.

k Secure boresight kit components.

i. Install impulse cartridges (paragraph 16-32).

16-73. Launcher Boresight Procedure CS

NOTE

Launcher boresight procedures are used when launcher has been removed or reinstalled.

a. Perform preliminary procedures (paragraph 16-59).

b. Sight through borescope (2, Figure 16-21) and move target assembly (5, Figure 16-19) to center of borescope crosshairs.

c. Boresight launcher (paragraph 16-68 thru 16-71).

d. Perform boresight completion (paragraph 16-72).

CHAPTER 17
EMERGENCY EQUIPMENT

17-1. EMERGENCY EQUIPMENT.

17-2. Description — Emergency Equipment. The emergency equipment consists of fire extinguisher and first aid kit. For equipment location, refer to figure 17-1.

17-3. FIRE EXTINGUISHER.

17-4. Description — Fire Extinguisher. Provisions for mounting a fire extinguisher are provided on the side of the canted center post below the first aid kit.

17-5. Removal — Fire Extinguisher and Bracket.

a. Loosen the retaining clamp from around the upper section of the extinguisher (4, figure 17-1) by pulling the hinged lever aft. Tension on the extinguisher will be released so that the catch on the hinged lever will be disengaged from the attaching ring.

b. Grasp the fire extinguisher (4) by the handle and remove from the mounting bracket (1).

c. Remove screws (3) and washers (2) attaching mounting bracket (1) to canted center post and remove bracket.

17-6. Inspection — Fire Extinguisher. All fire extinguishers will be weighed every six months to determine that they are fully charged. The fully charged weight of fire extinguisher should not be less than four ounces below the gross weight stamped on the nameplate. If this weight is not met the extinguisher should be replaced. Refer to TM 55-1500-204-25/1.

17-7. Repair or Replacement — Fire Extinguisher. Replace the fire extinguisher if it does not meet inspection requirements in paragraph 17-6.

17-8. Installation — Fire Extinguisher.

a. Position mounting bracket (1, figure 17-1), on canted center post and install attaching screws (3) and washers (2).

b. Position fire extinguisher (4) in mounting bracket (1) with extinguisher handle opposite bracket.

c. Hook the latch of the retaining clamp handle through ring on inboard section of the retaining clamp. Force free end of clamp handle to the left and forward. This will close the clamp and secure the fire extinguisher in the hanger bracket.

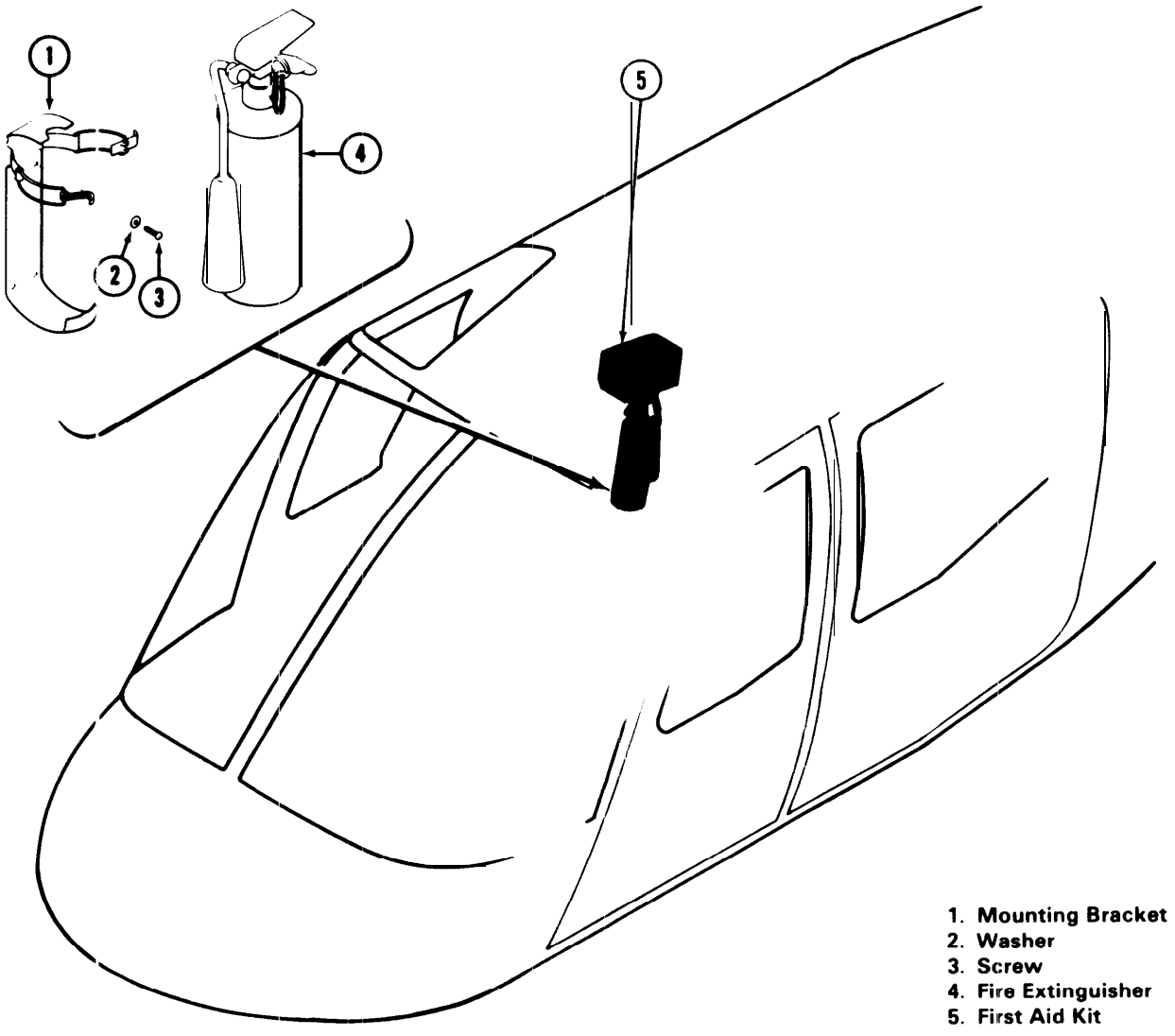
17-9. FIRST AID KIT.

17-10. Description — First Aid Kit. The first aid kit is installed on the right side of canted center post.

17-11. Removal — First Aid Kit. To remove the first aid kit (5, figure 17-1), pull outward on kit to release fasteners.

17-12. Installation — First Aid Kit. To install first aid kit (5, figure 17-1), position on fasteners and push to engage snaps.

17-13. Inspection — Reference TM 1-1500-204-23. ■



1. Mounting Bracket
2. Washer
3. Screw
4. Fire Extinguisher
5. First Aid Kit

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Figure 17-1. Emergency Equipment

APPENDIX A
REFERENCES

The following references, of the issue in effect, in addition to those references contained in TM 55-1520-228-10, Appendix A are required for use by Organizational Maintenance personnel in performance of their duties.

AR 95-1	Army Aviation General Provision and Flight Regulation
AR 95-3	General Provisions, Training, Standardization and Resource Management
AR 385-11	Ionizing Radiation Protection
AR 310-50	Management Authorized Abbreviations and Brevity Codes Ionizing
AR 385-40	Accident Reporting and Records
AR 700-52	Licensing and Control of Sources of Ionizing Radiation
AR 750-5	The Army Maintenance Management Systems
AR 750-50	Requisition, Receipt, and Issue System
AR 755-15	Disposal of Unwanted Radioactive Material
DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2408-13	Aircraft Status Information Record
DA Form 2408-17	Aircraft Inventory Record
DA PAM 738-751	The Army Maintenance Management Systems (TAMMSA)
FM 3-5	Nuclear Biological and Chemical (NBC) Contamination
FM 10-68	Refueling of Aircraft
FM 38-700	Packaging of Materiel for Presentation
FM 38-701	Packing of Materiel for Packing
MIL-HDBK-263	Electrostatic Discharge Control
MIL-S-18729	Steel Plate, Sheet, and Strip Alloy 4130, Aircraft Quality
MIL-STD-1949	Magnetic Particle Inspection
MIL-STD-12C	Abbreviations for Use on Drawings, Specifications, and in Technical Documents
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-1686	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts
MIL-STD-2219	Fusion Welding for Aerospace Applications
MIL-T-9046	Titanium and Titanium Alloy, Sheet, and Plate
MWO 1-1520-228-50-52	Installation of Altitude Voice Warning System AN/APN-209(V) Radar Altimeter
MWO 1-1520-228-50-53	Installation of Global Positioning System Special Mission Kits
MWO 55-1520-228-50	Installation of the Upper IFF Antenna
MWO 55-1520-228-50-18	Installation of Reduced Vulnerability Flight Control System
MWO 55-1520-228-50-22	Installation of Night Vision Goggles
MWO 55-1520-228-50-32	Installation of Improved Fuel Supply
MWO 55-1520-228-50-51	Installation of 3-Micron Transmission Oil Filter
TB MED-501	Occupational and Environmental Health-Hearing Conservation

TB 1-1500-341-01	Aircraft Components Requiring Maintenance Management and Historical Data Reports
TB 43-0002-3	Maintenance Expenditure Limitation for Army Aircraft
TB 43-0106	Aeronautical Equipment Army Oil Analysis Program (AOAP)
TB 43-180	Calibration Requirements for the Maintenance of Army Material
TB 55-1500-314-25	Disposal of Radioactive Material
TB 55-1500-334-25	Conversion to Fire Resistant Hydraulic Fluid
TB 55-9150-200-24	Engine and Transmission Oils, Fuels, and Additives for Army Aircraft
TB 750-25	Maintenance of Supplies and Equipment: Army Metrology and Calibrating System
TB 750-125	Assembly and Inspection of Medium Pressure Hose and Hose Assembly
TM 1-1500-204-23	General Aircraft Maintenance Manual
TM 1-1500-328-23	Aeronautical Equipment Maintenance Management Policies and Procedures
TM 1-1520-250-23	General Tie-Down and Mooring Technical Manual, Aviation Unit and Intermediate Maintenance. All Series Army Models AH-64, UH-60, CH-47, UH-1, AH-1 and OH-58 Helicopters
TM 1-1520-254-23	Nondestructive Inspection Procedures for OH-58 Helicopter Series
TM 1-6625-724-13&P	Aviation Vibration Analyzer P/N 29313102, NSN 6625-01-282-3746
TM 3-261	Handling and Disposal of Unwanted Radioactive Material
TM 9-1005-298-12	Operator and Organizational Maintenance Subsystem, Helicopter, 7.62 Millimeter Machine Gun: High Rate M27E1
TM 9-1440-431-23	Aviation Unit and Aviation Intermediate Maintenance, Air-To-Air Stinger (ATAS) Weapon System
TM 11-1520-228-20	Operator and Organizational Maintenance Manual: Electronic Equipment Configuration, Army Model OH-58A Helicopter
TM 11-1520-228-20-1	Operator and Organizational Maintenance Manual: Electronic Equipment Configuration, Army Model OH-58C
TM 11-1520-228-20P	Organizational DS, GS, and Depot Maintenance and Repair Parts and Special Tools List: Electronic Equipment Configuration for Army Helicopter OH-58A
TM 11-1520-228-34-1	DS and GS Maintenance Manual: Electronic Equipment Configuration for Army Helicopter OH-58C
TM 11-1520-228-20P	Organizational, DS, GS, and Depot Maintenance and Repair Parts and Special Tools List: Electronic Equipment Configuration for Army Helicopter OH-58A
TM 11-1520-228-34-1	DS and GS Maintenance Manual: Electronic Equipment Configuration, Army Model OH-58C
TM 11-6140-203-14-2	OPERATOR'S Organizational, Direct, and General Support Maintenance Manual for Aircraft Nickel Cadmium Batteries
TM 11-6805-202-12	Maintenance Procedures: AN/ASN-43 Compass Set
TM 43-0105	Corrosion Control for Army Aircraft
TM 55-1500-322-24	Maintenance of Aeronautical Antifriction Bearings for Organizational, Intermediate, and Depot Maintenance Levels

TM 55-1500-323-2	Installation Practices for Aircraft Electric and Electric Wiring
TM 55-1500-333-23	Organizational, Direct, and General Support Maintenance Manual for Cleaning Procedures for Army Aircraft
TM 55-1500-335-23	Nondestructive Inspection Methods
TM 55-1500-338-S	Preparation for Shipment of OH-58 Aircraft
TM 55-1500-345-23	Painting and Marking of Army Aircraft
TM 55-1520-228-MTF	Maintenance Test Flight Manual Army OH-58A Helicopter
TM 55-1520-228-PM	Phased Maintenance Checklist
TM 55-1520-228-PMD	Daily Inspection Checklist
TM 55-1520-228-10	Operator's Manual, Helicopter, Observation, OH-58A
TM 55-1520-228-23P	Aviation Unit and Intermediate Maintenance Repair Parts and Special Tool Lists (Including Depot Maintenance Repair Parts and Special Tools) Helicopter Observation, OH-58A/C
TM 55-2840-231-23	Organizational and DS and GS Maintenance Manuals: Engine Assembly, Model T63-A-5A (2840-293-6023) and Model T63-A-700, (2840-179-5536)
TM 55-2840-241-23	Aviation Unit and Intermediate Maintenance Manual: Engine Assembly, Model T63-A-720
TM 55-4920-201-14	Operator, Organizational, DS and GS Maintenance Manual for Marvel Balancing Kits
TM 55-4920-243-15	Operator, Organizational, DS and GS, and Depot Maintenance Manual: Vibration Monitoring Kit (FSM 4920-379-0331
TM 55-4920-244-14	Operations and Maintenance Instructions for Tester Exhaust Gas Temperature (Model BH112JA-36)
TM 55-4920-401-13&P	Operator's Aviation Unit and Intermediate Maintenance Manual for Tester Exhaust Gas Temperature
TM 750-244-1-5	Procedures for the Destruction of Aircraft Associated Equipment to Prevent Enemy Use

APPENDIX B
MAINTENANCE ALLOCATION CHART
SECTION I. INTRODUCTION

B-1. MAINTENANCE ALLOCATION CHART.

a. This Maintenance Allocation Chart (MAC) assig ns maintenance functions in accordance with the three Levels of Maintenance concept for Army aircraft. These maintenance levels, Aviation Unit Maintenance (AVUM); Aviation intermediate Maintenance (AVIM) and Depot Maintenance are depicted on the MAC as:

AVUM which corresponds to the O Code in the RPSTL
AVIM which corresponds to an F Code in the RPSTL
DEPOT which corresponds to a D Code in the RPSTL

b. The maintenance to be performed below depot and in the field is described as follows:

(1) Aviation Unit Maintenance (AVUM) activities will be staffed and equipped to perform high frequency "On-Aircraft" maintenance tasks required to retain or return aircraft to a serviceable condition. The maintenance capability of the AVUM will be governed by the Maintenance Allocation Chart (MAC) and limited by the amount and complexity of ground support equipment (GSE), facilities required, and number of spaces and critical skills available. The range and quantity of authorized spare modules/components will be consistent with the mobility requirements dictated by the air rnobility concept (Assignments of maintenance tasks to divisional company size aviation units will consider the overall maintenance capability of the division, the requirement to conserve personnel and equipment resources and air mobility requirements.)

(a) Company size aviation units: Perform those tasks which consist primarily of preventive maintenance and maintenance repair and replacement functions associated with sustaining a high level of aircraft operational readiness. Perform maintenance inspections and servicing to include preflight, daily, intermediate, periodic, and special inspections as authorized by the MAC or higher headquarters. Identify the cause of equipment/ system malfunctions using applicable technical manual troubleshooting instructions, built-in-test equipment (BITE), installed aircraft instruments, or easy to use/interpret diagnostic/fault isolation devices (TMDE). Replace worn or damaged modules/ components which do not require complex adjustments or system alignment and which can be removed/installed with available skills, tools, and equipment. Perform operational and continuity checks and make minor repairs to the electrical system. Inspect, service and make operational, capacity and pressure checks to hydraulic systems. Perform servicing functional adjustments and minor repair/replacement to the flight control, propulsion, power train, and fuel systems. Accomplish air frame repair which does not require extensive disassembly, jigging, or alignment. The manufacture of airframe parts will be limited to those items which can be fabricated with tools and equipment found in current air mobile tool and shop sets Evacuate unserviceable modules/components and end items beyond the repair capability of AVUM to the supporting AVIM.

(b) Less than company size aviation units: Aviation elements organic to brigade, group, battalion headquarters, and detachment size units are normally small and have less than ten aircraft assigned. Maintenance tasks performed by these units will be those which can be accomplished by the aircraft crew chief or assigned aircraft repairman and will normally be limited to preventive maintenance, Inspections, servicing, spot painting, spot drilling, application of nonstress patches, minor adjustments, module/component fault diagnosis, and replacement of selected modules/components. Repair functions will normally be accomplished by the supporting AVIM unit.

(2) Aviation Intermediate Maintenance (AVIM) provides mobile, responsive "One Stop" maintenance support. (Maintenance functions which are not conducive to sustaining air mobility will be assigned to depot maintenance.) Performs all maintenance functions authorized to be done at AVUM. Repair of equipment for return to user will emphasize support or operational readiness

require ments. Authorized maintenance includes replacement and repair of modules/components and end items which can be accomplished efficiently with available sk ills, tools, and equipment. Established the Direct Exchange (DX) program for AVUM units by repairing selected ltems for return to stock when such repairs car not be accomplished at the AVUM level. Inspects, roubleshoots, test diagnoses, repairs, adjusts, calibrates, and aligns aircraft system modules/components. AVIM units will have capability to determine the serviceability of specified module s/components removed prior to the expiration of the Time Between Overhaul (TBO) or finite life. Module/component disassembly and repair will support the DX program and will normally be limited to tasks requiring cleaning and the replacement of seals, fittings, and items of common hardware. Airframe repair and fabrication of parts will be limited to those maintenance tasks which can be performed with available tools and test equipment. Unserviceable reparable modules/components and end items which are beyond the capability of AVIM to repair will he evacuated to Depot Maintenance. This level will perform aircraft weight and balance inspections and other special inspections which exceed AVIM capability. Provides quick response maintenance e support, including aircraft recovery and air evacuation, on-the-job training, and technical assistance through the use of mobile maintenance contact teams. Maintains authorized operational readiness fIoat aircraft. Provides collection and classification services for serviceably/unserviceable material. operates a cannibalization activity in accordance with AR 750-50. (The aircraft maintenance company within the maintenance battalion of a division will perform AVIM functions consistent with air mobility requirements and conservation of personnel and equipment resources. Additional intermediate maintenance support will be provided by the supporting nondivisional AVIM unit.)

B-2. USE OF THE MAINTENANCE ALLOCATION CHART,

a. The Maintenance Allocation Chart assigns maintenance functions based on past experience and the following consideration:

(1) Skills available.

(2) Time required.

(3) Tools and test equipment required and/or available.

b. The assigned levels of maintenance authorized to perform a maintenance function is indicated.

c. A maintenance function assigned to a lower maintenance level will automatically be authorized to be performed at any higher maintenance level.

d. A maintenance function that cannot be performed at the assigned level of maintenance for any reason may be evacuated to the next higher maintenance organization. Higher maintenance levels will perform the maintenance functions of lower maintenance levels when required or directed by the appropriate commander

e. The assignment of a maintenance function will not be construed as authorization to carry the associated repair parts in stock. Information to requisition or otherwise secure the necessary repair parts will be as specified in the Repair Parts, Special Tools List.

f. Normally there will be no deviation from the assigned level of maintenance. In cases of operational necessity, maintenance functions assigned to a higher maintenance level may, on a one-time basis and at the request of the lower maintenance level, be specifically authorized by the maintenance officer of the higher level of maintenance to which the function is assigned. The special tools, equipment, etc. required by the lower level of maintenance to perform this function will be furnished by the maintenance level to which the function is assigned. This transfer of a maintenance function to a lower maintenance level does not relieve the higher maintenance level of the responsibility of the function. The higher level of maintenance has the authority to determine:

(1) If the lower level is capable of performing the work.

(2) If the lower level will require assistance or technical supervision and on-site inspection.

(3) If the authorization will be granted.

g. Maintenance of the US Army Communications and Electronics Material Readiness Command equipment will be performed by designated US Army CERCOM personnel.

h. Changes to the Maintenance Allocation Chart will be based on continuing evaluation and analysis

by responsible technical personnel and on reports received from field activities.

B-3. DEFINITIONS.

Maintenance functions. Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operation required periodically to keep an item In proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or ccompressed air supplies.

d. Adjust. To maintain, with prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly)in a manner to allow the proper functioning of an equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module, (components or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services or other maintenance actions to restore serviceability to an item by correcting specific damage, fault, malfunctions, or failure in a part, subassembly, module component or assembly), end item, or system.

j. Overhaul That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operationa condition as prescribed by maintenance standard (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those service actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero) those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

B-4. STANDARD GROUPS.

The standard groupings shown below are used, as applicable, throughout this MAC. Maintenance manuals and RPSTLS reflect these standard groupings as individual chapters with sections in each chapter relative to the individual systems, subsystems, modules, components, assemblies, or specific parts noted.

B-5. SYMBOLS.

The letters AVUM, AVIM and Depot" as placed on the Maintenance Allocation Chart indicate the level of maintenance responsible for performing the particular maintenance function based upon assigned skills, tools, and test equipment and time required to accomplish maintenance.

Table B-1. Airframe Items

GROUP NUMBER	DESCRIPTION
00	Aircraft System
01	Aircraft General
02	Airframe Fuselage, empennage, pylons, wings, mounts (engine and transmission), armor, seats, ramps, decks, and tiedowns. Servicing, handling, inspection requirements, lubrication requirements, overhaul and retirement requirements, cleaning, mooring, towing,, jacking, hoisting, preservation requirements, weight and balance requirements, spot painting, complete painting, and subassembly painting requirements.
03	Alighting Gear Landing gear, skids, floats, skis, struts, wheel brakes, anti mechanical mechanisms.
04	Power Plant Installation Removal, installation, cooling systems, air induction, exhaust, oil systems, components, ignition systems, power control, harnesses, carburetors, fuel controls, pumps (engine driven), filters/particle separators, and Quick Change Assemblies (QCA). (See Power Plant Items, figure 2, for more detailed functions.)
05	Propellers/Rotors, System Propellers, governors, rotors (main and tail), hubs, blades, dampeners, stabilizer bars, and swashplates.
06	Drive Train Systems Transmission, gearboxes, clutches, shafting, oil systems, bearings, hangers, oil tanks, and freewheeling units.
07	Hydraulic and Pneumatic Systems Pumps, filters, reservoirs, cylinders, valves, servos, motors, starters, and accumulators.
08	Instrument Systems Flight instruments, navigation instruments, engine instruments, miscellaneous instruments (i.e., clocks), sending units, panels, and flow meters.
09	Electrical Systems Motors, actuators, regulators, generators, starters, batteries, lighting, caution and warning lights, inverters, fault isolation systems, rotor brakes, and avionics provisions.
10	Fuel Systems Tanks, cells, filters, pumps, valves, auxiliary fuel systems, and refueling systems.
11	Flight Controls System Control sticks, pedals, cables, pulleys, push-pull rods, torque tubes, quadrants, force gradients, control surfaces, bellcranks, and trim actuators (mechanical).

Table B-1. Airframe Items (Cont)

GROUP NUMBER	DESCRIPTION
12	Utility Systems Fire detect ing/extinguishing systems, oxygen systems, windshield wiper systems, mirrors, and de-ice/anti-ice systems.
13	Environmental Control Systems (ECS) Heaters, air conditioners, defrosters, control mixing valves, and ducts.
14	Hoists and Winches Cargo/rescue hoists, winches, hooks, slings, loading systems, and emergency release systems.
15	Auxiliary Power Plants (APP) Fuel, exhaust, and ducting.
16	Mission Equipment Spraying equipment, stores, racks, armament, reconnaissance, photography, pods, and litters.
17	Emergency Equipment Ejection seats, canopies, jettison system, portable fire extinguishers, axes, and first aid kits.
18	Installed Avionics Components Communications and Navigational Black Boxes.

B-6. WORK TIMES.

The symbol —.--identifies the level of maintenance authorized to perform a maintenance function and indicates that work time figures are being developed and will be entered at a later date. When developed, this time will appear: for example as, 0.1 and also indicates the level of authorized maintenance.

B-7. TOOLS AND TEST EQUIPMENT (Section III).

Special tools, test, and support equipment required to do maintenance functions are listed with a reference number to permit cross-referencing to column 5 in the MAC. In addition, the maintenance category authorized to use the device is listed along with the item National Stock Number and, if applicable, the number to aid in identifying the tool/device.

B-8. REMARKS (Section IV).

Column 6 of the MAC contains alphabetic reference codes which are explained in Section IV of this appendix.

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-58A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	(5) TOOLS AND EQPT	(6) REMARKS
		NOTE					
		The extent of maintenance to be performed by AVUM as indicated in this MAC is governed by the size of the unit and the tools authorized (refer to paragraph B-1 b.(1)(a) and (b)). Specific notes are given to further identify or describe the extent or limit of maintenance to be performed.					
00	Aircraft System						
0100	Aircraft General						
0101	Clean		— . —				
0102	Moor		— . —				
0103	Tow		— . — .			100	
0104	Jack		— . —				
0105	Preservation		— . —			101	
0106	Weight and Balance			— . —		118,T43	
0107	Complete Painting			— . —		118	
0108	Spot Painting		— . —			100	
0109	Hoisting		— . —			T12	
0110	Subassembly Painting			— . —		118	
02	Airframe	Inspect	— . —				
		Test	— . —				
		Service	— . —				
		Repair	— . —	— . —			
		overhaul			— . —		
0201	Fuselage	Inspect	— . —				
		Repair	— . —			101,103	A
				— . —		103,117	A

SECTION II

MAINTENANCE ALLOCATION CHART

NOMECLATURE OF END ITEMS
OH-58A/OH-581C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	AVUM	AVIM	DEPOT	(5) TOOLS AND EQPT	(6) REMARKS
0201 01	Crew and Passenger Doors	Inspect	— . —				
		Adjust	— . —			102	
		Replace	— . —			102	
		Repair	— . —			101,103	
0201 02	Jettison Mechanism	Inspect	— . —				
		Replace	— . —			100,102	
		Repair	— . —			101,103	
0201 03	Honeycomb Panels	Inspect	— . —				
		Repair	— . —			101,102, 103	D
				— . —		103,117	M
0201 04	Windows (All)	Inspect	— . —				
		Replace	— . —			101,103	
		Repair	— . —			101,103	
0201 05	Windshield	Inspect	— . —				
		Replace	— . —			101,103	
		Repair	— . —			101,103	
0201 06	Seats and Cushions	Inspect	— . —				
		Replace	— . —			102	
		Repair	— , —			102	C
0201 07	Seat Belts and Shoulder Harness	Inspect	— . —				
		Replace	— . —			102	
0201 08	Inertia Reel and Strap	Inspect	— . —				
		Replace	— . —			102	
		Repair	— , —			102	
0201 09	Sound Proofing	Inspect	— . —				
		Service	— , —				
		Replace	— . —			102	
		Repair	— . —			102	
0201 10	Cowling and Fairing	Inspect	— , —				
		Replace	— . —			100,102	
		Repair	— . —			101,103	

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-58A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	(5) TOOLS AND EQPT	(6 REMARKS
0201 11	Engine Mount Assembly	Inspect	— . —				
		Replace	— . —			100,102	
		Repair	— . —			100,102	
0201 12	Pylon Support	Inspect	— . —			102	
				— . —		112	M
		Replace	— . —			101,102	
		Repair		— . —		112,T27 T33	
0201 13	Isolation Mount	Inspect	— . —			102	
		Replace	— . —			101,102	
		Repair	— . —	— . —		109	
		Overhaul			— . —		
0201 14	Access Doors and Panels	Inspect	— . —			102	
		Replace	— . —			100,102	
		Repair	— . —			100,103	
0201 15	Protective Armor	Inspect	— . —				
		Replace	— . —			101,102	
0201 16	Cargo Platform	Inspect	— . —				
		Replace	— . —			102	
0201 17	Armament Provisions						
0201 1701	Armament Fittings Assemblies	Inspect	— . —				
		Replace	— . —			100,102	
0202	Tailboom	Inspect	— . —			102	
		Replace	— . —			101,102 103	
		Repair	— . —			100,102 103	A
				— , —		102,117	A
0202 01	Driveshaft Cover	Inspect	— . —				
		Repair	— . —			101,103	
		Replace	— . —			101,103	

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-58A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	(5) TOOLS AND EQPT	(6) REMARKS
0202 02	Horizontal Stabilizer Assembly	Inspect Replace Repair	—.— —.— —.—			100,102 101,103	
0202 03	Vertical Stabilizer	Inspect Replace Repair	—.— —.— —.—	—.—		100,102 102,103 103,117	M
0202 0301	Tail Skid Assembly	Inspect Replace	—.— —.—			100,102 103	
0202 04	WSPS	Inspect Replace Repair	—.— —.— —.—	—.— —.—		101,103 103,117 101,103 103,117	
03	Alighting Gear						
0301	Cross Tubes	Inspect Replace Repair	—.— —.— —.—			I 00,102 101,102	
0302	Skid Tubes	Inspect Replace Repair	—.— —.— —.—			100,102 101,103	
0302 01	Skid Shoes	Inspect Replace Repair	—.— —.— —.—			100,102 101,103	
0302 02	Tow Rings	Inspect Replace	—.— —.—			102	
0305	Floats	Inspect Service Install Replace Repair	—.— —.— —.— —.— —.—			100,T10 100,102 100,102 101,103	

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-58A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	(5) TOOLS AND EQPT	(6) REMARKS
0306	Skis	Inspect	— . —				
		Install	— . —			100,102	
		Replace	— . —			100,102	
		Repair	— . —			101,103	
04	Power Plant Installation						
0401	Engine (Complete Assembly)	Inspect	— . —				
		Service	— . —			102	
		Replace	— . —			101,108	E
						T40	
		Repair	— . —				E
0401 01	Exhaust Stacks	Inspect	— . —				
		Replace	— . —			100,102	
		Repair	— . —			100,102	
						103	
				— . —		120	L
0402	Hoses, Fittings, and Tubing	Inspect	— . —				
		Replace	— . —			100,102	
0403	Engine Oil Cooler	Inspect	— . —				
		Service	— . —			102	
		Replace	— . —			100,102	
		Repair	— . —			101,108	
0404	Oil Tank	Inspect	— . —			102	
		Service	— . —			102	
		Replace	— . —			100,102	
		Repair	— . —			100,102	
0405	Engine Control Linkage	Inspect	— . —			102	
		Adjust	— . —			101,102	
		Replace	— . —			101,108	
		Repair	— . —			101,108	
0406	Droop Compensator Linkage	Inspect	— . —			102	
		Adjust	— . —			101,102	
		Replace	— . —			101,108	
		Repair	— . —			101,108	

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS **OH-58A/OH-58C Helicopters**							
(1) GROUP NUMBER	**(2) COMPONENT/ASSEMBLY**	**(3) MAINTENANCE FUNCTION**	**(4) MAINTENANCE CATEGORY**			**(5) TOOLS AND EQPT**	**(6) REMARKS**
			AVUM	**AVIM**	**DEPOT**		
0407	Particle Separator	inspect	--------			102	
		Replace	-------			102	
		Repair	--------			101, 102,	
				-------		102, 117, T38	M
0408	Oil Bypass Selector Valve	Inspect	-------			102	
				-------		108, 119	M
		Test	------			100, 102	
		Service	------			102	
		Replace	------			100, 102	
		Repair		-------		108, 119	M
05	Propeller/Rotor Systems						
0501	Main Rotor Hub and Blade Assembly	Inspect	-------				
		Service	-------			100, 102	
		Adjust	-------			101, 102 T41, T42,	F
		Align	--------			101, 102, T13, T14, T15, T28, T29	
		Replace	--------			T42, 102, 109, T12 101	
05 0101	Main Rotor Hub Assembly	Inspect	--------			102	
		Service	-------			102	
		Replace	-------			101, 102, T12	
		Repair	-------			101, 109	
		Overhaul			-------		
05 0101 01	Yoke	Inspect		------		109, 113	
		Replace		-------			
		Repair		------		109, 113	

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-56A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	(5) TOOLS AND EQPT	(6) REMARKS
05 0101 01	Grip	Inspect	-----				
		Service	-----			102	
		Replace		------			
		Repair			------	109, 113	G
05 0101 02	Reservoir and Sight Glass	Inspect	------				
		Service	-----			102	
		Replace	-----			100, 102	
		Repair	------			100, 102	
05 0101 03	Trunnion	Inspect	-------				
		Repair		------			M
		Adjust		------		102, 116	
		Replace		-----		102, 116	
05 0101 04	Pitch Horn Trunnion	Inspect	-------				
		Replace	-------			100, 102	
05 0101 05	Latch Assembly	Inspect	------				
		Replace	------			101, 109, T12, T31	
		Repair	-----			101, 109	
05 0101 06	Grip Seals and Bearing	Inspect		------		109, 113	
		Replace		------		109, 113	
05 0101 07	Pillow Block	Inspect	------		------		
		Service	------			102	
		Replace		------			
		Repair	-------			101, 102	
				------		102, 116 T16	M

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-58A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
05 0101 08	Blade Retention Bolt	Inspect	------			101, 102	
		Replace	------			101, 102	
		Repair	-----			101, 102	
05 0101 09	Pitch Horn	Inspect	------			101, 109	
		Replace		-----		109, 113	
		Repair	------			101, 109	
05 0101 10	Split Cone Set	Inspect	------				
		Replace	------			101, 109	
		Repair	-----			101, 109	
05 0101 11	Tension Strap	Inspect		-----		109, 113	
		Replace		-----		109, 113	
05 0102	Main Rotor Retaining Nut	Inspect	-----				
		Replace	-----			101, 109, T36	
05 0103	Main Rotor Blade	Inspect	------				
		Replace	------			100, 102	
		Repair	-----			101, 109	
				-----		109, 116	M
		Overhaul			------		
05 0104	Swash plate and Support Assembly	Inspect	------				
				------		109, 113	M
		Adjust	-----			100, 102	
		Replace	------			101, 102	
		Repair	-----			101, 109	
				------		109, 113, T27	M
		overhaul			------		

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS **OH-58A/OH-58C Helicopters**							
(1) GROUP NUMBER	**(2) COMPONENT/ASSEMBLY**	**(3) MAINTENANCE FUNCTION**	**(4) MAINTENANCE CATEGORY**			**(5) TOOLS AND EQPT**	**(6) REMARKS**
			AVUM	**AVIM**	**DEPOT**		
05 0104 01	Pitch Link Assembly	Inspect Adjust Replace Repair	—•— —•— —•— —•—			 100,102 101,102 101,109	
05 0104 02	Idler Link Assembly	Inspect Replace Repair	—•— —•— —•—			 101,102 101,109	
05 0104 03	Mast Boot Assembly	Inspect Replace	—•— —•—			 100,102	
05 0104 04	Collective Lever	Inspect Replace Repair	—•— —•— —•—			 101,109 101,109	
05 0104 05	Collective Link Assembly	Inspect Replace Repair	—•— —•— —•—			 101,109 101,109	
0502	Tail Rotor Hub and Blade Assembly	Inspect Adjust & Balance	—•— —•—	 —•—		 101,102 T41,T42, T39	 F
		Replace Repair	—•— —•—			101,102 101,109	
05 0201	Tail Rotor Blade	Inspect Replace Repair	—•— —•— —•—			 101,109 101,109	
05 0201 01	Bearing	Inspect Replace	—.— 	 —.—		 109,112, T20,T21, T22,T23, T24,T25, T26	

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-58A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	(5) TOOLS AND EQPT	(6) REMARKS
05 0202	Tail Rotor Hub Assembly	Inspect	— . —				
		Replace	— . —			101,109	
		Repair	— . —			101,109	
05 0203	Tail Rotor Pitch Horn	Inspect	— . —				
		Replace	— . —			100,102, T44	
		Repair	— . —			101,109	
05 0204	Tail Rotor Pitch Change Mechanism	Inspect	— . —				
		Adjust	— . —			101,102	
		Replace	— . —			101,102	
		Repair	— . —			101,102	
				— . —		102,112	M
06	Drive Train Systems						
0601	Main Transmission Assembly	Inspect	— . —			102	
		Service	— . —			102	
		Replace	— . —			101,102	
		Repair	— . —			101,109	
		Overhaul			— . . —		
06 0101	Oil Pump	Inspect	— . —			102	
		Replace	— . —			101,102	
		Overhaul			— . . —		
06 0102	Input Pinion Housing Adapter and Seals	Inspect	— . —				
		Replace		— . —		109,113, T32	
					— . —		
06 0103	Drag Pin Assembly	Inspect	— . —			102	
		Replace	— . —			100,102	
		Repair		— . —		109,112, T30	

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-58A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	TOOLS AND EQPT	(6) REMARKS
06 0104	Oil Filter and Head Assembly	Inspect	— . —			102	
		Replace	— . —			100,102	
		Repair	— . —			101,102	
06 0105	Chip Detector	Inspect	— . —			102	
		Replace	— . —			100,102	
06 0106	Oil Cooler	Inspect	— . —			102	
		Replace	— . —			100,102	
		Repair	— . —			101,102	
0602	Transmission Driveshaft	Inspect	— . —			100,T47	
		Service	— . —			102	
		Replace	— . —			100,102	
		Repair	— . —			101,109	
0603	Mast Assembly	Inspect	— . —				
				— . —		112	M
		Replace	— . —			100,102	
		Repair		— . —		109,112 T17	
0604	Freewheeling Assembly	Inspect	— . —			102	M
				— . —		109,112	
		Replace	— . —			100,102 T32	
		Repair		— . —		109,112	
0605	Tail Rotor Driveshaft Assembly	Inspect	— . —				
		Align	— . —			101,109	
		Replace	— . —			101,102	
		Repair	— . —			101,109	
06 0501	Engine Oil Cooler Blower Assembly	Inspect	— . —			102	
		Replace	— . —			101,102	
		Repair	— . —			101,109	F

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS OH-58A/OH-58C Helicopters							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0606	Tail Rotor Gearbox	Inspect	—.—				
		Service	—.—				
		Replace	—.—			101,102	
		Repair	—.—			101,109, T19	
				—.—		112	M
		Overhaul			—.—		
06							
0601	Seals	Inspect	—.—				
		Replace	—.—			101,109	
07	Hydraulic and Pneumatic Systems						
0701	Pump Assembly	Inspect	—.—				
		Service	—.—			100,102	
		Replace	—.—			100,102	
		Repair	—.—			101,109	
0702	Reservoir	Inspect	—.—				
		Service	—.—			100,102	
		Replace	—.—			100,102	
		Repair	—.—			101,104	
0703	Filter Assembly	Inspect	—.—			102	
		Replace	—.—			100,102	
		Repair	—.—			101,104	
0704	Solenoid Valve	Inspect	—.—			102	
		Test	—.—			101,104	
		Replace	—.—			100,102	
		Repair	—.—			101,104	
0705	Servoactuator Assembly	Inspect	—.—			102	
		Service	—.—			102	
		Replace	—.—			100,102	
		Repair	—.—			100,102	
		Overhaul			—.—		
0706	Servo Support	Inspect	—.—			100,102	
		Replace	—.—			101,104	
		Repair	—.—			101,104	

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS OH-58A/OH-58C Helicopters							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	 AVIM	 DEPOT	(5) TOOLS AND EQPT	(6) REMARKS
0707	Check Valves	Inspect Replace	—.— —.—			102 101,104	
0708	Pressure Switch	Inspect Replace	—.— —.—			102 100,102	
0709	Relief Valve	Inspect Test Replace	—.— —.— —.—			102 101,104 101,104	
0710	Quick-disconnect	Inspect Replace	—.— —.—			102 100,102	
0711	Hoses and Lines	Inspect Replace	—.— —.—			102 100,102	
08	Instrument Systems						
0801	Miscellaneous Instruments						
08 0101	Clock	Inspect Replace Overhaul	—.— —.—		 —.—	 100,102	
08 0102	Free Air Temperature Indicator	Inspect Test Replace	—.— —.— —.—			 101,102 100,102	
08 0103	DC Ammeter	Inspect Replace	—.— —.—			 101,106	
0802	Fuel Quantity Indicating System						
08 0201	Fuel Pressure Switch	Inspect Replace	—.— —.—			 101,106	

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS OH-58A/OH-58C Helicopters							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
08 0202	Fuel Quantity Indicator	Inspect Test Replace	—.— —.— —.—			 101,106 101,106	
08 0203	Fuel Quantity Transmitter	Inspect Test Adjust Replace	—.— —.— —.— —.—			 101,106 101,106	
0803	Flight and Navigation Instruments						
08 0301	Standby Compass	Inspect Adjust Replace	—.— —.— —.—			 101,106 101,106	
08 0302	Airspeed Indicator	Inspect Test Replace	—.— —.— —.—			 101,106 101,106	
08 0303	Altimeter	Inspect Test Replace Overhaul	—.— —.— —.—		 —.—	 101,106 101,106	
08 0304	Attitude Indicator	Inspect Test Replace Overhaul	—.— —.— —.—		 —.—	 100,102 101,106	
08 0305	Turn and Slip Indicator	Inspect Replace Overhaul	—.— —.—		 —.—	 101,106	

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS **OH-58A/OH-58C Helicopters**							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
08 0306	Pitot-Static System	Inspect Test Repair	—.— —.— —.—			 101,106 101,106	
08 0307	Instantaneous Vertical Velocity Indicator	Inspect Test Replace Overhaul	—.— —.— —.—		 —.—	 101,106 101,106	
0804	Engine Rotors and Transmission Instruments						
08 0401	Engine (N2) and Rotor Tachometer (Dual)	Inspect Replace Overhaul	—.— —.—		 —.—	 101,106	
08 0402	TOT Indicator and System	Inspect Test Adjust Replace	—.— —.— —.— —.—			 101,106, T3 101,106 101,106	
08 0403	Oil Temperature Indicator	Inspect Replace	—.— —.—			 100,102	
08 0404	Oil Pressure Indicator	Inspect Test Replace	—.— —.— —.—			 101,106, T6 101,106	
08 0405	Torque Meter Indicator	Inspect Test Replace	—.— —.— —.—			 101,106, T6 101,106	

SECTION II

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS
OH-58A/OH-58C Helicopters

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
08							
0406	Gas Producer N1	Inspect	—.—				
	Tachometer	Replace	—.—			101,106	
		Overhaul			—.—		
08							
0407	Rotor, N1 and N2	Inspect	—.—				
	Tachometer Generator	Replace	—.—			101,106	
08							
0408	Temperature Transmitter	Inspect	—.—				
		Test		—.—		106,110	
		Replace	—.—			100,102	
08							
0409	Transmission Oil Pressure	Inspect	—.—				
	Indicator C	Test	—.—			101,106, T6	
		Replace	—.—			101,106	
08							
0410	Transmission Oil Pressure	Inspect	—.—				
	Transmitter C	Test	—.—			101,106	
		Replace	—.—			101,106	
09	Electrical Systems						
0901	Battery	Inspect	—.—				H
		Test					H
		Service					
		Replace	—.—			100,102	
		Repair					H
0902	Starter-Generator	Inspect	—.—			102	
		Test		—.—			I
		Service	—.—			100,102	
		Replace	—.—			101,107	
		Repair		—.—		107,110	
0903	Voltage Regulator	Inspect	—.—				
		Adjust	—.—			101,107	
		Replace	—.—			101,107	
		Overhaul			—.—		

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS OH-58A/OH-58C Helicopters							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0904	Relays, Rheostats, Switches, Circuits Breakers, Connectors, Conduits, Receptacles, Shunts, Shocks Mounts, and Plugs	Inspect	—.—				
		Replace	—.—			101,107	
		Repair	—.—			101,107	
0905	Wiring	Inspect	—.—				
		Test	—.—			101,107	
		Replace	—.—			101,107	
		Repair	—.—			101,107	
0906	Flasher Unit	Inspect	—.—				
		Replace	—.—			101,107	
0907	Fault Annunciator Panel	Inspect	—.—				
		Service	—.—			100,102	
		Replace	—.—			101,107	
		Repair		—.—		107,110	
0908	Warning Lights	Inspect	—.—				
		Test	—.—			102	
		Replace	—.—			107	
0909	Landing, Navigation, Instrument, Cabin, Map, and Anticollision Lights	Inspect	—.—				
		Replace	—.—			100,102	
		Repair	—.—			101,107	
0910	Chip Detector System	Inspect	—.—				
		Service	—.—			100,102	
		Replace	—.—			100,102	
		Repair	—.—			100,107	
0911	Linear Actuator	Inspect	—.—				
		Service	—.—			101,107	
		Replace	—.—			101,107	
		Repair	—.—			102,107	
				—.—		107,110	M
10	Fuel Systems						
1001	Fuel Cell	Inspect	—.—			102	
		Service	—.—			100,102	
		Replace	—.—			101,102	

SECTION II

MAINTENANCE ALLOCATION CHART								
NOMENCLATURE OF END ITEMS OH-58A/OH-58C Helicopters								
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1002	Boost Pump	Inspect	—.—			102	
		Replace	—.—			101,102	
		Repair		—.—		102,110	
1003	Low Level Switch	Inspect	—.—			102	
		Replace	—.—			101,102	
1004	Shutoff Valve	Inspect	—.—			102	
		Adjust	—.—			101,102	
		Replace	—.—			101,102	
1005	Hoses, Lines, and Fittings	Inspect	—.—			102	
		Replace	—.—			100,102	
1006	Closed Circuit Refueling Receiver	Inspect	—.—				
		Replace	—.—			101,102	
1007	Auxiliary Fuel System	Inspect	—.—				
		Service	—.—			100,102	
		Install	—.—			101,103	
		Repair		—.—		103,117, 118	
11	Flight Controls System						
1101	Force Gradient	Inspect	—.—				
		Adjust	—.—			101,102	
		Replace	—.—			100,102	
		Repair	—.—			100,102	
1102	Jackshaft Collective Control	Inspect	—.—				
		Adjust	—.—			100,102	
		Replace	—.—			101,102	
		Repair	—.—			101,102	
1103	Cyclic Control Stick	Inspect	—.—				
		Adjust	—.—			100,102	
		Replace	—.—			100,102	
		Repair	—.—			101,102	
1104	Magnetic Brake	Inspect	—.—			102	
		Adjust	—.—				
		Replace	—.—			100,102	
		Repair		—.—			

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS OH-58A/OH-58C Helicopters							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1105	Collective and Cylic Linkage	Inspect	—.—			102	
		Adjust	—.—			101,102	
		Replace	—.—			101,102	
		Repair	—.—			101,102	
1106	Tail Rotor Control Linkage	Inspect	—.—			102	
		Adjust	—.—			101,102	
		Replace	—.—			101,102	
		Repair	—.—			101,102	
1107	Tail Rotor Pedal Assembly	Inspect	—.—				
		Adjust	—.—			101,102	
		Replace	—.—			101,102	
		Repair	—.—			101,102	
11 0701	Bearings	Inspect	—.—				
		Replace		—.—		101,102	
1108	Adjustable Rod Ends	Inspect	—.—				
		Replace	—.—			101,102	
1109	Vulnerability Reduction Tail Rotor Controls C						
11 0901	Electromechanical Control Tube Assemblies C	Inspect	—.—				
		Test	—.—				
		Adjust	—.—			101,102	
		Replace		—.—		102,118	
		Repair		—.—		107,110	
11 0902	Controlex Control C	Inspect	—.—				
		Adjust	—.—			101,102	
		Replace	—.—			101,102	
		Repair	—.—			101,102	
1109 0201	Rod Ends C	Inspect	—.—				
		Replace	—.—			100,101	
12	Utility Systems						

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS OH-58A/OH-58C Helicopters							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1201	Anti-icing Systems						
12 0101	Tube Assembly	Inspect	—.—			102	
		Adjust	—.—			100,102	
		Replace	—.—			100,102	
12 0102	Anti-icing Lever	Inspect	—.—			102	
		Replace	—.—			100,102	
13	Environmental Control Systems						
1301	Bleed Air Heating System						
13 0101	Plenum Assembly	Inspect	—.—				
		Replace	—.—			100,102	
13 0102	Ventilating and Defogging Valves	Inspect	—.—				
		Replace	—.—			101,102	
		Repair	—.—			101,107	
13 0103	Controls	Inspect	—.—				
		Replace	—.—			100,102	
13 0104	Ducts and Hoses	Inspect	—.—			102	
		Replace	—.—			100,102	
		Repair	—.—			100,102	
13 0105	Fan Motor	Inspect	—.—				
		Replace	—.—			107,110	
13 0106	Air Mixing Valve	Inspect	—.—				
		Replace	—.—			107,110	
		Repair		—.—		107,110	

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS **OH-58A/OH-58C Helicopters**							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1302	Combustion Heater System						
13 0201	Fan Motors	Inspect Replace	—•— —•—			 102,107	
13 0202	Fuel Pump and Valves	Inspect Replace	—•— —•—			 102,107	
13 0203	Ignition Unit	Inspect Replace	—•— —•—			 100,107	
13 0204	Fuel Filter	Inspect Replace	—•— —•—			 100,102	
13 0205	Pressure Switch	Inspect Replace	—•— —•—			 100,102	
13 0206	Heater Assembly	Inspect Replace	—•— —•—			 101,102	
13 0207	Fuel Pressure Relief Valve	Inspect Adjust Replace	—•— —•— —•—			 101,102 101,102	
16	Mission Equipment A						
16.1	ATAS Missile System CS	Remove Install Clean Inspect Repair Boresight	—•— —•— —•— —•— —•— —•—			121,123 121 121 121 121,122	
17	Emergency Equipment						K
1701	Portable Fire Extinguisher	Inspect Replace	—•— —•—			 100,102	

SECTION II

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS **OH-58A/OH-58C Helicopters**							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQPT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1702	First Aid Kit	Inspect Replace	—•— —•—			100,102	
18	Installed Avionic Components						J

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS
OH-58A/OH-58C Helicopters

TOOL OR TEST EQUIPMENT REFERENCE CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
T3	AVUM	Tester, Exh Gas Temp	4920-00-372-4593	BH112JB-53
T6	AVUM	Tool, Rigging	6685-00-693-5009	MP1
T10	AVUM	Tool, Float Inflation	4920-00-607-8215	T100061
T12	AVUM	Sling, Main Rotor	1730-00-0998099	T100220
T13	AVUM	Scope, Assembly	4920-00-718-6674	T101401
T14	AVUM	Tool, Tab Bending	5120-00-177-9403	T101444
T15	AVUM	Gage, Tab	5220-00-151-7292	T101445
T16	AVIM	Puller, Bearing	5120-00-999-5306	T101491
T17	AVIM	Fixture, Holding	4920-00-135-9136	T101499
T19	AVUM	Wrench, Spline	5120-00-177-9412	T101511
T20	AVIM	Tool, Staking	3419-00-402-2297	T101529-3
T21	AVIM	Assembly, Base	3419-00-350-4402	T101529-5
T22	AVIM	Assembly, Housing	5120-00-357-6325	T101529-7
T23	AVIM	Punch and Set	3419-00-177-9410	T101529-23
T24	AVIM	Pilot	3419-00-177-9411	T101529-25
T25	AVIM	Support	3419-00-223-3154	T101529-27
T26	AVIM	Shims	5365-00-159-3905	T101529-29
T27	AVIM	Tool, Roll Staking	3419-00-177-9400	T101530
T28	AVUM	Support, Assembly	4920-00-136-5008	T101532
T29	AVUM	Assembly, Target	4920-00-178-0712	T101536
T30	AVIM	Tool, Staking	5120-00-177-9398	T101547
T31	AVUM	Wrench, Socket	5120-00-177-7065	T101554
T32	AVIM	Tool, Holding	5120-00-178-0941	T101555
T33	AVIM	Tool, Roll Staking	5120-00-116-8312	T101584
T34	AVUM	Tool, Flapping Axis	4920-01-207-5040	T101740
T35	AVUM	Tool, Flapping Axis	4920-01-204-9938	T101741
T36	AVUM	Wrench	5120-01-047-0250	T102040
T38	AVIM	Tool	9530-00-233-1326	1560-OH58-105-1
T39	AVUM	Post Assembly	4920-00-708-3109	2539
T40	AVUM	Tool, Lifting, Engine	5120-00-924-7722	6796963
T41	AVUM	Kit, Propeller Balancing	4920-00-572-0987	7A050
T42	AVUM	Kit, Main and Tail Rotor Balancing	4920-00-111-3063	7HEL069
T43	AVIM	Level, Bulls Eye	6675-00-244-0446	810550
T44	AVUM	**Mechanical Puller**	**5120-00-595-9304**	**GGG-P-781**
T47	AVUM	0.006 Wire Gage	5210-00-189-9537	96369
100	AVUM	Tool Set, AVUM, No. 1	4920-00-159-8727	SC492099 CLA90
101	AVUM	Tool Set, AVUM, No. 2	4920-00-567-0476	SC492099 CLA92
102	AVUM/AVIM	Tool Kit, Aircraft Mechanics, General	5180-00-323-4692	SC518099 CLAO1
103	AVUM/AVIM	Tool Kit, Airframe Repairers	5180-00-323-4876	SC518099 CLA02
104	AVUM/AVIM	Tool Kit, Hydraulic Repairers	5180-00-323-4891	SC518099 CLAO3

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

OH-58A/OH-58C Helicopters

TOOL OR TEST EQUIPMENT REFERENCE CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
106	AVUM/AVIM	Tool Kit, Instrument Repairers	5180-00-323-4913	SC518099 CLA05
107	AVUM/AVIM	Tool Kit, Electrical Repairers	5180-00-323-4915	SC518099 CLA06
108	AVUM/AVIM	Tool Kit, Engine Repairers	5180-00-323-4944	SC518099 CLA07
109	AVUM/AVIM	Tool Kit, Power Train Repairers	5180-00-003-5267	SC518099 CLA13
110	AVIM	Shop Set, AVIM, Electrical - Instrument	4920-00-165-1453	SC492099 CLA91ELAM
112	AVIM	Shop Set, AVIM, Machine	4920-00-405-9279	SC492099 CLA91MAAM
113	AVIM	Shop Set, AVIM, Power Train	4920-00-001-4132	SC492099 CLA91PTAM
116	AVIM	Shop Set, AVIM, Rotor	4920-00-405-9270	SC492099 CLA91ROAM
117	AVIM	Shop Set, AVIM, Sheet Metal	4920-00-166-5505	SC492099 CLA91SMAM
118	AVIM	Shop Set, AVIM, Tool Crib	4920-00-472-4183	SC492099 CLA91TCAM
119	AVIM	Shop Set, AVIM, Turbine Engine	4920-00-224-3684	SC492099 CLA91ENTAM
120	AVIM	Shop Set, AVIM, Welding	4920-00-163-5093	SC492099 CLA91WEAM
121	AVUM	Tool Kit, Aircraft Armament Repairers	4933-00-967-9816	TBD
122	AVUM	Device, Boresight	1560-01-256-8919	T101844-101
123	AVUM	Wrench, Rack Release	5120-01-068-8831	209-071

Text

SECTION IV. REMARKS

OH-58A/OH-58C Helicopters

REFERENCE CODE	
A	Sheet metal, honeycomb panels, and structural members not requiring jigs and fixtures.
B	Limited to epoxy minor repair.
C	Patching by hand method only.
D	Limited to fiberglass repair.
E	For additional maintenance instructions refer to one of the following: (1) TM 55-2840-231-23 A (2) TM 55-2840-241-23 C
F	To include Balance.
G	Removal and Installation only.
H	Refer to TM 11-6140-203-14-2.
I	Based on distribution of generator test stand.
J	Refer to TM 11-1520-228-20 A and TM 11-1520-228-20-1 C for Avion c Maintenance Allocation.
K	Refer to TM 9-1005-298-12.
L	Requiring welding.
M	As indicated by instructions in this manual.

APPEDIX C

HELICOPTER INVENTORY MASTER GUIDE

C-1. INTRODUCTION.

a. Appendix C lists those items of installed or loose equipment required by and authorized for using organizations to accomplish their primary or alternate mission. This list will serve to standardize present inventory procedures, using the inventory master guide to determine the inventoriable items of installed and loose equipment, Insofar as possible, items of equipment are listed in the sequence of their physical location within the helicopter area.

b. Helicopter inventory is subject to change as a result of authorized changes (MWO's) and additions or deletions of property for special missions requirements; therefore, the selection of items of inventory from the inventory master guide may or may not provide a complete inventory list. When it is known that the master guide does not provide a complete inventory list, it will be necessary to research authorized changes (MWO's) and local command directives in order to compile an accurate and exact inventory list. Refer to DAPAM 738-751 for applicable forms and records.

C-2. SECURITY.

It is desired that helicopter inventory records be unclassified. However, when equipment bearing a security classification is installed, or the installation of unclassified equipment is of a confidential or secret nature, accomplishment of the classification will be in accordance with existing security regulations.

C-3. INVENTORIABLE ITEMS.

NOTE

The selection of inventoriable items is without regard to the agency (governmental or contractual) furnishing the items.

a. Items listed are:

(1) Items essential to the execution of the designated mission of the helicopter, such as electronic, photographic, armament, special mission instruments, and safety and comfort equipment.

(2) Loose equipment delivered with the helicopter and items subject to pilferage or readily converted to personal use.

(3) Modification kits which are issued or distributed to owning organizations for installation and which are not immediately placed in-work will be recorded on the affected helicopter DA Form 2408-17 (Aircraft Inventory Record) and identified as loose equipment until modification is completed.

(4) Equipment required for operation in special environment.

b. Items excluded are:

(1) Nonaccountable items coded as expendable in the applicable stock lists.

(2) Personal issue or furnished on unit allowance or other authority.

(3) Items or components considered basic or integral parts of the airframe or basic helicopter such as engines, propellers, wheels, and standard instruments.

(4) Equipment publications, check lists, and helicopter forms.

C-4. PERIODS OF INVENTORY.

Inventoriable items shall be checked against the Aircraft Inventory Record DA Form 2408-17 at the following periods:

a. Upon receipt of the helicopter.

b. Prior to transfer of the helicopter to another organization.

C. Upon placing helicopter in storage and upon removal from storage. Helicopter need not be inventoried while in storage.

d. Twelve months elapsed time since last inventory.

e. Loose equipment shipped under separate cover is inventoried upon transfer by the sending activity and immediately upon receipt by the receiving activity.

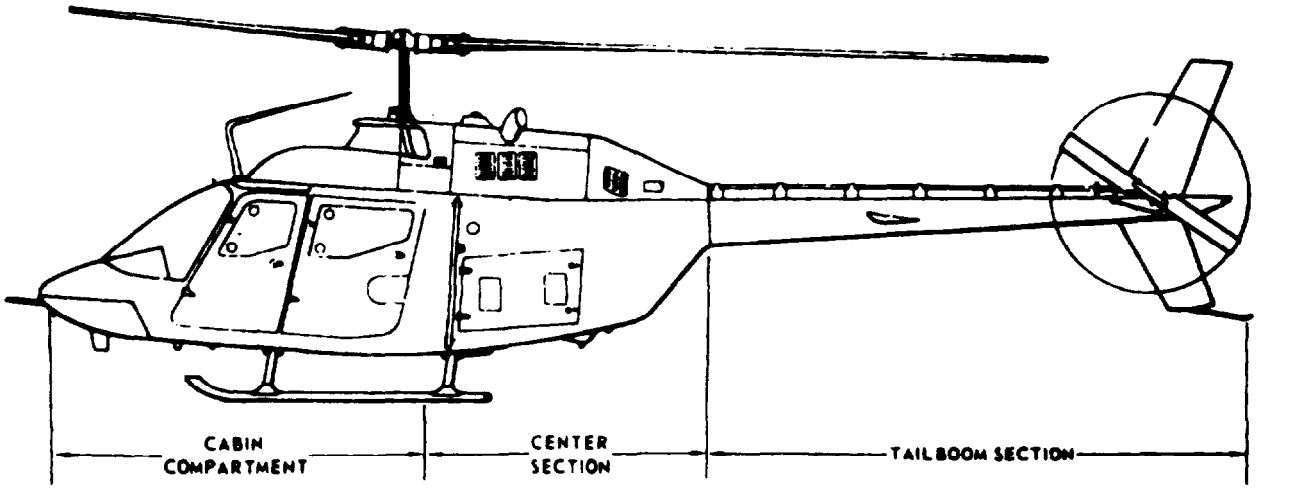


Figure C-1. Helicopter Inventory Sections

NOMENCLATURE	WHERE	AMOUNT INSTALLED
First Aid Kit	Cabin Compartment	1
Pilot and Copilot Back Cushions	Cabin Compartment	2
Pilot and Copilot Seat Cushions	Cabin Compartment	2
Pilot and Copilot Shoulder Harness	Cabin Compartment	2
Pilot and Copilot Seat Belts	Cabin Compartment	2
Passenger Seat cushion	Cabin Compartment	2
Passenger Back cushion	Cabin Compartment	1
Passenger Seat Belts	Cabin Compartment	2
Passenger Shoulder Harness	Cabin Compartment	2
Clock	Cabin Compartment	1
Magnetic Compass	Cabin Compartment	1
Aircraft Manufacturers Data Plate (100-030-1)	Cabin Compartment	1
Fire Extinguisher	Cabin Compartment	1
AN/ARC-116 or AN/ARC-164 UHF-AM	Cabin Compartment	1
C6533 control	Cabin Compartment	3
AN/ARC-114 VHF-FM	Cabin Compartment	1*
AN/ARC-115 VHF-AM or AN/ARC-186 VHF-AM	Cabin Compartment	1
AN/ARN-89 ADF	Cabin Compartment	1
C-6280P/APX IFF Control A	Cabin Compartment	1
Armament control Panel A	Cabin Compartment	1
Pilot Side Panel Armor	Cabin Compartment	1
copilot side Panel Armor	Cabin Compartment	1
APX-72 Transponder A	Cabin Compartment	1
Armament Hard Point Fittings A	Cabin Compartment	4
ATAS Control Panel CS	Cabin Compartment	1
Pilot Display Unit (PDU) CS	Exterior of Fuselage	1
ATAS Pylon CS	Left Side	1

NOMENCLATURE	WHERE	AMOUNT INSTALLED
ATAS Launcher and Adapter Assembly CS	Exterior of Fuselage Left Side	1
Armament Hard Point Fittings CS	Exterior of Fuselage Left Side	3
Compressor Armor A	Engine Compartment	2
AM-4859/ARN/89 Amplifier	Center Section	1
Electronics Unit CS	Center Section	1
Interface Electronics Assembly CS	Center Section	1
Kit-1A/TSEC IFF Computer or Kit-1C/TSEC IFF Computer	Cabin Compartment	1

NOMENCLATURE	WHERE	AMOUNT INSTALLED
Seal, Filler Assy	Center Section (Avionics Compartment)	1
Seal, Filler Assy	Center Section (Lwr Avionics Compartment)	1
Cord Assy	Center Section (Avionics Compartment)	3
Exhaust Cover	Exterior	2
Main Rotor Tiedown	Exterior	1
Pitot and Engine Inlet Cover	Exterior	1
Tow Fittings	Exterior	2
AN/ARC-51 BX UHF	Center Section (Avionics Compartment)	1
Binder Log Book		1
APX-100 Transponder	Cabin Compartment	1
AN-APR 39 Radar Warning	Cabin Compartment	1
AN/APN-123 CONUS Navigation	Cabin Compartment	1
Ignition Key	Cabin Compartment	2
Door Padlock and Key	Exterior Fuselage, Right Side	1
Test Set TS1843A/APX (A)	Cabin Compartment	1
RT-1115/APN209 Radar Altimeter	Cabin Compartment	1
RT-1115/APN209(V) Radar Altimeter (After compliance with MWO 1-1 520-228-50-52)	Cabin Compartment	1
16768-10 or 16768-20 Global Positioning System (GPS) (After compliance with MWO 1-1520-228-50-53)	Cabin Compartment	1
R-20231/ARN 123 VOR Receiver.	Center Section (Avionics Compartment)	1
Cargo Platform	Cabin Compartment	2

* When required, a second radio may be installed.

APPENDIX D

MANUFACTURE ITEMS LIST (AVUM, AVIM)

This appendix includes complete instructions, inducing bills of material for field manufacture of all items listed in TM 55-1520-228-23P. Aviation Unit Repair Parts and Special Tools Lists, bearing MO and MF Source Codes.

The part number index lists all items in part number order with a cross-reference to the figure in which the item appears. All materials necessary for manufacture of item are listed, by National Stock Number, in the bill of material for the item.

PART NUMBER INDEX

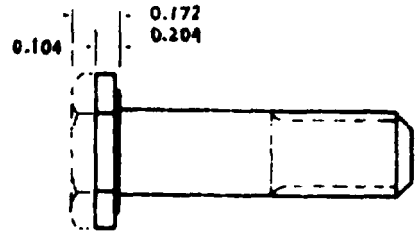
PART NUMBER	FIGURE NUMBER	PART NUMBER	FIGURE NUMBER
130-011-4N148	D-159	206-031-117-89	D-44
130-011-4N152	D-159	206-031-159-5	D-25
130-011-4N184	D-159	206-031-159-9	D-163
130-011-4N200	D-159	206-031-351-23	D-124
130-011-4N344	D-159	206-031-533-1	D-35
130-011-4N400	D-159	206-032-004-27	D-29
140-008-8	D-156	206-032-100-189	D-154
140-009-G17H48	D-47	206-032-103-33	D-125
1560-OH58-020-1	D-43	206-032-105-5	D-39
1560-OH58-100-1	D-37	206-032-105-7	D-40
1560-OH58-100-2	D-38	206-032-137-1	D-68
1560-OH58-105-1	D-157	206-032-210-77	D-64
1560-OH58-111-5	D-162	206-032-212-21	D-34
1560-OH58-111-11	D-161	206-032-216-5	D-126
1560-OH58-111-13	D-161	206-032-216-21	D-126
1560-OH58-118-2	D-77	206-032-218-1	D-86
1560-OH58-118-3	D-78	206-032-218-3	D-86
1560-OH58-118-4	D-79	206-032-312-23	D-131
156001-4S0117	D-85	206-032-333-29	D-69
156001-4S0146	D-85	206-032-341-15	D-19
156001-5S0125	D-85	206-032-341-17	D-19
156001-5S0143	D-85	206-032-341-19	D-19
156001-5S0193	D-85	206-032-341-27	D-118
156001-6D0206	D-85	206-032-345-1	D-99
156001-6D0252	D-85	206-032-345-3	D-100
156005-4S0125	D-85	206-032-345-7	D-101
156005-450143	D-85	206-032-345-9	D-102
156005-8D0077	D-85	206-032-345-11	D-103
156115-D0181D350	D-85	206-032-345-19	D-104
156654-8D-0400	D-80	206-032-345-23	D-107
156666-8D-0424	D-80	206-032-345-25	D-105
156722-8-0424	D-80	206-032-345-27	D-108
20-032-1	D-71	206-032-345-29	D-106
20-032-2	D-71	206-032-345-31	D-109
20-032-3	D-71	206-032-400-15	D-36
20-032-4	D-71	206-032-435-1	D-110
20-032-5	D-71	206-032-435-101	D-110
20-032-7	D-71	206-032-456-7	D-111
20-036-13-80	D-61	206-032-500-21	D-23
20-042-21-8	D-30	206-032-500-23	D-129
204-070-485-1	D-97	206-032-501-25	D-23
204-072-347-1	D-132	206-032-501-27	D-23
206-001-013-1	D-33	206-032-501-29	D-23
206-001-178-1	D-1	206-040-007-3	D-115
206-001-382-5	D-91	206-040-150-5	D-7
206-001-757-3	D-62	206-040-150-17	D-8
206-010-202-1	D-134	206-040-169-1	D-58
206-010-225-5	D-117	206-040-170-3	D-50
206-030-333-1	D-27	206-040-171-1	D-160
206-031-117-69	D-15	206-040-243-1	D-66
206-031-117-71	D-16	206-040-255-1	D-160

PART NUMBER	FIGURE NUMBER	PART NUMBER	FIGURE NUMBER
206-040-426-1	D-48	206-062-802-20	D-59
206-050-166-15	D-128	206-062-802-27	D-5
206-050-166-17	D-127	206-062-802-29	D-5
206-052-105-9	D-21	206-062-815-27	D-88
206-052-105-11	D-22	206-062-815-39	D-26
206-052-108-19	D-136	206-062-815-91	D-138
206-052-108-20	D-136	206-062-815-109	D-135
206-060-738-5	D-56	206-062-815-111	D-137
206-061-010-1	D-67	206-062-815-115	D-139
206-061-230-17	D-175	206-062-815-116	D-139
206-061-230-107	D-175	206-062-815-119	D-130
206-061-654-1	D-11	206-062-815-120	D-130
206-061-696-1	D-160	206-062-830-1	D-160
206-061-697-1	D-160	206-062-831-1	D-160
206-061-801-63	D-13	206-062-835-19	D-142
206-061-801-65	D-14	206-062-835-21	D-143
206-061-804-25	D-14	206-062-835-23	D-144
206-061-805-23	D-13	206-062-835-27	D-145
206-061-810-21	D-13	206-062-835-29	D-146
206-061-902-61	D-25	206-062-835-39	D-147
206-062-225-1	D-160	206-062-835-40	D-147
206-062-226-1	D-160	206-062-835-41	D-153
206-062-507-1	D-65	206-062-835-42	D-153
206-062-508-1	D-160	206-062-835-43	D-149
206-062-509-1	D-160	206-062-901-29	D-31
206-062-510-1	D-160	206-062-901-41	D-133
206-062-513-1	D-160	206-062-901-73	D-95
206-062-520-1	D-160	206-062-901-97	D-95
206-062-524-1	D-160	206-062-901-99	D-95
206-062-533-1	D-160	206-062-901-153	D-95
206-062-600-3	D-69	206-062-901-157	D-95
206-062-606-1	D-160	206-063-678-1	D-160
206-062-607-1	D-18	206-063-679-1	D-160
206-062-610-5	D-69	206-063-680-1	D-160
206-062-610-7	D-69	206-070-176-1	D-160
206-062-616-9	D-4	206-070-180-1	D-160
206-062-619-1	D-6	206-070-230-1	D-160
206-062-626-1	D-160	206-070-296-21	D-20
206-062-632-1	D-160	206-070-296-23	D-20
206-062-633-1	D-160	206-070-296-27	D-20
206-062-634-1	D-160	206-070-296-29	D-20
206-062-635-1	D-160	206-070-296-33	D-20
206-062-636-1	D-160	206-070-296-35	D-20
206-062-639-1	D-79	206-070-296-37	D-20
206-062-646-1	D-18	206-070-296-39	D-20
206-062-647-1	D-160	206-070-305-29	D-72
206-062-663-1	D-113	206-070-305-33	D-74
206-062-667-1	D-160	206-070-305-35	D-76
206-062-678-1	D-160	206-070-305-37	D-75
206-062-715-3	D-71	206-070-305-38	D-75
206-062-802-19	D-59	206-070-305-43	D-72

PART NUMBER	FIGURE NUMBER
206-070-305-45	D-75
206-070-305-47	D-85
206-070-305-51	D-51
206-070-310-29	D-28
206-070-310-31	D-28
206-070-313-9	D-12
206-070-313-11	D-12
206-070-314-1	D-57
206-070-318-1	D-69
206-070-324-1	D-17
206-070-332-5	D-59, D-164
206-070-332-6	D-59, D-164
206-070-332-7	D-60, D-165
206-070-332-8	D-60, D-165
206-070-333-1	D-49
206-070-333-3	D-49
206-070-333-5	D-49
206-070-334-1	D-52
206-070-335-27	D-53
206-070-339-1	D-160
206-070-340-1	D-160
206-070-341-1	D-160
206-070-343-1	D-160
206-070-344-1	D-160
206-070-345-1	D-160
206-070-348-1	D-160
206-070-349-1	D-160
206-070-362-7	D-94
206-070-362-13	D-54
206-070-366-1	D-81
206-070-402-5	D-42
206-070-474-1	D-114
206-070-474-3	D-82
206-070-489-1	D-63
206-070-529-1	D-160
206-070-530-1	D-160
206-070-588-1	D-160
206-070-887-11	D-82
206-073-027-1	D-112
206-073-030-1	D-160
206-073-031-1	D-160
206-073-033-1	D-160
206-073-035-1	D-160
206-073-036-1	D-160
206-073-037-1	D-160
206-073-038-1	D-160
206-073-039-1	D-160
206-073-040-1	D-160
206-073-042-1	D-160
206-073-043-1	D-160
206-073-044-1	D-160

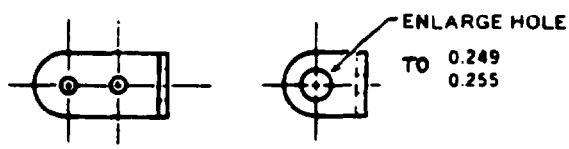
PART NUMBER	FIGURE NUMBER
206-075-310-1	D-2
206-075-314-29	D-69
206-075-314-33	D-69
206-075-434-1	D-69
206-075-441-5	D-46
206-075-475-3	D-69
206-075-476-1	D-69
206-075-544-3	D-122
206-075-544-7	D-122
206-075-556-1	D-45
206-075-595-1	D-162
206-076-381-1	D-160
206-076-382-1	D-160
206-076-383-1	D-160
206-076-384-1	D-160
206-076-385-1	D-160
206-532-401-127	D-169
206-532-401-129	D-169
206-532-401-131	D-169
206-532-401-133	D-169
206-532-401-135	D-169
206-532-401-139	D-169
206-532-401-141	D-169
206-704-074-3	D-123
206-706-035-17	D-121
206-961-211-29	D-116
209-001-138-7	D-87
209-030-597-1	D-120
209-030-597-5	D-119
30-006-2-26	D-92
30-006-3-26	D-92
30-006-4-26	D-92
30-006-5-26	D-92
30000694	D-9
365-83019-1	D-73
365-83041-1	D-41
5120-EG-OO9	D-83
60-003-1N7	D-152
60-003-1N9	D-152
60-003-1N38	D-152
60-003-1N40	D-152
60-003-3N8	D-152
602C0001-12	D-148
70-009E000X134	D-98
70-009E000X162	D-98
70-009E000X205	D-98
70-009E180E150	D-98
70-009F020F270	D-98
70-009F180F247	D-98
70-009G000Y164	D-98
10-009H140W240	D-98

PART NUMBER	FIGURE NUMBER
70-009J000V364	D-98
70-009L000T362	D-98
70-010E240F062	D-151
70-010F000X116	D-151
70-010G000X116	D-151
70-010J000A116	D-151
70-010K000A126	D-151
70-010L000A240	D-151
70-010L2332330	D-151
70-033-03-0030	D-155
70-033-04-0560	D-155
70-061J085C074	D-98
70-061K000V390	D-98
85T4-2-3	D-32
85T4-2-6	D-32
85T4-5-24	D-32
85T4-6-1	D-32
85T4-6-2	D-32
85T4-6-48	D-32
85T4-7-2	D-32
85T4-7-3	D-32
85T4-9-1	D-32
85T4-9-2	D-32
8514-11-1	D-32
85T4-11-2	D-32
85T4-11-32	D-32
85T4-11-38	D-32
85T4-11-40	D-32
85T4-375-50	D-32
85T4-375-90	D-32
85T4-500-1	D-32
85T4-500-6	D-32
85T4-500-12	D-32
85T4-750-48	D-32
85T4-1500-2	D-32
8535279	D-167
8535280	D-168
8535281	D-168
92-042-2	D-172
92-042-3	D-173
92-042-4	D-174
92-042-5	D-174
93-075-1	D-180
93-075-2	D-181
93-075-3	D-181
93-075-4	D-182
93-075-5	D-182
93-075-6	D-183
93-075-7	D-183
93-075-8	D-180
93-075-9	D-184
93-075-10	D-184
95-246-01	D-178
95-246-02	D-179
95-246-03	D-179
95-246-04	D-179
95-246-05	D-179



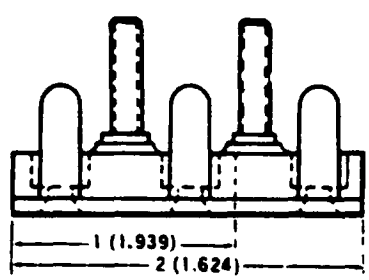
PART NUMBER: 206-001-178-1 BOLT
FABRICATE FROM: NSN 5306-00-190-1919

Figure D-1



PART NUMBER: 206-075-310-1 BRACKET ANGLE
FABRICATE FROM: NSN 5340-00-721-8182

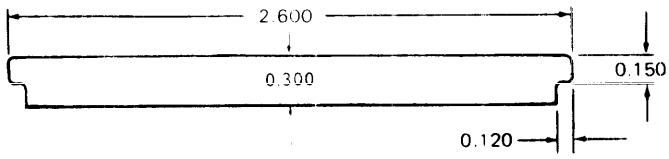
Figure D-2



PART NUMBER: MS27212-1-1 TERMINAL BOARD
MS27212-1-2 TERMINAL BOARD
MS27212-1-4 TERMINAL BOARD
FABRICATE FROM: NSN 5940-00-950-1610

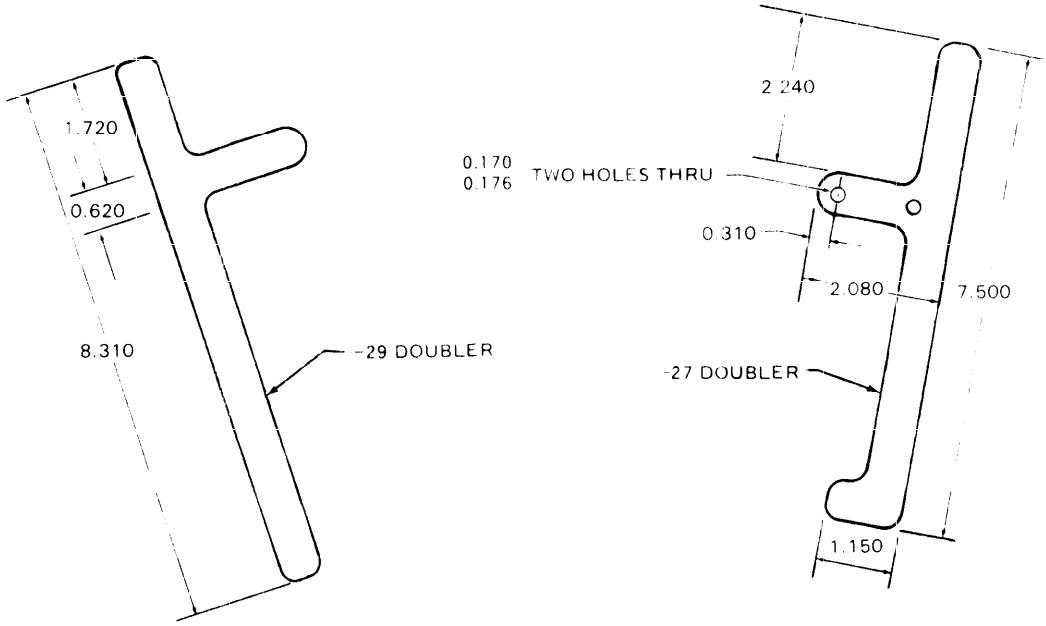
NOTE: Second dash number indicator number of terminal connecton.

Figure D-3



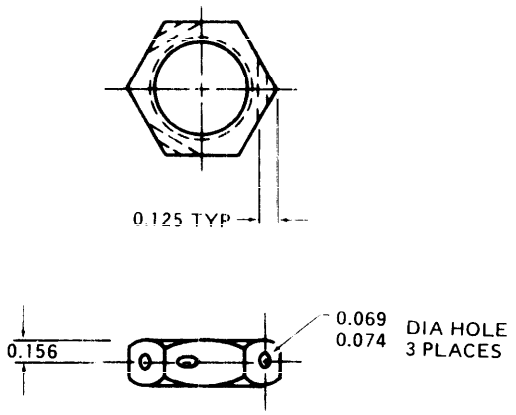
PART NUMBER: 206-062-616-9 WEARSTRIP
FABRICATE FROM: NSN 9330-00-143-8542

Figure D-4



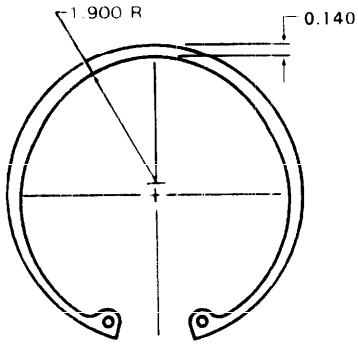
PART NUMBER: 206-062-802-27 DOUBLER
FABRICATE FROM: NSN 9535-00-084-4484
PART NUMBER: 206-062-802-29 DOUBLER
FABRICATE FROM: NSN 9535-00-084-4484

Figure D-5



PART NUMBER: 206-062-619-1 NUT, HEXAGON
FABRICATE FROM: NSN 5310-00-282-7835

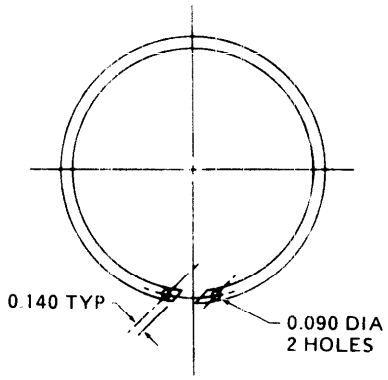
Figure D-6



GRIND TO OBTAIN DIM. SHOWN
SIDES TO BE PARALLEL
WITHIN 0.0002 T.I.R.

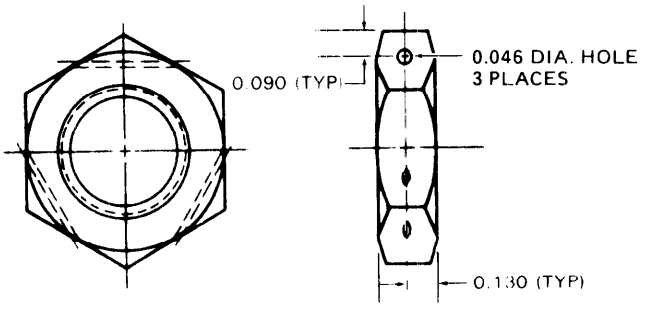
PART NUMBER: 206-040-150-5 SPACER
FABRICATE FROM: NSN 5365-00-059-6363

Figure D-7



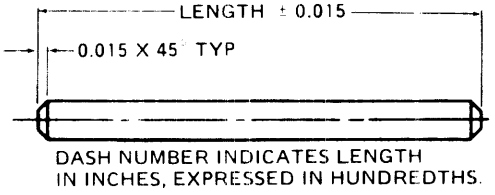
PART NUMBER: 206-040-150-17 SPACER
FABRICATE FROM: NSN 5365-00-059-6363

Figure D-8



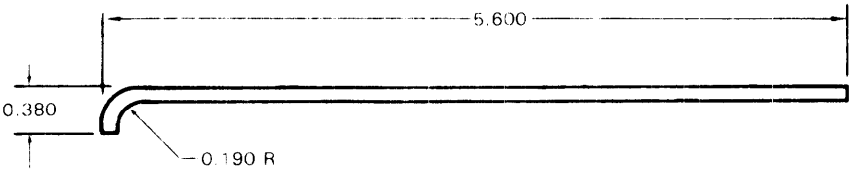
PART NUMBER: 30000694 NUT
FABRICATE FROM: NSN 5310-00-282-7818

Figure D-9



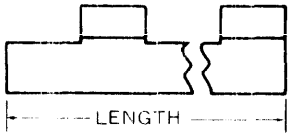
PART NUMBER:	MS20253P1-250 PIN	**PART NUMBER:**	MS20253P1-100 PIN
FABRICATE FROM:	NSN 5340-00-125-5792	**FABRICATE FROM:**	NSN 5430-00-125-5792
PART NUMBER:	MS20253P2-225 PIN	**PART NUMBER:**	MS20253P2-10900
FABRICATE FROM:	NSN 5340-00-043-3723	**FABRICATE FROM:**	NSN 5340-00-043-3723
PART NUMBER:	MS20253P2-438 PIN	**PART NUMBER:**	MS20253P2-1120
FABRICATE FROM:	NSN 5340-00-043-3723	**FABRICATE FROM:**	NSN 5340-00-043-3723
PART NUMBER:	MS20253P3-225 PIN	**PART NUMBER:**	MS20253P2-470
FABRICATE FROM:	NSN 5340-00-914-5745	**FABRICATE FROM:**	NSN 5340-00-043-3723

Figure D-10



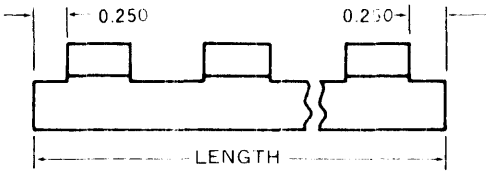
PART NUMBER: 206-061-654-1 PIN, HINGE
FABRICATE FROM: NSN 5340-00-043-3723

Figure D-11



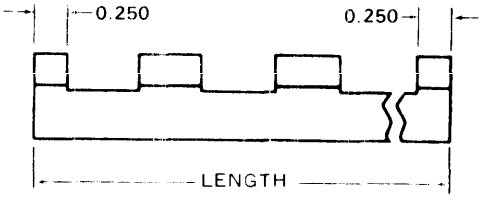
PART NUMBER:	206-070-313-9 HINGE HALF
FABRICATE FROM:	NSN 5340-00-057-2625
LENGTH	2.000
PART NUMBER:	206-070-313-11 HINGE HALF
FABRICATE FROM:	NSN 5340-00-057-2625
LENGTH	3.000

Figure D-12



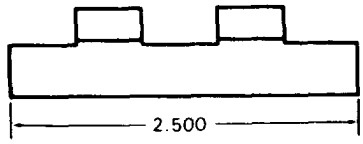
PART NUMBER:	206-061-801-63 HINGE HALF
FABRICATE FROM:	NSN 5340-00-993-1461
LENGTH:	4.500
PART NUMBER:	206-061-805-23 HINGE HALF
FABRICATE FROM:	NSN 5340-00-819-5563
LENGTH:	5.000
PART NUMBER:	206-061-810-21 HINGE HALF
FABRICATE FROM:	NSN 5340-00-982-3601
LENGTH:	5.000

Figure D-13



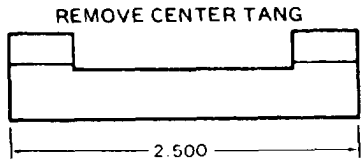
PART NUMBER:	206-061-804-25 HINGE HALF
FABRICATE FROM:	NSN 5340-00-819-5563
LENGTH:	5.000
PART NUMBER:	206-061-801-65 HINGE HALF
FABRICATE FROM:	NSN 5340-00-993-1461
LENGTH:	4.500

Figure D-14



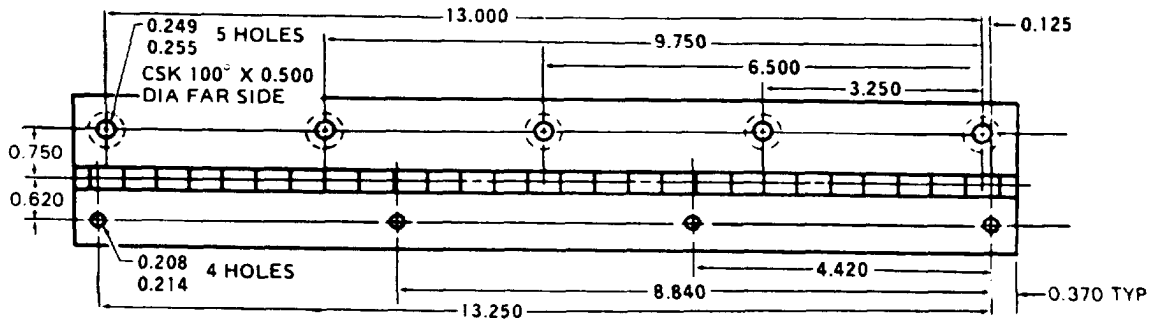
PART NUMBER: 206-031-117-69 HINGE HALF
FABRICATE FROM: NSN 5340-00-993-1461

Figure D-15



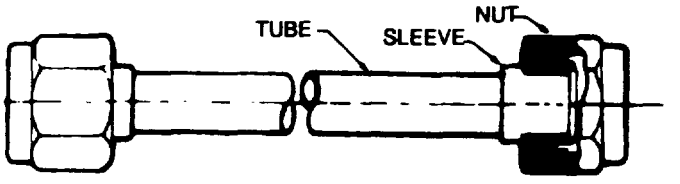
PART NUMBER: 206-031-117-71 HINGE HALF
FABRICATE FROM: NSN 5340-00-993-1461

Figure D-16



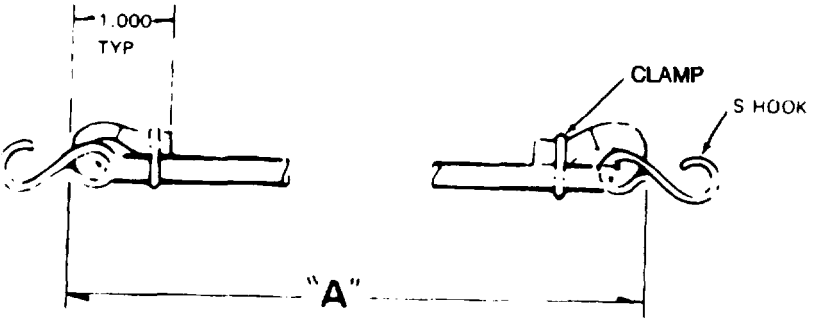
PART NUMBER: 206-070-324-1 HINGE
FABRICATE FROM: NSN 5340-00-664-8138

Figure D-17



PART NUMBER	TUBE NSN	NUT NSN	SLEEVE NSN
206-062-607-1	4710-00-595-2413	4730-00-287-0288	4730-00-277-5373
206-062-646-1	9330-00-484-4013	4730-00-287-0285	4730-00-287-0067

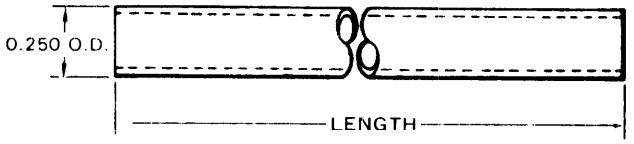
figure D-18



DASH NO	"A" DIMENSION
15	16.5 inches
17	39.0 inches
19	23.4 inches

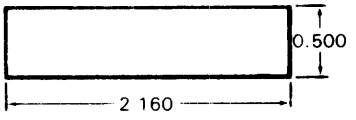
PART NUMBER	CORD ASSEMBLY	FABRICATE FROM
206-032-341-15		8305-00-276-7575 4030-00-270-5436 5340-01-093-4443
206-032-341-17	Cord Assembly	8305-00-276-7575 4030-00-270-5436 5340-01-093-0443
206-032-341-19	Cord Assembly	CORD 8305-00-276-7575 S HOOK 4030-00-270-5436 CLAMP 5340-01-093-0443

Figure D-19



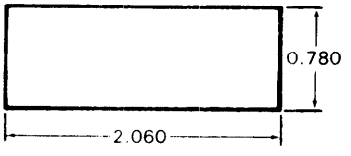
PART NUMBER:	206-070-296-21 TUBE, PLASTIC
FABRICATE FROM:	NSN 4720-00-916-7092
LENGTH:	6.000
PART NUMBER:	206-070-296-23 TUBE, PLASTIC
FABRICATE FROM:	NSN 4720-00-916-7092
LENGTH:	7.500
PART NUMBER:	206-070-296-27 TUBE, PLASTIC
FABRICATE FROM:	NSN 4720-00-916-7092
LENGTH:	18.000
PART NUMBER:	206-070-296-29 TUBE, PLASTIC
FABRICATE FROM:	NSN 4720-00-916-7092
LENGTH:	18.500
PART NUMBER:	206-070-296-33 TUBE, PLASTIC
FABRICATE FROM:	NSN 4720-00-916-7092
LENGTH:	19.000
PART NUMBER:	206-070-296-35 TUBE, PLASTIC
FABRICATE FROM:	NSN 4720-00-916-7092
LENGTH:	23.000
PART NUMBER:	206-070-296-37 TUBE, PLASTIC
FABRICATE FROM:	NSN 4720-00-916-7092
LENGTH:	50.000
PART NUMBER:	206-070-296-39 TUBE, PLASTIC
FABRICATE FROM:	NSN 4720-00-916-7092

Figure D-20



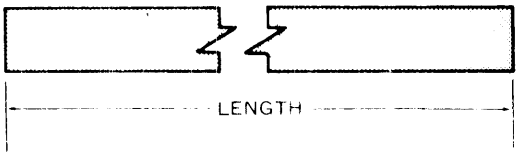
PART NUMBER:	206-052-105-9 CUSHION, CROSSTUBE
FABRICATE FROM:	NSN 9320-00-241-9763

Figure D-21



PART NUMBER:	206-052-105-11 CUSHION, CROSSTUBE
FABRICATE FROM:	NSN 9320-00-241-9763

Figure D-22

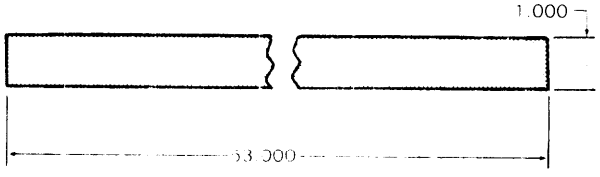


PART NUMBER: 206-032-500-21 STRIP, CHAFING
FABRICATE FROM: NSN 7510-00-133-6572
LENGTH: 156.0
PART NUMBER: 206-032-501-25 STRIP, CHAFING
FABRICATE FROM: NSN 7510-00-133-6572
LENGTH: 150.0
PART NUMBER: 206-032-501-27 STRIP, CHAFING
FABRICATE FROM: NSN 7510-00-133-6572
LENGTH: 163.0
PART NUMBER: 206-032-501-29 STRIP, CHAFING
FABRICATE FROM: NSN 7510-00-133-6572
LENGTH: 16.5

Figure D-23

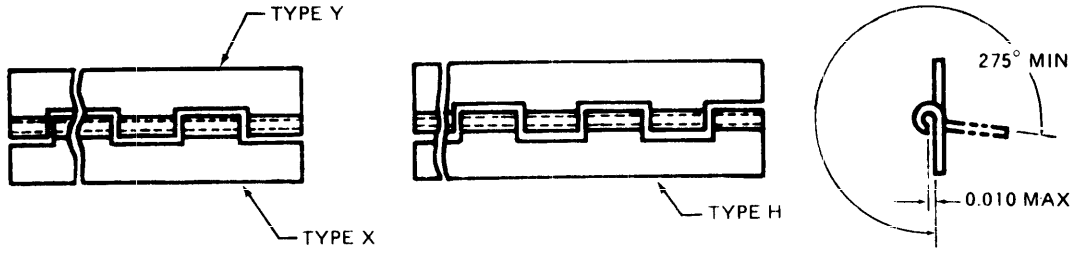
PART NUMBER: 110-004-3-0110 RUBBER STRIP
FABRICATE FROM: NSN 9390-00-133-6472
LENGTH: 11.0
PART NUMBER: 110-004-3-0173 RUBBER STRIP
FABRICATE FROM: NSN 9390-00-133-6472
LENGTH: 17.3
PART NUMBER: 110-004-3-0286 RUBBER STRIP
FABRICATE FROM: NSN 9390-00-133-6472
LENGTH: 28.6
PART NUMBER: 110-004-3-0438 RUBBER STRIP
FABRICATE FROM: NSN 9390-00-133-6472
LENGTH: 43.8
PART NUMBER: 110-004-3-1062 RUBBER STRIP
FABRICATE FROM: NSN 9390-00-133-6472
LENGTH: 106.2
PART NUMBER: 110-004-3-1154 RUBBER STRIP
FABRICATE FROM: NSN 9390-00-133-6472
LENGTH: 115.4
PART NUMBER: 206-031-159-5 RUBBER STRIP
FABRICATE FROM: NSN 9390-00-133-6472
LENGTH 1.8

Figure D-24



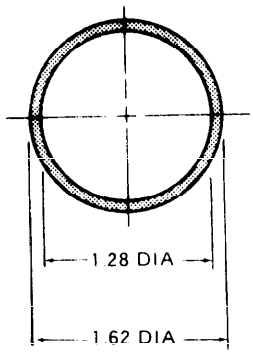
PART NUMBER: 206-061-902-61 STRIP
FABRICATE FROM: NSN 5330-00-938-1719

Figure D-25



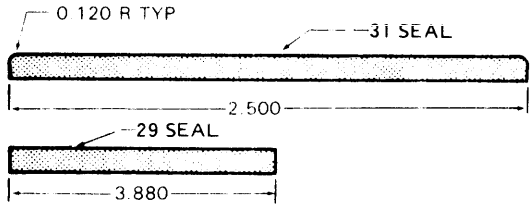
PART NUMBER: 206-062-815-39 HINGE
FABRICATE FROM: NSN 5340-00-250-4970

Figure D-26



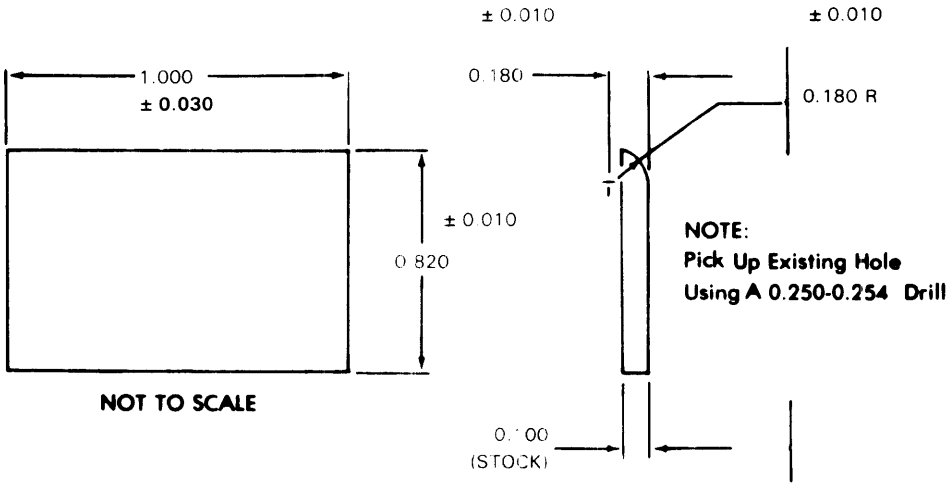
PART NUMBER: 206-030-333-1 GASKET
FABRICATE FROM: NSN 5330-00-938-1719

Figure D-27



PART NUMBER: 206-070-310-29 SEAL
206-070-310-31 SEAL
FABRICATE FROM: NSN 9320-00-069-5175

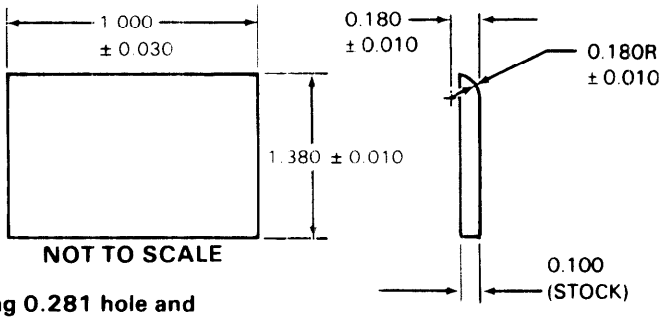
Figure D-28



PART NUMBER: 206-032-004-27 RADIUS BLOCK

FABRICATE FROM: NSN 9535-00-288-0675 (AL ALY 2024-T3) REF

Figure D-29

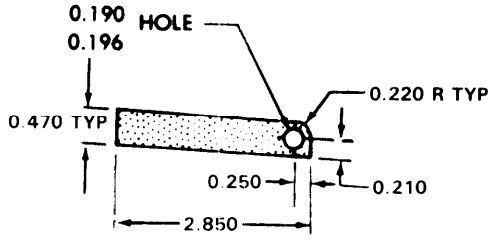


NOTE:

1. Pick up existing 0.281 hole and 0.253-0.255 hole.
2. All dimensions are in inches.

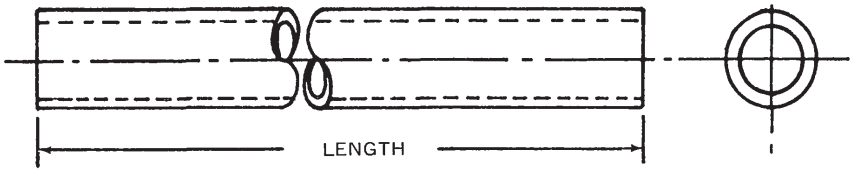
PART NUMBER : 20-042-21-8 RADIUS BLOCK
FABRICATE FROM : NSN 9535-01-049-0766 (AL ALY 2024-T4) REF

Figure D-30



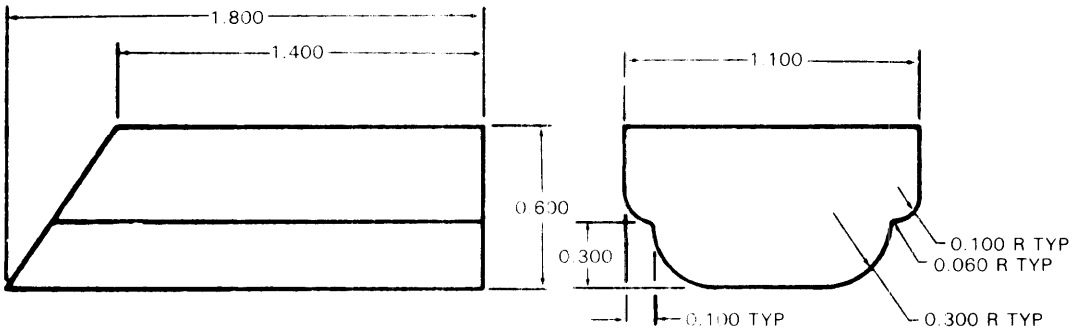
PART NUMBER: 206-062-901-29 GASKET
FABRICATE FROM: NSN 5330-00-938-1719

Figure D-31



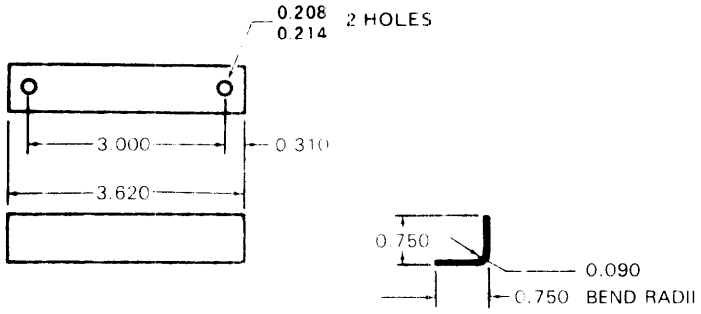
PART NUMBER	ITEM NAME	FABRICATE FROM	LENGTH
H34D81	INSULATION TUBE	NSN 5970-00-543-1104	AR
TFE4	INSULATION TUBE	NSN 5970-00-948-6648	AR
85T4-2-2	INSULATION TUBE	NSN 5970-00-235-2725	1.000
85T4-2-3	INSULATION TUBE	NSN 5970-00-235-2725	1.500
85T4-2-6	INSULATION TUBE	NSN 5970-00-235-2725	3.000
85T4-2-100	INSULATION TUBE	NSN 5970-00-235-2735	AR
85T4-5-24	INSULATION TUBE	NSN 5970-00-263-1325	12.000
85T4-6-1	INSULATION TUBE	NSN 5970-00-235-2719	0.500
85T4-6-2	INSULATION TUBE	NSN 5970-00-235-2719	1.000
85T4-6-48	INSULATION TUBE	NSN 5970-00-235-2719	24.000
85T4-7-2	INSULATION TUBE	NSN 5970-00-552-0205	1.000
85T4-7-3	INSULATION TUBE	NSN 5970-00-552-0205	1.500
85T4-9-1	INSULATION TUBE	NSN 5970-00-843-2281	0.500
85T4-9-2	INSULATION TUBE	NSN 5970-00-843-2281	1.000
85T4-11-1	INSULATION TUBE	NSN 5970-00-284-8627	0.500
85T4-11-2	INSULATION TUBE	NSN 5970-00-284-8627	1.000
85T4-11-32	INSULATION TUBE	NSN 5970-00-284-8627	16.000
85T4-11-38	INSULATION TUBE	NSN 5970-00-284-8627	19.000
85T4-11-40	INSULATION TUBE	NSN 5970-00-284-8627	20.000
85T4-375-50	INSULATION TUBE	NSN 5970-00-235-2728	25.000
85T4-375-90	INSULATION TUBE	NSN 5970-00-235-2728	45.000
85T4-500-1	INSULATION TUBE	NSN 5970-00-557-6254	0.500
85T4-500-6	INSULATION TUBE	NSN 5970-00-557-6254	3.000
85T4-500-12	INSULATION TUBE	NSN 5970-00-557-6254	6.000
85T4-750-48	INSULATION TUBE	NSN 5970-00-557-6247	24.00
85T4-1500-2	INSULATION TUBE	NSN 5970-00-809-9134	1.000
130-005-2-2	INSULATION TUBE	NSN 5970-00-812-2968	1.000
130-005-3-3	INSULATION TUBE	NSN 5970-00-812-2974	1.500
130-005-4-2	INSULATION TUBE	NSN 5970-00-812-2969	1.000
130-005-5-4	INSULATION TUBE	NSN 5970-00-954-1622	2.000
130-005-6-2	INSULATION TUBE	NSN 5970-00-815-1295	1.000
130-005-6-4	INSULATION TUBE	NSN 5970-00-815-1295	2.000
130-005-6-5	INSULATION TUBE	NSN 5970-00-815-1295	2.500
130-005-7-4	INSULATION TUBE	NSN 5970-00-954-1624	2.000
130-005-7-68	INSULATION TUBE	NSN 5970-00-954-1624	34.000
130-005-8-4	INSULATION TUBE	NSN 5970-00-812-2967	2.000
130-005-8-8	INSULATION TUBE	NSN 5970-00-812-2967	4.000
130-005-9-6	INSULATION TUBE	NSN 5970-00-914-3118	3.000

Figure D-32



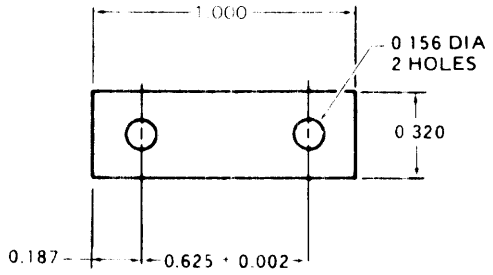
PART NUMBER: 206-001-013-1 FILLER
FABRICATE FROM: NSN 9320-00-202-1847

Figure D-33



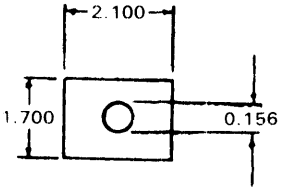
PART NUMBER: 206-032-212-21 SUPPORT
FABRICATE FROM: NSN 9535-00-167-2280

Figure D-34



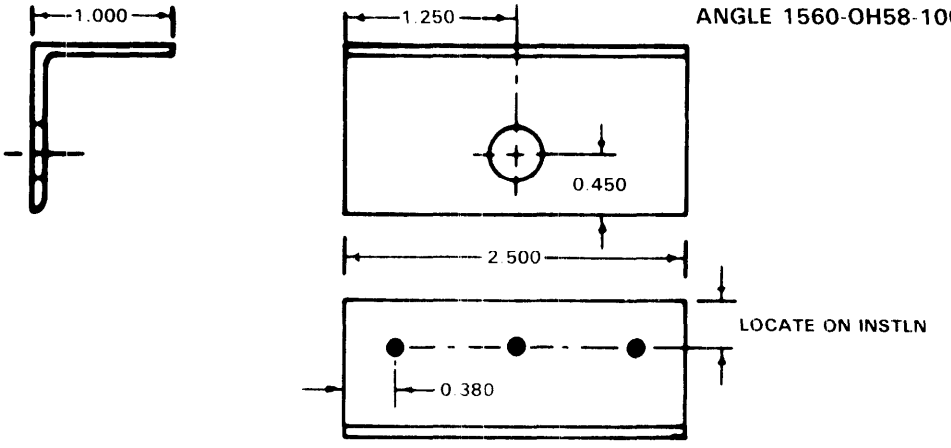
PART NUMBER: 206-031-533-1 SHIM
FABRICATE FROM: NSN 9535-00-400-3622

Figure D-35



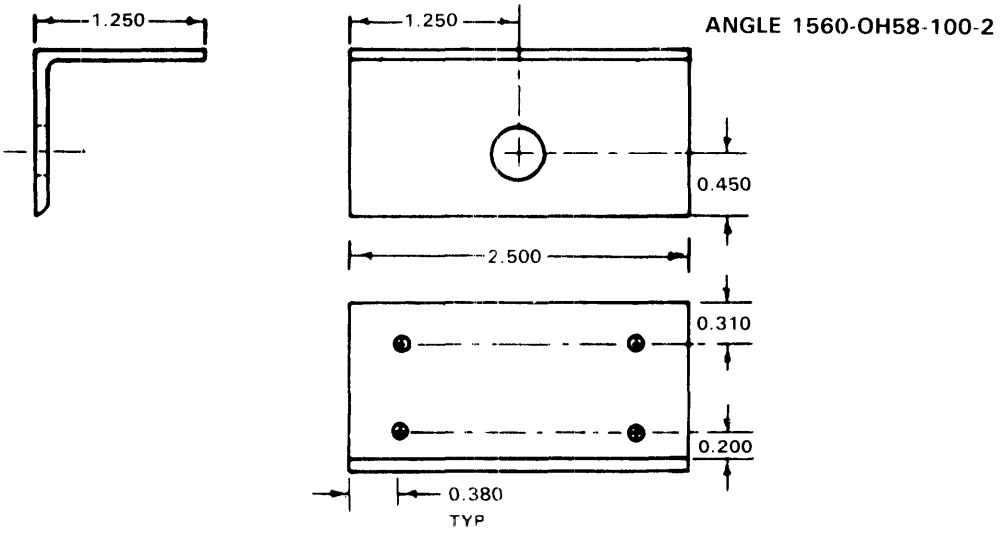
PART NUMBER: 206-032-400-15 SHIM
FABRICATE FROM: NSN 9535-00-086-9763

Figure D-36



PART NUMBER: 1560-OH58-100-1 ANGLE
FABRICATE FROM: NSN 9540-00-186-6333

Figure D-37



PART NUMBER: 1560-OH58-100-2 ANGLE
FABRICATE FROM: NSN 9540-00-186-6333

Figure D-38

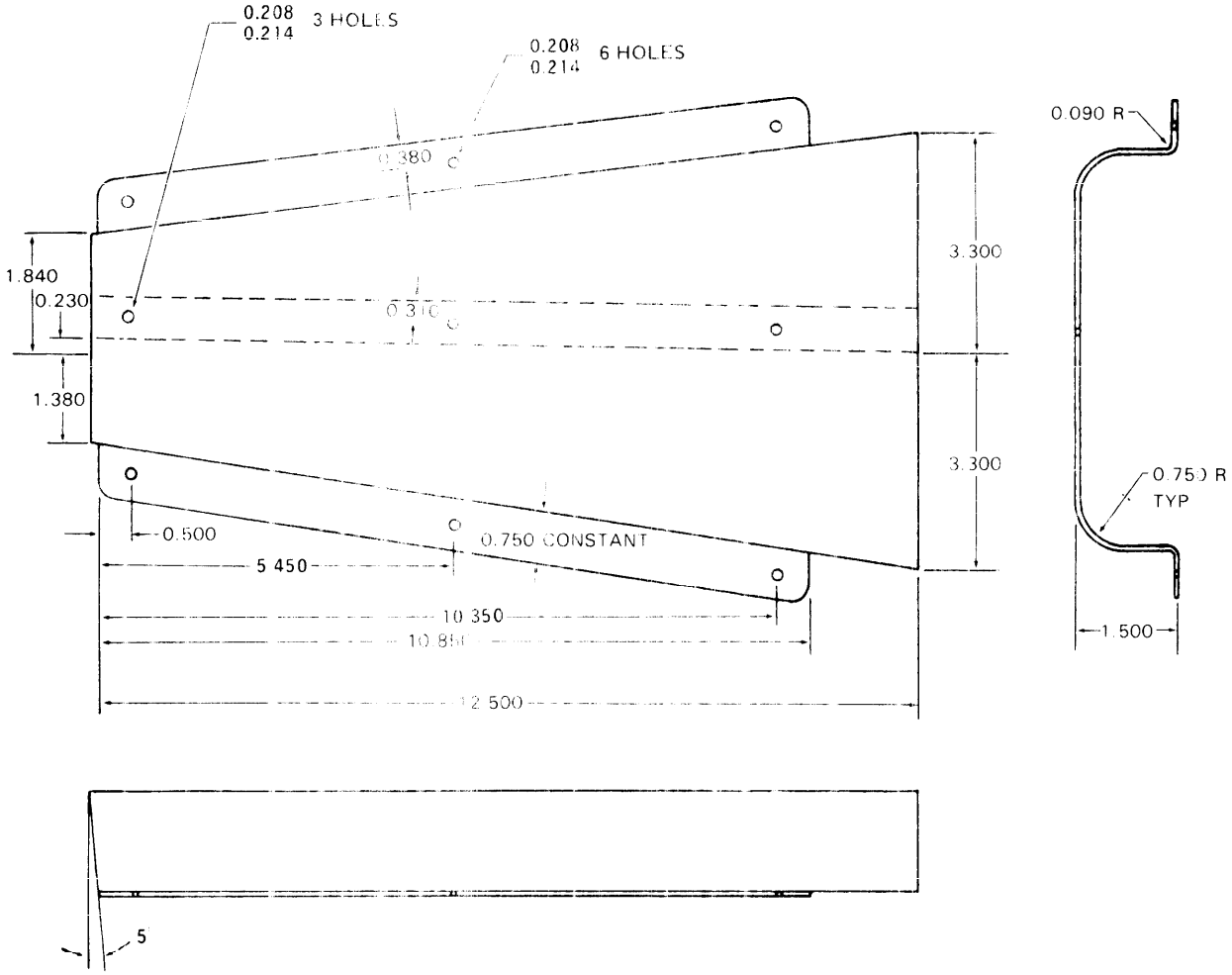


Figure D-36 PART NUMBER: 206-032-105-5 COVER, FLOOR
FABRICATE FROM: NSN 9535-00-084-4551

Figure D-39

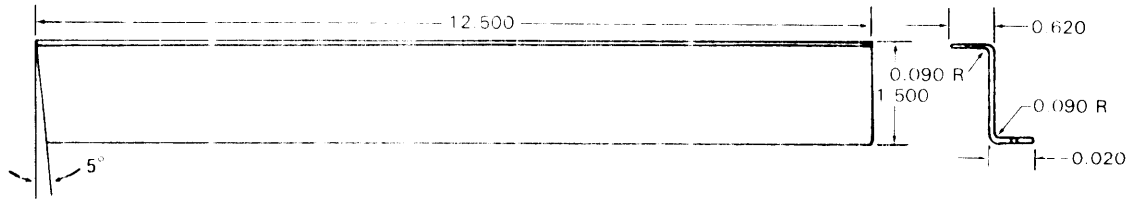
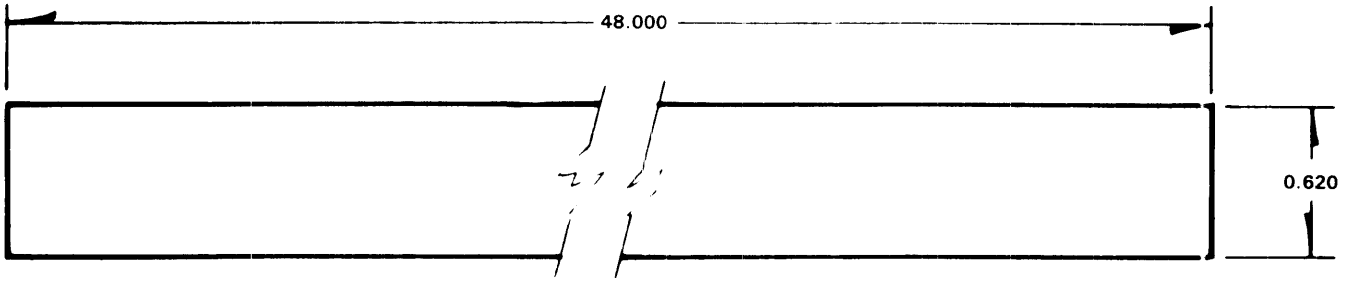


Figure D-37 PART NUMBER: 206-032-105-7 SHIELD, FLOOR
FABRICATE FROM: NSN 9535-00-084-4551

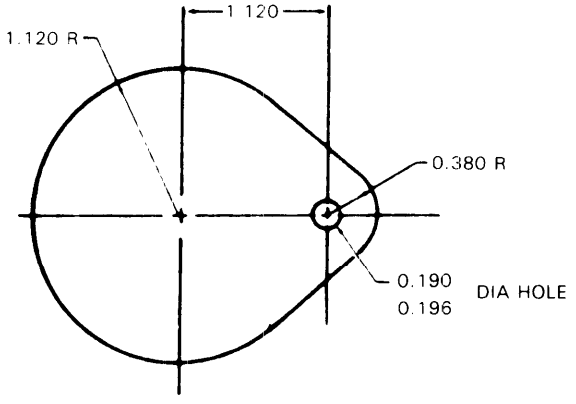
Figure D-40



PART NUMBERS: 365-83041-1 TEMPLATE

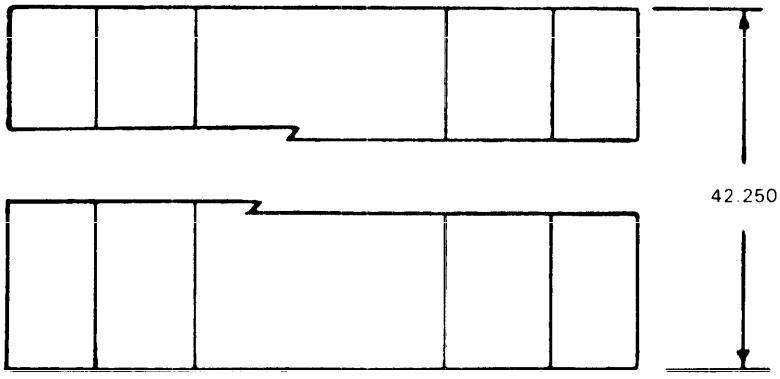
FABRICATE FROM: NSN 9535-00-167-2278

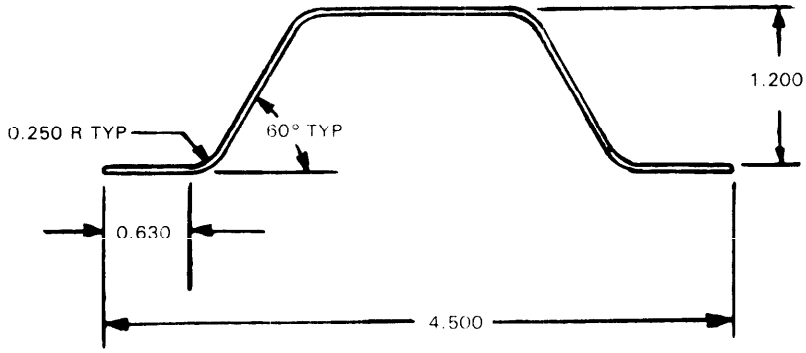
Figure D-41



PART NUMBER: 206-070-402-5 WEAR STRIP
FABRICATE FROM: NSN 8135-00-923-0591

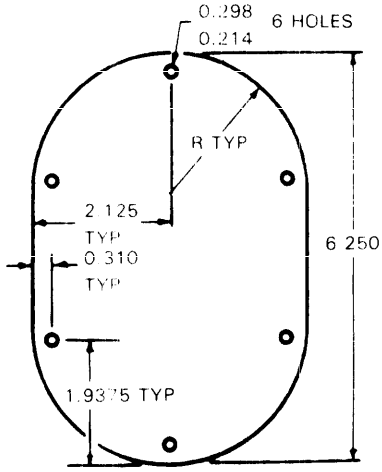
Figure D-42





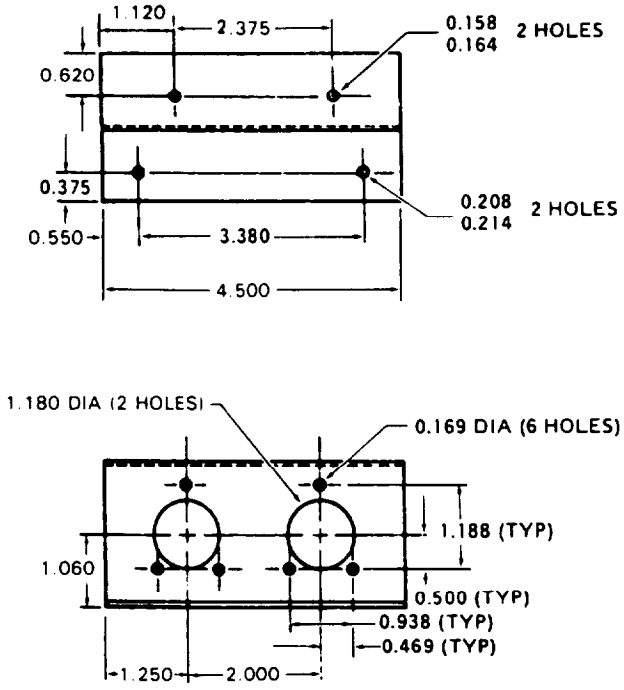
PART NUMBER: 1560-OH58-020-1 INFRA-RED SHIELD
FABRICATE FROM: NSN 9535-00-098-4484

Figure D-43



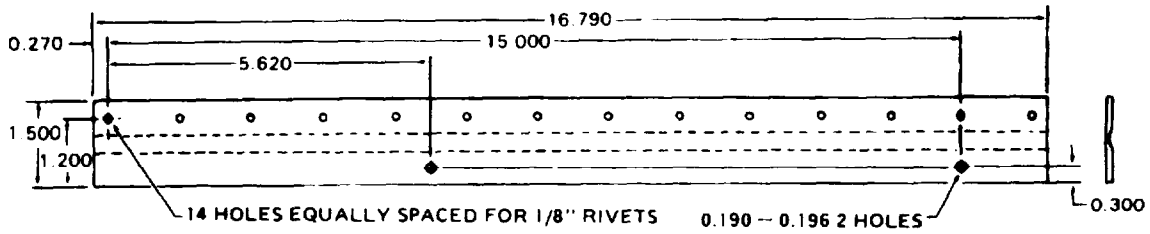
PART NUMBER: 206-031-117-89 DOOR
FABRICATE FROM: NSN 9535-00-084-4533

Figure D-44



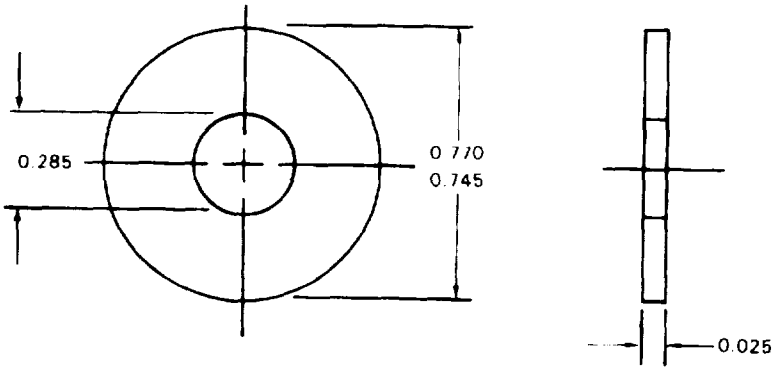
PART NUMBER: 206-075-556-1 BRACKET, ANGLE
FABRICATE FROM: NSN 9535-00-084-4551

Figure D-45



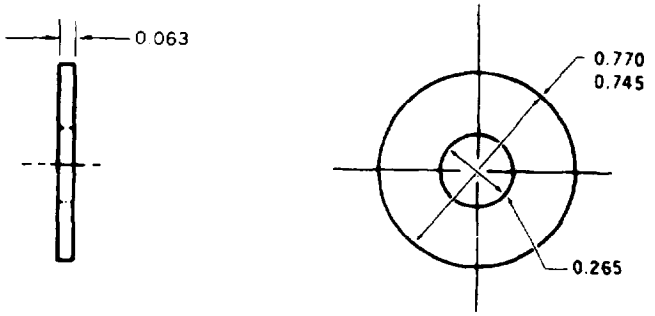
PART NUMBER: 206-075-441-5 HINGE
FABRICATE FROM: NSN 9330-00-938-0442
FABRICATE FROM ALT: NSN 5340-00-664-8141

Figure D-46



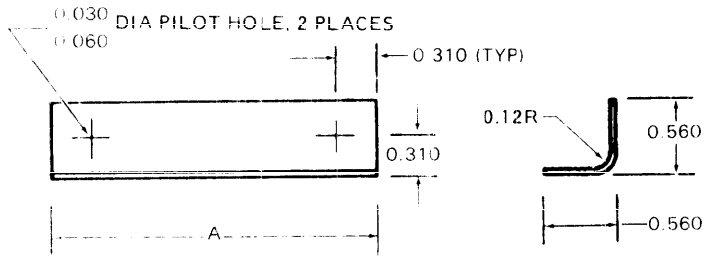
PART NUMBER: 140-009-G17H48 WASHER, FLAT
FABRICATE FROM: NSN 9535-00-242-8601

Figure D-47



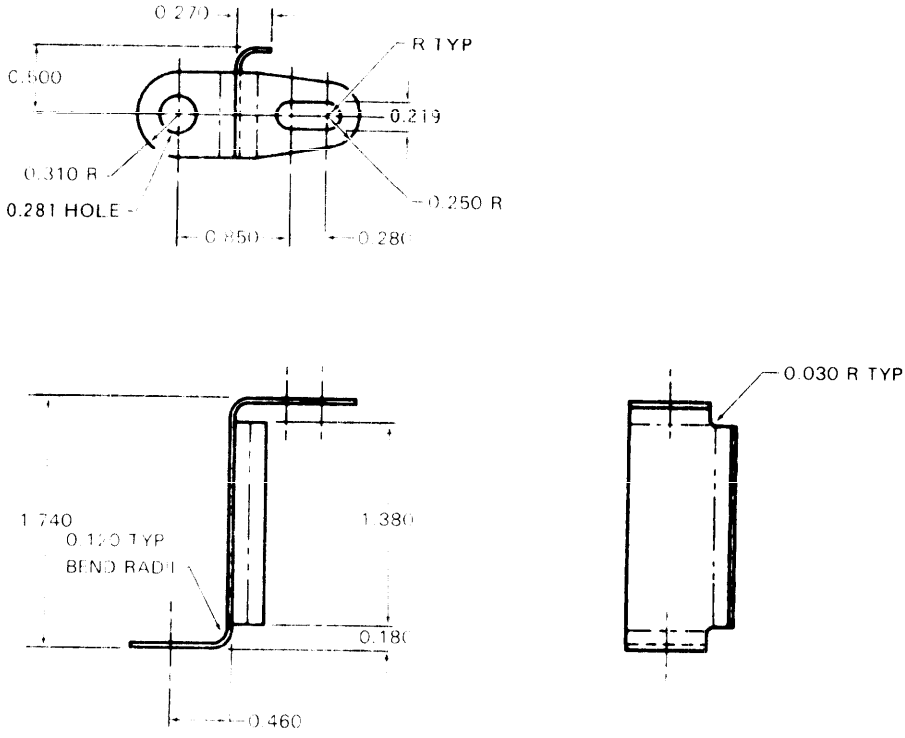
PART NUMBER: 206-040-426-1 WASHER, FLAT
FABRICATE FROM: NSN 9535-00-242-8605

Figure D-48



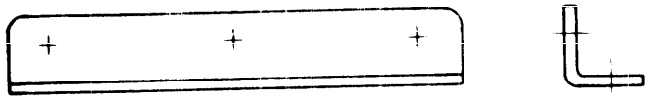
PART NUMBER: 206-070-333-1 CLIP
FABRICATE FROM: NSN 9535-00-086-9729
PART NUMBER: 206-070-333-3 CLIP
FABRICATE FROM: NSN 9535-00-086-9729
PART NUMBER: 206-070-333-5 CLIP
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-49



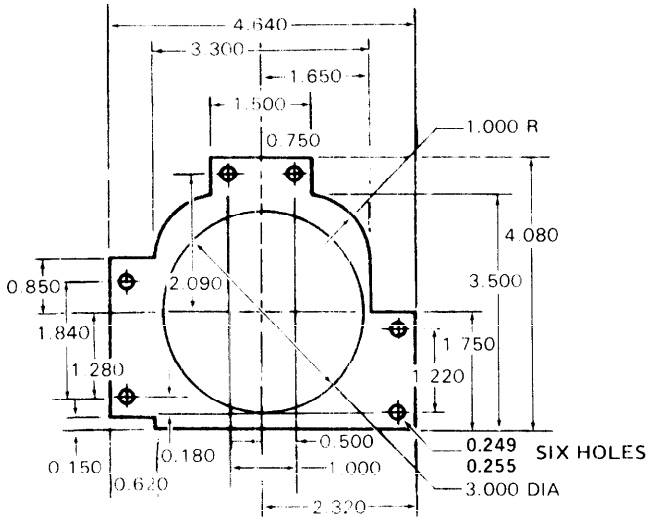
PART NUMBER: 206-040-170-3 BRACKET
FABRICATE FROM: NSN 9535-00-084-4395

Figure D-50



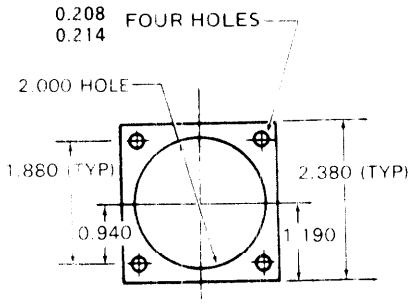
PART NUMBER: 206-070-305-51 BRACKET, ANGLE
FABRICATE FROM: NSN 9535-00-084-4551

Figure D-51



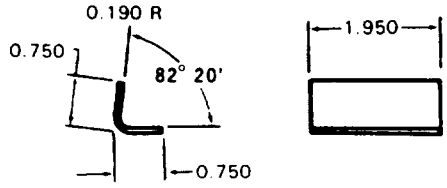
PART NUMBER: 206-070-334-1 GASKET
FABRICATE FROM: NSN 5330-00-871-7859

Figure D-52



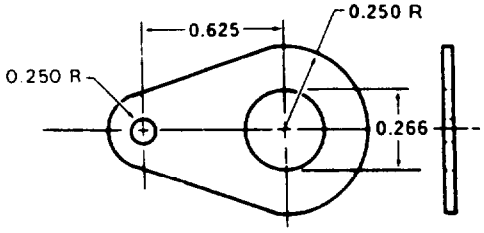
PART NUMBER: 206-070-335-27 GASKET
FABRICATE FROM: NSN 5330-00-871-7859

Figure D-53



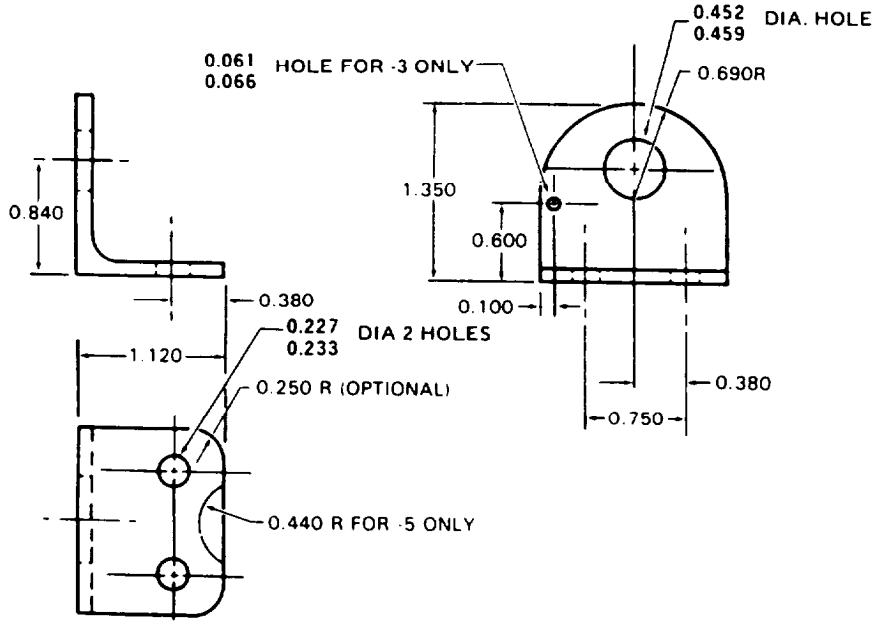
PART NUMBER: 206-070-362-13 BRACKET, ANGLE
FABRICATE FROM: NSN 9535-00-554-1416

Figure D-54



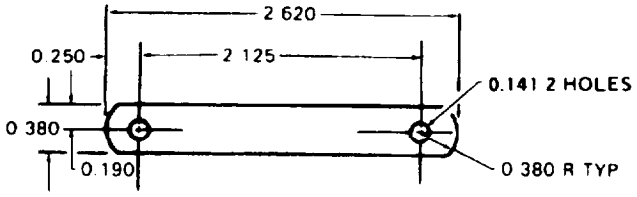
PART NUMBER: 10-003D2 ADAPTER
FABRICATE FROM: NSN 9535-00-084-4551

Figure D-55



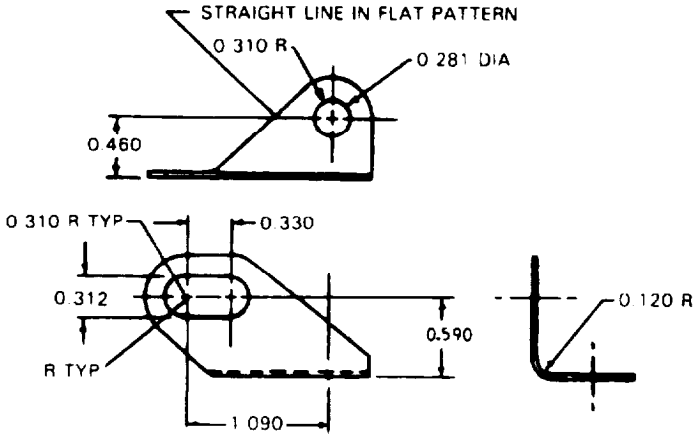
PART NUMBER: 206-060-738-5 BRACKET, ANGLE
FABRICATE FROM: NSN 9540-00-596-3006

Figure D-56



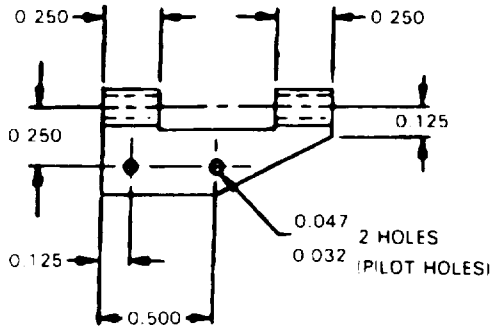
PART NUMBER: 206-070-314-1 ARM, FLAPPER CONTROL
FABRICATE FROM: NSN 9535-00-544-1416

Figure D-57



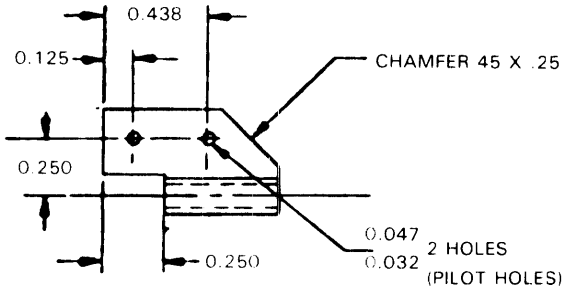
PART NUMBER: 206-040-169-1 BRACKET, ANGLE
FABRICATE FROM: NSN 9535-00-084-4395

Figure D-58



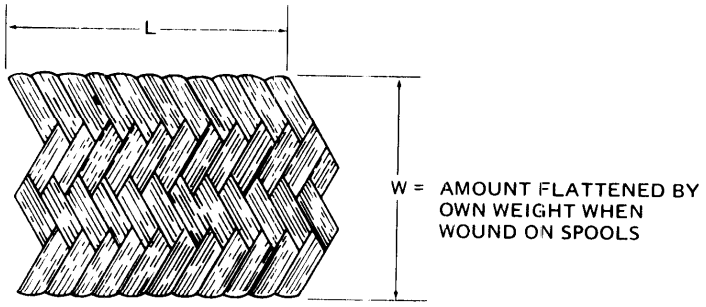
PART NUMBER: 206-070-332-5 HINGE SHOWN-6 OPP.
FABRICATE FROM: NSN 534-01-047-0600

Figure D-59



PART NUMBER: 206-070-332-7 HINGE SHOWN -8 OPP
FABRICATE FROM: NSN 5340-01-047-0600

FIGURE D-60.



ENGINEERING INFORMATION	
DASH NUMBER	13
SIZE DESIGNATION APPROX. INSIDE DIA.	13/64
NUMBER OF ENDS	312
SIZE OF INDIVIDUAL WIRES (A.W.G.)	36

CODE: FIRST DASH NUMBER INDICATES NOMINAL I. D. OF BRAID IN 1/64 INCH INCREMENTS.

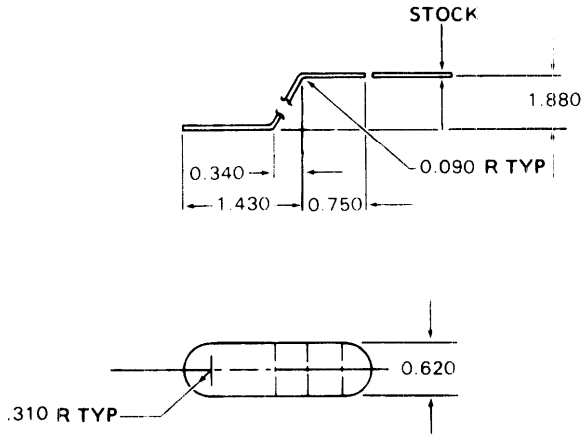
SECOND DASH NUMBER INDICATES LENGTH IN 1/2 INCH INCREMENTS.

EXAMPLE: 20-036-13-80 = BRAID - FLAT, NOMINAL SIZE 13/64 I.D. 40 INCHES LONG.

PART NUMBER: 20-036-13-80, BRAID FLAT

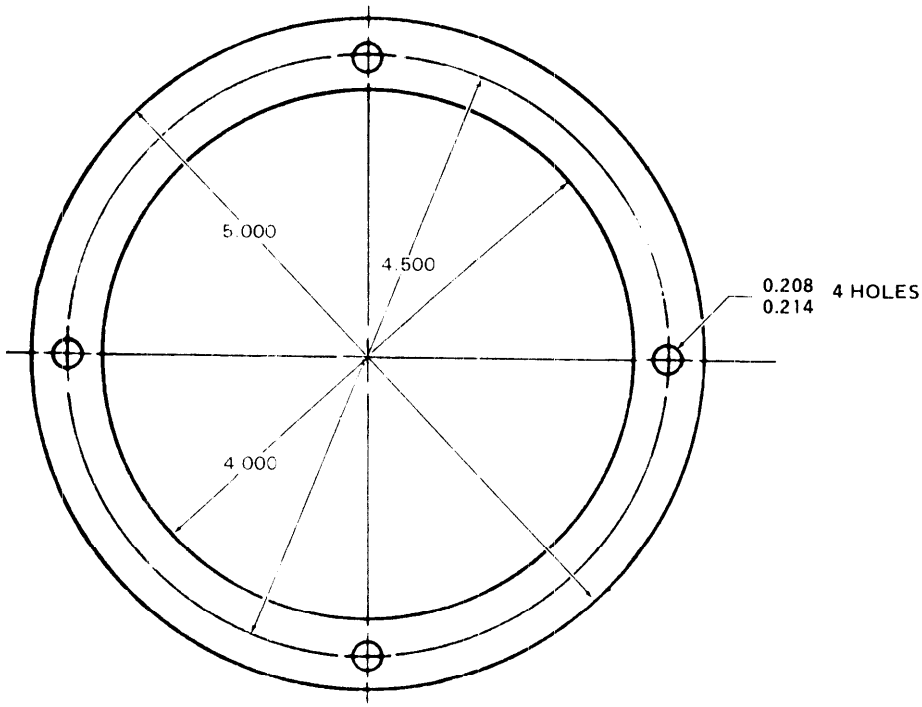
FABRICATE FROM: NSN 6145-00-191-8400

Figure D-61.



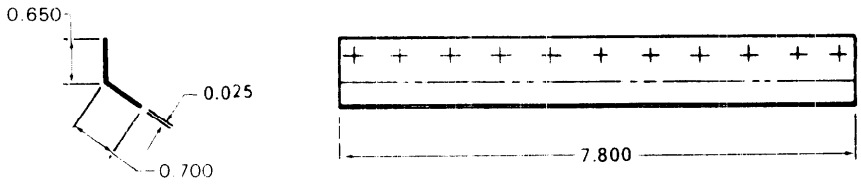
PART NUMBER: 206-001-757-3 CLIP

Figure D-62.



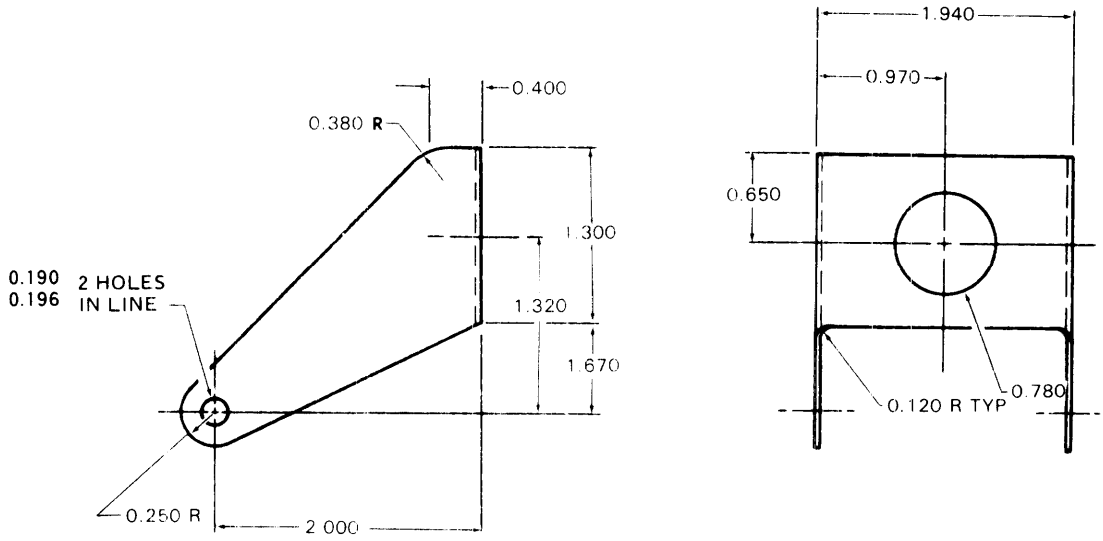
PART NUMBER: 206-070-489-1 RETAINER, DUCT
FABRICATE FROM: NSN 9535-00-640-2311

Figure D-63



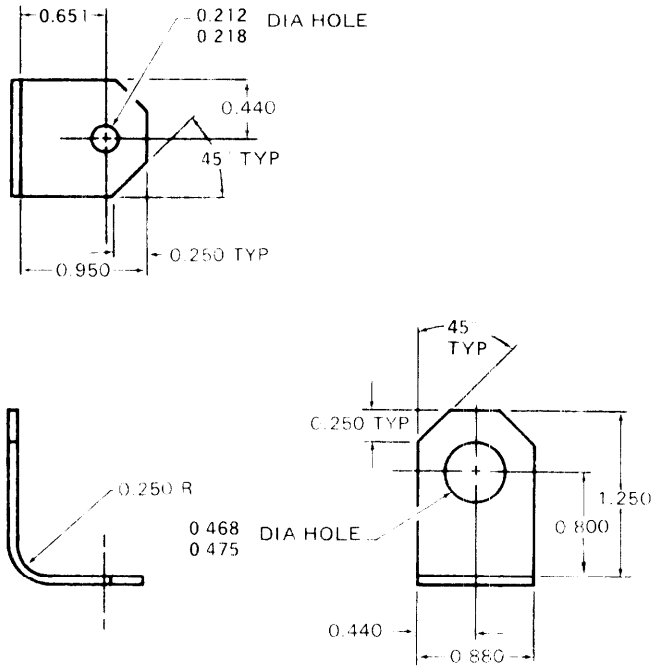
PART NUMBER: 206-032-210-77 CLIP
FABRICATE FROM: NSN 9535-00-084-4484

Figure D-64



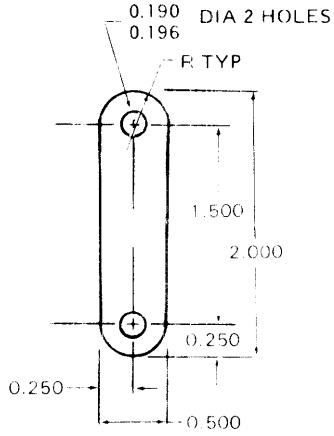
PART NUMBER: 206-062-507-1 BRACKET, ANGLE
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-65



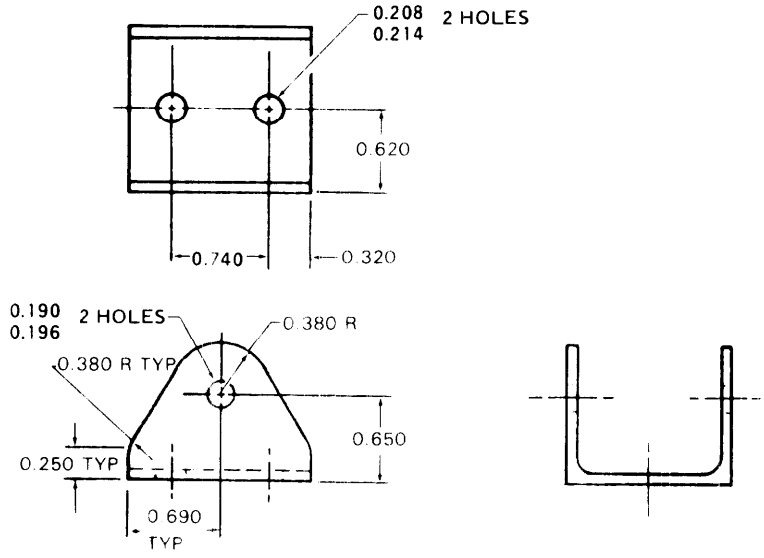
PART NUMBER: 206-040-243-1 CLIP, SUPPORT
FABRICATE FROM: NSN 9535-00-554-1417

Figure D-66



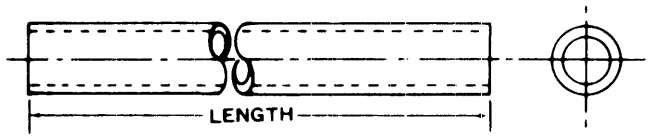
PART NUMBER: 206-061-010-1 CLIP
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-67



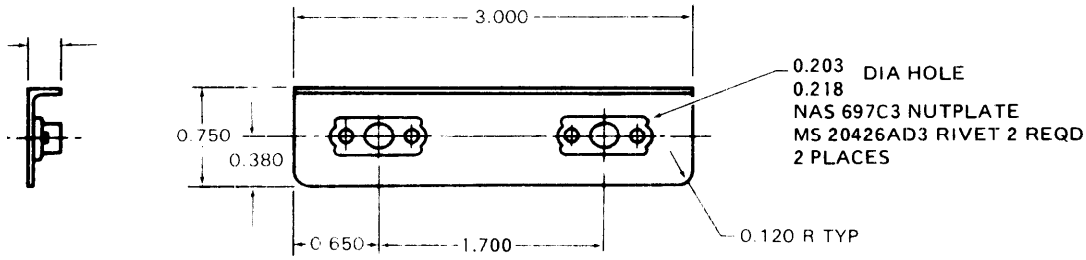
PART NUMBER: 206-032-137-1 FITTING
FABRICATE FROM: NSN 9540-00-400-3633

Figure D-68



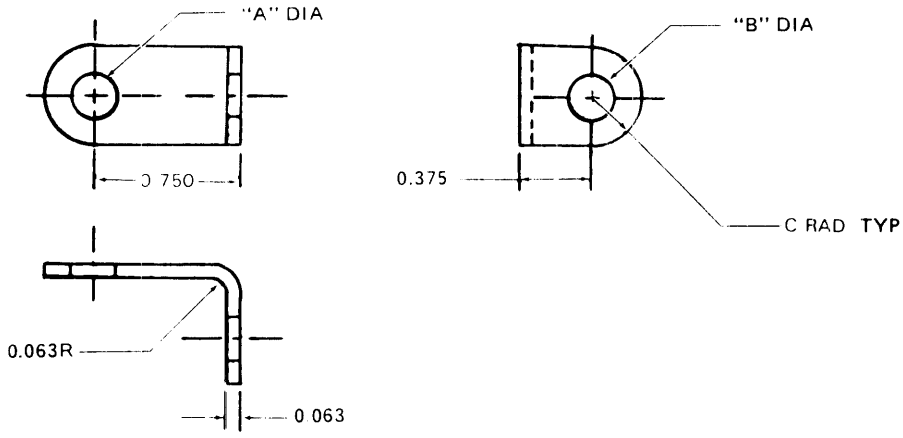
PART NUMBER	ITEM NAME	FABRICATE FROM	LENGTH
206-032-333-29	HOSE, RUBBER	NSN 4720-00-246-4354	3.800
206-062-600-3	HOSE, RUBBER	NSN 4720-00-246-4354	35.000
206-062-610-5	HOSE, RUBBER	NSN 4720-00-277-8986	31.000
206-062-610-7	HOSE, RUBBER	NSN 4720-00-277-8986	37.000
206-070-318-1	HOSE, RUBBER	NSN 4720-00-246-4354	16.500
206-075-314-29	HOSE, RUBBER	NSN 4720-00-540-3644	3.800
206-075-314-33	HOSE, RUBBER	NSN 4720-00-540-3644	6.000
206-075-434-1	BUSHING	NSN 5365-00-598-5394	0.630
206-075-475-3	TUBE	NSN 4710-00-421-1522	11.700
206-075-476-1	TUBE	NSN 4710-00-421-1522	14.000

Figure D-69



PART NO: 206-062-715-1 ANGLE
FABRICATE FROM: NSN 9540-00-833-1905
PART NO: NAS69703 NUTPLATE
FABRICATE FROM: NSN 5310-00-762-6148
PART NO: MS20426AD3-3 RIVET
FABRICATE FROM: NSN 5320-00-117-6937

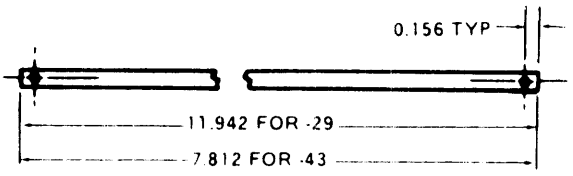
Figure D-70



DASH NO.	A DIA	B DIA.	C RAD.
-1	0.204	0.204	0.250
-2	0.204	0.264	0.250
-3	0.264	0.204	0.250
-4	0.264	0.264	0.250
-5	0.332	0.204	0.375
-7	0.332	0.204	0.250

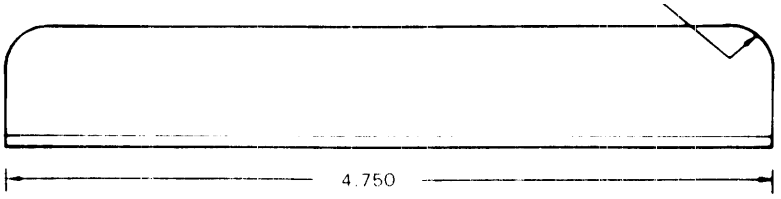
PART NUMBER: 20-032-1 BRACKET
FABRICATE FROM: NSN 9535-00-232-0378
PART NUMBER: 20-032-2 BRACKET
FABRICATE FROM: NSN 9535-00-232-0378
PART NUMBER: 20-032-3 BRACKET
FABRICATE FROM: NSN 9535-00-232-0378
PART NUMBER: 20-032-4 BRACKET
FABRICATE FROM: NSN 9535-00-232-0378
PART NUMBER: 20-032-5 BRACKET
FABRICATE FROM: NSN 9535-00-232-0378
PART NUMBER: 20-032-7 BRACKET
FABRICATE FROM: NSN 9535-00-232-0378

Figure D-71



PART NUMBER: 206-070-305-29 STRIP, PANEL
206-070-305-43 STRIP, PANEL
FABRICATE FROM: NSN 5325-00-036-9305

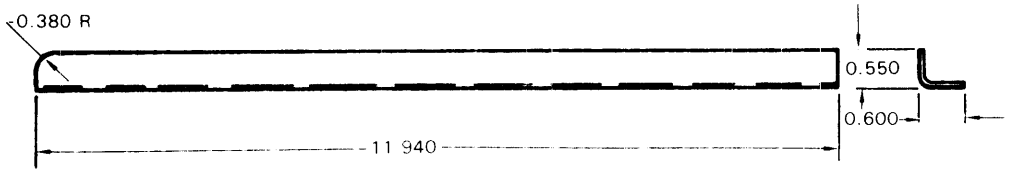
Figure D-72



DRILL TO MATCH DOUBLER 365 83018 1
AND CHECK PLATE P N 365 83016 1 AND 2

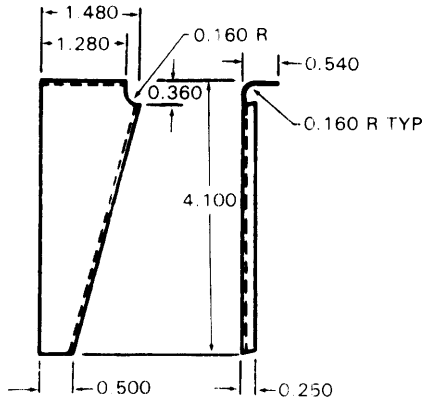
PART NUMBER: 365-83019-1 Angle
FABRICATE FROM: NSN 9540-00-261-5637

Figure D-73



PART NUMBER: 206-070-305-33 SUPPORT, PANEL
FABRICATE FROM: NSN 9535-00-086-9729

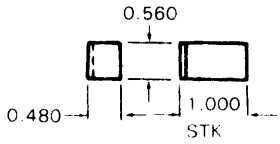
Figure D-74



PART NUMBER: **206-070-305-37 STIFFENER, SHOWN**
206-070-305-38 STIFFENER, OPPOSITE

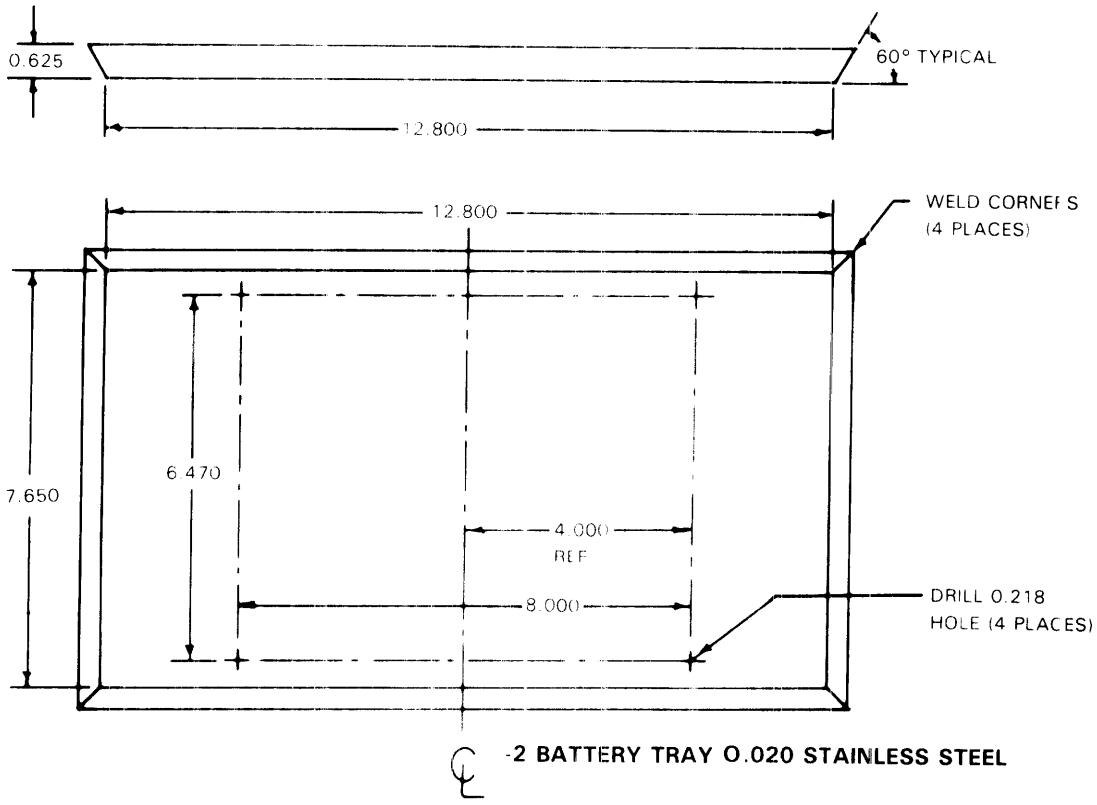
FABRICATE FROM: **NSN 9535-00-084-4551**

Figure D-75



PART NUMBER: **206-070-305-35 CLIP, PANEL**
FABRICATE FROM: **NSN 9540-00-833-1905**

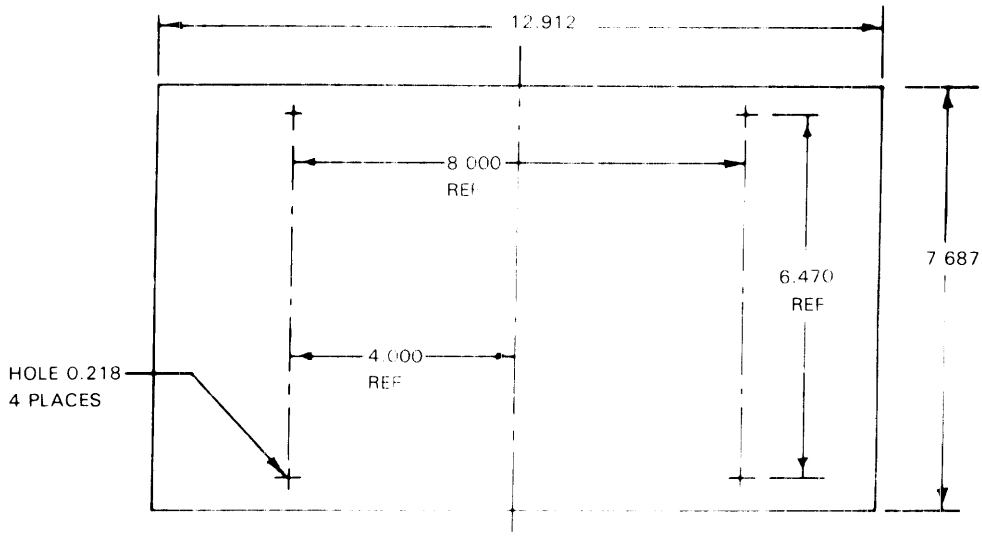
Figure D-76



-2 BATTERY TRAY 0.020 STAINLESS STEEL

PART NUMBER: 1560-OH58-118-2
FABRICATE FROM: NSN 9515-00-618-8658

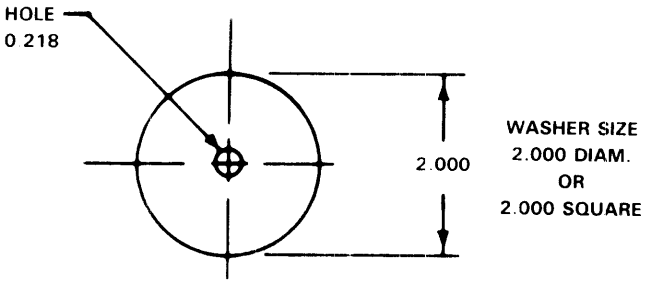
Figure D-77



-3 TRAY INSERT 1/4 INCH THICK SHEET

PART NUMBER: 1560-OH58-118-3
FABRICATE FROM: NSN 8305-00-633-9839

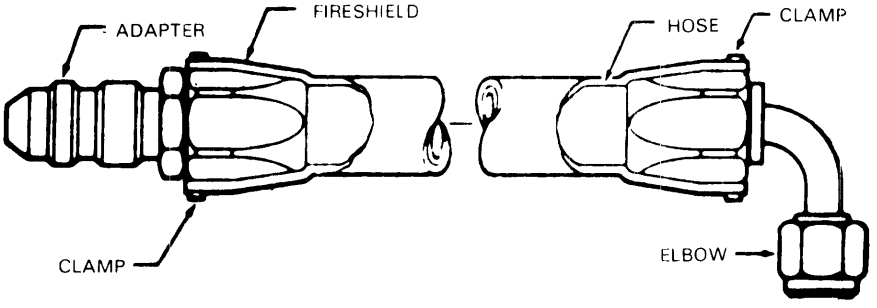
Figure D-78



PART NUMBER: 1560-OH-58-118-4 SPACER
FABRICATE FROM: NSN 5970-00-113-8833
or NSN 9320-00-241-9739

-4 WASHER
(4 REQD) SYNTAN. E. OR SYNTHETIC RUBBER

Figure D 79

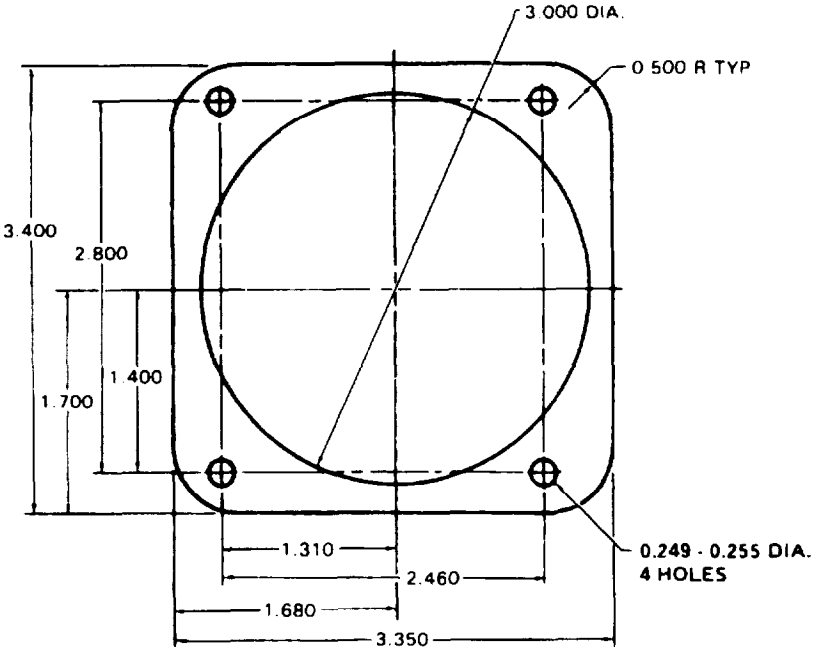


156666-8D-0424 = HOSE ASSEMBLY 42-1/2 INCHES LONG

BASIC NO. — LENGTH IN EIGHTHS OF AN INCH
DASH NO. — LENGTH IN INCHES
MATERIAL CODE

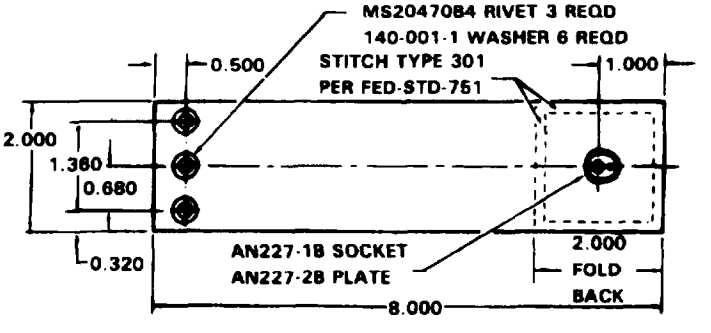
ITEM	PART NO.	FABRICATE FROM
HOSE ASSEMBLY	156654-8D-0400	
HOSE ASSEMBLY	156666-8D-0424	
HOSE ASSEMBLY	156722-8-0424	
ADAPTER (USED ON 156654-8D-0400)	M83798/1-8	NSN4730-00-632-2002
ADAPTER (USED ON 156666-8D-0424)	693-8D	NSN4730-00-491-6768
CLAMP (2)	900591B2C	NSN4730-00-996-8258
FIRE SHIELD (USED ON 156654-8D-0400)	2649 13	NSN5640-01-075-9296
FIRESHIELD	624 12	NSN5640-00-058-9000
HOSE	MS87027-8	NSN4720-00-580-6618
ELBOW	21987-8D	NSN4730-00-038-7052
PLUG	NAS815-8A	NSN5340-00-433-3269
STAPLE	STH5019-3-8	NSN7510-00-778-1597

Figure D-80



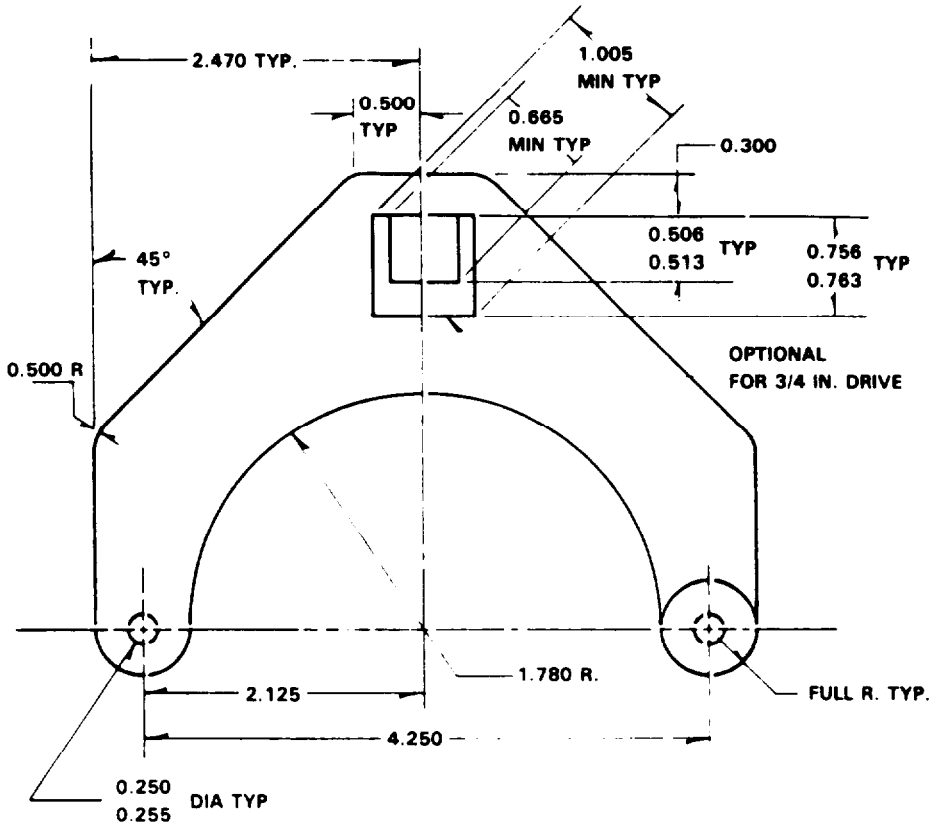
PART NUMBER: 206-070-366-1 GASKET
FABRICATE FROM: NSN 533-00-871-7859

Figure D-81



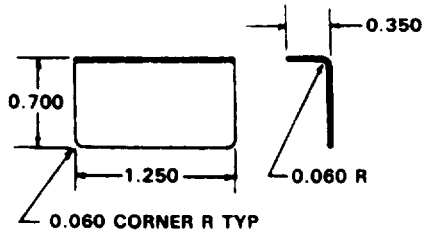
PART NUMBER: 206-070-887-11 STRAP, MAP CASE
FABRICATE FROM: NSN 8305-00-082-2142
NSN 5325-00-276-4283
NSN 5325-00-281-4356

Figure D-47



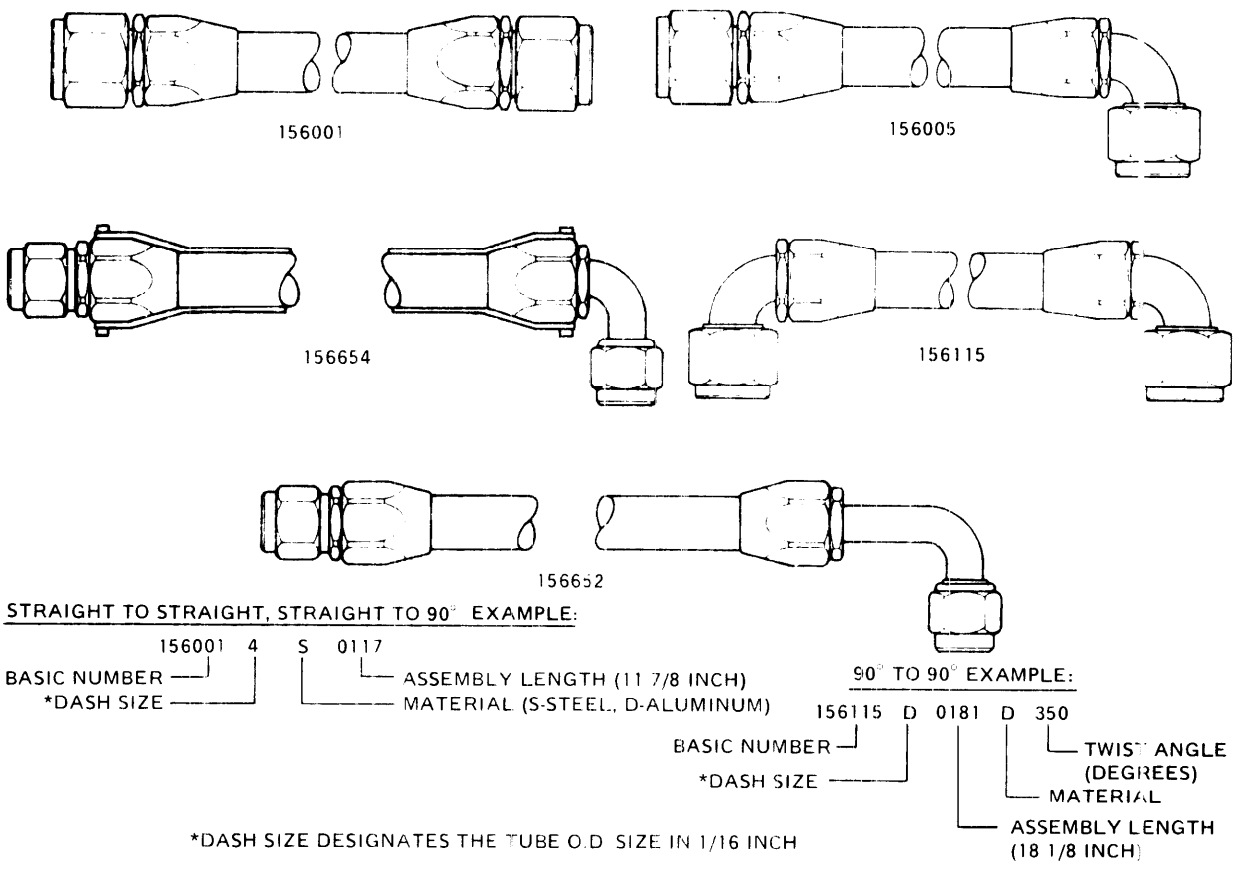
PART NUMBER: 5120-EG-009 TOOL, HOLDING (ALTERNATE]
FABRICATE FROM: NSN 5120-00-178-0941 PART NUMBER T101555

Figure D-83



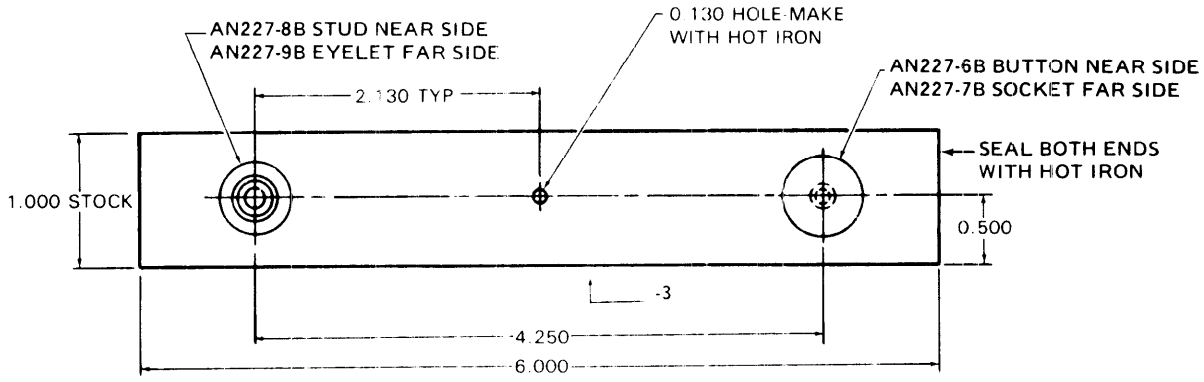
PART NUMBER: 206-070-474-3 BAFFLE. PIPING
FABRICATE FROM: NSN 9515-00-235-7609

Figure D-84



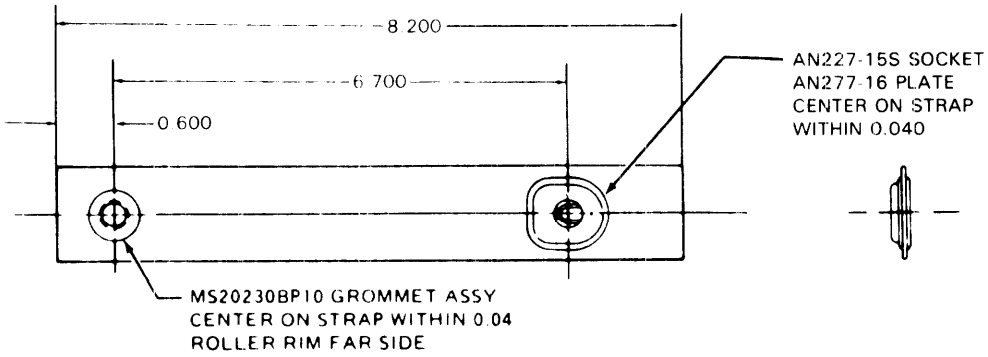
PART NUMBER	HOSE NSN	FITTING NSN	DUST PLUG NSN
156001-4S0117	4720-00-541-9281	4730-00-618-7378	5340-00-914-0521
156001-4S0146	4720-00-541-9281	4730-00-618-7378	5340-00-914-0521
156001-5S0125	4720-00-420-4636	4730-00-834-5456	5340-00-781-8061
156001-5S0193	4720-00-420-4636	4730-00-834-5456	5340-00-781-8061
156001-6D0206	4720-00-611-2548	4730-00-613-1859	5340-00-988-6032
156001-6D0252	4720-00-611-2548	4730-00-613-1859	5340-00-968-6032
156005-4S0125	4720-00-541-9281	4730-00-618-8862	5340-00-914-0521
		4730-00-618-7378	
156005-4S0143	4720-00-541-9281	4730-00-618-7378	5340-00-914-0521
		4730-00-618-8862	
156001-5S0143	4720-00-420-4636	4730-00-834-5456	5340-00-781-8061
156005-8D0077	4720-00-580-6618	4730-00-632-2002	5340-00-433-3269
		4730-00-795-0945	5340-00-433-3269
156115-D0181D350	4720-00-611-2548	4730-00-720-1166	5340-00-988-6032

Figure D-85



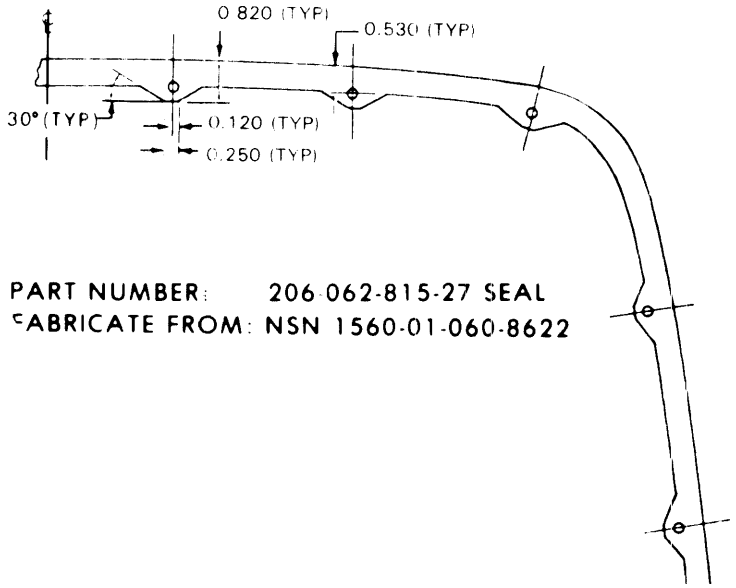
PART NUMBER: 206-032-218-1 STRAP ASSY
206-032-218-3 STRAP

Figure D-86



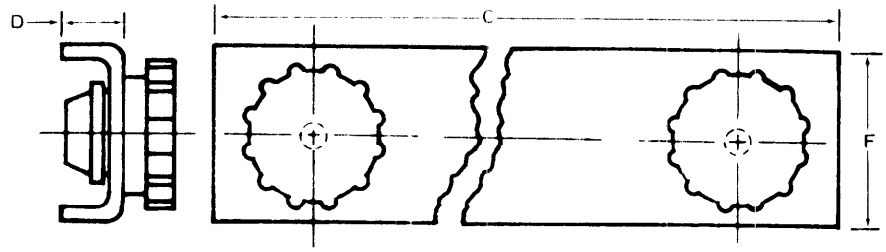
PART NUMBER: 209-001-138-7 STRAP
FABRICATE FROM: NSN 8305-00-267-3009

Figure D-87



PART NUMBER: 206-062-815-27 SEAL
FABRICATE FROM: NSN 1560-01-060-8622

Figure D-88

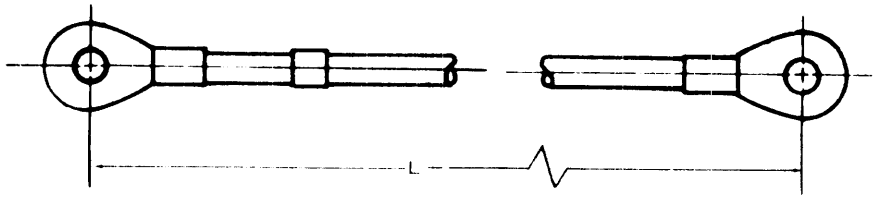


TERMINAL BOARD COVER

PART NUMBER	FABRICATE FROM	C	D	F
MS18029-1S-1	NSN 5940-00-082-4642 NSN 5940-00-907-5939	12.334	0.234	0.813
MS18029-1S-4	NSN 5940-00-082-4642 NSN 5940-00-907-5939	12.334	0.234	0.813

NOTE: Last dash number indicates number of studs in a MS27212 terminal board to be covered.

Figure D-89

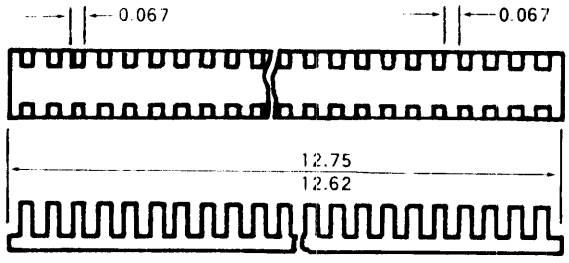


PART NUMBER: MS25083-2AB4 LEAD, ELECTRICAL
MS25083-2BC6 LEAD, ELECTRICAL
PART NUMBER: WIRE
FABRICATE FROM: NSN 6145-00-819-0058
PART NUMBER: MS25036-111, TERMINAL LUG
FABRICATE FROM: NSN 5940-00-204-8990
PART NUMBER: MS25036-112, TERMINAL LUG
FABRICATE FROM: NSN 5940-00-143-4794
PART NUMBER: MS25036-157, TERMINAL LUG
FABRICATE FROM: NSN 5940-00-113-8183

Figure D-90

NOTE:

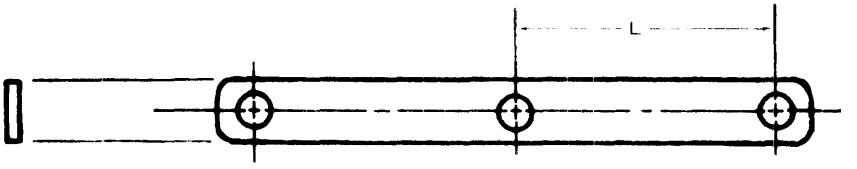
Last number designates length L in inches.



PART NUMBER: 206-001-382-5 GROMMET
FABRICATE FROM: NSN 9390-00-926-1394

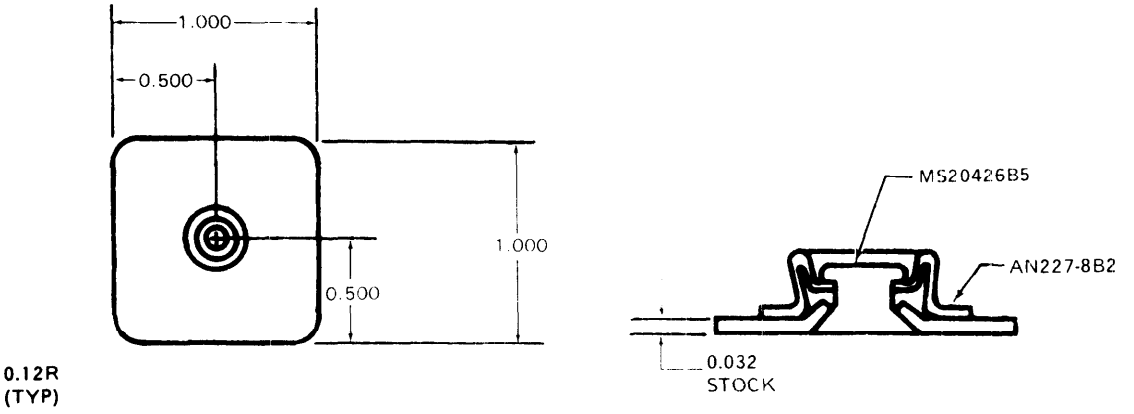
Figure D-91

NOTE: First dash number indicates number of holes. Second dash number indicates length "L" between holes in 1/32 increments.



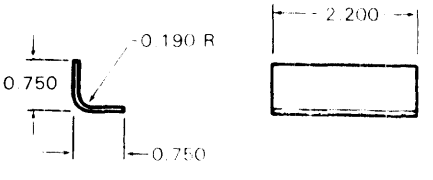
PART NUMBER: 30-006-2-26
FABRICATE FROM: NSN 9535-00-232-2293
PART NUMBER: 30-006-3-26
FABRICATE FROM: NSN 9535-00-232-2293
PART NUMBER: 30-006-4-26
FABRICATE FROM: NSN 9535-00-232-2293
PART NUMBER: 30-006-5-26
FABRICATE FROM: NSN 9535-00-232-2293

Figure D-92



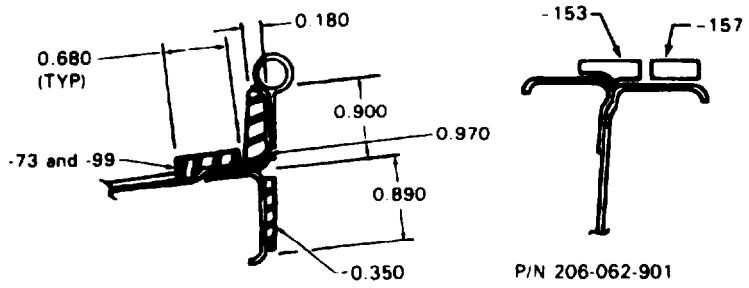
PART NUMBER: 100-057-5
FABRICATE FROM: NSN 9535-00-554-1415
NSN 5325-00-174-2923
NSN 5320-00717-6382

Figure D-93



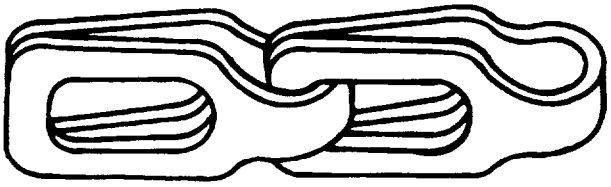
PART NUMBER: 206-070-362-7 BRACKET, ANGLE
FABRICATE FROM: NSN 9535-00-554-1416

Figure D-94



PART NUMBER:	206-062-901-73 SEAL
FABRICATE FROM:	NSN 9320-00-143-7110
PART NUMBER:	206-062-901-97 SEAL
FABRICATE FROM:	NS 8040-00-989-0026
PART NUMBER:	206-062-901-99 SEAL
FABRICATE FROM:	NSN 9330-00-242-6229
PART NUMBER:	206-062-901-153 SEAL
FABRICATE FROM:	NSN 9390-00-177-6406
PART NUMBER:	206-062-901-157 STRIP
FABRICATE FROM:	NSN 5330-00-938-1719

Figure D-95



CHAIN

PART NUMBER:	NAF 1088-1A4
FABRICATE FROM:	NSN 4010-00-262-1551
PART NUMBER:	NAF 1455B2-5
FABRICATE FROM:	NSN 4010-00-262-1551
PART NUMBER:	NAF 1455B30-10
FABRICATE FROM:	NSN 4910-00-228-9932

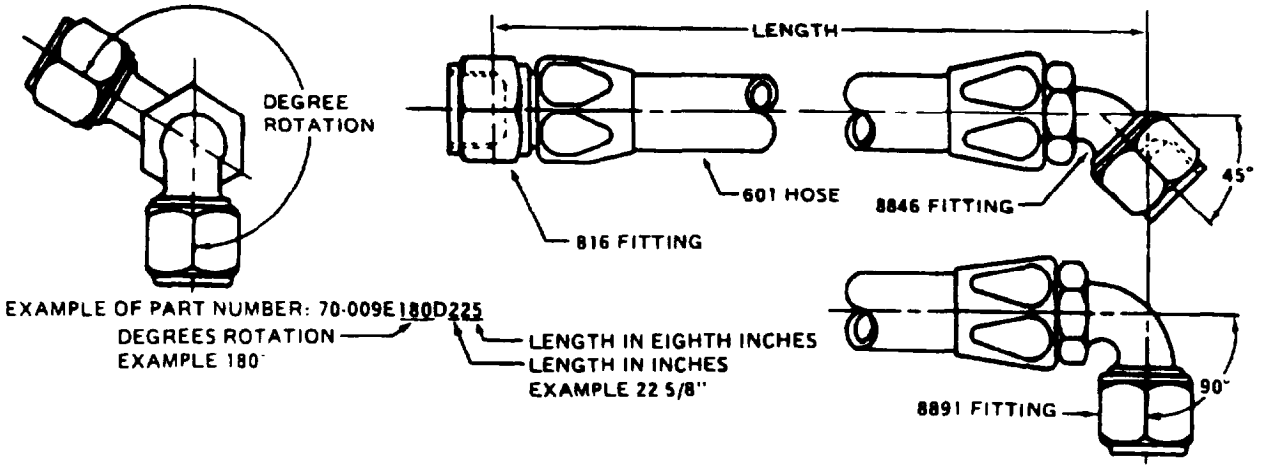
NOTE:

Last dash number gives length in inches

Figure D-96

PART NUMBER:	204-070-485-1 STENCIL
FABRICATE FROM:	NSN 9310-00-265-6797

Figure D-97



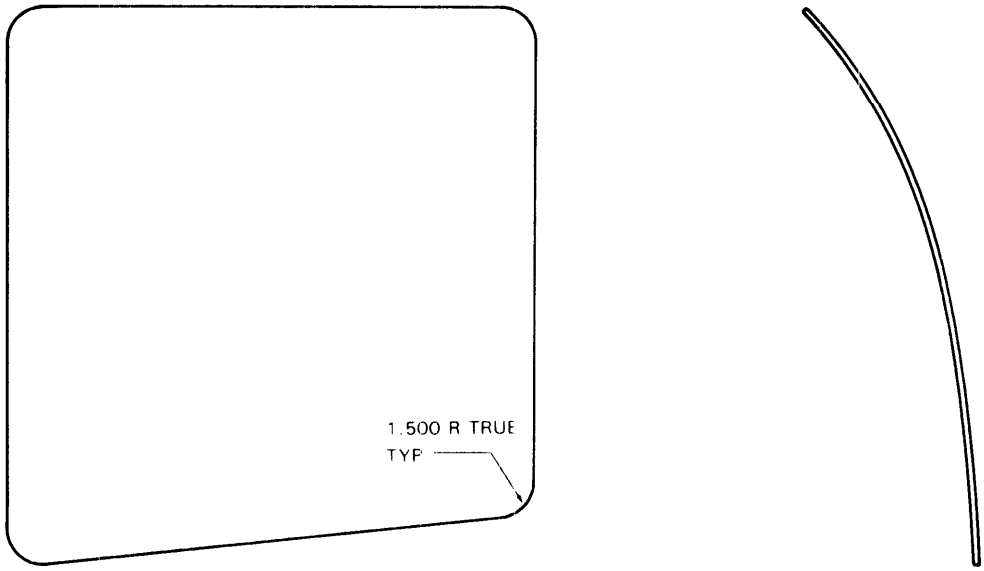
HOSE ASSEMBLY, NONMETALLIC

PART NUMBER	HOSE NSN	816 FITTING NSN	8891 FITTING NSN	8846 FITTING NSN	DUST PLUG NSN
70-009E000X134	4720-00-491-4980	4730-00-585-7496		4730-00-891-1948	5340-00-881-2676
70-009E000X162	4720-00-491-4980	4730-00-585-7496		47330-00-891-1948	5340-00-881-2676
70-009E000X205	4720-00-491-4980	4730-00-585-7496		4730-00-891-1948	5340-00-881-2676
70-009E180E150	4720-00-461-4980			4730-00-891-1948	5340-00-881-2676
70-009F020F270	4720-00-541-9281		4730-00-618-8862		5340-00-914-0521
70-009F180F247	4720-00-541-9281		4730-00-618-8862		5340-00-914-0521
70-009G000Y164	4720-00-420-4636	4730-00-834-5456	4730-00-817-1864		5340-00-781-8061
70-009H140W240	4720-00-611-2548		4730-00-720-1166	4730-00-541-8234	5340-00-988-6032
70-009J000V364	4720-00-580-6618	4730-00-632-2002	4730-00-795-0945		5340-00-433-3269
70-009L000T362	4720-00-555-3499	4730-00-541-1957		4730-00-618-7382	5940-00-726-3009
70-061J085C074	4720-00-580-6618		4730-00-795-0945		5340-00-433-3269
70-061K000V390	4720-00-541-8328	4730-00-541-9105	4730-00-919-9785		5340-00-726-3006

PART NUMBER	624 INSULATION NSN
70-009 E	5640-00-568-4687
70-009 F	5640-00-568-4687
70-009 G	5640-00-054-7083
70-009 H	5640-00-054-7083
70-009 J	5640-00-469-7723
70-009 L	5640-00-507-4104
70-009 K	5640-00-568-4640
AE102-9	5640-01-103-8487

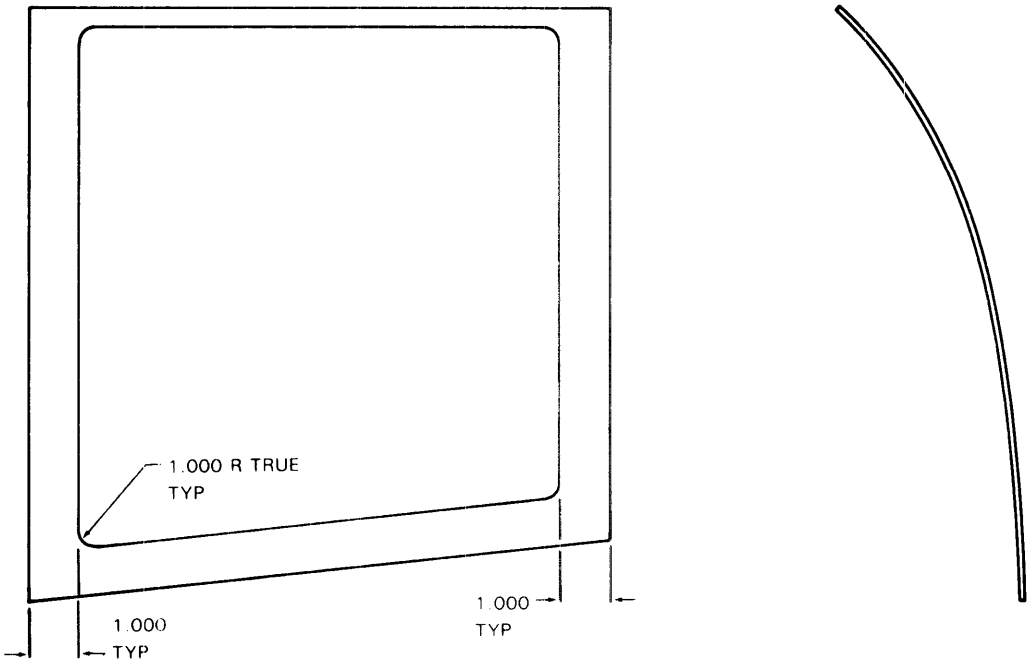
NOTE: ASSEMBLE WITH SEALING COMPOUND (C65) IN ACCORDANCE WITH TB 750-125.

Figure D-98



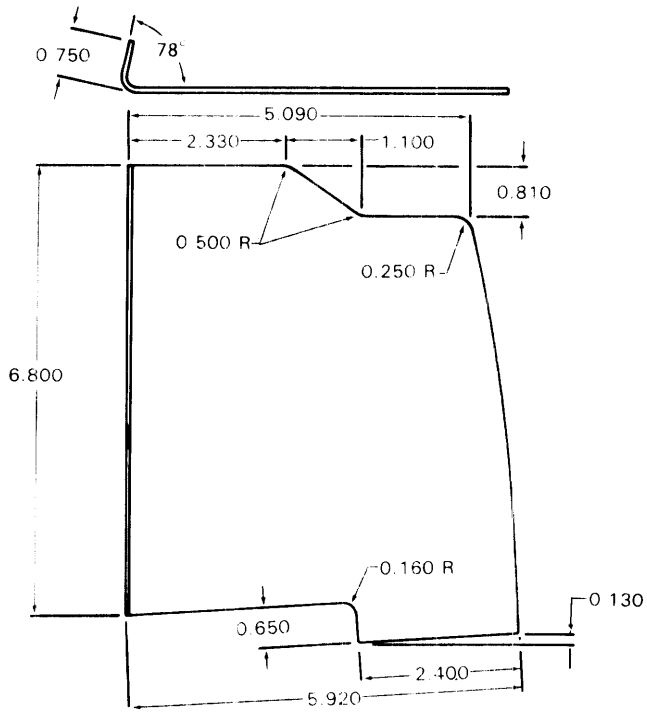
PART NUMBER: 206-032-345-1 DOOR
FABRICATE FROM: NSN 9535-00-640-2211

Figure D-99



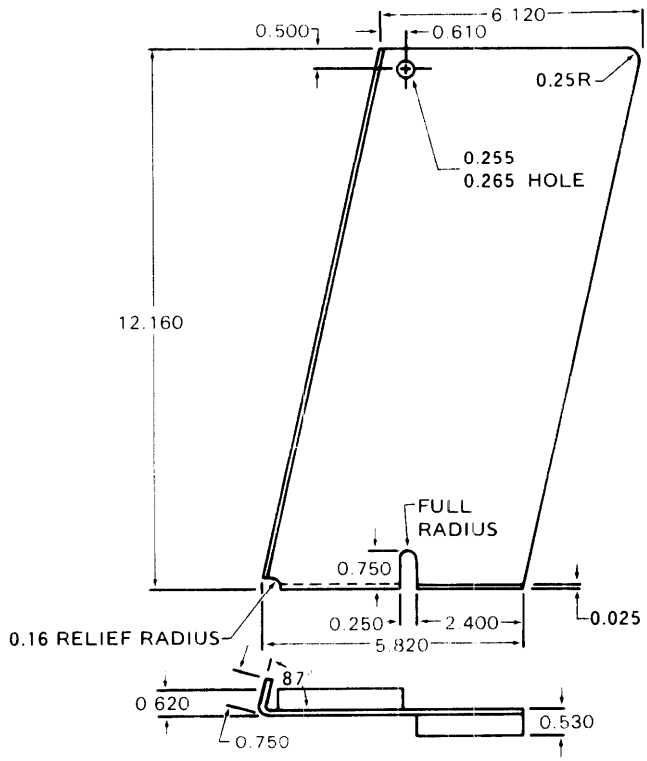
PART NUMBER: 206-032-345-3 DOUBLER
FABRICATE FROM: NSN 9535-00-084-4551

Figure D-100



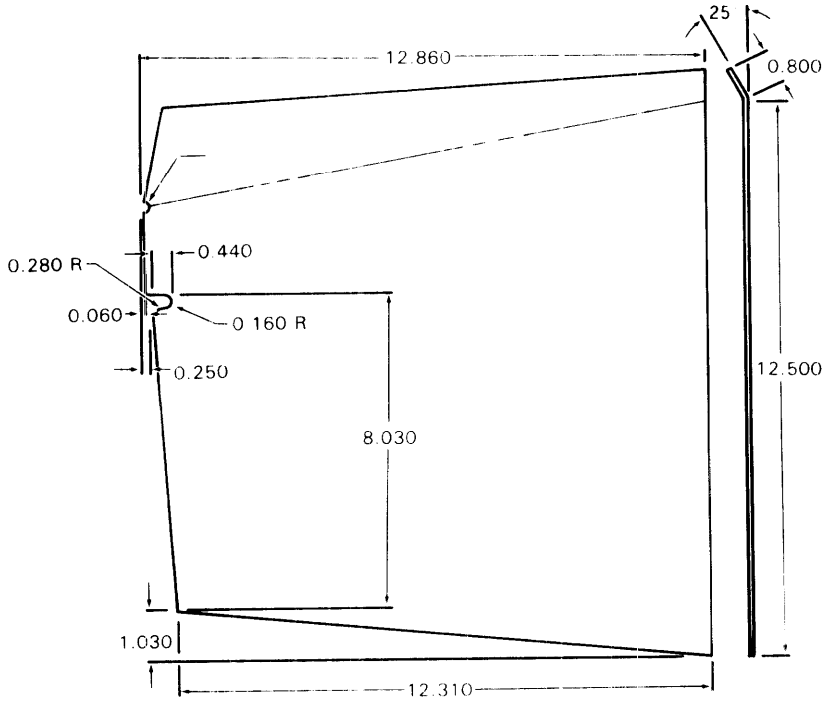
PART NUMBER: 206-032-345-7 WEB
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-101



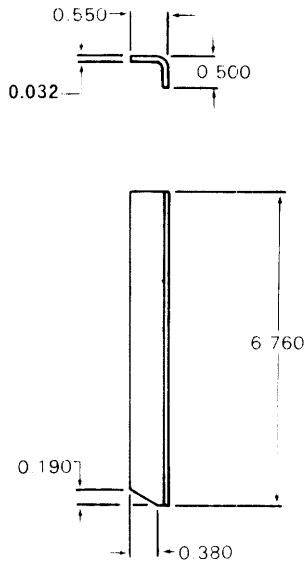
PART NUMBER: 206-032-345-9 WEB
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-102



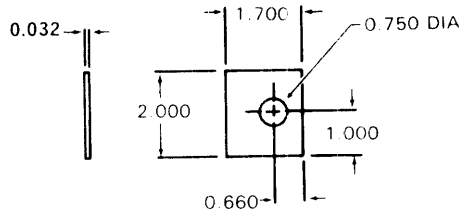
PART NUMBER: 206-032-345-11 WEB
FABRICATE FROM: NSN 9536-00-086-9729

Figure D-103



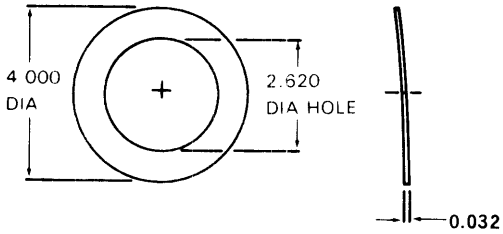
PART NUMBER: 206-032-345-19 STIFFENER
FABRICATE FROM: NSN 9535-00-085-4157

Figure D-104



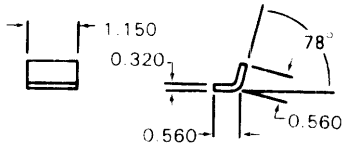
PART NUMBER: 206-032-345-25 DOUBLER
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-105



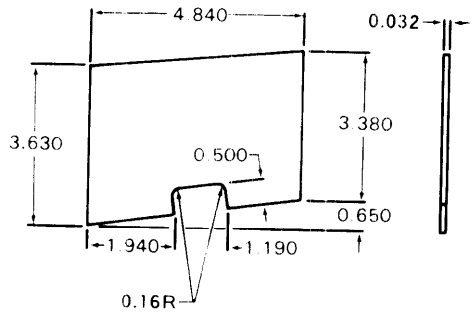
PART NUMBER: 206-032-345-29 DOUBLER

Figure D-106



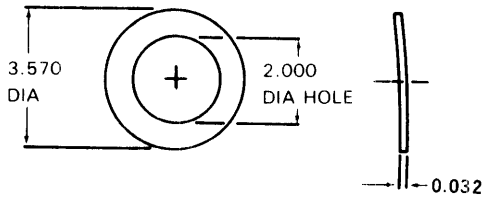
PART NUMBER: 206-032-345-23 CLIP
FABRICATE FROM: NSN 9535-00-085-4157

Figure D-107



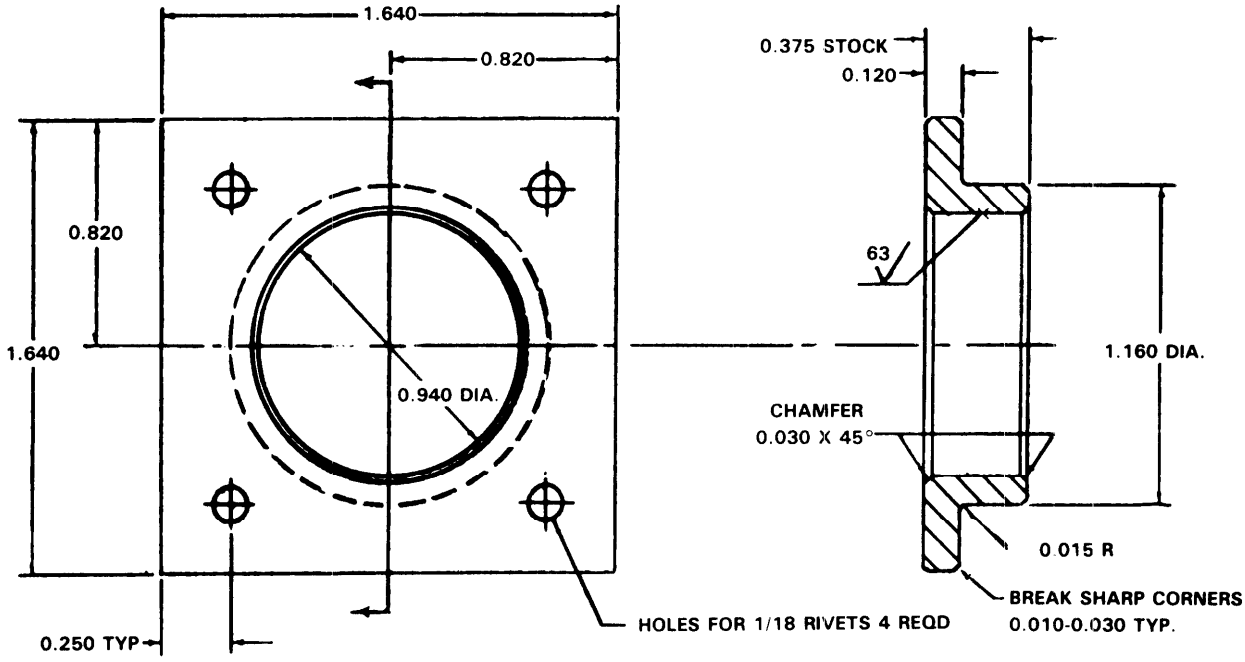
PART NUMBER: 206-032-345-27 DOUBLER
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-108



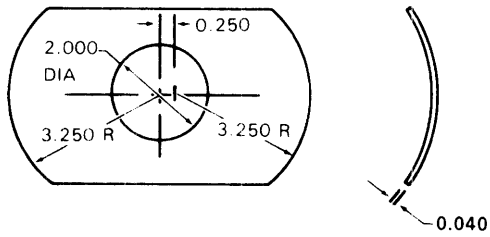
PART NUMBER: 206-032-345-31 DOUBLER
FABRICATE FROM: NSN 9535-00-167-2278

Figure D-109



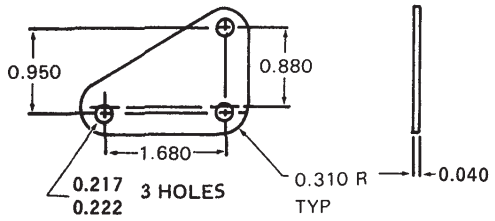
PART NUMBER: 206-032-435-101 FAIRLEAD
PART NUMBER: 206-032-435-1 FAIRLEAD
FABRICATE FROM: NSN 9330-00-901-5402

Figure D-110



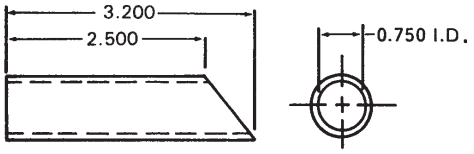
PART NUMBER: 206-032-456-7 DOUBLER
FABRICATE FROM: NSN 9535-00-084-4551

Figure D-111



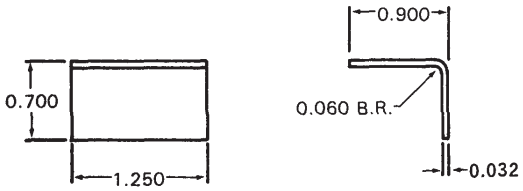
PART NUMBER: 206-073-027-1 SUPPORT
FABRICATE FROM: NSN 9535-00-084-4551

Figure D-112



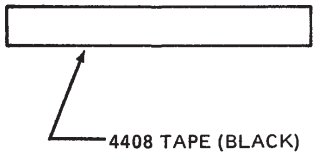
PART NUMBER: 206-062-663-1 HOSE
FABRICATE FROM: NSN 4720-00-233-0075

Figure D-113



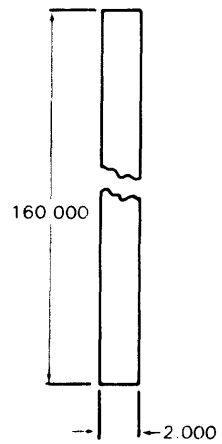
PART NUMBER: 206-070-474-1 BAFFLE
FABRICATE FROM: NSN 9515-00-230-2334

Figure D-114



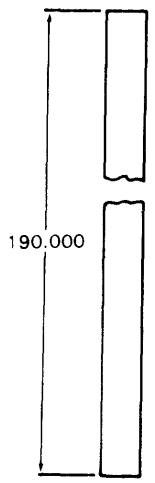
PART NUMBER: 206-040-007-3 FILLER TAPE
FABRICATE FROM: NSN 7510-00-165-6560

Figure D-115



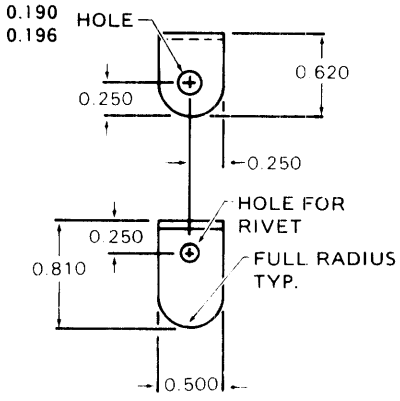
PART NUMBER: 206-961-211-29 TAPE
FABRICATE FROM: NSN 8135-00-923-0591

Figure D-116



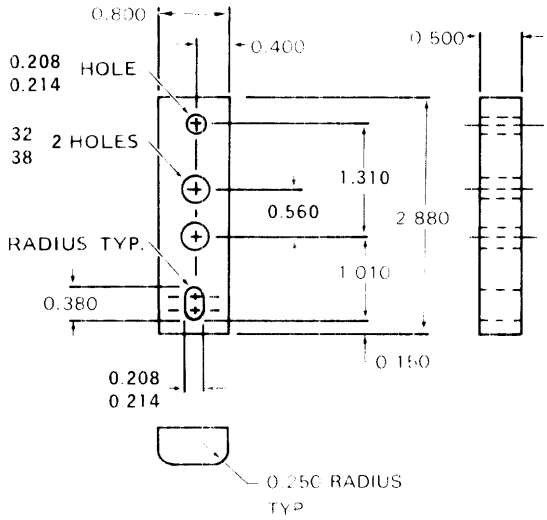
PART NUMBER: 206-010-225-5 STRIP TRAILING
FABRICATE FROM: NSN 1615-00-376-0298

Figure D-117



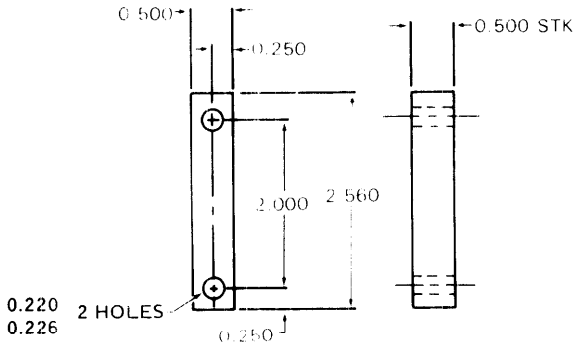
PART NUMBER: 206-032-341-27 CLIP
FABRICATE FROM: NSN 9535-00-167-2278

Figure D-118



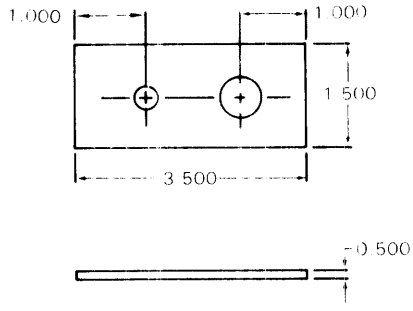
PART NUMBER: 209-030-597-5 SPACER
FABRICATE FROM: NSN 9330-00-540-5673

Figure D-119



PART NUMBER: 209-030-597-1 SPACER
FABRICATE FROM: NSN 9330-00-540-5673

Figure D-120



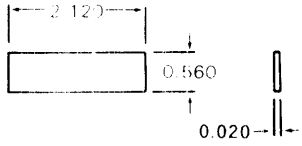
PART NUMBER: 206-706-035-17 DOUBLER
FABRICATE FROM: NSN 9535-00-640-2331

Figure D-121

LENGTH TABLE	
DASH NO.	DIMENSIONS(INCHES) "A" ESTIMATED
3	20.0
7	10.0

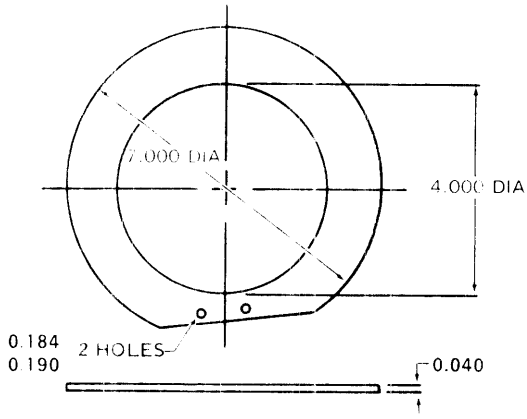
PART NUMBER: 206-075-544-3 & -7 TUBE VENT
FABRICATE FROM: NSN 4720-00-540-3644

Figure D-122



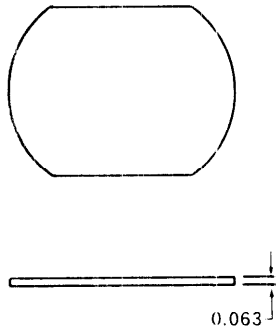
PART NUMBER: 206-704-074-3 DOUBLER
FABRICATE FROM: NSN 9535-00-084-4484

Figure D-123



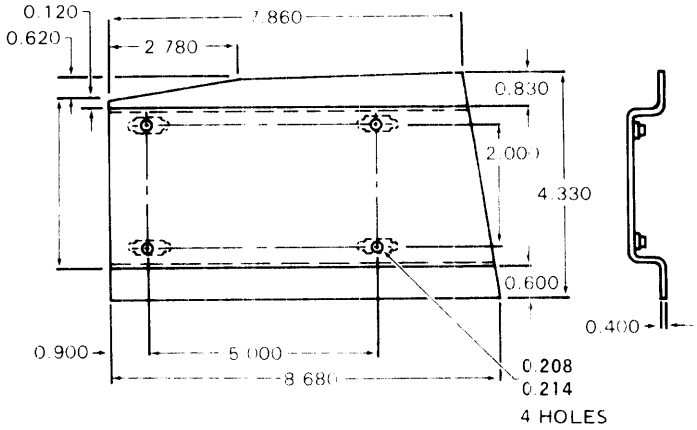
PART NUMBER: 206-031-351-23 DOUBLER
FABRICATE FROM: NSN 9535-00-167-2267

Figure D-124



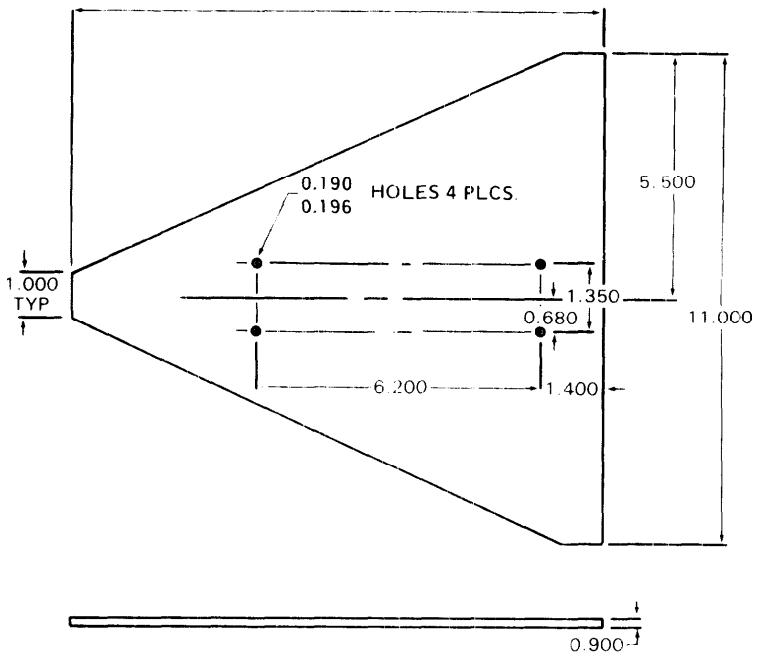
PART NUMBER: 206-032-103-33 COVER
FABRICATE FROM: NSN 9535-00-232-0378

Figure D-125



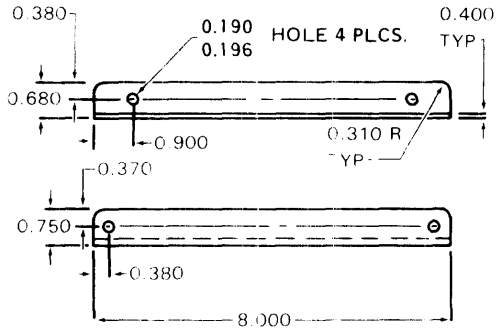
PART NUMBER: 206-032-216-5 SUPPORT
PART NUMBER: 206-032-216-21 SUPPORT
FABRICATE FROM: NSN 9535-00-084-4551
PART NUMBER: NAS 1068A08 NUTPLATE
FABRICATE FROM: NSN 5310-00-772-3721
PART NUMBER: MS20426AD3 RIVET
FABRICATE FROM: NSN 5320-00-117-6938

Figure D-126



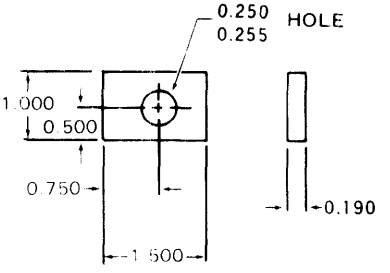
PART NUMBER: 206-050-166-17 PLATE
FABRICATE FROM: NSN 9535-00-084-4469

Figure D-127



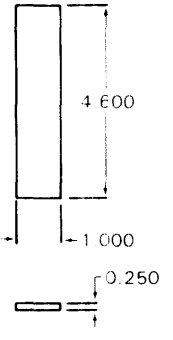
PART NUMBER: 206-050-166-15 CLIP
FABRICATE FROM: NSN 9535-00-084-4451

Figure D-128



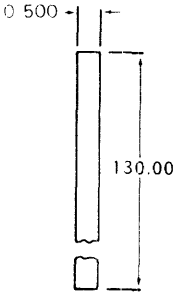
PART NUMBER: 206-032-500-23 PLATE DOOR
FABRICATE FROM: NSN 9535-00-084-4516

Figure D-129



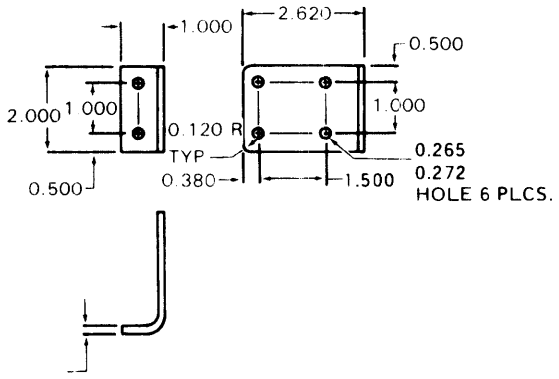
PART NUMBER: 206-062-815-119 TAPE SHOWN -120 OPP.
FABRICATE FROM: NSN 8040-00-989-0026

Figure D-130



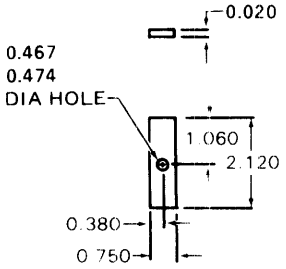
PART NUMBER: 206-032-312-23 TAPE
FABRICATE FROM: NSN 7510-00-105-3092

FigureD-131



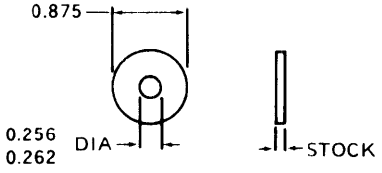
PART NUMBER: 204-072-347-1 BRACKET
FABRICATE FROM: NSN 9535-00-232-0532

Figure D-132



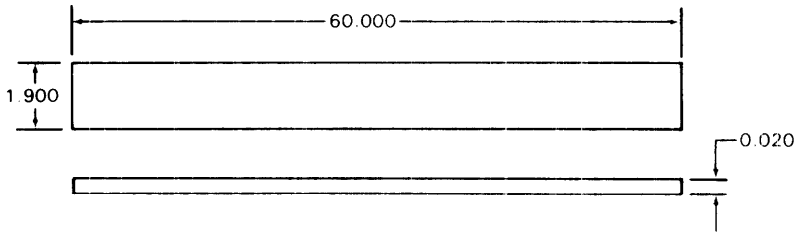
PART NUMBER: 206-062-901-41 DOUBLER
FABRICATE FROM: NSN 9535-00-084-4484

Figure D- 133



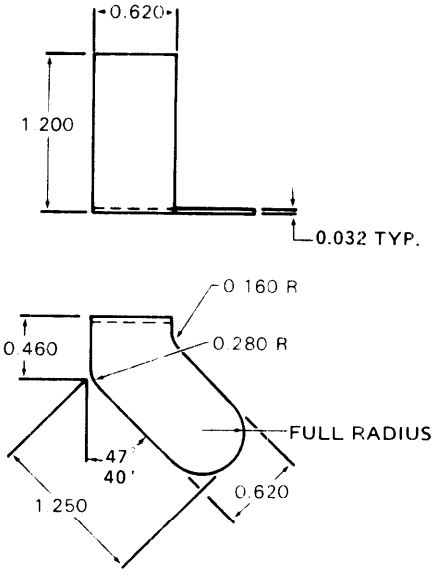
PART NUMBER: 206-010-202-1 WEIGHT, TIP END
FABRICATE FROM: NSN 5310-00-167-0765

Figure D-134



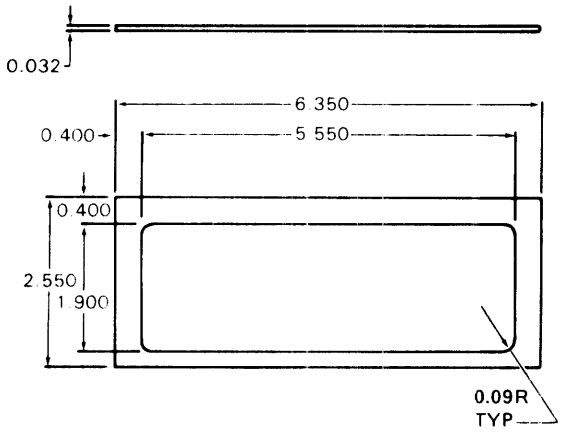
PART NUMBER: 206-062-815-109 BACKUP PLATE
FABRICATE FROM: NSN 9535-00-232-0532

Figure D-135



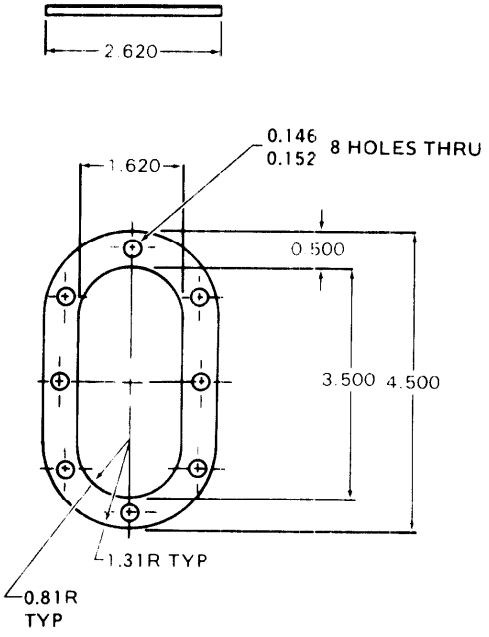
PART NUMBER: 206-052-108-19 CLIP -20 OPP
FABRICATE FROM: NSN 9535-00-085-4157

Figure D-136



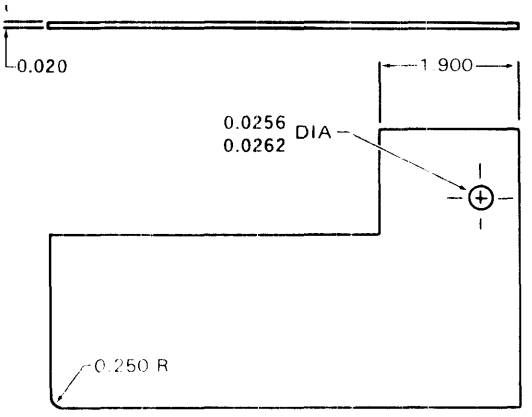
PART NUMBER: 206-062-815-111 FLANGE
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-137



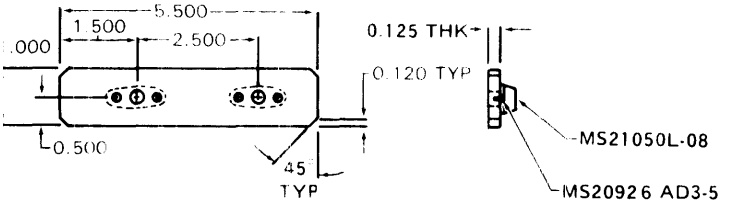
PART NUMBER: 206-062-815-91 WINDOW
FABRICATE FROM: NSN 9330-00-890-2842

Figure D-138



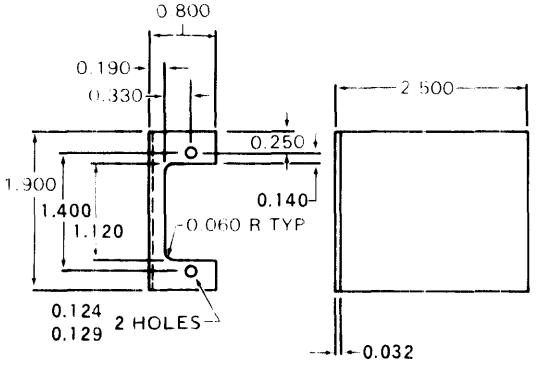
PART NUMBER: 206-062-815-115 PLATE SHOWN -116 OPP.
FABRICATE FROM: NSN 9535-00-084-4484

Figure D-139



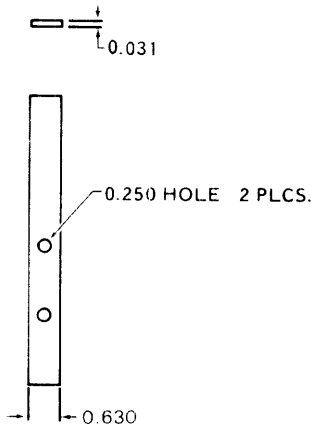
PART NUMBER: SK6733-1 PLATE
FABRICATE FROM: NSN 9535-00-084-4558
PART NUMBER: MS20926AD3-5 RIVET
FABRICATE FROM: NSN 5320-00-117-6939
PART NUMBER: MS21050L-08 ANCHOR NUT
FABRICATE FROM: NSN 5310-00-779-6737

Figure D-140

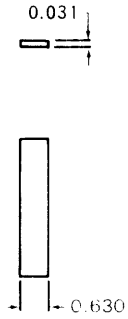


PART NUMBER: 206-075-595-1 BRACKET
FABRICATE FROM: NSN 9535-00-086-9729

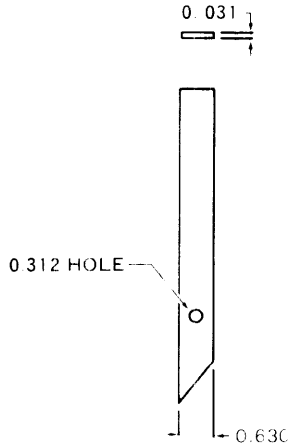
Figure D-141



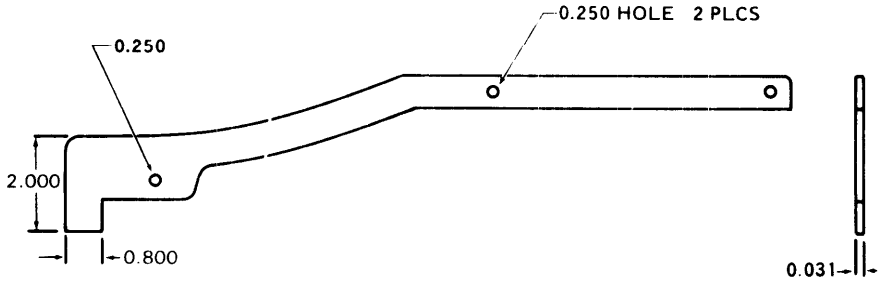
PART NUMBER: 206-062-835-19 GASKET
FABRICATE FROM: NSN 9320-00-241-9739
Figure D-142



PART NUMBER: 206-062-835-21 GASKET
FABRICATE FROM: NSN 9320-00-291-9739
Figure D-143

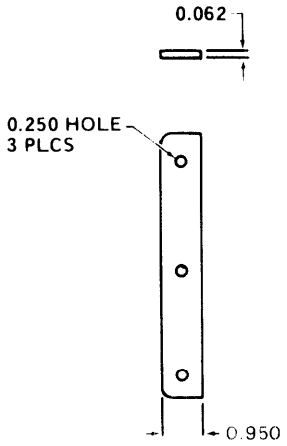


PART NUMBER: 206-062-835-23 GASKET
FABRICATE FROM: NSN 9320-00-241-9739
Figure D-144



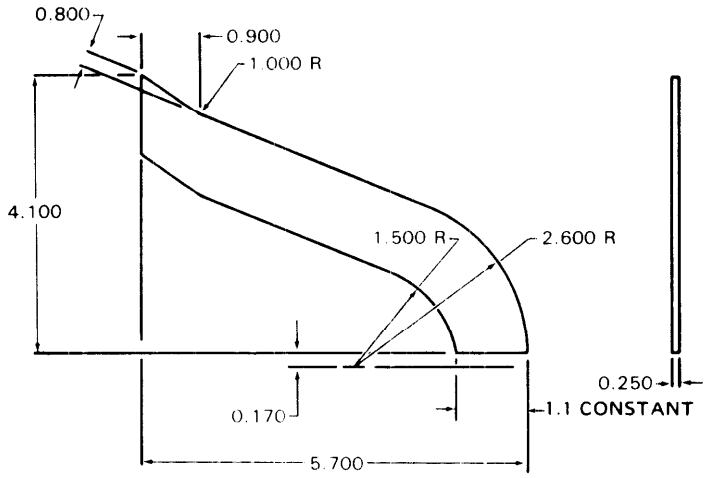
PART NUMBER: 206-062-835-27 GASKET
FABRICATE FROM: NSN 9320-00-241-9739

Figure D-145



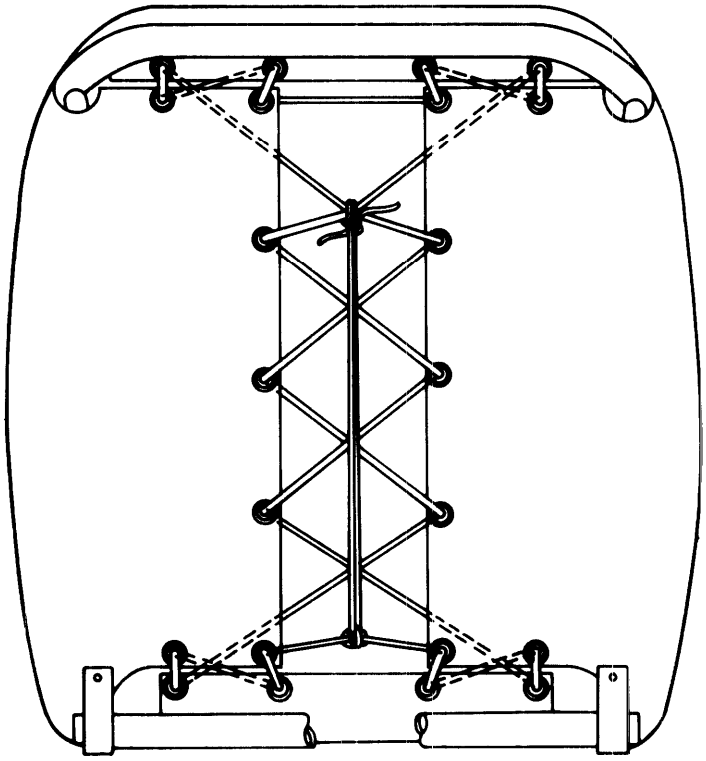
PART NUMBER: 206-062-835-29 GASKET
FABRICATE FROM: NSN 9320-00-241-9741

Figure D-146



PART NUMBER: 206-062-835-39 SEAL SHOWN -40 OPPOSITE
FABRICATE FROM: NSN 7510-00-104-9311

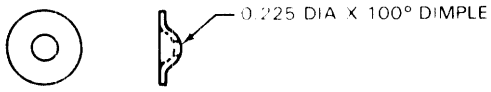
Figure D-147



LACING

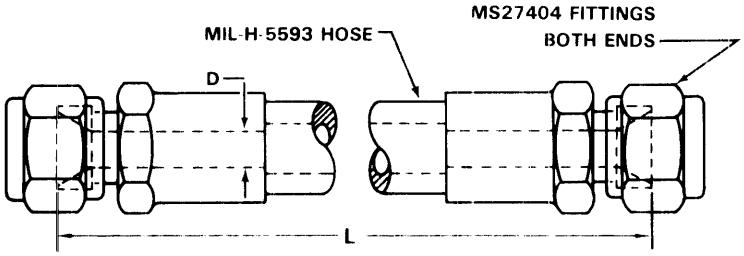
PART NUMBER: 602C0001-12
FABRICATE FROM: NSN 4020-00-246-0688

Figure D-148



PART NUMBER: 206-062-835-43 WASHER
FABRICATE FROM:

Figure D-149

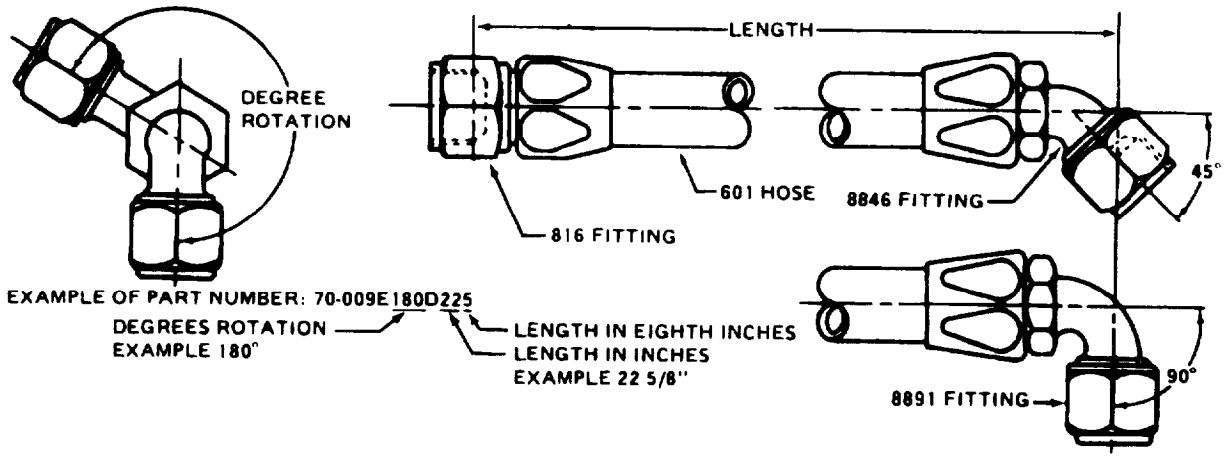


DASH NO	TUBING OD	HOSE SIZE NO	HOSE NOM ID	END FITTING	D MIN DIA
3	3/16	3	3/16	MS27404-3	0.109
4	1/4	4	1/4	MS27404-4	0.156

AN6270-4D-0230 — HOSE ASSEMBLY, STEEL END FITTINGS,
1/4 INCH TUBING, 23 INCHES LONG
LENGTH IN EIGHTS OF INCH
LENGTH IN INCHES
MATERIAL OF END FITTINGS
OUTSIDE DIAMETER

PART NO.	HOSE NSN	FITTING NSN
AN6270-3D-0200	4720-00-277-8982	4730-00-278-5688
AN6270-3D-0220	4720-00-277-8982	4730-00-278-5688
AN6270-3D-0260	4720-00-277-8982	4730-00-278-5688
AN6270-4D-0230	4720-00-540-1962	4730-00-497-4281

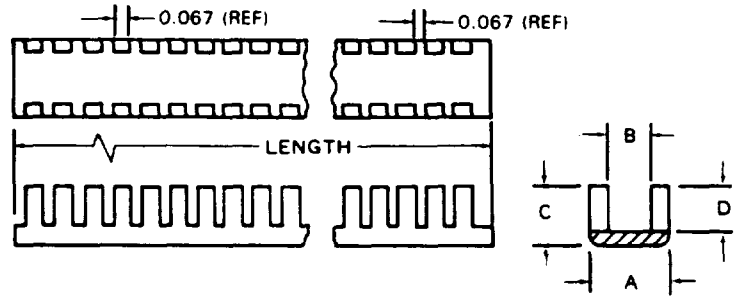
Figure D-150



HOSE ASSEMBLY - NONFIRE RESISTANT

PART No.	HOSE NSN	816 FITTING NSN	8891 FITTING NSN	8846 FITTING NSN	DUST PLUG NSN
70-010E240F062	4720-00-491-4980	4730-00-891-9343 (2)		4730-00-891-1948	5340-00-881-2676
70-010F000X116	4720-00-541-9281	4730-00-618-7378		4730-00-709-3887	5340-00-914-0521
70-01G000X116	4720-00-420-4636	4730-00-834-5456		4730-00-559-1600	5340-00-781-8061
70-010J000A116	472-00-580-6618	4730-00-632-2002 (2)			5340-00-433-3269
70-010K000A126	4720-00-541-8328	4730-00-541-9105 (2)	4730-00-919-6785 (2)		5340-00-726-3009
70-010L000A240	4720-00-555-3499	4730-00-541-1957 (2)			5340-00-833-7039
70-010L233Z330	4720-00-555-3499		4730-00-619-7382	4730-00-238-5338	5340-00-433-3269

Figure D-151



GROMMET PLASTIC EDGING

PART NUMBER	A	B	C	D	SHEET OR PANEL THICKNESS	WT LB/IN
60-003.IN(*)	0.150	0.056	0.155	0.100	0.015 - 0.052	.00048

EXAMPLE OF CALLOUT: 60.003 - IN40 = GROMMET FOR 0.015 - 0.052 THICK PANEL, 10 INCHES LONG

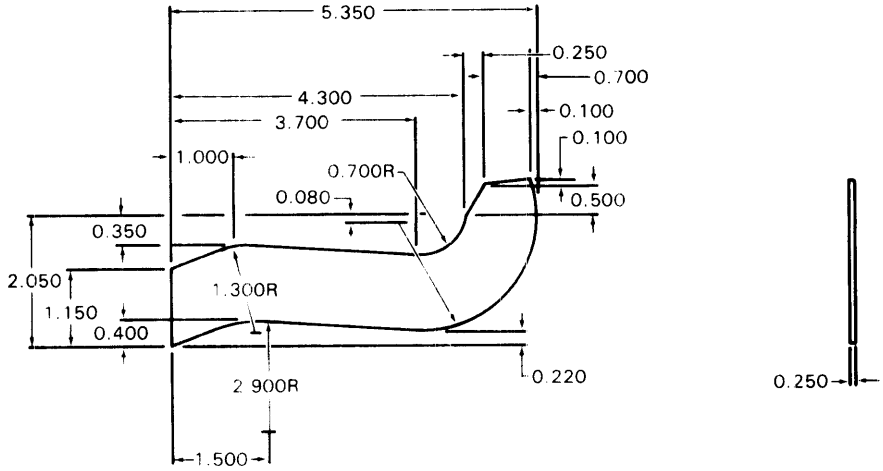
BASIC No.

SIZE

LENGTH EXPRESSED IN 1/4 INCH INCREMENTS (MAX 50)

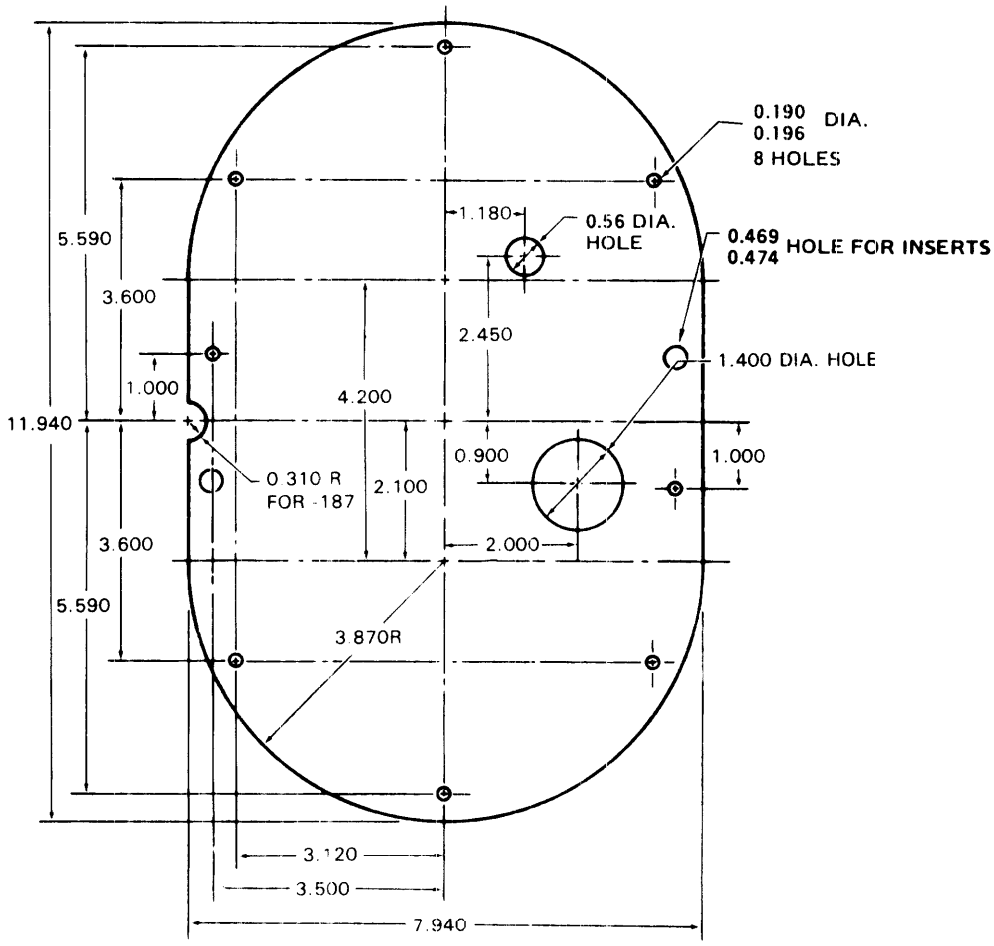
PART NUMBER	FABRICATE FROM
60-003-1N7	NSN 5325-00-960-2410
60-003-1N9	NSN 5325-00-960-2410
60-003-1N38	NSN 5325-00-960-2410
60-003-1N40	NSN 5325-00-960-2410
60-003-3N8	NSN 5325-00-926-1394

Figure D-152



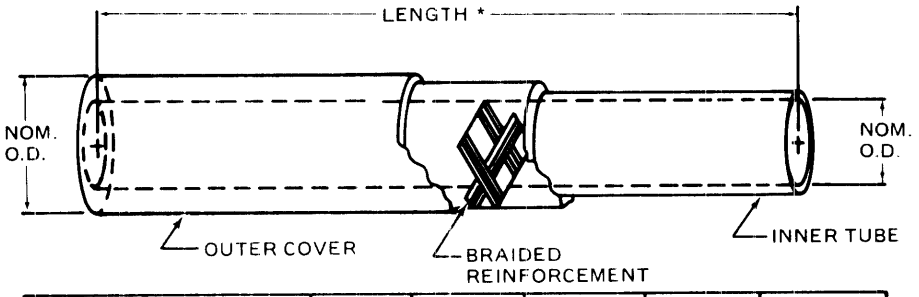
PART NO: **206-062-835-41 SEAL SHOWN -42 OPPOSITE**
FABRICATE FROM: **NSN 7510-00-104-9311**

Figure D-153



PART NUMBER: 206-032-100-189 DOOR, CABIN
FABRICATE FROM: NSN 9535-00-086-9729

Figure D-154



BELL P/N	NOM. O.D.	NOM. O.D.	OPR. PRESS	MIN. BEND RAD.	WT. LB/IN.
70-033-03-(*)	.188	438	.250 PSI	2 IN.	.0050
70-033-04-(*)	.250	500	.200 PSI	4 IN.	.0058

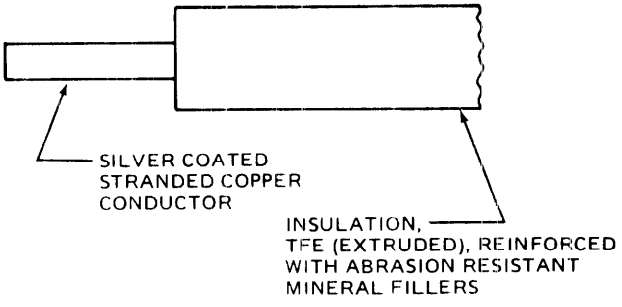
*PART NO. CODE: 70 - 033 - 08 - 090 4

BASIC NO.
HOSE SIZE
LENGTH IN INCHES
FRACTIONAL LENGTH CODED IN 1 8 INCH INCREMENTS

(*) LENGTH IN 4 DIGITS

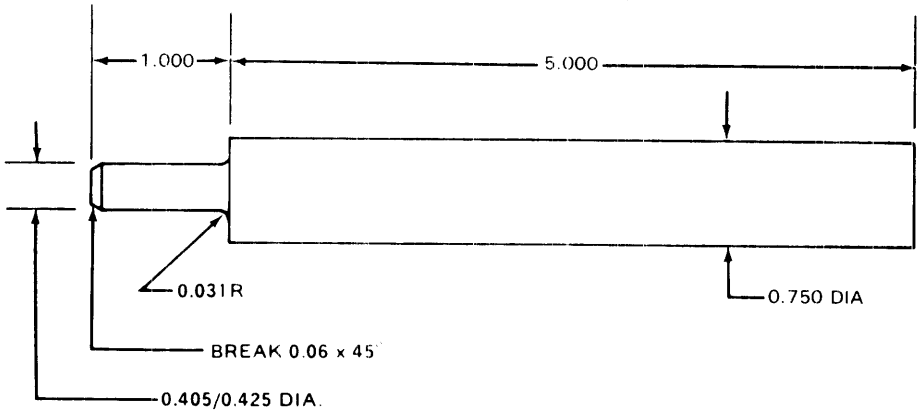
EXAMPLE OF CALLOUT: 70-033-08-0904 = HOSE, SYNTHETIC RUBBER, 0.500 I.D., 0.781 O.D., 90.5 INCHES LONG

Figure D-155



PART NUMBER: 140-008-8 WIRE, ELECTRICAL
FABRICATE FROM: NSN 6145-00-174-4461

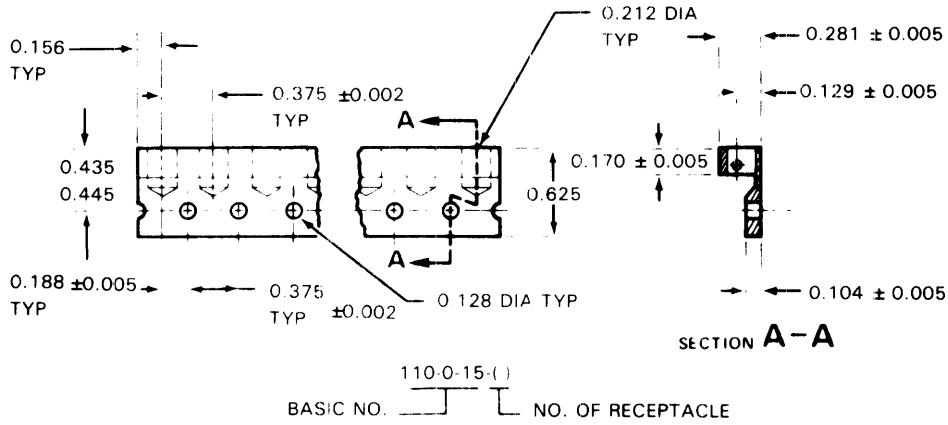
Figure D-156



NOTES:

1. **Finish using MIL-P-8585.**
2. **All dimensions are in inches.**

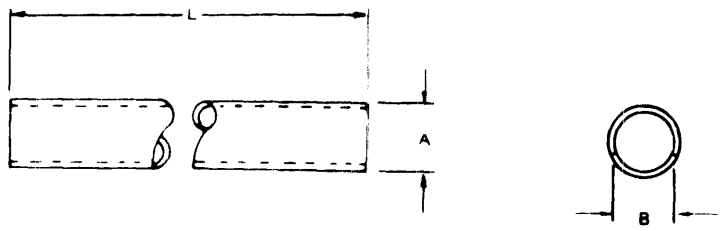
Figure D-157



PART NUMBER 110-045-20 RECEPTACLE STRIP
110-045-29 RECEPTACLE STRIP
110-045-39 RECEPTACLE STRIP

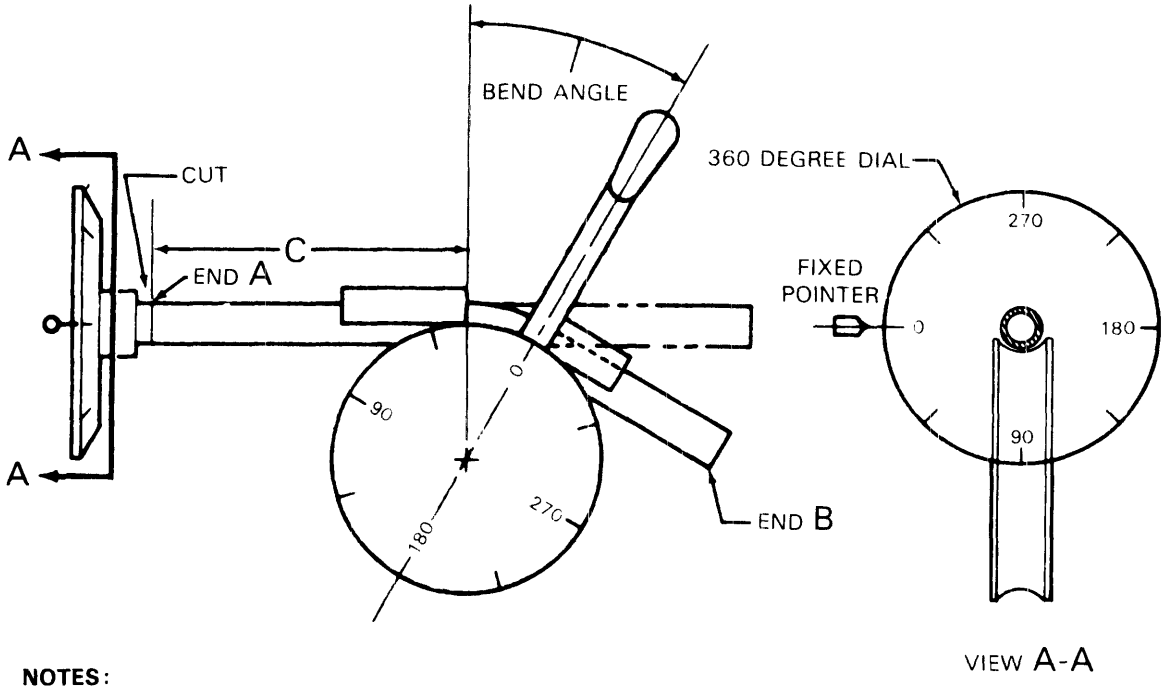
FABRICATE FROM: NSN 5325-00-036-9305

Figure D-158



PART NUMBER	(A) O.D. (INCHES)	(B) I.D. (INCHES)	(L) LENGTH (INCHES)	COLOR	FABRICATE FROM
130-011-4N12	0.250	0.182	1.500	Natural	9330-00-931-7097
130-011-4N18	0.250	0.182	2.250	Natural	9330-00-931-7097
130-011-4N38	0.250	0.182	4.750	Natural	9330-00-931-7097
130-011-4N48	0.250	0.182	6.000	Natural	9330-00-931-7097
130-011-4N56	0.250	0.182	7.000	Natural	9330-00-931-7097
130-011-4N72	0.250	0.182	9.000	Natural	9330-00-931-7097
130-011-4N73	0.250	0.182	9.125	Natural	9330-00-931-7097
130-011-4N86	0.250	0.182	10.750	Natural	9330-00-931-7097
130-011-4N88	0.250	0.182	11.000	Natural	9330-00-931-7097
130-011-4N90	0.250	0.182	11.250	Natural	9330-00-931-7097
130-011-4N110	0.250	0.182	13.750	Natural	9330-00-931-7097
130-011-4N144	0.250	0.182	18.000	Natural	9330-00-931-7097
130-011-4N148	0.250	0.182	18.500	Natural	9330-00-931-7097
130-011-4N152	0.250	0.182	19.000	Natural	9330-00-931-7097
130-011-4N184	0.250	0.182	23.000	Natural	9330-00-931-7097
130-011-4N200	0.250	0.182	25.000	Natural	9330-00-931-7097
130-011-4N344	0.250	0.182	45.500	Natural	9330-00-931-7097
130-011-4N400	0.250	0.182	50.000	Natural	9330-00-931-7097

Figure D-159



NOTES:

1. SELECT MATERIAL AND END FITTINGS.
2. REFER TO TUBE BENDING DATA FOR ALL DIMENSIONS, ANGLES, AND DIAL SETTINGS.
3. MARK DIMENSION "C" FOR EACH BEND PRIOR TO BENDING.
4. MAKE FIRST BEND WITH DIAL SET TO 0 DEG AND ROTATE DIAL TO "RIGHT" (CLOCKWISE) AND MAKE REMAINING BEND AT SPECIFIED DIAL SETTINGS.
5. CUT "A" END AFTER BENDING.
6. IF SCARF IS REQUIRED, SET DIAL AND CUT TO SPECIFIED ANGLE.
7. TRIM AND BURR ENDS "A" AND "B" AS NECESSARY.
8. BEND RADI SHALL CONFORM TO MS33611.
9. NUTS AND SLEEVES INSTALLED PER MS33566.
10. PRESSURE TEST, IF APPLICABLE.
11. IDENTIFY TUBE ASSEMBLY BY MARKING PART NUMBER WITH RUBBER INK STAMP OR FELT PEN.

TYPE OF ENDS

I SINGLE FLARE - MS33584

II BEAD - MS33660 TYPE "A" UNLESS NOTED.

III DOUBLE FLARE - MS33583

IV PLAIN SQUARE

V ANGLE - 45" SCARF UNLESS NOTED.

VI OTHER - DESIGNATED.

Figure D-160 (Sheet 1 of 9)

PART NO. PRESS TEST	TUBING MATERIAL	BEND NO.	BEND FROM END A	BEND RADIUS	DIAL SETTING °	BEND ANGLE °	END TYPE		
							NO.	TYPE	FITTING
206-040-255-1 Press Test None	4710-00-278-6398 5052 AL ALY 1/4 x 0.035 x 9.0 Final Length 7.56	1 2	6.25 2.00	0.56 0.56	0° 180°	76° 73°	A & B	III	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-061-696-1 Press Test None	4710-00-278-3294 CRES 304 1/4 x 0.028 x 18.0 Final Length 15.06	1 2 3	13.12 9.37 2.50	0.56 0.56 0.56	0° 185° 11°	55° 62° 74°	A B	I IV	AN 818-4J 4730-00-203-2658 MS 20819-4J 4730-00-580-7471
206-061-697-1 Press Test None	4710-00-278-3294 CRES 304 **1/4 x 0.028 x 20.0** Final Length 17.62	1 2 3 4 5	16.56 13.75 11.31 8.37 1.75	0.56 0.56 0.56 0.56 0.56	0° 180° 78° 213° 36°	86° 36° 61° 63° 69°	A B	I IV	AN 818-4J 4730-00-203-2658 MS 20819-4J 4730-00-680-7471
206-062-225-1 Press Test None	4710-00-421-1522 CRES 321 3/8 x 0.020 x 12.0 Final Length 9.9	1 2 3	7.7 5.3 2.3	1.00 1.00 1.00	0° 351° 132°	74° 72° 79°	A & B	I	AN 818-6 4730-00-203-3831 MS 20819-6 4730-00-278-0682
206-062-226-1 Press Test None	4710-00-421-1522 CRES 321 3/8 x 0.020 x 13.0 Final Length 10.9	1 2	9.3 5.3	1.00 1.00	0° 274°	45° 83°	A & B	I	AN 818-6 4730-00-203-3831 MS 20819-6 4730-00-278-0682
206-062-508-1 Press Test None	4710-00-541-4932 5052-0 AL ALY 1/4 x 0.028 x 8.0 Final Length 6.75	1 2	5.75 2.75	0.56 0.56	0° 90°	120° 80°	A & B	I	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-062-509-1 Press Test None	4710-00-541-4932 5052-0 AL ALY 1/4 x 0.028 x 34.0 Final length 31.88	1 2 3 4 5	30.38 28.12 24.50 21.25 2.50	0.56 0.56 0.56 0.56 0.56	0° 185° 117° 194° 3°	32° 42° 14° 82° 90°	A & B	I	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641

Figure D-160. (Sheet 2 of 9)

PART NO. PRESS. TEST	TUBING MATERIAL	BEND NO.	BEND FROM END A	BEND RADIUS	DIAL SETTING °	BEND ANGLE °	END TYPE		
							NO.	TYPE	FITTING
206-062-510-1 Press Test 100 PSI	4710-00-595-2413 5052-0 AL ALY 1/2 x 0.028 x 29.0 Final Length 24.62	1 2 3 4 5	23.25 18.62 11.25 4.50 2.12	1.25 1.25 1.25 1.25 1.25	0° 256° 348° 318° 138°	115° 10.5° 89° 21° 18°	A & B	I	AN 818-8D 4730-00-287-0288 MS 20819-8D 4730-00-277-5373
206-062-513-1 Press Test None	4710-00-541-4932 5052-0 AL ALY 1/4 x 0.028 x 35.0 Final Length 32.75	1 2 3 4 5 6 7	31.50 29.50 23.25 18.62 12.62 9.62 3.50	0.56 0.56 0.56 0.56 0.56 0.56 0.56	0° 188° 278° 278° 278° 278° 108°	58° 46° 17° 9° 14° 33° 75°	A B	I V	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641 None
206-062-520-1 Press Test None	4710-00-541-4932 5052-0 AL ALY 1/4 x 0.028 x 31.75 Final Length 26.75	1 2 3 4	25.50 19.81 15.94 2.0	0.56 0.56 0.56 0.56	0° 170° 134° 318°	123° 39° 82° 87°	A & B	I	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-062-524-1 Press Test None	4710-00-541-4932 5052-0 AL ALY 1/4 x 0.028 x 15.0 Final Length 13.0	1 2	11.38 2.31	0.56 0.56	0° 85°	61° 57°	A & B	I	AN 818-4D 4730-00-287-0284 MS 20819-4D 4730-00-302-8641
206-062-533-1 Press Test 100 PSI	4710-00-595-2416 5052-0 AL ALY 5/8 x 0.028 x 3.0 Final Length 25.16	1 2 3 4 5	24.28 19.37 11.55 4.64 2.81	1.50 1.50 1.50 1.50 1.50	0° 257° 352° 302° 126°	111° 11° 92° 19° 15°	A & B	I	AN 818-10D 4730-00-287-0290 MS 20819-10D 4730-00-277-5358
206-062-606-1 Press Test None	4710-00-595-2413 5052-0 AL ALY 1/2 x 0.028 x 25.0 Final Length 23.12	1 2 3 4	20.75 18.31 16.88 8.50	1.25 1.25 1.25 1.25	0° 180° 87° 87°	28° 26° 90° 85°	A & B	I	AN 818-8D 4730-00-287-0288 MS 20819-8D 4730-00-277-5373
206-062-626-1 Press Test 35 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 15.0 Final Length 12.31	1 2 3	10.31 7.56 2.00	0.44 0.44 0.44	0° 184° 68°	88° 79° 29°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-062-632-1 Press Test 35 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 19.0 Final Length 15.75	1 2 3 4	14.94 13.31 7.12 3.44	0.44 0.44 0.44 0.44	0° 148° 248° 248°	71° 31° 29° 20°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362

Figure D-160 (Sheet 3 of 9)

PART NO. PRESS. TEST	TUBING MATERIAL	BEND NO.	BEND FROM END A	BEND RADIUS	DIAL SETTING °	BEND ANGLE °	END TYPE		
							NO.	TYPE	FITTING
206-062-633-1 Press Test None	4710-00-278-3297 CRES 3/16 x 0.028 x 16.0 Final Length 13.50	1 2 3	12.62 9.87 0.94	0.44 0.44 0.44	0° 251° 169°	129° 8° 80°	A B	I IV	AN 818-3J 4730-00-540-0488 MS 20819-3J None
206-062-634-1 Press Test None	4710-00-278-3294 CRES 1/4 x 0.028 x 19.0 Final Length 17.44	1 2 3 4 5	16.12 14.12 10.44 8.06 2.50	0.56 0.56 0.56 0.56 0.56	0° 115° 37° 214° 24°	70° 22° 15° 75° 73°	A B	I IV	AN 818-4J 4730-00-203-2658 MS 20819-4J 4730-00-580-7471 None
206-062-635-1	4710-00-278-3294 CRES 1/4 x 0.028 x 18.0	1 2 3 4 5 6	14.87 13.62 11.94 10.68 7.50 2.37	0.56 0.56 0.56 0.56 0.56 0.56	0° 131° 85° 332° 127° 28°	33° 23° 9° 17° 66° 75°	A B	I IV	AN 818-4J 4730-00-203-2658 MS 20819-4J 4730-00-580-7471 None
206-062-636-1 Press Test None	4710-00-541-4932 5052-0 AL ALY 1/4 x 0.028 x 11.0 Final Length 9.87	1 2 3	9.94 5.94 1.88	0.56 0.56 0.56	0° 183° 282.5°	70° 85° 72°	A B	III IV	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641 None
206-062-647-1 Press Test None	4710-00-178-7954 5052-0 AL ALY 3/4 x 0.028 x 29.0 Final Length 25.18	1 2	20.68 6.81	1.75 1.75	0° 201°	14° 19°	A B	45° I	None AN 818-12D 4730-00-287-0285 MS 20819-12J 4730-00-287-0067
206-062-667-1 Press Test None	4710-00-278-3297 CRES 304 3/16 x 0.028 x 17.0 Final Length 14.12	1 2 3 4	13.31 8.31 4.81 1.68	0.50 0.50 0.50 0.50	0° 316° 135° 225°	45° 32° 80° 76°	A B	I IV	AN 818-3J 4730-00-540-0488 MS 20819-3J 4730-00-540-0454 None
206-062-678-1 Press Test None	4710-00-278-3297 CRES 304 3/16 x 0.028 x 22.0 Final Length 17.23	1 2 3 4 5	15.68 9.92 7.06 4.64 2.17	0.56 0.56 0.56 0.56 0.56	0° 353° 128° 140° 217°	42° 47° 74° 47° 80°	A B	IV I	None AN 818-3J 4730-00-540-0488 MS 20819-3J 4730-00-540-0454

Figure D-160 (Sheet 4 of 9)

PART NO. PRESS TEST	TUBING MATERIAL	BEND NO.	BEND FROM END A	BEND RADIUS	DIAL SETTING °	BEND ANGLE °	END TYPE NO.	END TYPE TYPE	END TYPE FITTING
206-062-830-1 Press Test 50 PSI	4710-00-541-4932 5052 AL ALY 1/4 x 0.028 x 17.0 Final Length 14.56	1 2	12.56 3.75	0.56 0.56	0° 303°	60° 91°	A & B	III	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-062-831-1 Press Test 50 PSI	4710-00-541-4932 5052 AL ALY 1/4 x 0.028 x 8.0 Final Length 5.8	1 2	5.0 2.56	0.56 0.56	0° 91°	77° 105°	A & B	III	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-063-678-1 Press Test None	4710-00-541-4932 5052 AL ALY 1/4 x 0.028 x 11.0 Final Length 9.56	1 2	7.87 2.50	0.56 0.56	0° 86°	26° 72°	A B	III IV	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641 None
206-063-679-1 Press Test None	4710-00-278-3294 CRES 304 1/4 x 0.028 x 17.0 Final Length 15.38	1 2 3	14.38 10.69 2.50	0.56 0.56 0.56	0° 180° 3°	58° 71° 71°	A B	I IV	AN 818-4J 4730-00-203-2652 MS 20819-4J 4730-00-580-7471 None
206-063-680-1 Press Test None	4710-00-278-3294 CRES 304 1/2 x 0.028 x 21.0 Final Length 19.94	1 2 3 4	18.75 15.00 11.43 2.50	0.56 0.56 0.56 0.56	0° 91° 176° 357°	92° 74° 78° 74°	A B	I IV	AN 818-4J 4730-00-203-2658 MS 20819-4J 4730-00-580-7471 None
206-070-176-1 Press Test 150 PSI	4710-00-278-6394 5052 AL ALY 3/16 x 0.028 x 49.0 Final Length 45.75	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	45.06 44.44 42.62 41.25 36.75 35.06 29.69 27.75 20.25 18.69 16.25 8.06 7.12 2.31 1.31	0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44	0° 265° 45° 270° 68° 180° 100° 180° 54° 180° 180° 38° 180° 62° 180°	25° 30° 83° 83° 53° 60° 41° 41° 48° 90° 41° 32° 32° 27° 27°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362

Figure D-160. (Sheet 5 of 9)

PART NO. PRESS. TEST	TUBING MATERIAL	BEND NO.	BEND FROM END A	BEND RADIUS	DIAL SETTING °	BEND ANGLE °	END TYPE		
							NO.	TYPE	FITTING
206-070-180-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 50.0 Final Length 47.25	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	45.38 44.38 39.62 38.62 30.25 28.18 26.50 18.25 16.38 10.87 9.0 5.87 4.50 2.38 1.25	0.43 0.43 0.43 0.43 0.43 0.43 0.43 0.43 0.43 0.43 0.43 0.43 0.43 0.43 0.43	0° 230° 35° 270° 45° 180° 105° 180° 45° 180° 180° 290° 180° 320° 180°	32° 45° 84° 77° 72° 72° 42° 42° 50° 100° 50° 30° 30° 30° 30°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-230-1 Press Test None	4710-00-209-1757 CRES 18-8 3/16 x 0.020 x 27.0 Final Length 25.0	1 2 3	19.0 12.63 5.13	0.44 0.44 0.44	0° 180° 0°	10° 16° 25°	A B	I V	AN 818-3 4730-00-277-6451 MS 20819-3 4730-00-277-5361 None
206-070-339-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 24.0 Final Length 20.94	1 2 3 4 5 6	19.94 17.19 12.50 10.44 8.12 4.88	0.44 0.44 0.44 0.44 0.44 0.44	0° 191° 10° 176° 124° 27°	78° 84° 55° 50° 83° 45°	A & B		AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-340-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 23.0 Final Length 21.06	1 2 3 4	20.12 19.00 3.00 2.31	0.44 0.44 0.44 0.44	0° 270° 225° 45°	20° 37° 37° 37°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-341-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 20.0 Final Length 17.81	1 2 3 4	14.31 11.31 9.56 1.44	0.44 0.44 0.44 0.44	0° 195° 15° 15°	79° 96° 25° 52°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-343-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 26.0 Final Length 22.44	1 2 3 4 5 6 7	21.50 20.62 17.88 13.44 11.06 8.88 5.81	0.44 0.44 0.44 0.44 0.44 0.44 0.44	0° 274° 106° 293° 123° 47° 320°	14° 80° 86° 51° 33° 77° 30°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362

Figure D-160 (Sheet 6 of 9)

PART NO. PRESS TEST	TUBING MATERIAL	BEND NO.	BEND FROM END A	BEND RADIUS	DIAL SETTING °	BEND ANGLE °	END TYPE		
							NO.	TYPE	FITTING
206-070-344-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 22.0 Final Length 19.19	1 2 3 4	18.56 17.31 2.62 1.19	0.44 0.44 0.44 0.44	0° 180° 180° 67°	40° 40° 34° 39°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-345-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 20.0 Final Length 17.12	1 2 3 4	16.31 10.62 7.69 4.81	0.44 0.44 0.44 0.44	0° 0° 180° 359°	48° 23° 77° 75°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-348-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 19.0 Final Length 16.69	1 2 3 4	15.38 11.13 9.19 6.94	0.44 0.44 0.44 0.44	0° 0° 0° 230°	75° 17° 82° 75°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-349-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 19.0 Final Length 16.81	1 2 3	15.38 8.06 6.19	0.44 0.44 0.44	0° 0° 230°	83° 75° 79°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-529-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 26.0 Final Length 23.50	1 2 3 4 5 6 7 8	22.19 21.50 19.25 18.06 16.38 15.25 1.75 1.00	0.44 0.44 0.44 0.44 0.44 0.44 0.44 0.44	0° 180° 88° 175° 0° 180° 53° 180°	34° 30° 26° 26° 28° 28° 26° 26°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-530-1 Press Test 150 PSI	4710-00-278-6394 5052-0 AL ALY 3/16 x 0.028 x 26.0 Final Length 24.0	1 2 3 4 5 6	23.44 22.56 21.06 19.94 18.00 16.88	0.44 0.44 0.44 0.44 0.44 0.44	0° 180° 211° 180° 0° 180°	25° 25° 28° 28° 29° 31°	A & B	III	AN 818-3D 4730-00-497-4458 MS 20819-3D 4730-00-277-5362
206-070-588-1 Press Test 150 PSI	4710-00-541-4932 5052-0 AL ALY 1/4 x 0.028 x 28.0 Final Length 25.12	1 2 3 4	24.0 18.38 8.38 2.38	0.56 0.56 0.56 0.56	0° 197° 49° 49°	123° 34° 90° 90°	A & B	III	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-073-030-1 Press Test 120 PSI	4710-00-541-4932 5052 AL ALY 1/4 x 0.028 x 8.0 Final Length 4.94	1	1.94	0.56	0°	36°	A & B	III	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641

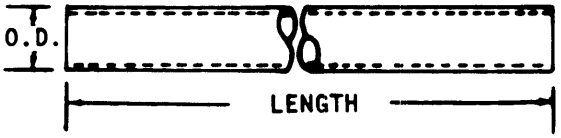
Figure D-160. (Sheet 7 of 9)

PART NO. PRESS TEST	TUBING MATERIAL	BEND NO.	BEND FROM END A	BEND RADIUS	DIAL SETTING ˚	BEND ANGLE ˚	END TYPE		
							NO.	TYPE	FITTING
206-073-031-1 Press Test 120 PSI	4710-00-541-4932 5052 AL ALY 1/4 x 0.020 x 11.0 Final Length 7.12	1 2	4.94 1.44	0.56 0.56	0˚ 217˚	90˚ 90˚	A & B	III	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-073-033-1 Press Test 120 PSI	4710-00-115-0371 CRES 1/4 x 0.020 x 18.0 Final Length 16.44	1	15.06	0.56	0˚	90˚	A & B	I	AN 818-4 4730-00-222-1912 MS 20819-4 4730-00-278-0678
206-073-035-1 Press Test 5 PSI	4710-00-115-0371 CRES 1/4 x 0.020 x 28.0 Final Length 25.06	1 2 3 4 5 6 7	24.31 22.69 19.25 17.25 11.75 9.06 6.75	0.56 0.56 0.56 0.56 0.56 0.56 0.56	0˚ 211˚ 197˚ 281˚ 127˚ 278˚ 99˚	51˚ 51˚ 65˚ 76˚ 73˚ 53˚ 60˚	A & B	I	AN 818-4 4730-00-222-1912 MS 20819-4 4730-00-278-0678
206-073-036-1 Press Test 5 PSI	4710-00-115-0371 CRES 1/4 x 0.020 x 5.0 Final Length 3.50	1	2.50	0.56	0˚	132˚	A & B	I	AN 818-4 4730-00-222-1912 MS 20819-4 4730-00-278-0678
206-073-037-1 Press Test 5 PSI	4710-00-115-0371 CRES 1/4 x 0.020 x 15.0 Final Length 11.38	1 2 3 4	10.31 6.75 3.88 2.56	0.56 0.56 0.56 0.56	0˚ 268.5˚ 8˚ 230˚	100˚ 63˚ 40˚ 41˚	A & B	I	AN 818-4 4730-00-222-1912 MS 20819-4 4730-00-278-0678
206-073-038-1 Press Test 5 PSI	4710-00-209-1757 CRES 18-8 3/16 x 0.020 x 8.0 Final Length 6.75	1	5.75	0.50	0˚	50˚	A & B	I	AN 818-3 4730-00-277-6451 MS 20819-3 4730-00-277-5361
206-073-039-1 Press Test 5 PSI	4710-00-209-1757 CRES 18-8 3/16 x 0.020 x 13.0 Final Length 10.19	1 2 3	9.25 7.81 1.56	0.50 0.50 0.50	0˚ 110˚ 143˚	58˚ 62˚ 95˚	A & B	I	AN 818-3 4730-00-277-6451 MS 20819-3 4730-00-277-5361
206-073-040-1 Press Test 5 PSI	4710-00-209-1757 CRES 18-8 3/16 x 0.020 x 14.0 Final Length 11.19	1 2 3	9.88 7.94 4.94	0.50 0.50 0.50	0˚ 90˚ 261˚	12˚ 85˚ 85˚	A & B	I	AN 818-3 4730-00-277-6451 MS 20819-3 4730-00-277-5361

Figure D-160. (Sheet 8 of 9)

PART NO. PRESS. TEST	TUBING MATERIAL	BEND NO.	BEND FROM END A	BEND RADIUS	DIAL SETTING °	BEND ANGLE °	END TYPE		
							NO.	TYPE	FITTING
206-073-042-1 Press Test 120 PSI	4710-00-541-4932 5052 AL ALY 1/4 x 0.028 x 9.0 Final Length 7.06	1 2	5.88 2.00	0.56 0.56	0° 151°	91° 75°	A & B	III	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-073-043-1	4710-00-541-4932 5052 AL ALY 1/4 x 0.028 x 9.0 Final Length 7.88	1 2 3	7.06 5.81 1.50	0.56 0.56 0.56	0° 90° 191°	17° 78° 75°	A & B	III	AN 818-4D 4730-00-287-0289 MS 20819-4D 4730-00-302-8641
206-073-044-1 Press Test 120 PSI	4710-00-115-0371 CRES 1/4 x 0.020 x 38.0 Final Length 36.13	1 2 3 4 5 6 7	35.19 34.25 32.50 28.12 24.62 11.06 2.88	0.56 0.56 0.56 0.56 0.56 0.56 0.56	0° 145° 95° 17° 19° 8° 237°	18° 26° 10° 24° 10° 18° 103°	A & B	I	AN 818-4 4730-00-222-1912 MS 20819-4 4730-00-278-0678
206-076-381-1 Press Test 1200 PSI	4710-00-274-3993 6061 AL ALY 3/8 x 0.028 x 9.0 Final Length 7.94	1 2	6.31 2.19	1.00 1.00	0° 276°	79° 56°	A & B	I	AN 818-6D 4730-00-142-2167 MS 20819-6 4730-00-278-0682
206-076-382-1 Press Test 1200 PSI	4710-00-274-3993 6061 AL ALY 3/8 x 0.028 x 23.0 Final Length 21.56	1 2 3 4 5 6	20.38 17.25 14.44 12.50 9.06 2.81	1.00 1.00 1.00 1.00 1.00 1.00	0° 110° 20° 200° 225° 225°	80° 59° 38° 38° 68° 79°	A & B	I	AN 818-6D 4730-00-142-2167 MS 20819-6 4730-00-278-0682
206-076-383-1 Press Test 1200 PSI	4710-00-274-3993 6061 AL ALY 3/8 x 0.028 x 16.0 Final Length 14.12	1 2 3	13.12 6.25 3.25	1.00 1.00 1.00	0° 5° 95°	150° 60° 79°	A & B	I	AN 818-6D 4730-00-142-2167 MS 20819-6 4730-00-278-0682
206-076-384-1 Press Test 1200 PSI	4710-00-274-3993 6061 AL ALY 3/8 x 0.028 x 14.0 Final Length 12.56	1 2	9.25 5.81	1.00 1.00	0° 180°	51° 47°	A & B	I	AN 818-6D 4730-00-142-2167 MS 20819-6 4730-00-278-0682
206-076-385-1 Press Test None	4710-00-278-3281 CRES 18-8 3/8 x 0.028 x 14.0 Final Length 12.19	1 2	11.25 4.63	1.00 1.00	0° 278°	60° 76°	A B	I IV	AN 818-6 4730-00-203-3831 MS 20819-6 4730-00-278-0682 None

Figure D-160 (sheet 9 of 9)



PART NUMBER: 1560-0H58-111-11
FABRICATE FROM: NSN 5970-00-263-1325 VINYL, CLEAR
LENGTH: 3"
PART NUMBER: 1560-0H58-111-13
FABRICATE FROM: NSN 5970-00-263-1325 VINYL, CLEAR
LENGTH: 16"

Figure D-161

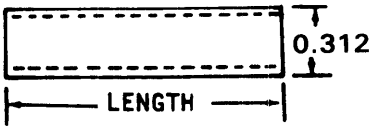
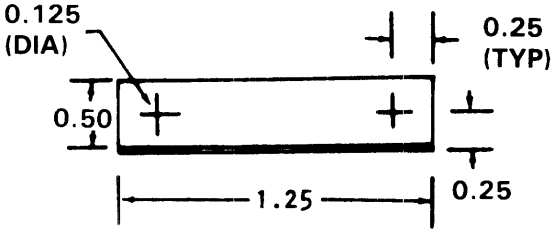


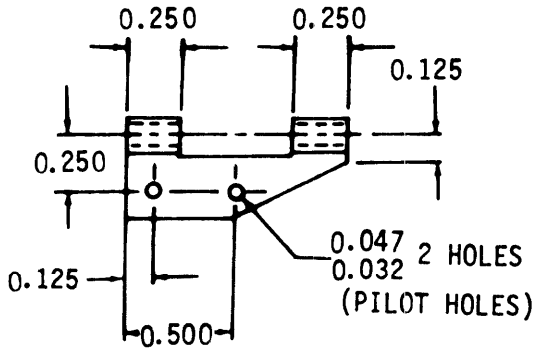
Figure D-162

PART NUMBER: 1560-0H58-111-5
FABRICATE FROM: 4710-00-278-8727 TUBE, METALLIC
LENGTH: 11.4"



PART NUMBER: 206-031-159-9 RETAINER
FABRICATE FROM: NSN 9535-00-085-4157

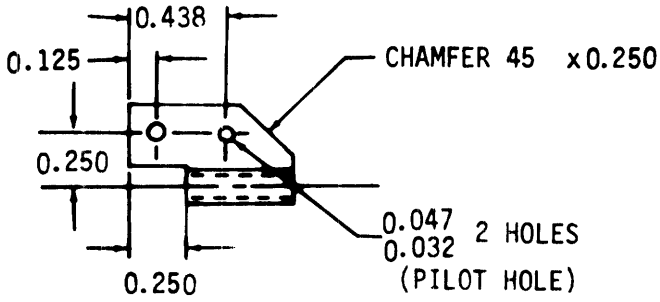
Figure D-163



DETAIL - 5 AS SHOWN
DETAIL - 6 AS SHOWN
SCALE 2/1

Part Number: 206-070-332-5 Hinge Half
Fabricate From: NSN 5340-01-047-0600
Part Number: 206-070-332-6 Hinge Half
Fabricate From: NSN 5340-01-047-0600

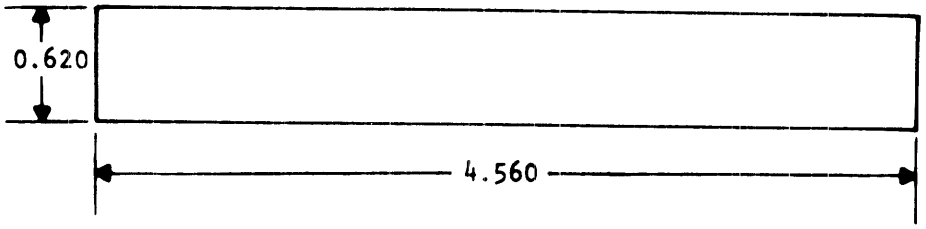
Figure D-164



DETAIL - 7 AS SHOWN
DETAIL - 8 OPPOSITE
SCALE 2/1

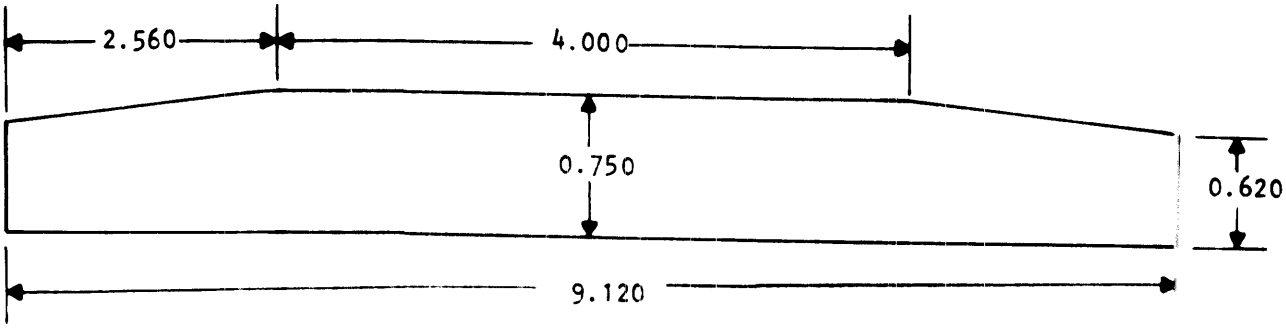
Part Number: 206-070-332-7 Hinge Half
Fabricate From: NSN 5340-01-047-0600
Part Number: 206-070-332-8 Hinge Half
Fabricate From: NSN 5340-01-047-0600

Figure D-165



PART NUMBER 8535281 GASKET
FABRICATE FROM: 9320-00-964-2559

Figure D-166



PART NUMBER: 8535279 GASKET
FABRICATE FROM: 9320-00-964-2559

Figure D-167

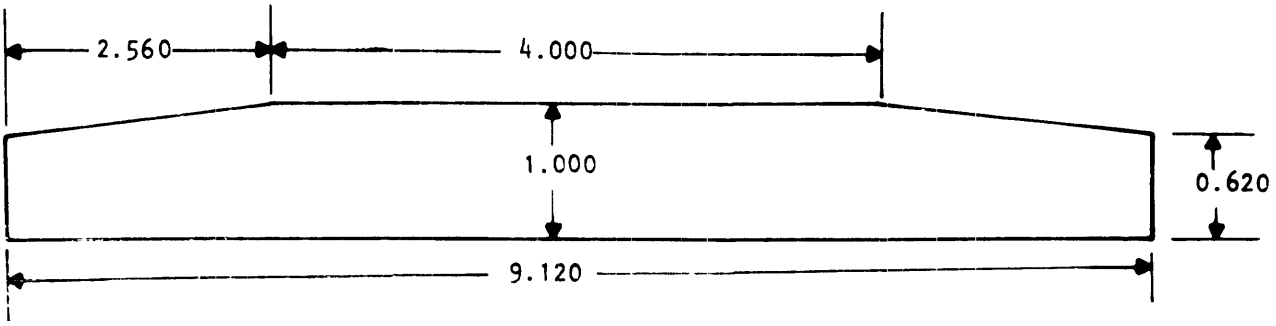
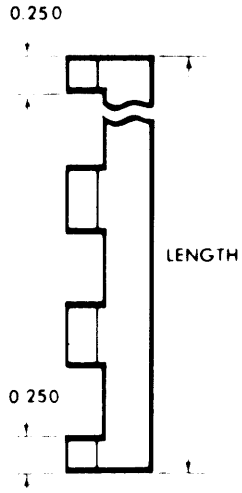


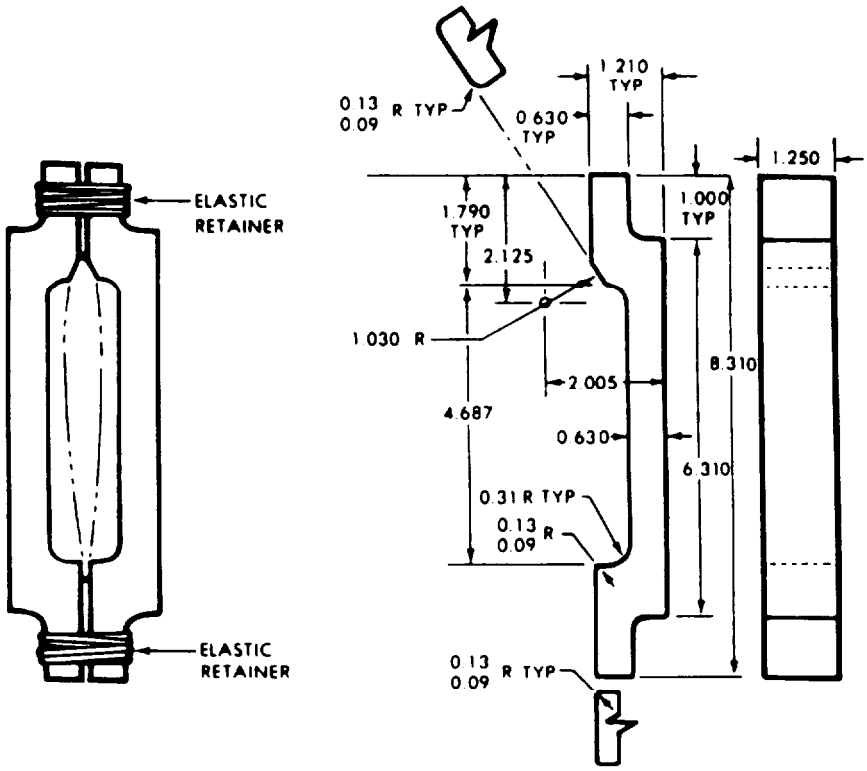
Figure D-168



PART NUMBER 206-532-401-127, 129, 131, 133, 135, 139
FABRICATE FROM 5340-00-889-4454

PART NUMBER 206-532-401-141
FABRICATE FROM 5340-00-664-8118

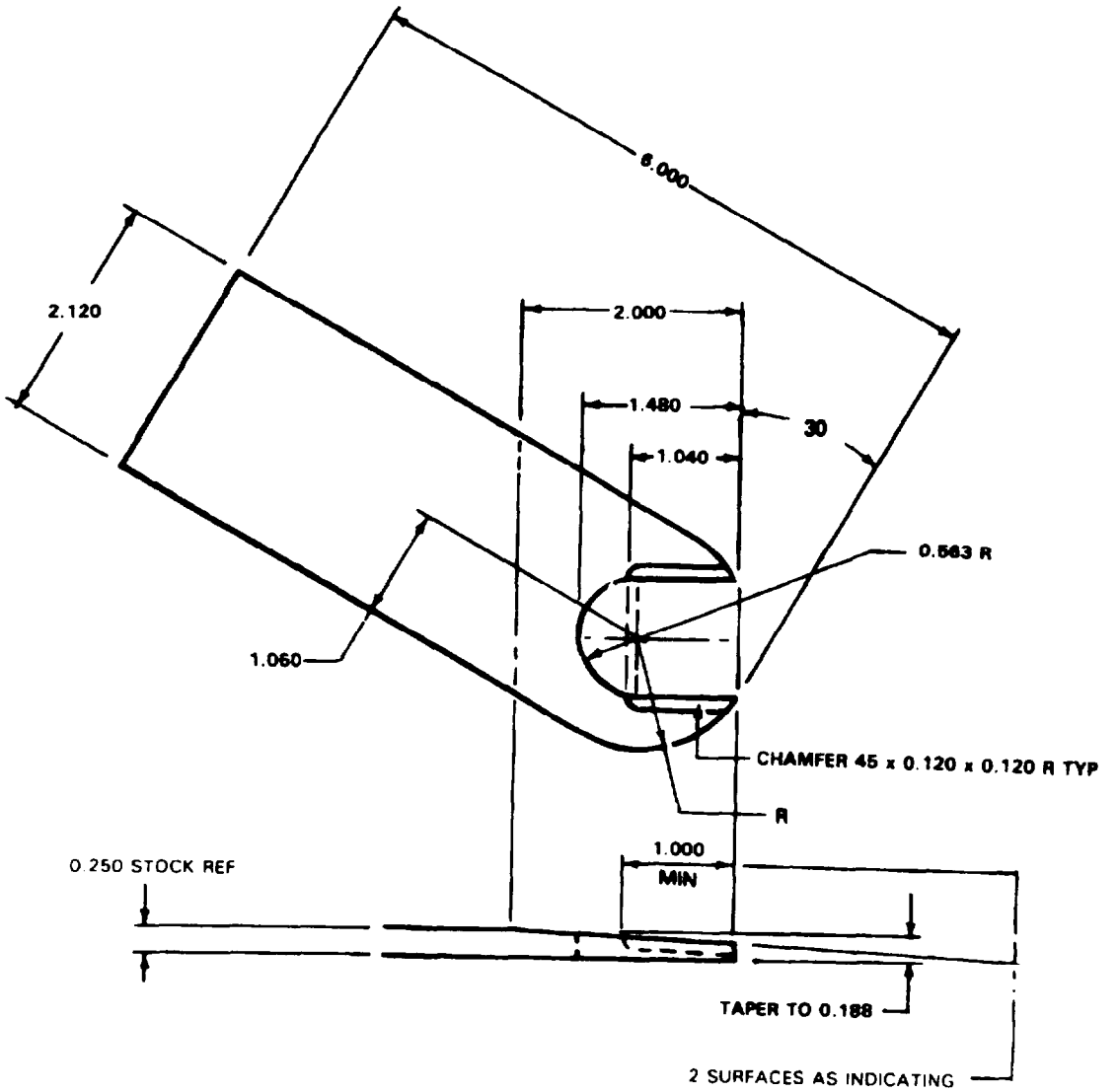
Figure D-169



Part Number T101740
FABRICATE FROM ALUMINUM PHENOLIC BLOCK OR WOOD (FIR. SPRUCE OR MAPLE) ENSURE EXPOSED AREAS ARE THOROUGHLY SEALED WITH POLYURETHANE CLEAR VARNISH OR SPAR VARNISH

T1101740 Work Aid - Toil Rotor Rigging

Figure D-170

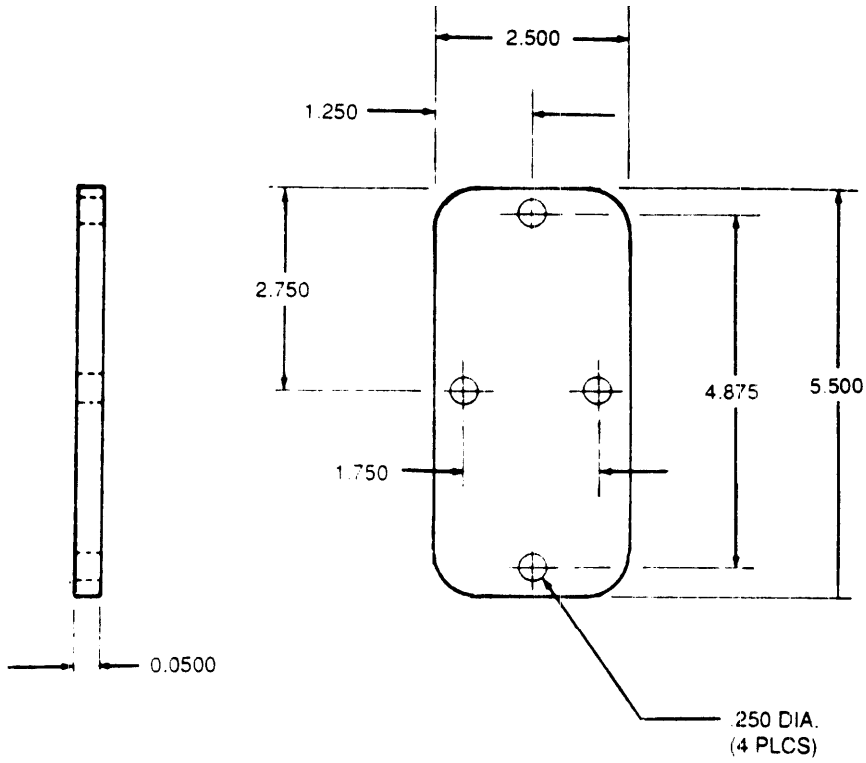


PART NUMBER:	QQA250=13
PART NUMBER:	T101741 FLAPPING AXIS TOOL
FABRICATE FROM:	NSN 9535-01-118-2583

NOTE: All dimensions are In inches.

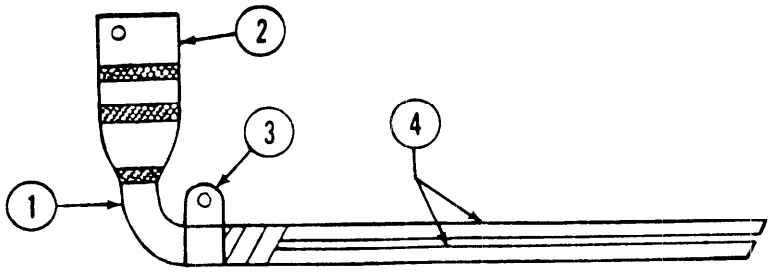
CENTERING TOOL - FLAPPING AXIS

Figure D-171



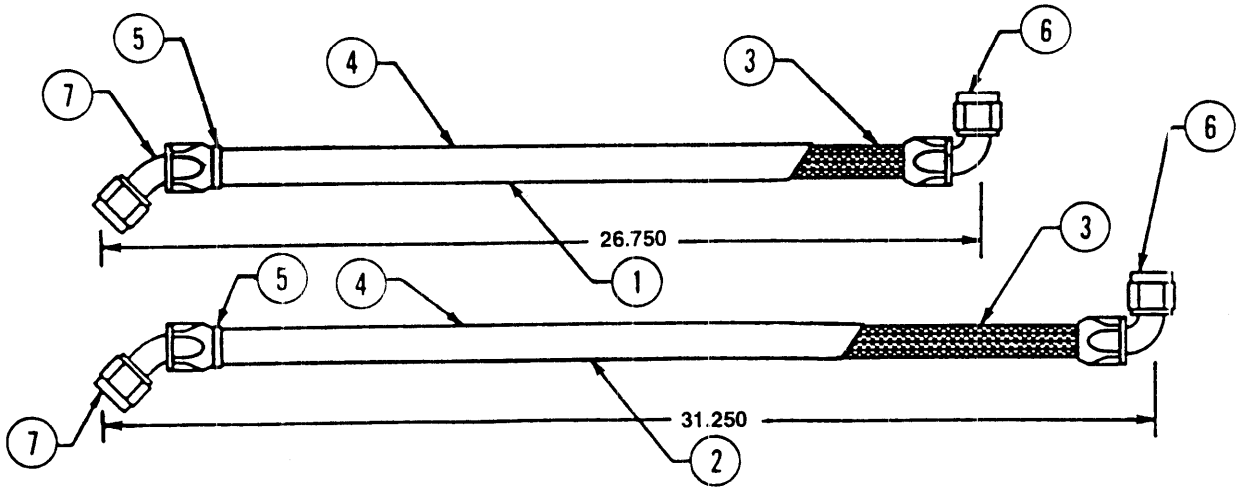
PART NUMBER: 92-042-2 ACCESS COVER
FABRICATE FROM: NSN 9515-00-162-6303

Figure D-172



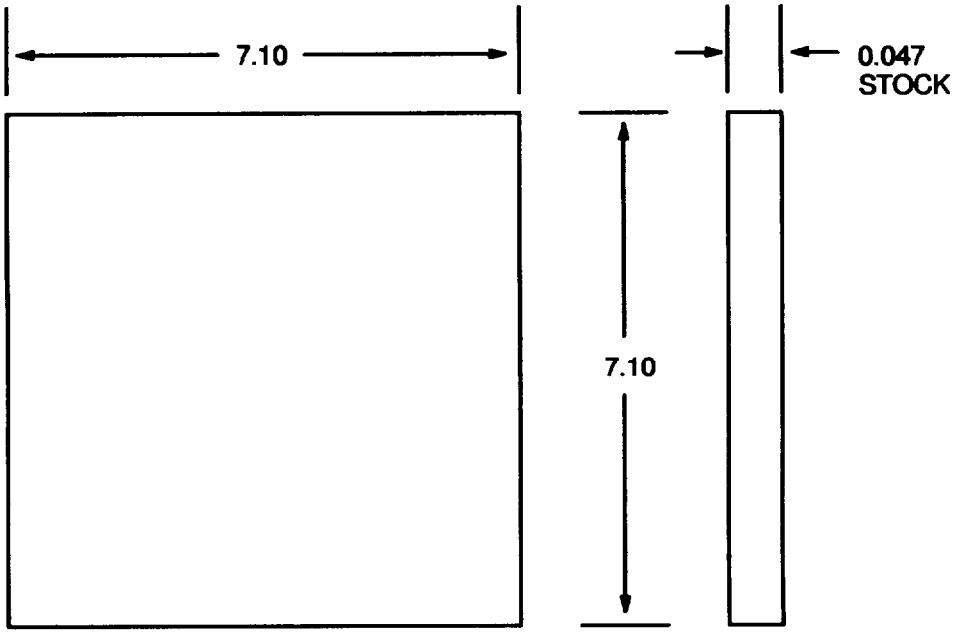
ITEM	DESCRIPTION	PART NO	NSN
1	WIRE HARNESS	92-042-3	
2	CONNECTOR	MS3116E8-2S	5935-01-009-3993
3	CABLE CLAMP	GTR115G08N	5935-01-193-4896
4	WIRE	M22759/5-20-9	6145-00-917-6378

Figure D-173. Wire Harness



ITEM	DESCRIPTION	PART NO	NSN
1	HOSE ASSEMBLY	92-042-4	
2	HOSE ASSEMBLY	92-042-5	
3	HOSE	156-10	4720-00-541-8328
4	FIRE SLEEVE	AE272-6	5640-01-H77-9965
5	CLAMP	900591B2C	4730-00-996-8258
6	90 DEGREE FITTING	680-10D	4730-00-919-6785
7	45 DEGREE FITTING	678-10D	4730-00-813-6923

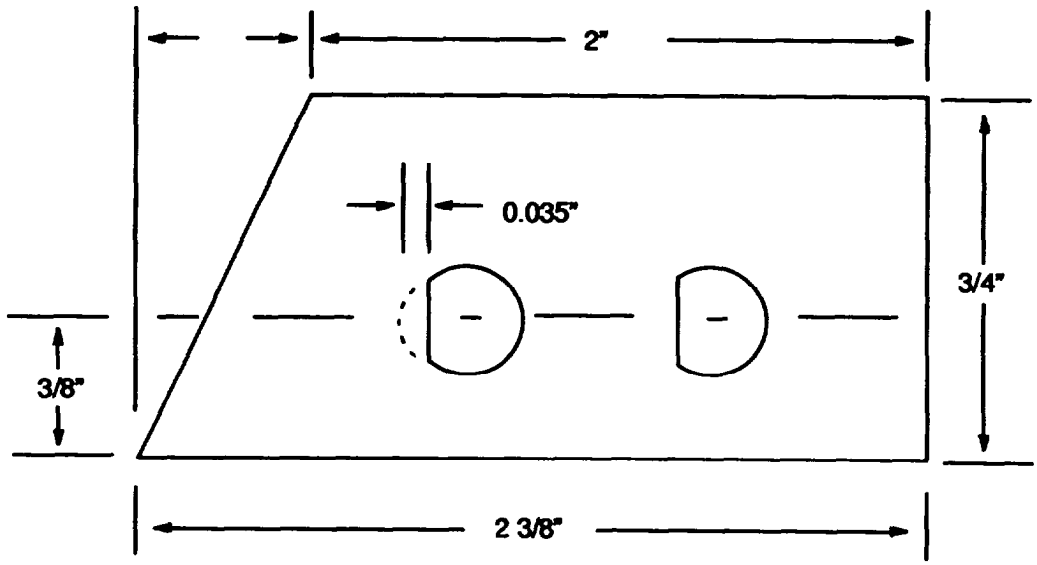
Figure D-174. Hose Assembly



PART NUMBER:	206-061-230-17 GASKET 206-061-230-107
FABRICATE FROM:	NSN 5330-01-197-7871

NOTES:
1. DIMENSIONS IN INCHES.
2. CUT TO REQUIRED WIDTH AND LENGTH.
3. MAKE FROM 151-008E FIREPROOF SHEET. JOHNS-MANWLLE, 92798-STYLE G-89 (STOCK).
4. STAMP PART NUMBER ON GASKET.

Figure D-175

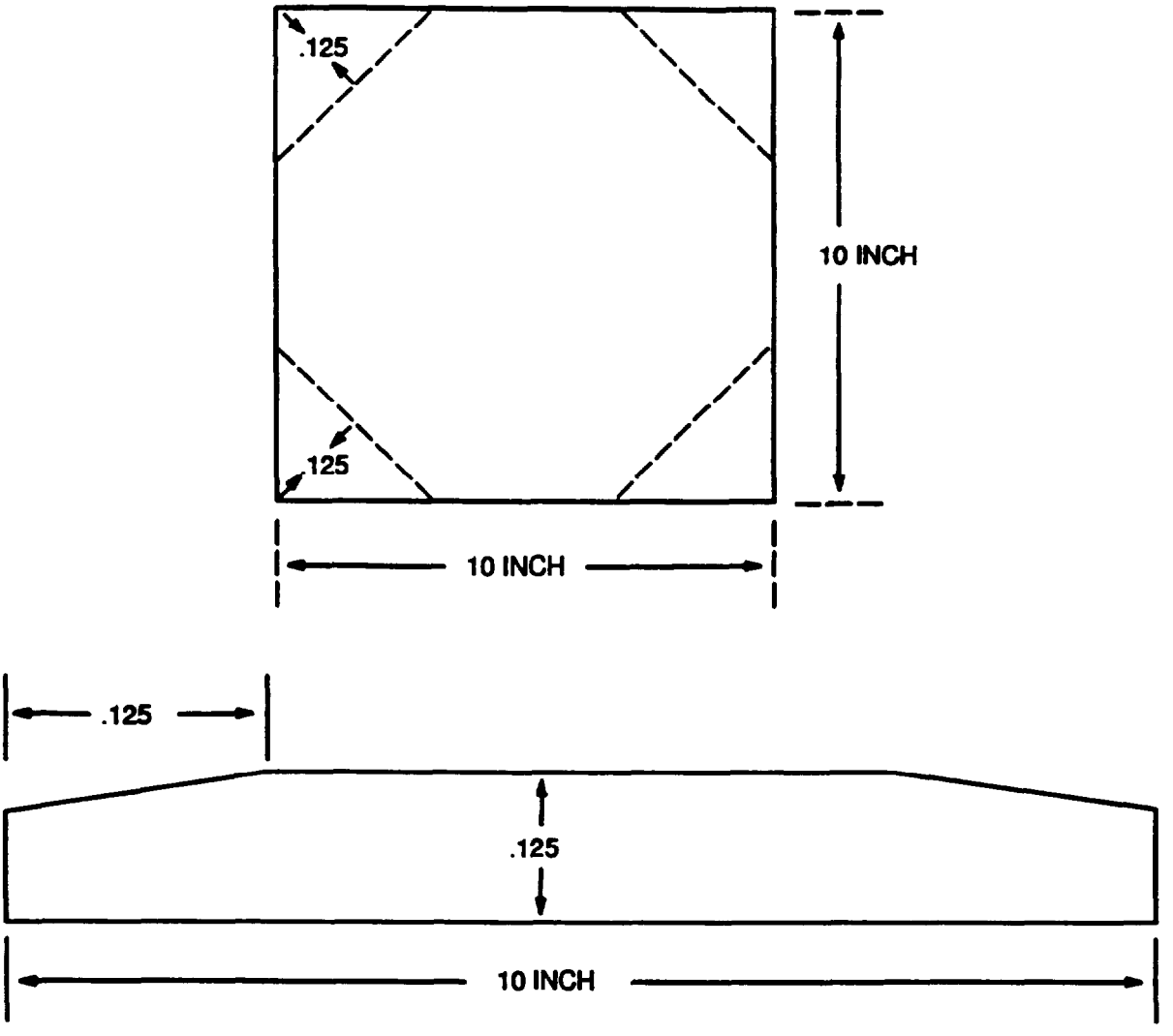


PART NUMBER: AED-A1498
FABRICATE FROM: .032 IN. AL AMY

NOTE

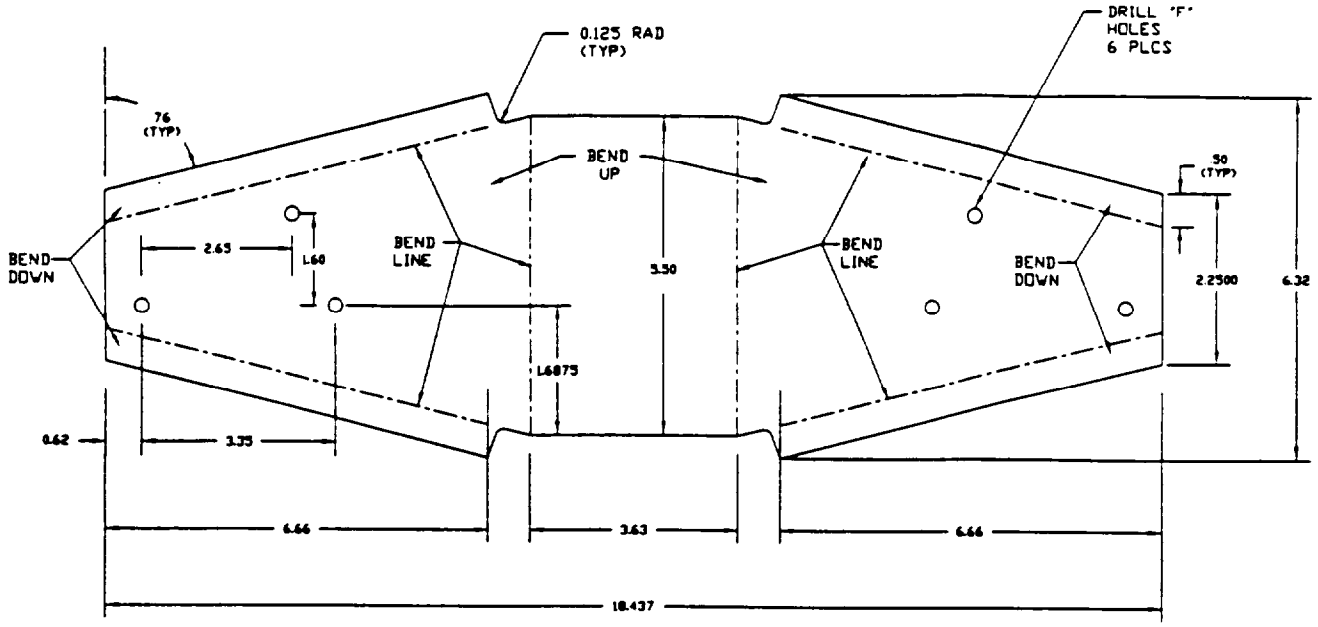
When installing antenna, at stabilizer, install backup plate for antenna receptacles.

Figure D-176



PART NUMBER: MIL-R-6855 RUBBER PAD
FABRICATE FROM: NSN 9320-00-241-9759

Figure D-177



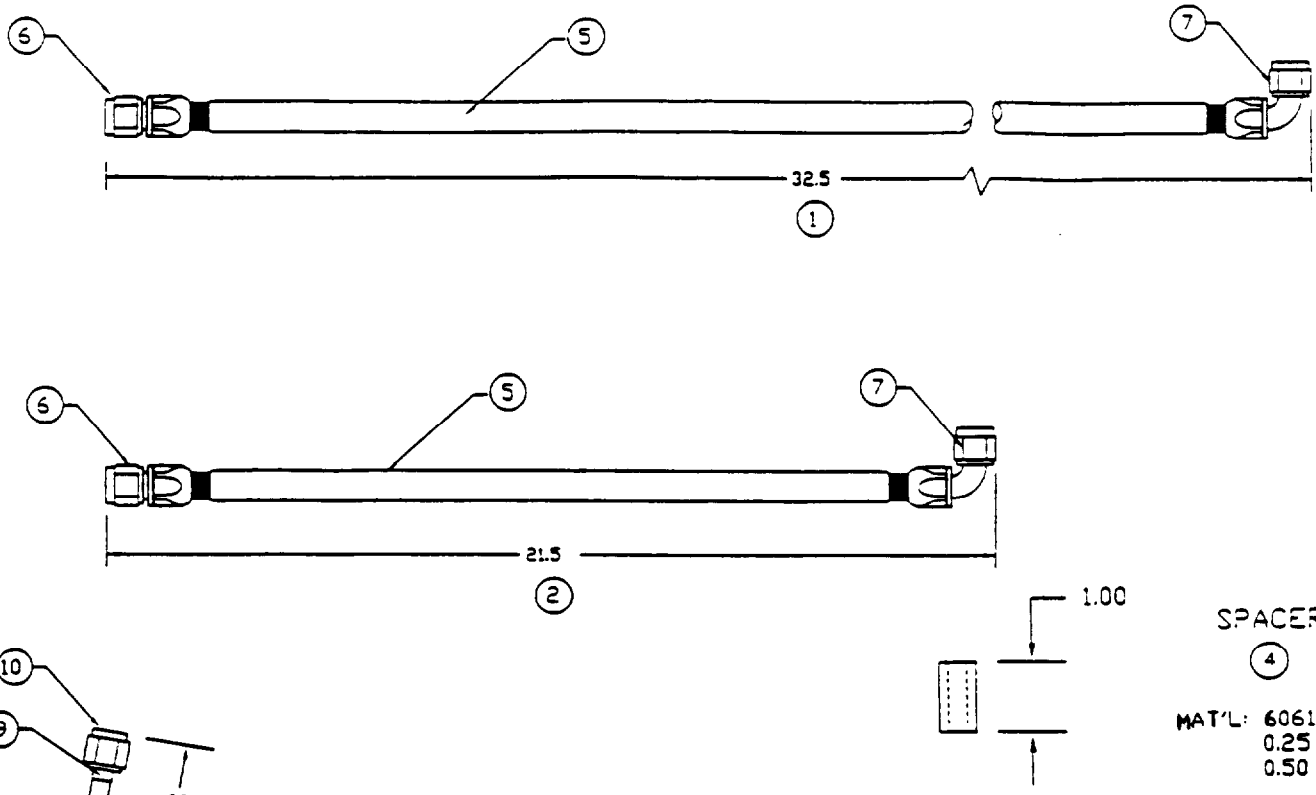
FLAT PATTERN LAYOUT

NOTES.

1. MATL: 6061-T6, 0.09 THK
   SPEC: QQ-A-250/11
2. REMOVE ALL BURRS AND
   SHARP EDGES.
3. ALODINE UPON COMPLETION
4. PRIME WITH EPOXY POLYAMIDE
   PER MIL-P-23377F, TYPE I,
   CLI, NSN: 8010-00-142-9279.

PART NUMBER: 95-246-01 SUPPORT BRACKET
FABRICATE FROM: NSN 95-00-818-0871

Figure D-178

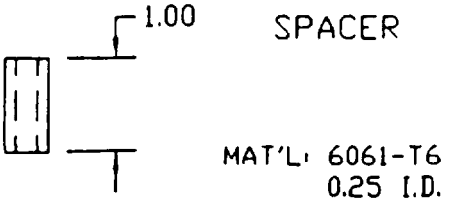


FABRICATE FROM: (LOCAL PURCHASE)

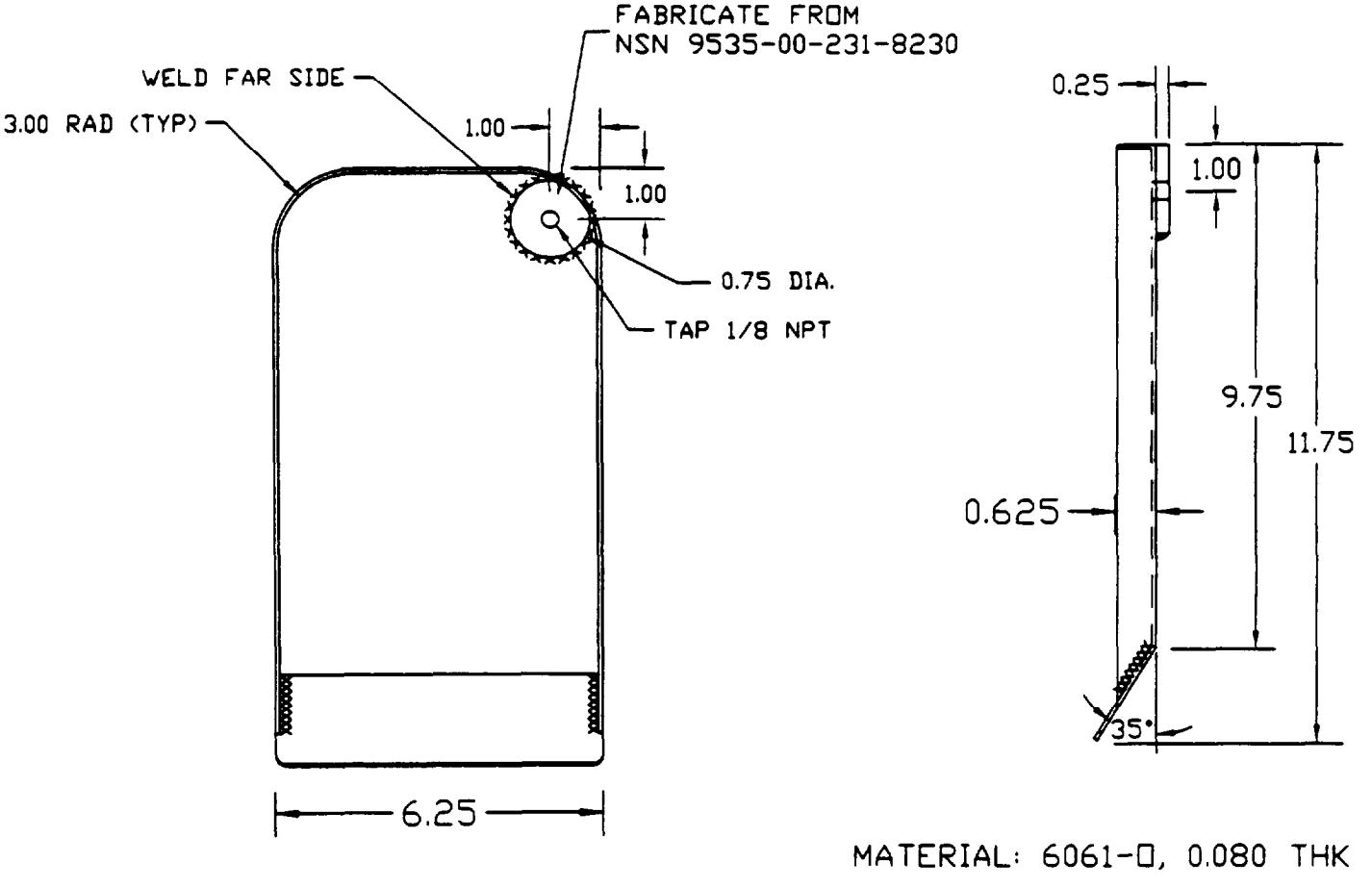
1. ALL MEASURMENTS ARE IN INCHES.
2. PRESSURE TEST FABRICATED LINES WITH AIR TO 150 PSIG IN ACCORDANCE WITH TM-1520-204-23-2.
3. FLUSH/PURGE FABRICATED LINES IN ACCORDANCE WITH TM-1520-204-23-2.
4. INSTALL APPROPRIATE DUST PLUGS TO LINES AFTER PURGING LINES.
5. APPLY COLOR CODE LABEL TO LINES INDICATING LINE iS FOR 'LUBRICATION'.

ITEM	DESCRIPTION	PART NO	NSN
1	HOSE ASSEMBLY	95-246-02	
2	HOSE ASSEMBLY	95-246-03	
3	LINE ASSEMBLY	95-246-04	
4	SPACER	95-246-05	
5	HOSE, FLEX	156-10	4720-00-541-8328
6	ADAPTER, STRAIGHT	AN816-10D	4730-00-1 96-9586
7	ADAPTER, 90° FITTING	680-10D	4730-00-919-6785
8	TUBING, 0.625x0.035	WW-T-700/4	4710-00-278-8742
9	SLEEVE, FLARED TUBE	MS20819-10J	4730-00-541-9088
10	NUT, TUBE, COUPLING	AN818-10D	4730-00-287-0290

Figure D-179

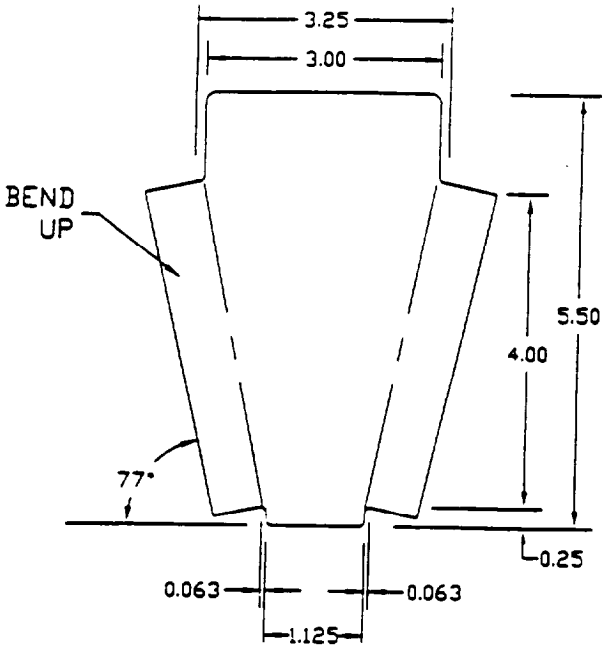


PART NUMBER: 93-075-8 SPACER
FABRICATE FROM: (LOCAL PURCHASE)



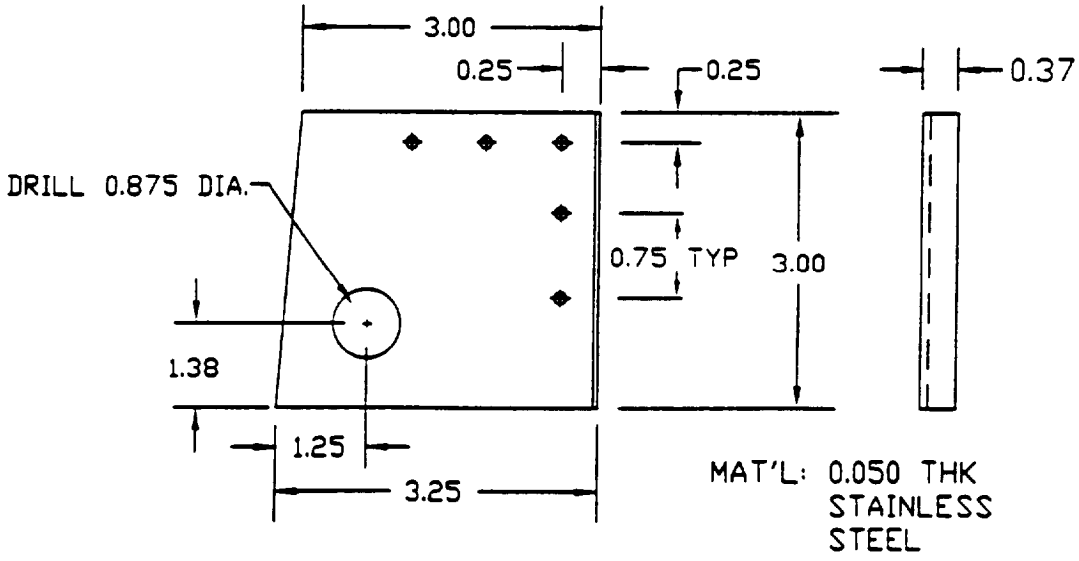
PART **NUMBER: 93-075-1 MOUNTING TRAY ASSEMBLY**
FABRICATE FROM: NSN 9535-00-232-0320

Figure 180



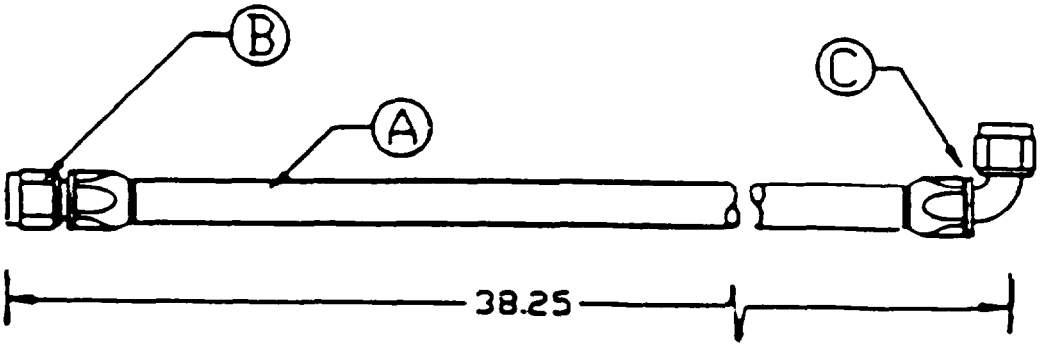
MATERIAL: 2024-T3, 0.050 THK

PART NUMBER: 93-075-2 SUPPORT BRACKET
FABRICATE FROM: NSN 9535-00-032-0569



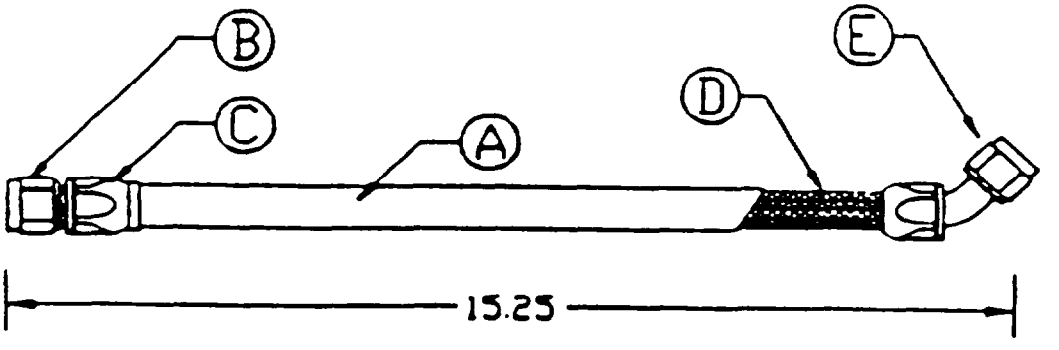
PART NUMBER: 93-075-3 FIREWALL DOUBLER
FABRICATE FROM: NSN 9515-00-204-4588

Figure D-181



93-0754 HOSE ASSEMBLY

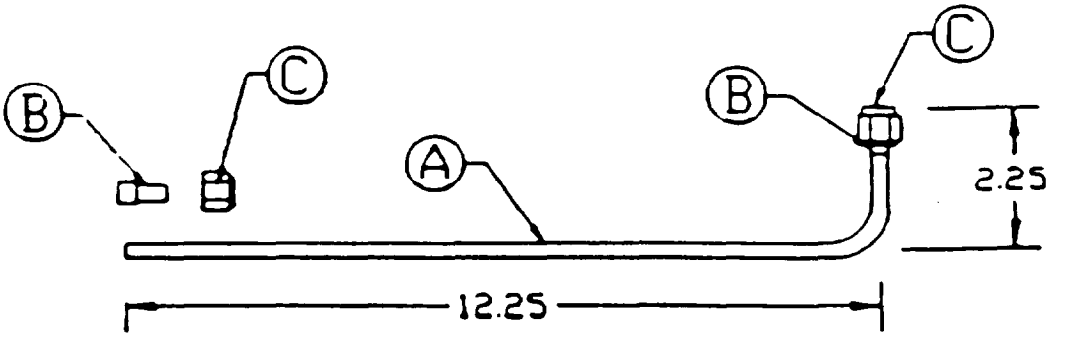
ITEM	NSN	PART NUMBER	DESCRIPTION	QTY
A	4720-01-301-2882	AE501-10	HOSE (35.50 INCHES)	1
B	4730-00-541-9105	816-10D	ADAPTER, STRAIGHT	2
C	4730-00-919-6785	680-10D	90° FITTING	1



93-075-5 HOSE ASSEMBLY

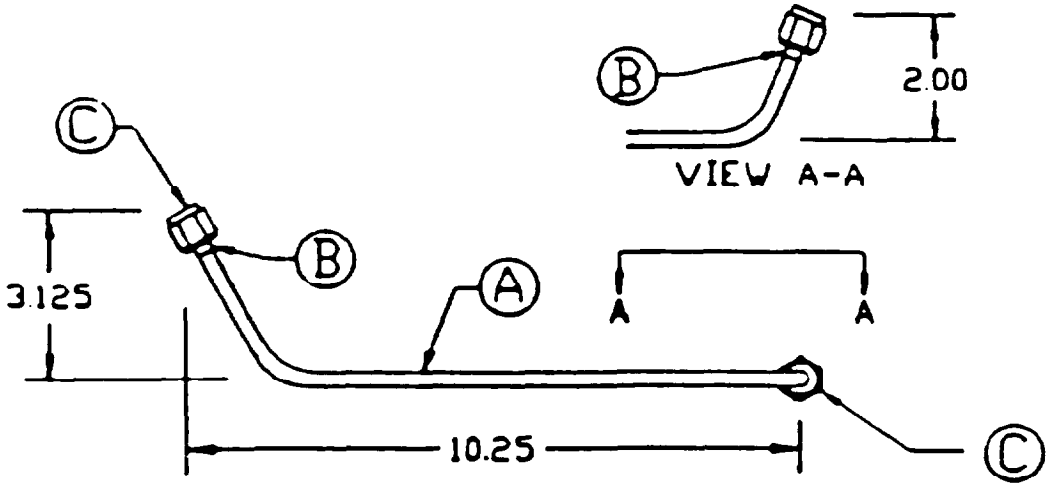
ITEM	NSN	PART NUMBER	DESCRIPTION	QTY
A	5640-00-568-4640	131716	FIRE SLEEVE (13.75 inches)	1
B	4730-00-541-9105	816-10D	ADAPTER, STRAIGHT	1
C	4730-00-996-8258	900591B2C	CLAMP	2
D	4720-00-541-8328	156-10	HOSE (12.75 inches)	1
E	4730-00-813-6923	678-10D	45° FITTING	1

Figure D-182



93-075-6 DRAIN LINE

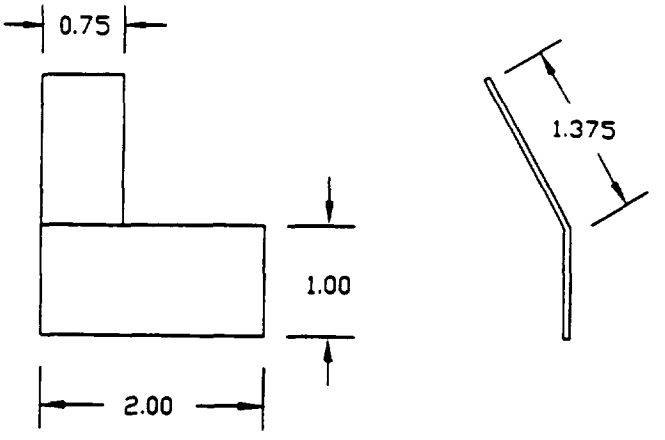
ITEM	NSN	PART NUMBER	DESCRIPTION	QTY
A	4710-00-595-2416	W-W-T-700/4	TUBING (13.625 INCHES)	1
B	4730-00-580-7471	MS20819-4J	SLEEVE	2
C	4730-00-203-2658	AN818-4J	NUT	2



93-075-7 DRAIN LINE

ITEM	NSN	PART NUMBER	DESCRIPTION	QTY
A	4710-00-595-2416	W-W-T-700/4	TUBING (12.625 INCHES)	1
B	4730-00-580-7471	MS20819-4J	SLEEVE	2
C	4730-00-203-2658	AN818-4J	NUT	2

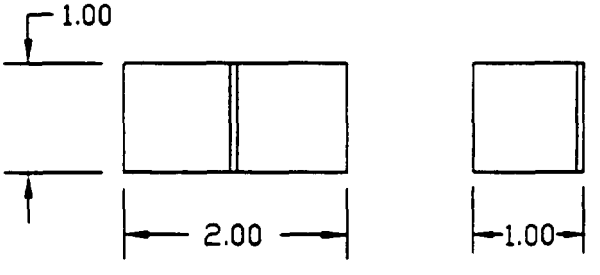
Figure D-183



MATERIAL: 2024-T3, 0.063 THK

RIGHT HAND SIMILAR
BUT OPPOSITE

PART NUMBER: 93-075-9 SUPPORT BRACKET
FABRICATE FROM: NSN 9535-00-232-0278



MAT'L: 1x2x0.064
'TEE ANGLE'
2024-T6

PART NUMBER: 93-075-10 TEE ANGLE
FABRICATE FROM: NSN (LOCAL PURCHASE)

Figure D-184

APPENDIX E

STORAGE OF HELICOPTER

SECTION I. GENERAL INFORMATION

E-1. COMPONENTS INVOLVED IN AN ACCIDENT.

Any component removed for reason of accident shall not be preserved but shall be shipped in the same condition as it was in after the accident.

E-2. REQUIREMENTS.

The existing environmental conditions and available facilities must be taken into account when a helicopter is to be placed in storage. A change of storage procedures is permissible for short periods of storage. For example, a change must be made between flyable storage and shod term storage for any period of time up to 45 days. The decision will be based on such on-site conditions as availability of men, materials, and equipment necessary to perform ground runups, motoring of engines, defueling and purging of fuel tanks, and other elements of the various procedures. Wet weather conditions create corrosion, rot, mildew, and mold. To prevent these deteriorating effects, inspect regularly and take proper preventive maintenance action. The following practices should be used as a guide during exceptionally wet weather conditions:

a. Prevent rot, mildew, and mold from forming on nonmetallic materials by keeping them clean and as dry as possible. Keep fabric material in the helicopter clean. Refer to Chapter 1.

b. Treat for visible corrosion in accordance with TM 43-0105.

c. Open all drain holes to facilitate draining when water accumulates.

d. Keep fuel tank full to prevent consideration in the tank.

e. Store helicopters in a hangar or shed if space permits.

E-3. MODES OF STORAGE.

NOTE

Inactive helicopters will be immediately placed into storage

The length of time the helicopter will be inactive and the facilities and manpower available will determine which of the following categories of storage will be used.

a. Storage of aircraft undergoing maintenance. Refer to paragraph E-5.1

b. Flyable Storage (No time limit). Flyable storage is the procedure prescribed to maintain a stored helicopter in an operable condition. Next to daily use this keeps the helicopter in the best possible condition It does, however, require attention periodically; a daily inspection every 7 days and a ground run every 14 days.

c. Short Term Storage (From 1 to 45 days). This type of storage is used to store a helicopter up to 45 days with very little attention during the storage period.

d. Intermediate Storage (From 46 to 180 days). A helicopter that will be inactive for more than 45 days, but not exceeding 180 days, shall be prepared and maintained in intermediate storage.

E-4. PROCEDURES COMMON TO ALL MODES OF STORAGE.

The following procedures are to be used whenever a helicopter is placed in flyable, short term, or intermediate storage:

a. Preservation Preservation should be accomplished in an uninterrupted series of operations. When periods of interruption are necessary, temporary protection shall be provided for partially processed items as required to avoid contamination.

NOTE

For component assemblies removed from the helicopter, preservation and packaging instructions may usually be found in FM 38-700 Packaging PF Materiel for Preservation and FM 38-701 Packing of Materiel for Packing.

b. Ventilation. The prevention of corrosion depends to a large extent on the control of moisture. One very satisfactory method of doing so is by means of ventilation. On days when the relative humidity is **55** percent or below, the doors and other openings can be opened to allow a circulation of the dry air through the helicopter. Fans or blowers, when available, are very helpful.

c. Drainage. Ensure that water drain holes are free from obstruction and are kept open for the duration of the storage period.

d. Towing. Tow the helicopter in accordance with standard procedures. Refer to paragraph 1-36.

e. Parking. Park the helicopter in accordance with paragraph 1-38.

f. Mooring. Moor the helicopter in accordance with standard mooring procedures. Refer to paragraph 1-39.

g. Lubrication. Lubricate the helicopter prior to placing it in storage in accordance with figure 1-5 and paragraph 1–32.

h. Deleted.

E-5. INSPECTION OF STORED HELICOPTERS.

The local maintenance officer is responsible for establishing the inspection program and frequency of inspection. The program includes the following for all types of storage.

a. When the helicopter protective covers are not available, the areas concerned will be protected with barrier material (C26) and the wrap secured with adhesive tape (136). This barrier material should be installed in such a manner as to prevent the accumulation of water on the surface of the cover. Provide drains if necessary. Replace helicopter protective covers or barrier material closures which are damaged or deteriorated.

b. Determine peak interior helicopter temperatures during hot weather conditions. Obtain temperature information from standard thermometers temporarily installed in the helicopter. Record interior temperatures at intervals during the hottest part of the day. Ventilate the helicopter if interior temperatures exceed **135˚F (57˚C)**. Provide forced ventilation if normal ventilation procedures are not adequate to prevent condensation and possible mildew and corrosion.

c. Inspect and treat the helicopter against corrosion. Inspection for corrosion includes close observation of areas where moisture does not evaporate rapidly. Evidence of corrosion will not be as prevalent on painted surfaces as it is on unpainted surfaces. Corrosion can attack metal through paint and will be evidenced by blisters or scaly appearance.

d. Inspect static ground wires, rotor blade tiedown straps and mooring devices (ropes, cables, rods or eyes) at regular intervals. Inspect tiedown devices immediately after the helicopter has been subjected to winds exceeding **40** mph. Replace ground wires mooring devices, or tiedown straps which are deformed or deteriorated.

e. Inspect communication equipment for fungus or corrosion. Remove, clean, repair, package, and identify communication equipment which is deteriorating. Stow the packaged equipment in the helicopter from which it was removed. Do not remove or package antennas.

f. If possible the helicopter will be stored in a hangar or under a shed roof, otherwise, it will be parked and moored in accordance with paragraph 1-39.

g. Enter the type of storage and the date helicopter was placed in storage in the helicopter log book.

E-5.1. STORAGE OF AIRCRAFT UNDERGOING MAINTENANCE.

Helicopters in this category require individual determination as to the degree of protection and inspection necessary while undergoing maintenance. Varying environmental conditions may justify an increase or decrease in the degree of protection needed. Some factors which should be considered are: humidity, temperature, actual location of aircraft (hangered or outside). Depending on the nature of the maintenance being performed certain inspections may not be necessary.

a. Preservation In general, when appropriate, the preservation requirements of aircraft in flyable storage are applicable to this storage category. Aircraft that are hangered are relieved from the ground run-up, installation of protective covers, and the requirement for full fuel tanks. If deemed appropriate, additional preservation measures contained in Section II and Section Ill may be taken.

b. Maintenance of Preservation of Aircraft Undergoing Maintenance.

(1) Daily inspection shall be scheduled at the discretion of the maintenance officer.

(2) Helicopter shall be inspected in accordance with local directives and requirements of preceding paragraph E-5 when applicable.

c. Depreservation after storage during maintenance. General maintenance procedures shall be followed for release of aircraft after all maintenance action has been completed.

SECTION II. FLYABLE STORAGE

E-6. DESCRIPTION.

Flyable storage for a helicopter denotes helicopter may be activatedat any time without performance of time consuming depreservation procedures. A helicopter in flyable storage (no time limit) will be maintained in a serviceable condition. Ensure that helicopter log book contains date and type of storage. The general requirements in Section I form a part of the following procedures.

E-7. POWER TRAIN.

a. Check power train system lubrication including sight glasses.

b. Service. as required, in accordance with Chapter 1, Section II.

c. Preserve engine as follows:

NOTE

Exercise every precaution to keep the engine and accessories clean. Keep the air intake duct, plenum chamber, and compressor inlet screens clean and free of any foreign materials. When external cleaning is necessary, use drycleaning solvent (C62).

(1) Start engine. Refer to TM 55-1520-228-10.

CAUTION

Do not exceed maximum temperatures and pressures in engine runup.

(2) If engine has not been started in 24 hours, start it and run at ground idle rpm until it is operating satisfactorily. If available, use external auxiliary power unit (APU) to start engine. Accelerate engine to 100 percent N2, collective full down, and operate until oil temperature reaches 88°C (191°F) or for no more than 5 minutes.

NOTE

Ground runup when preparing the engine will complete the necessary preservation of the transmission and tail rotor gearbox.

(3) Shut down engine. Refer to TM 55-1520-228-10.

(4) Install engine inlet and exhaust protective covers. If engine covers are not available, seal the air inlet and exhaust openings with barrier material (C26) and secure material with tape (Cl 36).

(5) Record the date engines were placed in flyable storage in the helicopter log book and other appropriate entries as applicable.

E-8. HYDRAULIC SYSTEM.

a. Leak check hydraulic system and repair if required.

b. If repaired, bleed and service the system.

E-9. FUEL SYSTEM.

Service fuel tank to normal capacity after each engine preservation run. Drain water from the fuel tank before adding fuel.

NOTE

If the fuel tank is filled to normal capacity it reduces fuel contamination by condensation. The maintenance officer will determine the interval of periodic water drainage.

E-10. AIRFRAME.

a. Install pitot tube cover, or if the cover is not available, wrap pitot tube with barrier material (C26) and secure wrap with tape (Cl 36).

b. Remove any objects from vicinity of helicopter that are likely to strike helicopter during high wind conditions.

c. Close all doors and windows.

d. Ensure that battery disconnected.

E-11. MAIN ROTOR BLADES.

a. The OH-58 Main Rotor Blade Spar is not sealed. The inboard end of the blade was sealed at time of manufacture to prevent moisture entry. The outboard end of the blade is not sealed and it is possible for water to enter the spar during high moisture conditions.

b. The Main Rotor Blade tiedown will naturally pull the blade in a lower slanting position. During high mositure conditions (rain, high humidity, snow, etc.) moisture could become trapped inside the blade spar. The tiedown could also act to trap water inside and add to the potential for water to enter the blade.

c. If the aircraft was parked outside during high moisture conditions, prior to startup, check to see the blade drain hole is clear, and the low blade is drained of moisture. The main rotor blades should be rotated by hand to permit the "high" blade to drain any moisture potentially trapped inside the spar.

CAUTION

If the aircraft is parked outside during high moisture conditions (snow, rain, high humidity, etc.) and the aircraft is not runup it is possible for moisture to be trapped in the blade spar. If subsequent freezing conditions exist, this moisture trapped inside the blade spar could freeze and damage could occur on aircraft startup.

d. If the aircraft is runup daily, and no freezing conditions exist, minor amounts of moisture trapped in the blade spar will be removed by the normal centrifugal forces upon aircraft runup; the moisture will be forced out the blade drain hole.

E-12. MAINTENANCE OF PRESERVATION DURING FLYABLE STORAGE.

a. Helicopters in flyable storage will be inspected in accordance with local directives and those requirements outlined in paragraphs E-4 and E-5.

b. Perform a preventive maintenance daily inspection at least once every 7 days.

c. Operate the engine at least once every 14 days in accordance with paragraph E-7.

d. Install engine and exhaust covers in accordance with paragraph E-7, c.(4).

SECTION III. SHORT TERM STORAGE

E-1 3. DESCRIPTION.

Short term storage for a helicopter denotes any period of time between 1 and 45 days. The general requirements outlined in Section I of this chapter apply and form a part of short term storage procedures.

E-14. INSPECTION PRIOR TO STORAGE.

The following inspection is required.

a. Ensure that all removed components are preserved and stowed within the helicopter in suitable containers.

b. Ensure that a record of all removed or disconnected parts are entered in the helicopter log book.

c. Check fuel, oil, and hydraulic lines and hoses for leakage.

d. Lubricate the helicopter for the 150-hour interval. Refer to figure 1-5 and paragraph 1-33.

e. Ensure that bolts, washers, nuts, etc., which are removed during disassembly, are coated with a light coat of corrosion preventive compound (C51) and reinstalled as removed from the major component, unless otherwise specified.

f. Record the date and type of storage in the helicopter log book.

E-15. POWER TRAIN SYSTEM.

a. Clean the exposed metal surfaces of the power train system with a clean cloth dampened with drycleaning solvent (C62).

b. Check the power train lubrication system including the sight glasses and service in accordance with paragraph 1-10 and figure 1-5.

c. Coat the exposed metal surfaces with corrosion preventive compound (C51).

NOTE

The preservation runup prescribed in paragraph E-7 completes the preservation of the transmission and tail rotor gearbox.

d. If the engine cannot be motored, preserve power train as follows:

(1) Remove the main hub blade assembly and mast assembly.

(2) Spray inside of transmission, through top opening, with approximately one gallon of lubricating oil (C103). While spraying, manually rotate internal gears and bearings with the input drive quill.

(3) Apply fingerprint remover (C72) to all exposed metal surfaces of the mast assembly, and remove fingerprint residue with drycleaning solvent (C62). Wipe mast dry with a clean lint-free cloth. Apply corrosion preventive compound (C51) to all exposed metal surfaces.

(4) Reinstall main rotor hub blade and mast assembly.

(5) fill tail rotor gearbox to the proper operating level with operating oi. Refer to paragraph 1-11.

(6) Cover breather holes in the transmission and tail rotor gearbox with barrier material (C26) and secure with tape (C136).

E-16. ENGINE.

NOTE

If the engine cannot be motored, no effort will be made to preserve the engine fuel system, however comply with the provisions of subparagraphs a., b., f., l., and o. below.

a. Exercise every precaution to keep the engine and its accessories clean. Keep the air intake ducts, plenum chambers, and compressor inlet screens clean and free of any foreign materials. Ground the helicopter. When external cleaning is required, use drycleaning solvent (C62).

WARNING

Do not use contact preservatives of any kind either internally or externally on the compressor section.

b. Fill the engine oil tank to normal operating level with standard operating oil in dance with paragraph 1-8.

CAUTION

Do not exceed maximum temperatures and pressures in engine runup.

NOTE

Ground runup when preparing the engine will complete the necessary preservation of the transmission and tail rotor gearbox.

c. If the engine has not been started in **24** hours, start it and run at ground idle rpm until it is operating satisfactorily. Using an external auxiliary power unit (APU) to start engine. Accelerate engine to **100** percent N2 collective full down and operate until oil temperature reaches **88°C (191°F)** or for no more than **5** minutes.

WARNING

Ensure ignition system has been off for at least S minutes before removing igniter lead. To dissipate all energy stored in the condenser, ground igniter lead to engine using an insulated screwdriver.

d. Disconnect cable to ignition exciter.

e. Allow engine to cool sufficiently to prevent auto ignition.

f. Cover engine air intake and exhaust openings with standard aircraft covers or in the absence of these covers proceed as follows: Cover intake, exhaust, and all other engine openings with barrier material (C26). Secure barrier cover with tape (Cl 36).

NOTE

Do not cover fuel and oil openings with tape only. The tape adhesive is soluble in petroleum compounds and can cause contamination.

g. Close the fuel shutoff valve. Disconnect the fuel line at the inlet port of the engine fuel pump. Cap disconnected fuel line.

h. Connect a source of lubricating oil (C87) to the inlet port of the engine fuel pump.

CAUTION

Observe starter time restriction of 35 seconds when temperature is 90°F (32°C).

i. Move the twist grip to IDLE DETENT. Motor engine with the starter (use APU if available).

j. Continue motoring until fuel free oil flows from fuel overboard drain line.

k. Disconnect source of lubricating oil from the engine fuel pump and connect the disconnected fuel line.

l. Seal vents in the transmission and tail rotor gearbox with barrier material (C26) and secure with tape (Cl 36).

m. Connect igniter and exciter input leads and torque in accordance with TM 55-2840-231-23 A, TM 55-2840-241-23 C.

n. Tag engine and cyclic stick with the following information: ENGINE FUEL SYSTEM HAS BEEN PRESERVED WITH LUBRICATING OIL MIL-L-6081 GRADE 1010. NO FLUSHING REQUIRED PRIOR TO OPERATION. Bleed engine fuel system in accordance with TM 55-2840-231-23 A., TM 55-2840-241-23 C before next start.

o. Record date and extent of engine preservation in the engine historical records. In addition, annotate the records that corrosion preventive concentrate has been added to the engine, transmission, and gearbox oil system in accordance with TB 55-9150-200-24 and that flushing is not required during depreservation.

E-17. FUEL SYSTEM.

Maintain the fuel tank at the fuel level for the duration of the storage period. A full tank prevents fuel contamination. Drain water from the fuel tank prior to adding fuel. Service fuel tank in accordance with paragraph 1-5. Refer to paragraph E-31 for damaged fuel tank procedure.

E-18. HYDRAULIC SYSTEM.

a. Check the hydraulic system for leaks and repair as necessary.

b. Service hydraulic system. Refer to paragraph 1-12.

c. Coat the exposed portions of the hydraulic actuator rods with a light coat of hydraulic preservative fluid (C82).

E-19. ROTOR SYSTEM.

a. Lubricate rotor system in accordance with paragraph 1-33 and figure 1-5.

b. Apply fingerprint remover (C72) to all unpainted metal surfaces. Remove any film residueof fingerprint remover with drycleaning solvent (C62).

c. Wipe all parts dry with clean, lint-free cloth, and apply corrosion preventive compound (C50) on all

unpainted metal surfaces not in contact with bearings.

d Clean and wax main rotor blades. Refer to paragraph 5-98.

E-20. MAIN ROTOR BLADES.

a. The main rotor blade spar is not sealed against moisture entry. The inboard end of the blade was sealed at time of manufacture to prevent moisture entry. The outboard end of the blade is not sealed, and it is possible for water to enter the spar during high moisture conditions.

b. The main rotor blade tiedown will naturally pull the blade in a lower slanting position. During high moisture conditions (rain, high humidity, snow, etc.) mositure could run down the lower blade and become trapped inside the blade spar. The tiedown will act to trap water inside the blade during short term storage conditions, if the aircraft is not runup.

c. A small drain hole is located at the end of the blade spar, on the lower side, just inboard of the tip weight and (if not plugged up) should allow moisture to drain from the blade.

d. For short term storage under high moisture conditons use of the main rotor blade cover is the preferred alternative unless-the aircraft can be runup, or the aircraft is stored inside.

CAUTION

If the aircraft is parked outside during high moisture conditions (snow, rain, high humidity, etc.) and the aircraft is not runup it is possible for moisture to be trapped in the blade spar. If subsequent freezing conditions exist, this moisture trapped inside the blade spar could freeze and damage could occur on aircraft startup.

e. Whenever the aircraft was parked outside during high moisture conditions any moisture trapped in the blade spar must be removed as follows:

(1) Remove blade cover and/or blade tiedown.

CAUTION

Use a nonmetallic probe (toothpick or plastic rod) to probe the drain hole.

(2) Check that blade drain hole is clear.

(3) With blade in low position, allow any trapped moisture to drain out.

(4) Rotate main rotor so that the “high” blade is in a low position and repeat steps (2) and (3) above.

WARNING

Use **of excessive heat on the blade will degrade the blade’s structural adhesive system. Heat in excess of 175°F is not permitted on the main rotor blade.**

f. If in a high moisture condition and subsequent freezing conditions exist then either the main rotor blade cover must have been used on the blade, or the blade will have to be brought up to a temperature sufficient to allow potential frozen moisture to be drained from the blade.

E-21. INSTRUMENTS.

a. Install pitot tube cover or cover pitot tube with barrier material (C26) and secure wrap with tape (C136).

b. Cut a piece of barrier material (C26) to fit over each static vent of airspeed system. Secure material in place with tape (C136).

E-22. AVIONICS EQUIPMENT.

a. Remove, attach condition tags, and return all headsets and microphones to supply.

b. Leave all other unclassified avionic equipment installed in helicopter.

E-23. LANDING GEAR.

a. Place blocks or shoring under skid tubes to provide free air passage.

b. Clean cross tubes and skid tubes, and treat for corrosion in accordance with TM 43-0105.

c. Repaint any exposed metal surfaces. If the paint system can not be touched up, coat the bare metal surfaces with corrosion preventive compound (C50).

E-24. AIRFRAME.

a. Park and moor helicopter with main rotor tiedown installed. Refer to paragraph 1-39.

b. Close all doors and windows.

c. Close and secure all cowling, inspection panels, and covers.

d. Close all openings not already covered with barrier material (C26) and secure material with tape (C136).

E-25. MAINTENANCE OF PRESERVATION.

a. Helicopters in short term storage will be inspected in accordance with local directives and those requirements outlined in paragraph E-5.

b. Perform applicable portions of preventive maintenance daily inspection at least once every 7 days.

c. If conditions change so that a helicopter prepared for short term storage must remain in storage for a longer period of time, represerve the helicopter in accordance with Section IV. DO NOT RENEW SHORT TERM STORAGE.

E-26. BATTERY.

a. Disconnect battery and allow battery to remain in helicopter.

b. Wrap battery quick-disconnect plug with barrier material (C27). secure with tape (C136).

c. Secure quick-disconnect plug to airframe with tape (Cl 36).

SECTION IV.

INTERMEDIATE STORAGE

E-27. DESCRIPTION.

Intermediate storage for a helicopter denotes any period of time between 46 and 180 days. The general requirements of Section I of this chapter apply and form a part of intermediate procedures.

E-28. INSPECTION PRIOR TO STORAGE.

Inspect the helicopter in accordance with paragraph E-5 and as follows:

a. Ensure that all removed components are preserved and either stowed in the helicopter or at a designated location as prescribed in the respective paragraph.

b. Ensure that a record of all removed or disconnected components is entered in the helicopter log book.

c. Check fuel, oil, and hydraulic lines and hoses for leakage.

d. Lubricate the helicopter in accordance with paragraph 1-33 and figure 1-5.

e. Ensure that bolts, washers, nuts, etc., which are removed during disassembly, are coated with a light coat of corrosion preventive compound (C51) and reinstalled as removed from the major component unless otherwise specified.

f. Record the type and date of storage in helicopter log book.

E-29. POWER TRAIN SYSTEM.

Preserve the power train system in accordance with paragraph E-7.

E-30. ENGINE.

NOTE

If the engine can not be motored no effort will be made to preserve the engine fuel system, however comply with the provisions of paragraph E-16a., b., f., l., and o.

a. Exercise every precaution to keep the engine and its accessories clean. Keep the air intake ducts, plenum chambers, and compressor inlet screens clean and free of any foreign materials. Ground the helicopter. When external cleaning is required, use drycleaning solvent (C62).

CAUTION

Do not use contact preservatives of any kind either internally or externally on the compressor section.

b. Fill the engine oil tank to normal operating level with standard lubricating oil (Cl 03) in accordance with paragraph 1-8.

CAUTION

Rotor blades shall be attached to the rotor hub when operating the engine above ground idle speed. Do not exceed maximum temperatures and pressures in engine runup.

NOTE

Ground runup, when preparing the engine, will complete the necessary preservation of transmission and tail rotor gearbox.

c. If the engine has not been started in **24** hours, start and run it at ground idle rpm until it is operating satisfactorily. Use external auxiliary power unit (APU), if available to start engine. Refer to TM 55-1520-228-10. Accelerate engine to **100** percent N2, collective full down, and operate until oil temperature reaches **88°C (191°F)** or for no more than **5** minutes.

d. Shut down engine. Refer to TM 55-1520-228-10.

WARNING

Ensure ignition system has been off for at least 5 minutes before removing igniter lead. To dissipate all energy stored in the condenser, ground igniter lead to engine using an insulated screwdriver.

e. Disconnect cable to ignition exciter.

f. Allow engine to cool sufficiently to prevent auto ignition.

g. Cover air intake and exhaust with standard aircraft covers, or cover these openings and all other engine openings with barrier material (C26). Secure barrier material with tape (C136).

CAUTION

Do not cover fuel and oil openings with tape only. The tape adhesive is soluble in petroleum compounds and can cause contamination.

h. Tag engine and cyclic stick with the following information printed on it: LUBRICATION SYSTEM PRESERVED WITH OPERATING LUBRICANT. NO FLUSHING REQUIRED.

i. Record extent of engine preservation in the helicopter log book.

E-31. FUEL SYSTEM.

WARNING

In the interest of safety of personnel and equipment, the following precautions must be observed while preparing helicopter fuel tanks for storage:

WARNING

The helicopter and all equipment used in performing the operation must be properly grounded. This includes defueling equipment, work stands, purging equipment, and any powered or pneumatic devices. Work stands shall be equipped with a personnel static discharge plate of copper or zinc plate, which shall be affixed in such a position that personnel can contact the plate before coming in contact with the helicopter.

Fuel tanks should not be drained near the end of the working day and then allowed to stand empty over night. Residue fuel drains down the sides of the tank and forms puddles. Over night, fuel from these puddles evaporates into the air in the tank and should a critical fuel-air ratio develop, an explosion could be set off by a spark. A lapse of time between draining and purging should be avoided.

The fuel system may be preserved by one of two methods. The method to be used will be determined by the number of helicopters to be placed in storage, the availability of lubricating oil (C87). the availability of fueling and defueling equipment, or the availability of $C0_2$ or other inert gases.

NOTE

Combat damaged fuel tanks will be preserved in accordance with paragraph E-32. In order to conserve lubricating oil due to the energy crisis, the primary method of preserving fuel cells will not be used until further notice. Use the alternate method described in paragraph E-31.

a. Primary Method. If a sufficient number of helicopters are to be placed in storage to warrant the purchase of necessary lubricating oil, and if adequate fueling and defueling equipment is available, preserve the fuel system as follows:

(1) Defud fuel tanks in accordance with paragraph 1-7.

(2) The flashpoint of the empty fuel tank may be reduced by pouring 5 gallons of lubricating oil (C87) into it. Allow the lubricating oil to remain in the tank **10-16** minutes and then drain.

NOTE

Reduction of the flashpoint in purging operations will extend the useful life of the 'lubricating oil necessary when an assembly line operation is set up. When the tank is completely drained, close the drain valve and fill the tanks with lubricating oil. Allow oil to remain in fuel tanks for at least 8 hours or overnight.

CAUTION

Observe starter time restriction (35 seconds) when temperature is 9O°F (32°C).

(3) Move the twist grip to IDLE DETENT. Motor engine with the starter (use APU if available).

(4) Continue motoring until fuel-free oil flows from fuel overboard line.

(6) Connect igniter and exciter input leads.

(6) Remove oil from fuel tanks and save to flush other tanks.

(7) After 2 or 3 hours test the fuel tanks with an explosion meter, or equivalent, for the presence of fuel vapors. If an unsafe condition exists, discard the drained lubricating oil and flush with fresh oil until a safe reading is obtained.

(8) Attach a tag to the cyclic stick and the fuel filler cap stating: THIS FUEL SYSTEM HAS BEEN PRESERVED WITH LUBRICATING OIL, MIL-L-6081, GRADE 1010. NO FLUSHING REQUIRED DURING DEPRESERVATION, FILL TANKS WITH STANDARD OPERATING FUEL.

b. Alternate Method. If the proper equipment is not available or the lubricating oil (C87) supply is limited, use the following procedure to preserve the fuel system:

(1) Drain all fuel from the fuel system and close drains.

(2) Pour approximately 5 gallons of lubricating oil (C87) into the fuel tank.

(3) Preserve the fuel control system in accordance with subparagraph a.(3), (4), and (5) above.

(4) Drain oil from fuel tanks.

WARNING

When using a fire extinguisher bottle as a source of CO2 for purging fuel tanks, regardless of the size of the bottle used, the fiber horn shall be removed, not only because it is too large for insertion into the tank filler neck, but also to avoid generating static electrical charges which can build up by gas moving rapidly through the horn. The nozzle as well as the bottle itself must be grounded to the aircraft. The C02 must be discharged into fuel tanks slowly at a rate of one pound per minute. C02 must be released slowly because the rapid passage of a gas through a hose can generate static electricity. In addition to this, a very rapid rate of discharge allows rapid expansion of the C02 when it flows into a fuel cell The expanding gas can lower the temperature to the point that will cause damage to the cell. It is permissible to use nitrogen or other inert gas in place of the C02 gas called out in any of the purging procedures. The same precautionary measures stated above will be observed,

(5) Purge fuel tanks with CO2 or nitrogen as follows:

CAUTION

Use moisture-free air.

NOTE

Size of the C02 bottle to be used can be varied to meet existing conditions. The 15-pound size is handy to use. The total amount recommended is based on the quantity usually needed to purge a tank or tanks of the size under discussion; however, more may be needed to obtain a safe reading on the combustible gas indicator.

(a) Open fuel tank drains and remove fuel filler cap; make sure fuel vents are open. Introduce into the filler neck a reduced pressure air hose supplying air through a **0.250** orifice at approximately **50** psi. Purge fuel tank for approximately **30** minutes with air. Close fuel drains.

(b) purge fuel cells with C02 or nitrogen gas.

(c) Introduce into the fuel tank filler neck C02 or nitrogen from a tank set to discharge at a rate of not more than 1 pound of purging gas per minute.

(d) Use not less than 3 pounds of C02 or 5 pounds of nitrogen to purge fuel cells.

(e) After purging of the fuel tank has been completed, wait approximately 2 to 3 hours, and then test main fuel tanks for the presence of dangerous fuel vapors with an explosion meter. If an unsafe condition exists, use additional purging gas until a satisfactory test is made.

(f) Fog cells with a suitable spray gun and 1/2 pint of lubricating oil. Replace filler cap.

(g) Attach a tag to the cyclic stick and the fuel filler cap stating: THIS FUEL SYSTEM HAS BEEN PRESERVED WITH LUBRICATING OIL, MIL-L-6081, GRADE 1010. NO FLUSHING REQUIRED DURING DEPRESERVATION. FILL TANK WITH STANDARD OPERATING FUEL.

E-32. COMBAT DAMAGED FUEL TANKS.

Fuel tanks that cannot be filled with lubricating oil because of leaks or holes will be purged as follows:

a. Open the fuel cell and ventilate fuel cell with rapidly moving dry air until fumes are below the danger area as shown on a vapor tester

b. Preserve the tank by spraying wit h lubricating oil (C87) through the access openings. Coat the entire interior surface of the fuel cell.

E-33. HYDRAULIC SYSTEM

Process the hydraulic system for storage in accordance with paragraph E-18.

E-34. ELECTRICAL SYSTEM.

a. Remove the battery and turn it into the battery shop for storage.

b. Clean the battery compartment and accessories as necessary. Refer to paragraph 9-27.

c. Wrap the quick-disconnect plug with grade A barrier material (C26) and secure wrap with tape (C136).

E-35. MAIN ROTOR BLADES.

CAUTION

Do not change the position of the latch nut on the leading edge of the blade. These nuts determine the alignment position of the blades.

a. Remove the main rotor blades.

b. Clean and wax the main rotor blades in accordance with paragraph 5-98.

c. Apply corrosion preventive compound (C51) sparingly to the bolt hole in the root end of the blade and all exposed metal surfaces. Wrap the root end of the blade and that portion of blade that fits in the cradles of the blade container with grade A barrier material (C26). Secure wrap with tape (C136).

d. Secure rotor blade in a metal shipping or storage container if available or a plywood shipping container.

E-36. MAIN ROTOR HUB AND MAST ASSEMBLY.

a. Lubricate rotor system in accordance with the lubrication chart. Refer to figure 1-5.

b. Apply fingerprint remover (C72) to all exposed metal surfaces to include splines and threads, Remove any film residue of fingerprint remover with a clean cloth dampened with drycleaning solvent (C62).

c. Coat the blade retention bolt, washer, and nuts sparingly with corrosion preventive compound (C53) and reinstall in the hub grip. Apply the same preservative to all other exposed metal surfaces to include splines and threads not in contact with bearings.

d. Wrap the entire rotor hub and mast assembly to include swashplate assembly with barrier mate rial (C26). Secure barrier joints together and secure entire wrap to the top of the fuselage with tape (C136) in such a manner that entire assembly is sealed against the entry of water. Lash cover snugly to the hub and mast assembly with **0.125** inch nylon rope and tape (C136).

E-37. TAIL ROTOR GROUP.

a. Coat the exposed metal surfaces of the tail rotor group to include the tail rotor gearbox, not protected with a dry lubricant, with corrosion preventive compound (C51). Wrap the entire tail rotor group to include tail rotor blades with barrier material (C26) and secure wrap with tape (C136).

b. Make two cushions to fit between the tail rotor blades and the tailboom, Cellulosic cushioning material (C56) can be rolled into a cylinder approximately 8 inches in diameter and 8 inches long. Secure blades and cushioning material to tailboom with tape (C136),

E-38. INSTRUMENTS.

Process instruments in accordance with paragraph E-12, Remove clock, apply condition tag, and turn into supply.

E-39. AVIONIC EQUIPMENT.

Process avionic equipment in accordance with paragraph E-22.

E-40. EMERGENCY EQUIPMENT.

a. Remove fire extinguishers, apply condition tag and return to local supply.

b. Remove apply condition tag, and return to supply such items as first aid kits and other equipment subject to mildew and deterioration.

E-41. LANDING GEAR.

Process landing gear in accordance with paragraph E-23.

E-42. AIRFRAME.

a. Close the secure all cowling, inspection panels doors, and window.

b. Close and cover all openings in the fuselage, not already covered with barrier material (C26) and secure material with tape (C136).

c. Park and moor helicopter in accordance with paragraph 1-39.

E-43. MAINTENANCE OF PRESERVATION.

a. Helicopters in intermediate storage will be inspected in accordance with local directives and those requirements outlined in paragraphs E-5 and E-14.

b. Applicable portions of preventive maintenance daily inspection will be performed at least once every 7 days in accordance with paragraph E-5.

c. If conditions change so that a helicopter that was prepared for intermediate storage must remain in storage for a longer period of time, represerve the helicopter.

E-44. ACCIDENT ENGINES – PRESERVATION.

NOTE

Engines removed from a helicopter which has been involved in an accident in which engine failure or malfunction is known or suspected to have been a factor should not be treated for corrosion protection.

a. Without disconnecting lines or fittings make every effort ro prevent the remaining fuel and oil in the engine from leaking out.

b. To prevent the accumulation of moisture place four 8 unit bags of desiccant (C60) in the air intake and 4 bags in the exhaust diffuser.

c. Plug all ports and cap all fittings and lines Seal all openings with covers or barrier material, (C26) and secure with tape (C136).

E-45. DAMAGED, CANNIBALIZED, OR FAILED ENGINE PRESERVATION PROCEDURE.

Inoperable engines that are idle because they require parts, maintenance, or overhaul shall be preserved as required (depending on storage time) and stored in a shipping container or in a clean, dry area, adequately protected from dirt and physical damage.

SECTION V. DEPRESERVATION AND ACTIVATION PROCEDURES

E-46. DEPRESERVATION AFTER FLYABLE STORAGE.

a. Remove protective covers and stow them In designated location in helicopter.

b. Remove all barrier material and tape; remove tape residue with drycleaning solvent (C62)

c. Clean helicopter as necessary in accordance with paragraph 1-15

d. Open all doors and ventilate helicopter

e. Remove tiedown restraints if applicable.

f. perform preventive maintenance daily Inspection in accordance with TM 55-1520-228 PMS

g. Record the date the helicopter was prepared for service in the helicopter log book, DA Form 2408-13.

h. Remove static ground wire Installed for storage.

E-47. DEPRESERVATION AFTER SHORT TERM STORAGE.

a. Airframe.

(1) Remove protective covers and stow them in designated location in the helicopter.

(2) Remove all barrier material and tape; remove tape residue with drycleaning solvent (C62).

(3) Open all doors and window and ventilate helicopter.

(4) Remove tiedown restraints if applicable.

b. Landing Gear. Remove blocks from under skid gear.

c. Avionics. Perform functional test.

d Electrical System:

(1) Remove barrier material and tape from battery quick-disconnect plug.

CAUTION

Ensure battery switch is in OFF position.

(2) Connect battery.

e. Rotors and Controls:

(1) Clean main and tail rotor assemblies with aliphatic naphtha (C22). Wipe dry with lint-free cloth.

(2) Lubricate in accordance with paragraph 1-32.

f. Power Train Assembly

(1) Fill transmission and tail rotor gearbox as necessary, with operating oil in accordance with paragraphs 1-10 and 1-11.

(2) Clean drive shafts as necessary with drycleaning solvent (C62).

g. **Fuel** System.

(1) Take fuel sample and drain as necessary. Fill fuel tanks with operating fuel in accordance with paragraph 1-5.

(2) Place fuel shutoff valve in OPEN position

h. Hydraulic System.

(1) Clean exposed portion of hydraulic actuator rods with a clean cloth dampened with hydraulic fluid (C73).

(2) Coat hydraulic rods with a light coat of hydraulic fluid (C73).

i. Engine.

(1) Remove air intake and exhaust covers and any barrier material and tape used to close engine openings.

(2) Remove tape residue with drycleaning solvent (C62).

CAUTION

Bleed engine fuel system in accordance with TM 55-2840-231-231 A , TM 55-2840-241-23 C . Failure to bleed engine may cause failure or hot start.

NOTE

Flushing of the engine fuel system is not required.

j Miscellaneous.

(1) Clean helicopter as necessary in accordance with paragraph 1-15.

(2) Check that all removed components have been reinstalled on the helicopter. Check the helicopter log book for a record of components that have been removed or disconnected. Check for subsequent installation or connection,

(3) Check that related systems have been properly depreserved and serviced before any system or component operational check has been performed

(4) Perform necessary inspection required. Refer to Chapter 1 and TM 55-1520-228 PMS.

(5) Remove static ground wire installed for storage.

(6) Record the date the helicopter was prepared for service on DA Form 2408-13.

E-48. DEPRESERVATION AFTER INTERMEDIATE STORAGE.

a. Airframe.

(1) Remove protective covers and stow in designated location in the helicopter.

(2) Remove all barrier material and tape; remove tape residue with drycleaning solvent (C62).

(3) Open all doors and windows and ventilate helicopter.

(4) Remove tiedown restraints if applicable.

b. Landing Gear. Remove blocks from under skid gear.

C. Avionics. Functional test radios

d. Instruments.

(1) Remove barrier material and tape from static vents in airspeed system; remove tape residue with drycleaning solvent (C62).

(2) Remove pitot cover and stow with other protective covers in helicopter.

(3) Secure clock from supply and install

e. Battery.

(1) Obtain battery from battery shop and install in helicopter.

(2) Remove barrier material and tape from battery quick-disconnect plug.

CAUTION

Ensure battery switch is in OFF position.

(3) Connect battery.

f. Rotors and Controls.

(1) Clean main and tail rotor assemblies with aliphatic naphtha (C22). Wipe dry with lint-freecloth.

(2) Install main rotor blades.

(3) Lubricate in accordance with paragraph 1-33.

g. Emergency Equipment. Secure fire extinguishers, first aid kits, and other equipment from supply facilities and install.

h. Hydraulic System.

(1) Clean exposed portion of hydraulic actuator rods with a clean cloth dampened with hydraulic fluid (C73).

(2) Coat hydraulic rods with a light coat of hydraulic fluid (C73).

i. Fuel System.

(1) Take fuel sample and drain as necessary. Service fuel tanks in accordance with paragraph 1-5. No flushing of fuel system is required.

(2) Place fuel shutoff valve in OPEN position.

j. Engine.

(1) Remove air intake and exhaust covers and/or barrier material and tape used to close engine openings.

(2) Remove tape residue with drycleaning solvent (C62).

NOTE

No flushing of the engine fuel system is required.

k. Power Train Assembly.

(1) Fill transmission and tail rotor gearbox as necessary with operating oil in accordance with paragraphs 1-10 and 1-11.

(2) Clean drive shafts as necessary with drycleaning solvent (C62).

I. Miscellaneous.

(1) Clean helicopter. Refer to paragraph 1-15.

(2) Check that all removed components have been reinstalled on the helicopter. Check DA Form 2408-13 for a record of components that have been removed or disconnected.

(3) Check that related systems have been properly depreserved and serviced before any system or component operational check is performed.

(4) Perform necessary inspection required in accordance with Chapter 1 and TM 55-1520-228 PMS.

(6) Remove static ground wire installed for storage.

(6) Record the date the helicopter was prepared for service in DA Form 2408-13.

APPENDIX F

WIRING DIAGRAMS AND LOAD CHARTS

F-1. WIRING DATA.

All wiring IS adequately shielded and wires are marked with Identification letters and numbers, Table F-1 provides personnel with the necessary information to correlate equipment location wiring diagrams, and text. Alphabetical numer ical code item numbers are assigned to each piece of equipment and is common in equipment ocation illustrations, wiring diagrams, and text Table F-2 provides personnel with necessary Information to replace (resolder or crimp) a damaged electrical connector The chart contains the connector code item number, the connector pin letters or numbers, and the wire number that Installs In each respective pin. Only those connectors that are now shown In their entirety in one of the system diagrams are presented In table F-2

F-2. WIRE IDENTIFICATION

Identification of each wire IS accomplished by a combination of letters and numbers. Refer to figure F-1.

F-3. ABBREVIATION.

Abbreviations used are in accordance with MIL STD-12C and AR310-50 except when the abbreviation depicts a marking actuall y found in the aircraft.

F-4. SYMBOLS.

Diagram components symbols are drawn in accordance with ANSI Y14, 15 Part 1. Refer to figure F-2.

Table F-1 . Equipment List

ITEM	DESCRIPTION
A1	Panel - Caution
A2	Impedance Pad
B1	Fuel Pump
B3	Gov Cont Actuator
B4	Eng De-Ice Control
B7	Defog Blower RH
B8	Defog Blower LH
BT1	Battery
CB1	Circuit Breaker (5 Amp)
CB3	Circuit Breaker (10 Amp)
CB4	Circuit Breaker (20 Amp)
CB5	Circuit Breaker (5 Amp)
CB6	Circuit Breaker (1/2 Amp)
CB7	Circuit Breaker (5 Amp)
CB8	Circuit Breaker 10 Amp)
CB9	Circuit Breaker (50 Amp)
CB10	Circuit Breaker (10 Amp)
CB11	Circuit Breaker (10 Amp)
CR7	Diode Ext Pwr Rel
CR8	Diode Pore and Aft Force Trim
CR9	Diode Lateral Force Trim
CR12	Diode
CR14	Diode
DS1	Light, Anticoll Upper
DS2	Light, Position LH
DS3	Light, Position RH
DS4	L[ght, Position Tail
DS5	Light, Anticoll Lower
DS6	L[ght, Cockpit
DS6A	Light, Cockpit
DS7	Light, Landing, Fwd
DS8	Light, Landing
DS12	Light, XMSN Oil Hot
DS13	Light XMSN Oil Press
DS14	Light Eng Out Warning
DS15	Light Master Caution
DS16	Light, Standby Compass
DS17	Light Audio Warning
DS18	Light Rotor RPM
DS40	Engine Automatic Reignit on Indicator Light -- Press to Test
E3	Chip Det Engine Upper
E4	Chip Det Tail Rotor
E5	Chip Det, XMSN

Table F-1. Equipment List (Cont)

ITEM	DESCRIPTION
E6	Chip Det, Engine,Lower
E7	Chip Det, XMSN
G1	Starter-Generator
G2	Rotor Tach, Generator
G3	Power Turbine Tach Generator
G4	Gas Prod Tach Generator
HR1	Pitot Tube Heater
J1	Recep, Pwr Turbine Tach
J2	Recep, Rotor and Turbine RPM
J3	Recep, Gas Prod Tach
J4	Recep, Inst Cluster
J6	Recep, Rotor Tach Gen
J1	Recep, Turb Tach
J2	Recep, XMSN
J10	Recep, Gas Prod Tach
J11	Recep, Eng Oil Temp Bulb
J12	Recep, Engine
J13	Recep, Starter-Generator
J16	Recep, Ext Pwr
J23	Recep, Fuel Filter Press
J24	Recep, Tailboom Disc
J29	Recep, Pitot Tube Heater
J30	Recep, Hyd Bypass Solenoid
J31	Recep, Audio Warning Disc
J32	Recep, Caution Panel
J33	Recep, Edge Lt Panel, Cont Boost
J34	Recep, Edge Lt Panel
J38	Recep, RPM Sensor
J39	Recep, Att Gyro
J43	Recep, Anticollision Light
J44	Upper Anticollision Light Disc
J105	Recep, Turn and Slip lnd
J114	Recep, Hyd Press Switch
J115	Recep, Standby Compass
J119	Recep, Battery
J120	Recep, Aux Pwr
J121	Recep, Force Trim Brake
J122	Recep, Force Trim Brake
J123	Recep, Heater Solenoid
J126	Recep, Eng Chip Det
J168	Recep, Upper Fuel Tank Unit
J169	Recep, Signal Lt
J171	Recep, Voltage Regulator
J172	Recep, Fuel Press Switch
J173	Recep, Inverter
J216	Recep, Copilot Cyclic Stick
J502	Recep, Line to Z11 Reignition Control Assembly
J600	Recep, Imp Pad
K1	Relay, Ext Pwr
K2	Relay, Non-Ess
K3	Relay, Starter
K4	Relay, Eng Oil Bypass
K6	Relay, Battery
K8	Relay,Ldg Light, Fwd
K9	Reay, Ldg Light, Aft
K10	Relay, Inverter Fail
K11	Relay, Gen Fail
K12	Relay, Line Control
K15	Relay, Heater
K16	Relay, Fuel Boost Pump
K45	Engine Relight Relay
L1	Hyd Bypass Solenoid
L2	Heater Solenoid
L4	Force Trim ---- Fore and Aft
L5	Force Trim –- Lateral
M1	Meter, Rotor and Turbine RPM
M1	Meter, Turb Outlet Temp
M3	Meter, Gas Prod Tach
M4	Meter, Inst Cluster
M7	Meter, Altimeter
M8	Meter, Airspeed
M9	Meter, Torque
M10	Meter, Attitude Gyro A
M11	Meter Dir Gyro
M13	Meter, Clock
M14	Meter, Turn and Slip A
M15	Meter. Vertical Speed Rapid Response
P1	Plug, Pwr Turbine Tach Ind A
P2	Plug, Rotor and Turbine RPM lnd
P3	Plug, Gas Producer Tach lnd A
P4	Plug, Inst Cluster
P6	Plug, Rotor Tach Gen
P7	Plug, Pwr Turb Tach Gen
P9	Plug, XMSN
P10	Plug, Gas Prod Tach Gen
P11	Plug, Eng Oil Temp Bulb
P12	Plug, Engine
P13	Plug, Starter-Generator
P23	Plug, Fuel Filter Press Switch
P24	Plug, Tailboom Disc
P25	Plug, Airframe Fuel Filter Press Switch
P29	Plug, Pitot Tube Heater
P30	Plug, Hyd Bypass Solenoid
P31	Plug, Auldio Warning Disc
P32	plug Caution Panel A
P33	Plug, Edgelit Panel, Cont Boost
P34	Plug, Edgelit Panel
P38	Plug, RPM Sensor

Table F-1. Equipment List (Cont)

ITEM	DESCRIPTION
P39	Plug, Attitude Gyro A
P43	Plug, Anticoll Lt
P44	Upper Anticoll Lt Disc
P105	Plug, Turn and Slip Ind A
P113	Plug, Engine Chip Det
P114	Plug, Hyd Press Switch
P115	Plug, Standby Compass
P119	Plug, Battery
P121	Plug, Force Trim Mag Brake
P122	Plug, Force Trim Mag Brake
P123	Plug, Heater Solenoid
P126	Plug, Eng Chip Det
P127	Plug, Eng Oil Bypass
P168	Plug, Upper Fuel Tank Unit
P169	Plug, Signal Lt
P171	Plug, Voltage Regulator
P172	Plug, Fuel Press Switch
P173	Plug, Inverter
P174	Plug, Sensor Rotor RPM
P216	Plug, Copilot Cyclic Stick
P501	Plug, Disconnect from Z11
P502	Plug, Line from Z11
P600	Plug, Impedance Pad
Q1	Transistor, Dimming Element
PS1	Inverter
R1	Resistor, Turb Outlet Temp
R3	Resistor, Shunt
R7	Resistor, Instrument Lts
R25	Resistor, Console Lts
R33	Resistor, Position Lts, Dimming
S1	Switch, Battery
S2	Switch, Main Generator
S3	Switch, XMSN Oil Temp
S4	Switch, XMSN Oil Press
S5	Switch, Gov RPM
S6	Switch, Starter
S7	Switch, Hyd Boost
S8	Switch, Eng De-Ice
S10	Switch, Fuel Filter Diff Press
S11	Switch, Airframe Fuel Filter Diff Press
S12	Switch, Fuel Press
S 3	Switch, XMSN Oil Press
S14	Switch, Ignition
S18	Switch, RPM
S19	Switch, Inst Lights
S49	Switch, Landing Lights
S52	Switch, Oil Level Float
S58	Switch, Force Trim – Pilot
S59	Switch, Force Trim – Copilot
S60	Switch, Force Trim Pwr
S67	Switch, Hyd Press
S68	Switch, Position Lts
S69	Switch, Fuel Boost Pump
S70	Switch, Eng Out Warning
S81	Switch, Non-Ess Bus
S82	Switch, Inverter
S83	Switch, Anticoll Lts
S84	Switch, Eng Oil Bypass
S85	Switch, Low Level Fuel
S86	Switch, Test Warning Lts
S90	Switch, Heater Overheat
S91	Switch, Rotor RPM Sensor
S121	Switch, Eng Auto Reignition
S121A	Switch, NVG Lights
TB1	Term, Board, Inst Panel
TB3	Term, Board, Turb Outlet
TB4	Term, Board, Console
TB5	Term, Board, Utility Lt
TB6	Term, Board, Lighting
TB7	Term, Board, Position Lts
TB14	Term, Board, Oil Level
TB25	Term, Board, Inst Lts
TB26	Term, Board, Ground
TB27	Term, Board, Landing Lts
TB28	Term, Board, Master Caution Panel
TB29	Term, Board, Diode Inst
TB30	Term, Board, Diode Inst
VR1	Voltage Regulator
Z1	Igniter
Z2	Eng Oil Temp Bulb
Z5	Upper Fuel Tank Unit
Z6	Lower Fuel Tank Unit
Z10	Anticoll Flasher
Z11	Reignition Control Assembly
OH-58C PECULIAR EQUIPMENT C	
CB13	Circuit Breaker (1 Amp)
CB14	Circuit Breaker (3 Amp)
CB15	Circuit Breaker (5 Amp)
CB16	Circuit Breaker (5 Amp)
CB17	Circuit Breaker (5 Amp)
CB18	Circuit Breaker (5 Amp)
CB19	Circuit Breaker (5 Amp)
CB21	Circuit Breaker (5 Amp)
CB22	Circuit Breaker (5 Amp)
CB23	Circuit Breaker (5 Amp)
CR29	Diode
CR30	Diode
CR31	Diode
CR32	Diode

Table F-1. Equipment List (Cont)

ITEM	DESCRIPTION
CR33	**Diodo**
CR34	**Diode**
CR35	**Diodo**
DS50	Light, Pri Dir Control
DS51	Light, Pri Dir Control
J515	Recep, Caution Light Relay
J516	Recep, Night Vision Goggles Relay
J517	Recep, Control Relay
J518	Recep, Aft Control Relay
K18	Relay, Night Vision Goggles
K19	Relay, Caution Light
M5	Meter, Gas Prod Tach
M16	Meter, Xmsn 011 Press
M17	Attitude and Turn and Slip Indicator
M21	Meter, Load
M22	Meter, Fuel Quantity
M23	Meter, Vertical Speed
MT1	Xmtr, Xmsn Oil Press
P50	Plug, Turbine Outlet Temp
P51	Plug, Loadmeter
P52	Plug, Fuel Quanitity
P53	Plug, Torque Meter
P54	Plug, Airspeed Indicator
P55	Plug, Rotor and Engine RPM Indicator
P56	Plug, Vertical Speed Indicator
P57	Plug, Power Supply
P58	Plug, Power Supply
P59	Plug, Clock
P60	Plug, Voltage Regulator
P61	Plug, Gas Producer Tach Indicator
P62	Plug, Engine Oil Temp
P63	Plug, Attitude and Turn and Slip Ind
P64	Plug, Caution Panel
P201	Plug, RMI Heading Bearing
P508	Plug, Xmsn Oil Press Meter
P509	Plug, Xmsn Oil Press Xmtr
PS1	Power Supply, Interior Lights
PS2	Power Supply, Interior Lights
R37	Resistor, Night Vision Goggles
R38	Resistor, Night Vision Goggles
R39	Resistor, Night Vision Goggles
R40	Resistor, Night Vision Goggles
R41	Resistor, Night Vision Goggles
R42	Resistor, Night Vision Goggles
R43	Resistor, Night Vision Goggles
R44	Resistor, Night Vision Goggles
S90	Switch, Night Vision Goggles
S122	Switch, Console Lts
S123	Switch, Instrument Lts
S130	Switch, Pri Dir Control Diseng
TB31	Term, Board, Interior Lights
TB32	Term Board, Intertor Lights
TB33	Term. Board, Turb Outlet Temp
TB34	Term. Board, Pri Dir Control Deviation
VR2	Voltage Regulator, Night Vision Goggles
21A1	ATAS Control Panel
21A1J1	Connector
21A1J2	Connector
21A1J3	Connector
21A1P1	Connector
21A1P2	Connector
21A1R1	Resistor
21A1R2	Resistor
21A1S1	Switch, MASTER
21A1S2	Switch, UNCAGE
21A1S3	Button, SEQ STEP
21A1S4	Button, CFT RST
21A1S5	Switch, JTSN
21A2	Electronics Unit
21A2J1	Connector
21A2J2	Connector
21A2P1	Connector
21A2P2	Connector
21A3	Interface Electronics Assembly
21A3J1	Connector
21A3J2	Connector
21A3J3	Connector
21A3J4	Connector
21A3J5	Connector
21A3J6	Connector
21A3P1	Connector
21A3P2	Connector
21A3P3	Connector
21A3P4	Connector
21A3P5	Connector
21A3P6	Connector
21A4	Pilot Display Unit
21A4J1	Connector
21A4P1	Connector
21A5	Launcher
21A5J1	Connector
21A5P1	Connector
21CB1	Circuit Breaker, ATAS PWR
21CB2	Circuit Breaker, ATAS CONT
21CB3	Circuit Breaker, MSS PWR
21CB4	Circuit Breaker, JETTISON
21J1	Fuselage Disconnect
21J2	Jettison Fuselage Disconnect
21J3	Ejector Disconnect
21K1	Relay
21P1	Fuselage Disconnect
21P2	Jettison Fuselage Disconnect

Table F-1. Equipment List (Cont)

ITEM	DESCRIPTION	ITEM	DESCRIPTION
21P3	Ejector Disconnect		
21T1	Transformer		
21XK1	Socket		

Table F-2. Connector Replacement Chart

WIRE NO.	RECEPTACLE	PIN	PLUG	WIRE NO.
P/O Equipment	J4	A	P4	E1A22
		B	P4	D6A22N
		C	P4	L100A22
		D	P4	E2A22
		E	P4	D7A22
		F	P4	D8A22
		G	P4	E20A22
		H	P4	E26A22
D4822	J9	A	P9	D4C20
C2A22	J9	B	P9	C2B20
	J9	C	P9	
D11A22	J9	D	P9	D11B20
D12A22	J9	E	P9	D12B20
	J9	F	P9	
	J9	G	P9	
D3822	J9	H	P9	D3C20
C66B22	J9	J	P9	C66A20
W56A22	J9	K	P9	W56820
ESB-CR	J12	A	P12	E9A-CR
E7B-AL	J12	B	P12	E7A-AL
J2B22	J12	C	P12	J3B18
QBB22	J12	D	P12	QBC20
Q9B22	J12	E	P12	09C20
E4B22	J12	F	P12	E4A20
E5B22	J12	G	P12	E5A20
E16B16N	J12	H	P12	E16A16N
E15A22	J12	I	P12	E15B20
H2A22	J12	J	P12	H2B20
H3A22	J12	K	P12	H3B20
P26822	J12	L	P12	P26A20
E13822	J12	M	P12	E13A20
E12822	J12	N	P12	E12A20
W41A22	J43	A	P43	W41B18
E62D22	J43	B	P43	E62C18
L57A18	J43	C	P43	L57B18
L56A18	J43	D	P43	L56B18
P24B16	J43	E	P43	P24A16
L56B18	J44	A	P44	L56C18
L57B18	J44	B	P44	L57C18
L62A18	J44	C	P44	L62B18
P/O Equipment	J174	A	P174	E100A22N
		B	P174	E42H22
		C	P174	D12822
		D	P174	E44C22
		E	P174	E101A22

Table F-2. Connector Replacement Chart (Cont)

WIRE NO.	RECEPTACLE	PIN	PLUG	WIRE No.
		F	P174	No Connection
	J216	A	A216	P/O Stick Assembly
A10C20	J216	B		
C6533B-2B22	J216	C		
C6533B-50B20	J216	D		
C6533B-5B22	J216	E		
	J216	F		
	J216	G		
	J216	H		
	J216	J		
	J216	K		
	J216	L		
	J216	M		
A12B20	J216	N		
A13B20	J216	P		
C75A20	J216	R		
C76A20	J216	S		
A16B20	J216	T		
A8B20	J216	U		
A11B20	J216	V	P501	P/O Equipment
J6C22N	J502	A	P502	J6A20
J5A22	J502	F	P502	No Connection
J4A22	J502	E	P502	J4B20
J2B22	J502	D	P502	J2C20
J7B22	J502	C	P502	J7C20
J6D22N	J502	B	P502	J6B20
A24A20	J600	2	P600	P/O Equipment
A19D20	J600	4		
A21A20	J600	6		
A22A20	J600	8		
A3A20	J600	10		
A18A20	J600	12		
A23A20	J600	14		
A17A20	J600	16		
A4B20	J600	17		
A4A20	J600	22		
E43A20	J600	23		
D4A22	J600	25		
D5A22	J600	26		
D3A22	J600	27		
APPX100-5048A22 (BLU)	J600	28		
C6533A-22B20	J600	28		
SX803A22	J600	20		
APPX100-5048A22 (WHT)	J600	29		
C6533A-29A22	J600	29		
C6533B-29A22	J600	30		
C6533C-29A22	J600	30		
C6533A-40A22	J600	31		
C6533B-40A22	J600	31		
C6533C-40A22	J600	32		

Table F-2. Connector Replacement Chart (Cont)

WIRE NO.	RECEPTACLE	PIN	PLUG	WIRE NO.
C6533A-26A22	J600	33		
C6533B-26A22	J600	33		
C6533C-26A22	J600	34		
ARN89-1A22	J600	35		
C6533A-41A22	J600	35		
C6533B-41A22	J600	36		
C6533C-41A22	J600	36		
ARC116-27A22	J600	37		
C6533A-37A22	J600	37		
C6533B-37A22	J600	38		
C6533C-37A22	J600	38		
ARC115-27A22	5600	39		
C6533A-35A22	J600	39		
C6533B-35A22	J600	40		
C6533C-35A22	J600	40		
2ARC114-27A22	J600	41		
C6533A-47A22	J600	41		
C6533B-47A22	J600	42		
C6533C-47A22	J600	42		
OH-58C Peculiar Equipment C :				
P/O Equipment	J50	A	P50	L159D20
		B		L167P20N
		C		E32A20
		D		P83B20
		E		E9B-CR
		F		E8A-AL
		G		No Connection
		H		No Connection
		J		No Connection
		K		No Connection
P/O Equipment	J51	A	P51	D7A22
		B		D8A22
		C		No Connection
		D		No Connection
		E		L159F20
		F		L167F20N
P/O Equipment	J52	A	P52	L159G20
		B		L167G20N
		C		E1A22
		D		P86A20
		E		E20A22 BLK
		F		E26A22 RED
		G		No Connection
		H		No Connection
		J		No Connection
		K		No Connection
P/O Equipment		A	P53	L159H20
		B		L167H20N

Table F-2. Connector Replacement Chart (Cont)

WIRE NO.	RECEPTACLE	PIN	PLUG	WIRE NO.
P/O Equipment			P54	L159J20
				L167J20N
P/O Equipment	J55		P55	E5B22
				E4B22
				D12A22
				D11A22
				E34A22
				E6B22N
				L159K20
				L167M20N
				No Connection
				No Connection
				No Connection
				No Connection
				No Connection
				No Connection
				No Connection
				No Connection
				No Connection
				No Connection
				No Connection
P/O Equipment			P56	No Connection
				L167L20N
				L157D20
P/O Equipment			P57	L152B20
				W74E20
				L157A20
				L153A20
				No Connection
P/O Equipment			P5B	L152C20
				W74F20
				L159A20
				L153C20
				No Connection
P/O Equipment			P59	L167S20N
				No Connection
				L157E20
P/O Equipment			P60	W87A22
				W73A22
				W74C22
				No Connection
				No Connection
				No Connection

Table F-2. Connector Replacement Chart (Cont)

WIRE NO.	RECEPTACLE	PIN	PLUG	WIRE NO.
P/O Equipment	J61	A	P61	E13B22
		B		E12B22
		c		E14A22N
		D		E31A20
		E		L159C20
		F		L167N20
P/O Equipment	J62	A	P62	E33A20
		B		P83C20
		c		E2B22
		D		E125A22
		E		L159E20
		F		L167E20N
P/O Equipment		A	P63	F5A20
		B		P83D20
		c		L157C20
		D		L167K20N
		E		F1A20
		F		F2A20N
		G		TN17213B22 BLU
		H		TN17214B22 WHT
		J		TN17215B22 ORN
		K		TN1 7201E22
		L		TN17205E22
P/O Equipment		A	P64	E70A22
		B		E40A22
		c		E15A22
		D		Q30A22
		E		W41A22
		F		W56A22
		G		L122A22
		H		W42A20
		J		No Connection
		K		V2A22
		L		P31A22
		M		C66B22
		N		SX802B22
		P		No Connection
		R		No Connection
		s		W79A22
		T		W75A22
		U		W33A22N
		V		W1A22
		W		W71A22
		X		No Connection
		Y		E65A22
		z		D27A22

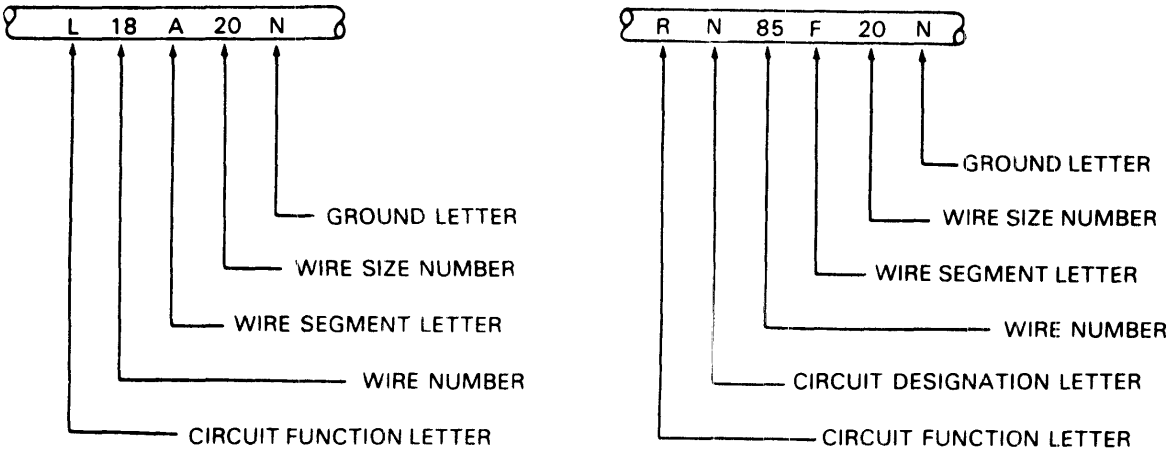
Table F-2. Connector Replacement Chart (Cont)

WIRE NO.	RECEPTACLE	PIN	PLUG	WIRE NO
		a		D25A22
		b		E67A22
		c		No Connection
P/O Equipment	J515	A1		No Connection
		A2		D26A22
		A3		D25B22
		B1		No Connection
		B2		D28A22
		B3		D27B22
		C1		No Connection
		C2		W80A22
		C3		W79B.22
		D1		No Connection
		D2		E66A22
		D3		E65B22
		E1		No Connection
		E2		E63A22
		E3		E67B22
		F1		No Connection
		F2		No Connection
		F3		No Connection
		X1		W74D22
		X2		W78A22
P/O Equipment	J516	A1		No Connection
		A2		W75A22
		A3		W176A22
		B1		L154A20
		B2		L153D20
		B3		No Connection
		C1		L161A20
		C2		L162A20
		C3		L160B20
		D1		W73A22
		D2		W71A22
		D3		W70A22
		E1		W90A22
		E2		W87A22
		E3		No Connection
		F1		L176A22
		F2		APN209-7B22
		F3		L175A22
		X1		L164B22
		X2		P83F20

F-5. INDEX.

The following wiring diagrams are contained in this appendix.

WIRING IDENTIFICATION CODE



CIRCUIT FUNCTIONS

CODE	NOMENCLATURE	CODE	NOMENCLATURE
A	ARMAMENT	RC	COMMAND
C	CONTROL SURFACES	RF	VHF LIAISON
D	INSTRUMENTS (OTHER THAN FLIGHT OR ENGINE)	RL	LIAISON
E	ENGINE INSTRUMENTS	RM	MARKER BEACON
F	FLIGHT INSTRUMENTS	RN	NAVIGATION
H	HEATING, VENTILATING, AND DE-ICING	RU	UHF COMMAND
J	IGNITION	RV	VHF COMMAND
K	ENGINE CONTROL	RZ	INTERPHONE AND HEADPHONE
L	LIGHTING	S	RADAR
M	MISCELLANEOUS ELECTRIC	SX	RECOGNITION (IFF)
N	GROUND	TN	TRACKING NAVIGATION
P	DC POWER	V	DC POWER AND DC CONTROL CABLES FOR AC SYSTEM
Q	FUEL AND OIL	W	WARNING AND EMERGENCY
R	RADIO (NAVIGATION AND COMMUNICATION)	X	AC POWER

206075-281

Figure F-1. Wiring Identification Code

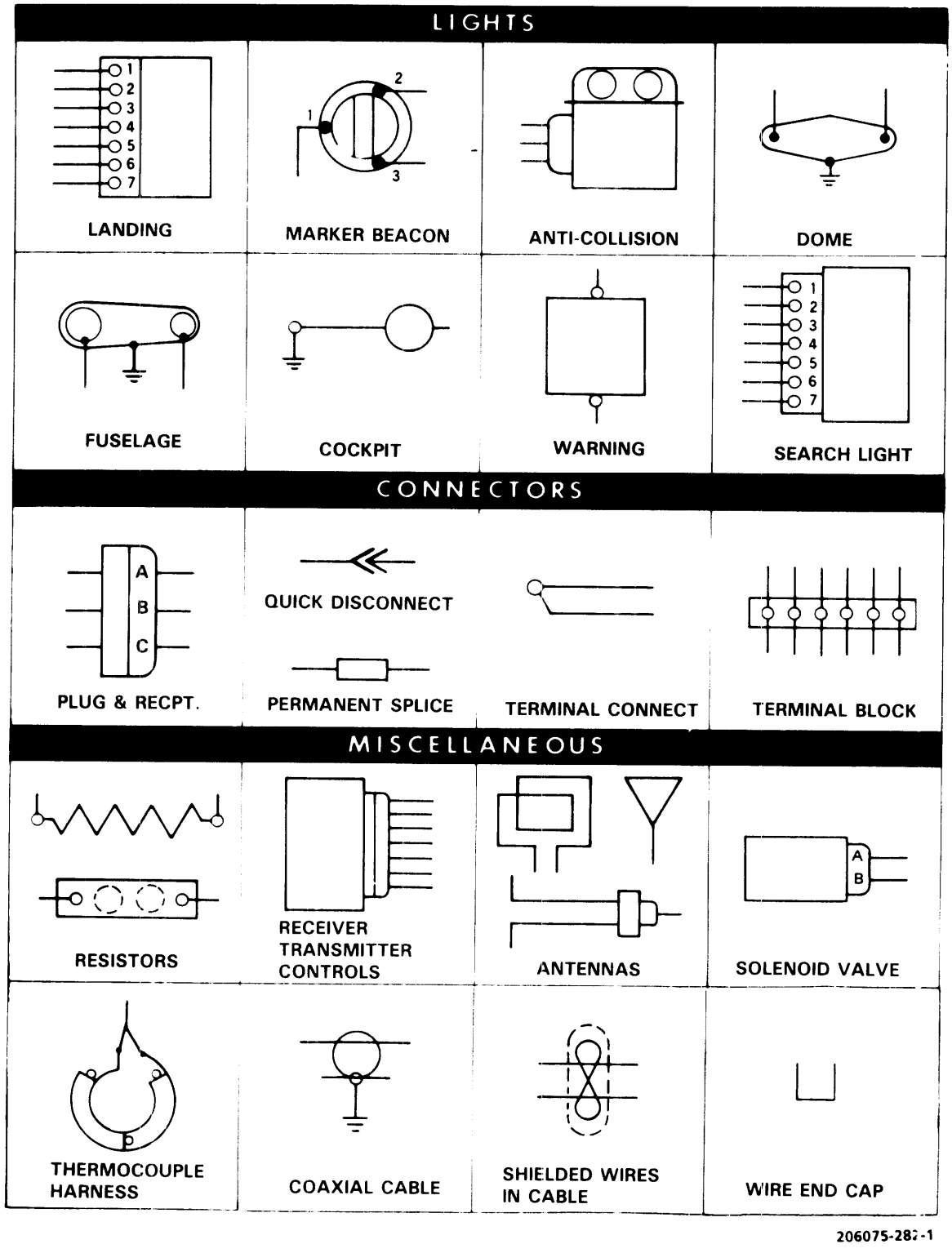


Figure F-2. Electrical Symbol Chart (Sheet 1 of 2)

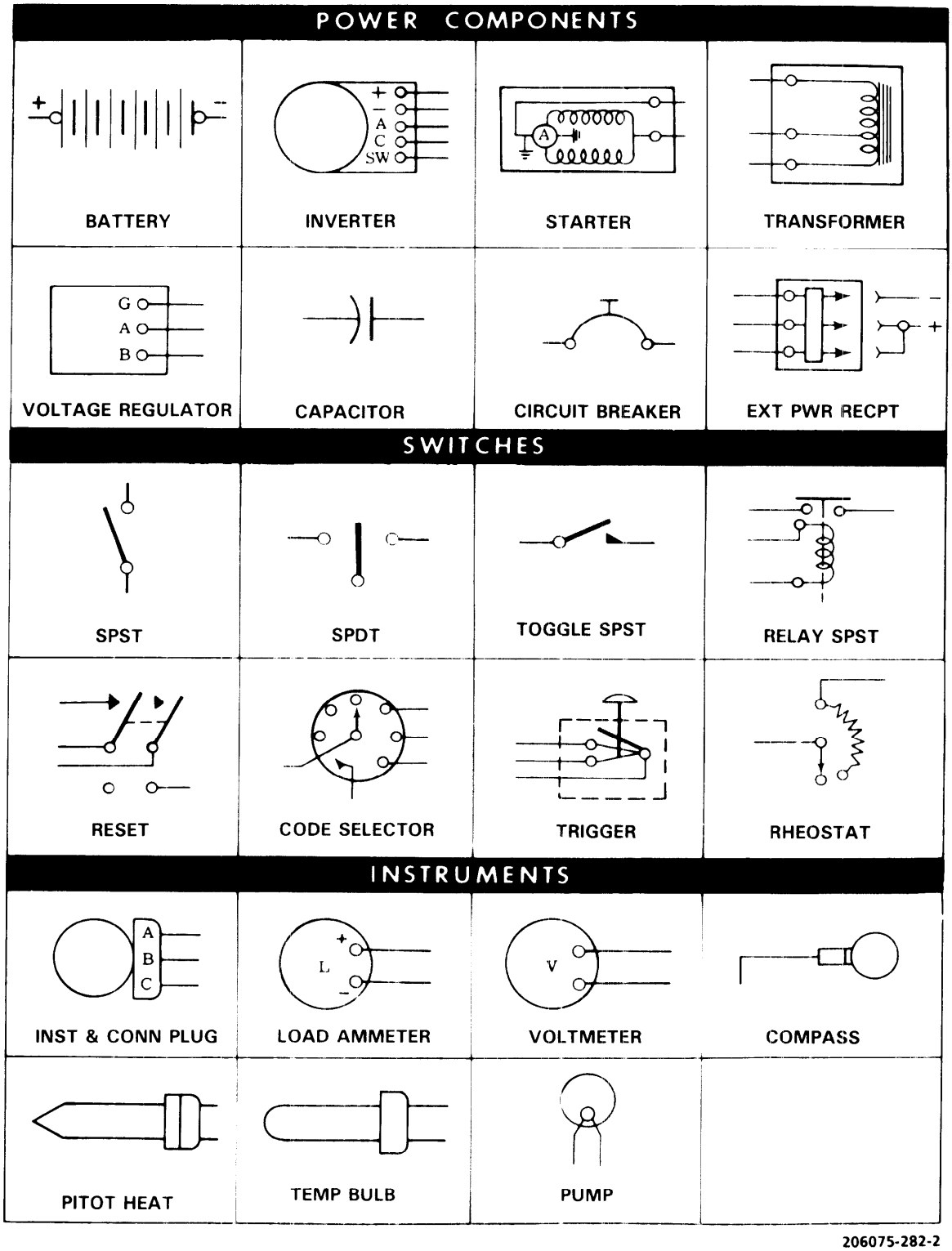


Figure F-2. Electrical Symbol Chart (Sheet 2)

A DESCRIPTION OF ITEM (NEXT HIGHER ASSY)	B OPER TIME MIN.	C TOTAL NO OF UNITS	D AMPS PER UNIT	E EQUIPMENT IDENTIFICATION (CKT)	F SOURCE OF POWER INFO	G OPERATING RANGE VOLTAGE MIN	G MAX	H CONN LOAD AMPS	OPERATING CONDITIONS K — START & WARM UP K-4: COND AMPS	AVERAGE AMPS 50 SEC	20 MIN	150 MIN	CONT
ESSENTIAL BUS													
ANN LTS SYSTEM				A XM-27E-1									
ANN LTS MASTER SW	0.5	1	52.1	A XM-13A	MEAS DATA	18.0	30.0	52.1	0	0	0	0	0
ELEVATION MOTOR	1.0	1	27.4	A XM-13A	MEAS DATA	18.0	30.0	27.4	0	0	0	0	0
ANN LGTS	30.0	1	0.68	A 6.2 #37 LAMP	MFG	18.0	30.0	0.7	0	0	0	0	0
MAG BRAKE-BOOST VENT SOLENOID VALVE BYPASS	30.0	1 1	0.336 0.8	C 206-001-374 C 20M-076-037	MEAS DATA MEAS DATA	16.0 18.0	32.0 30.0	0.8 0.8	0.8 0	0.8 0	0.8 0	0.8 0	0.8 0
INSTRUMENT CLUSTER	30.0	1	0.05	E 206-070-302	MEAS DATA	18.0	30.0	0.1	0.1	0.1	0.1	0.1	0.1
TURN & BANK IND	30.0	1	0.125	F MS25041-1	MEAS DATA	21.0	29.0	0.1	0.1	0.1	0.1	0.1	0.1
PITOT TUBE HEATER	30.0	1	3.64	H 206-070-296	MEAS DATA	21.0	29.0	3.6	3.6	3.6	3.6	3.6	3.6
ENG HEATER CONTROL	0.2	1	0.14	H AIR OIL NYLC 3463	MEAS DATA	21.0	29.0	0.1	0.1	0	0	0	0
SOLENOID-HEATER VALVE	30.0	1	0.736	H 206-070-991	MEAS DATA	19.0	30.0	0.7	0.7	0.7	0.7	0.7	0.7
IGNITER UNIT	0.4	1	0.50	J PART OF ENGINE	MEAS DATA	21.0	29.0	0.5	0.5	0.5	0.1	0	0
RELAY-STARTER STARTER-GENERATOR	0.4	1 1	6.41	K MS24133-D1 K 206-062-200	MEAS DATA	18.0	29.0	0.4					
INSTRUMENT & PEDESTAL LTS	30.0	55	0.04	L MS25237-327 LAMP	MEAS DATA	25.0	28.0	2.7	2.7	2.7	2.7	2.7	2.7
INSTRUMENT CLUSTER (TS)	30.0	1	0.35	L 206-070-307	MEAS DATA	21.0	29.0						
ANT-COLLISION LIGHT	30.0	2	6.77	L 206-075-529-3	MEAS DATA	21.0	29.0	6.8	6.8	6.8	6.8	6.8	6.8
FLASHER UNIT	30.0	1		L 206-075-529-5	MEAS DATA	21.0	29.0						
LANDING LIGHT	3.0	2	8.2	L 206-027-303-1	MEAS DATA	21.0	29.0	16.4	0	0	0	0	0
RELAY	3.0	2		L G.E. 3SAA50SIM1	MEAS DATA	23.0	30.0						
BATTERY CHARGING	30.0	1		P 206-075-363	MFG			0	34.1	34.1	25.3	20.4	20.4
RELAY-BATTERY	30.0	1	0.41	P MS24183-D1	MEAS DATA	18.0	29.0	0.4	0.4	0.4	0.4	0.4	0.4
RELAY-NONESSENTIAL BUS	30.0	1	0.40	P MS24182-D1	MIL-STD	18.0	29.0	0.5	0.5	0.5	0.5	0.5	0.5
RELAY-LINE CONTACT	30.0	1	0.41	P MS24183-D1	MEAS DATA	18.0	29.0	0.4	0.4	0.4	0.4	0.4	0.4
GOV RPM ACTUATOR	0.13	1	0.25	Q AIR-COL SPLC3598-1	MEAS DATA	26.0	35.0	0.3	0.3	0.3	0	0	0
PUMP-FUEL BOOST	30.0	1	3.46	Q LEAR SIEGLER RR/2240-1	MEAS DATA	21.0	29.0	3.5	3.5	3.5	3.5	3.5	3.5
ENG OIL BYPASS VALVE		1	2.0	Q ALLIED MHB-6D	MEAS DATA	18.0	30.0	2.0	0	0	0	0	0
ENG OIL BYPASS RELAY		1	1.5	Q GEN CONT AV2381106B	MEAS DATA	21.0	29.0	1.5	0	0	0	0	0
INTERCOM SYSTEM	30.0	2	0.072	R C6533/ARC	MEAS DATA	21.0	29.0	0.1	0.1	0.1	0.1	0.1	0.1
UHF TRANSCEIVER	30.0	1	0.775	R AN/ARC-116	MEAS DATA	21.0	29.0	0.8	0.8	0.8	0.8	0.8	0.8
(ADDITIONAL POWER XMIT)			0.922					0.9	0.9	0.9	0.1	0	0
ADF RADIO COMPASS	30.0	1	0.837	R R-1476(V)1/ARN-89	MEAS DATA	21.0	29.0	0.9	0.9	0.9	0.9	0.9	0.9
AUDIO THRESHOLD SYS	30.0	1	0.140	R 206-075-597	MEAS DATA	21.0	29.0	0.1	0.1	0.1	0.1	0.1	0.1
IFF TRANSPONDER	30.0	1	2.13	S RT-459/APX-72	MEAS DATA	21.0	29.0	2.1	2.1	2.1	2.1	2.1	2.1
XPNDR COMPUTER	30.0	1	1.1	S KIT-1A/TSEC	MFG	21.0	29.0	1.1	1.1	1.1	1.1	1.1	1.1
TEST SET	30.0	1	0.7	S TS-1843/APX	MFG	21.0	29.0	0.7	0.7	0.7	0.7	0.7	0.7
CAUTION PANEL	30.0	1	0.2	W 226-073-456-7	EST	17.0	30.0	0.2	0.2	0.2	0.2	0.2	0.2
ENG OUT WARNING BOX	30.0	1	0.2	W 206-075-545	EST	20.0	30.0	0.2	0.2	0.2	0.2	0.2	0.2
ESSENTIAL BUS TOTAL									61.7	61.6	57.8	46.3	46.2

OPERATING CONDITIONS K — TAKE OFF K-6: COND	AMPS	AVERAGE AMPS 5 0 SEC	2 0 MIN	1 5 0 MIN	CONT	CRUISE K-7: COND	AMPS	AVERAGE AMPS 5 0 SEC	2 0 MIN	1 5 0 MIN	CONT	CRUISE-COMBAT K-8: COND	AMPS	AVERAGE AMPS 5 0 SEC	2 0 MIN	1 5 0 MIN	CONT	LAND K-9: COND	AMPS	AVERAGE AMPS 5 0 SEC	2 0 MIN	1 5 0 MIN	CONT	EMERGENCY K-10: COND	AMPS	AVERAGE AMPS 5 0 SEC	2 0 MIN	1 5 0 MIN	CONT
0	0	0	0	0	0	0	0	0	0	0	0	52.1	52.1	13.1	1.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	27.4	27.4	13.7	1.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0.7	0.7	0.7	0.7	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0
0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	0	0	0	0	0	0	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.4	16.4	16.4	5.5	0	0	16.4	16.4	16.4	5.5	0	0
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0	0	0	0	0	0
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
47.4	47.4	44.2	41.1	41.0	42.2	42.2	42.3	33.7	33.6	30.2	30.2	34.5	27.6	25.0	47.8	47.7	46.6	34.3	29.3	41.1	41.1	40.4	30.0	23.5					

POWER SOURCE EQUIPMENT

STARTER-GENERATOR - BMC SPECIFICATION 206-062-200, 30 VOLT, 150 AMPS (OPERATED AT 140 AMPS FOR THIS INSTALLATION) @ RATIO TO 12,500 RPM ENGINE GENERATOR GAS SPEED 8300 TO 12,080 RPM (BASED ON 69% TO 100% OF GAS PRODUCER RPM AND GEAR RATIO OF 0.6361 TO 1.0, STARTER TO GAS PRODUCER)

VOLTAGE REGULATOR - BMC SPECIFICATION 206-075-447

BATTERY - BMC SPECIFICATION 206-075-363, 24 VOLT, 13 AMP-HOUR RATING (BASED ON FIVE HOUR DISCHARGE RATE).

A THIS EQUIPMENT INSTALLED ON S/N 70-15263 THRU 70-15277.

B POWER PROVIDED FOR THIS EQUIPMENT ON ALL AIRCRAFT EXCEPT S/N 70-15263 THRU 70-15277.

3 THE BATTERY, WHEN 85% CHARGED, CAN SUPPLY ALL ESSENTIAL LOADS FOR 83.3 MINUTES, OR ALL ESSENTIAL LOADS LESS PITOT TUBE AND FUEL BOOST PUMP FOR 346 MINUTES

4 ONE MINUTE OPERATION PER TEN MINUTES

B ANTI-COLLISION LIGHTS FLASHING ALTERNATELY

2 BATTERY LOAD DURING STARTING ONLY

1 THIS EQUIPMENT NORMALLY DE-ENERGIZED

NOTES-

CHART- LOAD ANALYSIS
ELECTRICAL-D.C.
SHEET 1 OF 3

Figure F-3. Load Analysis Chart (Sheet 1 of 3) A

206075-283-1

A DESCRIPTION OF ITEM (SEE NOTE)	B OPER TIME-MIN	C TOTAL NO OF UNITS	D AMPS PER UNIT	E EQUIPMENT IDENTIFICATION (**)	F SOURCE OF POWER INFO	G OPERATING RANGE VOLTAGE MIN	G MAX	H CONN LOAD AMPS	OPERATING CONDITIONS K: START & WARM UP K-4 — COND AMPS	AVERAGE AMPS 50 SEC	20 MIN	150 MIN	CONT	TAKE OFF K-6 — COND AMPS	AVERAGE AMPS 50 SEC	20 MIN	150 MIN	CONT	CRUISE K-7 — COND AMPS	AVERAGE AMPS 50 SEC	20 MIN	150 MIN	CONT	CRUISE-COMBAT K-8 — COND AMPS	AVERAGE AMPS 50 SEC	20 MIN	150 MIN	CONT	LAND K-9 — COND AMPS	AVERAGE AMPS 50 SEC	20 MIN	150 MIN	CONT	EMERGENCY K-10 — COND AMPS	AVERAGE AMPS 50 SEC	20 MIN	150 MIN	CONT	
NON-ESSENTIAL BUS																																							
COMBUSTION HEATER MOTOR	30.0	1	22.5	H 206-076-340	MEAS DATA	21.2	29.0	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
COMBUSTION HEATER KIT	30.0	1	22.5	H 206-076-33 (Mod)																																			
LEVEL GAUGE	30.0	2	1.41	H [illegible]	MEAS DATA	21.2	29.0	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
LOCKER LIGHT	30.0	1	0.178	L MS17247-5	MEAS DATA	22.2	27.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
POSITION LIGHTS - FWD	30.0	2	2.8	L 14752 LAMP	MEAS DATA	21.0	29.0	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
POSITION LIGHTS - AFT	30.0	1		L 1683 LAMP	VEH SYS	21.0	29.0																																
INVERTER	30.0	1	3.08	P 206-078-264	[illegible]	22.0	30.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
VHF-FM TRANSCEIVER	30.0	2	0.46	R AN/ARC-114	MEAS DATA	21.2	29.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
(ADDITIONAL PWR XMIT) (4)			3.74					7.5	7.5	7.5	3.8	0.8	0	7.5	7.5	3.8	0.8	0	7.5	7.5	3.8	0.8	0	7.5	7.5	3.8	0.8	0	7.5	7.5	3.8	0.8	0	0	0	0	0	0
VHF-AM TRANSCEIVER	30.0	1	0.62	R AN/ARC-115	MEAS DATA	21.0	29.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
(OPTIONAL PWR XMIT) (4)			1.79					1.8	1.8	1.8	0.9	0.2	0	1.8	1.8	0.9	0.2	0	1.8	1.8	0.9	0.2	0	1.8	1.8	0.9	0.2	0	1.8	1.8	0.9	0.2	0	0	0	0	0	0
COMMUNICATION SECURITY SET	30.0	1	2.2	R TSEC/KY-28	SPEC	21.0	29.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ESSENTIAL BUS TOTALS				(FROM SHEET 1)					41.7	41.6	41.8	41.2	41.2	41.7	41.9	41.4	41.1	41.0	42.2	42.2	42.4	39.7	33.6	108.2	108.2	54.5	27.6	24.0	47.8	47.7	46.6	34.9	29.3	41.1	41.1	40.4	30.0	23.5
NON-ESSENTIAL BUS TOTALS									44.2	44.2	39.6	35.9	34.9	44.2	44.2	37.6	35.9	34.9	44.2	44.2	37.6	35.9	34.9	44.2	41.2	36.6	30.1	31.9	44.2	44.2	39.6	35.9	34.9	0	0	0	0	0
TOTAL DC LOAD									105.9	105.8	91.4	82.2	81.1	96.6	96.8	83.8	77.0	75.7	86.4	86.4	80.5	69.6	66.5	149.4	149.4	91.1	60.5	55.9	92.0	91.9	86.2	70.8	64.2	41.1	41.1	40.4	30.0	23.5

POWER SOURCE EQUIPMENT

NOTES-

CHART- LOAD ANALYSIS
ELECTRICAL-D.C.
SHEET 2 OF 3

206075-283-2

Figure F-3. Load Analysis Chart (Sheet 2) A

A DESCRIPTION OF ITEM (SEE NOTE)	B OPER. TIME-MIN.	C TOT. NO. OF UNITS	ELECTRICAL LOAD REQUIREMENTS PER UNIT D: 115 VOLTS 1 PHASE VA	115 VOLTS 1 PHASE WATTS	115 VOLTS 1 PHASE VARS	26 VOLTS 1 PHASE VA	26 VOLTS 1 PHASE WATTS	26 VOLTS 1 PHASE VARS	E CKT	E EQUIPMENT IDENTIFICATION	F SOURCE OF POWER INFO.	OPERATING RANGE G: VOLTAGE MIN.	VOLTAGE MAX.	FREQUENCY MIN.	FREQUENCY MAX.	H CONNECTED LOAD WATTS	H CONNECTED LOAD VARS	J POWER FACTOR	OPERATING CONDITIONS K: 5.0 SEC. WATTS	5.0 SEC. VARS	2.0 MIN. WATTS	2.0 MIN. VARS	15.0 MIN. WATTS	15.0 MIN. VARS	CONT. AVG. WATTS	CONT. AVG. VARS	
ESSENTIAL BUS																											
INDICATOR ATTITUDE	30.0	1	10.75	9.90	-4.20				F	206-070-320	MEAS. DATA	108.0	118.0	380	420	9.90	-4.20	0.921	9.90	-4.20	9.90	-4.20	9.90	-4.20	9.90	-4.20	B
COMPASS SYSTEM										AN/ASN-43																	
DIRECTIONAL GYRO	30.0	1	18.68	13.54	12.87				F	CN-998C()/ASN-43	MEAS. DATA	107.5	119.5	380	420	13.54	12.87	0.726	23.48	14.67	22.04	13.76	13.54	12.87	13.54	12.87	
TRANSMITTER	30.0	1							F	T-611()/ASN	MEAS. DATA	107.5	119.5	380	420												
BEARING MDS. IND.	30.0	1	5.16	1.76	4.79				F	IND-135/A	MEAS. DATA	107.5	119.5	390	410	1.76	4.79	0.342	1.76	4.79	1.76	4.79	1.76	4.79	1.76	4.79	
RELAY-AC FAIL	30.0	1	0.413	0.338	0.237				X	206-075-4571	MEAS. DATA	103.0	124.0	380	420	0.34	0.24	0.819	0.34	0.24	0.34	0.24	0.34	0.24	0.34	0.24	
TOTALS																			35.48	15.50	34.04	14.59	25.54	13.70	25.54	13.70	B
TOTAL AC LOAD																			38.8 VA 0.92 PF (LAG)		36.8 VA 0.92 PF (LAG)		29.0 VA 0.98 PF (LAG)		29.0 VA 0.88 PF (LAG)		B

POWER SOURCE EQUIPMENT

INVERTER - BMC SPECIFICATION 206-075-364 3 OR -5, 115 VAC, 400 HZ, 65 VOLT-AMPERES CONTINUOUS (A) 0.95 PF (LAG, TO 0.95 PF (LEAD) SERVICE FACTOR @ 1.0 PF AND FULL LOAD: 65% MINIMUM FOR -3 AND 45% MINIMUM FOR -5 INVERTER

1 THE TOTAL LOAD SHOWN FOR THE "CONT. AVG." COLUMN IS APPLICABLE TO ALL TIME INTERVALS FROM TAKE-OFF THRU THE "LAND" REGIMES

NOTES:

CHART - LOAD ANALYSIS
ELECTRICAL-AC
SHEET 3 OF 3

Figure F-3. Load Analysis Chart (Sheet 3) A

206075-283-3

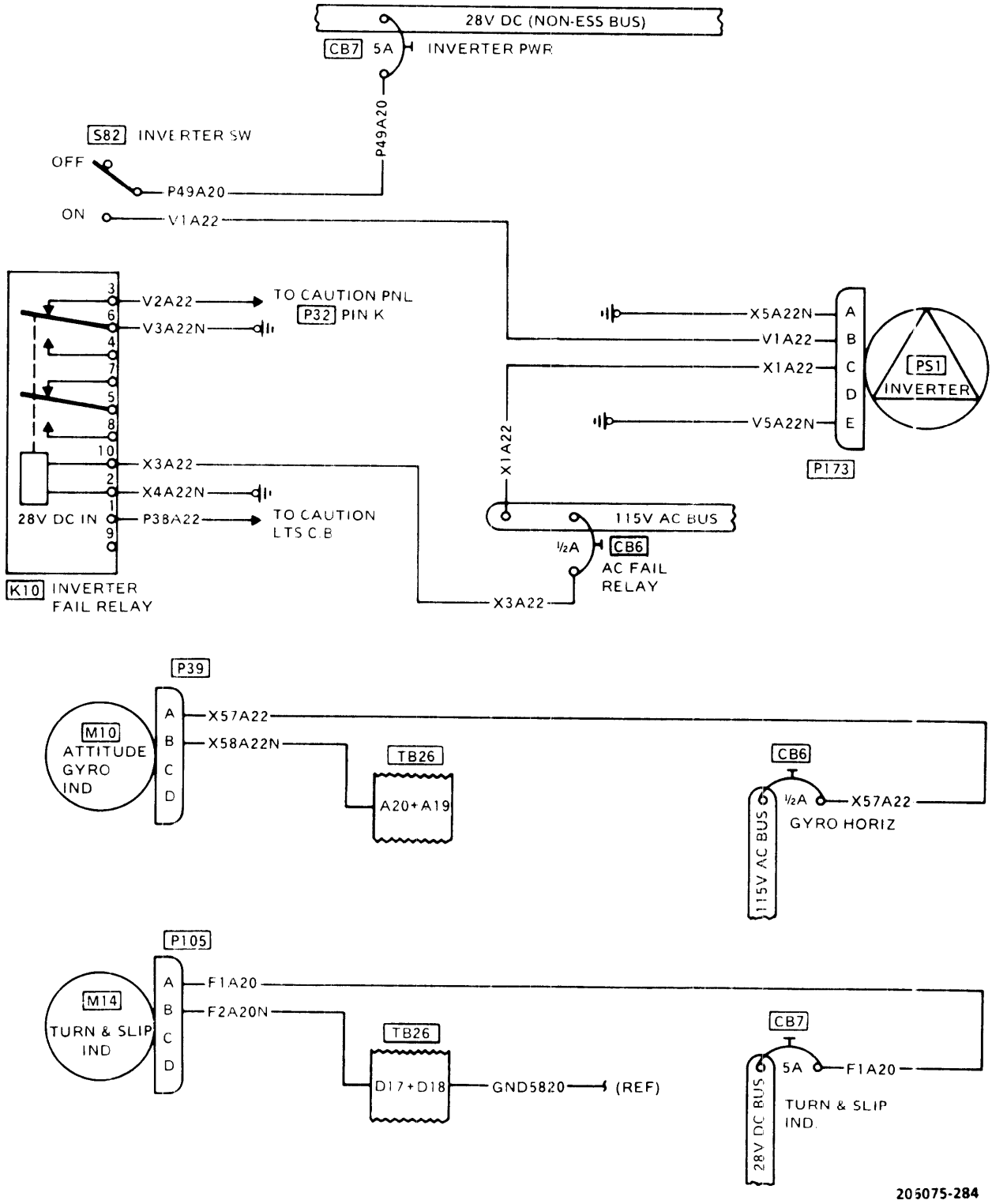


Figure F-4. Inverter, Attitude Gyro, and Turn and Slip Indicator Systems — Wiring Diagrams A

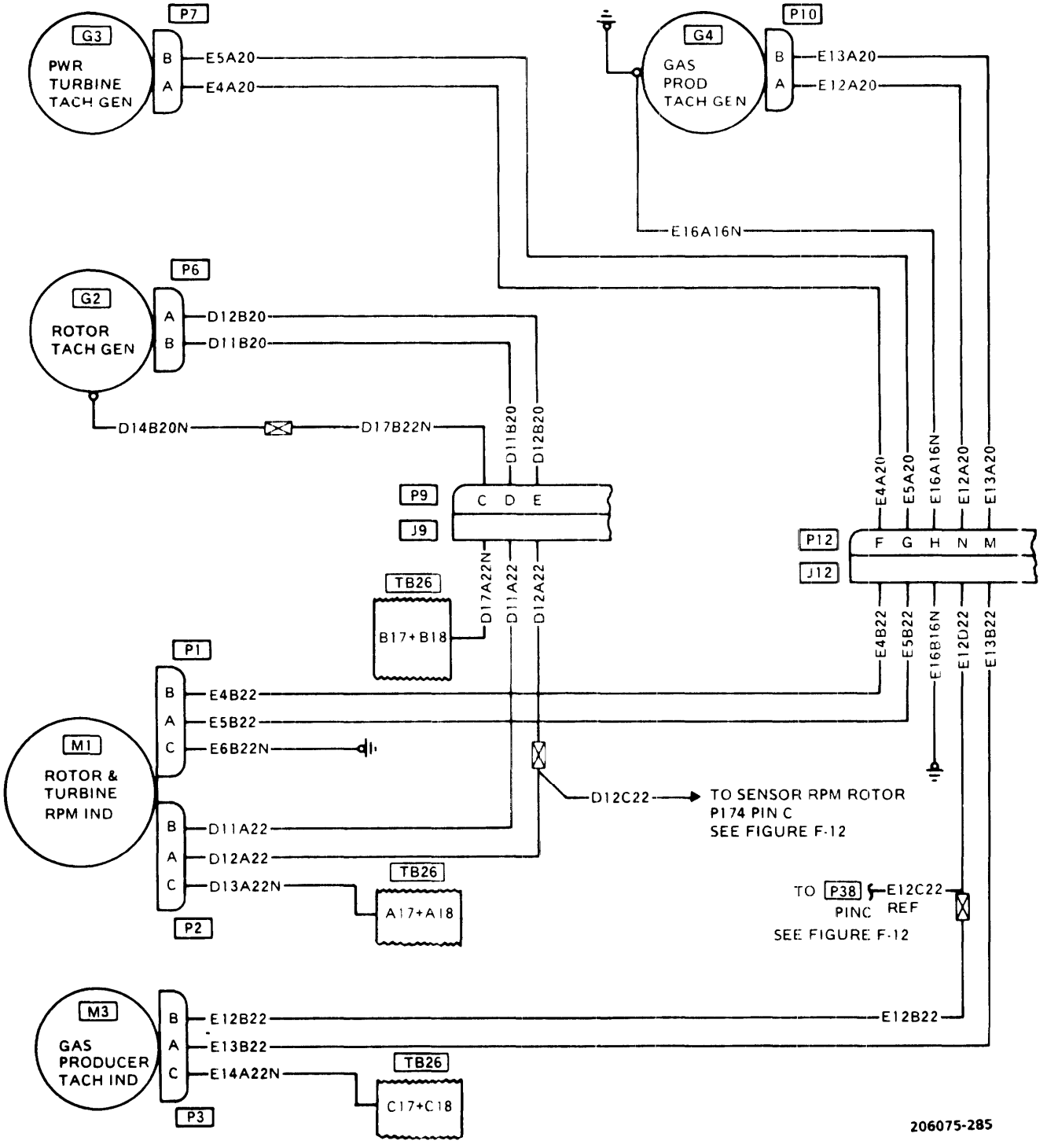


Figure F-5. Tachometer Indicator Systems -- Wiring Diagrams A

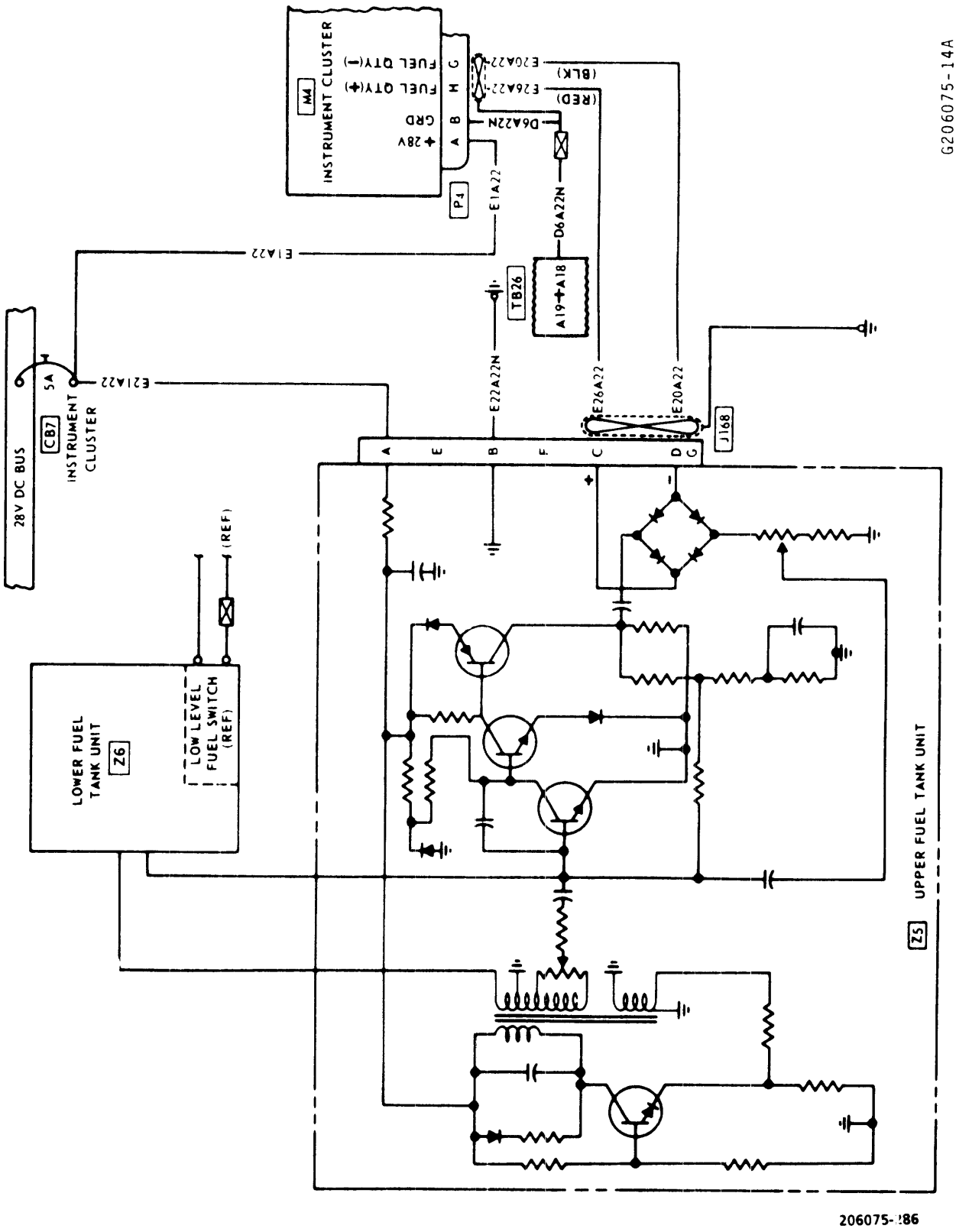


Figure F-6. Fuel Quantity Indicating System — Wiring Diagram A

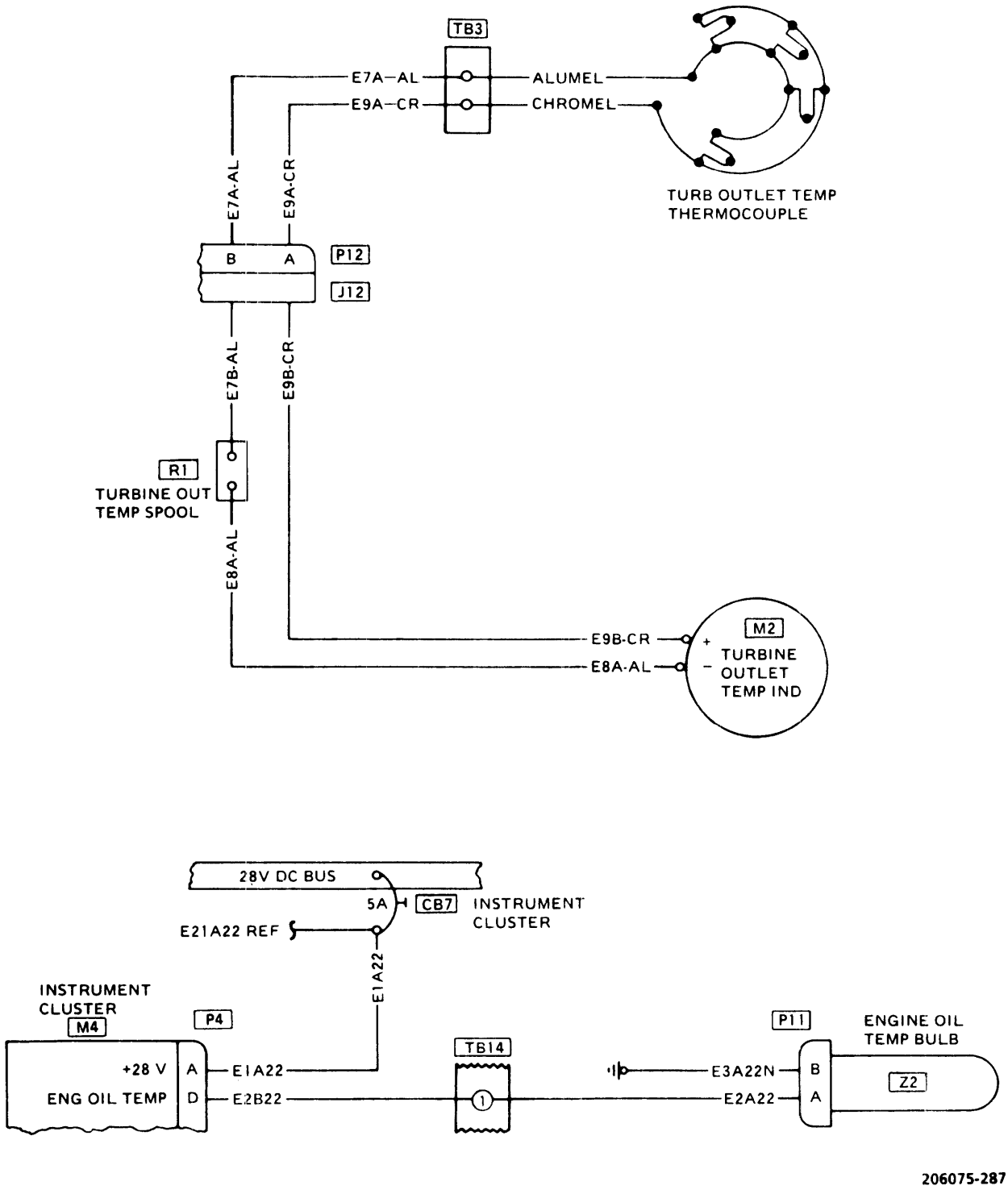
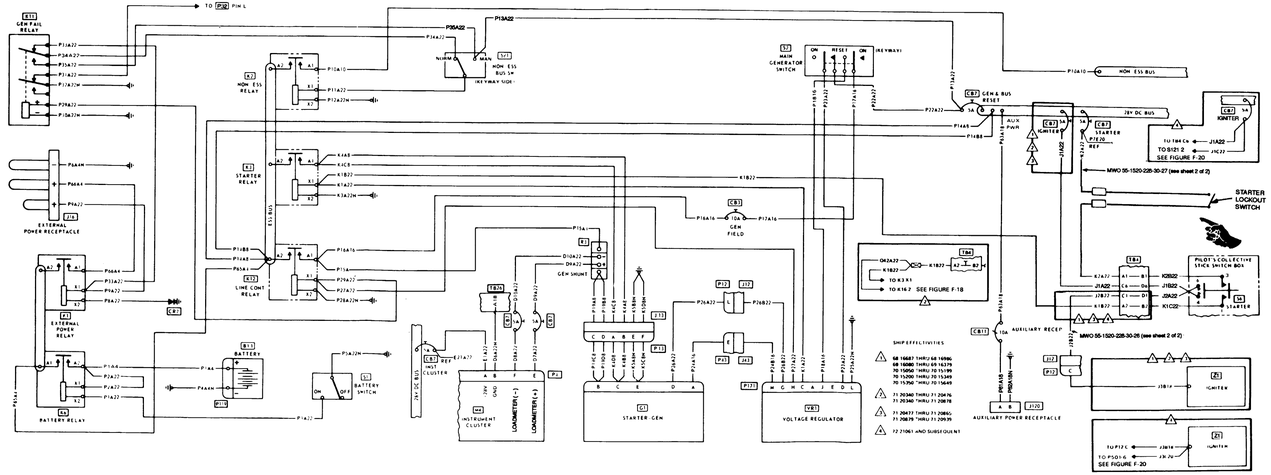


Figure F-7. Engine Oil and Turbine Outlet Temperature Indicating Systems — Wiring Diagram A


TO P12 PIN L
K11 GEN FAIL RELAY
P13A22
P35A22
P34A22
P33A22
P12A22
P17A22M
P29A22
P35A22M
K2 HOM ESS RELAY
P12A10
HOM ESS BUS
P11A22
P11A22M
S17 MAIN GENERATOR SWITCH
ON RESET ON
KEYWAY
P12A10
HOM ESS BUS
CB5 GEN & BUS RESET 1A
P27A22
787 DC BUS
P14A5
P14B4
AUX PWR
CB2 IGNITER 1A
CB7 STARTER 1A
P1E20 REF
J1A22
J1C27
TO T184 CA
TO R121 B
SEE FIGURE F-20
MWO 55-1520-228-30-27 (see sheet 2 of 2)
STARTER LOCKOUT SWITCH
K1 STARTER RELAY
K1A5
K1C3
K1B22
K1A22
K1A22M
K1B22
CB3 10A GEN FIELD
P16A16
P12A16
P16A16
P15A
P29A22
P27A22
P28A22M
P15A
D10A22
D9A22
GEN SHUNT
TB3
TB4
K1B22
TO K3 K1
TO K16 F
SEE FIGURE F-18
P1E1
P1E2
P1E3
P1E4
P1E5
P1E6
P1E7
P1E8
P1E9
P1E10
P1E11
P1E12
P1E13
P1E14
P1E15
P1E16
P1E17
P1E18
P1E19
P1E20
P1E21
P1E22
P1E23
P1E24
P1E25
P1E26
P1E27
P1E28
P1E29
P1E30
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P1E38
P1E39
P1E40

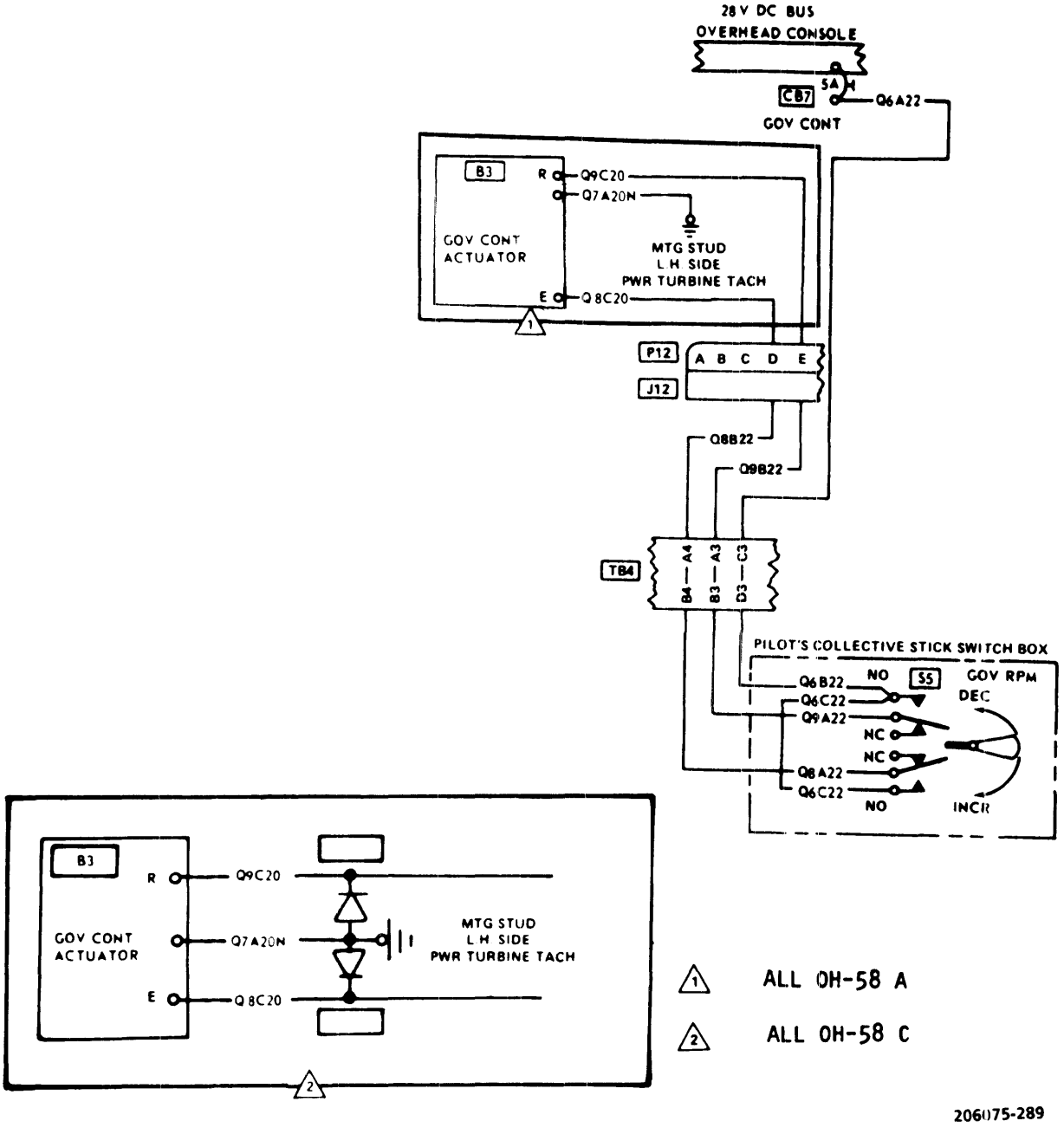


Figure F-9. Governor Control Systems — Wiring Diagram

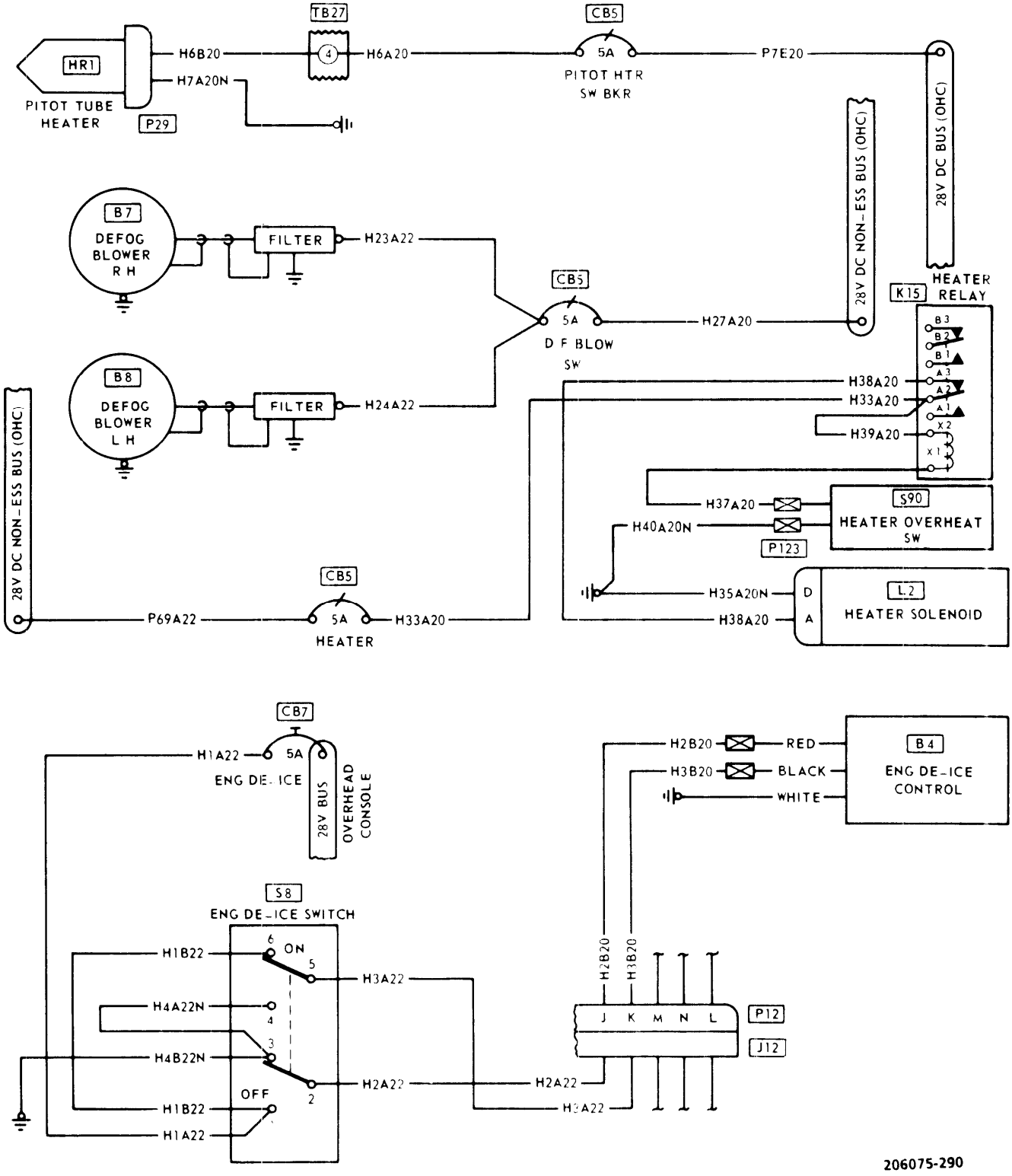


Figure F-10. Heating, Defogging Blower, and Engine De-Icing Systems — Wiring Diagram

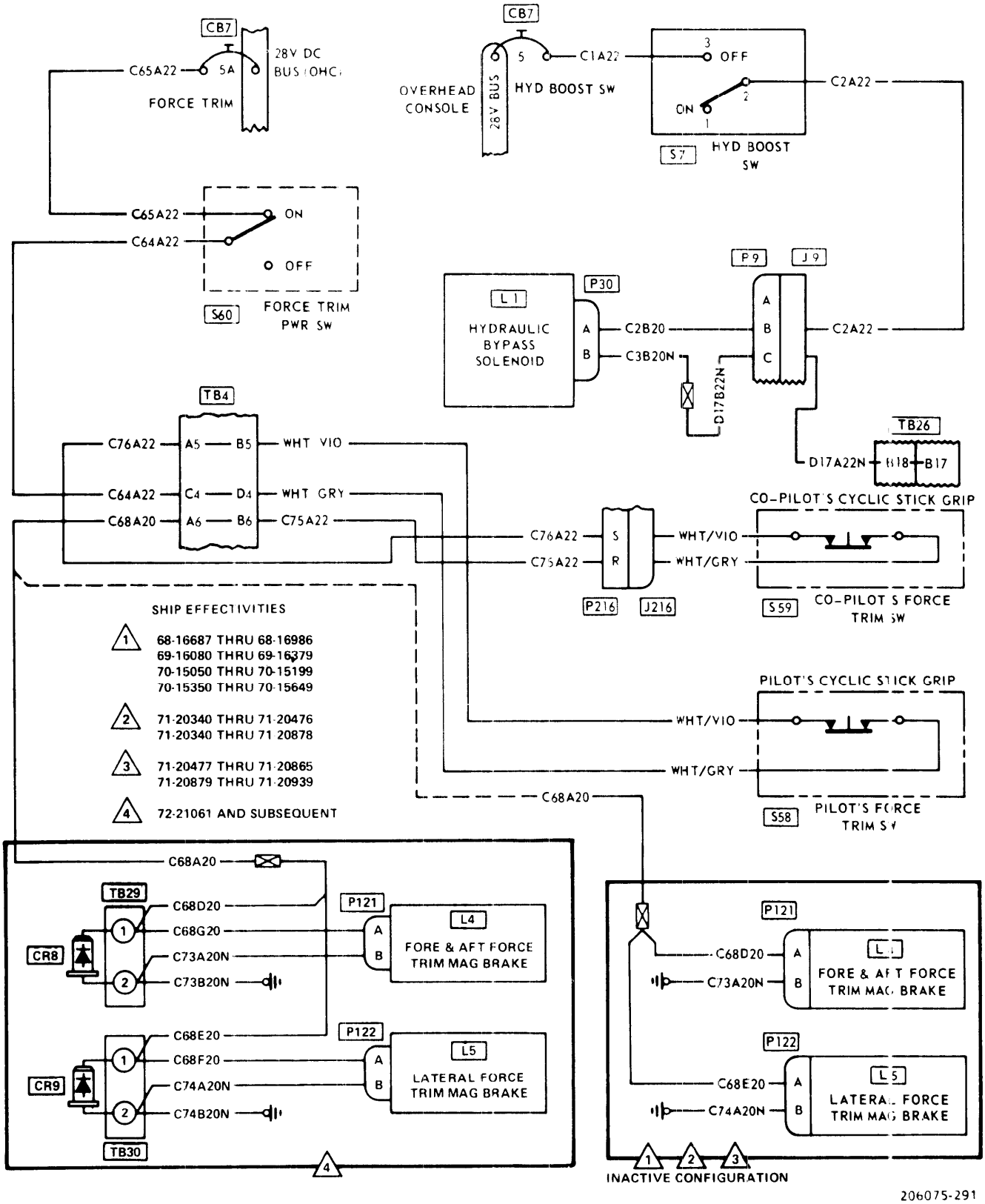
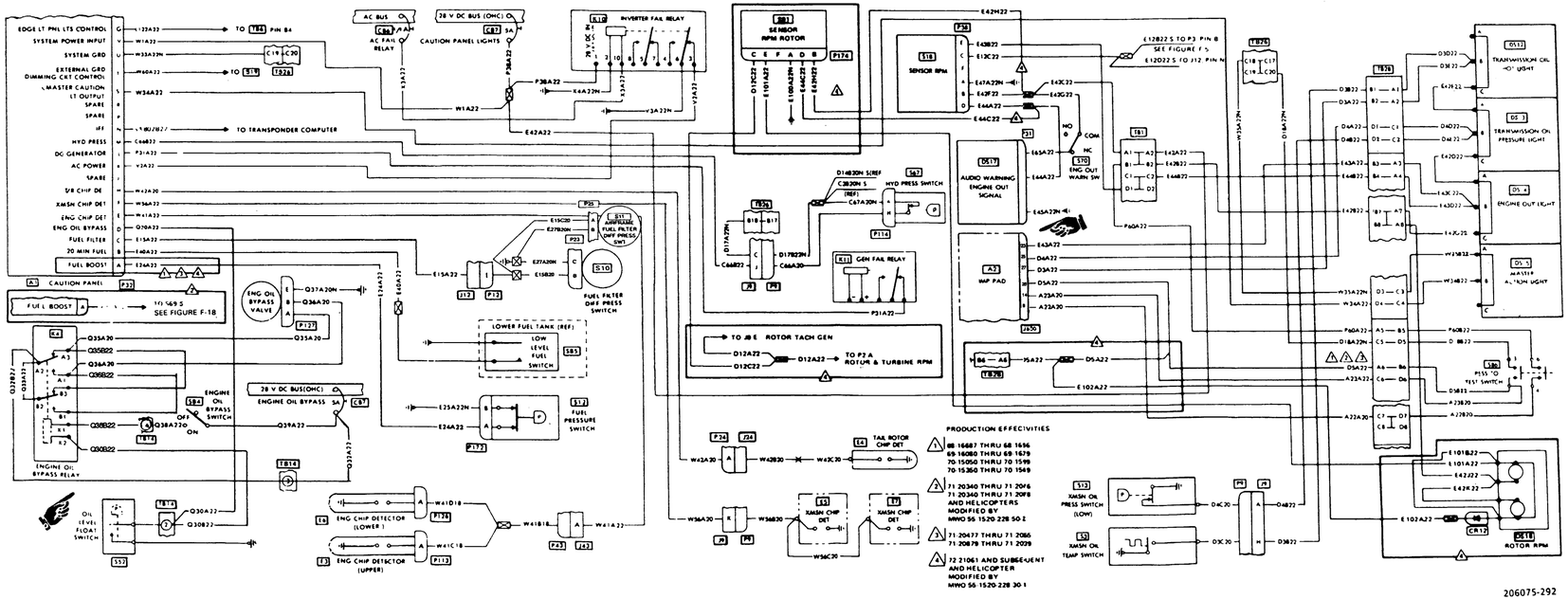


Figure F-11. Force Trim and Hydraulic Control Systems — Wiring Diagram



206075-292

Figure F-12. Caution and Warning Light Systems — Wiring Diagram A

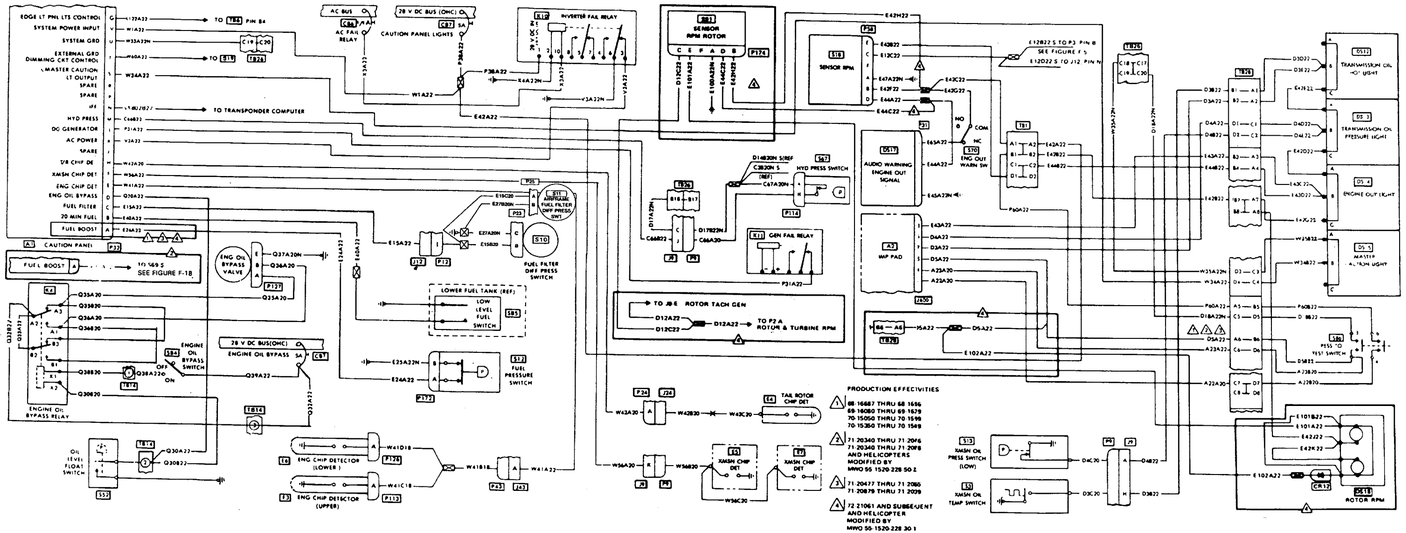


Figure F-12. Caution and Warning Light Systems — Wiring Diagram A

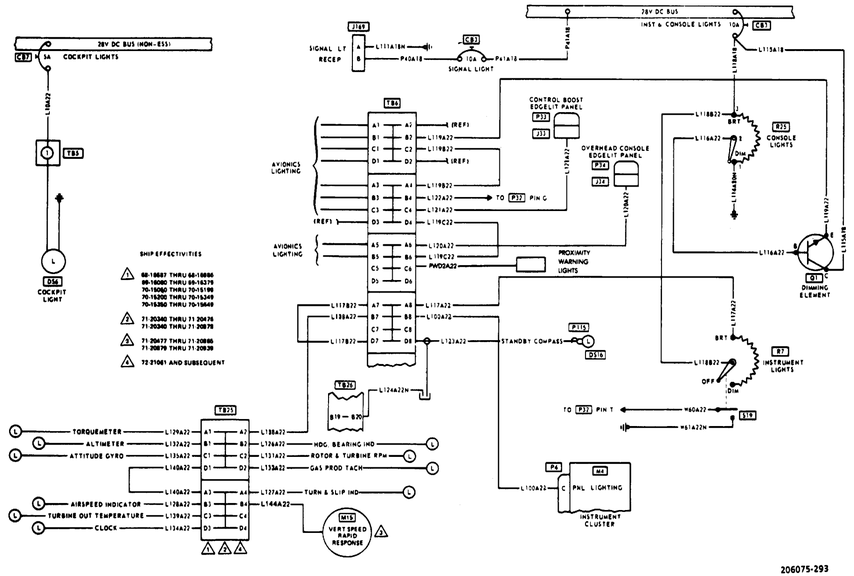


Figure F-13. Interior Lights System — Wiring Diagram A

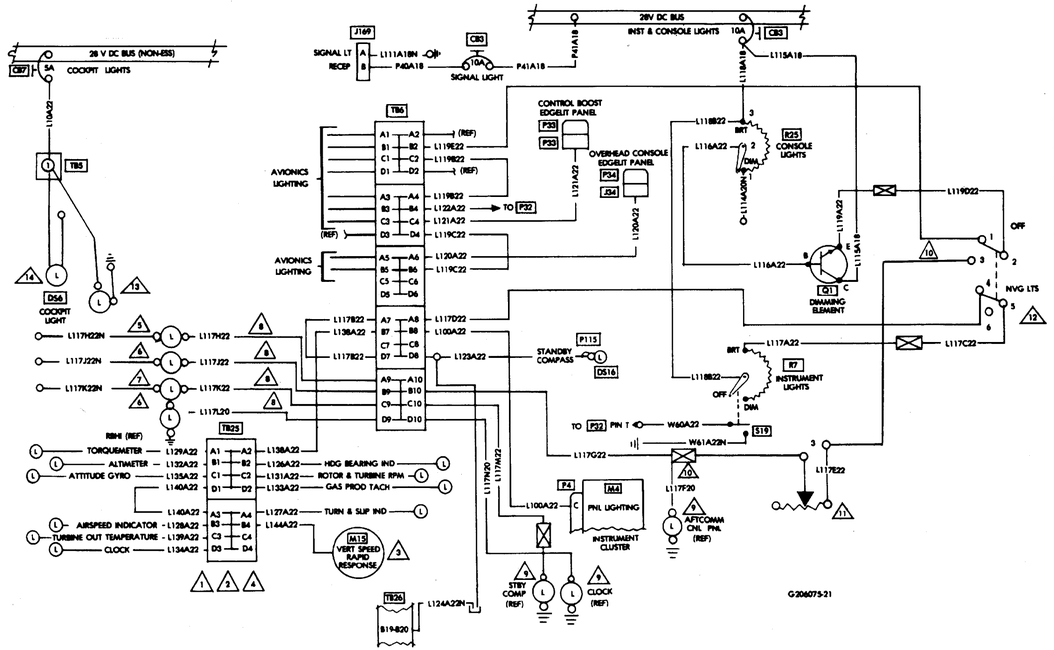


Figure F-14. Interior Lights System — Wiring Diagram A (After Compliance with MWO 55-1520-228-50/22 NVG)

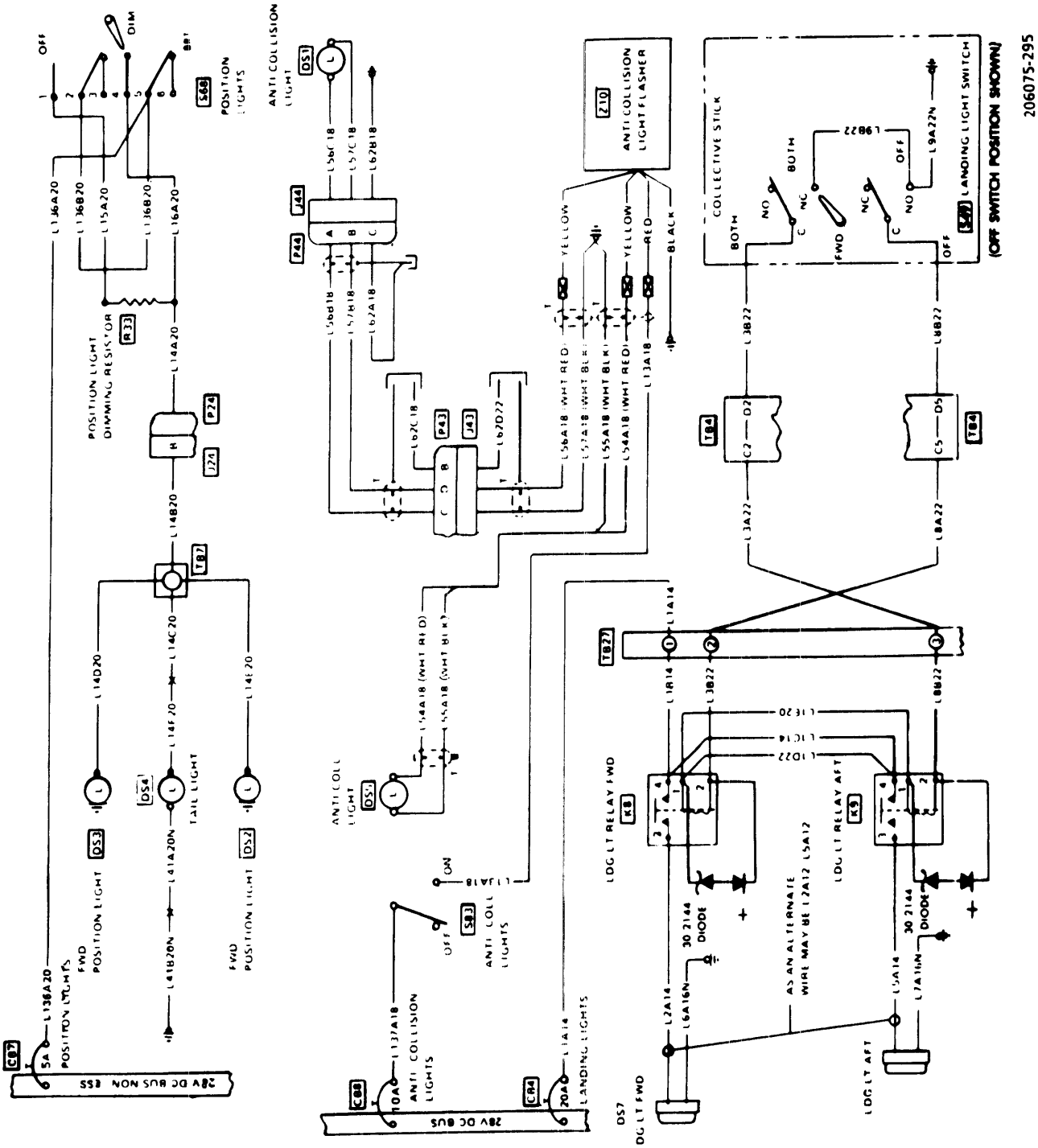


Figure F-15. Exterior Lights System — Wiring Diagram A
(Use for Rewired Lights)

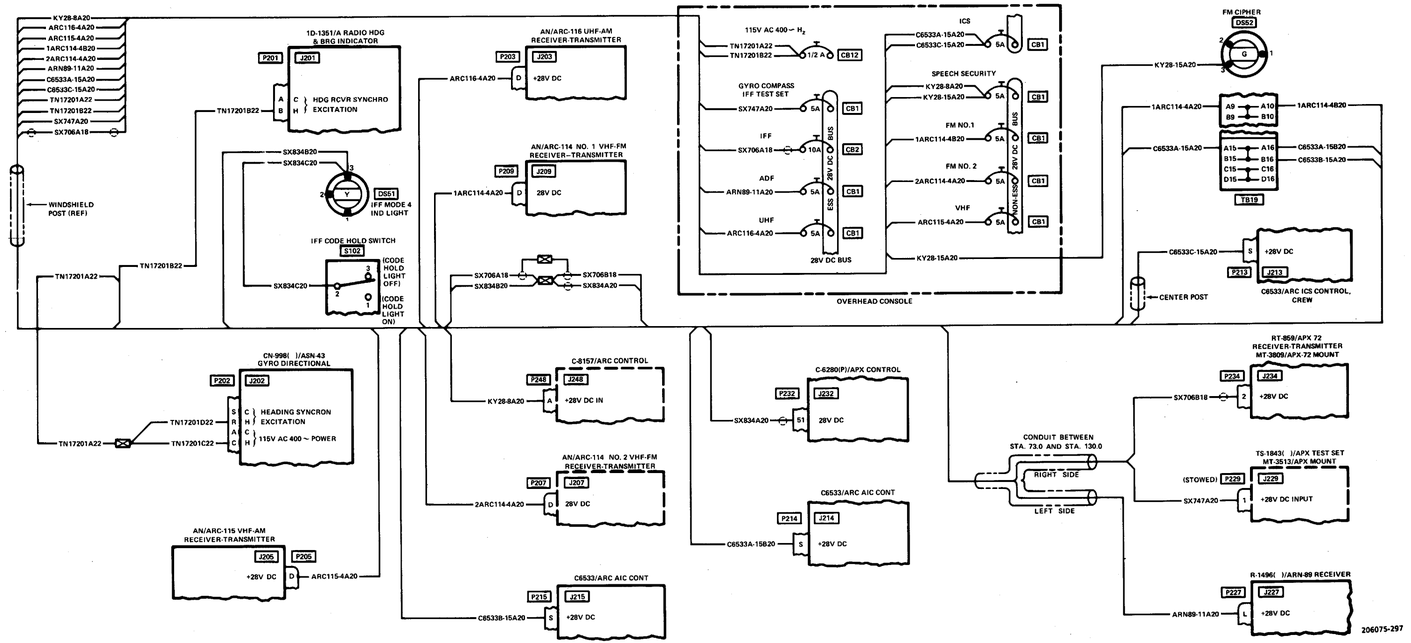


Figure F-17. Avionics Power — Wiring Diagram A

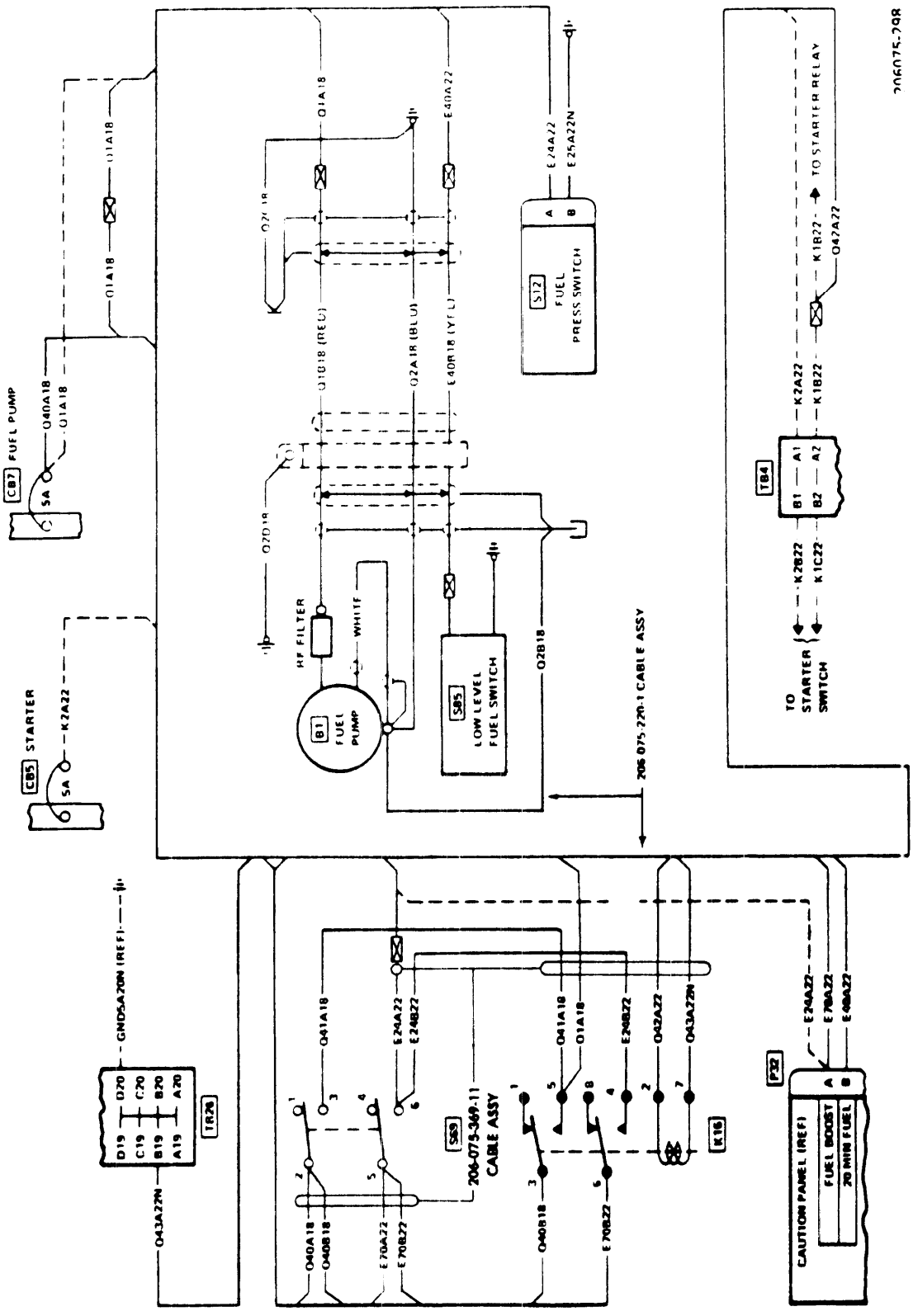
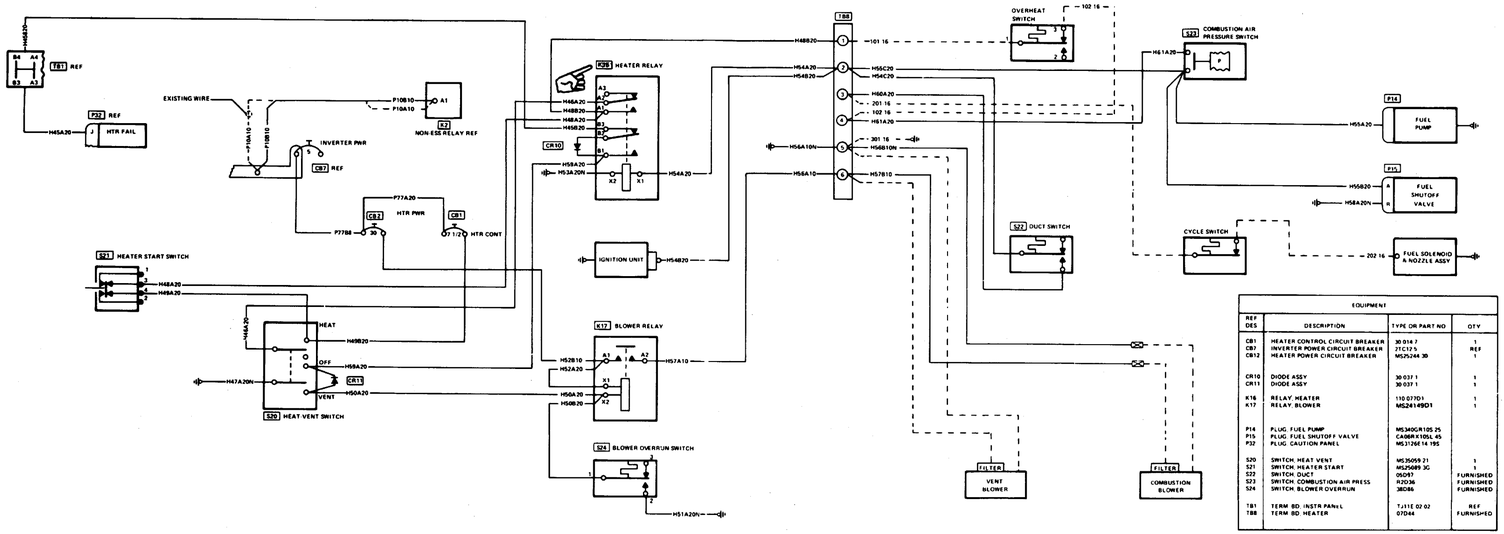


Figure F-18. Crashworthy Fuel System – Wiring Diagram A



EQUIPMENT			
REF DES	DESCRIPTION	TYPE OR PART NO	QTY
CB1	HEATER CONTROL CIRCUIT BREAKER	30 014 7	1
CB7	INVERTER POWER CIRCUIT BREAKER	27C12 5	REF
CB12	HEATER POWER CIRCUIT BREAKER	MS25244 30	1
CR10	DIODE ASSY	30 037 1	1
CR11	DIODE ASSY	30 037 1	1
K16	RELAY, HEATER	110 07701	1
K17	RELAY, BLOWER	MS24149D1	1
P14	PLUG, FUEL PUMP	MS3400R10S 2S	
P15	PLUG, FUEL SHUTOFF VALVE	CA08K10SL 4S	
P32	PLUG, CAUTION PANEL	MS3126E14 19S	
S20	SWITCH, HEAT VENT	MS25059 21	1
S21	SWITCH, HEATER START	MS25089 3G	1
S22	SWITCH, DUCT	06097	FURNISHED
S23	SWITCH, COMBUSTION AIR PRESS	R2036	FURNISHED
S24	SWITCH, BLOWER OVERRUN	38086	FURNISHED
TB1	TERM BD, INSTR PANEL	T-31E 02 02	REF
T88	TERM BD, HEATER	07D44	FURNISHED

206075-299

Figure F-19. Combustion Heater — Wiring Diagram

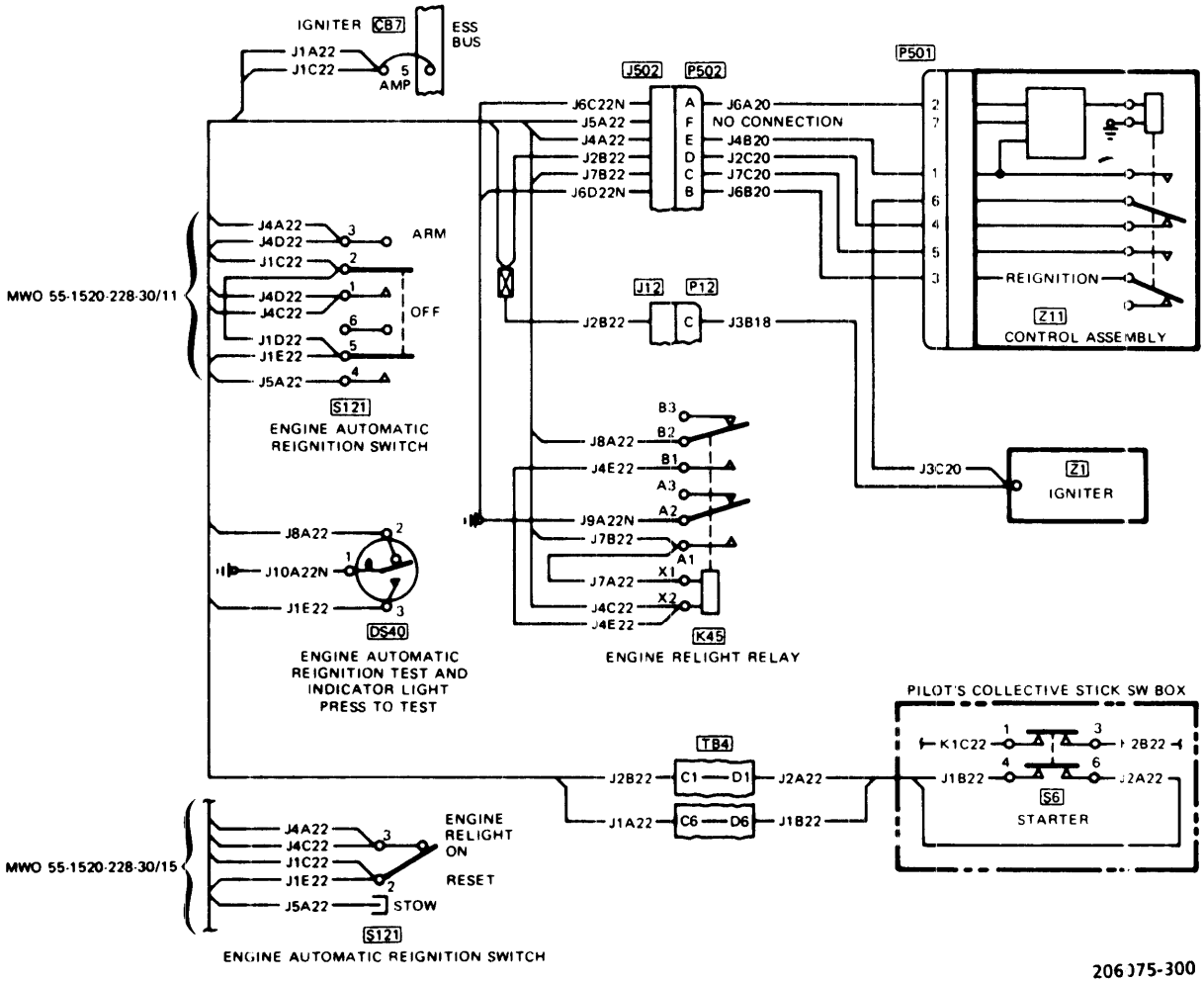


Figure F-20. Engine Auto Relight System — Wiring Diagram A

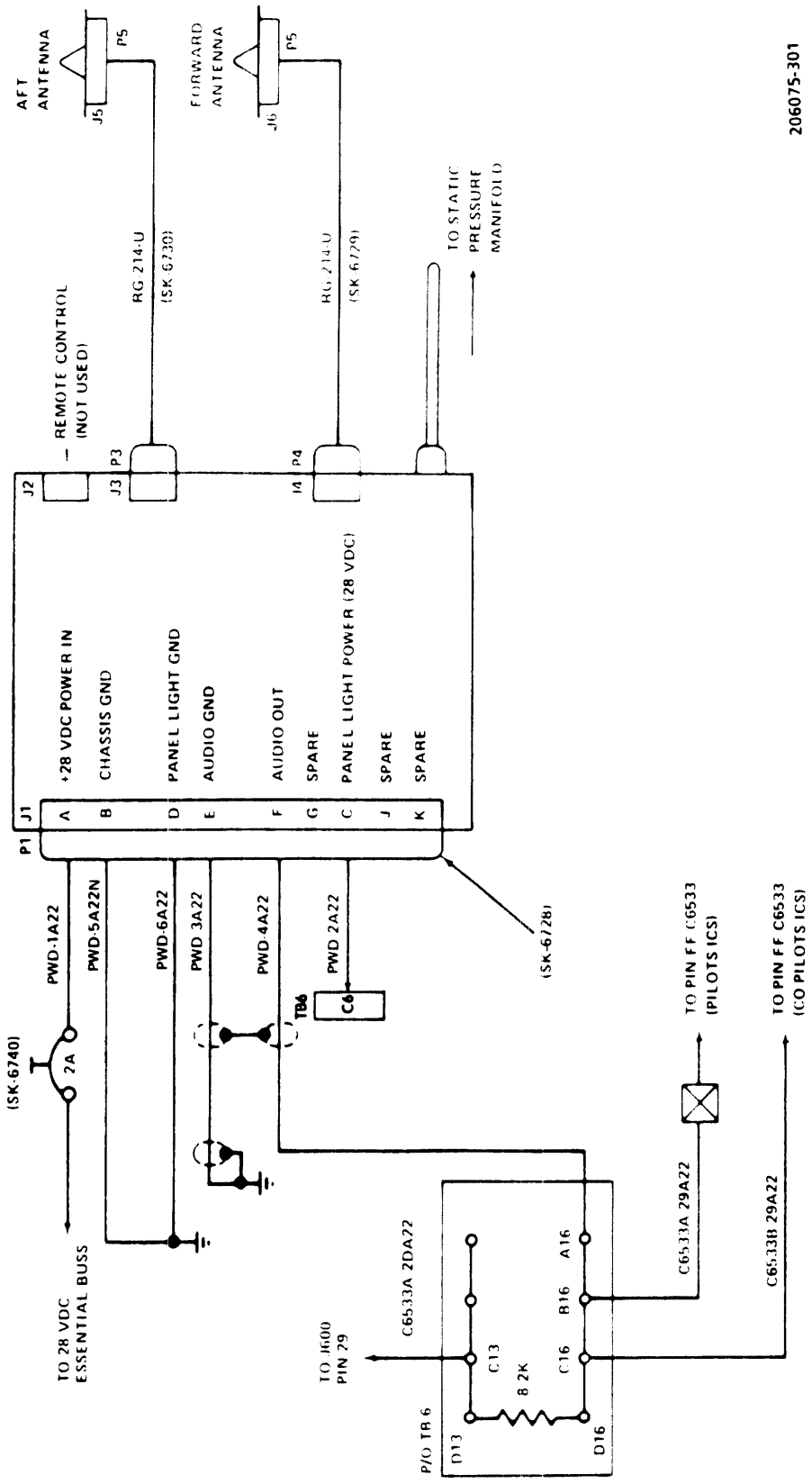
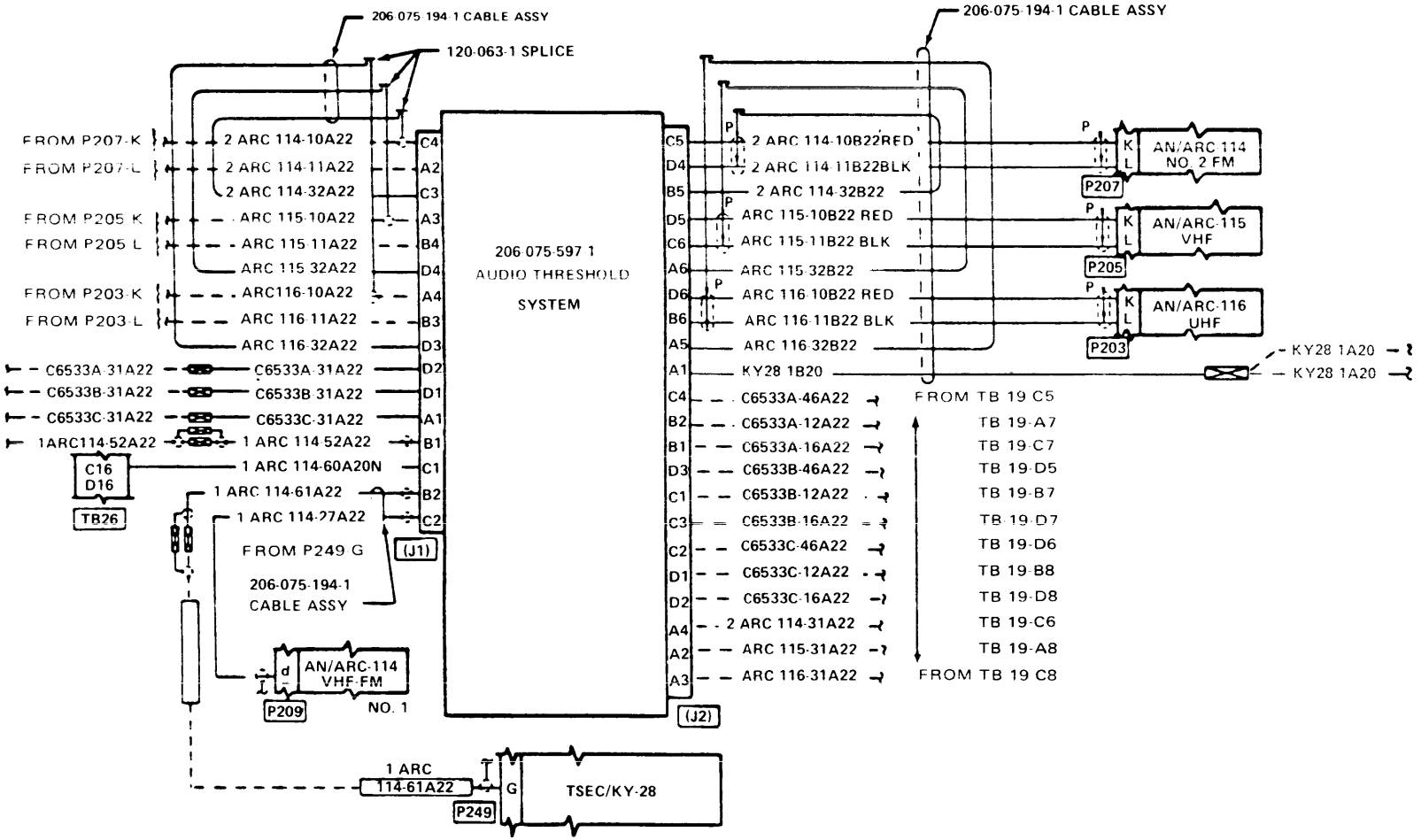


Figure F-21. Proximity Warning System — Wiring Diagram A



206075-302

Figure F-22. Audio Threshold System — Wiring Diagram

EQUIPMENT	PART DESIGNATION	NOTES	NO. OF UNITS	AMPS PER UNIT	OPER. TIME MIN.	MIN. VOLT	MAX. VOLT	PWR SOR INF	CONN LOAD	OPERATING CONDITIONS: START AND WARM-UP 5 SEC	START AND WARM-UP 2 MIN	START AND WARM-UP 15 MIN	TAKE-OFF 5 SEC	TAKE-OFF 2 MIN	TAKE-OFF 15 MIN	CRUISE 5 SEC	CRUISE 2 MIN	CRUISE 15 MIN	CRUISE — COMBAT 5 SEC	CRUISE — COMBAT 2 MIN	CRUISE — COMBAT 15 MIN	LAND EMERGENCY 5 SEC	LAND EMERGENCY 2 MIN	LAND EMERGENCY 15 MIN	5 SEC	2 MIN	15 MIN
			ESSENTIAL DC BUS																								
FLIGHT CONTROLS		C																									
MAG BRK-F-TRIM	204-001-376		2	0.39	15.00	24.00	28.50	MEA	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
HYDR BY-P SOIL	206-076-037	1	1	0.80	0.0	24.00	28.50	MEA	0.80																		
INSTRUMENTS		D																									
XMSN OIL PR IND	206-075-706		1	0.11	15.00	21.00	29.00	SPEC	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
ENGINE INSTRUMENTS		E																									
GAS PRODUCER IND	209-075-652		1	0.11	15.00	21.00	29.00	SPEC	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
ENG OIL T/P IND	206-075-705		1	0.11	15.00	21.00	29.00	SPEC	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
FUEL QTY INDSY	206-075-707		1	0.11	15.00	21.00	29.00	SPEC	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
TURBOUT TEMP IND	206-075-708		1	0.11	15.00	21.00	29.00	SPEC	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
AMMETER IND	206-075-710		1	0.11	15.00	21.00	29.00	SPEC	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
DUAL TACH IND	206-075-713		1	0.11	15.00	21.00	29.00	SPEC	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
FLIGHT INSTRUMENTS		F																									
PITOT HEATER	206-070-296		1	3.64	15.00	24.00	28.50	MEA	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64
ATTITUDE IND	206-075-714		1	0.72	15.00	21.00	29.00	SPEC	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
HEATING		H																									
ENG DE-ICE CONT	BARBER-C NYLC9463		1	0.14	0.20	24.00	28.50	MEA	0.14	0.14	0.01	0.00	0.14	0.01	0.00	0.14	0.01	0.00	0.14	0.01	0.00	0.14	0.01	0.00	0.14	0.01	0.00
HTR VALVE SOL	206-070-491		1	0.74	15.00	24.00	28.50	MEA	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74			
ENGINE IGNITION		J																									
IGNITER UNIT	PART OF ENGINE	2	1	0.50	0.0	24.00	28.50	MEA	0.50																		
ENGINE RELIGHT	PART OF ENGINE	1	1	0.05	0.0	24.00	28.50	MEA	0.05																		
ENGINE CONTROLS		K																									
STARTER RELAY	MS24183D1	2	1	0.41	0.0	24.00	28.50	MEA	0.41																		
LIGHTING		L																									
LANDING LIGHT	GRIMES G8386-1		1	16.50	5.00	24.00	28.50	SPEC	16.50													16.50	16.50	5.50	16.50	16.50	5.50
ANTI COLL LT	STROBE		1	10.50	15.00	24.00	28.50	SPEC	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50					10.50	10.50	10.50	10.50	10.50	10.50
INSTR PNL LTS	209-075-387		1	3.84	15.00	24.00	28.50	SPEC	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84
PANEL LIGHTING			1																								
RADAR WARNING			1	0.32	15.00	24.00	28.50	SPEC	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0932	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
CONUS NAV			1	0.08	15.00	24.00	28.50	SPEC	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
PROX WARNING			1	0.20	15.00	24.00	28.50	SPEC	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
POWER		P																									
BATTERY CHGING	206-075-363		1		15.00	24.00	28.50	MFG		39.86	29.45	13.04	12.99	11.88	5.97	5.95	5.42	2.83	2.82	2.62	1.83	1.82	1.78	1.68			
BATTERY RELAY	MS24183-D1		1	0.41	15.00	24.00	28.50	MEA	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
NONESS BUS RLY	MS24182-D1		1	0.50	15.00	18.00	29.00	MEA	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50			
LINE CONT RLY	MS24182-D1		1	0.41	15.00	24.00	28.50	MEA	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41			
FUEL and OIL		Q																									
GOV RPM ACT	BAR-COL SYLC9548-1		1	0.25	0.15	24.00	28.50	MEA	0.25	0.25	0.02	0.00	0.25	0.02	0.00	0.25	0.02	0.00	0.25	0.02	0.00	0.25	0.02	0.00	0.25	0.02	0.00
FUEL BOOST PUMP	LR-SIG RR12240-L		1	3.46	15.00	24.00	28.50	MEA	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46
ENG OIL BP VAL	ALLIED MH8-60	1	1	2.00	0.0	24.00	28.50	MEA	2.00																		
ENG OIL BP RLY	GEN CONTAV23811068B	1	1	1.50	0.0	24.00	28.50	MEA	1.50																		
RADIO NAV & COMM		R																									
UHF-AM RADIO	AN/ARC-116		1																								
UHF-AM RECEIVE	AN/ARC-116		1	0.80	15.00	24.00	28.50	MEA	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
UHF-AM XMITER	AN/ARC-116	3	1	3.00	1.00	24.00	28.50	MEA	3.00	3.00	1.50	0.42	3.00	1.50	0.42	3.00	1.50	0.42	3.00	1.50	0.42	3.00	1.50	0.42	3.00	1.50	0.42
ADF RECEIVER	AN/ARN-89		1	1.40	15.00	24.00	28.50	MEA	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
AUDIO THR SYS	206-075-597		1	0.14	15.00	24.00	28.50	MEA	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
INTERCOM SYS	C6533/ARC		2	0.07	15.00	24.00	28.50	MEA	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
VOR	AN/ARN-123 (CONUS)		1	0.30	15.00	24.00	28.50	SPEC	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

DC POWER SYSTEM COMPONENTS

ITEM	STARTER-GENERATOR	BATTERY
No. Units:	1	1
Ratings:	150A	13AH
Voltage:	30VDC	24VDC
Part No.:	208-062-200	206-075-363
Interval Ratings:	200A, 5-Sec 170A, 2-Min	— —
Voltage Regulation:	± 2%	—
Frequency Regulation:	—	—
Regulator P/N:	206-075-447	—

NOTES

1. This equipment normally de-energized.
2. Battery load during starting only.
3. One minute operation per ten minutes.

206075-303-1

Figure F-23. Load Analysis Chart (Sheet 1 of 3) C

EQUIPMENT	PART DESIGNATION	NOTES	NO. OF UNITS	AMPS PER UNIT	OPER. TIME MIN.	MIN. VOLT	MAX. VOLT	PWR SOR INF	CONN LOAD	OPERATING CONDITIONS START AND WARM-UP 5 SEC	START AND WARM-UP 2 MIN	START AND WARM-UP 15 MIN	TAKE-OFF 5 SEC	TAKE-OFF 2 MIN	TAKE-OFF 15 MIN	CRUISE 5 SEC	CRUISE 2 MIN	CRUISE 15 MIN	CRUISE – COMBAT 5 SEC	CRUISE – COMBAT 2 MIN	CRUISE – COMBAT 15 MIN	LAND 5 SEC	LAND 2 MIN	LAND 15 MIN	EMERGENCY 5 SEC	EMERGENCY 2 MIN	EMERGENCY 15 MIN
ESSENTIAL DC BUS (Continued)																											
RADAR		S																									
RADAR ALTIMETER	AN/APN-209		1	2.00	15.00	24.00	28.50	SPEC	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
RADAR WARNING	AN/APR-39		1	1.10	15.00	24.00	28.50	SPEC	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
PROX WARNING	YG-1054		1	1.50	15.00	24.00	28.50	SPEC	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
XPONDER SYS	AN/APX-72		1																								
IFF TRANSPONDER	AN/APX-72		1	2.13	15.00	24.00	28.50	MEA	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
XPNDR COMPUTER	KIT-1A/TSEC		1	1.10	15.00	24.00	28.50	MFG	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
WARNING & EMERGENCY		W					24.00	28.50	SPEC	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
CAUTION PNL	206-075-456-7		1	0.20	15.00	24.00	28.50	SPEC	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
ENG OUT WARN	206-075-545		1	0.20	15.00																						
TOTAL ESSENTIAL DC BUS										80.63	68.37	50.84	53.76	50.79	43.78	46.72	44.33	40.63	33.09	31.03	29.13	59.09	57.19	44.98	54.52	52.66	40.55
NON-ESSENTIAL DC BUS																											
HEATING		H																									
COMB HTR MOD	206-961-340		1	22.50	15.00	24.00	28.50	MEA	22.50										22.50	22.50	22.50						
COMB HTR KIT	206-706-331 (PROV)		1	22.50	0.0	24.00	28.50	SPEC	22.50																		
DE-FOG BLOWER	206-075-475		2	1.41	15.00	24.00	28.50	MEA	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82			
LIGHTING		L																									
COCKPIT LIGHT	MS17245-5		1	0.18	15.00	24.00	28.50	MEA	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18				0.18	0.18	0.18			
POS LIGHT-FWD	ASA 7512 LAMP		2	2.80	15.00	24.00	28.50	SPEC	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80				2.80	2.80	2.80			
POS LT-TAIL	1683 LAMP		1																								
RADIO NAV & COMM		R																									
VHF-FM RADIO	AN/ARC-114		2																								
VHF-FM RECEIVE	AN/ARC-114		2	0.70	15.00	24.00	28.50	MEA	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40			
VHF-FM XMITER	AN/ARC-114	3	2	3.00	1.00	24.00	28.50	MEA	6.00	6.00	3.00	0.84	6.00	3.00	0.84	6.00	3.00	0.84	6.00	3.00	0.84	6.00	3.00	0.84			
VHF-AM RADIO	AN/ARC-115		1																								
VHF-AM RECEIVE	AN/ARC-115		1	0.62	15.00	24.00	28.50	MEA	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62			
VHF-AM XMITER	AN/ARC-115	3	1	1.79	1.00	24.00	28.50	MEA	1.79	1.79	0.89	0.25	1.79	0.89	0.25	1.79	0.89	0.25	1.79	0.89	0.25	1.79	0.89	0.25			
SECURITY SET	TSEC/KY-28		1	2.00	15.00	24.00	28.50	SPEC	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00			
INVERTER		V																									
INTERTER	206-075-364-5		1		15.00	24.00	28.50	SPEC		2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65			
TOTAL NON-ESSENTIAL DC BUS										20.26	16.36	13.56	20.26	16.36	13.56	20.26	16.36	13.56	39 78	35.88	33.08	20.26	16.36	13.56			
TOTAL ESSENTIAL + NON-ESSENTIAL DC BUS										100.88	84.73	64.40	74.02	67.15	57.33	66.97	60.69	54.19	72 87	66.91	62.21	79.35	73.55	58.54	54.52	52.66	40.55

206075-303-2

Figure F-23. Load Analysis Chart (Sheet 2) C

EQUIPMENT	PART DESIGNATION	NOTES	NO. OF UNITS	OPER. TIME MIN.	ELECTRICAL REQUIREMENTS PER UNIT 115 VOLTS, 1 PHASE VA.	WATTS	VARS	26 VOLTS, 1 PHASE VA.	WATTS	VARS	PWR FTR	VOLTAGE MIN	VOLTAGE MAX	FREQUENCY MIN	FREQUENCY MAX	PWR SOR INF	CONNECTED LOADS PHASE A TO GND WATTS	VARS
		ESSENTIAL AC BUS						ESSENTIAL AC BUS										
26 VOLT AC																		
RADIO NAV & COMM		R																
CONUS NAV			1	15.00				10.40	5.20	9.01	0.50	24.5	27.5	380	420	SPEC	5.20	9.01
TOTAL 26 VOLT AC																	5.20	9.01
																	10.40 VA AT 0.500 PF LAGGING	
115 VOLT AC																		
FLIGHT INSTRUMENTS		F																
COMP SYS	AN/ASN-43		1									108.0	118.0	380	420	MEA		
DIR GYRO	CN/998( )ASN-43-		1	15.00	18.68	13.56	12.85				0.73	108.0	118.0	380	420	MEA	13.56	12.85
XMITER	T-611( )ASN		1	15.00	0.0	0.0	0.0				0.0	108.0	118.0	380	420	MEA	0.0	0.0
BRG-HDG IND	206-070-493		1	15.00	5.16	1.76	4.85				0.34	108.0	118.0	380	420	MEA	1.76	4.85
AC POWER		X																
AC FAIL RLY	206-075-457-1		1	15.00	0.41	0.34	0.24				0.82	108.0	118.0	380	420	MEA	0.34	0.24
																	15.66	17.93
TOTAL 115 VOLT AC																	23.81 VA AT 0.658 PF LAGGING	
																	20.86	26.94
TOTAL 26 VAC & 115 VAC ESSENTIAL AC BUS																	34.07 VA AT 0.612 PF LAGGING	

AC POWER SYSTEM COMPONENTS

ITEM	INVERTER	INST XMFR
No. Units:	1	1
Ratings:	65VA	50VA
Voltage:	115VDC	26VAC
Frequency:	400Hz	400Hz
Power Factor:	0.85 LAG to 0.95 LEAD	–
Configuration:	1 PHASE	–
Manufacturer:	–	GE
Model No.:	206-075-364	9T39Y5
Interval Ratings:	115VA, 5-Sec 80VA, 2-Min	– –
Voltage Regulation:	-8.7%; +6.1%	–
Frequency Regulation:	± 5%	–

206075-303-3

Figure F-23. Load Analysis Chart (Sheet 3 C

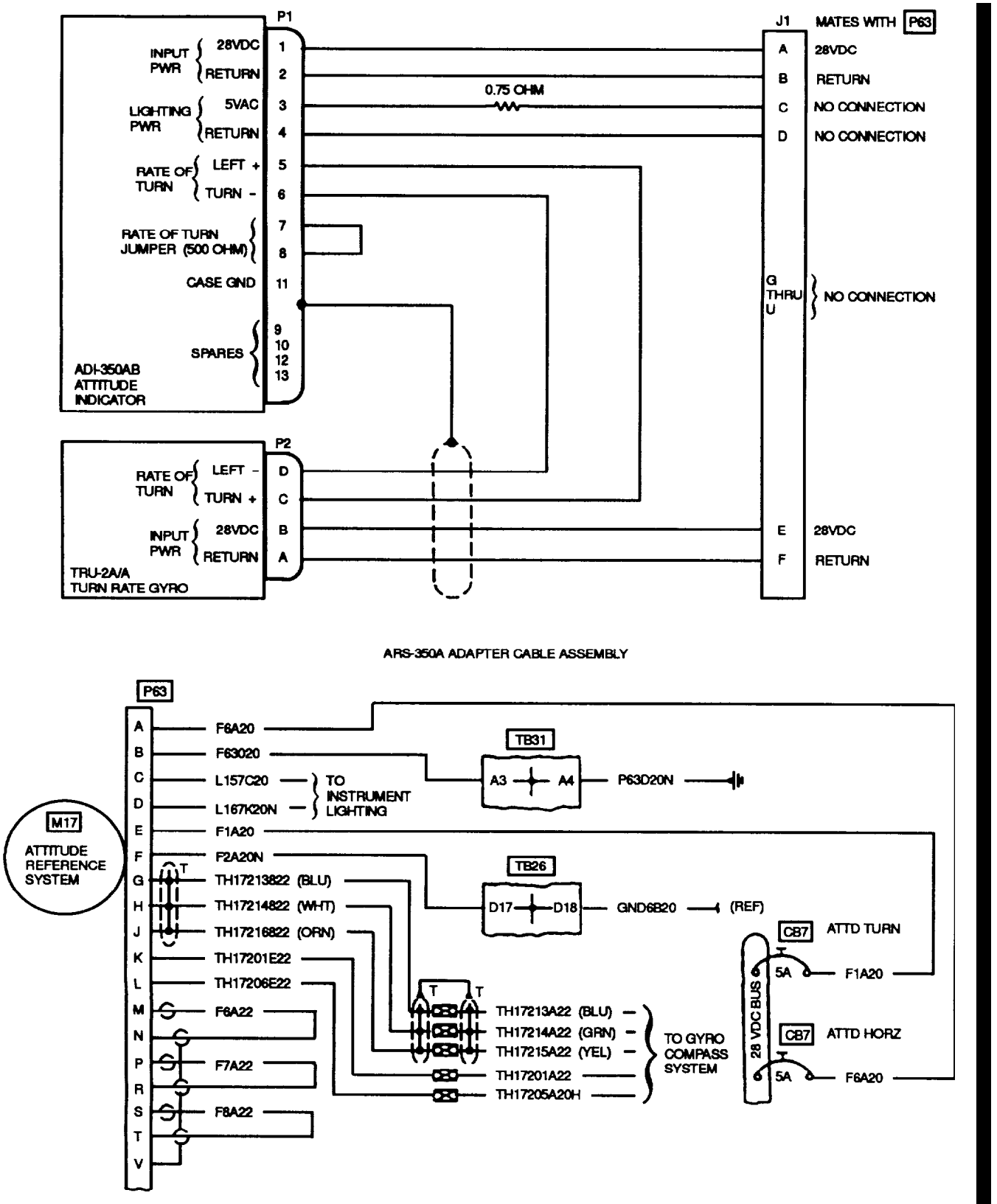


Figure F-23.1. Attitude Indicator and Turn Rate Gyro System (501-1660-01, Attitude Reference System) - Wiring Diagram C

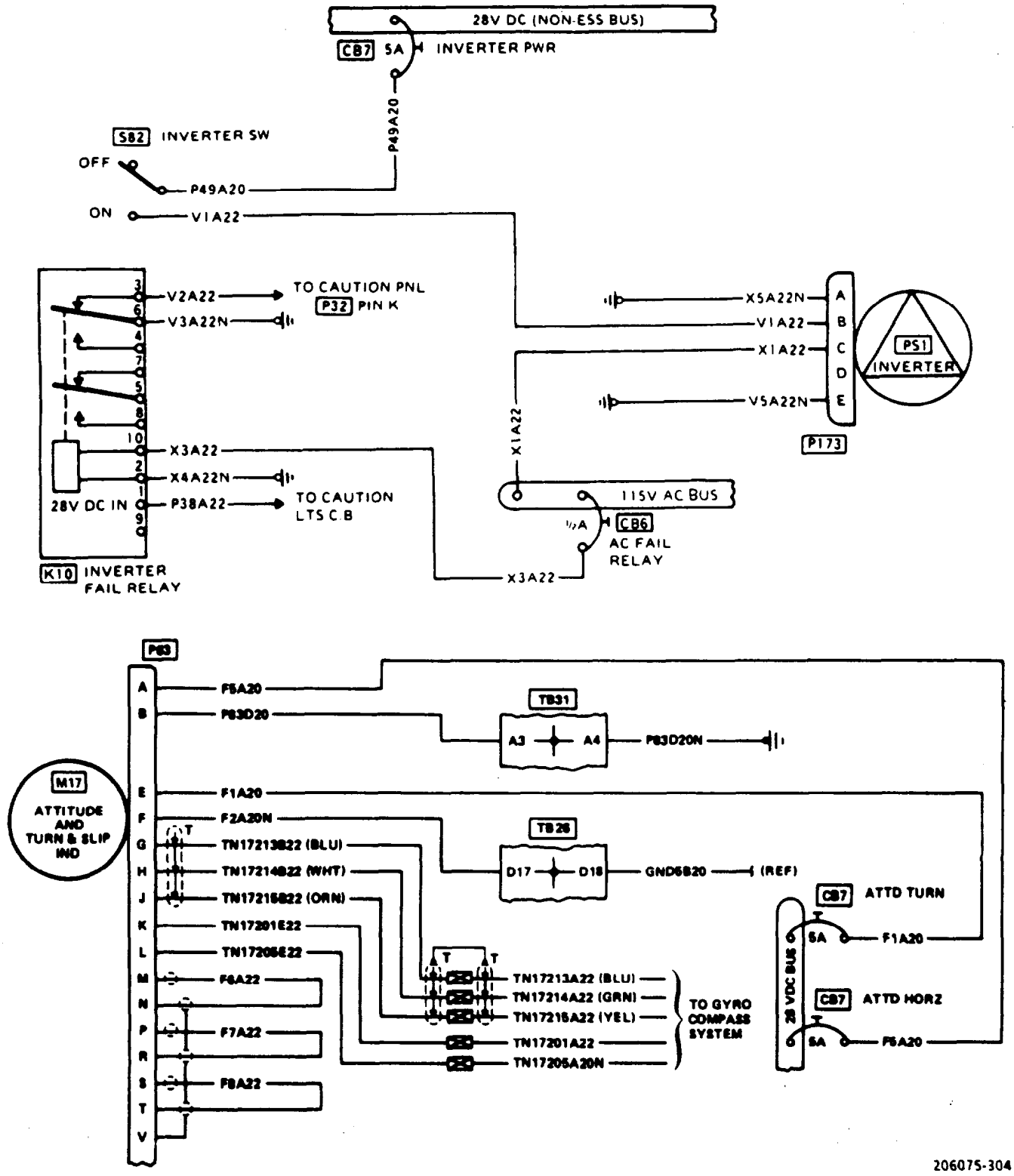


Figure F-24. Inverter, Attitude, and Turn and Slip Indicator Systems – Wiring Diagram C

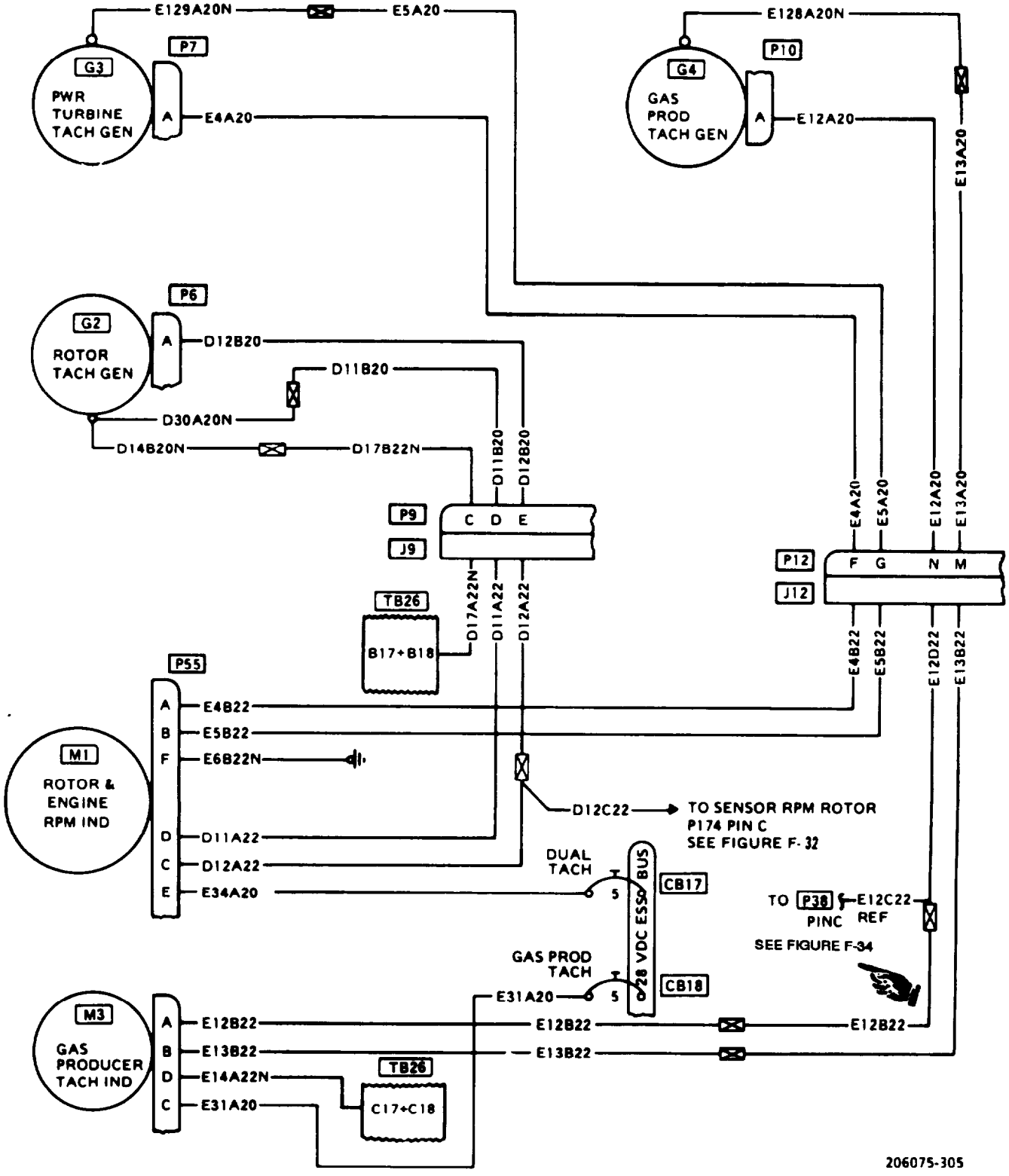


Figure F-25. Tachometer Indicator Systems - Wiring Diagram C

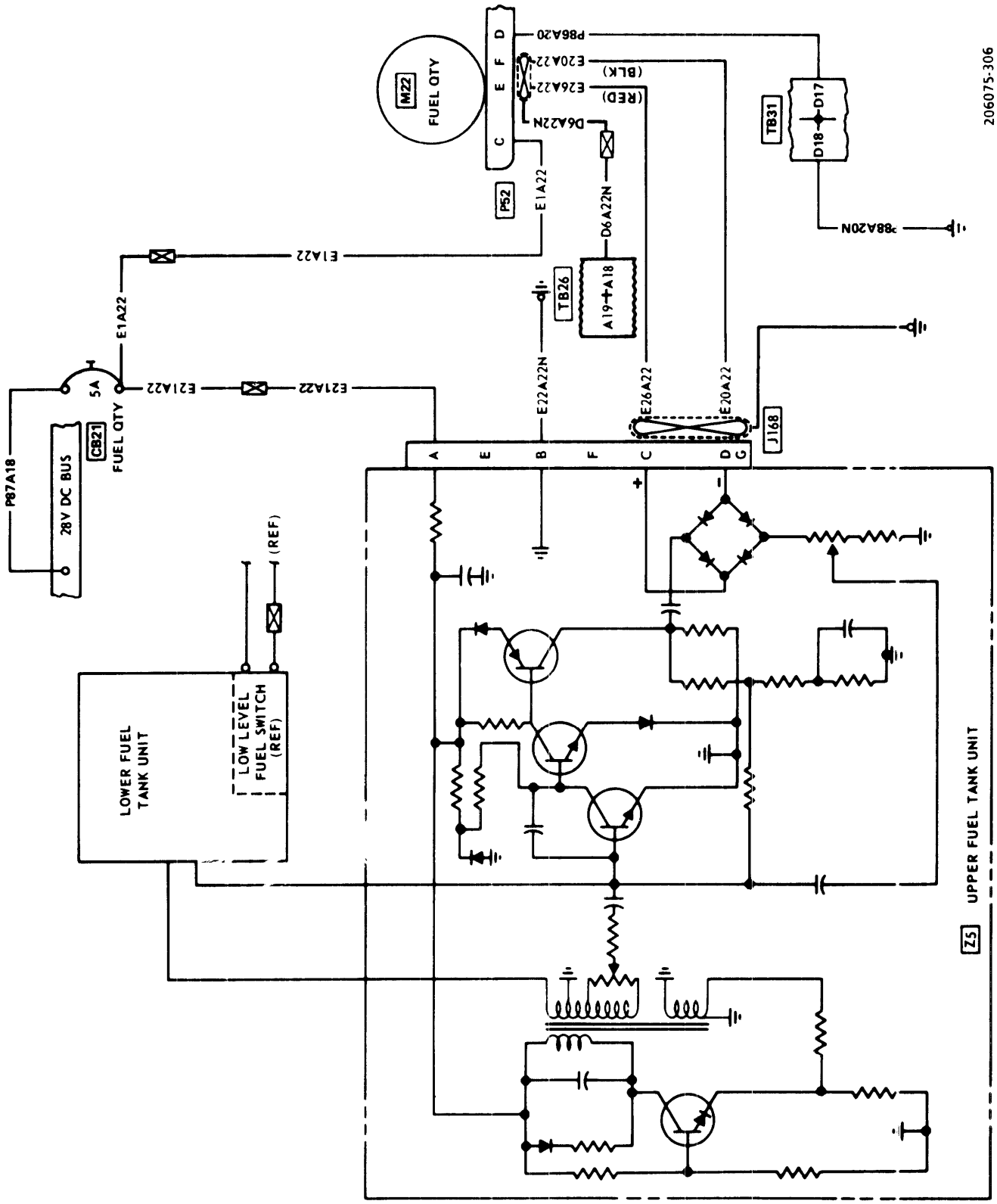


Figure F-26. Fuel Quantity Indicating System – Wiring Diagram C

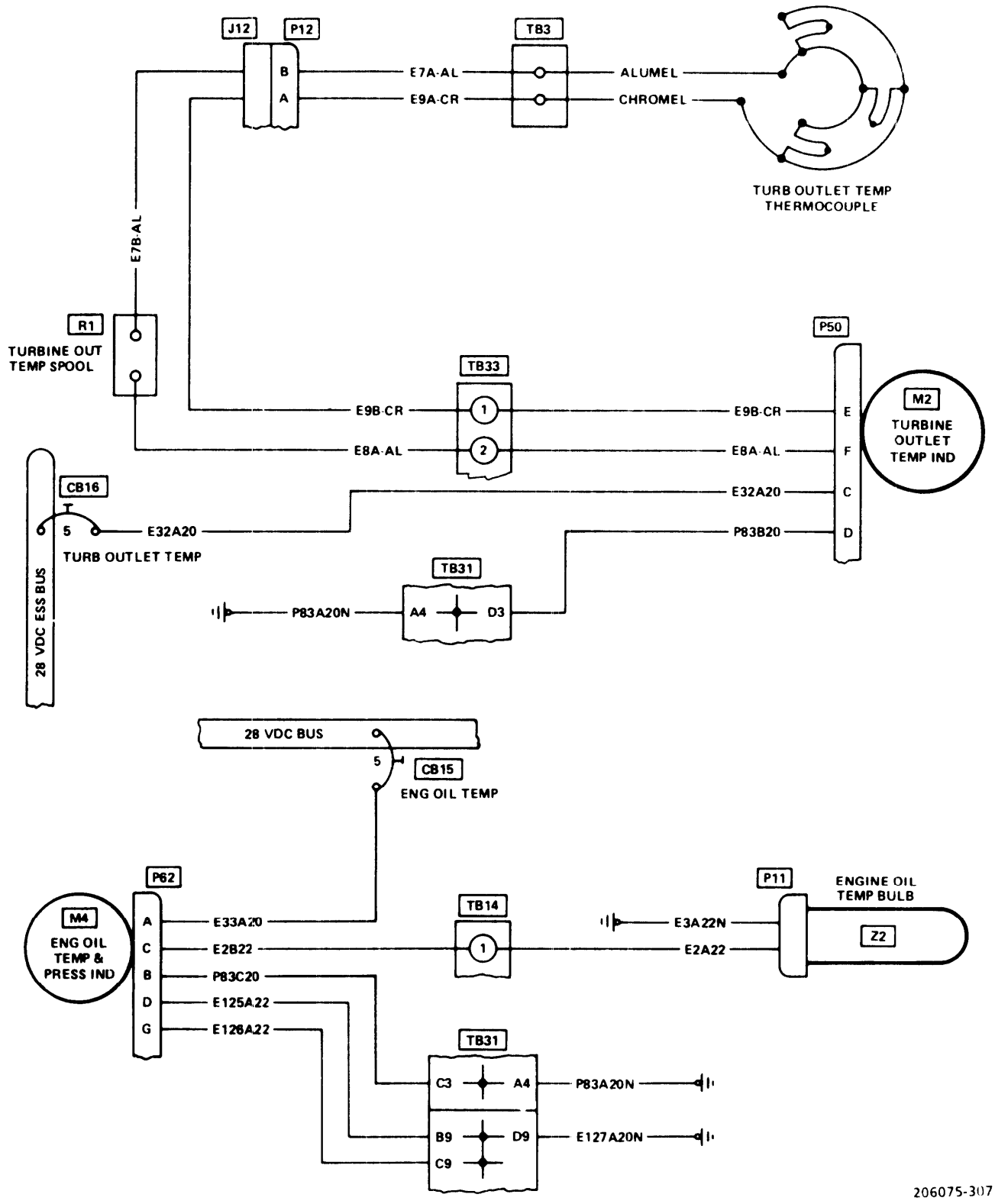


Figure F-27. Engine Oil and Turbine Outlet Temperature indicating Systems –- Wiring Diagram C

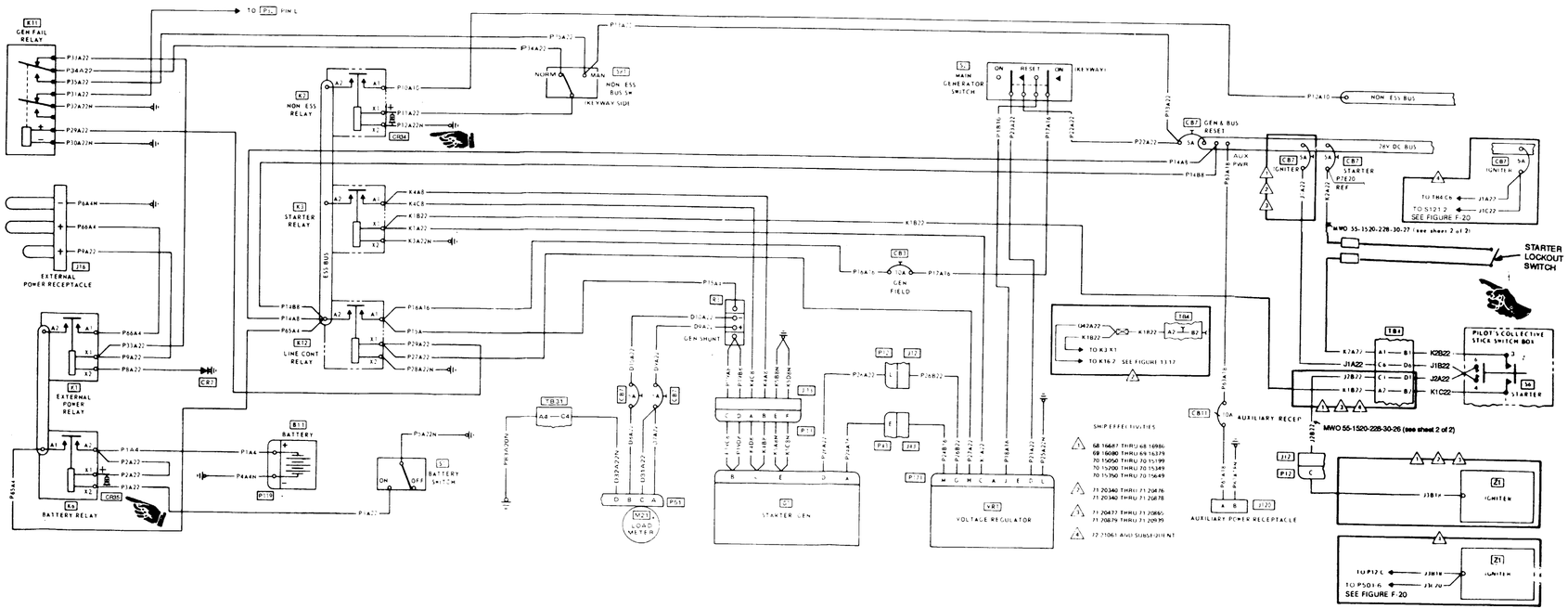


Figure F-28. DC Power and Starter Systems — Wiring Diagram C

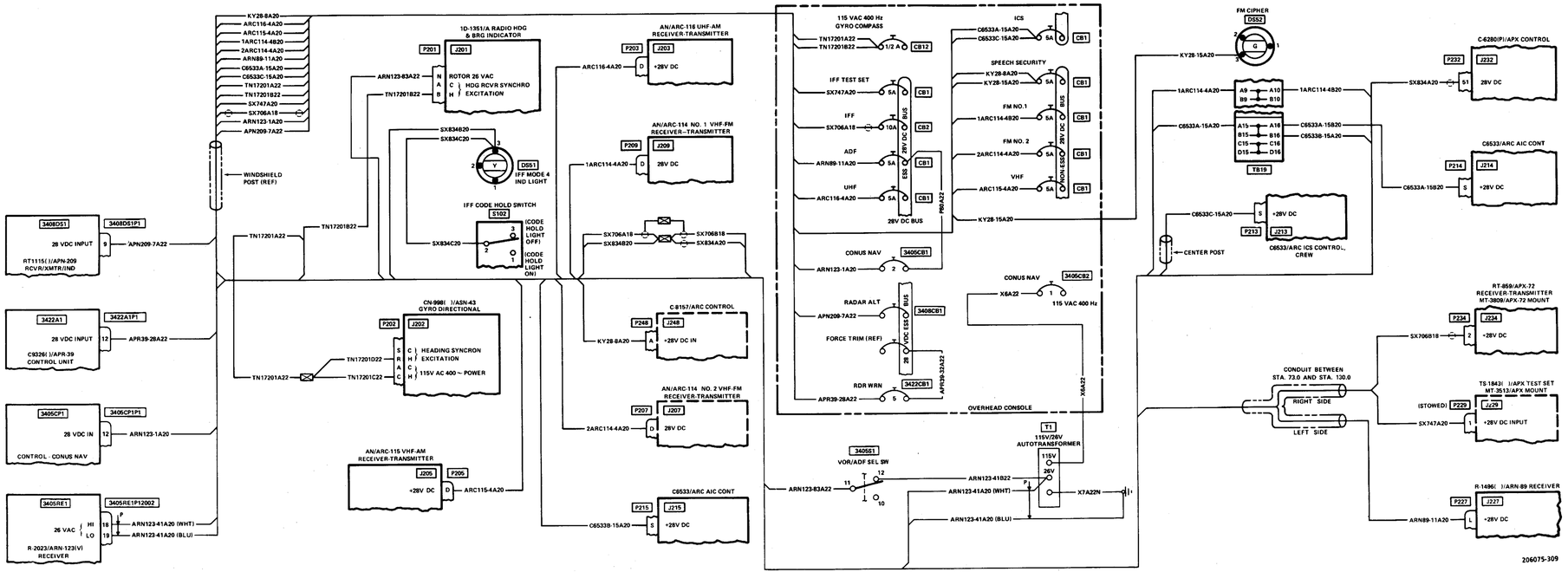


Figure F-29. Avionics Power — Wiring Diagram C

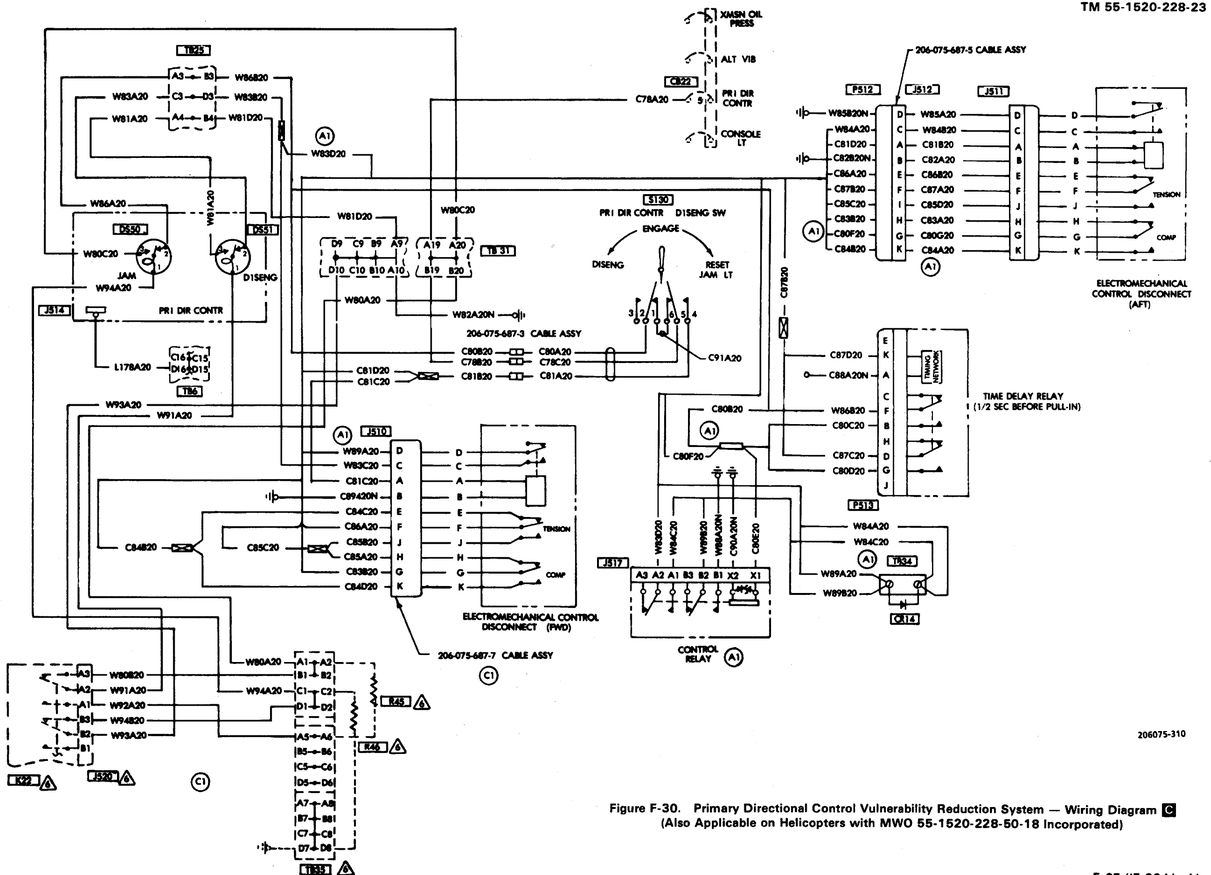


Figure F-30. Primary Directional Control Vulnerability Reduction System — Wiring Diagram C
(Also Applicable on Helicopters with MWO 55-1520-228-50-18 Incorporated)

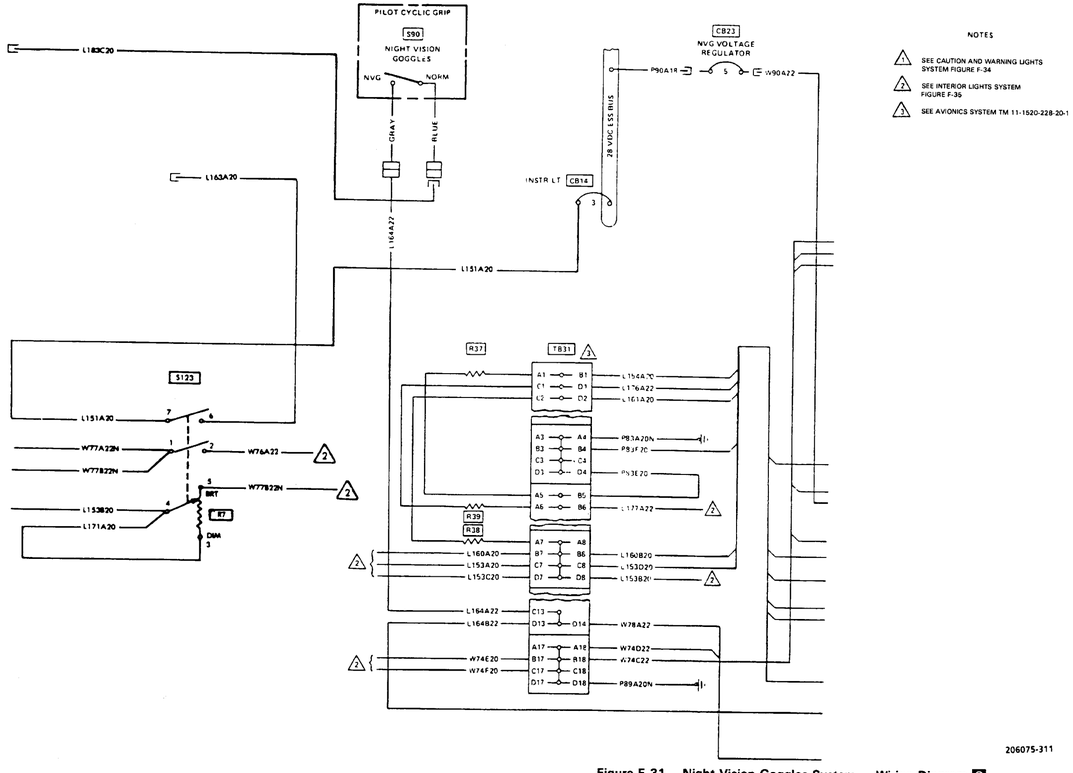


Figure F-31. Night Vision Goggles System — Wiring Diagram C
(After Compliance with MWO 55-1520-228-50-32)

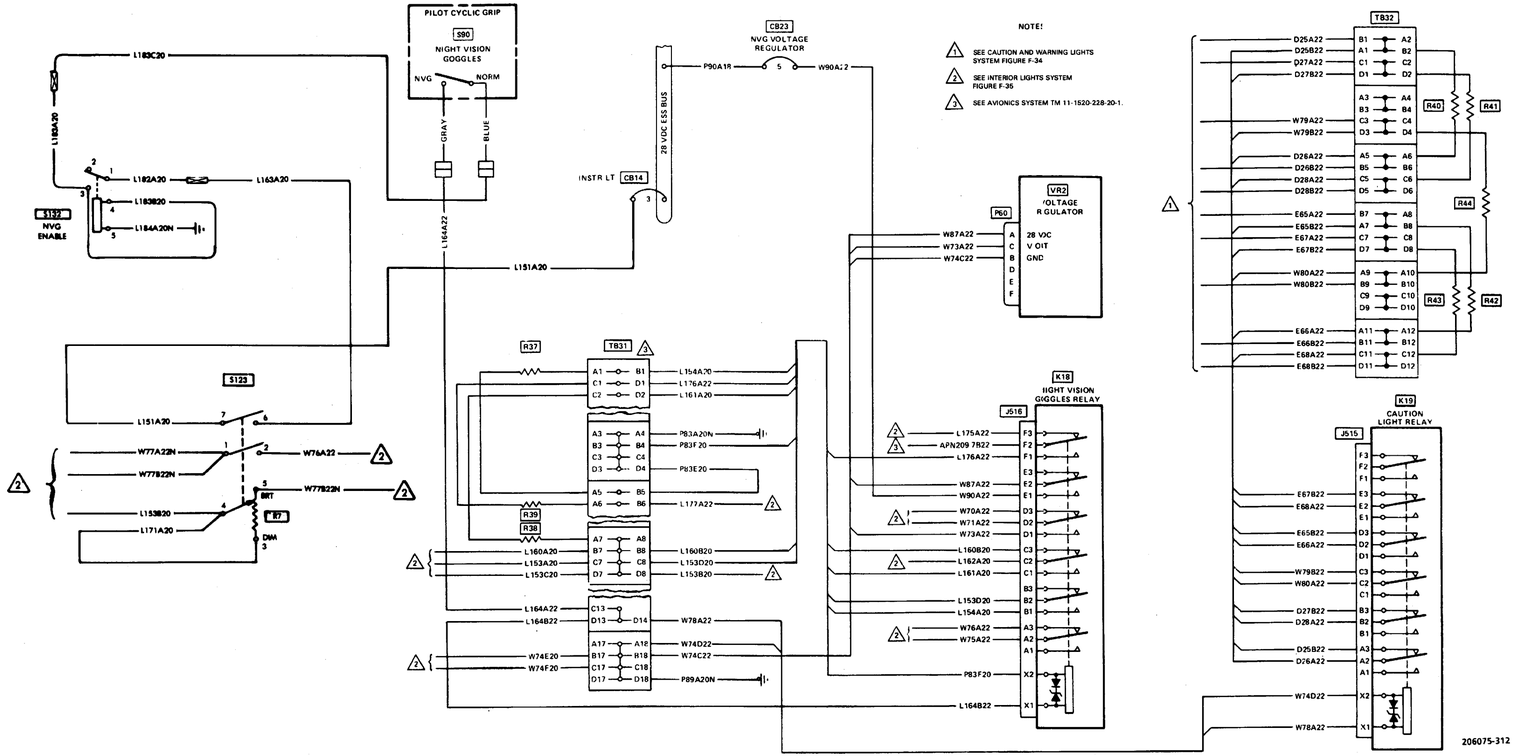


Figure F-32. Night Vision Goggles System — Wiring Diagram C
(Prior to Compliance with MWO 55-1520-228-50-32)

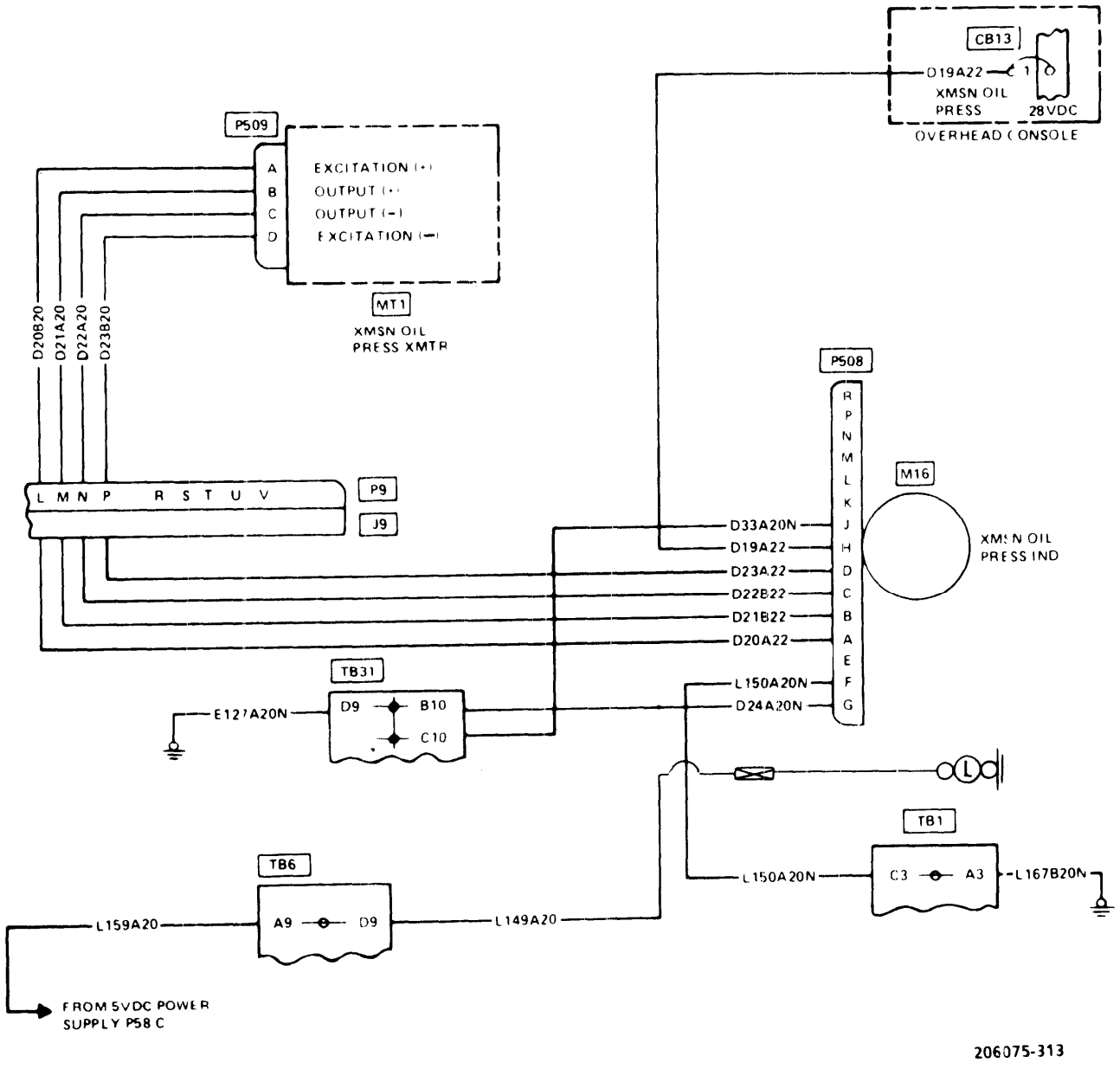


Figure F-33. Transmission Oil Pressure Indicating System C

Figure F-34. Caution and Warning Lights System — Wiring Diagram C

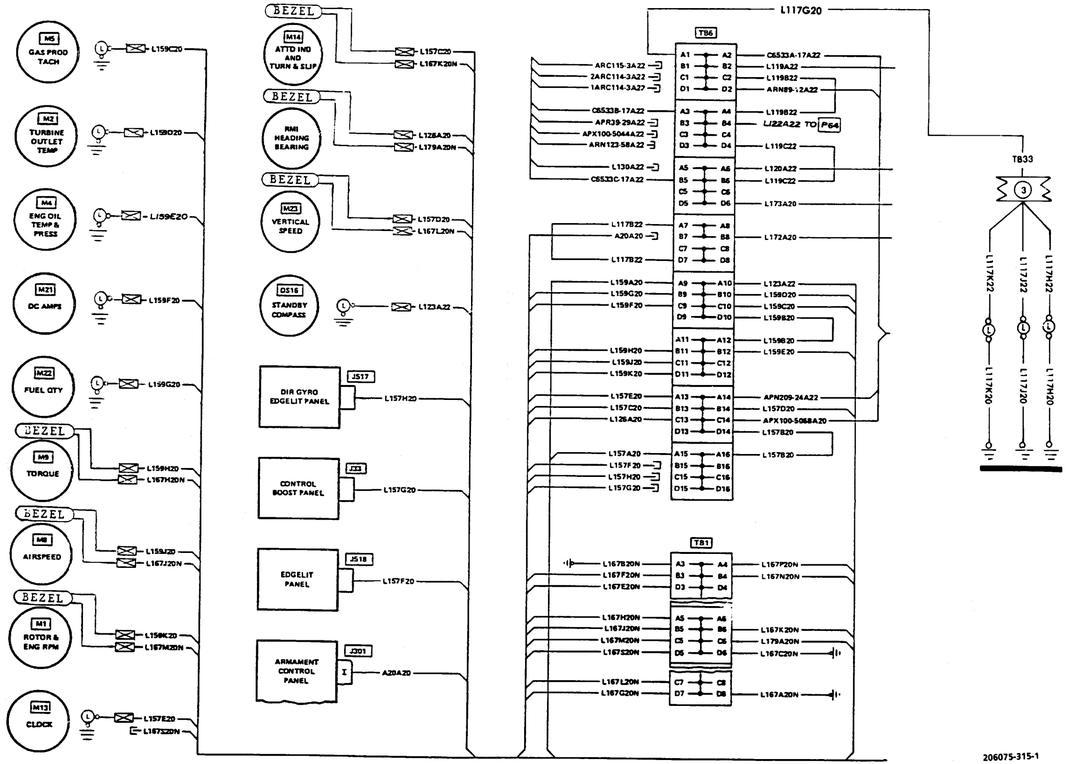
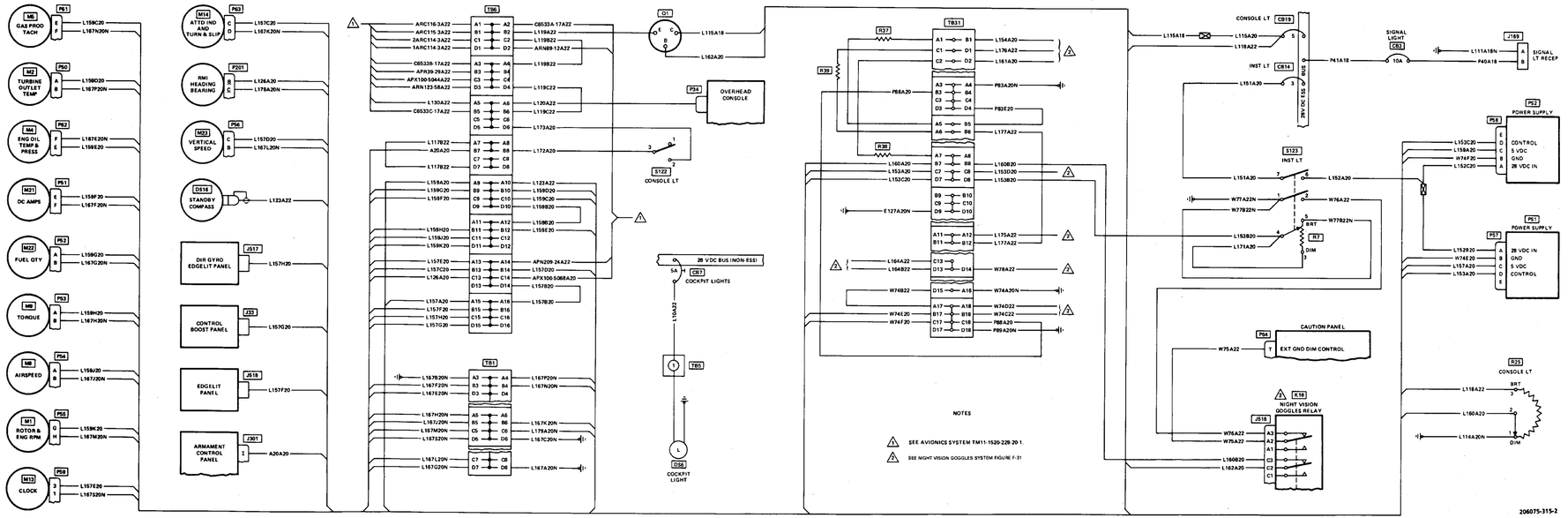


Figure F-35. Interior Lights System — Wiring Diagram (Sheet 1 of 3) C



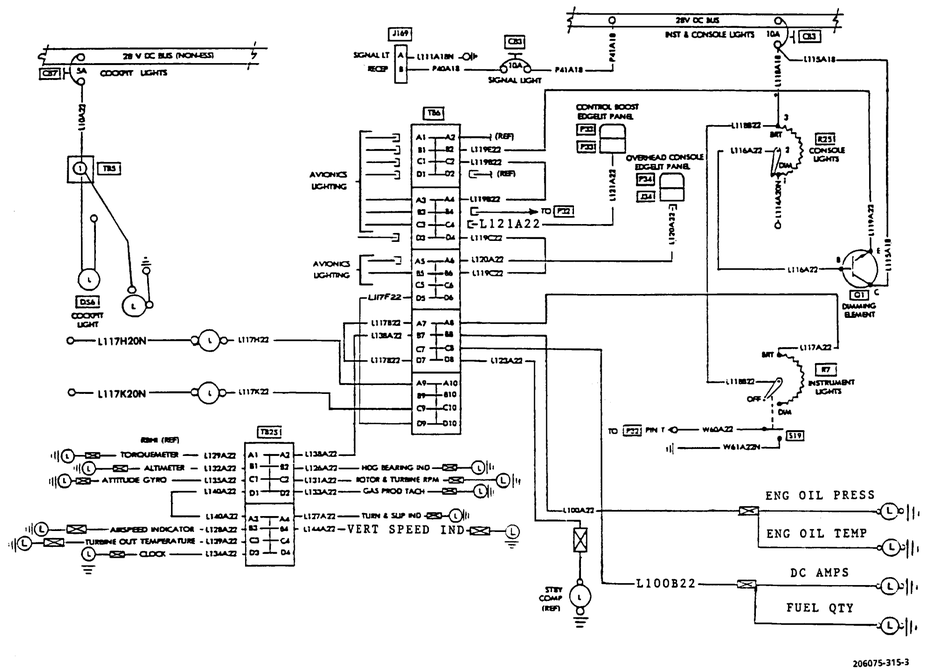


Figure F-35. Interior Lights System — Wiring Diagram (Sheet 3) C

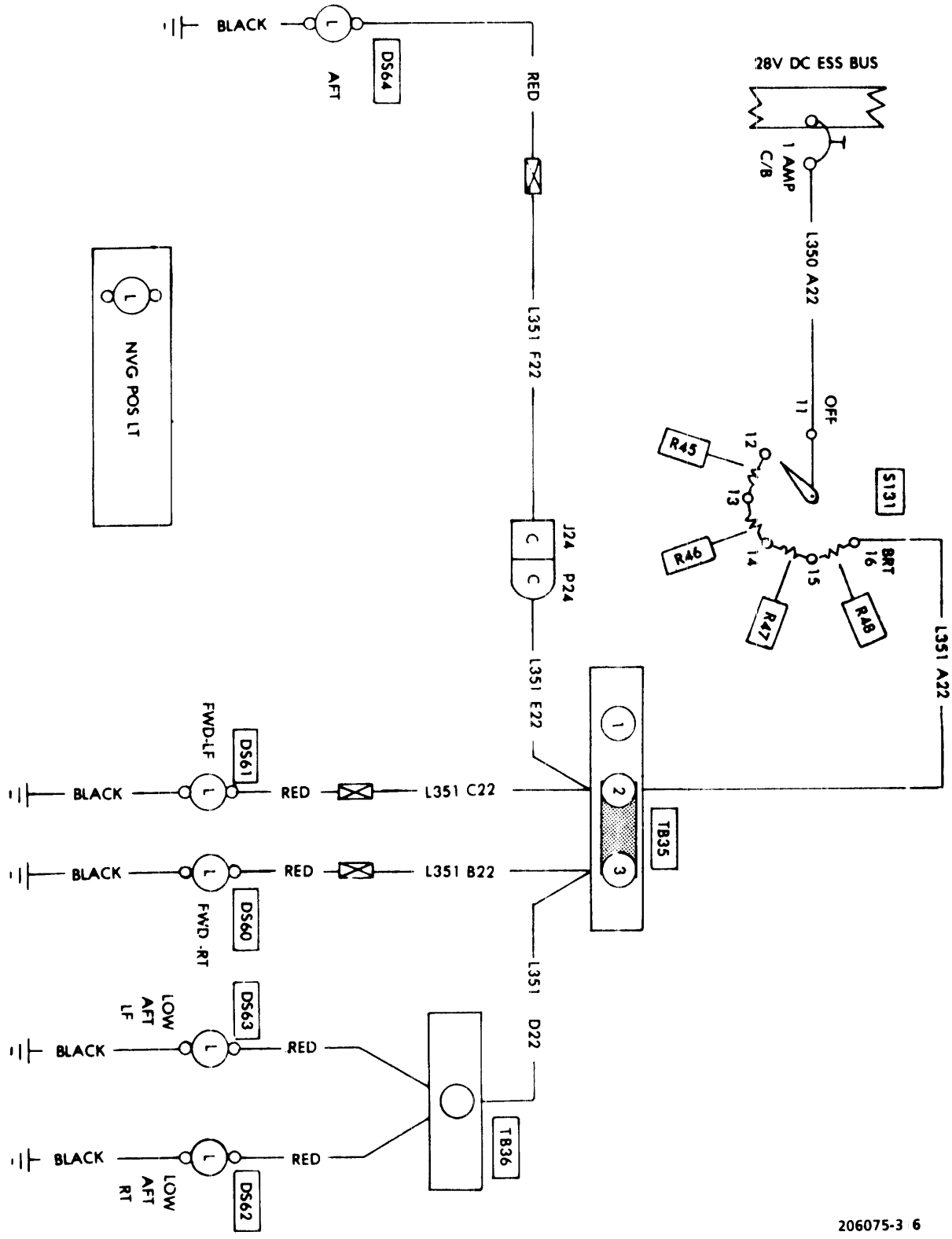


Figure F-36. Exterior NVG Position Light – Wiring Diagram C

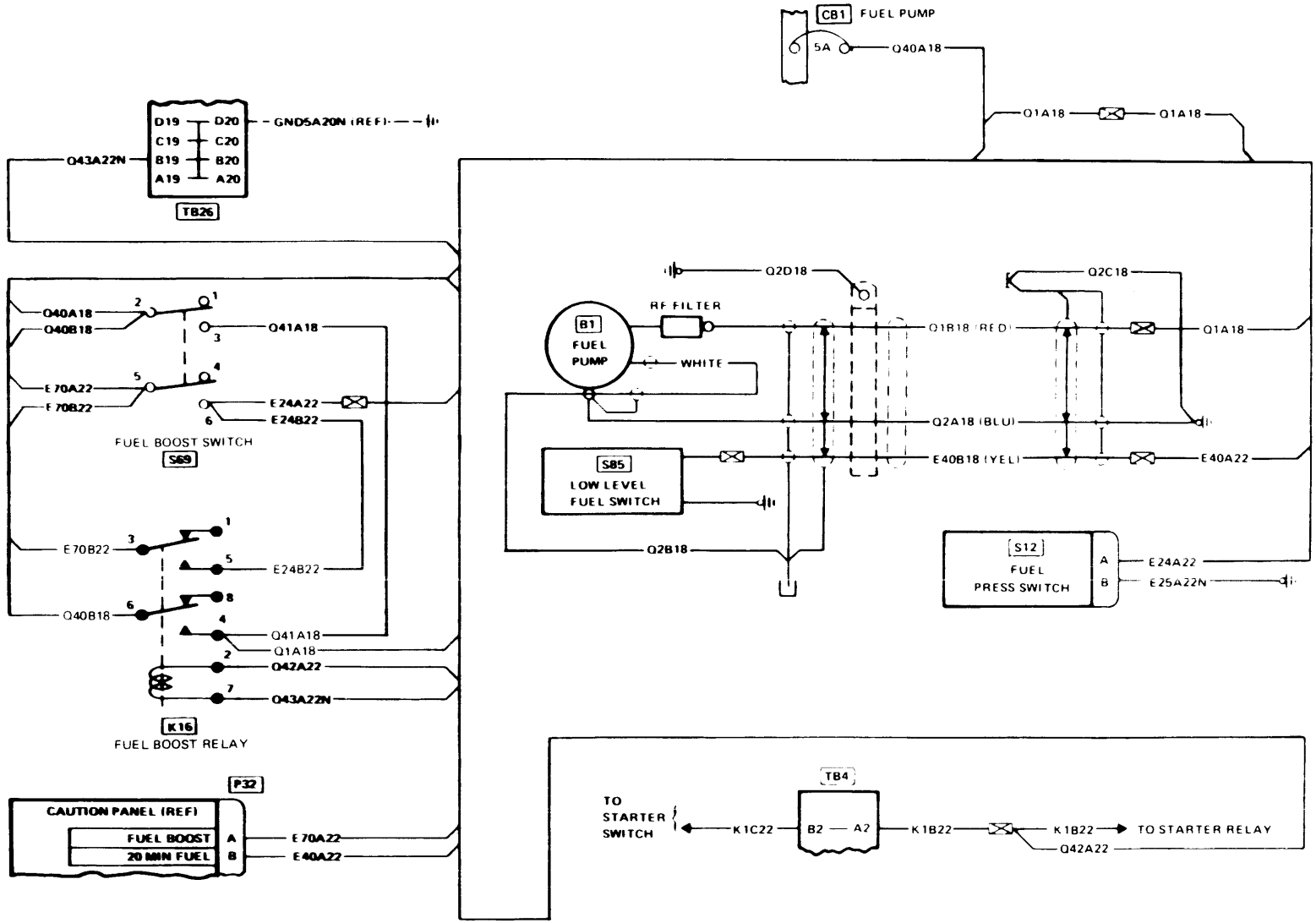


Figure F-37. Crashworthy Fuel System — Wiring Diagram C

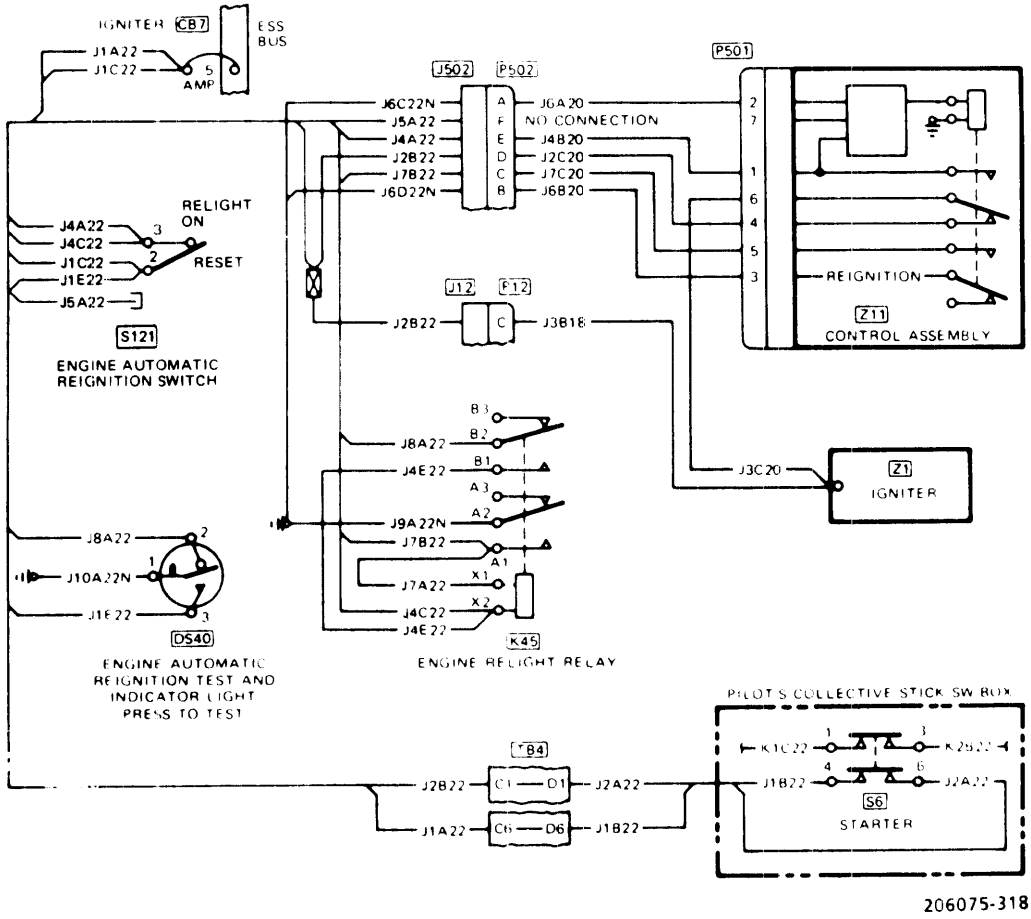


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Figure F-38. Engine Auto Relight System — Wiring Diagram C

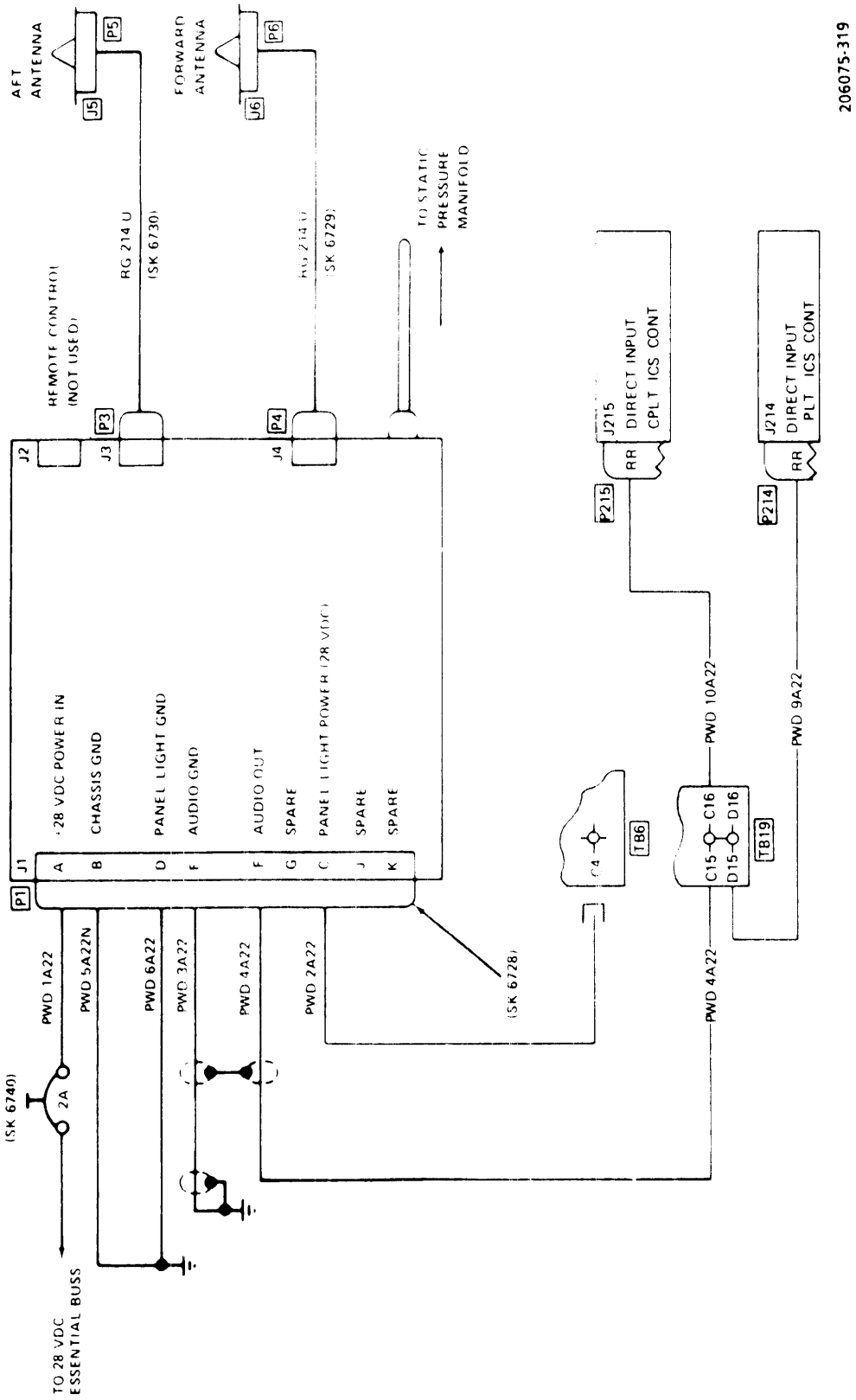

Figure F-39 Proximity Warning System — Wiring Diagram C

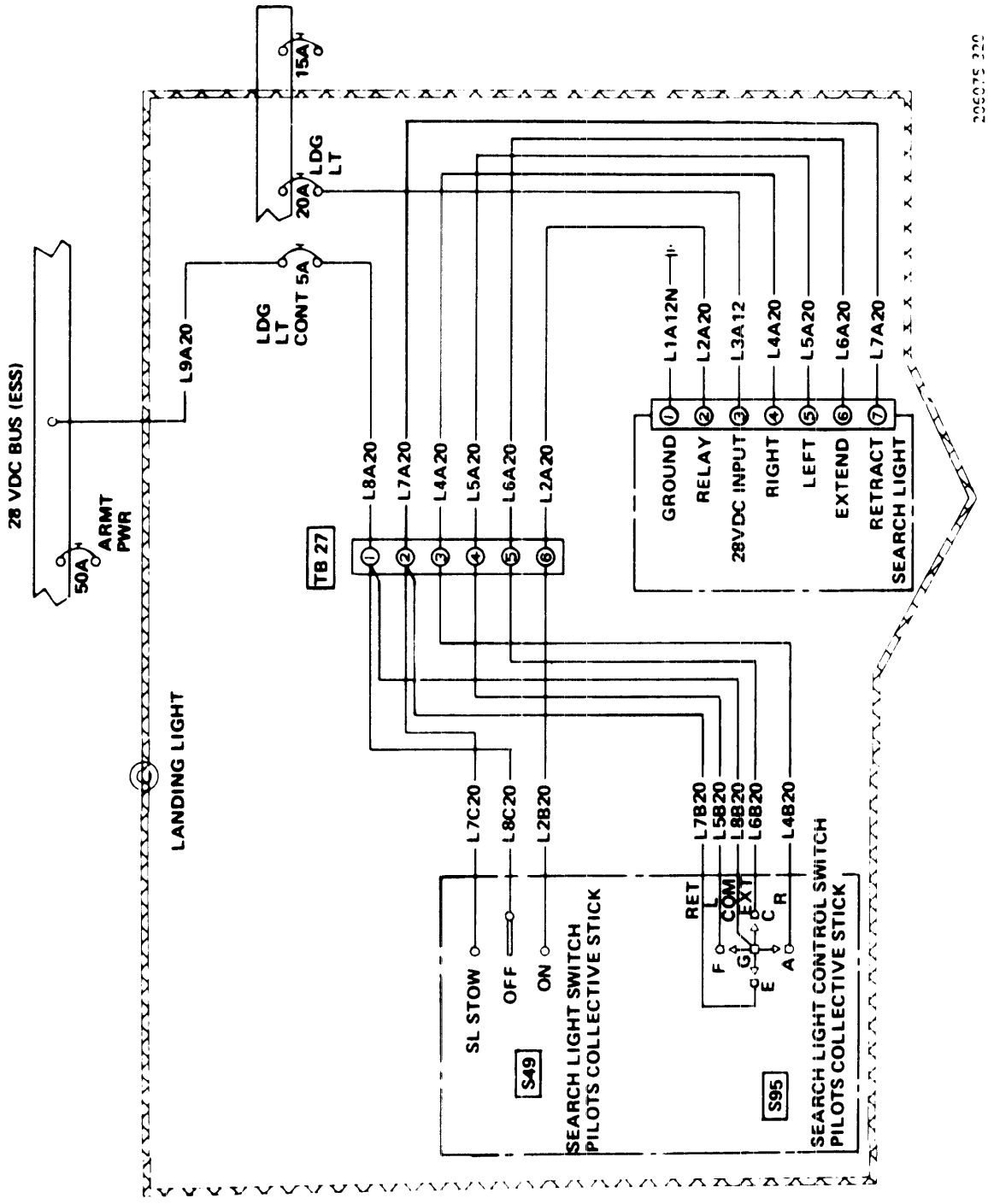

Figure F-40. Controllable Landing Light – Wiring Diagram C
(Prior to Compliance with MWO 55-1520-228-50-32)

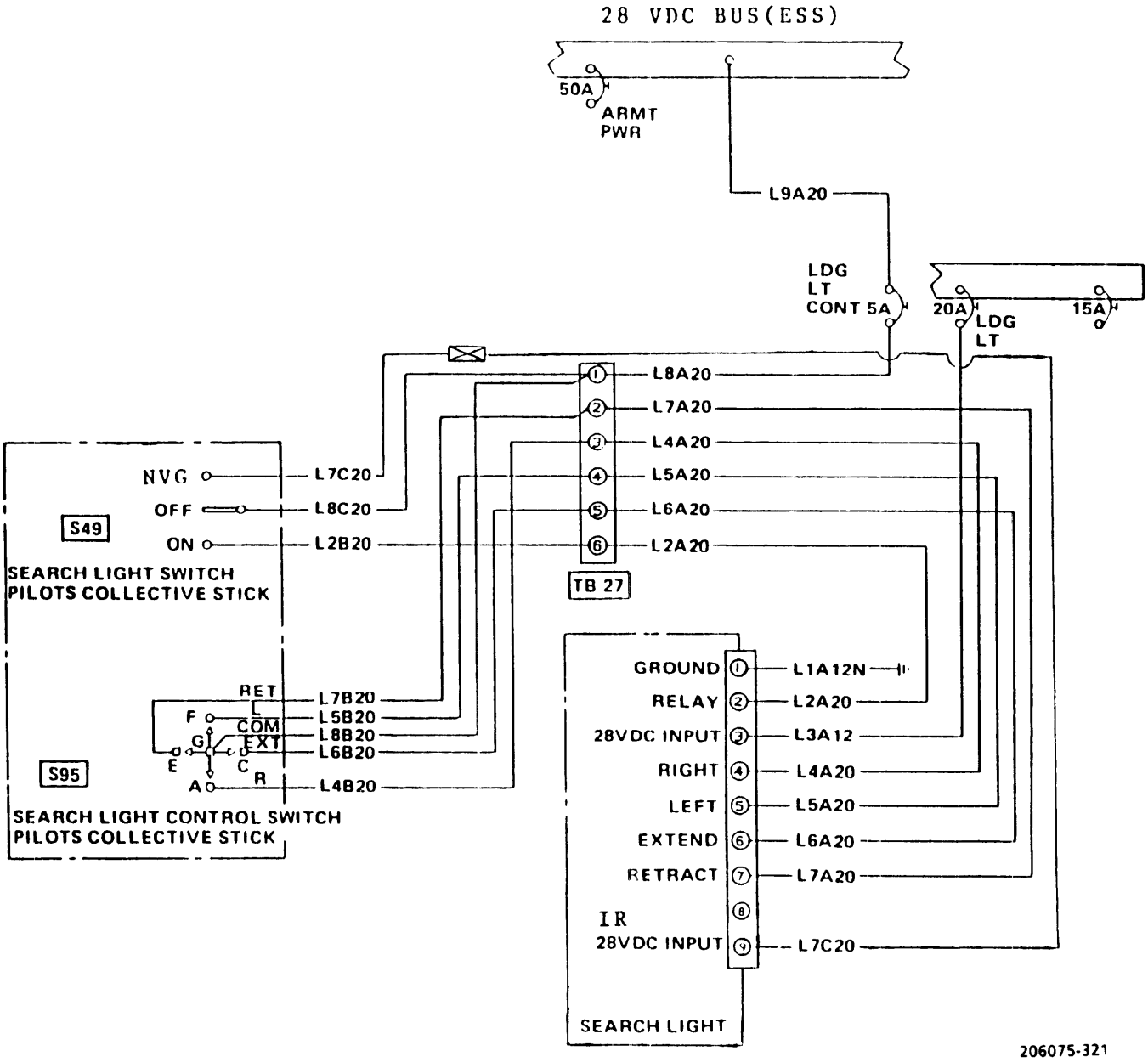

Figure F-41. IR/White Dual Landing Light,/Searchlight — Wiring Diagram C
(After Compliance with MWO 55-1520-228-50-31/32)

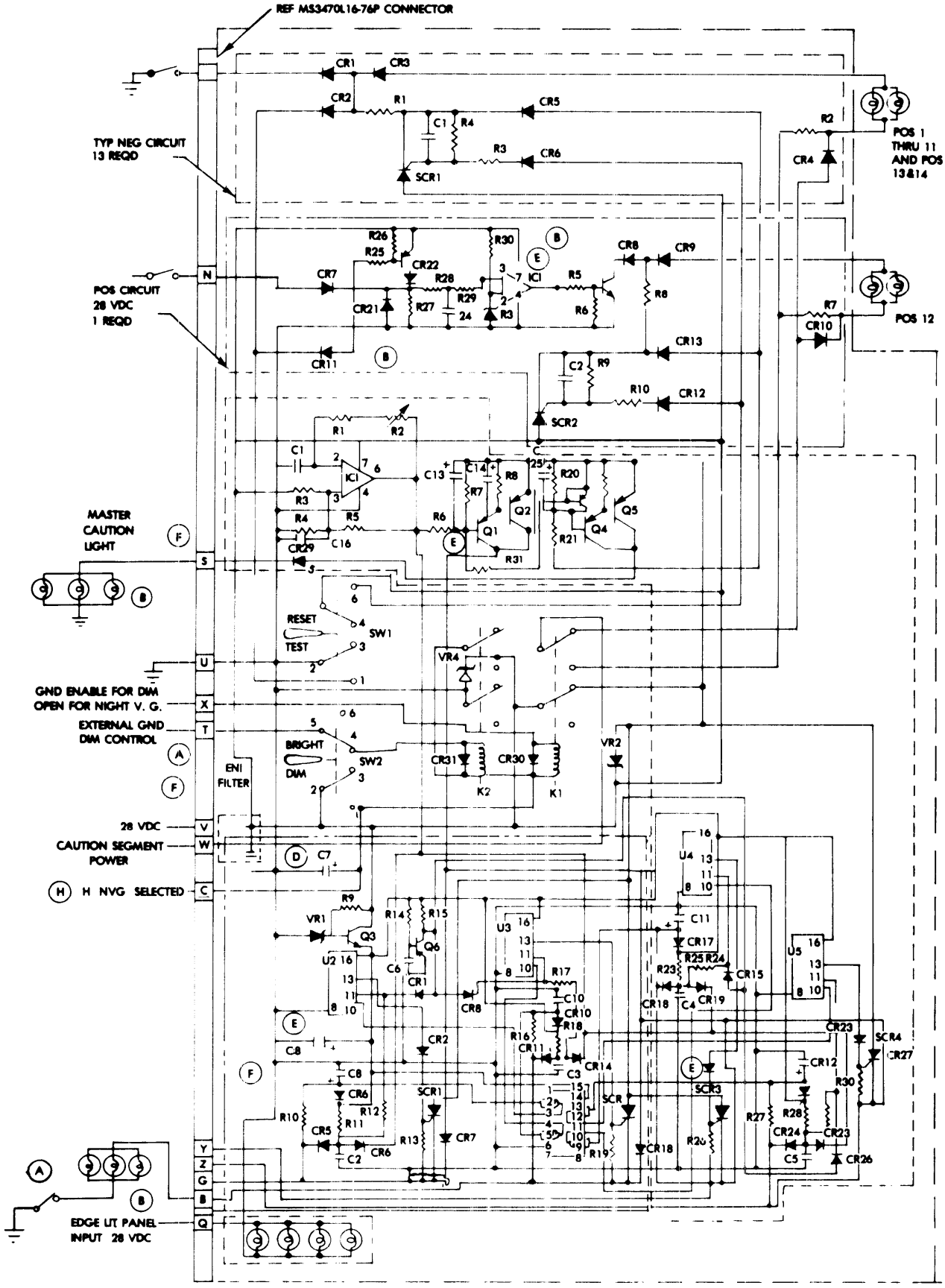

Figure FO-3. Fault Annunciator Panel Schematic C

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ALPHABETICAL INDEX

Paragraph
Figure, Table
Number

A (Cont)

Paragraph
Figure, Table
Number

A (Cont)

Paragraph
Figure, Table
Number

A (Cont)

B

Paragraph,
Figure, Table
Number

B (Cont)

Paragraph, Figure, Table Number

C (Cont)

Paragraph, Figure, Table Number

C (Cont)

D

Paragraph
Figure, Table
Number

D (Cont)

Paragraph
Figure, Table
Number

D (Cont)

Paragraph, Figure, Table Number

H

Paragraph, Figure, Table Number

H (Cont)

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I (Cont)

Paragraph
Figure, Table
Number

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Paragraph,
Figure, Table
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Paragraph, Figure, Table Number

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Figure, Table
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Figure, Table
Number

M (Cont)

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Figure, Table
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Figure, Table
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Figure, Table
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Figure, Table
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Paragraph, Figure, Table Number

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Figure, Table
Number

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Paragraph,
Figure, Table
Number

R (Cont)

Paragraph
Figure, Table
Number

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Figure, Table
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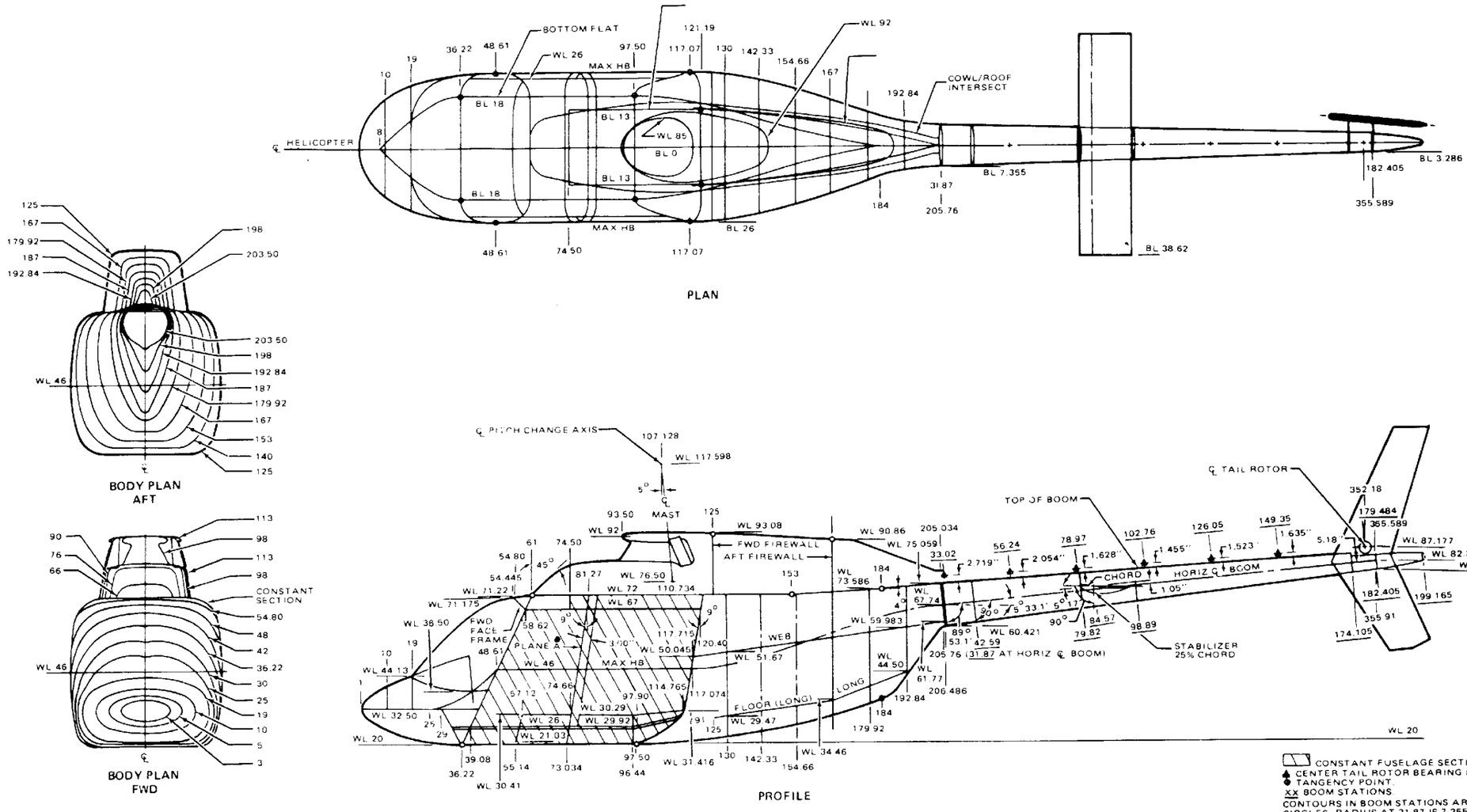
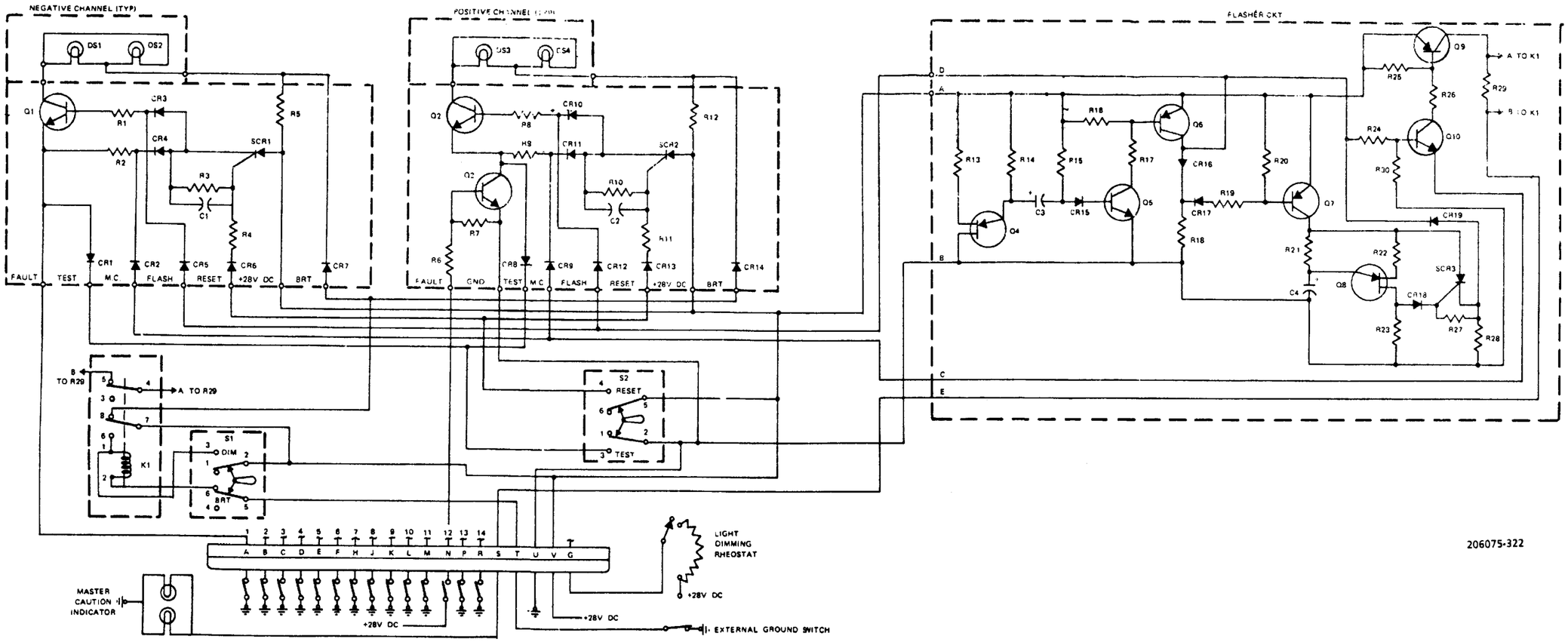


206900-567

Figure FO-1. Station Diagram



206075-322

Figure FO-2. Fault Annunciator Panel Schematic A

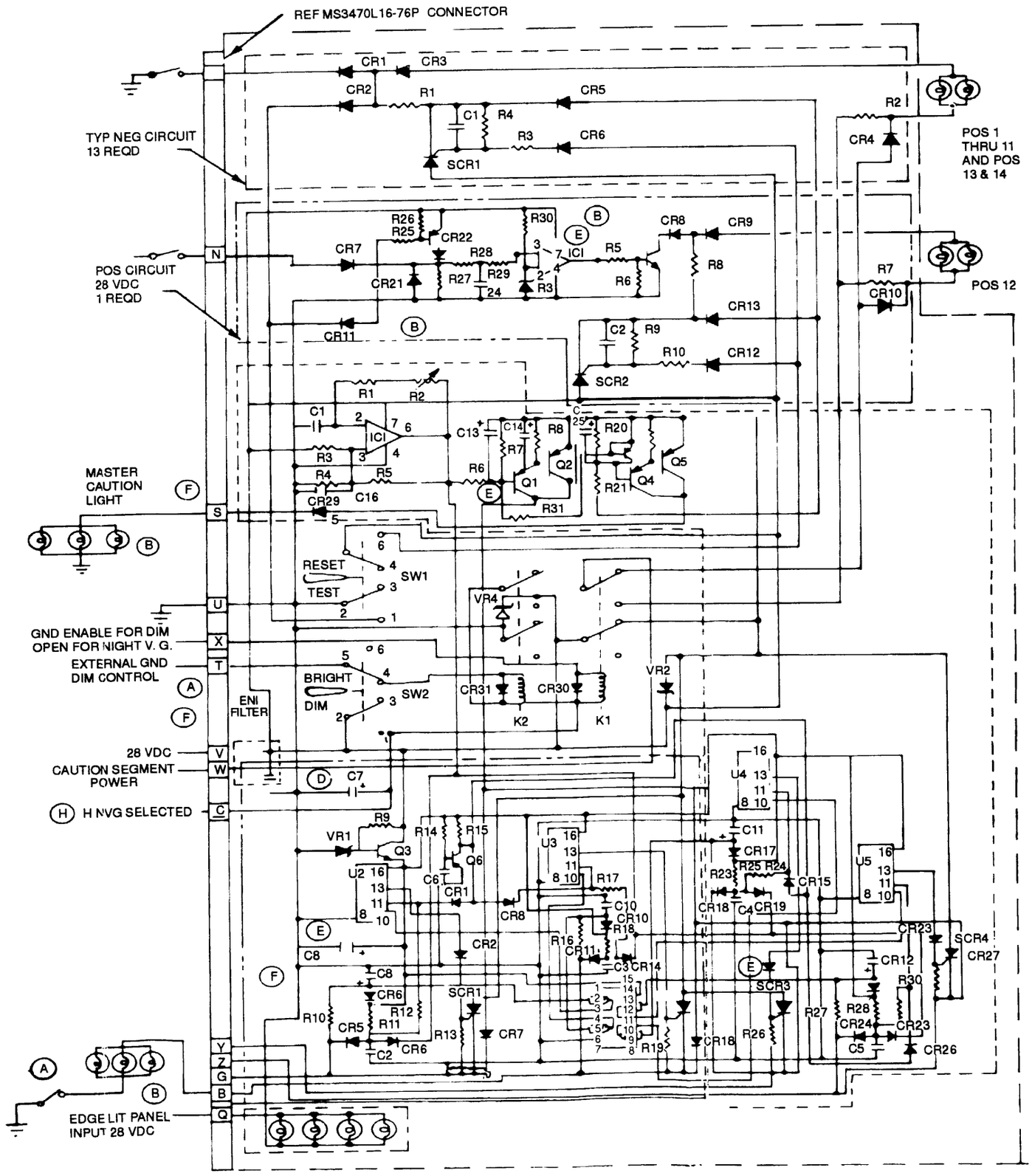
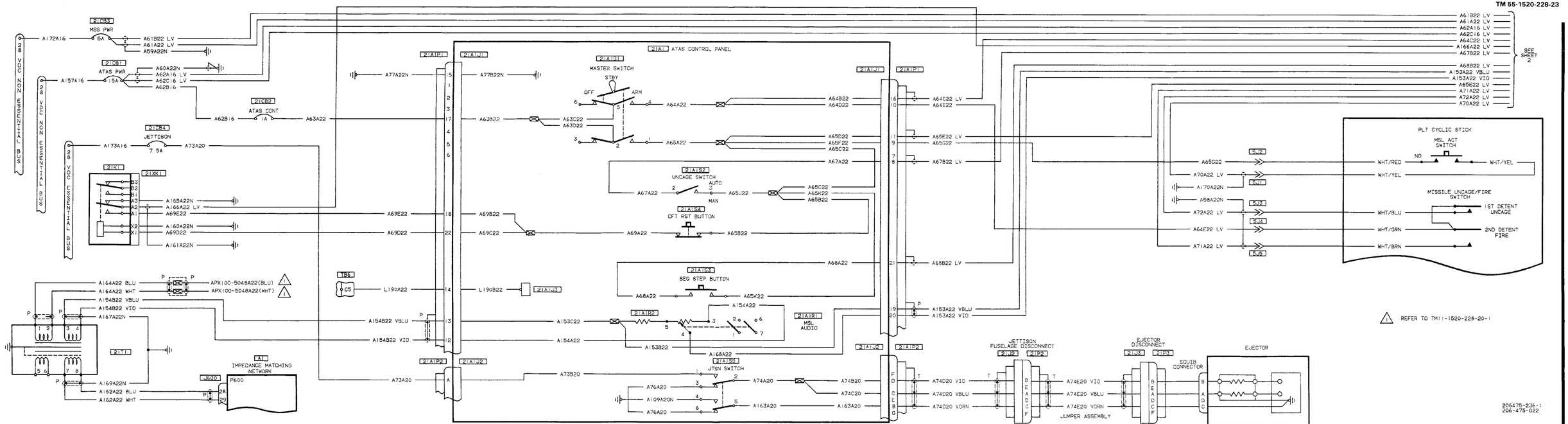


Figure FO-3. Fault Annunciator Panel Schematic C



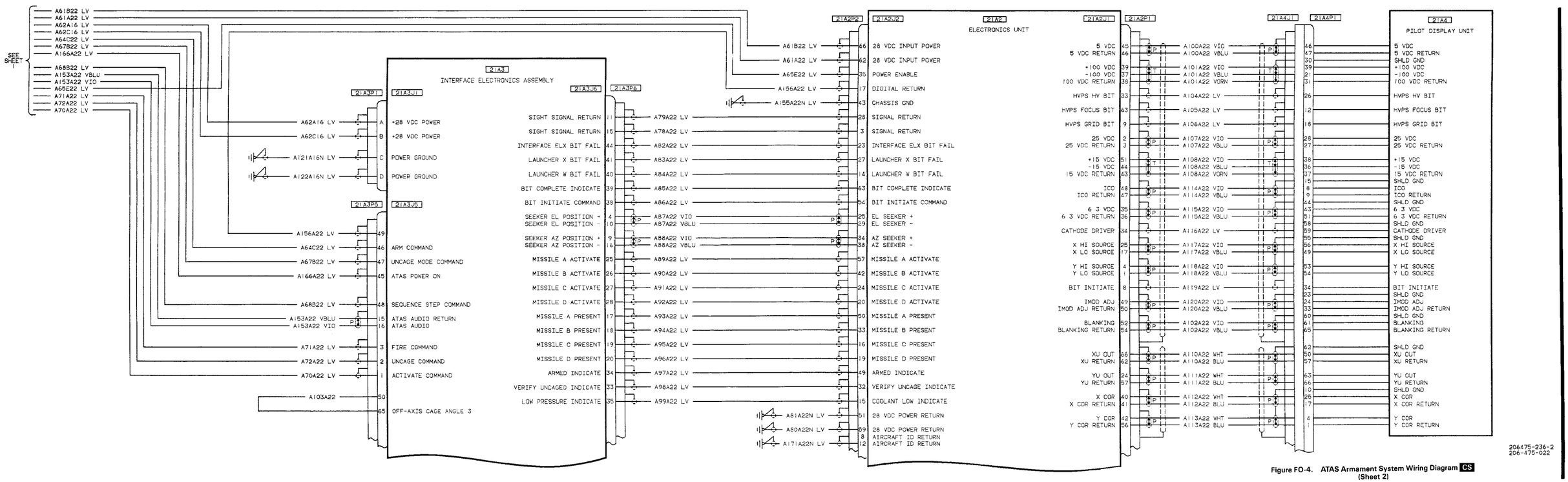


Figure FO-4. ATAS Armament System Wiring Diagram CS (Sheet 2)

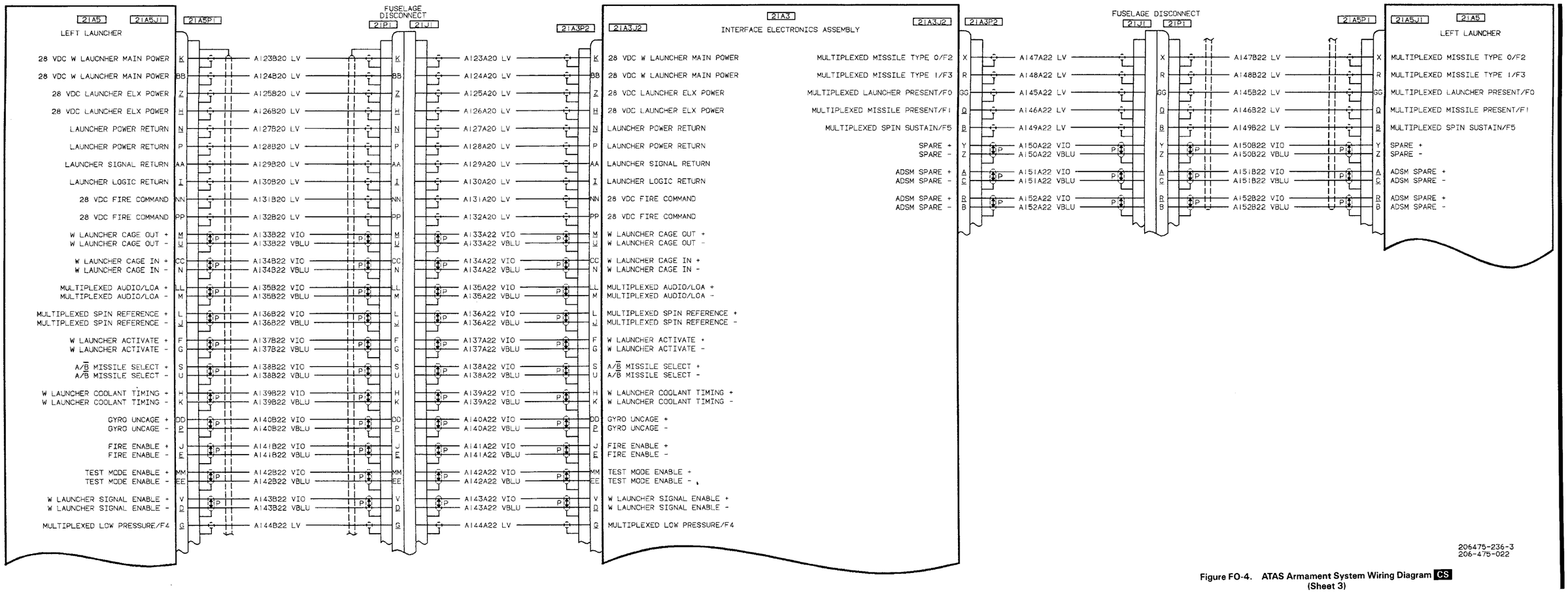


Figure FO-4. ATAS Armament System Wiring Diagram CS
(Sheet 3)

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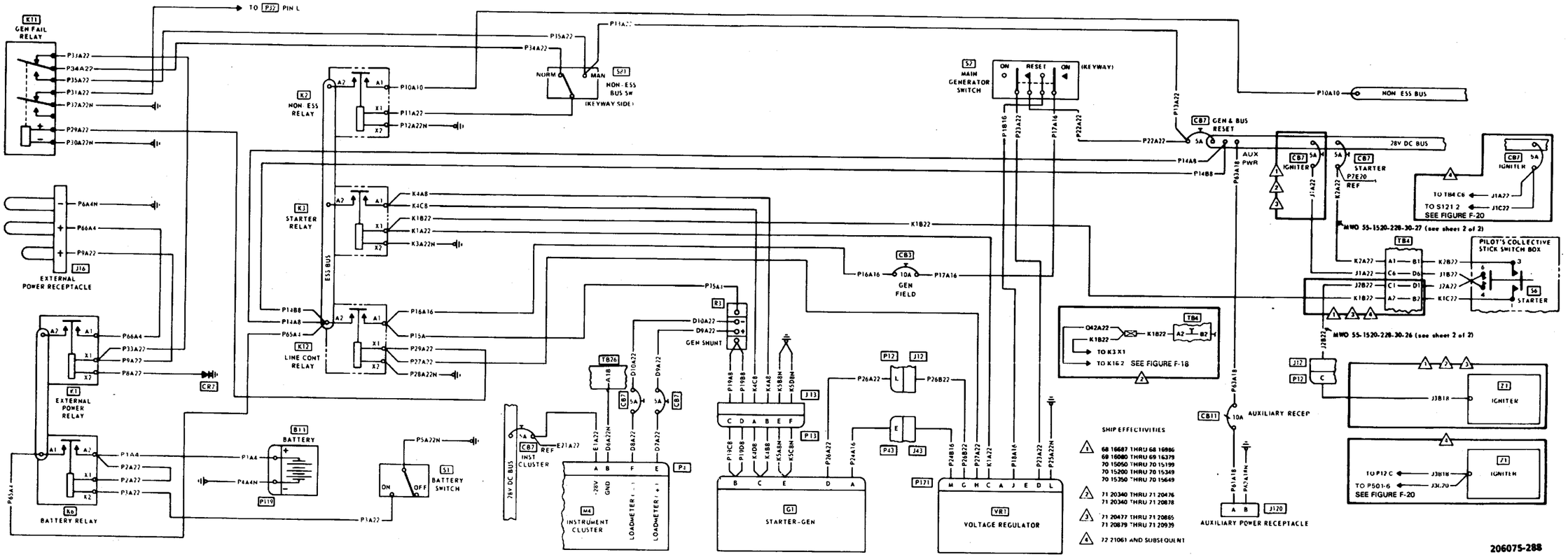
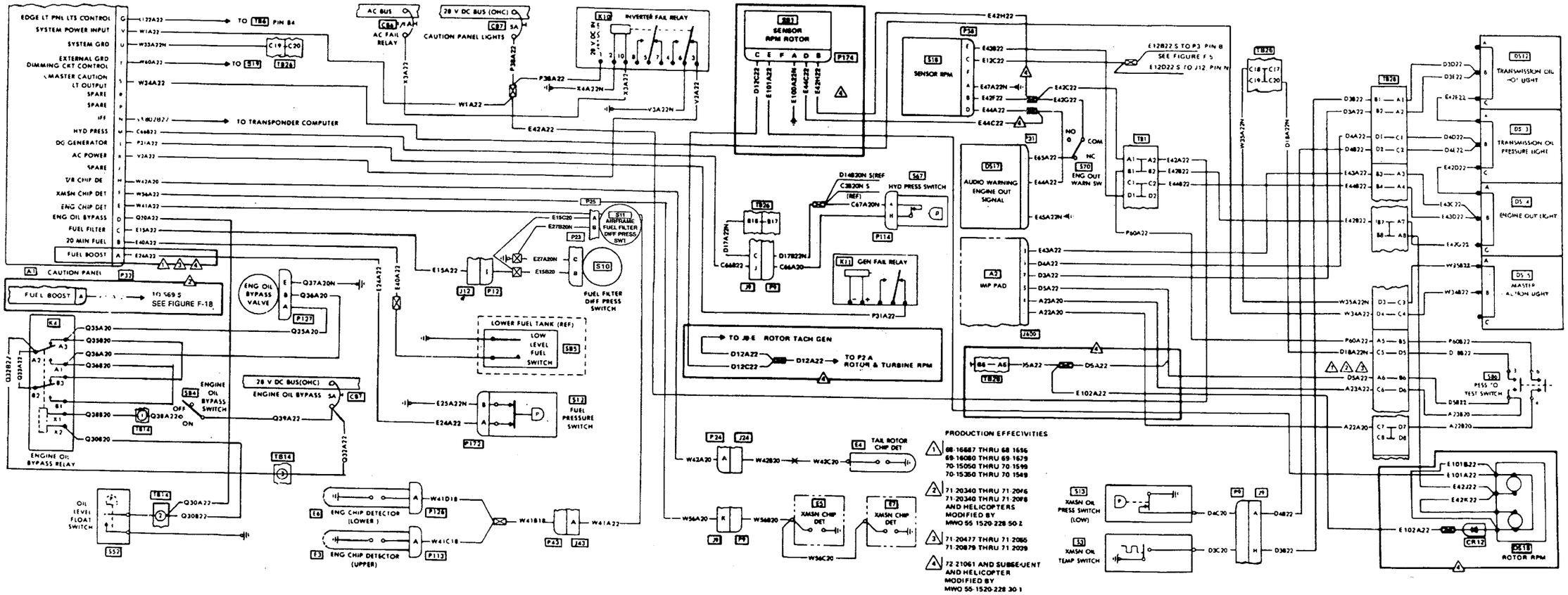


Figure F-8. DC Power and Starter Systems — Wiring Diagrams A



206075-292

Figure F-12. Caution and Warning Light Systems — Wiring Diagram A

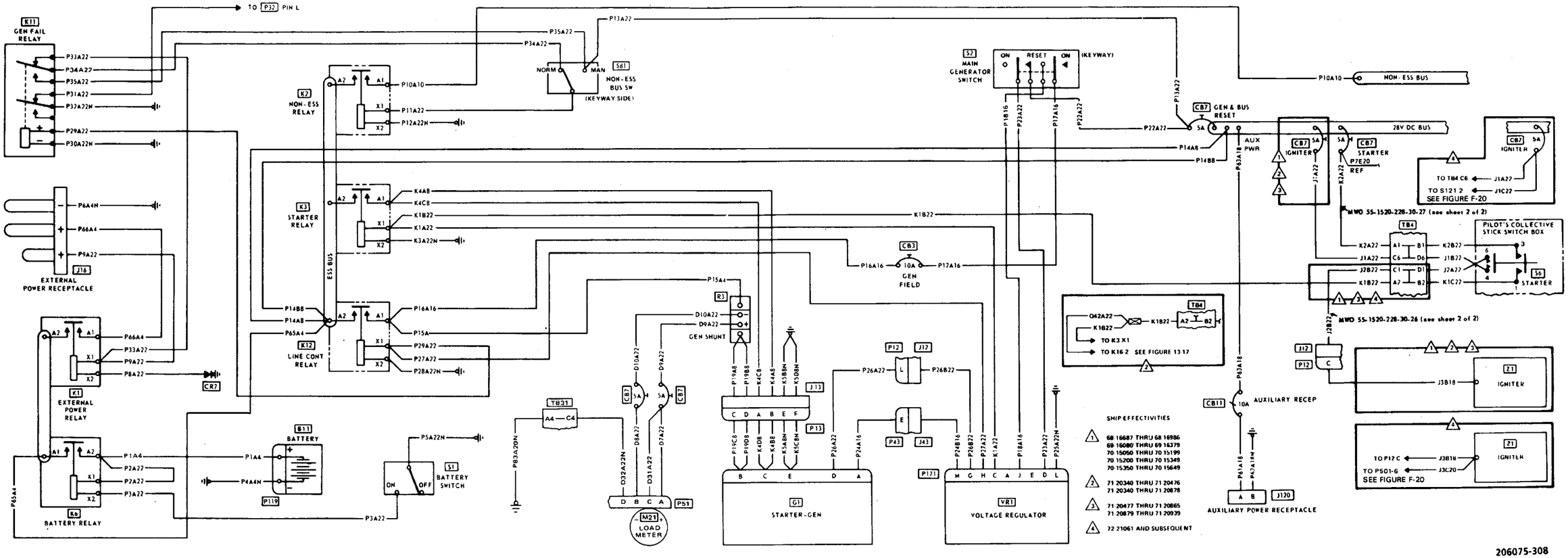


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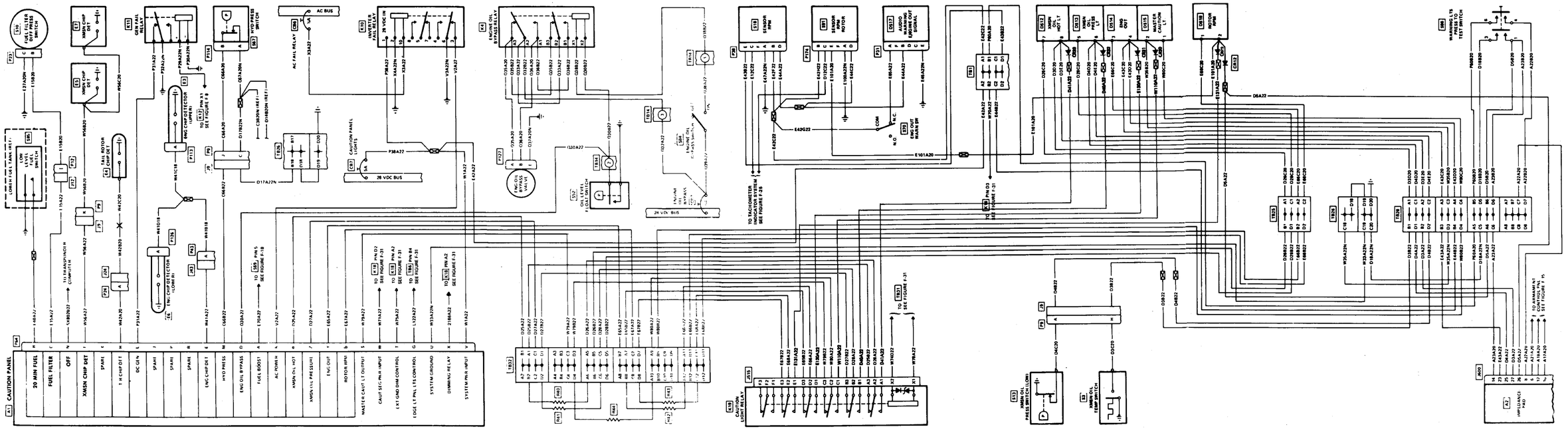
Figure F-28. DC Power and Starter Systems — Wiring Diagram C


CAUTION PANEL
20 MIN FUEL
FUEL FILTER
OFF
XMSN CHIP DET
SPARE
T-H CHIP DET
DC GEN
SPARE
SPARE
SPARE
ENG CHIP DET
HYD PRESS
ENG OIL BYPASS
FUEL BOOST
AC POWER
XMSN OIL HOT
XMSN OIL PRESSURE
ENG OUT
ROTOR BRAKE
MASTER CAUT LT OUTPUT
CAUT SEC PWR INPUT
EXT GND PWR CONTROL
EDGE LT PNL DIM CONTROL
SYSTEM GROUND
DIMMING RELAY
SYSTEM PWR INPUT
FUEL FILTER DIFF PRESS SWITCH
XMSN CHIP DET
GEN FAIL RELAY
HYD PRESS SWITCH
AC BUS
INVERTER FAIL RELAY
28 VDC BUS
ENGINE OIL BYPASS RELAY
SENSOR RPM
SENSOR ROTOR
AUDIO WARN ENGINE OUT SIGNAL
XMSN HOT LT
XMSN PRESS
RMS 2CD
MASTER CAUTION LT
MOTOR RPM
WARNING LTS PRESS TO TEST SWITCH
TAIL ROTOR CHIP DET
ENG CHIP DETECTOR (UPPER)
ENG CHIP DETECTOR (LOWER)
T-H CHIP DETECTOR
ENGINE OIL TEMP SENSOR
ENGINE OIL LEVEL SENSOR
ENG OIL PRESS VALVE
CAUTION PANEL LIGHTS
ENGINE OIL LEVEL SWITCH
ENGINE OIL TEMP SWITCH
XMSN OIL PRESS SWITCH
CAUTION LIGHT RELAY
ENG OUT WARN SW
TO TACHOMETER SYSTEM SEE FIGURE F-28
TO TRANSMISSION COMPARTMENT
TO AIRFRAME COMPARTMENT
TO ENGINE COMPARTMENT
TO TB31 SEE FIGURE F-31
TO J2 SEE FIGURE F-31
TO J3 SEE FIGURE F-31
TO J4 SEE FIGURE F-31
TO J5 SEE FIGURE F-31
TO J6 SEE FIGURE F-31
TO J7 SEE FIGURE F-31
TO J8 SEE FIGURE F-31
TO J9 SEE FIGURE F-31
TO

By Order of the Secretary of the Army:

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Chief of Staff

Official:

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Brigadier General, United States Army
The Adjutant General

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B1		4-3	

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 035017-013